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For my parents,
Shim Poong Sup and Koo Young Ja,
for loving guidance;

For my sister,
Jae Young Shim,
for loyal sisterhood;

For my nephew,
Brendan Jin Tsuda,
for sweetness and laughter;

And for my husband,
Dat Quoc Ly,
for love and faith.

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A standard maxim of sociology is that when individuals come together, they create much more than the sum of their parts. I need only look at this dissertation to understand deeply just how true this is. Some of the most rewarding social interactions I have been privileged to be a part of were the times I spent with the women and men whose lives, perspectives, and insights provided such rich fodder for this research. I am indebted to them for sharing their experiences and words with me, and hope that I have done some justice to their collective wisdom and expertise. I also am very grateful to those who helped me with recruitment: Teresa Juarbe, PhD of the University of California, San Francisco; Marty Lynch, PhD of Lifelong Medical Care; and Sue Chan, MD of Asian Health Services.

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but not only while Howard was away.

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A common image of the graduate student is one of an isolated recluse, leading a hermit-ish kind of existence. A close network of family and friends—kin of the best kind—has saved me from this fate. My aunt and uncle, Lee Hyun-soon and Koo Si-wan, and cousins, Oon-kyung Koo and Hye-mee Park, were an integral part of my childhood in Korea and I am grateful to have them close again here in California. My love also goes to

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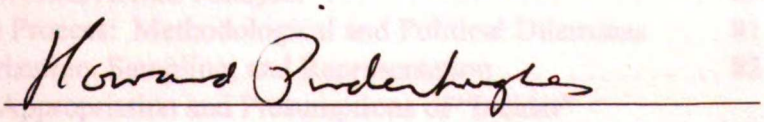
Race, Class, and Gender Across the Science-Lay Divide: Expertise, Experience, and "Difference" in Cardiovascular Disease

Janet K. Shim

ABSTRACT

This dissertation is a sociological examination of the construction of race, social class, and sex/gender in epidemiologic and experiential accounts of cardiovascular disease (CVD) causation. Through in-depth interviews with epidemiologists and people of color with CVD and ethnographic observation, I found that: (1) The epidemiology of cardiovascular inequalities is one contemporary manifestation of bio-power, but one that must work to maintain its public authority in the face of scientific and social challenges; (2) The application of epidemiologic knowledge to the daily lives of people of color with CVD enacts *stratified biomedicalization* in provisional and uneven ways. They negotiate and take up epidemiologic claims with varying degrees of pragmatism, selectivity, and/or resolution, but within a context that constantly demands the mobilization of *cultural health capital*. Cultural health capital is a cluster of skills, knowledges, and attitudes towards one's body and health that we are increasingly called upon to deploy in health-related interactions. I argue that its dynamics serve to exacerbate inequalities in cardiovascular health; (3) The biographical narratives of people with CVD testify to how racial, class, and gender formation processes produce structural dynamics that are central to shaping and stratifying cardiovascular risk; (4) In contrast, epidemiologic knowledge production is characterized by a kind of conceptual devolution, in which structural and multi-dimensional understandings of "difference" are reduced to individual-level,

demographic variables; (5) Further, despite widespread acknowledgment that these variables are conceptually and methodologically flawed, they are ritualistically included in epidemiologic research. This practice is sustained by their construction as "good enough" tools for the job of CVD epidemiology given the need to produce credibility in the face of technical, political, and economic contingencies. These findings detail the contours of what I refer to as a science-lay divide on conceptions of race, class, and sex/gender, and analyze the processes through which this divide is sustained. This research explicates the potential synergism among theories of racial, class, and gender formation; technoscientific knowledge production and lay constructions of knowledge; the social production and stratification of illness; and social conditions as fundamental causes of disease.



Howard Pinderhughes, PhD, Associate Professor & Chair

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Chapter One
Introduction

A. Setting the Stage

An urgent social problem and serious injustice in the domain of health and illness has been the persistence of racial, class, and gender inequalities in health status and their relative imperviousness to biomedical and policy interventions. The arena of heart health and disease is a major field of concern in which clearly documented inequities among social groups have compelled critical debates about and research into the role of "difference" in illness causation and distribution. Cardiovascular disease (CVD) has been constructed as a public health issue of immense significance in the U.S., not only in terms of its overall impact on the general population, but also its disproportionate burden on specific groups. Although mortality rates from heart disease have been dropping since 1970, it remains the leading cause of death in the U.S. and exhibits striking disparities in incidence and outcomes across racial, socioeconomic, and sex groups (American Heart Association 2001a; NCHS 2001). In this context, the science of epidemiology has emerged as one of the premier tools with which to research the causes, and find solutions for cardiovascular disease.

Epidemiology argues that through the scientific study and measurement of population differences, we can come to understand who gets sick and why, and develop appropriately targeted interventions. Embedded within the assumptions, practices, and frameworks of epidemiology are propositions that people and individuals can be

classified in ways that are self-evident and legitimate, that lay dependence upon professional intervention is warranted, and that intervention based on scientifically-produced knowledge can appropriately and effectively address CVD disparities. The conventional approach of much of the extant epidemiologic and biomedical literature on cardiovascular disease constructs race, class, and gender as scientifically legitimated individual risk factors for health status. That is, they are assumed to be characteristics of individuals, as units of analysis, that hold likely explanations for the distribution of illness. But before we can accept the contours of knowledges, ideologies, and practices that underlie such epidemiologic claims, I argue that we must interrogate the meanings of those claims and the social-material consequences they have for broader ideas about race, class, and gender.[1]

Thus, this dissertation takes as its focus the ways in which epidemiology actively participates in the construction of "difference" and its social organization—how it serves as a unique and crucial site of racial, class, and gender formation (Omi & Winant 1994; See also Shim 2000). At the same time, I also examine how alternative, embodied, and experiential knowledges construct meanings of "difference," and how they shape and are shaped by conventions and dilemmas around what race, social class, and gender mean. This dissertation is therefore an analysis of the social construction of race, class, and gender and their effects on health and illness, of what happens to "race," "class," and "gender" when they are incorporated into both scientific and lay accounts on health and disease, and of the subsequent production of a science-lay divide.

---

[1] I want to be clear at the outset, however, that what I do *not* dispute is that important social inequalities in CVD incidence and outcomes do exist, and that these deserve our most serious attention. It is the gravity of existing inequities and the desire to contribute to their eradication that motivate this research.

I chose to focus on the science of epidemiology in particular, for several reasons. First, epidemiology occupies an important and very public role in the U.S., as in most other Western societies. It constructs its mission as the producer of scientific knowledge about disease causes, prevention, and distribution. In doing so, epidemiology often frames its claims in the form of dispensing rational, evidence-based advice to the general population or to specific population groups, and thus inevitably pursues goals of social surveillance, evaluation, and change. In this fashion, epidemiologic knowledge has come to have a kind of everyday salience, as a form of scientific expertise with which people now regularly engage, interact, and negotiate. The assumptions implicit within the practices and frameworks of epidemiology therefore possess the power and the position to social ideas of "difference," making their interrogation and analysis a crucial move.

Second, epidemiology by most accounts is considered the basic science of public health (Petersen & Lupton 1996). It provides the scientific authority for a profession engaged in social processes critical to the construction and maintenance of "difference": classifying individuals and groups, defining particular people and bodies as "problems," and intervening in ways that are simultaneously scientific and political. Numerous scholars (e.g., Armstrong 1995; Edgley & Brissett 1990; Greco 1993; Lupton 1995; Petersen & Lupton 1996) highlight the often oppressive and pernicious effects of such strategies, and the imperatives of health that give rise to them. It is critical, therefore, to trace these practices back to the scientific knowledges in which they are rooted, that is, the discipline of epidemiology.

My concerns here also pivot around the etiological stories of cardiovascular disease in particular, which intrigue me for many reasons. First, not only does CVD lead

all other diseases in its lethality in the U.S., but the striking inequities which characterize its incidence across different populations and groups represent for me a case of health inequality in dire need of social research and political action.

Second, the epidemiology of cardiovascular disease has been integral to the conceptual and methodological development of the larger discipline, establishing emergent investigational designs, legitimating new kinds of data collection strategies, driving the advancement of complex analytic methods, and playing a central role in conflicts over the effects of genetic, biological, lifestyle, environmental, and social factors in disease causation. In addition, social epidemiology, a budding sub-discipline within epidemiology aimed at incorporating considerations of social dynamics in disease, originated largely from studies of CVD, where the potential influence of numerous behavioral and environmental factors seemed as obvious a place as any to begin such research. Thus the centrality of CVD in epidemiology, and, as we shall see, the particular ways in which it affects the epidemiologic management of socio-demographic[2] differences, make cardiovascular epidemiology a key area for investigation.

Third, cardiovascular disease has a great deal of personal significance for me. I am, by most any epidemiologic measure, a "high risk" individual. All four of my grandparents died suddenly of either strokes or heart attacks, three of them while they were only in their early sixties. Both of my parents have one or more of the traditional risk factors for cardiovascular disease. I too have been diagnosed with hypertension, ironically enough, during the course of conducting this research. As a result, I have been

[2] I use the hyphenated term "socio-demographic" as a collective way to refer to differences of race, class, and sex/gender that are simultaneously social relations as well as attributes used to characterize populations in demography and other statistical arenas.

a participant observer in my own and my family's experiences of negotiating among biomedical and biographical knowledges. Because of our respective risk factors, we embody in a singularly immediate way the contradictory desires to scrutinize ourselves and take action, and simultaneously to be rather circumspect about the strategies being promoted that will allegedly control and transform our bodily fates.

Finally, discourses about cardiovascular disease causation are rife with the language of "risk reduction," "risk management," "health promotion," and "lifestyle choices." Given my own and my family's experiences with such imperatives, and learning from other scholars' critical analyses of these discourses (e.g., Armstrong 1995; Edgley & Brissett 1990; Greco 1993; Lupton 1995; Petersen & Lupton 1996), I wished to examine and contest their assumptions and consequences in the empirical case of CVD and cardiovascular epidemiology.

Lastly, before I go on, some comments about the name I have given to my dissertation—*Race, Class, and Gender Across the Science-Lay Divide: Constructing Expertise, Experience, and "Difference" in Cardiovascular Disease*. There are many terms within this title that deserve some explication, especially since the acts and consequences of definition and the social construction of meanings lie at the heart of this project. For the purposes of this dissertation, then, and with the caveat that the intersections of race, class, and gender will be dealt with later in this chapter,[3] I define *race* as a category of identity and social stratification that refers to phenotypic differences, conflated with differences in cultural and geographic origin, and the significance attached

[3] The "official" or standard definitions given to "race," "class" or "socioeconomic status," and "sex" or "gender" in epidemiology will be described and discussed in Chapter 4. I foreground my own understandings of these "differences" here to explicate the theoretical positions taken up in this dissertation.

to each of these kinds of distinctions. The meanings given to race as a general concept or to particular races have been reconstructed over time and across social contexts. At various times, these meanings have included definitions of superiority and inferiority, notions of class and socioeconomic status, ethnic and cultural differences, national ancestry, physical appearance, performative aspects, as well as biological and genetic traits. It must be recognized that these aspects themselves are not static sociohistorical concepts but shift in terms of how they are defined and to what extent they are deemed significant; their meanings are also often constituted with respect to each other and to the historical and material conditions within which racialized groups have lived. In addition, beliefs about what groups constitute legitimate racial categories have changed, appearing, disappearing, and sometimes reappearing throughout U.S. history (Lee 1993). However, notions and consequences of race as a social construction—as postulated by my formulation—have not been incorporated systematically in biomedical and health research. Although a biological basis for race has been officially dismissed since roughly the mid-twentieth century (Cavalli-Sforza 1974; UNESCO 1952), it has not been replaced with a theoretically robust definition of race as a social construct.[4] Nor have such proclamations precluded conceptions of genetic, physiological, and other biologically-informed differences between races from continuing to circulate in the scientific and popular imaginations. The inability to define mutually exclusive groups, inexact measurement methods, the frequent conflation of race with class and ethnicity, and

[4] Often, in fact, this argument is used to assert that race is no longer tenable nor relevant, despite social constructionism's credo that society is a socially constructed reality, a human product (Berger & Luckmann 1966), that effects "real" consequences precisely because things are constructed as "real" (Thomas & Thomas 1970).

historically shifting classification systems have all underscored serious questions of how "race" should be defined, used, and interpreted in health research (e.g., Cooper & David 1986; Hahn 1999; Herman 1996; Kaufman, Cooper & McGee 1997; Krieger & Bassett 1993; LaVeist 1996; Osborne & Feit 1992; Wilkinson & King 1987; 1997; 1996; Williams 1990; Williams & Collins 1995).

Class is defined here as a relational attribute which refers to a group's position within economic structures and processes. Class in my view is thus a social relationship marked by location within modes of economic production (in the Marxist sense) and distribution (in the Weberian sense). It is difficult to specify at the outset exactly what locations are currently salient, given that class categories, like racial ones, are continually renegotiated and thus in flux. However, important elements of class have consistently included measures of income, wealth, occupation, social status, economic power, education, performative aspects, and "cultural" traits and group-specific characteristics that accompany them. While health differences by class, or the more conventionally used "socioeconomic status," are well documented, biomedical and health research has made little progress in adopting a more theoretically informed definition of social class that offers opportunities to explain why they exist and how they are produced (e.g., Adler, Boyce, Chesney et al. 1993; Krieger & Fee 1993; Krieger, Williams & Moss 1997; 1996; Williams 1990; Williams & Collins 1995). The frequent use of social class as an axis of difference in epidemiology, and its general social and sociological conceptualizations, therefore belie the conceptual and methodological difficulties encountered in attempts to understand and interpret the effects of class on cardiovascular health.

I understand *gender* as a way of referring to the social organization of the

distinction and the relationship among groups based on sex. This definition rejects biological determinism, instead emphasizing the relationality and interactions among social processes distinguishing "male" from "female" sex. I argue that these emphases incorporate a contestation of both the binary classification and the criteria by which individuals are categorized within this schema. By invoking the term "gender," I therefore problematize the taken-for-granted notion that all people necessarily and transparently belong to one of two sexes. Gender, in my view, is thus a historical and social construction whose classificatory schemes, performative as well as essentialist criteria, and meanings are constantly policed and negotiated. My use of the term "sex/gender" is intended to highlight and allude to the ways in which the signification and interpretations of "sex" and "gender" both depend on the strategic and ideological mobilization of biological, social, and cultural discourses differentiating women and men. Additionally, I also invoke the hybrid term when referring to, for example, variations in cardiovascular disease incidence and outcomes between women and men; research, as we will see, has concentrated almost solely on biological differences of sex, and therefore the extent to which gender plays a role remains an open question. In most health research not only is "gender" often interpreted and studied as synonymous with biological "sex," but also "gender" is often used instead of "sex" for describing biological factors simply because it is considered a more politically correct term (Fishman, Wick & Koenig 1999; Lewine 1994; Pearson 1996). One consequence of the biological construction of "gender" and the conceptual and lexical conflation of sex and gender is that the role of social and cultural dimensions of difference between women and men in determining health has been sorely neglected.

The terms *science* and *lay*, and *expertise* and *experience* are also invoked in the title of my dissertation, and various forms of these words are used throughout these chapters, often as a shorthand way to refer to the accounts of risk and causation constructed by two groups of participants centrally involved in this research—epidemiologists and people of color living with CVD. My use of these terms is not intended to make any a priori claims about the nature of their perspectives or the content of their knowledge constructions. I conceive that all knowledges are embodied as they emerge out of the particular situations and situatedness of the knowers (Haraway 1989; 1991). I do believe, however, that the accounts of people of color living with CVD are embodied in a way unique from epidemiologists' accounts because they involve people trying to make sense of something that is literally taking place in their body; thus knowledge will always be filtered through embodied experiences. Scientists' understandings about CVD risks and causes are not (necessarily) as explicitly experiential and embodied as those living with CVD; rather the principles and procedures of the scientific method are crucial to their knowledge production.[5] I do not mean to reify any distinctions between "expert" and "lay" (or between "objective" and "subjective") knowledge—a central tenet of my research is that the dominance of science depends upon the successful policing of definitional boundaries between the two. Rather I argue that by virtue of their lived experiences of cardiovascular risk and disease, people with CVD possess a certain kind of expertise, different from that of scientists, and one to which

[5] Of course, epidemiologists may also be living with CVD and thus constructing knowledge via embodied and experiential sources as well as scientific and epidemiological ones. Also, many science and technology studies scholars have highlighted that scientific constructions are always embodied and experiential on multiple levels, and that lay people continually engage with scientific and biomedical framings of disease.

epidemiologic science should attend. Thus scientific and lay ways of knowing are distinct (e.g., Freidson 1970; Mishler 1984; Zavestoski, Brown, Linder et al. 2002), and shape the products of their knowledge construction in ways that I will explore in subsequent chapters.[6] In order to point to these different forms of expertise, I refer throughout this dissertation to epidemiologists as "scientific experts" and people of color living with CVD as "lay experts."

Finally, several other caveats and qualifications apply: First, one might legitimately question why race, social class, and gender in particular were chosen as the "differences" of interest in this project. In this project, while I foreground racial, class, and gender categories, I do not presume that these are the only identities at work. In fact, identities are multiple, fluid, and fragmented, and one's sexuality, family status, religion, and many other dimensions of "difference" can and do variously take on specified meanings and shape one's knowledges. However, I am most interested in those dimensions of "difference"—like race, class, and gender—that have social structural dynamics that potentially affect CVD risk. Race, class, and sex/gender have been made to be materially consequential in multiple ways for cardiovascular health in the past and present, and will likely continue to do so in the future. They are also axes whose social stratification is often studied by sociologists, and are central to epidemiology itself as a discipline. Finally, these characteristics have been targeted by the National Institutes of Health recently, and the Centers for Disease Control and Prevention historically, as being significant factors in the distribution of health and disease. The study of these concepts within cardiovascular epidemiology and the lived experiences of CVD provides a means

[6] See also additional discussion of forms of expertise later in this chapter.

of understanding some of the issues around such health inequalities.

A second caveat is that in focusing this study on people of color, I do not mean to imply that whites have no "race," or that they as a population are not profoundly affected by cardiovascular disease. But in the current era, African Americans, Latinos, and Asian Pacific Americans are targeted (sometimes despite epidemiologic statistics on prevalence, incidence, and distribution[7]) in cardiovascular risk reduction campaigns and in discourses and representations of at-risk populations in ways that whites often are not. Moreover, by arguing that "race," "class," "gender," and "expertise" are socially constructed (and by signaling this argument by placing these terms in quotation marks), I do not mean to argue that they are not "real" or consequential. In fact, I argue precisely the opposite: that it is *because* we assign them significance and meaning that they come to impose real consequences on lived realities.

In the remainder of this Introduction, I first outline the questions guiding this project, and articulate the significance of this research within the context of the existing literature. Next, I provide some nuts and bolts of cardiovascular disease, briefly describing its mechanisms and its stratified incidence and distribution across the U.S. population. I follow with a survey of the theoretical perspectives which inform my work, including theories of racial, class, and gender formation and intersectionality; science, technology, and medicine studies; and finally critical theories in the sociology of health and illness. In closing, I offer a look ahead with an overview of the chapters that follow.

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[7] For example, Asian Pacific Americans have among the lowest rates of heart disease (American Heart Association 2001a).

B. Research Questions and Significance

I considered three sets of research questions through a multi-sited ethnography that includes interviews with epidemiologists and people of color with CVD, and participant observation, as described in Chapter 2. The first set of questions this dissertation addressed is how "differences" of "race," "class," and "gender" are constructed by cardiovascular epidemiologists and by people of color living with CVD. I was interested in understanding how categories of difference are conceptualized and operationalized in epidemiology—that is, how do scientists think about the effects of such categories on cardiovascular health? I also analyzed what people of color who live with CVD and come from various racial, socioeconomic, and gender backgrounds themselves identify as the consequences of their social positions for their cardiovascular health. The incidence of illness usually initiates questions like, "Why me? Why this disease? Why now?" Such questions seek explanatory accounts and frameworks for understanding the causes and determinants of disease, and answers can be framed in biomedical, epidemiologic, social, and relational terms. I therefore asked how do individuals with CVD incorporate their social identities and the nature and consequences of their biographical experiences into their understandings of their risks?

Second, I examined how the meanings given to race, class, and gender in cardiovascular epidemiology are shaped by the assumptions, frameworks, and practices of cardiovascular epidemiology. How are definitions of "difference" managed, stabilized, and enacted in epidemiologic research? What conditions and constraints does the production of epidemiologic knowledge operate under, and how do these configure conceptions of bodily and social "differences"? I explored the various theoretical and

methodological innovations used and challenges encountered by cardiovascular epidemiologists, whether current "tools" at their disposal are sufficient or "right" for the job to be done (Clarke & Fujimura 1992b). I also considered the implications that current practices of the epidemiologic method have for the scientific and social construction of race, class, and gender.

Finally, I analyzed the experiences of engaging with epidemiologic knowledge about the roles of "differences" in cardiovascular risk and cause. How do individuals diagnosed with CVD interact with epidemiologic information about their risk factors? Engagements with biomedical knowledge are rarely simple one-way transfers of knowledge, from scientific and clinical "experts" to so-called "lay" persons. However the social authority accorded to science means that the classificatory practices and claims of epidemiology have the potential to shape the social processes through which categories of difference are constructed, experienced, and made to be consequential (see Bowker & Star 1999). That is, scientific technologies and constructions of race, class, and gender can serve as what Higginbotham (1992/1996: 4) terms "metalanguages" to call "attention to [their] powerful, all-encompassing effect on the construction and representation of other social and power relations." As such, I considered the ways in which epidemiologic knowledge represents and organizes "different" kinds of bodies, is "applied" to human bodies and subjectivities in efforts to reduce disease and sustain health, and the consequences such efforts effect for health and social inequalities.

This analysis of cardiovascular epidemiology is significant for multiple reasons. The role of the biomedical sciences in general in the social construction of racial, class, and sex/gender differences has been an ongoing focus of inquiry for historians and social

scientists (see, e.g., Anderson 1996; Clarke 1998; Duster 1990; Fausto-Sterling 1985; Haraway 1989; Haraway 1991; Jordanova 1989; Krieger & Fee 1994; Martin 1987; Oudshoorn 1994; Stepan & Gilman 1993). However, epidemiology *specifically* has only recently emerged as the foci of social analysis and commentary (e.g., Fujimura & Chou 1994; Krieger & Fee 1994; Petersen & Lupton 1996; Waldby 1996),[8] as have the construction and mobilization of concepts of race, social class, and gender within epidemiology and public health (e.g., Cooper & David 1986; Herman 1996; Jones, LaVeist & Lillie-Blanton 1991; Krieger 1994; LaVeist 1994; Schulman, Rubenstein, Chesley et al. 1995; Williams 1994; 1996; Williams, Lavizzo-Mourey & Warren 1994; Zuberi 2001). Yet "differences" of race, class, and sex/gender have exhibited a continued salience in epidemiologic research.

While there now exists a wide array of biomedical and social science literature that document and speculate on the causes of what I, among others, call the social stratification of health, less attention has been paid to *how* race, class, and gender *themselves* are constructed and mobilized in explanatory accounts of the etiology and distribution of ill health. Even less attention has been paid to the *mutual constitution* of epidemiologic conceptualizations and everyday social constructions of difference and their interactions. In the face of limited research on the social construction of epidemiologic knowledge—a type of knowledge currently accorded considerable and growing influence—this dissertation enhances our understanding of the scientific and social categories by which we organize human bodies to interpret their well-being. My research offers insights into how social, cultural, and political processes shape

[8] See also Bloor (1991), Hacking (1990), and Porter (1986; 1995) on statistics.

epidemiologic knowledge, as well as how epidemiologic claims about disease causation and bodily "differences" influence social ideas about race, class, gender, and illness. Moreover, my analysis of how epidemiologic investigators work with the materials and techniques on hand to produce "data" and "conclusions" about the social distribution of CVD helps to explicate what issues related to conceptions of "difference" remain open to question, and how despite this uncertainty they become stabilized and embedded within epidemiologic practices. This project therefore also has important policy contributions in that it suggests more meaningful ways of conceptualizing, measuring, and interpreting race, class, gender, and studying the relevance and influence of complex social and cultural processes in the production of health.

C. Some Nuts and Bolts of Cardiovascular Disease

Before moving onto outlining the theoretical perspectives which frame this dissertation, a brief overview of the "nuts and bolts" of cardiovascular disease—what it is, the inequalities that characterize its incidence and distribution, and how epidemiologists conventionally account for them—is in order. Cardiovascular diseases are diseases of the heart and blood vessel systems. One such disease is *coronary heart disease* (CHD), a condition where the coronary arteries which provide the heart tissue with blood become occluded and harden, resulting in insufficient blood supply to organs or tissue (ischemia). Such occlusion is usually the outcome of the progressive process of atherosclerosis, in which the inner layer of arteries becomes thickened by fatty deposits and fibrous tissue. This process often leads to chest pain (angina pectoris) and to heart attacks (also termed myocardial infarctions), and is responsible for over half the mortality

in the United States. Another condition is high blood pressure, or *hypertension*, considered to be a risk factor for CHD as well as a cardiovascular disease in and of itself.[9] In this dissertation I use the term "cardiovascular disease" as a convenient way to refer collectively to coronary heart disease and hypertension (although others may define the term differently depending upon the context). Together, these two conditions are a major focus of behavioral risk reduction campaigns, clinical intervention on a patient-by-patient basis, and epidemiologic studies, and as such, coronary heart disease and hypertension constitute the focus of my research.

The epidemiology of coronary heart disease and hypertension reflects the historical shift in public emphasis and concern from infectious diseases to chronic illnesses (Gordis 2000; Hennekens & Buring 1987; Lilienfeld & Lilienfeld 1980).[10] During the twentieth century, in what is termed the *epidemiologic transition*, the label of "epidemic" and the science of epidemiology began to be applied to many of these chronic diseases, including cardiovascular disease. Epidemiology had to adapt to the differing contingencies and dynamics of noninfectious diseases, including accounting for long latency periods, cumulative exposure to risk factors, and multifactorial causation that mark conditions like hypertension and coronary heart disease.

Moreover, not only have epidemics shifted from infectious to chronic illnesses, but also their patterns of incidence and the ways in which they impact some populations more than others have shifted. Earlier in the twentieth century, cardiovascular disease was considered an affliction of "civilization," or a consumerist style of life, in that it

[9] Other types of cardiovascular diseases include rheumatic heart disease (now no longer a major source of morbidity), congenital heart defects, and strokes (cerebral infarctions), which can result from atherosclerosis of the arteries supplying blood to the brain.

tended to increase with modernization, affluence, and rising quality of life. Within societies, available surveillance statistics show that CVD disproportionately struck white, middle- and upper-class groups, particularly men (e.g., Bartley 1985; Marmot, Shipley & Rose 1984; Riska 2000), although this could of course be an artifact of the populations being diagnosed, surveyed, and given medical care. However, another epidemiologic transition of sorts has been occurring: while as recently as the 1950s, heart disease mortality rates were greater among higher social classes, since then, the burden of cardiovascular disease has shifted to the poor and people of color (Antonovsky 1967; Beaglehole 1990). This statistical shift of course may be reflective of numerous social trends: which populations were monitored, who could enter and access health care systems, where detection would and could occur, and whose health was deemed important. Currently, the bulk of the epidemiologic evidence on CVD indicates the continued existence of complex and intersectional racial, socioeconomic, and gender inequalities in incidence, morbidity, and mortality in the U.S. Although a complete description of epidemiologic patterns of cardiovascular disease and its risk factors is outside of the scope of this Introduction,[11] a sampling of some of the complex and intersecting inequalities in the burden of CVD include the following (unless otherwise noted, from American Heart Association 2001a; NCHS 1998):

- African American[12] women and men and Mexican American women have a higher

[10] More on the historical context of epidemiology will be covered in Chapter 3.

[11] The American Heart Association (see, e.g., American Heart Association 2001a) and the National Center for Health Statistics (see, e.g., NCHS 2001) regularly publish reviews and summaries of the current epidemiologic literature on the incidence, prevalence, and distribution of cardiovascular diseases.

[12] Here I refer to various kinds of groups (e.g., "American Indians," "Hispanics") by the category labels used in the primary or secondary sources.

age-adjusted prevalence of both CVD and of CVD risk factors than their white counterparts, even after adjusting for socioeconomic status.

- Among American Indians/Alaskan Natives, over 60% of both women and men have one or more CVD risk factor. (This does not include physical inactivity, and thus probably represents an underestimate of the prevalence of risk factors.)
- Non-Hispanic blacks, both women and men, die from coronary heart disease at higher rates than non-Hispanic whites, even after adjusting for income level.
- The prevalence of hypertension is disproportionately high among African American women and men, Mexican American women, and American Indian women and men. In fact, African Americans' levels of hypertension are among the highest in the world.
- At 25-64 years of age, heart disease mortality was higher for black men than for white men regardless of income. At older ages, however, the death rate for white men was nearly the same or exceeded that of black men at the same level of income. Mexican Americans also suffer from higher rates of heart disease mortality than non-Hispanic whites (Hunt 2002).
- African Americans under 85 years of age, and American Indians, Asian Pacific Americans, and Hispanics under 65 all have higher relative risks for dying of stroke than their non-Hispanic white counterparts.
- Among men 25-64 years of age, heart disease mortality for those with incomes less than $10,000 was 2.5 times that for those with incomes of $25,000.
- People with lower educational and income levels tend to have higher levels of blood pressure.
- Hypertension is more prevalent among men up until about age 55; thereafter, it is

more prevalent among women.

- The poorest women aged 25-64 years were 3.4 times more likely to die from heart disease as those with the highest incomes. This income gradient is much steeper for women than for men.
- The poorest women had death rates from heart disease similar to those of the highest income men.

These statistics reveal that women and men of color carry an especially high burden of cardiovascular disease; people with low socioeconomic status do so as well. Furthermore, the intersecting dynamics of race and social class on sex/gender can significantly moderate and even reverse much of the presumed sex "advantage" in CVD. Moreover, there are indications that the influence of race and class on cardiovascular health is more pronounced for women than for men.

Epidemiologic studies of CVD have tried to account for this complicated picture of cardiovascular health inequalities by pointing to several possible explanations, including differences in the distribution of risk factors for heart disease, inequalities in access to health services and in treatment and medical management, biological/physiological (including genetic) differences, and the potential effects of institutionalized discrimination and other experiences of marginalized social status. First, the uneven distribution of modifiable risk factors like hypertension, obesity, lack of physical activity, diet, smoking, and even diabetes is a popular explanation for social inequalities in cardiovascular disease. The prevalence of these risk factors—at least those institutionalized as the "established" risk factors conventionally used in epidemiologic research—has indeed been shown to differ by race-ethnicity, social class, and gender. For

example, hypertension, a risk factor for coronary heart disease, is higher among blacks than whites (Anderson, Myers, Pickering et al. 1989; NCHS 1998), and higher among men than women until the age of 55 when rates are higher among women (American Heart Association 2001a). Hypertension is also higher among black and Mexican American women than white women (Winkleby, Kraemer, Ahn et al. 1998). The prevalence of diabetes is higher among blacks and Mexican Americans than among whites, and death rates from diabetes are far higher for blacks than whites (American Heart Association 2000). Cigarette smoking has historically and continues to be more common among persons of lower socioeconomic status, with the gap between the most educated and least educated increasing over the past few decades (American Heart Association 2001a; NCHS 1998). Obesity is similarly more prevalent among persons of lower educational status (NCHS 1998), although men of all races do not exhibit a clear income gradient while women do (NCHS 1998; Winkleby et al. 1998). Black and Hispanic women were much more likely to be overweight than white women (American Heart Association 2001a; NCHS 1998; Winkleby et al. 1998). A sedentary lifestyle is also more prevalent among blacks and Hispanics, and it is also strongly related to income for all age, sex, and ethnic groups (Crespo, Smit, Andersen et al. 2000; NCHS 1998; Winkleby et al. 1998). A recent study indicated that many of these disparities in risk factors—including body-mass index, dietary fat intake, blood pressure, and smoking—appear much earlier in the life course than had previously been thought (Winkleby, Robinson, Sundquist et al. 1999).

Second, research into the *treatment* of CVD and its risk factors has documented racial and sex differences (that access to care varies by class seems to be taken-for-

granted and socioeconomic status is used as a control variable in much of this research). For example, Mexican Americans (Hyman & Pavlik 2001) and Hispanics (Sudano & Baker 2001) with hypertension are more likely to go untreated than blacks or whites. Research also reveals that Mexican Americans and African Americans are less likely than whites to receive cholesterol screening (Nelson, Norris & Mangione 2002). Among those screened and found to have high cholesterol, Mexican Americans and African Americans are less likely than whites (Nelson et al. 2002), and women less likely than men (Miller, Byington, Hunninghake et al. 2000), to be take cholesterol-lowering drugs. Studies have also found that people of color have lower age-adjusted utilization rates for higher-technology treatment *after* CVD has been diagnosed. For example, blacks less frequently receive angioplasty (Escarce, Epstein, Colby et al. 1993; Whittle, Conigliaro, Good et al. 1993), cardiac catheterization (Chen, Rathore, Radford et al. 2001; Escarce et al. 1993; Wenneker & Epstein 1989; Whittle et al. 1993), reperfusion therapy for acute myocardial infarction (Canto, Allison, Kiefe et al. 2000), and coronary artery bypass surgery (Escarce et al. 1993; Wenneker & Epstein 1989; Whittle et al. 1993) than do whites, even after controlling for payer source, co-morbidities, and other factors. Differences in cardiac catheterization rates were found to persist regardless of the race of the physician (Chen et al. 2001). Women were also found to be less likely to undergo angiography, angioplasty, and bypass surgery than men (Ayanian & Epstein 1991). In order to measure whether physicians' referral patterns contributed to such disparities, a recent study found that physicians' recommendations for cardiac catheterization were significantly and independently affected by the race and sex of (fictional) patients (Schulman, Berlin, Harless et al. 1999). Specifically, physicians estimated lower probabilities of coronary

artery disease for women than for men, and recommended catheterization less frequently for women than for men and for blacks than for whites, and least frequently of all for black women.

Possible physiological and genetic differences constitute a third dominant explanation used to account for CVD health and outcomes disparities, particularly by race-ethnicity and sex. Indeed, they are sometimes considered the key to understanding the causes of complex diseases like CVD (e.g., Shriver 1997). For example, one study found that black patients with left ventricular systolic dysfunction have higher overall mortality than white patients (Dries, Exner, Gersh et al. 1999), and young African Americans were found to have increased left ventricular mass when compared to their white counterparts (Dekkers, Treiber, Kapuku et al. 2002). Also genetic studies to pinpoint possible genes responsible for racial differences in cardiovascular health, for example, in left ventricular mass and contractility (e.g., Arnett, Devereux, Kitzman et al. 2001; Arnett, Hong, Bella et al. 2001), in hypertension (e.g., Suthanthiran, Li, Song et al. 2000), and in coronary heart disease (e.g., Wu, Aleksic, Ahn et al. 2001), are common. Comparisons across different racial-ethnic groups have also found significant differences in the effects of various risk and other factors on cardiovascular physiology (e.g., He, Klag, Appel et al. 1999; Pristipino, Beltrame, Finocchiaro et al. 2000; Treiber, Jackson, Davis et al. 2000; Woo, Robinson, Chook et al. 1997). Along differences of sex, innumerable studies are aimed at understanding the role of estrogen in coronary heart disease (e.g., Blumenthal, Zacur, Reis et al. 2000; McCrohon, Nakhla, Jessup et al. 1999; Steinberg, Paradisi, Cronin et al. 2000). Current clinical trials of BiDil®, a drug that treats congestive heart failure and the first to be approved by the U.S. Food and Drug

Administration for testing in a specific racial group, being conducted among African Americans, are emblematic of the hopes of researchers investigating biological/physiological distinctions in racial- and sex-specific populations.

Finally, some groundbreaking efforts to contribute to a more explicitly social and theoretical elucidation of how racial-ethnic, class, and gender differences lead to inequalities in the distribution of CVD have been and are currently being made. One study of black males in rural North Carolina found a positive relationship between blood pressure and perceptions that being black hindered one's chances for success among those actively seeking to improve their socioeconomic status (James, LaCroix, Kleinbaum et al. 1984). More recent investigations have analyzed the cardiovascular effects of experiences of discrimination and other potential predictors of discrimination such as skin color, socioeconomic status, and gender (e.g., Klag, Whelton, Coresh et al. 1991; Krieger 1990; Krieger, Sidney & Coakley 1998). These studies are usually grounded within social epidemiology,[13] and work from the hypothesis that experiences of discrimination result in stress and internalized anger that in themselves constitute risk factors for heart disease. Other studies examine potential social, environmental, and dynamic mechanisms through which one's social position and experiences engender heart disease (e.g., Cubbin, Hadden & Winkleby 2001; Diez-Roux, Link & Northridge 2000; Diez-Roux, Nieto, Muntaner et al. 1997; Ford, Ahluwalia & Galuska 2000; Marmot, Bosma, Hemingway et al. 1997; Matthews, Kiefe, Lweis et al. 2002).

The causes of racial-ethnic, socioeconomic, and gender disparities in CVD incidence and outcomes are conceived as most probably multifactorial in nature; therefore

these explanations clearly cannot be considered as mutually exclusive. However, the research resources spent on exploring each of these various hypotheses has not been comparable. Namely, biomedical and epidemiologic research has concentrated most predominantly on identifying biological and physiological explanations for such disparities, measuring differences in the incidence of risk factors between social groups (without questioning why such differences exist in the first place), and documenting inequalities in access to medical treatment. In contrast, studies such as the groundbreaking research described above constitute a minute proportion of the vast amounts of research being conducted on heart disease in the U.S. This body of evidence on the relevance of race, class, and sex/gender in cardiovascular disease therefore raises questions about the ways in which the structuring of research priorities, conventional modes of epidemiologic investigations, and scientific ways of knowing have shaped epidemiologic knowledge production, issues that constitute a focus of this dissertation. I now turn to a discussion of the theoretical frameworks that anchor my analysis of the social construction of expertise, experience, and "difference" embedded within and emerging out of such knowledge production practices.

D. Theorizing "Difference," Scientific Expertise, and Experiences of Risk

This dissertation is intended as a synthetic project that draws upon and elaborates the theoretical interfaces of three conceptual fields: theories of racial, class, and gender formation and intersectionality; science, technology, and medicine studies; and critical perspectives in sociocultural theories of health and illness. These perspectives share a

[13] More discussion of this sub-discipline can be found in Chapter 3.

common element in that each in various ways links micro- and macro-level dynamics of inequality and power, and connects the interactional and negotiated construction of "difference" in everyday life to the enduring social structures of hierarchy within which we live. They therefore lend themselves to an analysis of knowledge production and efforts to theorize how ideas and representations are mutually constituted alongside social processes and institutions that exert material consequences for health. In this section, I provide a discussion of each of these theoretical perspectives.

Theories of Racial, Class, and Gender Formation and Intersectionality

Central to this dissertation is the constructionist and interactionist argument that beliefs about race, class, gender, and their categorization are socially, politically, and culturally defined and performed in interactions. Social constructionism and symbolic interactionism offer theoretical tenets through which the simultaneous flexibility and durability of racial, class, and gender meanings and inequalities can be understood (e.g., Almaguer 1994; Hall 1996; Lowe 1996; Pinderhughes 1997). That people construct "differences" in interactions renders their meanings transmutable and variable, and thus definitions of "race," "class," and "gender" often exhibit distinctive expressions and relations in specific local and historical contexts. I therefore view constructions of race, class, gender, and of particular racial, class, and gender groups as fluid, intersectional social formations, and interwoven in lived experience.

Yet this does not mean that the meanings of such categories are "up for grabs": social structures and institutions shape the situations within which people interact and supply fixed sets of symbols which people use to make meanings of their situations (e.g.,

Blumer 1969). In the U.S., the meanings attached to race, class, and gender, and to specific racial, class, and gender categories, also form taken-for-granted sets of beliefs framed in hierarchical, power-laden, relational, and group-based terms (e.g., Blumer 1958). As Young (1994/1996: 160; see also Collins 1998) observes, "The categories according to which people are identified as the same or different ... carry and express relations of privilege and subordination, the power of some to determine for others how they will be named, what differences are important for what purposes." Such categories and the meanings they carry are used as ideological tools in the exercise of power and as justifications for domination and entitlement, and for marginalization and exclusion. These ideologies structure particular histories of experiences and life conditions that in turn shape exposure to injury and disease and abilities to access resources. In this fashion, constructions of "difference" are made to be consequential. Two sets of theoretical frameworks I have found to be especially useful in explicating these dynamics are racial, class, and gender formation, and theories of intersectionality.

Racial, Class, and Gender Formation

Racial formation theory (Omi & Winant 1994) provides a framework for analyzing the constructions and articulations of race within specific socio-historical contexts and in mutual determination with other axes of "difference" and hierarchy. Omi and Winant define race as a concept "which signifies and symbolizes social conflicts and interests by referring to different types of human bodies ... Selection of these particular human features for purposes of racial signification is always and necessarily a social and historical process" (1994: 55), one that they term *racial formation*. That is, racial

formation is a "sociohistorical process by which racial categories are created, inhabited, transformed, and destroyed" (1994: 55), realized through *racial projects* in which human bodies and social structures are represented and organized. These racial projects serve as the linkages between structure and representation:

> a racial project is simultaneously an interpretation, representation, or explanation of racial dynamics, and an effort to reorganize and redistribute resources along particular racial lines. Racial projects connect what race *means* in a particular discursive practice and the ways in which both social structures and everyday experiences are racially organized. (1994: 56)

Omi and Winant's approach is an explicit attempt to link large-scale social and institutional inequities with practices of signification. As they see it, efforts "to interpret the meaning of race is to frame it social structurally ... Conversely, to recognize the racial dimension in social structure is to interpret the meaning of race" (1994: 56-7). Without an understanding of the historically and socially constructed meaning of race and its ongoing political contestation, they argue, it is "hard to grasp the way racial identity is assigned and assumed, or to perceive the tacit racial dimensions of everyday experience ... [or] to recognize the enduring role race plays in the social structure" (1994: vii).

Omi and Winant's approach moves away from a focus on intentional actions and individual prejudices that have preoccupied many race theorists in the past, maintaining that individual racist attitudes and behaviors, in and of themselves, are insufficient causes of racial inequity, and even well-meaning individuals can participate in the maintenance of racial hierarchies. Instead, in their conceptualization, the ongoing processes and projects of interpreting experiences in racial terms whose synthesis drives racial formation have the effects of shaping institutions and organizations that embed us within

social structures. In and through racial projects, then, the meanings of race, while fluid and unstable, effect material and significant consequences. In so doing, racial formation theory gives equal weight to both representations and structures, discursive practices and institutions, and indeed, theorizes precisely at their junction.

Next, Omi and Winant link racial formation to the evolution of hegemony whereby domination is effected not solely through coercion, but also through the manufacture of consent (Gramsci 1971). Consent is obtained and sustained through the production of and adherence to a system of values and norms that support racial hierarchy. People in the U.S. expect race to be salient and therefore use it in explanatory accounts of social differences among groups of human beings. Moreover, race, class, and gender, in Omi and Winant's view, "are not fixed and discrete categories, and that such 'regions' are by no means autonomous. They overlap, intersect, and fuse with each other in countless ways" (1994: 68). As such, they constitute interlocking "building blocks" of hegemony, with class- and gender-based conflict also linking the ways in which social processes and institutions are organized with how class and gender are represented and signified. Multiple social practices emerge out of systems of racial, class, and sex/gender classification and the ways in which they organize social structures; these practices are so numerous, diffuse, and often unconscious to the point of being almost invisible. That is, race, class, and gender become "'common sense'—a way of comprehending, explaining, and acting in the world" (1994: 60). Ruling groups articulate and maintain a popular system of ideas, practices, and ideologies, incorporating selected but limited aspects of the interests and demands of the subordinate groups, in order to produce and maintain hegemony.

Racial formation's theorizing of the complex and variable linkages between how "differences" are represented, and their material consequences for how social institutions and practices are organized, provides invaluable insights for framing this dissertation. A study of scientific and lay knowledge claims about the effects of bodily differences for cardiovascular health, and the consequences they engender necessarily involves the simultaneous analysis of representations of those differences, as well as their impacts on and the influence of social structures and processes. Epidemiologic knowledge production about disease causation and distribution is one site where the meanings of race, class, and gender are defined and contested. Much as the U.S. Census formulates and debates the meanings of racial categories, epidemiologic research taking place every day constructs and authorizes particular definitions of what race, class, and gender are and what categories are considered legitimate. Cardiovascular epidemiology provides readily available explanations for illness outcomes, and in turn directs future scientific practices and health-related resources along specific lines. As I will demonstrate, epidemiologic science serves as a source of legitimation for ideologies of "difference" that function to maintain inequality. Constructions of race, class, and sex/gender as individual-level phenomena that circulate in and gain authority through the science of cardiovascular epidemiology help to hold in place notions of "difference" that work in the interests of some, and to the detriment and subordination of others.

Moreover, racial formation theory provides a useful tool for thinking about how multiple social phenomena constitutive of racial, class, and gender hegemony—for example racial and gender segregation in the labor force, seemingly distant from bodily matters of health and illness, and theories of disease causation, seemingly the domain of

esoteric science—can produce cardiovascular risk and disease (Pinderhughes & Shim 2001; Shim 2000). As such, the practice of epidemiologic science and the social production of health and illness can be seen to constitute racial, class, and gender projects, significant contributors to a vast, interwoven, fluid, yet durable web of racial, class, and gender formation processes.

Theories of Intersectionality

As alluded to above, I take seriously the notion that "differences" of race, ethnicity, class, sex, and gender are mutually constructed, and thus empirically examine them as interlocking relations of power in the production of both scientific knowledge and cardiovascular inequalities. This project is therefore deeply influenced by efforts to theorize the intersectionality of race, class, and gender, primarily by feminist scholars (e.g., Anzaldua 1990; Collins 1991; 1998; Davis 1981; Frankenberg 1994; Glenn 1985; hooks 1984; 1990; Moraga & Anzaldua 1981; Sacks 1989; Spelman 1988). Many of these theories of intersectionality emerged from third-wave feminism, in which the focal concern was to deconstruct the unified, monolithic category of "women," and attend to differences among them.

An initial step in such theorizing was the elaboration of standpoint theories (e.g., Harding 1993; Hartsock 1983/1997) that postulate the basis for a uniquely feminist perspective. More immediately relevant here are versions of standpoint theory which assert that differences in ideas and knowledge are not simply the outcomes of the different interests of social groups, but "of the differential effects of power in the constitution of subjects" (Swidler & Arditi 1994: 320). Harding (1993: 54-5)

summarizes:

> The starting point of standpoint theory ... is that in societies stratefied [*sic*] by race, ethnicity, class, gender, sexuality, or some other such politics shaping the very structure of a society, the *activities* of those at the top both organize and set limits on what persons who perform such activities can understand about themselves and the world around them ... In contrast, the activities of those at the bottom of such social hierarchies can provide starting points for thought ... from which humans' relations with each other and the natural world can become visible.

More generally, those with lived experiences of being on the margins and in the borderlands are uniquely able to reflect on the taken-for-granted ideologies and experiences of those at the center. However, as noted by Scott (1992), experience itself should not be viewed as unproblematic: it is shaped by social and material circumstances, both a construction and interpretation. But in part because of their positionality, oppressed peoples can generate different, and perhaps more critical questions about the ways in which society is organized, and the practices used to enforce and police such organization (e.g., Anzaldua 1987; hooks 1984).

Individuals and groups who inhabit various intersections of race, class, and gender therefore occupy different locations from which to view everyday life, explain social patterns and structures, and construct knowledge. Theories of intersectionality also argue that subject positions, and their signification and representation, are deeply relational, in that such things like identities, iconic images, and ideas regarding the appropriate roles of one group are constructed in relation to those of others. One is, for example, a compliant and knowledgeable patient—an ideal that is, as I will show, implicitly and often explicitly racialized, classed, and gendered—only in contrast to "others" who are not. In this way,

then, intersectional dynamics of race, class, and gender are what Spelman (1988) calls *interlocking* matrices of power and oppression, where the meanings and consequences of "differences" are predicated upon each other.

I use the concept of intersectionality in this dissertation as a theoretical and empirical commitment to assert and explore the mutual constitution of race, class, and gender in social interactions and institutions. Collins (1998: 208) argues that intersectionality works best as a conceptual framework "describing what kinds of things to consider than as one describing any actual patterns of social organization ... intersectionality provides an interpretive framework for thinking through how intersections of race and class, or race and gender, or sexuality and class, for example, shape any group's experience across specific social contexts." In her view, then, intersectionality should be used as a heuristic device to think through the ways in which social institutions, organizational structures, patterns of social interactions, and other social practices at multiple levels enable, actualize, exemplify, and explicate how social phenomena like race, class, and gender mutually construct one another. For example, as Glenn (1992/1996; 1985) and Higginbotham (1992/1996) point out, race has the ability to fracture the division of labor by gender, and within the gendered division of labor, racial stratification profoundly structures its dynamics and consequences. In such intellectual approaches, the relationality of categories, hierarchical positions, groups, and power are central conceptual arguments and empirical lenses with which one can analyze the world.

I am therefore interested here in analyzing and understanding the simultaneity of these axes of "difference" in lived experience, and the fluid ways in which they overlap, intersect, and operate antagonistically or synergistically. In some senses, it is difficult to

grasp the idea of intersectionality in the abstract, but in examining the practices of epidemiologic science, and the biographical experiences of "difference," health, and cardiovascular risk of people of color, intersectionality is ubiquitously present, effected, and materialized. By framing my work within these theoretical perspectives, then, my analysis of the constructions of "difference" and their effects on cardiovascular risk attends to the dynamics of intersecting racial, class, and gender formation processes in the lives of people of color with CVD, in the situated knowledges they construct and use, and in the shaping of scientific, technical, economic, social, and political conditions of epidemiologic knowledge production.

Science, Technology, and Medicine Studies

Theoretically, this research is also situated within science, technology, and medicine studies (ST&MS). This broad conceptual field offers abundant potential for an analysis of constructions of race, class, and gender differences in cardiovascular disease. First, epidemiologic investigations occur within scientific and biomedical domains, and thus constitute an appropriate analytic site for ST&MS. Numerous scholars (e.g., Anderson 1996; Clarke 1998; Duster 1990; Fausto-Sterling 1985; Haraway 1989; Jordanova 1989; Oudshoorn 1994) using the varied and multidisciplinary approaches of ST&MS have analyzed the dynamics through which race and sex/gender, and sometimes class, have been signified in the biomedical sciences and practices. Second, a hallmark of this field is the problematization of the distinction between sociocultural and

technoscientific[14] worlds. Biomedical and epidemiologic research does not constitute an arena of knowledge production separate from others. Nor can its products be understood as theories and facts revealing a "natural reality" that is detached from the social and political contexts from which they emerge. This is crucial with respect to epidemiologic knowledge, as the diffusion of scientific paradigms and systems of conceptualization must be seen not only as contributing to biomedical constructions of race, class, and sex/gender, but also configuring and reinforcing representations of racialized, classed, and gendered individuals and groups that circulate "outside" biomedicine. That is, rather than being scientific models used only in the laboratory and clinic, biomedical knowledge claims shape broader ideologies of race, class, and gender used in everyday life. Simultaneously, epidemiologic theories and accounts of how race, class, and gender figure in disease risk and causation reflect conceptions of health, illness, and "difference" dwelling in social, cultural, political, and popular imaginations. As such, epidemiology is a technoscientific site where racial, class, and gender orderings are both visible and constitutive, and can effect far-reaching consequences.

This dissertation addresses two concerns currently salient to ST&MS that are critical to my analysis: first, the construction of credibility and the management of scientific uncertainty, and second, notions of expertise and the role of lay knowledges.

The Construction of Credibility and the Management of Scientific Uncertainty

First, ST&MS are centrally concerned with the social practices involved in the

[14] Following Latour (1990), Casper and Koenig (1996), and others, I use the term "technoscience" to indicate an explicit move past previous works and traditions which kept science and technology analytically and conceptually separate. Instead, here I regard these domains as mutually constituted.

making of scientific "facts" and certainty (e.g., Callon 1985; Clarke 1998; Epstein 1996; Fujimura 1996; Garrety 1997; Latour 1987). Fujimura and Chou (1994) identify an "epidemiological style of practice" in which incongruities are common, no one piece of information can adequately define the problem, and information and technologies from many different lines of work are accumulated to vindicate conclusions about disease etiology (see also Star 1986). Consequences of such a style of practice include the tendency for self-authentication, and the obscuring of the social, political, cultural, and historical contexts of scientific claims.

In such a discipline, the management of uncertainty and the manufacture of credibility are key questions. Strategies for controlling ambiguities and conditions within which agreement can be achieved on what constitute "good enough" or the "right tools for the job" (Clarke & Fujimura 1992b) are requisite if scientific practices and claims are to be viewed as credible. For example, scholars in the actor-network tradition (e.g., Callon 1985; Latour 1987; Latour & Woolgar 1986) argue that the stability and form of scientific artifacts are a function of social, natural, and technical elements (Law 1987), and that the analytic focus should be on the work that different actors do and the consequences their actions have on either advancing or undermining scientific claims. To conceptualize the construction of scientific facts, Latour (1987) uses the metaphor of the black box, borrowed from cybernetics where a box with only inputs and outputs is used in diagrams as a quick way of representing some process or piece of machinery. Various discursive techniques function to open or close these black boxes; at the same time, scientists engage in other key processes, including *translation*, where claims are interpreted in terms that other people will take up, and *enrollment*, where other scientists

are enlisted to help produce the facticity of those claims.

However, numerous scholars (e.g., 1996; Fujimura 1992; Hess 1997; Star 1991; Star & Griesemer 1989; Watson-Verran & Turnbull 1995) critique actor-network theory as a top-down approach whereby experts make decisions about the credibility and authority of scientific claims and proceed to enroll allies—much like leaders enrolling armies and politicians enrolling sponsors—in order to seal their facticity. While actor-network theory provides a good account of why winners win and, sometimes, why would-be winners lose, it fails to locate actors and the networks they build within an explicit context of power, including how some actors are excluded from the game, how the playing field is not level, and how resources are, to begin with, distributed unequally (Hess 1997).

I follow works in more interactionist traditions of ST&MS (e.g., Baszanger 1998; Casper 1998; Clarke 1998; Clarke & Fujimura 1992a; Figert 1996; Fujimura 1996; Garrety 1997; 1995; Star 1989) that provide a finer-grained understanding of specifically what technoscientific work and practices entail and how technoscience is concretely "made." Their analyses of science-in-the-making point out that enforcing conceptual and methodological enrollment and consensus is not necessary for cooperative or collective work. Instead they examine how scientific social worlds—"groups with shared commitments to certain activities, sharing resources ... and building shared ideologies about how to go about their business" (Clarke 1991)—come together in arenas of larger concern and align their work through negotiations, debates, conflicts, compromise, and sometimes coercion. Conventions of theory and accepted rules and practices in science are thus "achieved orders" (Fujimura 1996). This line of research potently illustrates that

technoscientific knowledges—often seen as universal, indisputable, consensual, and certain—can in fact be multiple, situated, and perspectival (e.g., Arksey 1994; Clarke & Montini 1993; Figert 1996; Fujimura 1996). Furthermore, their approach takes to heart the co-construction of theories and representations with methods and so empirically highlights the dynamics of the mutual constitution of scientific concepts and practices.

Interactionist scholars have proposed several concepts that capture the ways in which scientific uncertainty can be managed. While I discuss them in greater depth in later chapters, I will briefly describe three such strategies that prove especially illuminating when considering the case of the cardiovascular epidemiology of racial, class, and sex/gender differences: boundary objects, triangulation, and technical downshifts.[15] Boundary objects (Star & Griesemer 1989) are scientific objects that have the dual properties of plasticity and integrity such that they can "inhabit several intersecting social worlds ... and satisfy the informational requirements of each of them" (1989: 393). Such objects allow for collective work to proceed without requiring complete consensus because they are robust enough to maintain a common identity across sites, yet flexible enough to adapt to the local needs of any one site. Triangulation (Star 1985; 1986) is another mechanism for handling ambiguity by attributing certainty to other fields. As evidence is collected from several areas at the same time, each referring to the others, lines of proof become entangled, and local ambiguities are rendered invisible. Finally, certainty is constructed through downshifting from more threatening, fundamental questions about the legitimacy of a particular scientific approach, theory, or

[15] I thank Adele E. Clarke for suggesting the phrase "technical downshifts."

claim, to internal debates over technical and methodological issues that have less potential to undermine the basic argument (Star 1985).

As Petersen and Lupton (1996: 33) note, epidemiologic research "like any other form of 'fact' generation ... is a practice of constructing 'problems', defining them and proposing ways of dealing with them in the context of 'ways of seeing' which shape the 'facts' that consequently emerge." These strategies for manufacturing credibility are crucial foci for analyzing the social, cultural, technical, and political processes by which "ways of seeing" race, class, and sex/gender in cardiovascular epidemiology are constructed, "problems" of "differences" or "inequalities" get defined, and methods for approaching them are selected.

The Maintenance of Boundaries Between Expertise and Lay Knowledges

Another major theme in science, technology, and medicine studies with which this dissertation engages is research on the social construction of expertise, lay knowledges, and the public understanding of science (e.g., Arksey 1994; Balshem 1993; 1997; Brown 1987; Cozzens & Woodhouse 1995; Epstein 1996; Irwin & Wynne 1996c; Jasanoff 1990; Martin 1987; Popay, Williams, Thomas et al. 1998; Watson-Verran & Turnbull 1995; Wynne 1995; Zavestoski et al. 2002). My research is situated among scholarly efforts that, as Wynne (1995: 375) describes, attempt

> to examine the influence of social contexts and social relations upon people's renegotiation of the "science" handed down from formal institutions as if already validated and closed ... A common thread in all this research is the encounter of different cultures: on the one hand, scientific culture, which tends to reduce issues to those of control and prediction within the terms of the scientific field in play, and on the other hand, social worlds that reflect fundamentally different

> models of agency and also recognize many more cross-cutting and open-ended agendas and interests beyond those embodied in scientific discourse.

These critical perspectives assert that explorations of how people experience "science" and "technology" in everyday life illuminate the taken-for-granted norms, frameworks, epistemological assumptions, and interests of technoscientific knowledge, and challenge its representation as universal, politically neutral, and an undistorted reflection of "natural reality."

This tradition in ST&MS is thus concerned with both analyzing the situated knowledges of lay people, shaped by their social positions, and asserting science as *itself* a situated knowledge. In this concept of situated knowledges, Haraway (1992; 1991) seeks to reclaim the metaphor of vision from discourses and practices that have used it to "signify a leap out of the marked body and into a conquering gaze from nowhere" (1991: 188) and instead pay attention to the particularity and embodiment of all vision. Situated knowledges "do not *reflect* but rather *diffract* what is before them ... [they] do not *reproduce* what is already given but rather *regenerate* contested and contestable 'novel forms'" (Prins 1995: 354). They are partial, clearly situated as being *from* somewhere, and in this fashion held to account. I note here that my own use of standpoint theory and situated knowledges is not to argue that some have "clearer" and "better" views from their position than others, but that they have different and distinctive ones. People of color and other groups are in a no more epistemologically privileged position than are scientists; instead knowledge for *everyone* is partial and situated.

Once scientific knowledge is understood to embody its own culture and particular, normative ways of seeing and interpreting the world, we can understand the equation of

"science" with "expertise" as a socially constructed order. Works in ST&MS that question "expert" and "lay" distinctions therefore take seriously the notion of the mutual constitution of scientific and lay knowledges, problematizing "the supposition of an objective boundary between science and the public domain, as if for example knowledge and cognitive influence only flow one way" (Wynne 1996a: 75). Some social analysts of science and medicine (e.g., Haraway 1997; Star 1991; Watson-Verran & Turnbull 1995) have criticized others for using an "executive approach" in which only scientists and professionals figure as significant actors, and for failing to grasp the political nature of scientific enterprises and work toward change. These critics argue that power relations are deeply embedded, yet fluid, in the making of scientific knowledge, and that alternative knowledge systems must be made to interrogate each other. The experiential expertise of people of color who live with CVD—as individuals implicated by axes of power like race, class, and gender—can therefore serve as a critical contribution as well as potential counterpoint to epidemiologic knowledge.

In this dissertation, I explore how individuals with CVD view the usefulness or relevance of epidemiologic knowledge about "risky differences," and how their social contexts and experiences shape their integration and negotiation of that knowledge in their everyday lives (see e.g., Balshem 1993; Lambert & Rose 1996; Martin 1987). In interpreting and making sense of their personal bodily experiences of illness generally and cardiovascular disease specifically, individuals may call upon biomedical concepts and explanations that are the products of epidemiologic practices. In the process of using these concepts, individuals situated in different contexts inevitably test the utility of those theories in explaining the cause, nature, and resolution of their and others' illness

experiences. They may subsequently modify, negotiate, or even reject such knowledge claims to better comprehend the circumstances of their own lives and what, through their lived experiences, they believe to be true. Their understandings of health and disease, as I alluded to above, can be conceptualized as a form of expertise distinct from those of scientists, with different bases and ways of knowing rooted in embodied experience. Martin (1987: 197), for example, argues that women—whose bodily experiences are often denigrated by biomedical claims, characterizations, and metaphors—"have it literally within them to confront the story science tells with another story based in their own experience."

Moreover, despite the demonstrable statistical inequalities in cardiovascular risk, current attention to disadvantaged groups is often perceived by them as inherently suspect, given the historical, often violent uses of their bodies in the interests of biomedical knowledge production, surveillance, and stigmatization (e.g., Handwerker 1994; Jones 1993; Krieger & Fee 1994; Shavers-Hornaday, Lynch, Burmeister et al. 1997). History, perceptions of trust, and identification with scientific practices and institutions are therefore seen here as critical in shaping responses to epidemiologic knowledge (e.g., Wynne 1996b). These theoretical concerns encourage attention to people's relationships with epidemiologic and biomedical institutions, the influence of social contexts and relations on knowledge production and uptake, individuals' renegotiation of scientific claims, and the conditions that engender sometimes paradoxical responses of acceptance, trust, and/or ambivalence.

Situating my research within this strand of ST&MS thus forges links with theories of racial, class, and gender formation in that it attends to the connections between

knowledge and power. Knowledges are stratified, that is, some knowledges and their claimants have markedly more political, social, cultural, and economic power than others. As Collins (1998: xii-xiii) cogently remarks:

> Separating questions of what counts as knowledge from questions of who decides what knowledge is—in effect, severing epistemology from power—privileges elites ... It is not that elites produce theory while everyone else produces mere thought. Rather, elites possess the power to legitimate the knowledge that they define as theory as being universal, normative, and ideal. Legitimated theory typically delivers tangible social rewards to those who possess it. Elites simultaneously derogate the social theory of less powerful groups who may express contrary standpoints on the same social issues by labeling subordinate groups' social theory as being folk wisdom, raw experience, or common sense.

Knowledges constitute integral elements in the construction and maintenance of hegemony, and examining questions of who has the power to know, and what kind of knowledges count as valuable, legitimate, and real therefore represent core concerns of this dissertation. Through interrogating such issues, my research seeks to understand how the social constructions of scientific knowledge, biomedical practices, and definitions of "expertise" contribute to the stratification and inequalities of health.

Critical Perspectives in the Sociocultural Theories of Health and Illness

A final area of social inquiry central to the theoretical framing of this dissertation is critical perspectives in the sociology and anthropology of health and illness, specifically the literature on health and governmentality (e.g., Castel 1991; Foucault 1991; Gordon 1991; Lupton 1999; Petersen 1997; Petersen & Lupton 1996; Turner 1997), biomedicalization theory (Clarke, Fishman, Fosket et al. 2000; Clarke, Shim, Mamo et al. 2002), attention to the agency, embodiment, and experiences of lay patients

and consumers (e.g., Charmaz 1992; Conrad 1987; Kleinman 1988; Lock 1993; Ortner 1995; 1991; Scheper-Hughes & Lock 1987; Zola 1991), and the concept of social conditions as fundamental causes of disease (Link, Northridge, Phelan et al. 1998; Link & Phelan 1995; 1996). I discuss each of these in turn below.

Governmentality

The concept of governmentality draws heavily upon Foucauldian notions of biopower and power-knowledge and social analyses of risk (e.g., Armstrong 1995; Castel 1991; 1995; 1999; Lupton 1993; Petersen 1997). Foucault's (1975; 1986; 1977; 1991; 1978; 1980) works are marked by his ongoing concern with the emergence of a new kind of "micro-physics of power" in eighteenth- and nineteenth-century Western societies. During this period, he argues, dominant mechanisms of power shifted from coercion and ritualized public punishment to surveillance and normalization. He views this shift not as a curious historical accident, but as the direct result of the construction of various "problems of population" (e.g., birthrate, longevity, public health, and housing), the simultaneous development of several fields of knowledge, and the refinement of more diverse and efficient techniques of human control (Foucault 1978). Governments perceived that they were dealing not merely with individual subjects, but with a population characterized by specific phenomena and its own particular economic and political problems. This new concept of "population" constituted, in Foucault's mind, one of the innovations that helped to usher in the modern era of *bio-power*.

The exercise of power aimed at disciplining the population became the objective and the effect of new types, or disciplines, of knowledge such as demography, public

health, statistics, and medicine. In these new fields, power and knowledge can be seen as mutually productive: "the formation of knowledge and the increase of power regularly reinforce one another in a circular process" (Foucault 1977: 224). Foucault captures the nature of this relationship in his concept of *power-knowledge*. Bio-power refers then to a new form of power-knowledge that operates as "an agent of transformation of human life" (Foucault 1978: 142-3), engaged with the regulation and distribution of human bodies in the domain of value and utility. In particular, the application and exercise of bio-power leads to the description, comparison, and arrangement and distribution of individuals, and their bodies, sensations, and behaviors. Bio-power fixes and renders individual differences "scientific," pinning individuals—arrayed around constructed notions of the "norm"—down in their particularity. As Foucault saw it, power, in contemporary society, constitutes a "political anatomy of the body," in which apparatuses and technologies exert diffuse yet constant forces of surveillance and control on human bodies.

Governmentality is the strategy and rationale for exercising this kind of power in contemporary Western societies. As a set of technologies of power, governmentality works in ways similar to hegemony (Gramsci 1971) in that it does not rely upon coercion alone, but also upon diffuse mechanisms in which individuals comply by surveying and regulating themselves (Foucault 1991; Gordon 1991). By focusing on our relationships with ourselves, with others, with social institutions and communities, and with the state, and promoting the pursuit of happiness and healthiness through certain modes of personal conduct, governmental discourses position us to govern, police, and normalize ourselves. The concept of governmentality thus attends to the ways in which contemporary

mechanisms of power so frequently operate through trying to shape what Foucault calls "technologies of the self":

> "self-steering mechanisms," or the ways in which individuals experience, understand, judge, and conduct themselves. Technologies of the self take the form of the elaboration of certain techniques for the conduct of one's relation with oneself, for example, requiring one to relate to oneself epistemologically (know yourself), despotically (master yourself), or in other ways (care for yourself) ... they are always practiced under the actual or imagined authority of some system of truth and of some authoritative individual. (Rose 1996: 29).[16]

Significantly for this research, governmentality is guided by expert knowledges that seek to monitor, observe, measure, and normalize individuals and populations, and their relations with a diversity of phenomena. Rose (1996: 25-8) proposes a series of questions or pathways for an investigation of these practices of governmentality:

> Where, how, and by whom are aspects of the human being rendered problematic, according to what systems of judgment and in relation to what concerns? ... What means have been invented to govern the human being, to shape or fashion conduct in desired directions, and how have programs sought to embody these in certain technical forms? ... Who is accorded or claims the capacity to speak truthfully about humans, their nature and their problems, and what characterizes the truths about persons that are accorded such authority? ... How are these procedures for regulating the capacities of persons linked into wider moral, social, or political objectives concerning the undesirable and desirable features of populations, work force, family, society?

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[16] Foucault's (1975) metaphor of the Panopticon is also useful to think about here. Panoptic architecture is comprised of a central tower surrounded by a circular arrangement of cells in which individuals are isolated from one other while remaining completely visible to an observer in the central tower. In fact, ideally, individuals in the cells cannot ascertain whether anyone is actually in the tower; however because the individuals themselves are immediately visible, they conduct themselves *as if* someone is always observing them. This arrangement is therefore structured such that the regulation of individual bodies and conduct no longer depends upon the actual presence or specific identities of dominating agents. Panoptic forms of knowledge and discipline thereby place power relations within the everyday lives of humans by creating normalizing imperatives used to effect the *self*-judgment and *self*-surveillance of individuals and groups. Thus power is automatically "built in" and much more mobile, no longer dependent upon specific relationships between particular individuals.

The central concerns of governmentality thus emphasize the key roles played by expert knowledges and technical expertise. That is, the power relations exercised through governmental strategies are embedded within the dynamics of who can authoritatively define "problems," judge humans, shape conduct, and establish the systems of knowledge and criteria by which we do so. Disciplines like epidemiology that render individuals and populations thinkable, calculable, and therefore governable, and their practitioners are critical to (self-)surveillance and (self-)regulation.

These arguments invite a consideration of the power-knowledge relations and strategies of governmentality that underwrite contemporary discourses on health and risk, and the discursive connections that are made to concepts of race, social class, and gender in biomedicine and epidemiology. Indeed, historically, biostatistics and the collection of health-related data were instrumental in the rise of governmentality. The logic of contemporary epidemiology rests on the comparison of categories of individuals characterized by particular demographic, behavioral, and other factors, and the determination of which factors are associated with excess morbidity and mortality. To the extent that race, socioeconomic status, and sex enter into the analysis (and, as I will argue, they do so routinely in contemporary epidemiologic practice), individuals are grouped into categories, and often homogeneity within categories is assumed. I also show that measures such as race, socioeconomic status, and sex are constructed as proxies for, and presume the existence of, genetic, behavioral, and other essentialized determinants of susceptibility. In so doing, epidemiology produces knowledge that in turn, is translated into imperatives and mandates for self-surveillance and self-transformation in order to reduce such risks. As such, epidemiology represents an example of governmentality—

"government at a distance" (Lupton 1999: 97).

Biomedicalization Theory

My research is situated within a second theoretical framework from the sociology of health and illness—biomedicalization theory (Clarke et al. 2000; Clarke et al. 2002). Based also upon the conceptual insights of Foucault and ST&MS, as well as of the sociology of knowledge, my colleagues and I (Clarke et al. 2000; Clarke et al. 2002) have elaborated what we call *biomedicalization* as both a description of a set of social, technical, and organizational processes and transformations currently taking place within the domain of health and biomedicine, as well as a theoretical concept with which to understand such changes. The concept of biomedicalization shares with medicalization the notion of expanding professional medical jurisdictions, but understands such changes as accomplished largely through the application of both clinical and organizational innovations produced through the current and ongoing technoscientific revolution. Medicalization is intensifying in new, multi-directional, and complex ways, made possible by technoscientific transformations that require fresh theorization. For example, new diagnostics and treatments enabled by biotechnology, biochemical engineering, genomics, new computer-based visualization technologies, computer-assisted drug developments, and evidence-based medicine are some of the ways in which the technical, organizational, and institutional infrastructures of biomedicine are being remade. We therefore argue that biomedicine is being reorganized not only at the macro, but also at the micro and meso levels, and not only from the top down or the bottom up but from the inside out.

We identify five key, overlapping processes through which biomedicalization occurs: (1) political economic transformations of the biomedical sector; (2) the elaboration of risk and surveillance biomedicines; (3) the technoscientization of biomedicine; (4) transformations of biomedical knowledge production, information management, and distribution; and (5) transformations of bodies and the production of new individual and collective technoscientific identities. While those aspects of biomedicalization most pertinent to specific findings of this dissertation will be discussed further in later chapters, I briefly overview all five processes here.

First, vast economic and organizational shifts have fundamentally changed the health care marketplace over the last three decades and facilitated the expansion or transformation of biomedical jurisdiction. For example, biomedicalization works through the devolution of health services, where increasing expectations of and reliance on self-evaluation and monitoring of one's risks and health conditions, self-diagnosis, and self-treatment are gradually displacing public and private provision of medical services. Thus even as clinical observation and management decline, expanding aspects of our everyday lives are biomedicalized in attempts to reduce risks and prevent costs. Here, epidemiologic knowledge has been integral to identifying factors and conditions whose treatment can be devolved from the clinic to the home, and in doing so, legitimating and rationalizing the phenomenon itself.

Second, risk and surveillance practices have emerged in new and increasingly consequential ways, shaping both the technologies and discourses of biomedicalization as well as the spaces within which biomedicalization occurs. The ways in which notions of risk and technologies of surveillance discipline bodies are no longer contained in the

hospital, clinic, or even within the doctor-patient relationship (Armstrong 1995; Waitzkin 1991). Rather, constructions of risk factors, techniques of self-surveillance, and linkages between health and morality are today taken-for-granted features of daily life for each of us as individuals and for some of us as members of particularly targeted groups. Not only the presence of disease or symptoms are being biomedicalized, but health itself, as we encounter ubiquitous mandates and exhortations to maintain and promote our health (e.g., Crawford 1985; Greco 1993; Nettleton 1997; Williams 1998). Epidemiology is a key contributor and exemplar of this form of biomedicalization, providing the evidence base for new elaborations of risk and standardized techniques of self-surveillance.

Third, increasingly technoscientific innovations and practices of medicine are also facilitating and promoting biomedicalization. Major advances in computerization and data banking, and subsequent innovations in record keeping, access, and organization are allowing patient data—now in increasingly standardized formats—to be used to produce treatment regimens, decision support technologies (Berg 1997), and outcomes research. Epidemiology itself is profoundly dependent upon computer and data storage technologies. In another example, molecular biology, genomics (the study of genes and their functions), and now proteomics (the study of the set of proteins encoded by a genome) are making possible new forms and areas of epidemiologic prediction, for example, in the form of genetic epidemiology where populations of families are mined for linkages between conditions and genetic anomalies. These changes are occasioning major shifts in the social organization of biomedicine, the objects of biomedical knowledge production, the ways in which biomedicine intervenes, and the objectives with which it does so.

Fourth, the production and transmission of health and medical knowledges are key sites of biomedicalization in terms of both the transformation of their sources of production and dissemination and the reformulation of who is responsible for grasping such knowledges. Entities as heterogeneous as federal and state governments, pharmaceutical companies, grassroots movements in alternative health, and medical organizations are all now in the business of providing health-related information in many different media and forms, though with very divergent intentions and standpoints. The distribution of epidemiologic results and claims is emblematic of this new diversity and omnipresence, appearing in newspapers, popular magazines, and websites, as well as in the pages of the usual scientific journals. Moreover, as access to biomedical knowledges has widened, the shifts in the allocation of *responsibility* for grasping such information has been profound.

Fifth and finally, biomedicalization is effected through the transformation of bodies and production of new individual and collective identities. There is an extension of the modes of operation of medical research and clinical practice from attaining "control over" bodies through medicalization techniques of labeling disease and concomitant medical intervention, to enabling the "transformation of" bodies to include desired new properties and identities (see Clarke 1995). As a Foucauldian technique, regulation through biomedicalization works "from the inside out" as a type of biomedical governmentality achieved through alterations of biomedicalized subjectivities and desires for transformed bodies and selves. The biomedical governmentality to "know thyself" and "heal thyself" that is associated with the dissemination of epidemiologic knowledge and health promotion rhetorics based on them often rely on a neo-liberal and consumerist

discourse to be "proactive" and "take charge" of one's health. At the other end of the spectrum, epidemiologic knowledge is also being used to identify those classes of individuals and categories of bodies that are especially "risky," and therefore for whom tailored technoscientific and behavioral interventions are particularly advisable and desirable (Shim 2000; 2002).

Agency, Embodiment, and Illness Experience

A third domain of the sociology of health and illness central to my theoretical positioning is the study of the experiences of illness and the agency of people within biomedical and health contexts. Such concerns originate within interactionist and constructionist traditions in sociology (e.g., Berger & Luckmann 1966; Blumer 1969; Strauss 1993; Strauss, Bucher, Erlich et al. 1964; Strauss & Glaser 1975) and their subsequent uptake in medical sociology, constituting a fundamental shift in theoretical focus that displaced earlier functionalist perspectives that conceived the role of the ill person solely as patient (1961; 1975; Parsons 1951). Instead, the individual is seen as a reflexive, expressive, and embodied being, and knowledge and social action as emerging out of the interactions and experiences of individuals in everyday life. Hence, while knowledges and social interactions become routinized and often follow taken-for-granted sequences, the potential for revision and transformation are inherent within interactionist-constructionist conceptions of social action.

This line of inquiry takes as its focus the embodiment of people (e.g., Gordon 1990; Kirmayer 1992; Lock 1993; Scheper-Hughes & Lock 1987; Turner 1992; Zola 1991), the work that those with illness do to manage and live with it (e.g., Becker 1997;

1992; Charmaz 1983; Hunt, Browner & Jordan 1990; Hunt, Jordan & Browner 1989; Kelly 1992; Mamo 1999; Timmermans 1994), and the meanings of illness from their perspectives and their conceptions of "what's wrong" (Hunt, Jordan & Irwin 1989) based on their lived experiences (e.g., Becker & Kaufman 1995; Garro 1994; Hunt, Jordan & Irwin 1989; Kelly 1992; Mattingly & Garro 2000; Olesen, Schatzman, Droes et al. 1990). My own formulation of people of color with CVD as "experts" and as producers of critical knowledge about disease causes and risks thus borrows from this rich tradition of research. The guiding principle here is that the study of the experiences of "insiders" and their indigenous, first-hand knowledges reverses the previous usual tendency to take doctor-centered or professionally-oriented views of sickness as "facts." Such new theorizations also attend to the multitude of social construction processes, relationships, and interactions that shape illness experiences, rather than taking for granted the nature of diagnostic categories, claims, and medical science, and presuming that biomedically-defined symptoms and outcomes of a disease constitute its "reality." This work thus provides crucial insights into not only the institutions, discourses, and interactions around health but also broader sociological issues of meaning-making, agency, and situated knowledges as well.

Much like ST&MS research into lay knowledges, studies of illness experience also foreground the situated knowledges of those living with disease (e.g., Abel & Browner 1998; Arksey 1994; Balshem 1993; Charmaz 1992; Fosket 2000; Hunt et al. 1990; Hunt, Jordan & Irwin 1989; Ong 1995). Rather than being passive vessels to be filled by scientific knowledge dispensed by biomedical experts, people with CVD can be conceptualized as agential subjects, interpreting their experiences, making meaning of

their illness within the context of their social conditions and circumstances, and constructing frameworks about the causes and dynamics of their disease. Their particular vantage point—as one with embodied and first-hand experiences with illness, intersecting with multiple, other "differences" that shape their lives—affords them distinctive positions from which to view medicine and illness and produce knowledges about it.

Critical perspectives on illness experience also problematize traditional notions of agency and resistance to biomedicine in several key ways (e.g., Ong 1995; Ortner 1995; Scheper-Hughes & Lock 1991). First, resistance or compliance is not assumed to be coherent or uniform even within the same individual or across time and contexts, but rather provisional, uneven, and possibly contradictory. For example, Lock and Kaufert (1998a) argue that in analyzing the complexities of women's relationships with biomedical technologies, that they should neither be viewed as passive, responding to technologies in culturally determined ways, and unable to reflect on their own conditions, nor as inherently suspicious of and resistant to biomedical interventions. Instead, they suggest that "ambivalence coupled with pragmatism may be the dominant mode of response" (1998a: 2).

Second, enacting agency may look very different than wholesale rejection of biomedicine. Active resistance is not the only form of agency possible, rather even passive behavior must be analyzed within the context of the constraints to action women and men face and the extent to which options and choices are available to them (e.g., Hunt, Jordan & Browner 1989; Lock & Kaufert 1998a; Ong 1995). People take up, deflect, and dismiss biomedically-prescribed strategies of health in selective and often contradictory ways and for ambiguous reasons. There are a

> vast array of culturally-shaped resistance-like behaviors, responses on the part of individuals to inchoate feelings of a lack of justice, distress, exploitation, and so on ... research into the lived experience and pragmatics of behaviors by those who ostensibly lack power is essential, if the subtleties of compliance and resistance are to be exposed. (Lock & Kaufert 1998b: 13)

Thus, as the Foucauldian notion of biopower suggests, resistance and the potential for agency is immanent within the sites and technologies of power. Even as processes of governmentality and biomedicalization shape and constitute the strategies and knowledges of contemporary epidemiology, their applications, uptake, and use by different publics is variable and negotiated, influenced by the conditions, contexts, and pragmatic choices of individuals and communities as much by the objectives and aims of such strategies (e.g., Abel & Browner 1998; Balshem 1993; Handwerker 1998; Ong 1995; Orr 1993). These theoretical positions therefore suggest that attention to the ways in which people of color with CVD interpret biomedical knowledge and interventions, how they construct the meanings and consequences of different choices and options before them, and how they pragmatically, strategically, and/or even arbitrarily or unintentionally consent to or dissent from scientific, "expert" advice.

Finally, scholars examining the experiences and meanings of health and illness also contend that the embodiment of social and political relations expresses itself in somatic states of distress. Biomedicine's surveillance and intervention into these states then has the effect of displacing and deflecting attention away from social relations to the responsibilities of the individual to maintain health (e.g., Ong 1987; 1991; Scheper-Hughes & Lock 1987). Cardiovascular disease—as an affliction stratified by the intersections of race, class, and gender, and regularly linked to stress, depression, and

emotions—may very well be one such idiom of distress. The exploration of lived experience then, can yield insights into how social relations play a part in producing cardiovascular disease, and the implications of its biomedicalization. This notion—that social conditions constitute fundamental causes of disease—is a final theoretical perspective with which this research engages, to which I turn next.

Social Conditions as Fundamental Causes of Disease

The concept of social conditions as fundamental causes of disease takes up long-standing though marginalized traditions in the study of health and disease that integrate sociological concerns with epidemiologic approaches (e.g., Cassel 1976; Engels 1845/1978; Graham 1963; Syme, Hyman & Enterline 1965; Virchow 1848). Here it is argued that social conditions act as fundamental social causes of disease, mediated through but distinct from the more proximate risk, behavioral, and biological factors that contribute to ill health. As Link and Phelan (1995; 1996) define it, these fundamental social causes involve resources like knowledge, power, money, social connections, and prestige that profoundly shape people's ability to avoid risks and to minimize the consequences of risk exposure and disease once they occur. These resources—as the fundamental, general means upon which we depend for making our way in the world—forge links with many different risk factor mechanisms. Thus as knowledge is produced about the influence on disease of one or some of these risk factors, such as smoking or diet, those able to command the most resources are in a better position to avoid them. In this fashion, the linkages between specific social conditions, disease mechanisms, and outcomes may change or shift in salience, without altering the underlying relationship

between fundamental social causes and illness.

The concept of fundamental social causes takes on an explicitly dynamic and historicized view of the stratification of health. As the historical, social, economic, and political contexts within which people live and work change, the predominant pathways through which these fundamental social causes engender disease also shift. As such, fundamental causes are most apparent under conditions of change:

> If no new diseases emerged ... no new risks developed ... no new knowledge about risks emerged ... and no new treatments were developed ... the concept of fundamental social causes would be moot. In such a static system, as risk factors known to intervene between a social cause and disease were eliminated or reduced, the association between the social condition and disease would also decline. But, of course, this is nothing like the situation humans have ever confronted with regard to health. In a dynamic system, fundamental causes are likely to emerge. This is because the resources embodied in fundamental causes can be transported from one situation to another. Consequently, as health-related situations change, those with the most resources are best able to avoid diseases and their consequences. (Link & Phelan 1996: 472)

The concept of fundamental social causes is a central organizing perspective of this dissertation. As an exploration of the causal accounts of cardiovascular disease and the ways in which they invoke race, class, and gender, my research asserts that CVD is not only a biologically-mediated phenomenon, but a socially produced one as well. As such, the etiological theories rooted in the notion of social conditions as fundamental causes of disease provides a conceptual stance from which to analyze claims about the nature and effects of racial, class, and gender differences based in scientific and lay expertise. Moreover, it has significant potential linkages with other theories covered in this review; for example it supplements racial, class, and gender formation as another way of conceptualizing the social production of health. It also suggests that one possible

source of identifying and understanding fundamental social causes may come from ST&MS approaches to describing and analyzing lay knowledges. And perspectives on the social construction of scientific facts and biomedicalization can provide explanations for the conceptual trends in scientific knowledge production that tend to efface and displace fundamental social causes. Finally, the notion that social conditions are fundamental causes of disease attends explicitly to the issue of health inequalities, their persistence, and the social, political, and economic inequities inherent in their production and that emanate from their consequences. As Link and Phelan (1996: 472) assert: "inequalities in health will exist as long as social inequalities do, and the greater the social inequality, the greater the health inequality. It follows that if we truly wish to reduce inequalities in health, we must address the social inequalities that so reliably produce them."

E. A Look Ahead

Grounded in these theoretical perspectives, and taking the existence and persistence of racial, class, and sex/gender inequalities as an empirical point of departure, my project explores the causal accounts of cardiovascular disease produced by epidemiologists and by people of color living with CVD, and the ways in which conceptions of race, class, and gender are constructed and deployed within them. Here, I provide a look ahead to what the following chapters of this dissertation will discuss.

In Chapter 2, "Methods," I describe in detail my data sources, methods of data collection, and the analytic strategies I used in this multi-sited ethnography. I also consider the consequences of the methodological choices I have made in the research

process. Finally, I discuss some of the political and methodological quandaries I encountered while conducting this research, and situate myself as an active participant within the field of inquiry.

Chapter 3, "The Social Contexts of and in Cardiovascular Epidemiology," offers a brief chronicle of contemporary epidemiology. Drawing on secondary sources and on interview and observational data, Chapter 3 traces the emergence of the current ruling paradigm of disease causation—the multifactorial model—and examines its theoretical tenets and implications for the study of race, class, and sex/gender in cardiovascular disease. I then describe several key events in the development of the discipline of epidemiology: the Framingham Heart Study, a then-revolutionary and ambitious undertaking but not without its problems, and the expansion of the epidemiologic gaze through the surveillance of tens of thousands of individuals and entire communities. I follow with an analysis of several methodological and epistemological dilemmas in epidemiology that are especially acute in the study of racial, class, and sex/gender differences, and threaten to undermine its scientific legitimacy and social authority. These include the problems of establishing causality in the case of non-manipulable factors like race, class, and sex/gender, the problems of the resulting reliance on observational studies, and critiques leveled by those within and outside the epidemiologic community about the reductionism, over-simplification, and scientific inadequacy of current methods of racial, class, and sex/gender measurement and inclusion. This chapter closes with a consideration of social epidemiology, an emergent sub-discipline whose basic guiding principles counter many of the taken-for-granted conventions of epidemiology.

In Chapter 4, "Embodied and Epidemiologic Constructions of Race, Class, and Sex/Gender," I present my analysis of the conceptions of these dimensions of "difference" and their effects for cardiovascular risk and disease. Based predominantly on interviews with epidemiologists and lay experts, and supplemented with observational data, this chapter provides the bulk of the evidence for the "science-lay divide." I found that in their causal accounts of cardiovascular disease, epidemiologists tend to construct "race" as biological, cultural, and risk factor differences, and "gender" as biological sex. "Class," while framed in structural terms, in practice is often devolved to individualistic measures of socioeconomic status. People of color, on the other hand, tend to construct "differences" as stemming from intersectional, structural, synergistic processes of racial, class, and gender formation (Omi & Winant 1994). The consequences of interlocking forms of social organization and racialized, classed, and gendered practices and institutions for their lived experiences and material conditions pose, in their eyes, critical sources of cardiovascular risk. Throughout this chapter, I provide an analytic account of some of the ways in which scientific and everyday worlds of epidemiologists and lay experts shape their perceptions of how race, class, and gender work in producing health, in order to highlight the traffic between scientific and social conceptions of "difference" and ideologies.

Chapter 5, "Producing Credible Scientific Knowledge About 'Difference': Epidemiologic Paradigms, Practices, and Technologies," argues that the conventional conceptualization and treatment of "differences" in epidemiology routinizes them as individualized variables of standardized, static racial categories, socioeconomic status, and sex. This habitual practice, which I label the "usual suspects" approach, has been

black-boxed (Latour 1987; Latour & Woolgar 1986) to a great extent, despite significant challenges and contestations to its basic validity. Using both interview and ethnographic sources of data, I propose that multiple conditions and constraints exist that construct the "usual suspects" approach as the best available solution, a "good enough" tool (Casper & Clarke 1998; Clarke & Fujimura 1992b), for cardiovascular epidemiologists. The ritualized use of individualized variables of difference helps to fulfill methodological imperatives for exhaustive measurement and regulatory mandates for diverse study sample representation, while meeting the need to manage uncertainty and deal with inadequate theoretical models and data. By simultaneously satisfying such political, methodological, and technical contingencies, the routinized inclusion of race, socioeconomic status, and sex helps to build credibility in an uncertain field.

Chapter 6, "The Reproduction of Inequalities in Cardiovascular Health: Biomedicalization and Cultural Health Capital," is organized around two arguments about the mobilization of race, class, and gender in CVD causation. First, the dynamics and consequences of their invocation exemplify some of the key processes of biomedicalization (Clarke et al. 2000; Clarke et al. 2002). Epidemiologic knowledge production has been instrumental in establishing and standardizing practices and technologies of risk classification, assessment, and treatment, and in legitimating their application. The transformation of such knowledge into standardized risk assessment tools illustrates how the biomedical gaze is embedded and furthered in new technoscientific modalities. These have the effect of sustaining the distinctions between "expert" clinicians and "lay" persons, while also working to conceptually sever individuals from their biographical experiences, their material conditions, and their

politicized frameworks for viewing the world. The ideologies and discourses surrounding epidemiologic claims about CVD risk and prevention also contribute to biomedicalization's imperative to "know thyself," to acquire information and knowledge about one's cardiovascular conditions. I argue that such dynamics in turn have profound consequences for how people with CVD think about themselves, becoming a lens through which some evaluate their virtue and morality. Second, this chapter introduces the concept of cultural health capital, a set of resources that operates to enhance and improve health. The racialized, classed, and gendered dynamics through which people have access to, accumulate, and deploy cultural health capital provide an understanding of how power is exercised in health care institutions and interactions, and how contemporary mandates for cultural and scientific competencies advance the persistence and reproduction of health inequalities.

Finally, in Chapter 7, "Conclusions and Implications," I summarize my key arguments, and explore the implications of my findings for several domains of sociological theory and for health policy. Throughout my dissertation, the central questions and concerns repeatedly return to analyzing the processes and consequences of individualization, standardization, racial/class/gender formation, stratification, and the social production of health. In examining the intersections and relationships among these social processes lies the basis for understanding the origins and maintenance of the science-lay divide in conceptions of race, class, and gender, of the relevance and utility of "expertise" and experience, of the causes of disease, and the possibilities for remedying social inequalities in health.

Chapter Two
METHODS

A. INTRODUCTION

This project is a qualitative, sociological study of the construction, revision, mobilization, and consequences of conceptions of race, social class, and sex/gender in accounts of cardiovascular risk and causation. This qualitative research is in the interactionist-social constructionist tradition (Denzin 1992), which argues that knowledge is interest-driven, useful, relational, and embedded in the everyday experiences and practices of people. This approach holds that crucial to an understanding of the actions of scientists and individuals with cardiovascular disease towards things such as illness, risk, human difference, and the methods and claims of epidemiologic science, is a comprehension of the meanings that those things have for them. These meanings however are not stable nor inherent within the things themselves, but instead are fluid, and are forged and reinterpreted within specific situations and social interactions. Similarly, all knowledges are considered to be the products of social relationships, and are therefore historically contingent and subject to change and renegotiation. This perspective thus represents theoretical traditions that focus on the mutual determination of constructions of reality and systems of knowledge and more closely examine the processes by which "reality" and the social objects that comprise it, including knowledge, are constructed. In this chapter, I first describe my sources of data, detail my methodological and analytic strategies, and finally examine some of the dilemmas and

quandaries encountered in the process of conducting this research.

The methodological processes that I detail below and their epistemological foundations have many affinities and alliances. First, this research embodies many of the unique aspects of multi-sited ethnography (Gupta & Ferguson 1997; Marcus 1995), in which data collection and fieldwork are conducted at multiple related sites based on the notion that the local manifestations of some sociological phenomena can be found in numerous different places and studied in a relatively open-ended fashion. Certainly, knowledge claims about cardiovascular health are pervasive: they reside in the pages of newspapers and popular magazines, in the conversations people have with each other, in television programs and commercials, in the halls of policymaking bodies, as well as in the hospital and the laboratory. Thus, a multi-sited ethnography in this case aims to follow the people and the data, in a sense, to the places and in the actions through which constructions about racial-ethnic, socioeconomic, and gender differences and their effects on the distribution of heart disease are being articulated, negotiated, revised, and sustained. Such a methodology offers the opportunity to compare how racial, socioeconomic, and gender differences are conceptualized to matter for CVD causation within diverse institutions, at various events, and through myriad experiences; how they circulate in different settings and contexts, and how they are changed by such circulation; and what their consequences for health practices and social conceptions of "difference" might be.

My methodological approach also shares important aspects of the Foucauldian genealogical method (e.g., Foucault 1977; 1978; 1980). Genealogy seeks "to entertain the claims to attention of local, discontinuous, disqualified, illegitimate knowledges

against the claims of a unitary body of theory which would filter, hierarchise and order them in the name of some true knowledge and some arbitrary idea of what constitutes a science and its objects" (Foucault 1980: 83). As such, the genealogical method is concerned with the intersections and mutual generation of scientific knowledges about the body and the spread of technologies of power, and the role of human sciences (particularly the biological and biomedical sciences) in the organizing practices of modern societies.[1] Such a method also has activist intentions:

> it is really against the effects of the power of a discourse that is considered to be scientific that the genealogy must wage its struggle ... A genealogy should be seen as a kind of attempt to emancipate historical knowledges ... to render them ... capable of opposition and of struggle against the coercion of a theoretical, unitary, formal and scientific discourse. It is based on a reactivation of local knowledges ... in opposition to the scientific hierarchisation of knowledges and the effects intrinsic to their power. (Foucault 1980: 84-5)

Drawing from the perspectives and approaches of these two methodologies, I collected data from multiple sources, described next.

B. Sources of Data

The methods used here were selected for their ability to explore the substance and content, the range of perspectives, patterns of similarities and differences, and conditions shaping the production of the constructions of race, class, and gender in cardiovascular risk. My aim was to map out the array of positions taken, and the multiple constructions framed, rather than to determine their frequency, prevalence, or trends of central tendency

[1] More on how epidemiology is emblematic of Foucauldian power-knowledge relations is covered in Chapter 3.

among the participants (as might be the case if using quantitative methods). The premise underlying the juxtaposition of scientific and lay expert knowledges is that each of them engages in a different "calculus of credibility" (Epstein 1996: 355), and through their exploration I can unveil and underscore their similar and distinctive constructions of race, class, and sex/gender in the production of CVD, their criteria for credibility, the consequences of their stratification, and points of potential mutual engagement. My research also echoes qualitative analyses of the public understanding of science (e.g., Irwin & Wynne 1996c) that explore both the operation of scientific institutions and experts and different publics in relation to each other, and Gieryn's (1999) argument that it is by looking downstream from the production of scientific knowledge, at the points of their consumption that their credibility is fashioned and sustained. To examine these questions, and following the injunctions of multi-sited ethnography, I used several sources of qualitative data: (1) participant observation in a range of settings where epidemiologic knowledge about such differences is presented and debated; (2) in-depth, semi-structured interviews with researchers specializing in cardiovascular epidemiology; and (3) in-depth, semi-structured interviews with persons of color living with CVD.

Participant Observation

First, participant observation was conducted in several settings: (1) scientific meetings and professional conferences where epidemiologic research was presented and discussed; (2) events intended for lay audiences aimed at public education and awareness regarding cardiovascular health; and (3) events and lectures largely intended for epidemiologic/scientific audiences in which the methods of epidemiology or findings of

specific studies were presented and discussed.

Participant observation was conducted at a total of five scientific conferences at which epidemiologic research was presented: the 1999 Annual Meeting of the American Public Health Association, the 2000 American Heart Association Conference on Cardiovascular Epidemiology and Prevention, the 2000 American College of Cardiology Scientific Session, and the 2000 and 2001 American Heart Association Scientific Sessions. I chose these particular meetings as they are those sponsored by the most prominent national professional organizations in which CVD epidemiology and research represents a major field of activity for their memberships. In addition, I also followed respondents' recommendations of specific conferences that they most often attended and found most useful to their own work. To select which of the hundreds of sessions at each of these meetings to attend, I carefully examined each conference's abstract book, which were often available online prior to the meeting and always distributed to conference attendees upon registration. I first chose to attend oral presentation and poster sessions in which findings of racial, socioeconomic, and/or sex differences in cardiovascular risk, incidence, and outcomes were explicitly discussed in some fashion. I also tried to attend all sessions in which papers were being given on results from epidemiologic studies that I knew were exploring such differences, even if the specific presentation itself was not necessarily focused on those differences. Finally, in my remaining time, I attended presentations of analyses in which race, socioeconomic status, and/or sex were used or included in some fashion. When time permitted, I also spoke with the presenters at the conclusions of the sessions; poster presentations in particular offered opportunities to interact with researchers and delve more in-depth into the substance of their claims, their

methods, and interpretations of their data, which were often more speculative and beyond the scope of what the presentations or posters themselves covered. However, given that many of these meetings were quite massive, often involving tens of thousands of participants and thousands of presentations, it was inevitable that I missed some presentations due to scheduling overlaps and my own oversight; in such cases, I was often able to purchase tape recordings of those sessions. All oral presentations were audiotaped then transcribed, and supplemented with field notes. For face-to-face interactions and exchanges, notes were taken as soon as possible and then converted into more complete field notes at the end of the day.

By observing how researchers collectively speak about and define the effects of what they characterize as racial, socioeconomic, and gender differences on CVD, and reshape their research practices to better explore them, information was collected on how categories of "difference" are conceptualized and operationalized. Although conference presentations are frequently scripted events, they are also relatively informal when compared to publications and offer spaces where epidemiologists were able to discuss their work more candidly and reflexively. Problems, dilemmas, and contradictions encountered in doing epidemiologic work rarely are discussed at length in print but often are in question-and-answer sessions, discussions with colleagues, and informal conversations. At the same time, since the knowledge being discussed in these settings is still provisional, its ultimate impact on the lived experiences of individuals with CVD is at that time yet to be determined.

I also wanted to utilize participant observation because of my concern that relying

solely on interviews might run into the problem of interviewer effect[2] and social desirability bias, given the involvement of socially and politically sensitive issues like defining the roles of race, class, and gender in their research, and articulating conceptions of differences among human groups. Professional conferences are attended mostly by "insiders" and other members of the biomedical, public health, and epidemiologic communities who tend for the most part to share collective understandings of "science" and the legitimacy of the scientific method. By conducting participant observation at conferences, I was able to corroborate interviewees' accounts through firsthand observation, and to witness their "practical outworkings of [their beliefs] in their everyday lives and conversations" (MacLeod 1996: 146) as scientists.

I also conducted participant observation at several lectures and presentations on cardiovascular health and risks that were intended for "lay" audiences. These events included several "brown bag" lectures at a community hospital, between March 1999 through December 2000, and a women's health conference, held in March 1999, aimed at the public and sponsored by an academic medical center. Through participant observation at these venues aimed at the health education of the public—and my subsequent "education" as a consumer of biomedical information and as an informed patient—I examined how scientific information is being translated and transmitted to lay audiences. By analyzing this data, I wanted to understand whether and how epidemiologic constructions of racial, socioeconomic, and sex differences in cardiovascular risk were being framed and communicated to the public. All oral presentations were audiotaped then transcribed, and supplemented with field notes in

[2] I discuss the issue of interviewer effect in more detail later in this chapter.

which I noted such details as audience attendance and participation, descriptions of slides, other visual aids, and printed materials, and preliminary impressions and analyses of my own and others' reactions to the content and tenor of the talks.

Finally, I enrolled in an introductory course in epidemiology, and conducted participant observation throughout its duration. I wrote occasional memos and field notes of relevant experiences in the epidemiology course. I also attended methodological and clinical tutorials offered at scientific conferences.[3] These proceeding were audiotaped and fully transcribed, and supplemented with field notes. Initially, my intent with these activities was to gain sufficient background and familiarity with the concepts, language, and methods of epidemiology in order to better understand what questions to ask of epidemiologists, but they also offered the unexpected opportunity to observe how researchers are socialized and trained in the epidemiologic method.

Interviews With Cardiovascular Epidemiologists

Second, I conducted in-depth, semi-structured interviews with a total of ten scientists conducting research in cardiovascular disease epidemiology. Questions listed in the interview guides (see Appendix) were used as general prompts about the nature and conduct of their research. The original intent and advantages I saw to collecting this data was that it allowed "official" knowledge producers to speculate much more freely than in published accounts of their work about how they believe racial, class, and sex/gender differences operate in CVD, how they operationalize these concepts, and the kinds of

[3] Later in this chapter I discuss in greater depth the methodological implications of my insider/outsider status vis-à-vis the epidemiology community.

problems and difficulties they run into when conducting their work—thus the nuts and bolts of how "differences" are constructed, used, and interpreted. These interviews also offered a chance to explore what epidemiologists would *like* to do, as opposed to what they actually do, and their accounts of any discrepancies that might exist between the two. I also asked the respondents to reflect about the contributions of their own and others' studies to the understanding of racial, class, and sex/gender inequalities within a historical context. These interviews served multiple purposes in addition to the collection of raw data. They provided an opportunity to check my ethnographic observations and impressions (that is, I was able to triangulate observational with interview data). As well, they enabled a focus on seeming ambiguities, contradictions, and paradoxes in scientific practice, attitudes, and experiences. For example, in the interviews I was able to probe in greater depth the conceptual looseness with which the variable of "race" is used in epidemiologic research, and the discrepancies between how scientists currently measure socioeconomic status and how they would like to do so in an ideal world. Such dilemmas would normally not be covered in published accounts of epidemiologic "facts," where, as Petersen and Lupton (1996: 33) note, "the historical and sociocultural dimensions of their construction, as well as the more personal imperative such as maximising one's career opportunities, are effectively hidden." In this fashion, I began to map out a "range of variation" of positions on the conceptualization, operationalization, and other kinds of scientific "management" of race, social class, and sex/gender.

A total of ten in-person and telephone interviews with epidemiologists were

completed, each lasting from 45 minutes to two hours.[4] My inclusion criteria for scientists were that they used epidemiologic methods to investigate cardiovascular disease risks and incidence, though they did not have to necessarily self-identify professionally as an "epidemiologist" exclusively. Investigators currently presenting or publishing results from ongoing studies on cardiovascular disease that take racial, class, and/or gender differences as central research questions were selectively contacted and asked to participate in these interviews; convenience and snowball sampling were also used. All of these participants worked in academic research and university settings. These interviews were conducted in two phases: I conducted the first six interviews in the spring and summer of 2000, and the remaining in the latter half of 2001. By doing so, I was able to conduct the majority of the interviews with people of color with CVD in the period between these two phases; the data from my conversations with people of color were then used to revise the interview guide for the epidemiologists (both initial and revised interview guides are included in the Appendix). All interviews were audiotaped, then fully transcribed, and supplemented with field notes.

Six of the epidemiologists interviewed were women and four were men; three (two female and one male) were scientists of color, as measured by self-identification. I planned this sample of cardiovascular epidemiologists to be smaller than that of people of color with CVD (see below) for two primary reasons. First, I also obtained data on the epidemiologic management and conceptions of difference from ethnographic observation activities described above. Second, I expected to reach theoretical saturation—the point

[4] All names used in this dissertation are pseudonyms. In addition, some minor biographical details have been changed to protect the identities of the participants.

at which no new properties, dimensions, or relationships emerge (Glaser 1978; Glaser & Strauss 1967)—relatively sooner in the data collection and analysis process among epidemiologists, as members of a scientific discipline with a fairly coherent body of frameworks, standards, and methods. People of color, on the other hand, could have infinitely varied perspectives, lived experiences, and constructions of knowledge about CVD. Finally, I could also supplement the interview data with participant observation data collected as detailed above.

Interviews With People of Color With Cardiovascular Disease

I conducted in-depth interviews with people of color diagnosed with hypertension and/or coronary heart disease. These interviews were conducted at the participant's home or in a conference room at a nearby medical institution, and covered issues of how individuals understand and incorporate medical knowledge about CVD causes and risk factors, assess their own risks, engage with biomedical institutions, and consider their social status vis-à-vis race, class, and gender as influencing these experiences (see Appendix for Interview Guide). Additionally, basic demographic information such as racial-ethnic identification, occupation, income, wealth, sex, and age were collected with a short standardized questionnaire (see Appendix); response choices were selected to roughly correspond to those that are fairly routinely found in epidemiologic studies.

Interview subjects were recruited through posting flyers in a range of community-based health organizations and private, teaching, and non-profit medical institutions in different geographic communities. These communities were located within the larger San Francisco Bay area; the respondents' proximity allowed me to interview them face-to-

face and in person. Three racial-ethnic groups—Asian Pacific Americans, African Americans/Blacks, and Latinos/Hispanics—were of particular interest because of their high rates of CVD and concerns about their relationships to mainstream biomedical institutions. During my initial conversation with interested individuals, I ascertained their racial affiliation; by conducting this kind of screening I tried to obtain a sample of approximately equal numbers from each racial-ethnic group. Additionally, individuals from a range of socioeconomic positions were sought to ensure a diversity of backgrounds and to allow comparative analysis. By recruiting from different kinds of health care institutions, I tried to secure the participation of people from different socioeconomic backgrounds. Interviewees were offered $20 to thank them for their participation. These interviews were audiotaped, supplemented with field notes on the interview, then fully transcribed.

A total of 18 interviews with people of color diagnosed with CVD were completed. Because of the particular difficulties with recruitment with Asian Pacific Americans and Latino men (discussed later in this chapter), the final sample was composed as follows (see Tables 2.1 through 2.3). Of ten interviews completed with African Americans, six were with women, and four with men. The women displayed a somewhat bifurcated socioeconomic distribution: half had annual household incomes of less than $15,000 while the other had incomes of $35,000-$75,000. Of the five interviews completed among Latina/os, all were with women, who were approximately evenly distributed in terms of household income, with respondents reporting incomes of less than $15,000 up through $35,000-$50,000. Finally, three interviews were conducted among APAs, two of them with women. All three APAs were skewed more towards the

higher end of the income spectrum of this sample, with the women living with household incomes of $35,000-$50,000 and the one male earning an income of $75,000 or higher. At the time of their interviews, they ranged in age from 41 to 77, with five under the age of 50, another seven between 50 and 65, and the remaining six over the age of 65. Their age of diagnosis with either hypertension or coronary heart disease ranged from as young as 20 up to 66 years. Over two-thirds were initially diagnosed under the age of 50, with five being diagnosed under the age of 40, nine while they were in their 40s, and four in their 50s and 60s. While additional interviews with Asian Pacific Americans and with Latino men would be been highly desirable, I felt that my goal of obtaining a socioeconomically and gender diverse sample had been, for the most part, realized.

Table 2.1 Participants with CVD, by Race and Gender

	African American	Latina/Latino	Asian Pacific American	Total
Women	6	5	2	13
Men	4	0	1	5
Total	10	5	3	18

Table 2.2 Participants with CVD, by Household Income

Household Income	No. of Participants
Less than $15,000	5
$15,001-$35,000	5
$35,001-$50,000	2
$50,001-$75,000	3
More than $75,000	3

Table 2.3 Participants with CVD, by Age at Initial Diagnosis

Age at Diagnosis	No. of Participants
Less than 30 years old	2
30 - 39 years old	3
40 - 49 years old	9
50 - 59 years old	3
60 years old or more	1

C. Methodological and Analytic Strategies

All materials, including participant observation and interview field notes,

materials collected at professional meetings, and transcripts of interviews and taped scientific proceedings were coded and analyzed using the general principles of grounded theory (Strauss & Corbin 1998) in its more constructivist visions (Charmaz 2000). Grounded theory focuses on uncovering the social processes and conditions that lie behind the phenomena in question and following their consequences and effects. It is an analytic methodology that is especially suited to an exploratory study of the kind conducted here, where the general phenomena and its processes have not been fully articulated, and constant comparison (between data from epidemiologists and those from people of color living with CVD) is central to the analysis. Grounded theory offers a systematic process that moves beyond description into analysis, and through which theories can be developed inductively. Moreover, constructivist grounded theory (Charmaz 2000: 510; see also Guba & Lincoln 1994) "celebrates firsthand knowledge of empirical worlds, ... assumes the relativism of multiple social realities, recognizes the mutual creation of knowledge by the viewer and the viewed, and aims toward interpretive understanding of subjects' meanings." Several overlapping and recurring activities constitute the main analytic techniques of grounded theory: coding, memoing, and constant comparisons and theoretical sampling.

Coding and Memoing

I began analyzing the data as it was being collected, starting with the simultaneous processes of open coding and memoing, where concepts were labeled and grouped into categories, and those categories were developed in terms of its properties and dimensions through the writing of memos. These codes and categories were developed around the

phenomenon of interest, specifically, the formation of definitions and conceptualizations of race, social class, and gender, and how they affect or are affected by understandings of incidence, outcomes, and management of cardiovascular disease. I began by reading through transcripts of interviews with epidemiologists and field notes from those interviews and participant observation at scientific meetings. I labeled such phenomena as various constructions of "difference," scientific practices, requirements and aspects of the scientific method, and conditions facing epidemiologists with key words and phrases, sometimes using the researchers' own words (*in vivo* codes), that were later refined into a set of permanent codes. Analysis then moved into axial coding, where connections between codes were noted and explicated in memos, and then labeled, eventually forming the basis for constructing major categories and determining the conditions and the contexts within which phenomena unfold in different ways.

In coding and memoing, I paid particular attention to the specific content of the definitions and how those conceptualizations prevalent in epidemiologic research are formed and used in the study of CVD. Codes and categories were used to highlight the range of consequences conventional concepts of race, class, and gender have for our understanding of the nature of the "problem" of and "solutions" for the disproportionate burdens of cardiovascular disease. Codes and categories developed and the analysis of data from the study of epidemiologic research were used and elaborated when analyzing interview data from individuals living with CVD for the purposes of comparing how concepts of race, class, and gender are formulated in research and in lived experience. Additional codes and categories related to the knowledge constructions, social conditions, and health practices of lay experts developed out of the coding of such interview data

then allowed for an exploration and elucidation of how racial-ethnic, socioeconomic, and gender backgrounds affect health beliefs and behaviors, access to and evaluation of medical information, social and economic resources, and other factors that impinge on their cardiovascular health. Finally, the development of codes was geared towards understanding how race, social class, and sex/gender all interact with each other in CVD risk and management, highlighting the heterogeneity and complexity within peoples of color. By developing and using the same codes across the two types of interviews (with epidemiologists and with individuals with CVD) and participant observation data, I was able to examine the variations in the meanings of "difference" and scientific and health practices across the different sources of data, facilitating their explication and categorization, and serving as a kind of triangulation.

In this process, I was able to move from identifying descriptive codes to formulating analytic codes and categories, that encapsulated at a more conceptual level social processes and considerations involved in the construction of race, class, and sex/gender in cardiovascular disease risk and incidence. Some of these analytic codes and categories were revisions and redefinitions of previously descriptive codes, while others were newly created to account for some previously unobserved phenomenon or to group together a cluster of related codes. Codes and categories always emerged from the data itself, allowing for the inductive building of concepts and arguments. For example, in analyzing lay experts' narratives of encounters with epidemiologic and public health knowledge about CVD, and scientists' accounts of the racial, class, and sometimes gendered dimensions of CVD, I began to note a series of behaviors, attitudes, skills, and aptitudes that were being called upon and mobilized in health-related interactions. I

initially labeled these descriptively as "epidemiologic knowledge," "skills," "pathologizing," among other codes, but after writing memos about their frequent clustering and overlap, I began to sense that an underlying social process was at play. By noting the consequences that people both gained and suffered from their mobilization of these skills and aptitudes or their failure to do so, or of having the "right" or "wrong" kinds of knowledges and behaviors, I started to see that a form of resource or capital, with specific dynamics of access, transmission, and accumulation, could be conceptualized inductively from the data. Thus, from these beginnings emerged the concept of *cultural health capital*, a form of capital parallel to Bourdieu's (1983/1986; 1980/1990) notion of cultural capital, that I argue plays a central role in the reproduction of health inequalities and which I discuss in detail in Chapter 6.

Comparisons and Theoretical Sampling

Once the coding process had been completed twice by hand, and the codes themselves and their relationships to each other preliminarily defined, all transcripts and field notes were entered into a qualitative research computer software program, QSR Nud*ist. These materials were again coded, paragraph by paragraph, in Nud*ist using a coding "tree" which organized individual codes within categories and groups. This software allowed for convenient access to coded elements, including retrieving all paragraphs tagged with a single particular code, intersection of two or more codes (e.g., all paragraphs coded with both "cultural health capital" and with "constructions of race"), and the union of two or more codes (e.g., all those coded with either "gender as sex" or with "gender as structural"). Using these features of Nud*ist facilitated the comparison

and contrasting of codes, and exploring their properties and relationships with other codes, which resulted in a deeper understanding of how and when codes, and the discourses, dynamics, and social processes they referred to, occurred together, overlapped, or remained distinct from each other. This in turn aided the shift from more descriptive to more analytic codes and categories, and the inductively development and elaboration of concepts and theories.

Throughout the coding and memoing processes, under the principle of theoretical sampling (Strauss & Corbin 1998), I allowed my changing understandings and directions of my research questions to influence my ongoing data collection decisions. Theoretical sampling argues that data collection should "be driven by concepts derived from the evolving theory and based on the concept of 'making comparisons,' whose purpose is to go to places, people, or events that will maximize opportunities to discover variations among concepts and to densify categories in terms of their properties and dimensions" (1998: 201). This is particularly useful for explorations of new areas as it allows researchers to choose those avenues of sampling that offer the greatest potential for theoretical return. As I reached theoretical saturation on some questions, I shifted my sampling, questionnaires, and data collection strategies to pursue newly articulated and redefined questions based on a different perspective or experience raised in an interview. Such decisions were intended to gather sufficient data on the range of positions and perspectives taken on the role and effects of race, class, and sex/gender on cardiovascular disease. For example, after interviewing several epidemiologists and reviewing the literature, I became increasingly aware of the conceptual and methodological divergences between social and more mainstream epidemiologists. This prompted me to ensure that

at least some of my interviews would be with researchers who self-identified as social epidemiologists in order to represent a wide as possible a range of scientific perspectives. Through such analysis, I also came to realize that the discipline of epidemiology, while mostly conforming to a common, shared set of standard practices, is more appropriately characterized as many epidemiolog*ies*.

Situational and Social Worlds/Arenas Analysis

I also used the analytic technique of situational and social worlds/arenas mapping (Clarke 2002; 1991) in order to understand the "big news" (Park 1952) about the situation of concern, here, the epidemiology and experience of racial, class, and sex/gender inequalities in CVD. Clarke (2002) argues for situational analyses in which a particular situation of interest—such as cardiovascular epidemiology—is analyzed "through the specification, re-representation, and examination of all of the salient elements and their relations in that situation" (2002: 37). Suggested categories of such elements include: human elements/actors, nonhuman elements/actants, political/economic and sociocultural aspects, spatial and temporal dimensions, discursive constructions of human actors and nonhuman actants, major issues and debates, symbolic dimensions, discourses, and other elements as found in the situation.

A second kind of map involves the identification and elaboration of the social worlds present in an arena of concern, like cardiovascular disease. *Social worlds* (Strauss 1978; Strauss et al. 1964) are defined as "universes of discourses," as "groups with shared commitments to certain activities, sharing resources of many kinds to achieve their goals, and building shared ideologies about how to go about their business. Social worlds form

fundamental building blocks of collective action" (Clarke 1991: 130-1). An *arena* (Strauss 1978; Strauss et al. 1964) forms when multiple social worlds simultaneously focus on a particular issue or object and come together in a larger field of concern. In the arena, "various issues are debated, negotiated, fought out, forced and manipulated by representatives" (Strauss 1978: 124) of the participating social worlds. In my case, I found that the arena of cardiovascular disease is populated by many different social worlds, some of which were exceedingly important to the more immediate questions of the construction of race, class, and sex/gender in CVD risk and causation, and others which were less so. The analyst's task then becomes "to elucidate which worlds and sub-worlds come together in a particular arena and why, what their perspectives are, and what they hope to achieve through collective action" (Clarke 1991: 133). Thus, differences within and between worlds are critical analytic foci, as will be seen in the following chapter, where an analysis of varying commitments and perspectives within the social world of epidemiology helped to highlight the segmentation between mainstream and social epidemiologists. Through social worlds/arenas analysis, I aimed to delineate how various social worlds performed such activities like "establishing and maintaining boundaries between worlds and gaining social legitimation for the world itself" (Clarke 1991: 133), important to understanding the arena of action and the conditions and contexts which shape it.

D. Reflexivity in the Research Process: Methodological and Political Dilemmas

While the data collection and analytic strategies I outlined above were fruitful,

they were not entirely unproblematic. In this section, I examine three methodological and political dilemmas I encountered while conducting data collection and analysis: struggles over categorization, sampling, and representation; the strategic deployment and unexpected ascription of "insider" or "outsider" status; and the possible implications of "interviewer effect," or the ways in which participants' perceptions of me, my politics, and my own background might have influenced the kinds of data generated.

Struggles with Categorization, Sampling, and Representation

In the process of formulating my methods, I knew that I wanted to interview individuals with cardiovascular disease about their conceptions of their racial, class, and gender backgrounds for their cardiovascular health and well-being in general. However, I was concerned that my use of racial, class, and gender characterizations might work to reify those very categories that I wished to question. Miles (1989: 72) for example, argues that when common-sense notions of "race" are employed, their use attributes them with the status of a scientific concept. Moreover, the theoretical positions I outlined in Chapter 1 regarding the intersectionality, multiplicity, and fluidity of contemporary identities pose not only conceptual but also methodological dilemmas: I did not want to use race, class, and gender as separate variables, nor to presume their salience or meanings for different individuals, yet I did wish to capture the differences these markings hold for scientific practices and lived experiences. I also feared that defining the sample in terms of its *particular* racial-ethnic, class, and gender categories might inadvertently imply that my research was intended to develop generalizable conclusions about those specific groups. Once such expectations are in place, then the methodologic

focus becomes what is an adequate number of respondents for *each* group, rather than how I could productively explore the range of ways in which the lived experience of race, class, and gender intersect with and impact the incidence and experience of CVD.

In my attempts to come up with ways of conceptualizing sampling that were feasible, yet meaningful, deliberate, and reflexive, I revisited the central questions of interest to me: I was interested in looking at the constructions of race, class, and sex/gender in accounts about CVD etiology and distribution, their intersectionality, and the traffic between the content of scientific knowledge and the larger social, economic, and political contexts within which it is produced. Given this, it seemed a logical methodological option to try to aim for a heterogeneous sample in terms of individuals' social locations vis-a-vis race, class, and sex/gender, but to remain relatively flexible as to who I would interview so that I could shift and pursue different paths as called for by ongoing data analysis, new or emergent codes, and theoretical saturation. My initial plan then was to aim for achieving some diversity within the sample for comparative analysis, guided more by the notion of theoretical sampling (Strauss & Corbin 1998), rather than bound by strict "selection criteria." On the other hand, it also occurred to me that constraining the number of racial groups, and ensuring the representation of particular numbers of women and men of varying socioeconomic status within them could be useful even in looking at within-category differences and examining in-depth the social processes of racialization and categorization among one or a few racial groups.

Rapp (1999: 125-6) was extremely helpful here in conceptualizing the possibilities and anticipating the limitations of selecting certain groups to focus on:

> This problem of categories is most glaringly apparent in my attempts to build racial-ethnic and class diversity into my work. Initially, I intended to contrast observations and interviews with patients from white, Hispanic, and African-American backgrounds, distinguishing middle-class, working-class, and working-poor groups ... But the diversity I encountered *within* groups quickly underlined how static such sociological classifications can become ... Yet over the course of several years of research, I came to pick out patterns that *did* reflect the resources and boundaries of the class and ethnic identities to which people were assigned, or assigned themselves. There is thus an analytic tension in my texts and other presentations between labeling individuals and trying to indicate the rich array of cultural resources from which they draw their health beliefs and family aspirations ... Individual consciousness is always complex and cannot be reduced to the analytic categories within which positivist social investigators are most comfortable working. Yet we cannot do away with such categories, even as we interrogate them, for they provide not only sorting devices, but signposts on the way to understanding socially significant differences.

Rapp argues here that while the complexities and differences among individuals limit their categorization into social groupings that have become the norm in social science and epidemiology, there were, in her research, detectable and analyzable patterns that indicated the influence of categories to which they were assigned, or to which they assigned themselves. These patterns helped her to tease out the ways in which such assignments were socially consequential. So in my own research, my use of the categories of race, class, and sex/gender did not stem from their acceptance as self-evident and inherently meaningful classifications, but from the desire to study how they are constructed, the meanings contained within and carried with them, and how they are mobilized to act as socially significant differences. In this way, my use of categories and interrogation of them are not necessarily mutually exclusive endeavors: I could use categories to show the ways in which "their partiality is not impartial" (Rapp 1999: 127).

In the end, I chose to recruit participants with the intention of gaining approximately equal representation among African American, Asian Pacific American,

and Latina/o women and men but also attending to the internal differences among these groups, and the ways in which people did or did not self-identify with my labels. As Collins (1998: 208) argues, "Race and class and gender may *all* be present in *all* social settings in the United States, yet groups will experience and 'see' them differently. Within this logic, examining historically constructed groups that exist not in theory but in everyday practice requires having an open mind about what types of groups will actually be uncovered."

As described above, I was able to recruit and interview ten African Americans, about evenly split between women and men, and five Latina women with relative ease. Latino men and Asian Pacific Americans proved far more difficult to recruit as participants; despite extensive additional efforts, I was only able to interview a total of three APAs and no Latino men. Language was definitely an issue here; I did not have the resources for interpreters to conduct interviews in languages other than English. However I also suspected that some elements like a degree of mistrust, lack of time, and other logistical and emotional obstacles to participation played their part, as many health care practitioners whom I contacted for help in recruitment suggested. The voices of Latino men and Asian Pacific Americans, therefore, are either muted or absent in the accounts that follow. Their perspectives and experiences may or may not be consonant with those that I did interview.

However, this dissertation does not aim to make conclusions and generalizations about specific racial, gender, or socioeconomic categories. Therefore, while I definitely view the racial and gender skewing of the sample as a weakness of this study, it does not necessarily undermine the interpretations and conclusions that *were* reached. Instead, my

arguments, inductively developed from the data that were collected, remain partial. Yet at the same time, like Rapp's (1999) research, my analysis reveals the tensions between delineating the broad patterns that emerged among people with CVD of various racial, ethnic, economic, and gender backgrounds, particularly in comparison to scientific account of "difference" and CVD causation. By illuminating the complex ways in which these individuals' circumstances and biographical experiences shaped their health, conceptions of risk, and understandings of "difference," my findings are potentially indicative of the kinds of lay and local knowledges that are constructed, the politicized nature of their production, and the political implications of their claims.

Avoiding Quantitative Appropriation and Presumptions of "Insider" Knowledge

A second methodological dilemma I encountered was the particular problematics of conducting qualitative research among quantitatively-oriented scientists. In multiple settings I was often asked to explain my project. For the epidemiologists I was seeking to recruit for interviews, their questions arose out of simple curiosity or the understandable desire to know how their opinions and perspectives were going to be used. At times, though, my brief response to their inquiries gave way to further questions that implicitly demanded legitimations of my research in their own terms, inquiring about what "hypotheses" I was "testing," what kinds of "correlations" I was looking for, of whom my results would be "representative," and to whom they would be "generalizable." Some health care providers, whom I often enlisted as facilitators (or encountered as gatekeepers) in recruiting people of color with CVD, also challenged my project on similar grounds. In asking such questions, these scientists were evaluating my research

by the professional standards of epidemiology and quantitative methods more generally. Gieryn (1999: 2) remarks that in credibility struggles, such questions emerge that go to the heart of who is a scientist and what is scientific: "Is your training or expertise scientific? Did you follow methodologically proper scientific procedures? Would most other scientists agree with you? Is the science in which you claim expertise pertinent to the issue at hand?" I was, in effect, unwillingly involved in a credibility struggle.

In those moments, I decided that I could take one of two responses, that can be characterized at their roots as a "rhetoric of similarity" or a "rhetoric of difference" (Gieryn 1999: 71). That is, one option was to claim and try to show how qualitative methods is parallel and comparable to quantitative methods, involving only a different form of data, but with similar epistemological assumptions, or that could be converted into more quantitative forms. A second option would be to argue that substantive epistemological and methodological differences exist between my qualitative research and their epidemiologic research, and that their standards of science did not apply to mine.

What I often found was that it was exceedingly tempting to construct hypotheses just to satisfy my interlocutors, and to use, at least nominally, the language of quantitative methods and positivist science in order to demonstrate that this project was methodologically rigorous and "scientific." I often believed that a relatively minimal amount of shifting the "framing" of my research or "spinning" my methods would settle their questions and preclude any or further contestation.

In fact, in the course of pursuing research funding, I frequently resorted to this tactic. For example, a major source of support came from an agency well known for

funding quantitative health research. In preparing the proposal to be submitted for consideration, I was faced with requirements to provide specific aims and hypotheses and to frame my research methods and objectives in a manner that went against many of the theoretical-methodological commitments of interactionist-social constructionist qualitative research, which allows for inductive, emergent questions and analysis.[5] On the other hand, I was explicit in my application that this was intended to be an exploratory study; the reviewers seemed to agree that my proposed qualitative methods, while not producing generalizable results, were appropriate to the objectives at hand, and ultimately, I was successful in obtaining funding.

However, as this project concludes, I now must report on my findings and the extent to which the research aims were fulfilled and whether or not my articulated hypotheses were confirmed. Thus the theoretical-methodological "spinning" I had done in pursuit of financial support finds me revisiting these questions of quantitative appropriation all over again. This is not to say that I would not make the same choices if presented with similar opportunities, but that I would perhaps do so with greater awareness of the issues and their consequences.

In contrast, in most of my face-to-face interactions with my scientist participants, I chose to adopt a "rhetoric of difference," briefly explaining to them that the methods and aims of qualitative research diverged significantly from the kinds of science familiar to

[5] Relevant here is the critique that Straussian grounded theory (e.g., Glaser & Strauss 1967; Strauss & Corbin 1998), when rigorously followed, is often underwritten by positivist, objectivist premises (see Charmaz 2000; Clarke 2002; Denzin 1996; Van Maanen 1988), particularly the belief in an objective, external reality, a neutral observer, and homogeneous and generalized readings of data. In some ways, therefore, it was no great stretch to frame my descriptions of data analysis methods within a "rhetoric of similarity." However, the constructionist versions of grounded theory analysis (e.g., Charmaz 2000; Denzin 1992) that I adopt in this research explicitly reverse these objectivist tendencies.

them, and the kinds of information that I hoped to gather from their interviews needed to be qualitative in nature and analyzed using a different set of methods and criteria than the ones they used. A few times, this strategy was met with remarks to the effect that they did not understand how I was going to analyze my data or "get meaningful results." For the most part, though, my accounts of qualitative research encountered little additional resistance.

A measure of my acceptance by the scientists I interviewed can be seen by the degree to which I often had to negotiate an "insider" status with them. I had decided that in my interactions with them, I would assume and demonstrate at least some technical familiarity and epidemiologic knowledge. I chose to do so in part because of the concerns I had about the power differentials between myself and the participants, an issue that comes with "studying up" (see, e.g., Hertz & Imber 1995; Hess 2001; Nader 1972; Posner 2001). I had presented myself as a doctoral student working on her dissertation, with the idea that perhaps their participation might be more forthcoming because of their identification with their own graduate experiences, and because I was not yet their academic colleague with equal status and ability to question and contest their science. I therefore deliberately used their jargon and linguistic style in an attempt to level the playing field somewhat, and to signal that I was conversant with epidemiologic principles and methods. Engaging in impression management (Goffman 1959), I wanted to appear knowledgeable enough that I would be taken seriously.

Additionally, by using "their" language, I was also able to probe more efficiently and deeply into relationships between variables, the implications of their procedures, and the nuances of their interpretations. I found I could ask more direct questions about their

assumptions, methods, and ambiguities and this helped to serve as a validity check to determine whether my provisional observations and interpretations were consistent with those of the epidemiologists (see Anspach 1993: 202). However, this was always balanced with the desire to appear somewhat "naive" so that participants would explain usually taken-for-granted definitions, methods, assumptions, and methodological and theoretical issues in epidemiology and its practices that bear on the questions of conceptions of race, class, sex/gender. I therefore selectively deployed naivete or a knowing attitude in order to accomplish different things in the course of interviewing and collecting data.

But perhaps because of my demonstrated familiarity with their discipline, many epidemiologists seemed to assume that I was an "insider." Interviewees consistently took for granted that I understood their references to epidemiologic techniques, principles, and studies, and I would often have to ask them to elaborate or explain them to me. I struggled to follow up on the many instances in which shared knowledge or perspectives were being taken for granted as a result of these impressions of my "insider" status. Inevitably, however, some of these presumptions passed unexamined and unarticulated as I lost track of them in course of the interview, as the interview moved onto other topics, or as time ran short.

My respondents also seemed to assume that I would share their opinions and perspectives on some aspect or experience of conducting research. For example, in one interview, an epidemiologist recounted an experience in which he had been accused of being racist by some of the technicians and assistants on the research team for stating observed associations between race and obesity. In attempting to give expression to his

emotional reaction to this criticism, he remarked that I must know what he was talking about since I had probably come across the same thing myself. I was also exhorted by several of my participants to go to this conference or that workshop, not for the purposes of conducting fieldwork or collecting data, but to hone my quantitative skills as if I desired to practice epidemiology rather than to study it. Invariably, I would find these incidents to be somewhat awkward and discomfiting, as any efforts to clarify my own positions and objectives seemed to engender some disquiet on the part of my epidemiologists being interviewed as well. It was as if I had disrupted a relaxed and comfortable interactive zone we had created for ourselves, and reminded them that we may not be two like-minded people sharing a casual conversation. I suspect that my projecting insider knowledge afforded me the opportunity to witness some of the respondents' deeper concerns, feelings, and perceptions regarding their discipline, its practices and social role, and their professional community. At the same time, it also led at least some respondents to believe that I was someone I was not, a disciplinary insider who sought to improve epidemiology "from within," and certainly not a critic explicitly positioning herself outside of their paradigmatic and methodological commitments.

The issues of my strategic deployment and unexpected ascriptions of "insider" or "outsider" status also emerged in my encounters with people of color with CVD. Explications of both traditional and multi-sited ethnography (see Marcus 1995) emphasize the importance of "literal language learning" as a way to give coherence to the field as a culture unto itself; in multi-sited ethnography then, being multi-lingual becomes imperative. By virtue of having lived through or knowing about critical periods in American histories of colonialism, civil rights, and identity politics, and by being part of

communities that shared not only these histories but also cultural idioms, frames of reference, and linguistic styles and phrases, the people of color I interviewed often spoke in particular ways. By displaying knowledge about these shared histories and cultures, and by picking up additional familiarity throughout my interactions with them, I was often made to feel as an "insider" or least an ally to their ways of thinking. I explore the implications of these ascriptions in the following section.

Political Accountability and Transparency: How I (and Perceptions of Me) Affected the Data

The need to be reflexive about one's own identities in relation to the research and to my interactions with the participants is an integral part of the qualitative research process (Beoku-Betts 1994; DeVault 1995; Fine, Weiss, Weseen et al. 2000; Ladson-Billings 2000; Olesen 2000; Riessman 1987; Twine & Warren 2000). Given the research questions central to this project, participants' perceptions of my race, ethnicity, social class, and gender—and their consonance or dissonance with their own—influenced our interactions and the feelings and experiences they choose to share with me. Moreover, I found that participants' perceptions (sometimes followed by my confirmations or corrections) of my age, cultural upbringing, marital status (and inferred heterosexuality), religion, knowledge of the histories of different racial groups in America, political ideologies—and critically, the *intersections* between many of these dimensions and my race, class, and gender—have all been consequential to the direction and flow of the interviews. Thus I attend here to the possible effects of participants' perceptions of my own identity, and beliefs, values, and politics, on our interactions and the data collected.

For example, in interviewing social epidemiologists, their perceptions of my politically progressive viewpoints on health and society—revealed I think through such seemingly unremarkable interactive elements as my nodding agreement, showing familiarity with the literature on social epidemiology, and so on—often seemed to earn rapid rapport with them. As scientists committed to rather unconventional notions that the social environment and relations shape health, that there is no such thing as value-free science, and that epidemiology can contribute to social justice, these social epidemiologists were quite eager to share their perspectives with someone who shared their theoretical frameworks. Similarly, people of color with CVD who held quite politicized viewpoints on race, class, and gender and the ways in which they shaped social conditions and life chances also seemed to feel free to disclose their experiences and understandings of the impact of racism, classism, and sexism in their lives. Many of these epidemiologists and lay experts revealed at the end of the interviews that they felt very much at ease during the interview and that I was empathic to their perspectives. Such consonance greatly enhanced my data collection, I believe, and was one way being an insider colored my research.

In addition, I suspect that I was often configured as an "insider" by people of color with CVD or as an "ally" to their ways of thinking by virtue of my own identity as a woman of color. Much like the epidemiologists who assumed shared knowledge and perspective, lay experts, especially women, frequently made reference to opinions and experiences that they assumed were common to us both, saying, for example, that "you would know, women's work is never done," and referring to my being Asian American as a shorthand way to refer to parallel experiences of racism. This kind of rapport may have

given me access to "insider" knowledge, perhaps to more nuanced ideas, more deeply held emotions, and richer accounts of experiences that they might have been reluctant to share with others they did not perceive to be as empathic or like themselves in important ways.

But my expectations of my "insider" status also were confounded in many ways. My own expectation had been that as a woman of color I would most likely be viewed alongside other racially marginalized groups. However, unexpectedly, I was seen as an "insider" by some with whom I personally and politically felt very little affinity. For example, as a member of a racial group that is rarely the subject of epidemiologic research and thus relatively *un*implicated by the epidemiologic knowledge being produced, it seemed that my race enabled investigators with whom I interacted to make statements about the cultures and health practices of other ethnic groups (most often African Americans but also occasionally included Latinos) that I thought bordered on, or overtly were, racist and classist. For the most part, I limited my reactions to such statements to probing and questioning them further, with the remote hope that by making them articulate the illogic of their claims, they would revise what I considered to be untenable assertions. But rarely did I try to explicitly intervene in their views, concerned that the participants would terminate the interviews or at least circumscribe their comments. Nor did I feel comfortable initiating a discussion after the interview had concluded, because of the possibility of my needing to conduct follow-up interviews. I was greatly troubled by this lack of direct response on my part, though, and the prospect that they might see me as tolerant of or even complicit in their views I found to be dismaying and alarming.

The political ambiguity of my Asianness[6] was brought home in a setting far removed from any research site. I was in a taxi in Baltimore visiting friends when the cab driver, upon my observation of the changes brought upon by urban revitalization (it had been ten years since I was there last), engaged me in a conversation about the differing administrations and leadership styles of the current mayor—who, in the driver's words, "just happens to be black"—and the past mayor—who is white. His argument was that the past administration had worked very hard to "clean up" the city, while the current mayor was "not doing much." He continued, "Now I'm not a racist or anything, and I don't like to get into race politics or anything like that," but it seemed to him that "blacks didn't do much while they were in power." After giving the cab driver a long look through the rear-view mirror, I responded that no doubt there were some differences in mayoral administrations but that I didn't believe they could all be boiled down to race of the mayor. Before the driver had a chance to respond, we arrived at my destination. This incident highlighted for me the tenuousness with which my race was attributed either "insider" or "outsider" status, and in relation to whom. For probably many of the same reasons contributing to the ambiguous and fluid place of Asian Americans in the U.S. racial/economic hierarchy that numerous scholars (e.g., Light & Bonacich 1988; Min 1996; Saito 1998; Takagi 1992) have noted, I was being viewed as more likely sympathetic rather than antagonistic to the taxi driver's right-wing ideologies. This experience thus provoked an in-depth analysis of my research process, and led me to

[6] See Light and Bonacich (1988) and Min (1996) on the role of Asian Americans, specifically Korean Americans, as the "middleman minority" in economic stratification, and Saito (1998) and Takagi (1992) for their analyses of the frequent role of Asian Americans as a "wedge" group in U.S. racial politics, for example, around affirmative action debates.

"see" the much more complicated, unstable, and often confounding dynamics of insider-outsider status.

The shape and implications of such dynamics was often quite covert and subtle. For example, some epidemiologists and participants with CVD seemed to believe that as an Asian American I would naturally agree with their arguments about fundamental cultural differences, and essentialized and culturally deterministic characterizations of "ethnic" groups. In making their case they very often asked me about my own background, or more simply ventured, "Are you Chinese or ...?" (I usually responded that I was Korean American), or asked where I was "from" (my gracious answer was that I was from Hawai'i but my parents had immigrated to the U.S. from Korea; in my more contrary moments I simply offered the first part of that response and ended it there). They then proceeded to use my answers about my ethnicity as self-evident confirmation that I understood what they were talking about. I often wondered whether my being Asian American—often constructed as recent immigrants, perpetual foreigners, cultural "outsiders" (e.g., Lee 1999; Lowe 1996)—was critical to their confirmation, or whether being of any non-white race would do. Thus, along with the feminist problematization of the idea that shared attributes with participants gives researchers access to inside knowledge (e.g., Collins 1986; Kondo 1990; Lewin 1993), or that insider knowledge is unified and stable, I also highlight here the possibility that the assignment and perception of some attribute to insider (or outsider) status may in fact be just the opposite of that assumed.

What responsibility do I have in these kinds of situations to "correct" or clarify participants' mistaken or partial perceptions of me? How clear must I be about my own

theoretical and political stance that I take in my research? In conducting the interviews with epidemiologists, I usually took my cue from the participant: if they remained at a "scientific level," I also chose my language more deliberately, careful to phrase things in a largely technical, seemingly apolitical, and very "neutral" manner. Yet the interpretations and implications I chose to draw from these interviews were thoroughly political. The invisible boundaries circumscribing the tenor and content of the interviews—precisely because they were about intensely political (with concerns about "political correctness" looking over our shoulders) and even controversial topics of racial, class, and gender differences—felt quite clear to me, and must have been to at least some of my respondents. For example, Lance, an epidemiologist who discussed many methodological issues with the earnest aim of trying to do "better" science, did however pause for a bit, then mentioned that there were many "personal and other kinds of issues" that got in the way of doing good science but "maybe that's not what you want to talk about." Other epidemiologists divulged early in their interviews their rather unconventional (for epidemiologists) positions on politics and science, objectivity, mainstream epidemiology, and any number of other issues made it possible for me to be much less wary about revealing my own politics, ideas about science, and inequality.

In conducting interviews with women and men of color with CVD, in general I felt much less constricted in what I could share than in most of my interactions with epidemiologists. For the most part, I felt that this was because over the course of the interviews, I found that my participants and I had many views in common. They were quite frank and often forceful about their perspectives on cultural difference, class stratification, race and racism, and gender relations in ways that made it clear that little I

said, as long as it was not outrageously objectionable to them, would have the effect of silencing their narratives. For those lay experts whose perspectives and frameworks diverged from my own, I tried to be mindful, as with the epidemiologists, to use neutral language, but also to probe more carefully in order to understand the contours, contradictions, and explications for their biographical experiences and knowledge constructions.

E. Conclusions

While I may not always have been completely forthright, nor very transparent about my own positions and politics, I did make it possible, I think, for both participants who were epidemiologists and those with CVD to feel comfortable being honest with me about their own. To me, this suggests that while I might not have been wholly accountable to the participants, I made these particular choices in order to enhance the rapport of the interactions, to allow the interviews to remain centered upon the participant and her/his own perspectives, and to maximize the possibility of my comprehending the participants' lived experiences within their own contexts and understandings of the world, and in turn bolstering credibility and trustworthiness of this research. However, such considerations of the integrity of the *research* never managed to resolve these questions of politics and my *personal* integrity—indeed these are intertwined and mutually negotiated—and to the end I constantly reexamined and revised the ways in which I represented myself, my views, my objectives, and how I interacted with participants. I remained unsettled and often distressed by many of the choices I was making, reflecting at length on my ethics and actions and discussing them with

colleagues, my advisor, and other faculty. Such issues comprise tough, profoundly feminist methodological quandaries that go to heart of the dynamics of politics and claims to power in the research process for which I found no easy, pat, universal answers.

These dilemmas, and my attempts to explicitly examine and resolve them, ultimately led me to conclude that this research, as are all of the constructions of knowledge re-represented within it, is a set of situated knowledges, partial and emerging from specific, embodied, situated locations. As Haraway (1991: 193) argues, "the knowing self is partial in all its guises, never finished, whole, simply there and original; it is always constructed and stitched together imperfectly, and *therefore* able to join with another, to see together without claiming to be another." Through the set of theory-methods described in this and the previous chapter, my aim was to provide some understanding of the conceptions of "differences" of race, class, and sex/gender in accounts of cardiovascular disease causation located and produced within scientific worlds and embodied positions. This project delineates what can be characterized as a science-lay divide in how these differences are signified, how they operate in the world, and the extent to which they shape and reflect social ideologies of inequality and ideas about risk and health. In the next chapter, I begin to explicate the origins and dimensions of this divide by providing a brief historical account of the contemporary evolution of cardiovascular epidemiology, since about the mid-twentieth century, and outlining some of the technical and epistemological tensions and problematics involved in the study of "difference," inequalities, and cardiovascular disease.

Chapter Three
A Contemporary Chronicle of Cardiovascular Epidemiology, c1947 to the Present

A. Introduction

This chapter first provides a brief historical background of cardiovascular epidemiology, emphasizing the contemporary social and historical developments most directly relevant to the conceptualization and study of individual and population differences, particularly those of race, class, and sex/gender. I also explore the methodological technologies and commitments, concepts, and conditions of the social world of epidemiology most pertinent to considering research on racial, class, and sex/gender inequalities in CVD. These concerns underscore the social and cultural shaping of contemporary epidemiologic practices, and their significance for our current state of official knowledge on cardiovascular disease causation and risks.

Drawing mostly on secondary sources, supplemented with ethnographic data collected from epidemiologic conferences and interviews with epidemiologists, I argue that the epidemiology of cardiovascular inequalities is one contemporary manifestation of bio-power and a domain of power-knowledge, but one that must work to maintain its public authority and credibility in the face of scientific and social disputes. It is also a discipline that is at a historic moment in its development—which may become a turning point: a social movement within the discipline, collectively termed "social epidemiology," is posing serious challenges to traditional or mainstream epidemiology. Social epidemiologists are mustering tools such as new conceptual models and analytic

techniques, greater interdisciplinary collaborations, and the force of explicit political and ethical commitments to further their research agenda. In so doing, they are reshaping the relationships between professional, epidemiologic scientists and the public.

The existence of such heterogeneous, contending schools with seemingly incompatible explanatory paradigms and competing approaches complicates any exploration of the discipline of epidemiology. There is even some debate as to whether or not epidemiology constitutes a stand-alone scientific discipline at all, with a core body of concerns and content. But as Roth (1976: 48-9) explains, epidemiology

> is regarded as a distinct and independent science (or discipline) not because it deals with special problems or because it has acquired a unique content, but because it has developed specialized procedures of investigation and application ... epidemiology can claim no content of its own ... it draws on or "applies" the content of other departments of knowledge.

The existence of departments of epidemiology in various academic institutions in the U.S., the establishment of professional associations and academic journals, and the availability of funding for epidemiologic research indicate the taken-for-granted assumption that epidemiology is a legitimate scientific discipline and approach to an increasingly large body of problems. As such, epidemiology is widely considered to be an authoritative mode of knowledge production on health risks and disease as well as a trustworthy tool for policymaking. Cardiovascular epidemiology has thus become a credible and consequential source of scientific and popular knowledge about cardiovascular disease, and a key site in which conceptions of race, social class, and sex/gender are invoked.

I begin this chapter with a contemporary chronicle of the more recent history of

cardiovascular disease epidemiology in the U.S., focusing on the period between 1947, widely considered to be the debut of modern cardiovascular epidemiology, to the present. I then offer a map of the social worlds located within the arena of cardiovascular disease,[1] in which I examine some of the elements that shape and condition the present practice of epidemiology. Here I explore the debates over the public credibility of epidemiologic science and findings that mark its relationship with the social world of the public and configure how the discipline and its practitioners consider research on social inequalities in CVD. I then move into the social world of epidemiology itself, and examine recent and ongoing conceptual, methodological, and political movements within the discipline that are motivated in part by the desire to address the kinds of social inequalities in disease on which this dissertation focuses. This analysis illuminates the social conditions and elements of and in cardiovascular epidemiology that structure contestations over the conceptualization, measurement, interpretation, and significance of racial, class, and sex/gender inequalities in incidence and distribution.

B. Bio-Power and the Epidemiologic Gaze: The Surveillance of Individuals and Communities Beyond the Clinic

The development of epidemiology more broadly, and cardiovascular epidemiology in particular, are part of a unique set of historical, social, political, cultural, and technoscientific contexts. Epidemiology has historical roots that reach as far back as

[1] See Chapter 2 for explanations of situational and social worlds/arenas analyses. Elements of the social worlds/arenas analysis can also be found in Chapter 5, where I explore some of the relationships between epidemiology and other social worlds, the significance of nonhuman actants, political/economic aspects, organizational/institutional elements, and other major debates.

Hippocrates (Roth 1976), but came of age approximately in the last century and a half. It emerged out of the same crucible that produced the development of bureaucracies and technologies for classifying and enumerating (Hacking 1990), the rise of statistical thinking and the social authority of quantification (e.g., Porter 1986; 1995; Rose 1990), the emergence of a scientifically-rooted biomedical profession and specialties (e.g., Starr 1982), and concerns to intervene in the public's health (e.g., Lupton 1995). Epidemiology's core concerns are with the patterns of health conditions in human populations and with the factors that influence these patterns. Through measurement and analysis, a fundamental project is to develop predictive models of health status (e.g., Gordis 2000; Hennekens & Buring 1987; Lilienfeld & Lilienfeld 1980).

As such, epidemiology aims ultimately to apply its quantitative technologies and products to the governance of collective and individual health, and the factors and behaviors which determine them. Epidemiology thus embodies a form of what Foucault calls bio-power (Armstrong 1983; Shim 2000), a mutually productive combination of power and knowledge, in which apparatuses and technologies exert diffuse yet constant forces of surveillance and control on human bodies, their behaviors, sensations, physiological processes, and pleasures. Bio-power can extend even beyond individual bodies to myriad aspects of society and social spaces. Foucault (1978) argues that during the eighteenth and nineteenth centuries, there was the simultaneous development of various fields of knowledge and the construction of various problems of "population," such as birthrates, longevity, and public health. Governments came to perceive that they were dealing not merely with individual "subjects" but with "populations" characterized by specific phenomena and their own particular variables. These new bodies of

knowledge or disciplines, such as epidemiology, began to construct and establish in wide-ranging and diverse spheres of life polarities of "normal" and "pathological" against which individuals are constantly measured and judged (Canguilhem 1978). Such knowledge fixes and renders individual differences "scientific," pinning individuals—arrayed around constructed notions of the "norm"—down in their particularity. Individuals become cases to be studied, enabling the refinement of more diverse and efficient techniques of control based upon the regulation, quantification, judgment, and hierarchization of human bodies. As Porter (1995: 45) observes, "measures succeed by giving direction to the very activities that are being measured. In this way individuals are made governable; they display what Foucault called governmentality. Numbers create and can be compared with norms, which are among the ... most pervasive forms of power in modern democracies." Reflective of the preoccupations of modernity, epidemiology thus came to serve as an instrument of normalization. Weighted with the power of scientific reason and rhetoric, it is a significant tool for the disciplining of individuals and populations, for the exercise of power over behaviors and bodies, and for arbitrating contestations over different forms of knowledges and their legitimacy.

In this section, I examine the emergence and consequences of the basic theoretical paradigm of epidemiology—the multifactorial model of disease causation—and its implications for the routinized measurement of differences of race, socioeconomic status, and sex. I then turn to what by most accounts is considered the official birth of cardiovascular epidemiology, the Framingham Study. Finally, I describe the subsequent burst of activity in cardiovascular epidemiology which served to place millions of individuals, and multiple communities, under the epidemiologic gaze, and that provided

the scientific basis for claims-making about the nature of cardiovascular risks.

The Dominant Theoretical Paradigm: The Multifactorial Model of Disease Causation

By the turn of the twentieth century, the germ theory—the notion that diseases had specific, singular causes in the form of microorganisms—had become the ruling paradigm for understanding disease causation in the West. Throughout the first half of the twentieth century, however, the credibility of the germ theory was gradually eclipsed by the epidemic or epidemiologic transition: the shift from the predominance of infectious diseases to that of chronic diseases like cerebrovascular disease (or stroke), cancer, and most notably, heart disease. The germ theory's monocausal understanding of disease proved insufficient to account for the increased etiologic complexity and long latency of these new leading causes of death. Also, at the time of this transition, these chronic illnesses were understood to be degenerative, inevitable manifestations of the natural aging process (Susser 1985: 150). However, rising rates of chronic diseases in the industrialized West suggested that they were instead the outcome of multiple and changeable factors that therefore might be potentially preventable. In epidemiology, such hypotheses were eventually coalesced into the multifactorial model of disease causation.

In the multifactorial model, the incidence of chronic illnesses like cardiovascular disease is viewed not as random phenomena, nor as the inevitable outcome of aging, but as linked to specifiable factors of susceptibility and exposure. The multifactorial model posits that most of these illnesses are the result of multiple causes, determinants, and risks, involving complex "webs" of interactions among agent, environmental, and host

factors[2] (e.g., Evans 1978; Gordis 2000; Lilienfeld & Lilienfeld 1980; MacMahon, Pugh & Ipsen 1960; Susser 1985). This is the dominant conceptual framework or foundational assumption underwriting the epidemiology of chronic disease (Bhopal 1999; Krieger 1994; Susser 1985; Susser & Susser 1996a). Thus, contemporary epidemiology understands the health status of individuals to be the outcome of their particular constellations of health risks and exposures. The conceptual shift from a monoetiological to a multifactorial model was accompanied by the rise of statistical epidemiology, which provided techniques through which multiple causal factors could be studied and analyzed. The epidemiologic study of cardiovascular disease in particular emerged as a central player and contributor to the development of this maturing discipline.

The Birth of Modern Cardiovascular Epidemiology: The Framingham Study

The era of the epidemiologic study of cardiovascular disease in many ways began in 1947, when researchers at Harvard Medical School joined with officers of the U.S. Public Health Service to initiate a study in the town of Framingham, outside of Boston.[3] The initial objectives of the Framingham Study were to develop and test methods for the early detection of heart disease, and to screen an asymptomatic population to determine

[2] Host factors include, for example, immunologic status, genetic background, socioeconomic level, hygienic practices, behavioral patterns, age, and the presence of co-existing disease.

[3] I do not mean to suggest that the surveillance of individuals and communities is a new phenomenon emerging in the mid-twentieth century. In fact, governmental apparatuses to measure, survey, record, and regulate patterns of health and disease have been in existence since at least the eighteenth century (e.g., Armstrong 1983; La Berge 1992; Rose 1990). The nineteenth and early twentieth centuries saw a proliferation of government agencies, professional specializations, and philanthropic and volunteer organizations set up to deal with public health issues, including surveillance and intervention activities into practices of health, lifestyle, self- and (in the case of women) other-care, and hygiene (e.g., Fee & Porter 1992; Rogers 1992). However, in the case of studies undertaken to address etiological questions of cardiovascular disease, the mid-twentieth century does represent a watershed in the mass surveillance and measurement of populations via epidemiologic techniques.

rates and incidence of the disease (Dawber 1980: 15). Healthy volunteers would then be recruited and followed for a period of twenty years to observe how many and which of them would eventually develop heart disease. During this period, data on factors thought to be related to heart disease, including "bodily traits, [and] life habits" (Dawber 1980: 16), would be collected.

In 1949, the just-created National Heart Institute (now the National Heart, Lung, and Blood Institute) took over the Framingham Heart Study, based upon guidelines that allocated research into methods of disease prevention and control to the National Institutes of Health while projects concerned with practical control measures belonged elsewhere in the Public Health Service (Dawber 1980: 17). With this transfer came several revisions to the study design and methods (Dawber 1980: 17-23). First, investigators reconsidered the basis for sample selection: Felix Moore, who became director of biometrics at the National Heart Institute, concluded that the study sample needed to be more representative of the town's population if incidence rate estimates generated by the study were to be reliable and applicable to other regions in the U.S. Therefore a random sample was drawn up and participants were recruited accordingly. Volunteers were also accepted but their data was kept in a special category, as their characteristics might differ systematically from participants who were randomly selected. Specific hypotheses were also formulated for testing, including the increase of coronary heart disease with age, male sex, hypertension, elevated blood cholesterol levels, tobacco smoking, habitual use of alcohol, lack of physical activity, increased body weight, and diabetes. Based upon these newly articulated hypotheses, data collection procedures and instruments were revised to gather information on various bodily measurements

(anthropometry); blood pressure; consumption of coffee, tea, alcohol, tobacco, and other dietary factors; physical activity; medical history; blood and urine chemistries; electrocardiograms and X-rays; measurements of pulmonary function; work status and other socio-demographic data.

Over the past half-century, the Framingham Study has produced some of the most notable medical findings related to cardiovascular risk and the progression of heart disease. It identified the major CVD risk factors—high blood pressure, high blood cholesterol,[4] smoking, obesity, diabetes, and physical inactivity—and the influence of age, sex and menopause, and psychosocial factors (NHLBI 2001). As the first site in which the term "risk factor" was used instead of "cause" (Nieto 1999), the Framingham Study also served to verify and integrate the very concept of risk factors into modern medicine (NHLBI 2001). Thus the Framingham Study played a foundational role in establishing the scientific legitimacy and social authority of cardiovascular epidemiology to monitor, control, and govern behaviors and lifestyles.

The contribution of the Framingham Study to the theoretical and methodological development of epidemiology is also highly significant. Susser (1985: 151) argues that it was one of two major historic epidemiologic events (the other being the linking of lung cancer to cigarette smoking) that firmly established the multifactorial paradigm with its attention to potentially modifiable, environmental factors. The Framingham Study is often held up as an exemplar of epidemiologic research, and as the model and prototype for a prospective cohort study (Susser 1985), a specific and (from that point forward) widely-used study design in which a group of individuals is followed over a period of

time to observe who develops the disease or condition in question. Thus the Framingham Study served to demonstrate the utility of epidemiologic research and its ability to enhance the health of the public, reinforcing the social prestige of the discipline, its agenda, and its methodologies.

However, closer examination of the methods and the science-in-action of the Framingham Study reveals the fluidity of claims-making and the constructed nature of epidemiologic knowledge. In many ways, the Study breached many of the foundational principles and rules for the conduct of a study that epidemiologists take to be inviolate (Susser 1985). For example, the basic objective of Framingham was revised after the study and data collection had begun. As originally envisioned by the study's founders in 1947, its purpose was to establish the incidence of heart disease among the general population. However, when the National Heart Institute took over the study in 1949, its rationale was rearticulated as the determination of factors influencing the development of heart disease. Only at this point was a required sample size estimated, and data collection protocols and instruments accordingly revised; these continued to be modified over the years.

Recruitment efforts were not successful in gaining the participation of sufficient numbers of potential respondents selected at random, and the sample was therefore supplemented by volunteers. Indeed the frequency of refusals may have been a factor in the change of aim of the study as a whole. However, most descriptions of the Framingham Study in epidemiology textbooks and other accounts elsewhere omit these

[4] See Karin Garrety's work (1996; 1998; 1997) for a thorough historical analysis of the contestations over the connections between dietary fat, blood cholesterol levels, and heart disease.

alterations, while others defend the methodological integrity of the Study. Dawber (1980: 22), for example, argues that with the modified objective of determining which differences among groups played a role in producing differential incidence rates for heart disease, random sampling and high participation rates were no longer imperative: "Random sampling is not essential if the purpose of an epidemiologic study is to compare subgroups of the population determined by specific characteristics. The primary concern should be that the population contain sufficient numbers of subjects of these characteristics to enable comparison."

In part because of these methodological choices, conclusions drawn from the Framingham Study have always been dogged by questions about their generalizability and the representativeness of the sample. While the study did include slightly more women than men, and some attempts were made to measure indicators of socioeconomic status, concerns are often raised about refusal and retention rates and the inclusion of only white individuals, and it is felt that its estimates of incidence and risk were not reliable enough to be applied to black populations. According to Dawber (1980: 60),

> there appears to be good reason to accept the Framingham findings as a reliable estimate of the actual incidence of the various disorders, with some obvious exceptions: there were too few black residents of Framingham to provide sufficient incidence data; the makeup of the white population was not completely representative of the U.S. white population; and there were more participants of Italian extraction than would be found in most communities in this country. However, unless national origin plays an important role (which apparently it does not), the data reported may be considered reasonably representative of the North American white population.

This conclusion seems curious, in that "national origin" (or ethnicity, as it would most likely be termed today) among whites was summarily dismissed as playing a role in

coronary heart disease incidence, whereas the importance of "race," defined here as a black-white binary, was in comparison unquestioned. Given the relative lack of knowledge about racial disparities in CVD incidence and risk at that time, the taken-for-granted significance of race is striking.

Indeed, given these problems, along with the initial lack of recruitment procedures including eligibility criteria, data collection methods, and details of how the data were to be analyzed, Susser (1985) argues that the Framingham Study would never be funded in today's political, economic, scientific, and regulatory contexts. However, the "successes" of Framingham serve to establish the now dominant conviction that only prospective studies produce sound epidemiologic data and scientifically defensible results (Susser 1985). These successes also contribute to a widely accepted understanding of the kinds of research that yield the best and most legitimate epidemiologic science. I explore the workings and consequences of this supposed hierarchy of legitimate scientific data, and other issues in sustaining the scientific legitimacy of cardiovascular epidemiology later in this chapter.

The Expansion of Epidemiologic Surveillance and Claims-Making on Cardiovascular Risks

Since the Framingham Study, numerous cohort studies, involving scores of communities and millions of individuals, have been launched to investigate etiologic factors of cardiovascular disease.[5] Cohort investigations of other communities began

[5] Numerous epidemiologic studies examining the effects of preventive programs at the community level have also been initiated. However, as these studies investigate the efficacy of CVD interventions, rather than the determinants of CVD incidence and distribution, they are outside of the scope of this project and

soon after the implementation of the Framingham Study, in Tecumseh, Michigan in 1957 and in Evans County, Georgia in 1960. Other community-based studies include the Honolulu Heart Study, started in 1965 with a sample of Japanese American men (N=8,000)[6] who enabled the investigation of cultural, dietary, and immigration factors in the development of cardiovascular disease (Syme, Marmot, Kagan et al. 1975).[7] Beginning in the 1980s, several cohort studies were initiated that involved multiple recruitment and research sites. For example, the Atherosclerosis Risk in Communities Study (ARIC) began in 1987 (N=16,000), with sites across the U.S., and includes a significant sub-sample of African Americans (ARIC Investigators 1989). The Coronary Artery Risk Development in Young Adults (CARDIA) study was initiated in 1984 with a sample fairly evenly divided among blacks and whites and women and men from four urban areas (N=5,100) (Friedman, Cutter, Donahue et al. 1988). In 1989, the Cardiovascular Health Study began among a randomized sample of elderly people (N=5,000) in four clinical sites. Finally, most recently, the Multi-Ethnic Study of Atherosclerosis (MESA) is a 10-year observational study begun in 1999 of the subclinical characteristics and risk factors of cardiovascular disease; approximately 30% of the cohort will be African American, 20% Hispanic, and 10% Chinese American (N=6,500) (Anonymous 2000). Other efforts to focus more exclusively on the cardiovascular risk factors among women and people of color have accelerated, and include the Nurses'

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are not discussed here.

[6] Approximate total sample sizes are provided to give a sense of the large numbers of individuals being enrolled in these studies.

[7] It is not a coincidence that these massive epidemiologic projects were initiated in the post-war period; they were part of a larger phenomenon in the U.S. to produce quantitative criteria for public decisions, aided by the success of quantification in the social, behavioral, and medical sciences. Porter (1995) calls this phenomenon the emergence of a "culture of evidence."

Health Study begun in 1976 with a sample of female nurses (N=122,000) (Stampfer, Willett, Colditz et al. 1985); the Strong Heart Study launched in 1989 among Native Americans (N=4,500) (Lee, Welty, Fabsitz et al. 1990); the Women's Health Initiative which in 1993 started recruiting women from multiple racial and ethnic backgrounds (N=205,000) (NHLBI 1999); and the Black Women's Health Study initiated in 1995 (N=65,000) (Willett & Colditz 1998).

Some of the core epidemiologic claims about cardiovascular risk produced by these observational studies include the following (Blackburn & Epstein 1995): In the 1960s through the early 1970s, epidemiologic research first indicated links between diet, serum cholesterol levels,[8] Type A behavior,[9] and coronary heart disease. In the American Heart Association (AHA) Pooling Project, scientists from the AHA Committee of Epidemiological Studies Subcommittee on Criteria and Methods decided to minimize the perceived uncertainties of an increasing number of small epidemiologic studies on coronary heart disease by conducting a statistical summary of risk factors and individual coronary heart disease risk from several select cohort studies. The Project's publications (Pooling Project Research Group 1978) reporting on their findings "had a major strengthening effect on the risk factor concept as the basis for preventive action" (Blackburn & Epstein 1995: 1258). They also firmly ascertained the quantitative

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[8] See note 4, this chapter.

[9] In the Framingham Study, Type A behavior pattern was measured through questionnaires that included the following questions and items: (1) "traits and qualities which describe you: being hard-driving and competitive, usually pressed for time, being bossy or dominating, having a strong need to excel in most things, eating too quickly;" (2) "feeling at the end of an average day of work: often felt very pressed for time, work stayed with you so you were thinking about it after working hours, work often stretched you to the very limits of your energy and capacity, often felt uncertain, uncomfortable, or dissatisfied with how well you were doing;" and (3) "do you get upset when you have to wait for anything?" (Haynes, Levine, Scotch et al. 1978: 382).

relationships between cholesterol, blood pressure, smoking, and coronary heart disease risk.

The following decade was marked by the emergent understanding of the contributory role of lipids and lipid fractions,[10] insulin, and alcohol consumption in cardiovascular risk. In the mid-1980s through the 1990s, interest in Type A behavior shifted to attempts to dissect component effects of hostility and anger, and the risks associated with restricted social networks and social support. The importance of obesity and body fat distribution were also recognized. Genetic epidemiologic research into DNA polymorphisms potentially linked to CVD began in some of the cohort studies, including ARIC and the Strong Heart Study. The role of diet, particularly the effects of antioxidants and different kinds of foods, was further elaborated.

What are now considered to be the "established" risk factors for coronary heart disease include cigarette smoking, high blood cholesterol, high blood pressure, diabetes, sedentary lifestyle and obesity. These factors also constitute the primary elements that go into clinical risk assessments. Male sex, family history of cardiovascular disease, and increasing age are also widely recognized as risk factors. However, combined, these known risk factors account for or explain only about 40% of the cases of CVD; that is, over half of the individuals who have CVD have none of these factors (Syme 2000: xi). Thus ongoing epidemiologic research is also examining a slew of emerging and novel risk factors—such as homocysteine, inflammatory factors, and fibrinogen, among others—for their effects on the incidence and progression of cardiovascular disease, and

[10] Lipid fractions include high-density and low-density lipoproteins—the now fairly well-known LDL or "bad" and HDL or "good" cholesterol—as well as triglycerides.

for their predictive value in predicting identifying who will eventually develop CVD.

Cardiovascular epidemiology is attempting to predict with increasing accuracy those who will develop cardiovascular disease and those who will not. More broadly, epidemiologic research is producing knowledge that can often be readily translated into behavioral and risk reduction mandates. Under the intense surveillance of epidemiologic cohort studies, individuals classified as distinct groups and populations characterized by particular demographic and behavioral factors become sites for the further production of epidemiologic knowledge on cardiovascular risk. When behaviors are implicated in producing more frequent adverse outcomes, as is often the case, standards of conformity and deviance are created: "In this sense, epidemiology is inevitably a 'normalizing' science, employing—and reinforcing—unexamined notions of normality to measure and classify deviations from the norm" (Epstein 1996: 47; see also Petersen & Lupton 1996: 29). Moreover, the power of these knowledge claims and acts of judgment about health risks is magnified by the mask of scientific neutrality, generated as they are through the constitution of epidemiologic knowledge and the rational, statistical arbitration of risk. The validity of epidemiologic calculations, embodied in their seeming abstractedness and scientific objectivity, serve as "an agency for acting on people, exercising power over them ... Numbers turn people into objects to be manipulated" (Porter 1995: 77). Individual bodies are constructed not as the potential objects of medical control, but as the de facto objects of epidemiologic surveillance, under the current assumption that almost all bodies have one or more health risk factors (Armstrong 1995). Epidemiology's classificatory practices thus confer scientific legitimacy on the enterprise of risk assessment and management, imparting an aura of rationality to what are thoroughly

social, power-laden, and ultimately hierarchical discourses, institutions, and practices.

These governing and disciplining knowledges and technologies of epidemiology took on and reflected long-standing public health and biomedical concerns to categorize and pathologize populations by race, social class, and gender (e.g., Anderson 1996; Ernst & Harris 1999; Jordanova 1989; Krieger & Fee 1994; Lupton 1995; Oudshoorn 1994; Porter 1999; Shah 2001). The epidemiologic gaze continues to sharpen its focus, such that scrutiny has converged upon select groups who manifest or embody a disproportionate share of the "problem" of cardiovascular disease. Based on the multifactorial model, epidemiologic research seeks to identify characteristics of the "host" that increase the likelihood that a category of individuals defined by those characteristics will develop some condition or disease. As Waldby (1996:101) explains,

> This conceptualisation of disease aetiology means that epidemiological science can only proceed through the specification and classification of sub-populations. If the social topography of disease is taken to indicate a pattern of disease aetiology constituted at least in part through host factors, then hosts must be categorised according to these factors.

Thus, the conceptual framework of the multifactorial model—that posits that differences in host characteristics, among other factors, determine disease—enables the biomedical relevance of racial, class, and sex/gender classifications and their inclusion in epidemiologic research. Following these conventional epidemiologic practices where the population at large is categorized into more specific classifications of higher- and lower-risk groups, the focus has narrowed on sub-populations—often characterized by socio-demographic dimensions of race, socioeconomic status, and sex—who represent apparently more pressing concerns. In so doing, however, epidemiology has run into a

series of issues that can be explicated through a social worlds/arenas analysis, which I offer next.

C. Ruptures in Discipline: A Social Worlds Analysis of Contemporary Cardiovascular Epidemiology

The present situation of cardiovascular epidemiology reflects in many ways this relatively short history and its shifting, tenuous positions vis-a-vis clinical medicine and the biological and social sciences. Currently, the production of epidemiologic knowledge continues to escalate, and the public and policymakers increasingly turn to its findings for guidance on risk identification, assessment, and management. At the same time, the reliability, utility, and relevance of epidemiology has been subject to increasingly intense scrutiny by both members within the epidemiologic community and from without. In particular, debates over the front and back ends of the epidemiologic research process—setting the agenda and research questions, and the interpretation and application of results—can be especially intense. As such, epidemiology as a discipline constitutes a significant site of both public and professional surveillance, participation, and/or intervention.

In this section, based on ethnographic and interview data, as well as a literature review of commentaries on epidemiologic theories, methods, and the state of the discipline, I first offer a social worlds map of the arena of cardiovascular disease. I then provide a more in-depth analysis of a portion of that map, specifically the social worlds of cardiovascular epidemiology and one set of implicated actors (Clarke & Montini 1993; Clarke 2002), the public. In doing so, I consider questions of the public belief in and

understandings of epidemiologic knowledge and examine some of the contestations pointing to ruptures in the supposed cohesion and consensus of epidemiologic conventions. These debates over the credibility of mainstream epidemiology involve some of the key concepts and discourses in the situation of cardiovascular epidemiology, including the notions of validity and causal inference, and cultural discourses on risk, reliance on science, and social credibility. These elements prove to be particularly consequential for the study of social inequalities in CVD.

A Social Worlds Map of the Cardiovascular Disease Arena

Figure 3.1 shows the arena of cardiovascular disease in the U.S., situated within the broader arena of health and health care, each drawn with dotted lines to signify their porous and fuzzy boundaries. A number of different social worlds are present in one or both of these domains (some also extend outside of larger arena of American health care). Federal agencies like the National Institutes of Health (NIH), particularly the National Heart, Lung, and Blood Institute (NHLBI) and within the NIH Office of the Director, the Offices of Research on Women's Health (ORWH) and Minority Health (ORMH), are critical to the arena as major actors in setting priorities for research, its funding and regulation, and disseminating, translating, and applying research findings on cardiovascular disease to clinical practice and prevention policies.

Non-governmental organizations like the American Heart Association (AHA) constitute another significant social world. The AHA has local, regional, and national chapters, provides extensive funds for research, supports educational campaigns and other interventions, and houses a substantial scientific and professional arm that sponsors

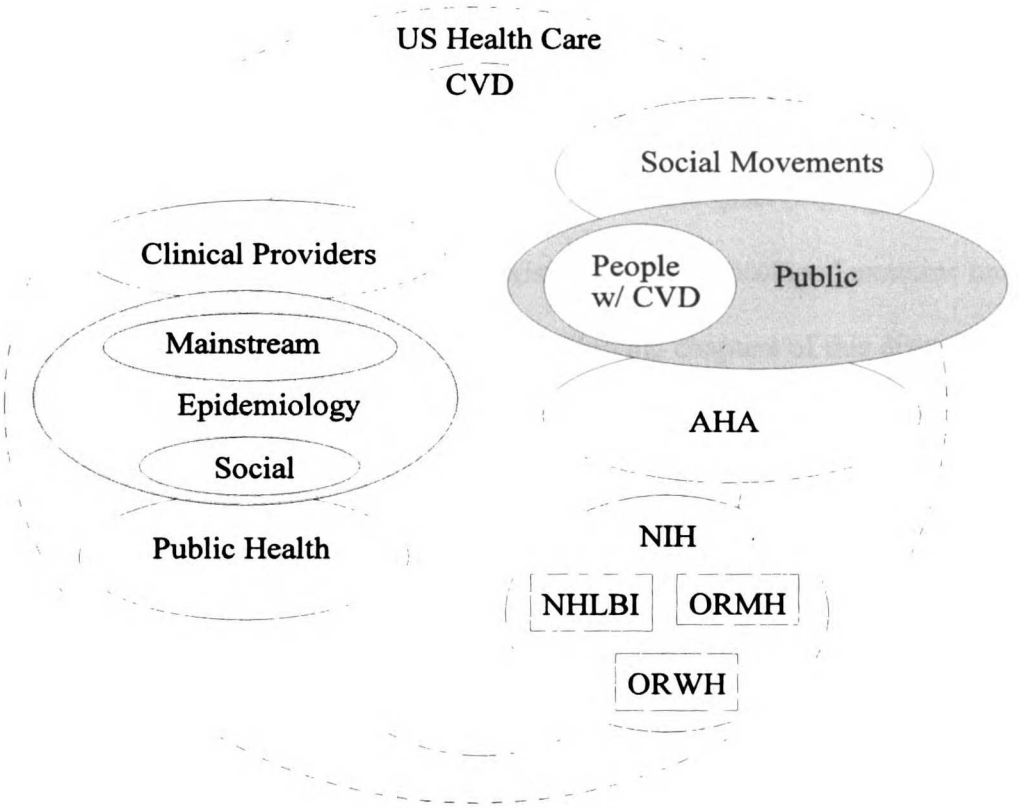

Figure 3.1 A Social Worlds Map of the Cardiovacular Disease Arena

numerous conferences and issues consensus statements on CVD treatment and prevention.

A number of other professional social worlds populate the arena of cardiovascular disease, including public health providers, clinical and basic science researchers, and clinical providers such as internists, cardiologists, nurse practitioners, nutritionists, and other health professionals. These actors often overlap with researchers and epidemiologists, and through their experience, practice, and public voice exert significant influence over how CVD and cardiovascular risks are conceptualized, studied, and treated. As later chapters will show, social movements such as the civil rights/anti-racism

movements, women's health movements, health activists for communities of color, and the AIDS movements are also present and significant to varying degrees, through their impacts on the public credibility and social status of health research and epidemiology. Finally, there are two social worlds—the public and epidemiologists (highlighted in Figure 3.1)—whose internal dynamics, characteristics, and relationships I examine more closely in the remainder of this chapter and in the following chapters of this dissertation.

The Public as Implicated Actors: Public Credibility and Understanding of Epidemiology

A social world central to understanding the present state of epidemiology is the public, and I have found that ongoing debates about its public credibility, and the public's understanding of its science play a significant role in shaping the social world of epidemiology. In contrast to the actors in many of the other social worlds mentioned above, the public, of which people with CVD are a part (see Figure 3.1), are not collective actors. They do not have an explicit group-based identity or commitments, and are thus differently situated in the arena than other, more organized social worlds. More significantly, although lay actors possess their own understandings, conceptions, and theories about CVD causation and risk, their knowledges are rarely defined or valorized as such, nor are they given active voice and participation in the production of authoritative knowledge. As such, they are most often implicated actors (Clarke & Montini 1993; Clarke 2002) in the CVD arena. According to Clarke (2002: 102),

> There are at least two kinds of implicated actors. First are those implicated actors who are physically present but are generally silenced/ignored/invisibled by those

> in power in the social world or arena. Second are those implicated actors *not* physically present in a given social world but solely discursively constructed by others; they are conceived, represented, and perhaps targeted by the work of those others ... *Neither* category of implicated actors is actively involved in the active negotiations of self-representation in the social world or arena, nor are their thoughts or opinions or identities explored or sought out by other actors through any openly empirical mode of inquiry.

While people living with cardiovascular disease are physically present in the arena, both they and the public at large are also discursively constructed by epidemiologists, clinicians, and public health personnel. One of the major ways in which I find "the public" represented in the CVD arena pivots around the question of their understanding and uptake of epidemiologic "facts."

In epidemiology, arguments about the public "misunderstanding" of the study of cardiovascular disease are mobilized by clinicians and epidemiologists to explain impediments to the judicious application and potential of epidemiologic knowledge to improve the public's health, which in turn reduce the perceived efficacy of epidemiology to identify and manage CVD risk. Epidemiologists, like many other scientists, feel that public doubts about the utility of epidemiology stem from the public's fundamental misunderstanding of the objectives, interpretations, and inherent limitations in the scientific arbitration of risk. Yet such contestations play a significant role in the social world of cardiovascular epidemiology, and structure the general conditions under which research on racial, class, and gender inequalities can be and are conceptualized, funded, and interpreted.

The quest for understanding the complex and subtle "webs of causation" that link cardiovascular disease to socio-demographic characteristics, styles of life, environmental

factors, and the distribution of social structural opportunities and constraints relies, for the moment, upon fairly blunt instruments. Observational or "risk factor epidemiology" can conclude whether there is a statistical link between factor X and CVD, but usually cannot say that X works through mechanism Y, is countered in its effects by factor Z, or even if X causes cardiovascular disease in some way. That is, in settling questions of causality—the very reason why such studies are presumably launched in the first place—epidemiologic research frequently falls short. While most epidemiologists are quite mindful about the distinctions between findings of statistically significant associations and inferences of causal effects, they worry that such distinctions are usually lost or muted in public representations, often leading to interpretations that infer or draw linear causal connections from the purported risk to some cardiovascular outcome.

Then-editors of the *New England Journal of Medicine*, Marcia Angell and Jerome Kassirer (1994), among others (see e.g., Mann 1995; Taubes 1995), find fault with the press for its reporting of epidemiology, and with the public "for its unrealistic expectations" (Angell & Kassirer 1994: 189) of what modern medical research can do for their health. They assert that "the public at large needs to become much more sophisticated about clinical research, particularly epidemiology," and

> what is called for is more moderation in our response to news of clinical research ... In general, we should not embrace the conclusions of a study until other studies support them. Reserving judgment in this way, without succumbing to antiscientific nihilism, is the best protection against being whipsawed by media reports of clinical research. (1994: 190)

Such representations of a misguided public echo Irwin and Wynne's (1996a: 215) observation that the dominant ideology within the public understanding of science

assumes that lay people desire and expect certainty, and that they therefore are incapable of confronting "science's 'grown-up' recognition that risk and uncertainty are intrinsic to everything." However, qualitative field research (e.g., Irwin & Wynne 1996c) indicates no such naivete, and instead shows that individuals and groups are quite sophisticated and sometimes more aware than scientists are forthcoming about the ambiguities and contingencies of scientific knowledge.[11] Certainly Nelkin (1995) found that public reports of scientific findings are typically overly enthusiastic and optimistic and make false or premature promises. Moreover, science, technology, and medicine studies' approaches to the public understanding of science (e.g., Irwin & Wynne 1996c; Jasanoff, Markle, Petersen et al. 1995) tend to view normative assessments of the public's "misinterpretation" and "ignorance" of scientific objectives, methods, and results as socially constructed and power-laden framings of the "problem." Such claims serve to fortify the demarcation between "expert" understandings and analyses of risk and disease and what the "lay" public is able to grasp, thereby sustaining the social credibility and authority of science.

Public doubts about the utility and credibility of epidemiology implicitly and explicitly question the ability of cardiovascular epidemiology, as currently practiced, to address the kinds of issues that some argue matter most for public health. The taken-for-granted nature of the epidemiologic paradigm seems to have been disrupted to some extent, and there is no longer the undisputed confidence that standard techniques will

[11] Irwin and Wynne (1996a: 218) conclude that "what scientists interpret as a naive and impracticable public expectation of a zero-risk environment can ... be seen instead as an expression of zero trust in institutions which claim to be able to manage large-scale risks throughout society." The analyses described in the following chapters of this dissertation seek in part to explore this proposition in the context of accounts of cardiovascular risk and causation.

provide plausible and reliable answers to questions of disease etiology and risk reduction. Moreover, such challenges as the persistence of social inequalities in CVD incidence and outcomes are proving increasingly pivotal to perceptions of the public and scientific efficacy of epidemiology, and testing the limits of conventional epidemiologic practices. At their core, these contestations speak to the changing social conditions and situations of the arena within which epidemiology plays an increasingly visible and public role, yet paradoxically also comes under increasing fire. In this context, an emergent sub-world of epidemiology has been coalescing, and its distinct orientations and commitments are turning out to be deeply consequential for the epidemiologic study of social inequalities in CVD.

Scientific (R)evolution? Conceptual, Methodological, and Political Movements Within Epidemiology

In this section, I examine in greater depth the social world of epidemiology, and the efforts of a set of key actors working to delineate a sub-specialty and a social movement—termed "social epidemiology"—within it.[12] This sub-world is calling for transformations in the ways in which disease causation is conceptualized, the very definitions of what constitute "causes" and "risks," and the procedures through which disease risks are identified and studied. Social epidemiology—also referred to as ecological or ecosocial epidemiology, or multilevel or contextual analysis[13]—pertains to

[12] See Bucher (1988; 1962) and Bucher and Strauss (1961) on reform movements in professions.

[13] Others may take issue with my consideration of ecological epidemiology, multilevel analysis, or contextual analysis as essentially synonymous with social epidemiology, arguing that some social epidemiologists are less engaged with the issues of combining micro- and macro-level variables, and more with inclusion of social and political determinants of health. However, since many of concerns of social

the epidemiologic investigation of the social distribution and social determinants of health (Berkman & Kawachi 2000). It is significant to the larger social world of epidemiology and the arena of cardiovascular disease for its innovative concerns with social inequalities in disease, its methods of studying social factors and differences, and its influence upon the disciplinary conditions under which the understandings of the effects of race, social class, and sex/gender on cardiovascular disease are being forged.

The organizing concerns of social epidemiology were in part born out of critiques of the continuing inability of traditional epidemiology to fully explain individual and group-level variances in disease incidence and outcomes. Social epidemiologists argue that social relations may affect individual health outcomes independently from individual factors (e.g., Diez-Roux 1998a; Susser 1998; Susser & Susser 1996b), an epidemiologic analog to the sociological proposition that individuals are shaped not only by their personal characteristics but also by the characteristics of the social groups to which they belong. As Krieger (1994: 894) asserts,

> the essential claim is that understanding patterns of health and disease *among* persons in these groups requires viewing these patterns as the consequence of the social relationships *between* the specified groups ... This perspective ... asks how individuals' membership in a society's historically-forged constituent groups shapes their particular health status, and how the health status of these groups in turn reflects their position within the larger society's social structure.

Social epidemiologists thus promote the thesis that disease is *socially* produced, and that the relative positions of socially-designated *groups* and the structural processes and

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epidemiology involve dynamics and social relations occurring on levels beyond the individual, and because many of their critiques of conventional epidemiology and proposed solutions are quite similar to those of ecological and multilevel analysis, I treat them as overlapping endeavors here.

institutions that maintain such positions are highly consequential for their health. A more comprehensive understanding of disease etiology must therefore include the investigation of social, cultural, and political forces as causes of illness, as well as the biological ones. Given such conceptual foundations, social epidemiologists constitute the vanguard in the epidemiologic study of health inequalities, particularly those by race, ethnicity, social class, and gender.

Many commentators (e.g., McMichael 1995; Pearce 1996; Vandenbroucke 1994) have observed that the concept of an epidemiology that takes seriously, in theoretical and methodological terms, the influence of social relations and structural environments is not new. They argue that these kinds of approaches are in fact a return to the ecological, environmental, community, and social concerns of epidemiology's early pioneers, such as Edwin Chadwick, Friedrich Engels, Rudolf Virchow, and John Snow. Susser (1985: 153) notes that more recently, during the mid-twentieth century epidemiologic transition from infectious to chronic diseases as leading causes of death in the U.S., it became increasingly clear that social and environmental factors were significant to the incidence of illness. Epidemiologists then turned to social science to address the need to conceptualize and apply "sociologic variables" in order to extend the reach and application of epidemiology. Key innovators in this tradition include Graham (1963), Susser (1964), Syme (1965), and Cassel (1976). Shy (1997: 483) has characterized research in the epidemiology of cardiovascular disease as being among the most earnest of the sub-disciplines in its attempts to integrate societal with individual perspectives on health and disease. Even so, cardiovascular epidemiologists, "who have elaborated a complex 'web of causation,' have failed to study the impact of potential changes in public

policy or in community-organized activity on cardiovascular health status" (Shy 1997: 483). But although epidemiologic research into social factors has always been conducted, not until recently has it gained widespread recognition and growing status as a sub-specialty within epidemiology.

To analyze the distinctions between mainstream or conventional epidemiology and social epidemiology, I focus first on the differing technologies in terms of study designs and methods of measurement available to them, and how the scientific and social significance of certain definitions of validity serve to contain social epidemiology in a relatively subaltern position within its social world. I next explore disputes over individual versus group-based levels of analysis, and social epidemiologists' critiques of mainstream epidemiology's tendency to individualize disease phenomena. Finally, I consider some of the potential implications of social epidemiology for the social world of epidemiology and the larger arena of cardiovascular disease.

Methodological Fissures in Epidemiology: Validity and Causal Inference

Efforts to coalesce the social epidemiology movement and solidify its position in the larger discipline are currently underway and focus on articulating the conceptual frameworks and methodological tools that enable the scientific investigation of the social production of disease. Major stumbling blocks to ecological epidemiology's gaining legitimacy within the larger domain of epidemiology, and a significant source of dissension between it and conventional epidemiology, are problems with maximizing scientific validity and issues of causal inference. Such problems underscore and emerge from the distinctions in methodological commitments, objectives, and technologies used

by and available to mainstream versus social epidemiologists.

An understanding of these issues requires first some discussion of how validity is methodologically produced. Evolving alongside advances in basic and clinical research, epidemiology has developed a well-understood hierarchy of research models and kinds of data based upon the perceived relative validity of the answers each provides. This hierarchy embodies, in a sense, the epidemiologic conventional wisdom on the ability of various kinds of study designs to make scientifically-supportable claims. At the apex of this hierarchy is the randomized controlled trial (see Marks 1997), in which the exposure to some suspected causal factor is applied to a randomly selected "experimental" group of research participants, while it is replaced with some kind of placebo or alternate intervention for the other, "control" group. This design enables the assumption that the experimental and control groups, overall, are quite likely to be "otherwise equal" with the sole exception of the exposure or risk factor under study, and that any observed effect must be due to the independent contribution of the experimental intervention. This ability to experimentally and deliberately control the exposure independently of other factors, and the random selection of who is to be exposed, are widely represented as making the randomized trial the most powerful research tool for measuring the causal contribution of some factor to producing some outcome. Indeed, in scientific meetings, public lectures on CVD risks and causes, interviews with epidemiologists, and in epidemiology textbooks, these features of clinical trials are repeatedly noted in order to bolster the legitimacy of their conclusions.

On the other hand, observational data of the kind generated in large quantities by

cardiovascular disease cohort studies,[14] like those described earlier in this chapter, are regularly depicted as coming in a poor second. In fact, observational data are often viewed as suspect, and problematic in that they can lead to misconceptions about disease etiology and risk that are sometimes obdurate, even in the face of later, "more accurate" data countering observational findings. For example, epidemiologists I interviewed frequently note that data from observational studies of the effects of hormone replacement therapy on CVD risk led to the belief that it reduced cardiovascular risk for menopausal and postmenopausal women. Yet this conventional wisdom was subsequently contradicted by recent data emerging from several large, highly reputed clinical trials. Respondents thus repeatedly caution that findings from observational studies must be viewed as provisional answers, and not definitive ones. "Conclusive" answers, they warn, can only be obtained through randomized controlled trials.

However, assessing chronic disease causation involves substantial uncertainties on pivotal issues such as the timing and nature of exposures, long incubation periods and the progressive nature of chronic disease, and the multiple co-factors involved in the pathogenesis of most chronic diseases including cardiovascular disease.[15] These kinds of complexities pose significant challenges to a central problem in epidemiology, the issue of *causal inference*, where clues about causal factors and disease determinants are

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[14] Observational data come from cohort and similar kinds of studies, where interventions or treatment are not being attempted.

[15] In fact, because of the etiologic complexity of chronic disease, the term "risk factor" rather than "cause" is usually applied (Evans 1978: 167). Some (e.g., Dawber 1980) have gone so far as to state that "cause" is a word that epidemiologists prefer to avoid, as it connotes that a factor labeled as such would lead to disease in every case of exposure, when disease-related factors that still have a causal effect rarely if ever work in such a fashion. While the judgment of whether a particular risk factor operates in an associative or in a cause-effect manner is traditionally represented as a separate stage in the epidemiologic method, in everyday epidemiologic parlance the terms "risks" and "risk factors" often refer to suspected direct or indirect "causes" or "causal mechanisms" of CVD.

gleaned from data and observations. For example, many of the risk factors under study in cardiovascular epidemiology, such as sedentary lifestyle, obesity, or high cholesterol, take years to produce an effect large enough to be measured. Thus randomized trials of such risk factors would be prohibitively slow and expensive to conduct.

In addition, the factors of most interest to this dissertation—racial, class, and sex/gender differences—cannot be randomly "assigned" to individuals as can a drug or a low-fat diet; moreover, even if it could, it could not be done so independently of other factors that would make the "experimental" and "control" groups "otherwise equal" (see e.g., Kaufman & Cooper 1999). One's race, social class, and sex/gender permeate and indelibly shape so many other aspects of life potentially related to cardiovascular health that it would be impossible for groups of varying racial, socioeconomic, or sex designations to be "otherwise equal." This thereby violates a key assumption that helps to in making valid inferences of causality. Thus, not only feasibility but also epidemiologic validity becomes problematic in the quest to address issues of social inequalities and their consequences for cardiovascular health through clinical trial research. Observational research, then, represents the next best solution.

But, in relying on observational studies, social epidemiologic research on the roles of socio-demographic inequalities in cardiovascular disease incidence and distribution encounter other methodological quandaries that have hampered its ability to state with confidence the conclusions of a study and its implications. First such research depends upon the reliable collection of myriad factors that influence cardiovascular health. Through the application of multivariate statistics (an analytic analogue to the theoretical framework of the multifactorial model (Diez-Roux 1998b)), it is assumed that the

contributions to the outcome of each variable—including race, socioeconomic status, and sex/gender—can be independently calculated. However, for the reasons stated above about the impossibility of disentangling race, class, and sex/gender from each other and from other aspects of life that may affect CVD incidence, this assumption that "independent" variables can be isolated from the others is again violated.

A second methodological quandary of social epidemiology based on observational study designs into social inequalities in CVD requires defining the epidemiologic concept of validity. In designing a study, there is always some amount of trade-off between what are termed "internal" and "external" validity. Internal validity is closely related to the issues of causal inference discussed above. It refers to the extent to which conclusions drawn from the data in fact reflect the normative "reality" of the group being studied per se, and are not the outcomes of biased or chance observations. This aspect of epidemiologic research is often encapsulated in calculations of a study's "statistical significance," "confidence intervals," and so on. External validity in contrast refers to the degree to which the conclusions drawn about the group under study can be applied to other groups and populations; this characteristic bears on concerns around a study's "generalizability."[16] Thus the selection of a study sample that is heterogeneous, while enhancing its external validity because the sample mirrors more closely the natural variability within the general population, may threaten its internal validity because so many differences exist within the sample that it is difficult to tease out which of them may play a role in the outcome of interest. On the other hand, the selection of a more restricted sample has the potential to strengthen its internal validity, but at the expense of

its generalizability. Because of this seemingly unavoidable trade-off, research on samples that are diverse along racial, socioeconomic, and gender lines—which social epidemiologists, given their interest in social factors, are generally committed to recruiting—may be viewed as scientifically suspect in terms of their internal validity. On the other hand, while studies limited to specific socio-demographic groups—samples, in effect, defined by their "difference"—are viewed as circumscribed in their applicability to other groups. Working on the assumption that results without internal validity are of little use to either the group being researched much less for other populations, most mainstream epidemiologists tend to give up external validity for internal validity, creating a body of knowledge based on fairly circumscribed and homogeneous samples.

A third issue with social epidemiologic research on CVD disparities is that such studies often involve the measurement of complex social variables like race and social class[17] as well as observations of health-related behaviors. This is based upon the hypothesis that behavioral differences among racial, class, and gender groups may account for some portion of the differences in CVD incidence. However, the measurement of such social and behavioral attributes is plagued by questions of scientific validity (the extent to which they measure what they set out to measure), and reliability (usually judged by the degree to which measurements can be replicated across space and time). Social epidemiologists I interviewed who use or had considered using such variables in their research recount the subtle pressures they feel to "prove" their scientific

[16] External validity also depends on the response rate and retention of participants throughout the course of a longitudinal study, in addition to the initial eligibility criteria for inclusion that are discussed here.
[17] How cardiovascular epidemiologists manage the measurement and conceptualization of such social variables is the focus of later chapters in this dissertation.

acceptability, and to choose instead biological indicators perceived to be more reliable because they are viewed as more replicable.[18] Many social epidemiologists are thus "disciplined" by their colleagues and by epidemiologic convention, and socialized as scientists to favor those risk factors and clinical markers that can be operationalized and measured physiologically, as these are viewed as less contestable and more believable than potential risk factors such as racial or class discrimination. Such physiological factors are considered to refer to phenomena whose measurement is "detached from the individuality of its makers" (Porter 1992: 644)—and, I would argue, of its reporters, the human participants themselves—and therefore conceived as more reliably comparable across cases. Within epidemiology, stable and quantifiable markers that reside in the biological body are constructed as more definitive and accurate indicators of risk and effect, or as one epidemiologist puts it, as more likely to be "really measuring what you want it to measure," and therefore less threatening to internal validity. Causal claims are thus seen as far more legitimate when they emerge from studies using biologically manifested measures. Epidemiologic research on the causes of social inequalities in cardiovascular disease, then, often falls short of ideal standards of measurement and validity in this regard.

However, social epidemiologists caution that such epidemiologic standards exact a price on the relevance and utility of epidemiologic research to address pressing concerns of public health. For example, one researcher warns of the consequences of mainstream epidemiology's continuing reluctance to move away from such biological indicators:

[18] However, Garrety (1996: 188-90) shows that in the case of serum cholesterol, the perception that physiological measures are more reliable in this regard is not always true.

> Traditional epi[demiology] is something that can be physiologically measured like a serum sample, or urinalysis, or a blood pressure reading, height, weight—things that they can actually measure that are objective criteria. And they tend to shy away, I think, from things that are a little bit more subjective and require a little bit more interpretation because the validation, the bias issues then become huge. But there's no way around it ... social factors are subjective. They're how people interpret their reality and no matter how we want to objectify it, you can't ignore the subjective component of it, and you have to just accept it ... But I don't think epidemiologists are ready for that because it's just ... outside their realm. We're not trained to develop scales, we're not trained to validate scales, we're not trained to measure things by self-report well ... until epidemiologists are willing to move into the subjective realm a little bit more, you know we're not going to go past the point we're at now. As you can see, the abundance of papers that have been written on hypertension and cardiovascular disease—it's disgusting almost how many have churned out the same exact results because people don't want to move beyond that realm ... we're kind of getting into a circle, a rut, because we're unwilling to move out and do the things that are necessary to get us out of that rut, as a field.

Social epidemiology very frequently encounters perceptions that it is of diminished scientific rigor and questionable validity, and scientifically subordinate to basic science and clinical trial research, often frustrating and confounding the funding, conduct, and dissemination of such research. Data from interviews with cardiovascular epidemiologists indicate that this subaltern position is often embedded within and reinforced by such institutional processes as the bureaucratic organization of scientific meetings. One epidemiologist, for example, relates how the selection of abstracts for presentation at conferences often favors basic science, clinical trial, and very large cohort studies, resulting in a lack of visibility for behavioral research, further shaping and reproducing the scientific community's perceptions of the legitimacy, validity, relevance, and scientific worth of such work. Only with new institutional practices, such as establishing separate review committees dedicated to selecting behavioral and more novel research that characterizes much of the epidemiologic research on social inequalities in

CVD, can this systematic marginalization reversed.

Disputes Over Conceptual and Methodological Individualization

In addition to these methodological concerns of validity in the epidemiology on racial, socioeconomic, and sex differences, there are a host of broader, more fundamental epistemological debates that figure prominently in the segmentation of the social world of epidemiology. A primary point of contention is the devolution of the focus of epidemiologic concepts and practices to the individual. Because most epidemiologic findings emerge from research in which the unit of analysis is the individual, processes and dynamics of disease risk and causation are systematically reduced to the level of the individual, simultaneously simplifying a complex world into smaller, presumed independent units of observation.[19] "Problems of scale, complexity, and multidimensionality have thus been minimized" (McMichael 1995: 633). The image of a complex and interconnected "web" of both causal and protective factors that together determine an individual's health status tends to concentrate attention on those risk factors *closest* to the outcome of interest. These typically translate to the direct biological or behavioral risks addressable at the individual level (Diez-Roux 1998a; Krieger 1994; McMichael 1995). Krieger (1994), for example, finds that, at critical shifts in the historical development of epidemiology, practitioners were exhorted to focus on identifying "causes" most amenable to medical intervention as closest to the specified outcome as possible, given that "'even knowledge of one small component may allow

[19] See for example Diez-Roux (1998a), Krieger (1994), McKinlay (2000), McMichael (1995), Pearce (1996), Shy (1997), and Susser and Susser (1996a).

some degree of prevention'" (as quoted in Krieger 1994: 890). Even so-called "psychosocial" and "social-behavioral" variables—such as hostility, health-seeking behaviors, and social support, and lifestyle factors like exercise, diet, and smoking—are measured at the individual level. Underwriting such methodological practices is the notion that these factors, despite their occasional designation as "social" variables, are individually mediated, the independent characteristics and behavioral choices of decontextualized individuals. Social epidemiologists thus argue that these practices implicitly assume that characteristics of one's social environment, as incorporated in the multifactorial model, are exogenous to the individual—that one's circumstances are taken as a given, as if individuals were dropped into a set of conditions that are not socially constructed nor patterned (Krieger 1994).

Moreover, social epidemiologists also assert that conventional interpretations given to statistical associations between many of these other factors and measures of race, socioeconomic status, and sex serve to further reinforce the "individualization of risk," perpetuating the notion that risk is individually, rather than socially, determined (Diez-Roux 1998a). For example, the recognition that rates of sedentary lifestyle or physical activity vary systematically by race, income, education, and sex (NCHS 1998) is at times interpreted to be the consequence of the lifestyle choices and risk management routines of individuals (e.g., McGinnis & Foege 1993). At other times, studies examining rates of physical activity adjust for race and socioeconomic status or compare across racial and socioeconomic categories (e.g., Crespo et al. 2000), often with little discussion or explicit study of the complex social contexts and causes leading to sedentary lifestyles. The first convention clearly individualizes the risk of physical inactivity, fostering "blaming the

victim" assumptions, while the second often can leave the impression that such associations are to be expected given the populations in question, playing into common racial and class stereotypes.

Conventional epidemiology therefore remains predominantly concerned with the identification of individual-level risk factors (Pearce 1996), earning it the label of "risk factor epidemiology." Such consequences further concretize the notion that non-intersectional and individualistic constructions, such as racial classifications, socioeconomic status, and sex, help "explain" the distribution of health and illness, pushing aside uncertainty and ambiguity over what *exactly* about one's race, class, and sex/gender shapes risk for chronic illness and how these mechanisms operate in concrete practice. There is an inherent contradiction here: race, class, and gender are not attributes of individuals, but refer to relations among socially defined and differentiated groups. Thus an epidemiology of individuals and their risk factors will not be able to account for such group-based processes and relationships. All of these forms of myopia, many social epidemiologists argue, produce an overly simplified, reductionist, and therefore inaccurate and scientifically invalid picture of disease causation and risk vis-a-vis such categories.

Social epidemiologists are advocating instead fundamental conceptual and methodological shifts that require the incorporation of variables at the group level into the analysis of individual-level health outcomes (e.g., Diez-Roux 1998a; Duncan, Jones & Moon 1996; Von Korff, Koepsell, Curry et al. 1992). Though this may appear at first mention to be a relatively innocuous practice, it in fact challenges many of epidemiology's standard operating procedures and assumptions about the scientific

validity and legitimacy of different types of research and data. With the "individualization of risk" (Diez-Roux 1998a) and the focus on individual factors and outcomes, group-level data is perceived by traditional epidemiologists to be less useful in contributing to etiologic understanding. Further, such data can even viewed as somewhat suspect in that they can indicate associations between some variable and outcome that may not bear out at the individual level—the lore of epidemiology is in fact littered with famous examples of such "ecological fallacies."[20] Contextual analyses are also critiqued on the basis of general proscriptions against mixing individual-level with community- and macro-level variables; numerous methodological complications can arise and drawing causal inferences from the data is subsequently seen as problematic (see e.g., Diez-Roux 1998a).

However, social epidemiologists counter that while such concerns are indeed methodological difficulties, "the complexity of developing theoretical formulations that relate multiple levels ... is likely to be a better reflection of reality than the simpler multicausal models prevalent today" (Diez-Roux 1998a: 220). Susser and Susser (1996b; see also Susser 1998), for example, argue for moving beyond the multifactorial framework of disease causation to a causal model based on the metaphor of Chinese boxes, a set of boxes of differing sizes that nest within each other. The essence of this new paradigm is that disease causation occurs on multiple levels, and the integration of these levels is critical to investigating and solving a designated problem. In using this

[20] An often-used example of an ecological fallacy is the assumption, based on observations that societies with high-fat diets have high rates of heart disease, that high-fat diets lead to heart disease. Such an assumption is impossible to make from this aggregate level of data as it is not possible to tell whether those individuals developing heart disease in a particular country are in fact those with the high-fat diets; exposure cannot be linked to the incidence of disease.

conceptual framework then, "the epidemiologist's need to hypothesis, design, and analysis would always keep in focus the object of viewing all the relevant levels as a whole. Each level is seen as a system in itself that interacts with those above and below it" (Susser 1998: 610-11).[21] Diez-Roux (1998b: 1029), following Bunge (1979), also proposes that alternate types of causation be considered:

> These include not only causal determination (determination of the effect by an external cause, as in 'among susceptible individuals, smoking causes lung cancer') and statistical determination (as in '*x* percent of persons with high cholesterol will develop a myocardial infarction'), which are the types of determination commonly implicit in epidemiologic research, but also other types of determination such as reciprocal causation and structural or holistic determination ... Reciprocal determination (determination of the consequent by mutual action) would be present if, for example, a person's consumption of 'unhealthy' foods is influenced by the types of foods available where he or she lives, and if in turn food availability is influenced by consumption in the area. Holistic determination (determination of the parts by the whole) would be present if a person's risk of adopting a certain behavior were influenced by the prevalence of that behavior in the social group to which he or she belonged, or if a person's risk of disease depended on the degree of social inequality in his or her society.

The concepts of reciprocal and holistic or structural causes of disease take into account the contextual and social conditions and situations within which people live and work, and allow for the consideration of synergistic, antagonistic, and more complex relationships between individuals' traditional risk factors—such as diet, smoking, and sedentary lifestyle—and their social, cultural, and material communities and environments. Such new causal models are potentially important to the study of socio-demographic inequalities in CVD, as they provide fresh conceptualizations of those cardiovascular risks that are frequently mobilized in explanations for racial,

[21] Pinderhughes and Shim (2001) advance a similar argument with respect to the role of race in producing health inequalities.

socioeconomic, and gender differences, as discussed in Chapter 1. Social and ecological epidemiologists also express great interest in plumbing mathematical modeling and statistical procedures designed to account for complex, fluid, and dynamic systems that are being used in other disciplines, including econometrics, climatology, and the study of global warming (Susser 1998: 610).

Finally, social epidemiologists emphasize the distinction between the question of why some individuals are at higher or lower risk than others from that of why some populations *as a whole* are at higher or lower risk. The work of Geoffrey Rose (1985; 1992) has been theoretically influential in formulating a different set of etiological questions based upon this distinction. Rose points out that the set of factors that explains why a particular individual has a disease may be very different from society- or population-wide forces that produce a population with a particular distribution of risk for that disease. Relatively rare factors may explain the risk distribution of *individuals* while widespread and common factors can account for the distribution among *populations*. The former approach is characteristic of conventional risk-factor epidemiology, while the latter articulates a population-based strategy.

Implications of Social Epidemiology: Postmodern Allusions

This growing body of work by social epidemiologists, particularly their critiques and commentaries on mainstream epidemiology, has occasioned much contestation and debate,[22] even earning the label of "the epidemiology wars" (Poole & Rothman 1998).

[22] See for example Coughlin (1998), Diez-Roux (1998a), Kogevinas (1998), Koopman (1996), Krieger (1994), Krieger and Zierler (1997; 1996), Mackenbach, 1998 #72; McMichael, 1995 #28; McPherson, 1998 #70; Pearce, 1996 #47; Poole and Rothman (1998), Savitz (1997), Savitz, Poole, and Miller (1999),

Great divides exist on what is considered causally "fundamental": some (e.g., Krieger 1994; Krieger & Zierler 1996; McMichael 1995; McPherson 1998; Pearce 1996; Williams 1997) argue that social, political, and structural influences underlie individual and biological causes of disease. Still others (e.g., Diez-Roux 1998a; Poole & Rothman 1998; Susser & Susser 1996b; Vineis 1998) argue that all levels of causation—social structural, individual, and genetic—matter, and that it is meaningless to designate one as more important than another. And finally, others (e.g., Berkman & Kawachi 2000; Mackenbach 1998) simply observe that the balance in the epidemiologic knowledge currently being produced and in the body of epidemiologic literature as a whole needs to be tipped more towards the consideration of societal and structural factors, as currently it tends to favor the individual and micro levels.

According to Berkman and Kawachi (2000: 6), "social epidemiology must integrate phenomena at the margins of what is defined as its domain ... Borders at the periphery of any field, and social epidemiology is no exception, are bound to be fuzzy. We make no attempt to draw clean lines encircling the field." The changes advocated by social epidemiologists to account for these phenomena include new kinds of questions, novel techniques, a pastiche of concepts and methods from other disciplines, and revised conceptions of what counts as "data." As such, their conceptual, theoretical, and methodological perspectives call for shifts in the ways in which epidemiologists see, make sense of, interpret, and order the "logic of health [and] of sickness" (Martin 1994: 13). This involves a multitude of work practices, network building, and other elements of the minutiae of everyday scientific work that encompass much more than changing

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Shy (1997), Susser (1998; 1989), Susser and Susser (1996b), and Taubes (1995).

abstract models and methodological technologies. However, with epidemiology—whose "style of practice" Fujimura and Chou (1994: 1023) characterize as a "mosaic framework of data, materials, technologies, and knowledges produced by different expertises or methodologies"—the inclination by some mainstream and social epidemiologists may be to represent the concerns and methods of social epidemiology as additions and supplements to traditional practices rather than a fundamental revolution of them. Indeed, it may be that the diversity of perspectives and heterogeneity of methods that social epidemiology brings to the larger discipline may prove to be critical to the continued adaptability of the discipline, and the sustaining and even promoting of its applicability, scientific credibility, and public relevance.[23]

However such changes are represented or perceived by the epidemiologic community and those outside it, they do pose a challenge to the primacy and hegemony of the biomedical model, and suggest the influence of postmodern currents of thought in science and culture. The shift from a mechanistic view of individual human organisms to an intricate, multi-level, interdependent systems concept of health and disease involves a move away from Cartesian reductionism (Loomis & Wing 1990) and an acknowledgment of the mutability, fluidity, and inherent instability of complex social systems and historical contexts. In addition, calls for adopting this new paradigm have been driven, at least in part, by the failure of conventional epidemiology to account for the vast public health consequences of globalization, including the shrinking and increasingly porous

[23] Rose (1990: 9-10) makes this point with regard to psychology, arguing that its "diversity and heterogeneity ... has been one of the keys to its continued inventiveness at the conceptual level and to its wide-ranging social applicability. Far from undermining its truth claims, it has allowed a fruitful differentiation in its points of application, enabling it to operate with a diversity of contexts and strategies for the government of subjectivity—different ways of articulating social power with the human soul."

boundaries between socially-organized groups, global environmental changes, and ensuing demographic and social transformations (e.g., Loomis & Wing 1990; McMichael 1995). Finally, many social epidemiologists have begun to question formerly taken-for-granted concepts such as scientific objectivity, the binaries of rationality versus passion and scientific rigor versus social values, that constitute the ideological infrastructure for the conduct of modern science.

Certainly there is much contestation within the epidemiologic community over whether more, better, or radically different theoretical and methodological explications can strengthen the discipline. Simultaneously, there is considerable deliberation about how epidemiology can achieve its ends of determining disease mechanisms and improving public health, and what kinds of scientific, methodological, and/or conceptual endeavors might accomplish this (e.g., Krieger & Zierler 1997; Krieger & Zierler 1996; McMichael 1995; Savitz 1997; Susser 1998; Susser & Susser 1996b). Debates over whether deep and fundamental changes to the practice of epidemiology may be in order have filled the pages of leading epidemiology journals, the halls and hotel ballrooms of epidemiologic conferences, and the narratives of cardiovascular epidemiologists interviewed. Susser (1998: 609), for example, attributes the present "stagnation and inertia" of epidemiologic science to the ultimate failure of the dominant conceptual paradigm—the taken-for-granted multifactorial model of causation—to further illuminate chronic disease etiology and stimulate new thinking in epidemiology. Instead, he argues, "the dominant risk factor black box obscures our vision and impedes our capacity to deal with the near future" (Susser 1998: 610). As indicated by the deficiency of current epidemiologic knowledge and procedures, "the signs are ominous that we are nearing its

displacement by a new era ... we need either to adopt a new paradigm or face a sort of eclipse" (Susser 1998: 609). Bhopal (1999), in his review of epidemiology textbooks (1997), argues that their heterogeneous vocabulary to describe concepts and methods, and differences in perspectives on the purposes and scope of epidemiology, can be read as Kuhnian indications of an evolving discipline or signs of an imminent paradigm shift.[24] Others suggest that epidemiology may already be in transition "from a science that identifies risk factors for disease to one that analyzes the systems that generate patterns of disease in populations ... from relationships between exposure and disease variables to the analysis of systems that give rise to exposures and through which those exposures act to cause disease" (Koopman 1996: 630).

The emergence of social epidemiology may augur the beginnings of an epidemiologic revolution and signal the potential for a deep epistemological shift in the discipline. Or it may continue to be contained as a sub-specialty within the social world of epidemiology, bringing less revolutionary concepts and techniques, some of which might be relatively easily incorporated into conventional epidemiologic practice. This remains to be seen. As the following chapters will show, however, some changes brought about by the segmentation of the discipline are proving consequential to how race, social class, and sex/gender are constructed, studied, interpreted, and otherwise mobilized in

[24] Kuhn (1962/1996) argues that in "normal science," research is firmly based upon past scientific achievements that a particular scientific community accepts as the foundation for its practice. A reigning paradigm provides the conceptual means to guide current research and by which certain problems are taken to be scientific and the proper domain of scientists. Normal science continues until anomalies accumulate, producing a scientific crisis, and engendering a paradigm shift. Kuhn's emphasis on the accumulation of anomalies as the driving force behind scientific crises and paradigm shifts has been critiqued by more recent works in science studies (Gieryn 1999; Hess 1997; Star 1989; 1986) as overly intellectualist and neglectful of the influence of broader social and cultural transformations within which the practice of science is always cradled.

cardiovascular epidemiology.

E. Conclusions

In this chapter, I have provided a contemporary chronicle and social worlds/arenas analysis of one site of Foucauldian bio-power, that of epidemiology. As a basic science of public health (Krieger 1999b), epidemiology has had to deal with a public that is increasingly diverse, more demanding that science acknowledge and account for its diversity, and openly questioning the utility and credibility of epidemiology as a relevant and beneficial scientific discipline. The loose social world of the public, and its agendas, discourses, and rhetorics have indelibly infused the contemporary history and the present situation of epidemiology, shaping the social and cultural conditions within which it works to produce legitimate and useful knowledge. They impact the discipline and practice of epidemiology, especially within the specialty of social epidemiology, but also permeate the narratives, worldviews, priorities, and questions of cardiovascular epidemiologists practicing today. These arguments reflect the notion that public mistrust of science and broader social changes can encourage and sustain expert dissent and disagreement (see e.g., Wynne 1996a: 48), rather than the converse, where public mistrust is thought to follow from scientific contestations, an argument asserted by some in epidemiology. The connections between epidemiologic science and the broader social and cultural situation underscore Haraway's (1989: 303) observation that "even to imagine destabilization, one must be formed at a social moment when change is possible, when people are producing different meanings in many other areas of life."

Yet the co-constitution of society and science, politics and culture within

epidemiology is the very focus of many traditional epidemiologists' objections to these newer directions and tenors of the discipline. They argue that acknowledgment of and deference to what some perceive as the inevitable infusion of epidemiology with social concerns is threatening the public status and credibility of their science and its claims. Safeguarding the discipline's prestige and redeeming its scientific standing requires a return to decision-making on design, implementation, and interpretation predicated primarily on scientific criteria. This is particularly necessary, they assert, when it comes to the study of phenomena like social factors and inequalities in disease, already tinged (some would say contaminated) by politics. In short, they contend that what is needed is an "ethic of personal renunciation on the part of those who construct knowledge" (Porter 1995: 85), a commitment to procedures that defines and then produces what is taken as (or, as others would argue, ensures) scientific objectivity. Such arguments reflect Porter's (1995: 230) observation that

> scientific knowledge is most likely to display conspicuously the trappings of science in fields with insecure borders, communities with persistent boundary problems ... science is indeed made by communities, but communities that are often troubled, insecure, and poorly insulated from outside criticism ... The enormous premium on objectivity in science is at least partly a response to the resultant pressures.

Whether or not the social world of epidemiologic science is to be transformed by approaches infused with new theoretical frameworks and social and political concerns—as developed by social epidemiologists—or by renewed commitments to conventional definitions of scientific rigor and validity, or by both, social and cultural analyses of science argue that scientific disciplines do not "progress" on some linear path or by

intellectual considerations alone.[25] And perhaps, as Richards (1991) argues, no amount of methodological reform can "rid" epidemiologic knowledge of the social and political concerns of the actors who construct it, and the broader social, cultural, and political situations within which they must do so. Instead, social, cultural, political, and economic forces, and the content and conduct of science must be viewed and analyzed as mutually shaping and constituting one another. Emerging domains of knowledge production—and particularly those involving socio-political issues like the significance of race, social class, and gender in health—perhaps illustrate these interfaces and permeations best. Thus the following chapters of this dissertation aim to examine one such site: the construction, mobilization, negotiation, and revision of the meanings of racial, class, and sex/gender "differences" for cardiovascular health and their varying consequences for public health knowledge and action.

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[25] As Gieryn (1999: 23) argues, "if the stakes are autonomy over scientists' ability to define problems and select procedures for investigating them, then science gets 'purified,' carefully demarcated from all political and market concerns, which are said to pollute truth; but if the stakes are material resources for scientific instruments, research materials, or personnel, science gets 'impurified,' erasing the borders or spaces between truth and policy relevance or technological panaceas. The sociological question is not whether science is really pure or impure or both, but rather how its borders and territories are flexibly and discursively mapped out in pursuit of some observed or inferred ambition—and with what consequences, and for whom?"

Chapter Four
Embodied and Epidemiologic Constructions of Race, Class, and Sex/Gender

A. Introduction

Discourses and accounts of disease causation highlight the social construction of difference, mobilizing ways of classifying people in order to make sense of who gets sick and who does not. When a scientific discipline like epidemiology weighs in on such questions, the natural, biological world to which it presumably refers and its assumptions of inherent and bodily distinctions among humans serve to reify those categories, treating them as real. In this chapter, I will demonstrate that rather than being an "objective" and "neutral" observer of some natural "reality," epidemiology *constructs* particular knowledge claims about the health effects of racial, class, and sex/gender differences; in so doing, it reflects, sustains, and shapes social meanings of bodily difference. As such, cardiovascular epidemiology participates in racial, class, and gender formation, in the sense developed by Omi and Winant (1994; see also Shim 2000). But at the same time, embodied individuals also participate in the construction of categories of difference, and can potentially bring about significant changes in scientific frameworks and practices.[1] As the boundaries between the worlds "inside" and "outside" science become increasingly porous, and the culture of biomedical science increasingly contributes to

[1] For example, if it were not for "lay" activists, diverse representation in biomedical research might never have become a political issue (e.g., Epstein 1995; 1996; Figert 1996; Ruzek 1980) nor would regulatory mandates to ensure it have been implemented.

popular culture, conceptions of bodily "differences" like those constructed in cardiovascular epidemiology and those mobilized in everyday life critically inform one another.

First, this chapter provides an analysis of the varied meanings of race, class, and gender—and other differences that are invoked in association, such as ethnicity, culture, socioeconomic status, and sex—that are mobilized, deployed, and interpreted in epidemiologic accounts of cardiovascular risk and incidence. These meanings are not intrinsic to the words or to their referents but rather are continually being constructed, modified, or sustained each time they are called upon and invoked in order to further scientific claims about disease causation. In the process, arguments are being crafted about the kinds of differences race, class, and gender are, and the differences they make in cardiovascular disease. That is, epidemiologic research, as a scientific discipline, constructs and authorizes particular ideas about what kinds of differences matter, how they should be defined, and what categories are deemed legitimate by which constituencies (see e.g., Anderson 1996; Clarke 1998; Duster 1990; Fausto-Sterling 1985; Gould 1981; Haraway 1989; Jordanova 1989; Oudshoorn 1994). As such, this chapter articulates how epidemiologic knowledge production is a racial, class, and gender project, participating in sociohistorical processes of racial, class, and gender formation, where racial, class, and gender "categories are created, inhabited, transformed, and destroyed" (Omi & Winant 1994: 56). That is, cardiovascular epidemiology is simultaneously an interpretation, representation, or explanation of racial, class, and gender dynamics, and an effort to reorganize and redistribute resources along these lines (see Omi & Winant 1994: 56; see also Shim 2000). Throughout, I argue that the dynamics of racial, class, and

gender formation operating in biomedical science on CVD contribute to processes of domination and privilege on the one hand, and oppression and exclusion on the other.

Second, this chapter explores how individuals with CVD understand how their race, class, and gender shape their lives in ways that influence their cardiovascular health. The ways in which they make sense of cardiovascular disease constitute complex processes that draw upon many sources, including but not limited to scientific ones. I thus consider how they view the usefulness or relevance of epidemiologic knowledge about "risky differences," and how their social contexts and experiences shape their integration and negotiation of that knowledge in their everyday lives (Lambert & Rose 1996; 1996b; Wynne 1995). As Irwin and Wynne (1996b: 9) argue, scientific accounts are often encountered as problematic: "sceptical publics are likely to be sceptical, critical or simply hostile to scientific statements—often because such statements seem to emerge from an idealised and inappropriate model of real world conditions." Currently, scientific attention to disadvantaged groups is often perceived by those very groups as inherently suspect, given the historical, often violent uses of their bodies in the interests of biomedical knowledge production, surveillance, and stigmatization (e.g., Handwerker 1994; Jones 1993; Shavers-Hornaday, Lynch, Burmeister, et al. 1997). History, perceptions of trust, and identification with scientific practices and institutions are therefore seen here as critical to responses to epidemiologic knowledge (e.g., Wynne 1996b). These theoretical concerns encourage attention to people's relationships with epidemiologic and biomedical institutions, the influence of social contexts and relations on individuals' renegotiation of scientific claims, and the conditions that engender sometimes paradoxical responses of acceptance, trust, refusal, and/or ambivalence.

Examining the *meanings of* "difference" shows us how "difference" is *made meaningful*; that is, exploring how race, class, and gender are defined tells us something about how they function and are made to do work within systems and relations of power. Varying interpretations of racial, class, and gender difference effect varying sets of consequences for lived experiences, social interactions, and institutional and power dynamics that in turn shape well-being. I therefore conceptualize race, class, and gender as locations of structural advantage and disadvantage, as standpoints—places and perspectives from which people look at themselves, at others, at society, and formulate situated knowledges about them—and as a set of cultural practices that are usually unmarked and unnamed. Such differences are "real" in the sense that they are consequential—such social constructions form the basis for intersecting racial, class, and gender formation processes that exert concrete, material, though changing and complicated effects on people's sense of self and of group identity, their life chances, and their experiences.

The experiences and knowledges of individuals with CVD—street intellectuals (Collins 1998) in their own right—tell us much about the myriad processes through which their race, class, and gender are embodied and come to have consequences for their health. As this chapter will show, the standpoints and situated knowledges (Collins 1991; 1998; Harding 1993) of populations deemed "risky" by current epidemiological knowledge provide alternative understandings of how differences of a social, political, cultural, and even biological nature function through multiple mechanisms to produce disease and risk. The experiential knowledge of people of color who live with CVD—as individuals implicated by axes of power like race, class, and gender—thus serves as a

critical contribution as well as potential counterpoint to "expert" epidemiologic knowledge. Gieryn (1999: x) metaphorically observes that

> Maps of science get drawn by knowledge makers hoping to have their claims accepted as valid and influential downstream, their practices esteemed and supported financially, their culture sustained as the home of objectivity, reason, truth, or utility. Maps of science get unfolded and read by those of us not so sure about reality, or about which accounts of it we should trust and act upon.

But maps also get marked on, measured against our interpretations of reality, judged by how well it lays out neighborhoods and contexts. Sometimes, maps of science are subsequently discarded. Credibility struggles over expert representations of science are, in other words, also adjudicated by people who have limited influence or esteem to bestow, no financial support to allocate, and no decisions to make of consequence to far-away others as policymakers would; but they do desire maps that are reasonable, useful, and speak to some truths that they divine from their own lived experiences.[2] Therefore, it is also with such "lay" experts and their lived experiences of knowledge construction and consumption that this chapter is concerned: how do epidemiologic maps—expert knowledge claims about the roles of difference for cardiovascular health—measure up to lived realities?[3]

In this chapter, I present my analysis of the meanings of race, class, and gender (in that order), of the ways in which these meanings are constructed and sustained, and of the

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[2] According to Gieryn (1999: 22), such people occupy a third role in credibility contests—not the scientists, nor those in positions to allocate credibility, but "the many people affected by allocations of epistemic authority—and especially by the institutional decisions grounded in such allocations—though they may not themselves be in a position to parse out epistemic authority."

[3] This issue, and how everyday folks think about this issue, are particularly important in the current era of biomedicalization (Clarke et al. 2002) precisely because it falls to the individual to access, consume, evaluate, and ultimately act upon scientific information about health more broadly, and cardiovascular health specifically. This part of the story is taken up in Chapter 6.

kinds of discursive and representational work they are made to do by both epidemiologists and people of color with CVD. For each dimension of "difference," I discuss the complex and contentious issues of identity and measurement, and the divergences that arise from "difference" as an embodied and lived identity and "difference" as a categorical variable. I then offer a critical analysis of the multiple constructions of each dimension that are invoked and mobilized by the two groups of participants. Table 4.1 below encapsulates some of the ways in which epidemiologic and embodied conceptions of race, class, and sex/gender diverge in accounts of CVD causation:

Table 4.1 Constructions of Race, Class, and Sex/Gender

	People of Color with CVD	**Epidemiologists**
Race	Structural (e.g., racial segregation)	Cultural
Class	Structural (e.g., stratified employment opportunities)	Structural, but measured at the individual level
Sex/Gender	Structural (e.g., gendered division of reproductive labor)	Biological/hormonal

I argue that first, while epidemiologists tend to construct racial differences in biological and cultural terms, people of color with CVD assert that they are structurally mediated and effected. Second, comparatively little disagreement exists on the construction of class and its effects on cardiovascular disease. Both researchers and those living with CVD subscribe to the understanding that class is an important *structural* determinant of cardiovascular risk. In marked contrast, epidemiologic and experiential constructions of the role of gender are profoundly contradictory. Researchers perceive *biological*

differences of sex to predominantly shape the differential risk of women and men, while people living with CVD implicate *structural* effects of gendered power relations as embodied sources of cardiovascular risk. Intersections of race and class are discussed in the later section on constructions of class; likewise, I examine intersections of race and/or class with gender in the final section on gender.

B. Constructions of Race

Of the three dimensions of "difference" featured in this research, considerations of race in both lived experience and in epidemiology are among the most complicated, ambiguous, and contentious. Both cardiovascular epidemiologists and people living with CVD agree that the conventional racial and ethnic categories used in epidemiology and in everyday life are clearly inadequate, yet my data indicate that race is almost ritualistically included in epidemiologic research. I find that there are significant disagreements over how race affects cardiovascular risk between these two participant groups: researchers tend to attribute racial disparities to biological differences and more frequently to cultural differences, while lay experts forefront the structural dynamics of race in making sense of their risks. In this section, I describe these findings, and argue that the routinization of racial categories in epidemiologic science and the inclusion of "race" as a taken-for-granted variable in research results in its construction as an individual trait, and the neglect of racialized social, political, and structural processes and relations of power as significant determinants for cardiovascular risk and health.

Racial-Ethnic-Cultural Identity as Experience Versus the Scientific Measurement of Racial Categories

In epidemiology, race is often measured by self-classification into one of the racial and ethnic categories standardized by the Office of Management and Budget (Office of Management and Budget 1997) and institutionalized in the U.S. Census and elsewhere: American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, White, and Hispanic or Latino.[4] These categories are treated as exhaustive and mutually exclusive groups, and regularly used to limit study samples or to adjust their results, under the assumption that systematic differences in the relationship between dependent and outcome variables may exist between different races. But in analyzing people of color's responses to queries of racial identification, I find that they pose four main critiques of scientific attempts to measure and use "race" as a variable in epidemiologic research: multiraciality, strategic and pragmatic racial affiliation, social inscription, and the normativity of whiteness.

First, people of color with CVD respond in heterogeneous ways to the question of racial-ethnic identity based upon the unique and multiple constructions of the meanings of race and ethnicity that they claim for themselves. For example, persons of mixed-race ancestry routinely offer highly specified and complex family genealogies, going back two and sometimes three generations. Such responses highlight the impossibility of participants' describing their racial and ethnic identity accurately in a simplistic and categorical way. They also illustrate the extent to which notions of racial purity and

[4] The latter category of "Hispanic or Latino" is a category for data on ethnicity, while the previous five constitute racial categories. Group labels and the ways in which they are combined and collapsed often diverge from these OMB standards, and indeed vary widely from study to study.

mutually exclusive racial categories have always been ideological myths and scientific fallacies veiling the historical realities of multiraciality in America.

At the same time, the context in which the question of racial identity arises seems to matter, indicating that individuals make strategic, and sometimes pragmatic, choices for how they describe themselves. For example, Juanita describes herself to me as a "checkerboard" of Guinean, Pygmy, Caucasian, American Indian, and Creole. In the context of an open-ended interview, she is able to provide a highly specific ethnic genealogy going back three generations in order to elaborate her mixed-race heritage. However, to the Census, she designates herself as "other race," because of the practical impossibility of providing—or perhaps her perceptions of the government's disinterest in—such detail.[5] Finally, to her co-workers and others Juanita encounters face-to-face, since she "can't tell people ... on an everyday basis, 'Oh, I'm this, that, and the other,'" she "look[s] in the mirror" and refers to herself as "Black." This last instance is, in a sense, a pragmatic racial affiliation based on how she believes others might categorize her. However, at the same time, it is a strategic choice borne of her coming of age in the 1960s, a time when African Americans were beginning to make inroads into occupations formerly closed to them, and when Black nationalism was at its peak. With the then-deliberate use of "Black" as a symbol of pride and unity, and as one of the first Black female computer key punch operators in the area, Juanita grew up with its vocabulary and is conscious of its legacy.

Juanita's description of her racial identity also underscores the power of

[5] My interview with Juanita took place prior to the 2000 Census in which she would have been able to indicate many of these categories.

inscription and social categorization in shaping her perceptions of herself. Other people of color strongly concur, and often speak passionately about the importance of social interaction and others' perceptions in forming and naming racial identity. Carmen, for example, describes herself as a "Latina of Mexican, Colombian descent" although she is "a mixture" of "Indian blood ... and some African blood and some white blood," and explains why she sees herself as such:

> my feeling is more that I lean more toward the minority part of ... my background, than I do to the white part. To a certain extent partly because that's how I've been treated. I've been treated as what they call a "Hispanic" woman ... And when the dominant culture tells you you're Hispanic, that encompasses a lot of things ... a lot of people have seen me as that, not necessarily because I profess myself as that, but because they simply see me as somebody who is different."

Diane also echoes the primacy of racial inscription over self-identification in shaping the lived realities of individuals, invoking the popular multiracial figure of Tiger Woods as well as herself as examples:

> he was trying to acknowledge all of his different ethnic backgrounds, and I was thinking to myself, that's true, we all have different things in our background. But because you look like an African American person, you're going to move through the world like an African American person, and your experience is going to be that of an African American person ... I mean, when he won the Masters, there was like, well, are they going to have collard greens and sweet potatoes, or it was collard greens and fried chicken ... it never goes away! ... you can identify all kinds of ways, but the truth of the matter is that the world looks at you the way you look, and that's where they put you ... My grandfather's white. It doesn't make a difference in my life because I'm looked at by the world as an African American person ... on those boxes where you can choose "mixed race" ... I totally get the concept, but let's face it, you move through the world the way you look.

Similarly, Rudolfo exclaims, "I can't look at myself outside of being told that I'm black in the social circles in which I move. Even in the black social circles, I'm reminded of

blackness, as if it is something you can *touch*! I don't see myself as a skin color! But I'm told that that's the way I *must* see myself." Despite Rudolfo's own multiracial heritage (one grandparent is Cherokee, another is white), and despite his feeling that he lacks the cultural ties to call himself African American, he says "I'm compelled to feel black, or subordinate I should say." Rudolfo and Diane argue that in their experience, self-identification—the preferred method by which epidemiologists measure race—is often meaningless; rather it is the racial or ethnic category that society places upon them that structures their everyday experiences and sense of self. These participants underscore how race becomes consequential through the social significance that is invested in it and imposed by others, rather than being a self-selected attribute by an individual presumably free to choose, a model which current epidemiologic practice implicitly embodies. Collins (1998: 149, 204) argues that "individuals cannot simply opt in or out of racial groups ... Within unjust power relations, groups remain unequal in the powers of self-definition and self-determination." Young (1990: 46) similarly observes that "one *finds oneself* as a member of a group, which one experiences as always already having been." That is, one's experience of race is thus often structured by ready-made, seemingly purely demographically descriptive categories that serve to veil a historically and socially constructed infrastructure of social relations, processes, and practices governed by racial meanings.

Finally, in discussing questions of racial identity, people of color critique the normativity of whiteness, and point to its consequences for both lived identity and science. A sense of otherness or double-consciousness (DuBois 1903/1989) that Rudolfo experiences is perceived as inescapable, distinguishing his awareness of himself from that

of a white man's: "I don't even know how to begin to imagine putting someone in my shoes ... But then I don't think that a white man ever thinks that. He has no cause to begin to think about being a member of ... a subordinate group. He has no cause!" Rudolfo instinctively understands that part of the privileges of whiteness come from its social construction as unmarked, an unquestioned and unreflexive norm. Diane, in fact, reflects explicitly about this in the context of scientific research:

> why is it that whites are considered as what's the norm, or they're like the stable race neutral part of it, and everyone else is a deviant. I've always wondered why is that? ... why aren't Asians like the base group? ... why [are] whites are considered so race neutral? ... whites are—in my opinion the way that studies are done and the way things are done, it's like they're the ones who are normal and they're the ones who are like the prototype, so anything that deviates from that is something that needs to be studied.

Diane asserts that the dominant racial group has the unique but invisible luxury of not having to name itself. Whites are considered the default reference point, against which all others are measured. She points out here that the often unintended implications of white normality, far from being limited to just scientific research, have profound consequences for social representations of racial difference and racial otherness.

In short, the conventional racial and ethnic categories commonly used in epidemiology cannot account for the complex issues of racial identification that people of color with CVD outline. Their critiques highlight the *social* nature of race, racial identity, and racial signification; but by neglecting and disregarding the existence of multiraciality, practices of strategic racial affiliation, racial inscription, and white normativity, the epidemiologic measurement of race renders it into an individual, discrete, non-relational attribute. Conventional racial classifications thus represent "make-do" choices whose

inherent categorical nature severely constrains epidemiology's ability to capture these very complicated and sometimes paradoxical aspects of lived experiences of race. Such classificatory systems erase much of the complexity of lived identities that, given the time and space, individuals would like to claim. Discussions with people with CVD reveal that their racial heritage in fact represents complicated family and personal biographies, and the process of charting their racial heritage calls forth interpersonal dynamics as well as larger social forces that challenge the seeming simplicity of checking a box.[6] Finally, the seeming demographic neutrality of bureaucratic racial categories obscures processes of social inscription and the profound consequences of how people are labeled, and by whom. As Porter (1995: 42) points out,

> The dependence on categorization on particular circumstances would seem to imply that the categories are highly contingent, and hence weak. Once put in place, though, they can be impressively resilient. Legions of statistical employees collect and process numbers on the presumption that the categories are valid. Newspapers and public officials wanting to discuss the numerical characteristics of a population have very limited ability to rework the numbers into different ones. They thus become black boxes, scarcely vulnerable to challenge except in a limited way by insiders. Having become official, then, they become increasingly real ... Increasingly, the statistical categories form the basis for individual and collective identity ... Public statistics are able to describe social reality partly because they help to define it.

Many of the cardiovascular epidemiologists, however, readily acknowledge these kinds of claims, expressing profound uncertainties about the meanings of race, its appropriate measures and interpretations, and its implications for CVD prevention and public health policy. Thus, for scientists, they view the measurement of race, its

[6] Juanita, for example, relates the story of her grandmother who was ostracized from her family, who passed as white, for marrying a black man. Her grandparents then had "nine black kids," the youngest and "blackest" of whom was her mother.

inclusion, and methods of study in epidemiologic research as plagued by several conceptual ambiguities and methodological controversies. First, researchers emphasize the problematic measurement of race, particularly concerns around who gathers that data, and how. Epidemiologists cite examples of studies and databases in which information on race was collected not through self-report but by some other person based on ad hoc criteria of appearance, language, and/or surnames.

A second predicament they invoke is the aggregated nature of the racial categories conventionally used, in which groups with distinct cultural roots, economic circumstances, and social histories are lumped together. Epidemiologists cite this argument most frequently for Asian Pacific Americans and at times for "Hispanics," but it is arguably true for any of the other racial classifications commonly used in research on health (and beyond). While such racial categories may be scientifically routinized, they tend to shed little light on and can actually confound the investigation of group differences in health.

Third, the epidemiologists I interviewed also view the fluidity and sensitivity of racial categories to social and political forces as scientifically troubling—categories can just appear, disappear, and change their meaning in response to the vicissitudes of the social, cultural, and political moment. In epidemiology, demographic characteristics of individuals as units of analysis are most conveniently managed and least subject to errors or biases of measurement when they are stable and constant, and therefore replicable and comparable over time and from study to study. As one epidemiologist describes, researchers can invest significant effort in carefully designating measurement techniques for racial categorization and selecting which groups to include—"that's just the

methodological issue"—that "logistically you could come up with a wonderful study question, wonderful survey, and you go to your study population and 'Whoops! It's changed!'" Therefore, while modifying racial categories according to the current historical context may be viewed as desirable from a social and political point of view, from the perspective of doing science, such instability renders the variable of race ill-suited as a scientific and epidemiologic entity. In short, both groups of participants clearly agree that current racial categories by themselves leave much to be desired.

Such conceptual and methodological problems engender among epidemiologists serious misgivings about data reliability, a more or less technical issue of potential misclassification or measurement error—whether the recorded race of an individual validly and accurately reflects her/his "actual" race. These concerns indicate at least some faith—whether conscious or unconscious—that racial categories, if conceptualized and measured more accurately, *can* be exhaustive and mutually exclusive, internally homogeneous and distinct from one another. (This is, as described above, an assumption with which most of the lay experts I interviewed would disagree.) But researchers also see such data reliability issues as raising more fundamental epistemological questions about the nature of race itself, wondering, for example, what race means in a multiracial world, what phenomena exactly are being captured in the variable of race, and then how to interpret racial differences that are found. These questions regarding the conceptualization of race have found themselves even codified in a Statement of Principles regarding epidemiology and minority populations by the American College of Epidemiology, a major North American professional association:

> Leadership from epidemiologists, through systematic study of minority health issues, will be particularly critical in the next phase of minority health initiatives, as the ability to define issues and problems along the lines of racial and ethnic classifications becomes more difficult. Even while we are still attempting to document the full extent of health disadvantage in some minority populations and to track progress being made in others, the matter of defining and characterizing who are in these populations and what specific aspects of being 'minority' pose health risks is becoming more and more complex. Social changes complicate the ability to separate disadvantages based on economic or political status from those associated with racial or ethnic variation that is related to cultural or even biological factors. Growing recognition of diversity within global categories such as 'Black' or 'Hispanic' as well as the reality of growing diversity within these populations are rendering these designations decreasingly useful for defining culturally or biologically homogeneous groups. (Schoenbach, Brown, Ferguson et al. 1995: 506)

Yet, despite scientists' acknowledgment of the ambiguity and insufficiency of epidemiologic methods of racial categorization, my analysis of the practices of epidemiology shows that race is almost ritualistically included in research. Both participant observation and interview data indicate that race is routinely and often uncritically used to limit or describe study samples, as well as to stratify and adjust results.[7] One researcher refers to the inclusion of race as just something that everyone has to do—that is, a practice that once may have come with explicit justifications, but that is now so taken-for-granted that epidemiologists perceive it as a standard operating procedure and a standard of practice with which they must comply. This ritualized practice is then motivated by the pressures of identity politics, an acknowledgment of the need for culturally-tailored health interventions, and a recognition of the significance of race in shaping health outcomes, the scope of which is, I argue, quite limited. At the same time, however, it is also driven by the very nature of science itself as a ritualized

[7] Others (see e.g., Jones et al. 1991; Williams 1994) have found these same practices in published literature on health research.

practice, with its needs for replicability, comparability, and standardization. There is also the sense that racial groups differ in multiple epidemiologically significant, yet very complicated, ways. As a result, scientists ritualistically invoke race, and make use of racial categories, but often without delving into its complex social and structural dynamics. In so doing, investigators implicitly infuse "race" with multiple meanings and definitions, and use it to refer to heterogeneous mechanisms linked to CVD, to which I turn below.

Race as Biological Difference

Even though some researchers explicitly disavow any biological basis for race, and others simply avoid invoking such understandings of racial difference, some epidemiologists do mobilize conceptions of biology and genetics when discussing the future of scientific research into racial health disparities. For example, several speak of the potential of genetic epidemiology and studies using new imaging technologies that take internal physiological measurements to reveal "deeper" or "underlying" potential sources of racial differences in CVD. Indeed in my observations of presentations of epidemiologic research at scientific meetings, findings of racial differences are often interpreted as indications for the potential mediation of genetic differences. In addition, genetic epidemiologic studies are often structured upon a comparison of the frequencies of particular mutations between two or more racial/ethnic groups. The scientific construction of racial difference through a biological lens relegates matters of racial cardiovascular inequalities to the function of genetics and physiology. Effective reduction then is seen in terms of intervening in individual bodies, rather than changing

social and environmental conditions. In so doing, biological constructions of race in cardiovascular epidemiology participate in racial formation processes, working to legitimate popular conceptions of racial, biological difference and funnel resources towards intervention at the individual level.

A few people of color with CVD also express biological constructions of racial differences in cardiovascular disease. They argue that "it's in the genes" or that there is "something in the genes or with the race or something," and a number of them invoke sickle cell anemia as a parallel example of a genetically transmitted disease. However, most lay experts, even as they invoke biological notions of race, do so with a significant conceptual twist. They understand "heredity" as involving the inter-generational transmission of not only genetic material but also aspects of diet, knowledge, and other health-related habits, which epidemiologists commonly classify as "culture." They incorporate other historically-rooted, socially- and culturally-mediated risks that they believe change bodies themselves over time in ways that can then be passed down from generation to generation. Such a complex construction of racial difference as biological difference points to how participants with CVD view the nature of biological and heritable risk as cumulative and sedimented across multiple generations. Thus while people with CVD speculate that biological differences may account for some of the disparities among racial groups in cardiovascular risk and incidence, their genetic discourses are intertwined with alternative definitions of heredity that make their biological constructions of race distinct from those of epidemiologists.

Race Through the Cultural and Risk Factor Prism

By far the most predominant construction of race that epidemiologists routinely invoke is as cultural difference: researchers repeatedly refer to differences of a "cultural" or "ethnic" nature, ones they perceive to be related to the customary beliefs and practices of a racially or ethnically defined social group. For example, one epidemiologist notes: "Race/ethnicity ... means their culture, their background. Their thinking process, how they make decisions and it's not just diet, not just genetic. It's environmental." Another researcher concurs: "You have the genetics, but far more important is the shared environmental factors that boil down to cultural habits of how they eat, whether they exercise, those kinds of things. Especially in the food categories I think that is true for almost any culture." A favorite illustration of this construction of race is the finding that immigrants to the U.S. and their subsequent generations eventually attain approximately equivalent rates of cardiovascular disease as those of the U.S.-born: "What's really most clear is that when Asian populations and Mediterranean populations who are low risk move to a high-risk country, they have very similar heart disease rates, compared to the native population of that area."

The popularity of a cultural construction of racial difference can be attributed to several aspects of the concept of "culture" that contribute to its social and scientific utility: its discursive opposition to biology, its tangibility, its resonance with health promotion ideologies, and finally its conceptual flexibility. First, cultural practices are seen as a politically acceptable way to talk about differences among "ethnic" groups without insinuating that "races" differ in some biological way. Cultural differences are clearly constructed in explicit opposition to genetics. Instead, aspects of the cultural

"environment"—that is, what exists *outside* the body—are held responsible, discursively distancing claims of "cultural" variations from troubling assertions of the political dangers of biological essentialism and more fundamental, internal differences.

Second, cultural readings of racial differences are perceived as "factual" in that they are descriptive of outwardly observable habits and customs that pose different kinds of CVD risks and benefits for different cultural groups. Indeed, it is in part because such practices are seen as empirically verifiable, based in scientific observation, and thus "real" that epidemiologists perceive that cultural conceptualizations of race are less contestable and politically controversial. An individual's race is therefore often perceived as a proxy variable, because it captures at least some of the multiple ways in which cultural habits, beliefs, customs, and practices might influence health.

Third, cultural constructions of race resonate particularly well with health promotion and risk reduction mandates. Viewing race through the prism of culture provides an extremely convenient entry point to targeting "risky" lifestyle behaviors—such as diet—that are a focus of CVD research and the mainstay of prevention discourses. Bonnie's experience with a research study indicates the extent to which such conceptions of race-based risk and pathology have the potential for stigmatization that, at its core, upholds essentialist notions of racial difference:

> [the study's investigators] were showing a film on these people that they had in the study, and they were showing white people and how they ate and they showed the black people and how they ate. And when they showed the black people and their diet, it was so funny to them. And that pissed me off, okay! I mean it just pissed me off. This is the way we eat. There's nothing funny about it. There wasn't nothing funny about you eating, you know, all this stuff. So, what so funny about the black person and what they was eating?!

Not all researchers, however, are wholly unreflective about the dangers of presuming cultural and behavioral differences directly from racial ones: in fact, about half of the researchers note that such presumptive equating of race with pathological risk, that explaining racial differences in CVD incidence by referring to racial differences in CVD risk factors, is not enough. They observe that taking into consideration all of the established and novel risk factors still does not account for all of the differences between racial groups, and there are enough statistical paradoxes—where CVD prevalence goes in the opposite direction of what risk factor prevalence would indicate—to create significant uncertainty about the utility of this explanation. One researcher was in fact very clear that even though differences in risk factors and behaviors can be *statistically associated* with racial and ethnic origin, to say that one's race is *causally and directly linked* to those behaviors is meaningless; rather race serves as a proxy for a multitude of economic, cultural, and other dynamics.

Despite those who offer such qualifications, however, cultural constructions of race resonate well with statistical observations of racial disparities in risk factor prevalence, and so behavioral differences quickly become a magnet for explanatory research into racial gaps in cardiovascular disease rates. Because risk factors often carry connotations of culture, ethnicity, and other dynamics commonly perceived as related to race, CVD risk and prevention discourses often invariably, almost tautologically, become racialized. Such discursive representations of racial difference cycle back into research as epidemiologists, familiar with the conceptions of racial difference as culturally-mediated differences in risk behaviors, proceed to examine risk factors levels for explanations to racial disparities in incidence or outcomes. In turn, any disparities that are found are

often attributed to those differences in risk factors, confirming, in a circuitous fashion, the legitimacy of cultural understandings of racial difference and the racialization of risk discourses. Thus the cultural prism, conceptions of the effects of race on cardiovascular risk, and a focus on risk behaviors create a self-authenticating style of practice (Fujimura & Chou 1994) and triangulate (see Star 1985; 1986) with each other. That is, each line of research strengthens and reinforces the loop of logic through which race and certain racial groups become targeted, and through which the constructions of race as differences in risk factors and as culture become legitimate, standardized ways to think about the role of race in CVD, displacing other modes of conceptualization. In short, then, "culture" then becomes constructed as a scientifically legitimate causal agent for CVD.

Fourth, as a result, the construction of race as cultural difference holds significant currency as an organizing concept and a collective approach for CVD epidemiology. This is in part because of its flexibility, in that it allows a wide range of behaviors, habits, preferences, and practices to be defined as "culture" and fall under the rubric of research into cultural difference. "Culture" is seen as a fluid and malleable concept, adaptable to different objectives and lines of research. In addition, as noted above, its perception as a more socially acceptable way to talk and think about racial difference and its representation as the conceptual converse of "biology" also contribute to the utility of the cultural template in framing and organizing research.

The popularity of this language and conceptual thinking of cultural difference has a number of consequences that are significant to considering racial formation processes in epidemiology. First, the cultural prism reflects and reinvigorates historical constructions of racial difference intended to explicitly oppose biological discourses and provide a

social understanding of race, but that in practice, tend to reinstitutionalize individualized, astructural notions of racial difference. For example, cultural constructions of race echo Omi and Winant's (1994) "ethnicity" paradigm of race, dominant in the period of the 1930s through 1960s, in which "ethnicity" co-existed with and sometimes displaced "race" as a descriptor of difference. Omi and Winant argue that belonging to an ethnic group came to be understood in behavioral rather than biological terms (although one could easily argue that biology continued to underwrite conceptions of ethnicity).[8] But they critique this discourse in that, in its reliance on group norms to explain differences in outcomes, sociopolitical dynamics and structural contexts get "ruled out at the level of assumptions" (1994: 21). Similarly, Frankenberg (1994: 14) observes that in its rhetoric of essential "sameness," the ethnicity paradigm evades issues of power: if different racial groups are basically the same underneath but vary in their values and degree of assimilation into the American majority, any failures to achieve social equality must therefore be the fault of people of color themselves. Thus while it may be that cultural constructions of race are motivated by the desire to oppose essentialism and racial hostility and to welcome cultural diversity, the selective embrace of cultural and other seemingly apolitical parameters of difference tends to uphold extant social hierarchies. The outcome is often a relative lack of attention to structural sources of health inequality

[8] One researcher however was careful to point out differences between "race" and "ethnicity" as a way of distinguishing race *from* culture: "I think race is definitely a socio-political construct. I don't think it's genetic phenomenon, hence—I would go about measuring it using that as my paradigm. I mean I would measure it based on how the person views himself and couple that with how other people view them, because that's going to define their social reality. Ethnicity? Ethnicity is I think a little different from race because ethnicity does have some kind of geo-political—it has land boundaries of some sort, or language boundaries of some sort, unlike race. So, for that one I think measuring would be more in terms of languages, or which cultural group do you identify yourself with—not necessarily race, but cultural group." Here, Sheila uses her distinction between race and ethnicity to implicitly reject a cultural construction of race, and explicitly reject a biological construction of race.

and issues of power, and a continued focus on causes of and consequences to health on an individual level rather than a group or collective one. My research shows that while "ethnic" constructions of race produce essentializing effects (see also Oppenheimer 2001), it is not enough to shift the lens from biological to other kinds of disease mechanisms, but from *individual*-level traits to *collective, social,* and *relational* processes.

In addition, the degree to which cultural constructions of racial difference in epidemiology actually affirm that racial groups, while having variant customs, are underneath all the "same" can be questioned. Implicit in the ways scientists often speak about cultural practices is the assumption of whiteness as unmarked and neutral, whereas people of color have "culture," something that Diane notes above.[9] That is, behaviors defined as "risky" to one's cardiovascular health are never labeled as "cultural" when they are observed among whites. Furthermore, racialized cultures are then equated to "tradition," in implicit comparison to behaviors perceived to be more modern and cosmopolitan—for example, the sophisticated and informed use of medical services, attention to one's body and health, and regular recreational exercise. This represents an interesting twist on the conventional binary of "nature" versus "culture" and the alignment of racialized, class, and gendered "others" as "closer to nature" (e.g., Douglas 1970). In contrast to their usual opposition, in the context of health and epidemiology, people of color are *simultaneously* seen as both closer to "nature" as well as more "cultural." Both characterizations, however, share the effect of sustaining white

[9] It is in this sense that Frankenberg (1994: 198) argues that whiteness and Americanness are conceptualized both as core and as residue: in addition to be the unmarked and neutral norm, they are also what is "left" when all culturally "other" practices and individuals have been named, marked, and bounded off.

normativity, and marginalizing and pathologizing many of the cultural practices of racial others while selectively valorizing those that are consonant with modernist health promotion discourses.[10] Thus cultural differences that are identified and studied by cardiovascular epidemiologists are viewed almost as deep-seated and essentially different as those of a biological nature. This occurs through the stigmatization of traits and customs associated with some cultures as in Bonnie's experiences as a research subject, the mobilization of derogatory images of behaviors in order to sustain hierarchical representations of particular racial categories, and the construction of ideological binaries of white/other, American/foreign, health/risk, and morality/deviance. As Ernst (1999: 6) observes, "'scientific racism' presents itself in cultural as well as biologistic guise. Further, even when expressed in the language of 'culture', a biological based perspective may, in the last instance, still be at work, as when 'culture' is evoked as if intrinsically linked to the biological inheritance of a race."

This is *not* to say that some behaviors and practices commonly viewed as culturally rooted do not play a role in cardiovascular risk, because undoubtedly they do. However, what I critique here are the routine attributions of racial difference to cultural difference, the pathologization of such behaviors, and the lack of attention to the social structures and forces that give rise to and sustain them. Epidemiologists, in these respects, tend to treat culture as static, separable from and stripped of their historical contexts, and thus as curiously *inherent to* racially "other" individuals themselves, rather than the fluid product of economic and political life.

[10] Many of these behaviors and the values and ideologies that sustain them are part of what I term "cultural health capital," which I discuss extensively in Chapter 6.

Representations of pathological cultural practices linked to specific racial/ethnic groups seem to have some conceptual power to also shape the interpretations that people of color give to their experiences. When I begin to ask Rudolfo about the causes of hypertension, he immediately begins to talk about the "so-called 'soul food'" of Black Americans as "probably the number one cause." Diet is also the first factor Sarah mentions when asked about causality: "I think it could be the diet, since it runs in families and usually you eat the way your parents was brought up eating ... I think that's why it's passed down through generations." However, despite the frequent attribution of cause to eating practices and preferences, qualifications and reservations against a simplistic notion of dietary risk are also amply expressed. For example, Rudolfo points out the structural reasons for the evolution of the "black diet"; that is, the diet is not something that is inherent to African Americans, but like all cultural products, is an outcome of social, political, economic, and historical conditions:

> I feel very strongly that the food pattern, the diet of the black or the African American person had an awful lot to do with it in the past. And because the slaves, for example, were not given any consideration as far as their diet is concerned, they had to make do with the leftovers, and in most cases the leftovers were the undesirable parts of the animal. So they made a feast out of those undesirable parts, and most of that, we're discovering now, was unhealthy from a diet point of view. And over the years, I don't doubt for a moment that this has been built into the biology of being black. Somehow ... over a few centuries, no doubt there have been some changes made because of diet, you know. And I feel very strongly that it is the diet of the southern African American that has contributed most to his diagnoses of hypertension ... I can imagine that over a few centuries of people eating the same thing over and over again are going to build in biological changes that will be passed down to the next generation, the succeeding generations.

Here Rudolfo echoes Sarah's view that socially- and economically-mediated exposures

and factors (e.g., foods that evolved out of survival practices during slavery) became culturally-mediated one (these then evolved into dietary tastes and preferences) which over time, then impose biologically-mediated risks.[11] In her analysis of a different historical context, Geline, a Filipina with hypertension, similarly describes how cigarette smoking—a risk factor typically seen as an individual habit—was promoted in the Philippines: "The demand was developed, the availability. The Philippines is ... a dumping ground, you know, of international companies ... the preferred brands are American brands ... tobacco companies deliberately dump lots of products into the Philippines." She therefore implicates the consequences of global capital in cultivating nicotine addiction and generating demand for their commodities through promoting brand name recognition and demand among developing countries like the Philippines, rather than the unwise lifestyle choices of individuals.

Participants also critique the automatic pathologizing of the dietary preferences and practices of African Americans, arguing that considering contemporary, mainstream dietary norms, any that can be labeled as "African American" hardly warrant being singled out. For example, Rahel acknowledges that although "people frown on pork," her people "ate nothing but pork"; but she also contends that the food she grew up on did not contain preservatives or other chemicals that she believes render today's diets suspect. Bonnie concurs, even providing epidemiologically-framed comparative evidence for her assertion: "I look at the children today and they are not coming up like we were, but then they have the fast foods which is just as bad. And a lot of them is coming up with heart

[11] This notion of the heredity of health stemming from cultural heritage—that "heredity" denotes practices and the embodied effects of those practices passed down intergenerationally—resonates with those noted in the previous section.

problems before we did. Ours came out in a later age, theirs is coming out in an early age." Thus her comparison of two age cohorts with different diets and the earlier age of onset of cardiovascular disease among contemporary youth (a trend that the epidemiologic data bear out) suggest that targeting African American dietary habits more characteristic of older generations may miss significant dynamics of cardiovascular risk.

Thus, in many ways, the constructions of the meanings of race, culture, and identity for people of color with CVD raise potential challenges to the epidemiologic practice of presuming and extrapolating cultural differences to account for racial ones. The experiences of one participant serve to explain this. While Sharon identifies as "Latina," when I asked her what that means to her, she says that

> it just means my heritage. I mean, my family's been here for a bunch of generations, so I'm pretty much Anglicized. I don't have an accent or anything. But, if I'm not feeling well, I crave, like, Spanish cuisine. That's all. You know, I'm just another person ... I'm not like ethnocentric or religious or anything ... only thinking of myself as Hispanic and only associating with Hispanics, and only doing things that would be considered Latino or whatever ... And I speak English, and I don't eat a lot of sauces and fried foods. I don't know. I don't run to church every Sunday ... I'm not, you know, like close-knit family. I'm just a person.

To Sharon, her racial-ethnic identification describes an aspect of herself that may be technically true, but dominant assumptions about what that entails do not capture accurately her everyday way of life. To her, the meaning of "being Latina" is constructed as the enactment of particular cultural and social aspects of life. According to these assumptions, then, Sharon's Latina identification is "just ... [her] heritage" and plays a minimal role currently in her everyday life. Underwriting this perspective is the understanding that linkages between race, ethnicity, and health are made via cultural

practices—that is, actual activities and things people do—that together, comprise a *lived* identity that can be called "Latina."

This then raises a concern with respect to epidemiologists' understandings of race as culture. Their presumption of cultural differences from the existence of differential racial affiliations ignores the experiences of individuals like Sharon who minimally engage in practices that epidemiologists define as "ethnic" and "cultural" and perhaps related to racial disparities in cardiovascular risk. In order to take account of the effects of "culture," then, the specific practices in question themselves have to be measured, studied, and analyzed, which, as discussed above, stands in contrast to the often routinized and ritualized inclusion of racial difference as an individualized variable in conventional cardiovascular epidemiology.

In sum, then, the cultural prism of race is a common feature of both epidemiologists' and lay experts' accounts of cardiovascular disease causation. A number of its characteristics make it especially amenable to the modern epidemiologic endeavor, and in their elision of structural dynamics of risk, cultural constructions of racial difference tend to reinforce individualizing tendencies of epidemiology. As a result, a conception of the social and relational aspects of racial formation as shaping and posing systematically unequal levels of cardiovascular benefit and risk—which suffuse the invocation of culture by people of color with CVD—are largely absent in epidemiologists' discourses of CVD causation, as I explore further next.

The Health Consequences of Racial Formation

At infrequent moments, some epidemiologists invoke structural dynamics of

racial formation (Omi & Winant 1994; see also Shim 2000), such as discrimination and segregation as possible sources for racial inequalities in CVD. For example, two researchers comment that experiences of racial discrimination can then cause stress, leading to potential cardiovascular effects. Another researcher, Mia, subscribes to the view that part of why race matters is structural, and that race is merely a marker, or target, for these dynamics:

> because you're this Latina, you have certain risk profiles associated with you because you're of Hispanic origin ... a tendency to be overweight, but tend to have a higher plant-based diet. You are probably less physically active ... But it's probably not because you're this person of Hispanic origin ... It probably has more to do with the neighborhood you're in, what's available in your neighborhood. It's all that kind of stuff. It's very interesting. We tend to focus on these individual attributes that are probably really more related to things that are going on on a much larger scale and have nothing really to do with that individual person, but because that's how we are used to dealing with things, you know, on an individual basis, that's where the focus goes. And it's *wrong*.

She continues to argue for the causal role of racial stratification and inequality:

> A lot of that oppression and such has long-term consequences of social inequalities, of people not being able to get what they need to have rich and full and productive lives, and that, whether it's on access to resources or on daily stress because it's more stressful to live in crowded housing conditions because that's where you live or whatever ... I think those are really more important as sort of these mechanisms that ... are more likely to enter into disease, as opposed to actually being white or black or Asian or Hispanic or whatever you are in America.

However, in marked contrast to the relatively sparse mentions of structural understandings of the effects of race in epidemiologists' accounts, such constructions abound in the narratives of people with CVD. Many directly attribute either their own or others' CVD to the multiple effects of discriminatory racial projects (Omi & Winant

1994; see also Shim 2000) in education, housing, employment, and everyday life.[12] These effects range from the emotional and physical experiences of suppression and stress, the damage to one's sense of self, to the drive to work extremely hard in order to overcome stereotypes and succeed in white- and male-dominated domains.

To my general inquiries about their sense of racial identification and the ways in which race affected their lives, people of color offer impassioned and sustained descriptions of both the minutiae and the sweeping effects that racism and racialization had for them. Numerous participants had grown up in the South during the decades following World War II, and speak extensively about the virulence of race in the Jim Crow era. These and others with CVD describe their encounters with the "micropolitics" and social geographies organized on racial difference. In Rudolfo's words:

> when you see from the beginning that there are certain avenues that are closed to you, after a while you begin to accept it or you destroy yourself if you fight it ... I was very unhappy, very unhappy at the prospect that there were areas that were off limits to me. And that I was called names simply because of my skin color, you know. But I can't say that I felt destroyed by it. There were many blacks who did, of course, feel this way ... [Were you angry about it?] Oh, indeed! *Indeed* I was angry! ... I went into the service at 16 and I was sent to Italy ... except for the American soldiers, I had no hint that I was black. I was just another human being. That is the way the Italians treated us. But the American soldiers themselves were *extremely* obnoxious! They brought with them their prejudices. And then for the first time in my life I began to feel, to question this racial deal. I had accepted it before, but I had accepted it in order to survive. And now I began to question it, you know, very, very much ... Can you imagine ... what effect that has on the mind of a youngster ... to hear the word nigger so much that the child begins to think it's his middle name?! To be told that he can't go to a swimming pool?! To be told that you don't have in your schools the kind of education that they have in the white schools?! That the books that you have came from the white schools after they're done with them?! They talked about separate but equal. No one would have cried if things had been separate but equal, you know?! But things were so unequal!

[12] For a theoretical framework of the multiple processes through which race impacts health, see Pinderhughes and Shim (2001).

Strictly policed rules of inter-racial interaction contributed to the racial apartheid. For example, an endemic part of the social organization and patterns of race relations in the racially segregated South was what Park (1950) calls "racial etiquette," where often implicit rules dictated that, for example, Whites could address Blacks as "boy" and "girl" and by their first names while insisting that they be addressed as "Mr." and "Mrs." or "Miss." Such rules enforced racial hierarchy, promoted the infantilization of people of color, and operated to legitimate unequal power relations. Rahel relates her memory of her grandparents' observance of this rule:

> my grandfather and them, they had these [white] people on pedestals ... they would call them "Mister" and "Mrs." They would call my grandfather by his name ... It was survival for them ... Talk about depression, I sure was in depression when I was younger because I just felt like, hey, why can't we be equal?

Geline, who came to the U.S. from the Philippines in the 1970s, also endured experiences of racialization and exclusion, whose dynamics of infantilization and the delineation of social boundaries echo those of Rudolfo and Rahel's family:

> they could never place you, how old you are. You know, being an adult here and they insisted you be the child here ... Like picnicking in a certain park, which I didn't realize was on the boundary with more white areas ... and then having people come out and say, "You're not allowed here." And you'll think twice before you call the police because the police could tell you that, too [laughs]. So, your sense of physical insecurity goes higher. It was there all the time with the different refugees and the southeast Asian refugees were being brought here, you know, so there was a lot of reactions to that, too ... in a traffic light, being stopped by a top-down car full of white people, you know, like that, and being told, "You go back to where you come from—taking away our jobs!"

Many of the people of color speak often of the deep conflicts between their desire to fight back and resist such treatment and the need to survive, and the difficult compromises they had to make. Bonnie, for example, describes how even as a child she understood the practical limits and material consequences of defiance:

> Anybody who talk back, speak up for themselves, they considered as crazy. And as I was growing up as a young person, as a young girl, there was a lot going on like—you know, you see white people pulling up in the yard with the truck to pick us up and we'd go work for them, and they called my father "Boy" or "Uncle" or something like that. We didn't like it, but what was you going to do? Go out and beat them up or something? So, it's something that, you know, you learn to deal with, even as children ... you found little ways to fight back, and then you accepted the fact that they was the one in authority. You are dependent on them. It was just like it was during the slave time. Your food, your clothing, everything came from master. He owned you, lock and stock and barrel ... a lot of people say it's giving in to the system, but I don't ... I think it's survival.

Geline describes some of the embodied repercussions of making such compromises: "you force yourself to be what you are not ... you keep quiet when you know you're not a quiet person ... Simmering ... instead of speaking up because you don't feel safe to do so ... Or you calculate things—what are the trade-offs? What are the risks?" However, despite the coercive contexts of racism, participants often note that multiple, everyday sites for exercising agency exist. For example, David explains:

> ... you had to take your hat off all the time in the presence of whites. So I learned not to wear a hat. This was my way of rebelling. I never wore a hat ... I stayed in Washington where it was harsh weather, and I never wore a hat, and I never wore one in Chicago. And that was extremely harsh [laughs]. It was because I was not going to take my hat off. So, therefore I got sunburned like hell ... But I could tolerate it because I wasn't going to take my hat off. That was my silent way of rebelling. I think everybody had a silent way of rebelling. Some insidious way of saying, "I'm defying you, but you don't know I'm defiant. I'm thumbing my nose at this because I don't like it!" ... If you were below Mason-Dixon Line, and you were riding on the train ... there was a curtain that separated you, the blacks, from

the rest of the diners. So, very early in life I started flying.

For those participants who immigrated to the U.S., their experiences of displacement, transition, alienation, and adaptation exacted significant emotional, psychic, and physical costs. As Geline describes,

> I had ... a support network, but despite that, you know, I was not exempted from the difficulties of just being different. I mean, probably even more so because you were more aware, you know, of inequities, that kind of thing ... I was already an English speaker back home, because the educational system there is English-based, but I was horrendous [laughs]. I remember ... being conscious of trying to say the right things the right way ... so that you won't cause so much attention yourself, either to be ridiculed or to lose an opportunity ... And then, you know, just being very different, everything about you is looked at and either questioned, praised in a condescending way or criticized in an unfair way. So it's like you're always had both sides. Someone would say, "Oh, you speak English very well!" because they didn't expect you to. And then you don't know whether you should react to it and just say, "Thank you," or whether you want to retort with something [laughs]. That's stressful ... I think it made me quiet, you know, which was kind of weird because, here's this flaming young activist ... and then tries to disappear, you know, in, let's say, work meetings ... your supervisor assumes certain things that you don't know or you won't do well because they assume because you're not, you know, white or you're not American born. So, a lot of times that was very hurtful ... So you try and be quiet because that's what they expect, you to, you know, be like that, or you don't want to cause trouble. After all, you have other plans, you know. You get by that way.

When I asked explicitly whether these experiences affected their health in any way, several participants asserted that it did not have an impact on her or his health. These participants profess a kind of color blindness, or more accurately, the kind of color evasiveness (Frankenberg 1994) that dominates U.S. public race discourse, and seem to mobilize it as an explanation for why they believe that race does not impact their health. Sarah, for example, explained that her family was religious and as a child she was continually told to turn the other cheek, and to not judge others on the basis of their race.

She also added that "things did change" and that her children were doing quite well, that "it worked out well for them." For this, she seemed content. Bonnie also said that although there was a time in her life where she was full of rage and hatred towards whites, she had since learned to not let their treatment of her and other African Americans affect her. She ties this to her belief that everyone is an individual, uniquely and differently created by God, and "once you separate yourself from the crowd and just focus on yourself as a person, all this other stuff doesn't matter." Joe, even after recounting how racism indelibly shaped his experiences with schooling, sports, and employment, describes his ambivalence regarding racism's effect and the elusiveness of the nature of race:

> Well, you know, I never—when I was a kid, I didn't feel so much, but in high school maybe I started realizing ... I started feeling a resentment, as a result of maybe being black was a factor, but it's confusing because I had a couple of white friends I really liked, that liked me ... but no I didn't feel it, me personally. But I know it was there. And I could tell the way some of my friends acted that they probably suffered more than I did. Maybe it was the visual effects, maybe the way they dressed or looked or talked or carried themselves ... I'm more of a humanitarian ... it's hard for me to hate, to say, "You're no good because you're white." I couldn't do that one. I judge you on your personal merits ... Although I recognized that there were injustices, there were things that were not done as a result of being black, but I never held them against them. They were there though. They were definitely there. I just waited to soar above them ... Because I felt there would be something better if I kept trying and not take issue with that problem. I could not be too extreme with that. We were not raised that way."

Similarly, despite experiencing racist treatment by others, Yolanda and Mabel are quick to point out that they have not been affected by such encounters, and that they themselves do not harbor discriminatory feelings towards others.

But at the same time, Mabel, Yolanda, Sarah, Bonnie, and Joe are able to talk

extensively in other portions of their interviews about how de jure and de facto segregation impacted their educational and economic circumstances and opportunities. Thus, although they readily acknowledge that their biographies are riddled with encounters with racism, they seem to disavow any role it has in shaping their own outlook on their experiences, others, and themselves as individuals, for fear that "to be caught in the act of seeing race was to be caught being 'prejudiced'" (Frankenberg 1994: 145). These people of color, while selectively acknowledging others' racism and its impacts on themselves and others, evade explicit talk about how race figures in their own views of the world and interpretations of their health. They seem to believe that the assumption of a racial*ized* worldview or the construction of their experiences as the results of racism must mean that they hold and endorse a rac*ist* attitude towards others. Thus by abjuring any notice of race itself, they seek to avoid the appearance of personal prejudice.[13]

However, at other times in their interviews, many of these participants express a deeply critical view on the impacts of racialization, and, along with most of the other participants with CVD, passionately articulate how such experiences can profoundly affect one's health. In response to my question of whether limitations or proscriptions by

[13] Articulating the health effects of race and racism also seems to be constructed at times and by some as a question of how much they had allowed racism to "hold you back" or "bring you down." Thus acknowledging that their mental, physical, and psychic health has indeed been impacted by the scars of racism seemed to mean, in their minds, that racism had in a sense "won." Their denial of any effects from experiences of marginalization may represent a "flight from feeling" (Frankenberg 1994: 156), where they seek to deflect attention away from deeply embodied responses to such experiences by referring, for instance, to humanitarian or religious values, a kind of etiquette ("we were not raised that way"), and speculation that others they knew who were subjected to more overt discrimination might have brought it on themselves ("maybe the way they dressed or looked or talked or carried themselves"). Indeed, many of these participants are among those who believe that judgment can and should be based only on individual merit and who take particular pride that they have been able to rise above their circumstances—both ideologies based in liberalism that foreground individual effort and reward and neglect the role of systemic and structural disadvantage.

race affected his health, Rudolfo for example says:

> Oh, it's affected everything, yeah. Sure it has. Yeah, it stresses me out to be regarded as a second-rate citizen. As a second-rate person. Not to be given my full due?! ... And if I'm going to survive, I have to accept it. I can't go out fighting everybody, everywhere I turn ... You can't relax. That's hell! You cannot just relax and enjoy some human being vis a vis, you know? That you always have to have a mask.

Carmen relates how contemporary racism, particularly in its more covert and slippery forms, affects her:

> you always get that—at certain times when people say, "Well, you know, you're Latina. That's how you would think," ... I usually try to take comments like that or attitudes like that with a grain of salt and say, "Well, you know, I'm not going to let that bother me. Why should I?" ... Other times, you want to say something, and sometimes you're able to and other times you're not ... But my sense is that if I let it bother me too much, it's going to be harmful to me, and it's not going to change the attitude of the person who's doing it ... And it's very subtle. It's not a blatant thing. And you have to be able to understand and to analyze it for what it is. But it's going to happen. It happens every day and it's going to continue to happen ... I think just the way that it's made me think, to a certain extent, about myself, and even though I'm okay with who I am ... when you're to a certain extent bombarded with a lot of negative attitudes and perceptions, it's going to tend to weigh on you.

Both Rudolfo's and Carmen's reflections indicate that race acts as a master status, creating interactional quandaries and indelibly shaping social encounters in ways that require constant vigilance, careful negotiation, and strategic choices about one's presentation of self. Emotional and psychic survival dictate against, in Rudolfo's words, "fighting everybody, everywhere I turn." This theme of self-preservation is echoed by many others: heightened awareness and vocal critique is sometimes seen by these participants not as psychically or physically liberating, but rather as stressful and tension-

inducing, and therefore contraindicated for those who have cardiovascular disease.

How might this connection between the constructions of race and their consequences, and the health of implicated groups and individuals work? Rudolfo tries to express the grinding effects of the everyday nature of being made to feel different:

> if you know the role that your emotions play on your physical being, then you know that your emotions have been negatively affected, and therefore, if your emotions are negatively affected *day in and day out* by the fact that you are black, and not a single day goes by that you're not reminded of this, you know—no matter what the environment, I can be here in my home by myself, even if I dare turn on the television or the radio, I'm reminded, you know? So, yes, everything is affected. My health is generally affected by the fact that I'm black.

David offers a picture of the systemic effects of race on health:

> no matter what your station in life was, no matter what your economic, social [position]—you could look at every aspect, it had an effect on you. You cannot say that it did not affect me. That would be a complete false thing. It does affect you. You carry a scar for life ... And I don't think it's speculative. I think it's actually a fact ... if you're a product of an oppressed environment, quite naturally you're going to have some health problems that another group of people would not necessarily have in an environment that was entirely different. When I say the environment, that takes it in as a whole. You have to take in the school system, you have to take in the housing, the availability of health facilities ... you have to take all of these and put them into that pot. You just can't extract one. You have to put them all in there, and then you would see that if that environment is oppressed, the people in that environment are going to come out with some problems, not only emotionally, mentally, social problems, but they're going to come out with a multiplicity of health problems.

Here, David makes an emphatic claim to authority, using his embodied knowledge as the basis for his expertise in the health effects of racism. He also articulates an understanding of the interlocking effects of race: it deeply affects multiple aspects of one's lived experience, and any one dynamic cannot be separated or dissected from others. Racial

meanings and racialized discourses and practices have constructed in contemporary life social, economic, political, and cultural infrastructures that synergistically sustain and reproduce one another.

In another example of how lay experts of color understand the linkages between race as a structural force and health, Diane talks about the connections between the chronic exposure to racism and established cardiovascular risk behaviors:

> I think that what happens is that when those things happen to you on a daily basis, you naturally do things that are comfortable and reaffirming to you. So, you go home and you eat food that you know is bad, but it tastes good. It makes you feel good. You go home and you may drink because it makes you feel good. You know it's bad, but it makes you feel good. You may need to relax and so you're smoking. I think that because of those things, you resort to things that make you feel comfortable, even if they had bad outcomes associated, you still do it ... my husband used to smoke. When he would get really upset, the first thing he would do was smoke. My mom—when she's upset, she comes home and cooks a huge dinner ... a lot of people do that. They do things that are comfortable, and ... when you have a lot of things in your life that hurt you, you have a tendency to do it more often. I think that's why a lot of women—black women—are overweight. Again, it's just feeling sad. And I think that's where the direct correlation is. I think if you're happy, you more attuned to want to take care of yourself, and if you're not, you're just sort of like "Whoosh! Whatever tastes good, feels good."

Finally, Joe articulates a particularly compelling picture of how structural racism (and sexism) can act as a significant risk for CVD:

> [Not to have gotten all the chances you deserve,] that's what irritates so much. That's what makes you angry, mean, nasty, and unforgiving ... that's all part, I guess, of the oppression thing, to be denied that chance. Sometimes not to be even heard. It's a biggie. It's got to weigh big with some people, especially if you're held back, and you feel like that's what's holding you back ... there are some people who just cannot shake that, you know, and it sticks in their craw, and it destroys them ... Because that's all they've got is the opportunity ... And you take away that, man, and there's nothing else ... just one time, you miss your shot one time and you can go through life saying, "If I had just got this shot or these things happened," two or three times, but these things continually happen ... how

> many times can you go through this? How many times can you turn your other cheek? How many times can say, "Oh, it'll be all right. I'll get it the next time." After a while it hammers on you, it lays on you, it beats you down. It really does. And eventually maybe destroy you ... Knowing the feeling, it's oppression that could be passed ... is it genocide? I don't know ... it's the most worse thing there is, is to know that ... your parents didn't have a chance, you didn't have a chance, and your children's not ... it's a monster thing! It's unforgivable ... You take that away, you destroy the people. You've destroyed yourself.

Thus experiences of discrimination, residential segregation, and the differential distribution of educational and economic opportunities that participants with CVD endure are deeply and powerfully embodied.[14] In this light, the relative silence on structural causes and the popularity of cultural constructions of racial inequalities on the part of epidemiologists appear very problematic indeed, standing in such sharp contrast to the experiences of those who live with CVD. At the least, the ritualized inclusion of race as a taken-for-granted and unexamined variable, and the continued study of cultural difference in CVD risk, neglect the role of race in organizing social relations of power and defer work on the effects of structural racism on health. At the worst, such practices operate to displace and replace structural understandings of race with individualistic ones that ignore the ways in which relations of power are embedded within the social organization of race.

C. Constructions of Class

Interviews with both groups of participants and ethnographic data from conference proceedings convey that, in contrast to their perspectives on race, a relatively

[14] Moreover, there is also the possibility that even those individuals who did not articulate or perceive the pernicious influences of structural racism in their lives may be experiencing some of their effects. Krieger and Sidney (1996), for example, found that, among their study sample, blood pressure was highest among working class, young Black women and men who reported having experienced no racial discrimination and who may have been internalizing their responses to such experiences.

significant amount of consensus on the social relevance of class differences for health. Both epidemiologic researchers and people with CVD clearly and unequivocally point to class formation processes as significant *social* and *structural* determinants of the stratification of cardiovascular health. However, the two participant groups do differ in their interpretations of the interactions between class and race, and the relative importance they place on various class-based mechanisms in producing socioeconomic disparities in CVD. In addition, current epidemiologic conventions regarding the measurement and conceptualization of class stymie efforts to understand the pivotal role of class-based structural forces in shaping cardiovascular risk. I first explore these methodological dilemmas, and then move to an examination of the various ways in which class formation processes are invoked when interpreting class differences in cardiovascular risk.

Methodological Deficiencies in the Operationalization of Class, and the Intersectionality of Class Identity

When asked to discuss their conceptions of class, epidemiologists and lay experts bring up a number of issues which bear on the questions of measurement, operationalization, and class identity. First, epidemiologists widely perceive current conventions for measuring economic position and status to be inadequate because they fail to capture many of the important ways in which class affects the distribution of CVD. At the same time, they regularly acknowledge that class characteristics, because of the complex and fluid ways in which they impact material conditions and health, are problematic to measure accurately and reliably. As described later in this chapter,

epidemiologists can easily conceptualize multiple, complex class dynamics that impact cardiovascular risk, ranging from health behaviors, access to resources, and as chronic stressor, but they emphasize that comprehensive measures of these effects have yet to be elaborated and widely accepted. In the absence of well-developed or convincingly valid alternatives for operationalizing class dynamics, researchers find it difficult to deviate from the routinized, though inadequate, methods and measures commonly used. Such components of social class are also commonly used by lay experts to characterize their understandings of their economic positions, but they often augment these with more complex descriptions of wealth and of the social relations between classes. In addition, class identity for people with CVD is a highly intersectional, intertwined with experiences of race. In contrast to the measurement of race, however, these kinds of methodological controversies are viewed largely not as political conflicts about the nature of class itself but as technical issues remediable through more precise and better science.

Currently, the default standard of practice for measuring class in epidemiology is to use variables of income (individual, family, and/or household), occupation, and/or educational attainment, often in combinations that may vary from study to study. These measures constitute components of "socioeconomic status," or SES, which is, according to all the researchers I spoke with, a key and routine ingredient in almost any epidemiologic investigation. One weakness perceived by epidemiologists in using such ritualized measures of socioeconomic status is the lack of context: epidemiologists argue that the expression of socioeconomic status as an absolute number or category (e.g., income in dollars, or occupational groupings) does not embody the reality of class position as a *relative* characteristic. As Mia explains,

> education and income ... you have to look at those in terms of context ... If you live in Silicon Valley and make $40,000 ... you're on the lower end, versus if you live in the middle of Illinois and you make $40,000, you'd be living like a queen ... you really have to look at the context of that, [and] look at how many people are in the household are sharing that income.

Another researcher notes, "are those variables that you're actually measuring completely parallel to what somebody's social class and exposure and availability to certain common factors are? ... things like status incongruity would be more important."

Another perceived methodological flaw with the routine variables of socioeconomic status is the failure of these measures to take into account the long-term, systemic effects of class over the life course (and indeed, over generations). Epidemiologists I interviewed readily invoke a longitudinal view of the effects of class on cardiovascular health. For example, Sheila argues:

> I really think you have to start with the beginning of someone's life and follow them from in utero all the way until their death ... to really understand the impact of social factors and socioeconomic factors on people's survival ... I think we tend to look very close to the outcome, maybe too close to the outcome if the damage has probably been accumulating over a period of time and the social factors are way back that we're not even accounting for. So we're only seeing a piece of the pie.

Prior class position is perceived to indelibly affect present and future status, and simply changing a person's current income through some sort of redistribution program does little to alter the cumulative benefits and disadvantages of their class locations throughout life. As another scientist says, "You don't just fix the problem at the end point."

However, the conventional time frame of most health research exacerbates this

and many of the other shortcomings in the measurement and operationalization of class.[15] In CVD epidemiology, much of the most prominent and productive research has been in the form of cohort studies, despite their significant financial costs. Many epidemiologists I interviewed speculate that this may be changing as investments in such long-term research seem to be diminishing as resources shift to faster and cheaper study designs. Moreover, most cohort studies include only adult participants (although this is shifting to some degree) and therefore are limited in their ability to trace the long-term effects of class on cardiovascular health in the ways that Sheila and other epidemiologists advocate. Finally, even in cohort studies, epidemiologists recount dilemmas in accounting for class factors that they know are important, but are methodologically unmanageable in some way. For example, they cite how individual measures of class or socioeconomic status are not stable (with the usual but not guaranteed exception of educational attainment) but instead change over the lifetime of study participants and the course of the study. Thus, it remains unclear to epidemiologists how they should account for the fluid economic status of a married woman who enjoys a firmly middle-class life but then drops into poverty when she and her husband separate, or the man who experiences a poverty-stricken childhood then homelessness then gainful employment in a relatively well-paying though physically strenuous job, or someone else who is working class or poor for much of her/his life.

Researchers struggling with such dilemmas phrase their comments within an implicit critique of current conventions of conceptualizing economic class. But such measurement and analytic dilemmas, rather than raising fundamental doubts about the

[15] A more thorough discussion of this is taken up in Chapter 5.

value and meanings of measures of class, as they did for race, are quite often perceived as resolvable through more comprehensive and valid measurement methods. That is, epidemiologists tend to articulate the problems as technical ones—in which study design and data collection procedures must be modified—and as an issue of research funding—in which sufficient resources must be committed in order to implement longitudinal studies that can study long-term and systemic effects of class on CVD. Most researchers believe that taking advantage of existing analytic methods and developing new ones can take into account more nuanced concepts of socioeconomic status, and would allow for the subsequent collection, availability, and analysis of more and "better" socioeconomic and class data. Thus methodological advances are seen as ultimately able to settle contentions over the causal or mediating role of social class in cardiovascular disease. In contemporary American epidemiology, then, investigations into the role of class in CVD and the production of health more generally are viewed predominantly not as involving politically charged issues about the nature of the concept itself, as they are for race, so much as technical problems that can be remedied through "better" science.

People with CVD use heterogeneous definitions and ways of describing their class background that often were somewhat congruent with the standard epidemiologic measures of socioeconomic status, such as income and education. These lay experts tended, however, to elaborate more complex economic indicators. For example, when asked to characterize their "economic situation" or "class background," most informants use some combination of home and property ownership, parents' as well as their own occupations, and the extent to which their parents' and their own incomes provided for food, clothing, housing, cars, and other kinds of resources for everyday life. Compared to

epidemiologists, participants of color with CVD are also clearer about the relationality of class distinctions—that is, the economic and representational dependence of one class upon the existence of others within relations marked by power. Juanita, for example, expresses this quite succinctly: "I just think it's terrible that people with means can afford to live longer than people who don't have the means ... That's what it's all about. Money. It revolves around money. Who has the most checkers, I've found that's who has the better chance of surviving." Bonnie, whose parents' occupation as sharecroppers centrally affected her class status growing up, invokes the relationality of class as she explains the exploitative labor relations between landowners and sharecroppers.

Finally, perspectives differ significantly between epidemiologists and some of the respondents who are living with CVD about the inter-connections of class and race. Epidemiologists almost invariably express concern over statistical confounding between class and race, and there is a preoccupation in interviews and at scientific meetings on how to eliminate this technical conundrum. They frequently observe, for example, that adjusting for socioeconomic status "tends to wash out" much (but not all) of the disparities by race. and propose hypotheses such as that well-educated blacks and well-educated whites have more similar risk profiles than blacks from different socioeconomic circumstances. Many researchers thus appear to understand the role of class in CVD risk as separable and independent from that of race such that their respective effects should be uncoupled through methodological techniques.

In contrast, the situated perspectives of people of color with CVD significantly differ from this position. When asked how they would describe their *class* background, people of color often interject experiences related to *race*, or when asked about their

racial identity, would recount aspects of their *class* circumstances. For example, in response to my query about economic background, one African American woman touched on residential racial segregation when mentioning her family's owning property. Several others qualified their description of their families' middle class status by stipulating that, in the end, however, they were Black; that is, the consequences of their families' relative economic advantage were highly constrained by the fact that they were Black because their income, occupational status, and relative wealth could "buy" them, as Black people, only so much. Other people of color I interviewed likewise consistently used more than one axis of difference to account for their experiences and for their cardiovascular conditions, explaining, for example, that being "a poor Mexican woman" matters, not being just "poor" or "Mexican." Thus, when articulating the effects of class on cardiovascular health, many participants incorporated the effects of race into their responses, and vice versa. The repeated use of racial indicators to give shape to their descriptions of their class backgrounds, and vice versa, convey the intimate linkages between the meanings of one dimension of difference to those of another, and point to the lived intersectionality of class and race.

These situated perspectives would argue that the conceptual and material distinctions between race and class are less meaningful—or are meaningful in different ways—than epidemiologists who aim to dissect their effects realize. That is, many researchers' framing of the "problem" in terms of how to *isolate* the distinct effects of class *from* race may be less relevant to the biographical experiences and embodied identities of people with CVD than how race and class *intersect* and *interact with* each

other, and how, as a few epidemiologists point out,[16] the meanings of such socioeconomic indicators as income differ for people from different racial groups. However, unlike gender and race, the appropriate conceptualization of class is seen as indisputably and manifestly about differences that are social and structural in nature, as discussed below.

Class as the Structural Distribution of Resources and Risks

Both researchers and those living with CVD argue that social class influences CVD risk primarily via *structural* mechanisms, although they emphasize slightly different kinds of mechanisms. Both participant groups view access to resources and exposures to risks as structurally distributed by class, challenging the extent to which people are "free" to pursue healthy lifestyles and sustain their own health. With varying frequency, they speak of class as stratifying access to heterogeneous kinds of resources—such as access to quality health services and information, and nutritious foods—and exposure to multiple kinds of risks—such as the stress of economic insecurity exacerbated by constrained occupational and educational opportunities, and their experiences of their lived environments. Thus both epidemiologists and lay experts construct the effects of class differences on cardiovascular risk from a class formation perspective, to a much more extensive degree than for either race or gender.

First, the construction of class as access to health care is pervasive in

[16] Carolyn, for example, describes the process of interpreting potential racial differences: "Well, you say, this is controlled for social class, but if you look and you're comparing African Americans and whites who have a college degree, for instance, you can say, 'Ah! They're of like social class.' Well, they're not of like social class because of other poly-discriminatory kinds of things in our society. Because the wages that are earned by the African American compared to white—same educational level, four-year college degree—they're a lot lower. So, your education does not buy you the same kind of thing if you're a minority in America."

epidemiologists' accounts of cause and risk, though it only sporadically appears in the narratives of people with CVD. The epidemiologists I interviewed or observed widely perceive the role of access to health care in producing CVD inequalities as clear and uncontroversial. They define access to health care not simply as a matter of health insurance status, but as effectively circumscribed by myriad other factors related to class, such as availability of time and transportation. In contrast, only three participants with CVD briefly mention issues of access when discussing class-mediated mechanisms of cardiovascular risk. Scientists and lay experts do agree that social class is closely tied to the quality of health care to which one has access. Those people of color with CVD who do invoke access to health care further elaborate that class hierarchy and power relations rooted in class differences are viewed as systematically structuring who has access to (or can demand) comprehensive and respectful health care, where their own perspectives are considered and solicited. For example, Lee explains,

> this whole thing is really, I think, really connected, you know. Social class meaning that how much education—my parents didn't have that much education. At the same time, they didn't speak English. They didn't have much access to health care. They had no health insurance, which makes every time you go, you had to pay so much money. It's kind of like punishment. So they were less likely to go and seek health care unless it was really bad. And them, being Chinese, always thought about, you know, what else can they do rather than take medications to help themselves. So sometimes that make them, I think, delay seeking help even more so ... to me it's all connected.

As Lee alludes to above, lay experts also understand that class stratifies educational opportunities and attainment and access to myriad other kinds of social capital and informational resources that shape what one knows and can do to promote

their own cardiovascular health.[17] For example, Diane, an African American woman with hypertension, when asked about the disadvantages or benefits that her class status affords her, responds:

> we have a computer at home, so I can always go online and get the latest news on what's happening. The ability to buy books and read on things. The ability to go to any doctor that we want to go to, and if we're pissed off with that one, go to another one. I mean, we really have more flexibility in where we get our services. I think that that's a major benefit of having money, that you can actually go where you need to go and where you want to go, and you're not told to go somewhere. And you have more of a voice in your health. And I think that, to me, is a major advantage.

Carolyn, an epidemiologist, concurs that access to informational resources and the ability to navigate and evaluate health-related material are crucial factors in structuring the socioeconomic gradient in cardiovascular health. Using the example of smoking, she explains how she believes health behaviors and lifestyle habits must be viewed as mediated by the linkages between social class and educational status, and social environment and cultural milieu:

> it's not just credentials. With each additional year of education, you find this gradient ... So, it's not just ... getting out of middle school, getting out of high school, getting out of a two-year community college, having a four year college degree ... there is this phenomenon that with each additional year of education ... you get a decrease in risk ... to me the thing that makes most sense is that there's something about the skills and the resources that accumulate with additional years of education, and that with additional years of education you're not only changing how you navigate the world and the skills in which you do that and interpret it, but you're also changing kind of your social environment ... you're in a more educated setting around your work colleagues, for instance, or your school colleagues ... if you're a smoker, then along with each additional years and you're at home, you're at work, you're with your peers and you're in your whole environment, those kinds of things go from actually being supported ... and so you get a change to it

[17] I discuss such arguments in greater depth in Chapter 6.

> being actually being easier to maintain or adopt healthy lifestyles because your social environment has changed. And also your knowledge of just the environmental influences. You're more likely to have been exposed to [the idea] and recognized that most people who smoke, that's not purely an individual choice ... if you look at the targeting of information, where the information is distributed, the ads, you know, they're at rodeos, they're at race tracks, they're at community events where lower income people congregate ... And as you become more educated, you become more cognizant of those kinds of influences and those kinds of influences are more likely to either keep you from smoking, get you to stop smoking successfully. If you're higher educated and you're pregnant and you're a smoker, probably much more likely to stop smoking because you're able to either read, understand the messages about the danger to the fetus ... And that's the kind of thing I think that education buys you and why there's this gradient ... Because each piece along the way—the whole social context is changing.

Second, many of the participants with CVD grew up in fairly humble circumstances, and spoke of their limited access to nutritious foods and the consequences of diminished economic resources on their diets. Bonnie, the African American woman whose parents were sharecroppers, describes this at length:

> As I look back on my life and I remember the diet that we came up on—like I say, we were poor. My mama had fourteen children—she and Dad. And my father did sharecropping. And you know they never made any money because the people the land belonged to—those are the ones that made the money off of it. You just got a little to get your bills paid and maybe get you some food for the winter, until you could grow you some more food the next summer. My mother canned, like peas and, you know, different vegetables that we have for the summer time. But a lot of my diets were—we couldn't afford to buy like regular cooking oil like we do now, so they used hog fat ... So that was pure cholesterol ... a lot of our diet was fat. Because we couldn't afford the other things ... the meat—they would pack it with salt, you know, to keep it from going bad ... So we was raised up on like a high salt diet with a lot of fat in it and the starchy foods ... So, as I look back over my life at that time, I think that's what might have caused it [hypertension and heart disease].

Importantly, Bonnie, as well as other African American informants, makes clear that in addition to immediate economic constraints, their diets were shaped in large part by

cultural tastes and preferences that themselves emerged from a history of racism, of generations of making do amidst the dire deprivation of slavery and the material inequalities imposed by residential, educational, and occupational segregation. Geline, a Filipina with hypertension, describes how upon immigration to the U.S., the abundance of meats and processed foods promoted their over-consumption, despite their relatively tenuous economic status:

> One of the things I think that happens to immigrants from developing countries coming to the U.S. is that you're commodity-shocked. No matter how poor you are, the availability of the junk you can buy, you know like that ... if we were more educated about it, I would have prevented more ... you know eggs are so, for example, so cheap here. You know, in the Philippines, you don't make certain kinds of dishes all the time because it involves the use of eggs ... So there's just a lot of things you could go in excess of without knowing about it and without understanding that health-wise ... you're going beyond the level of unhealthy consumption, just because you thought back where you first grew up, the deprivation of those kinds of things is more the problem. You know, it's like the amount of calories that's possible, available ... here, even though you're struggling and you're the main breadwinner, you could afford to buy those things, and it can shock you. In some ways there are so many processed ingredients here that are available to the immigrant communities.

While such dietary habits, from an epidemiologic standpoint, would tend to be racialized as cultural preferences, as described earlier in this chapter, people of color instead indicate how larger structural forces, such as power relations forged on essentialized definitions of racial difference systematically interacting with class circumstances and life chances, as well as the commodification and processing of foods in the U.S., are influential in shaping the dietary choices of different groups.

Third, both epidemiologists and people with CVD cite the chronic mental and emotional toll of economic insecurity and the constant struggle for economic survival as

significant bodily stressors and important contributors to the social class gradient in CVD. As Karen, an epidemiologist, argues,

> I think the biggest issue is that when you have so many other prevailing issues, like where will the next meal come from for the children, will we have a roof over our head—what happens to you in 20 or 30 years from a high blood pressure or cigarette smoking or high cholesterol, seems almost irrelevant ... It's almost like it's a privilege of the middle class and the wealthy to be able to worry about health and the future. I personally believe everyone is interested in [and] values their health. But, when it comes to stacking up your priorities of what you're going to spend your day today on doing, it becomes very, very hard when survival is such a huge issue at hand every, single day.

Even for those in less limiting economic straits, such as Lee, a Chinese American, middle-class woman, the need for dual incomes imposes restrictions on her ability to change her lifestyle "choices":

> A friend of mine, she always said, 'Oh, you shouldn't have high blood pressure. Maybe you should quit your job.' She can say that because she doesn't work, and she's able to go to the gym in the morning and do workouts and then the rest of the day she just sort of relaxes and shops and picks up her son later, and that's her day pretty much, you know. So, I'm not saying that's what I want to do, but I think if I had a little more time, a little more flexibility to do—maybe to incorporate exercise into my life a little more.

Further, Max, an epidemiologist, suggests that aside from greater flexibility in time and better access to the financial, material, and environmental resources necessary to engage in behavioral risk reduction, "if you're doing well and are well off, you're probably going to have a more positive response toward healthy dietary choices and activities, than in you're unemployed and everything is ... objectively dismal and depressing in your life." As such, he believes that measuring one's perception of their socioeconomic position relative to others may yield more understanding on differences by social class than using

measures of SES alone.

People of color with CVD further invoke complicated and intertwined processes like educational stratification and labor market segmentation by class and by gender to explain the constraints they face by virtue of their economic, educational, and occupational positions. Sharon for example compares her own life of constant financial struggles to those of people who are better off:

> someone who's better educated might not have the stress or the money problems that I do ... in San Francisco here, if you're middle class, it's really hard to make ends meet because of the price of rent and everything. I find myself increasingly going to thrift shops and garage sales instead of buying new things, and hoping I can find what I need instead of like going into a store and buying it brand new, because I can't afford it ... worrying about money is stressful. Looking for a job that isn't stressful and will help me survive financially is stressful. I'm not that knowledgeable about computers and that's pretty much a requirement for jobs these days, and I'm no longer young. And I'm not ancient, but I'm not a 20 year old. And it's just a struggle, and that is stressful, and it's going to affect my ability to choose healthy food and a good job and survive here in San Francisco and not have to move to some place else that's less expensive.

In this passage, Sharon points to her inability to fit in a service- and technology-oriented economy, and one that favors young, healthy, and technically-skilled workers. Lee, a Chinese American woman whose organization provides services to Asian Americans and Asian immigrants, talks about her clients and the racialized, classed, and gendered division of labor that funnel them into occupations that pose significant risks for their health:

> They work as cooks. Very high pressure jobs where you have to produce. You have to hurry up and produce the food, you know. And there are garment workers, and the garment workers often times are abused because they don't have the language capability. They don't know what their rights are as workers. And they oftentimes do what they call piece work, which they have to produce certain

> number of items by a certain time period. So they're under pressure. And I hear that a lot from the women, you know, that they can't keep up with the demand ... They're mostly women garment workers. There are a few men, but mostly women. The men are usually the cooks. That's the typical scenario of our patient population. Cooks and garment workers.

Participants of color thus invoke complicated and interlocking processes like educational stratification and labor market segmentation by race, class, and gender to explain the constraints they face by virtue of their economic, educational, and occupational positions. These constraints, particularly the often conflicting needs to find work that provides a living wage sufficient to survive in the Bay area, yet hold jobs that do not pose additional threats to their health, themselves constitute sources of stress, forming the experiential basis for which working class and poverty status, intersecting with race and gender, act as direct risks for CVD.

Other informants also recount complicated and long histories to explain the cyclical consequences of tenuous economic existence upon their education and myriad other aspects of their life that together comprise risks to their cardiovascular health. For example, after graduating from high school, Carmen enrolled in City College of San Francisco; however, as she recounts, "I had to work to go to school, and I didn't have any choice—to buy my books, to pay whatever tuition was required at that time, I had to work to go. It was a very difficult time for me ... then finally I decided, well, I can't go to school now because I need money, so I quit school and I worked for a few years, and then I would quit the job and I would try to go back to school ... back and forth, back and forth." In addition to being a significant source of stress for her at the time, Carmen's ultimate inability to fulfill her academic dreams continues to be a cause of great regret.

She never was able to accrue enough credits to earn her college degree, and this in turn has circumscribed her economic opportunities, relegating her to a semi-skilled but relatively low-paying job as an administrative assistant.

Similarly, Mabel had a tumultuous childhood, parented by a mother who suffered from alcoholism and by a number of abusive men, and attended school sporadically. She has some high school education but did not complete it. She speculates that had she been able to further her education,

> my life would have been much easier. If I had an education, I would have gone to work. I wouldn't have to go laboring jobs and work like a fool, you know, for minimum wages, because in those days they didn't pay that much ... if I had a good education, I would never be this way. I'd be more comfortable. So, it's hard to have—like I say, the brain works crazy ways. It's hard to have something in your mind and think about what you're going to do the next day, how are you going to eat, how you're going to take care of your kids.

Thus the long-term consequences of working class or poverty status during childhood manifest in part as limited educational attainment that in turn constrains participants' abilities to earn a subsistence wage. This then creates a lifetime of chronic stress that takes its physical, mental, and emotional toll, cumulatively and synergistically, on the health of participants. From their perspectives, the conditions of life structured and imposed by their economic position, social status, and opportunities constitute significant causal pathways to bodily stress and ultimately to their cardiovascular health.

Many of these educational and occupational forces are the manifestations of complex interactions of class with race. When participants of color did enter the workforce, they often did so at significant disadvantage because of their race. A racialized division of labor further constricted their employment opportunities, resulting

in lives of chronic deprivation. Mabel for example worked in a cannery and then in food service for much of her working life, and describes how hiring practices produced an occupational hierarchy that reflected racial hierarchy:

> Oh, my days, people were very prejudiced! I mean they [the whites] got the best jobs ... It was all underneath the table ... higher up, a white person rather than the Latino or black. I know what my place was there, it was that way because there was a lot of blacks and Latinos working. And they would hire—there was a girl came in and was light complected and ... I would go in or somebody else darker than me would go in. They'd hire her. I've seen that happen. There was a lot of prejudice. It was most always swept underneath the table [laughs]. Oh, we went through all that prejudice in our days. They used to call me Mexican greaser, and all, you know, names ... We got the dirty jobs while the others got the clean jobs [laughs]. It's always been that way.

Mabel then speaks about the effects of such racialized occupational stratification on her life, speculating that if she had not been Mexican American, she would have had

> different kinds of jobs and easier jobs, and a more calm life than I was having. In those days there, you couldn't even work in an office if you were Latin or black. You had to be white, and if you do go work in an office—oh, my God!—they get you fired right away. They give you all this trouble ... Looking at you like you're kind of slum or something like that. It's just terrible ... Oh, yeah, it'd be different if I was white ... today there is still some places that still goes on ... It's starting to get a little better right now. But it should be better yet ... they forget California belonged to Mexico ... they treat the Latins here, right now, just as bad in jobs and every occupation. How many Latins do you see that have high quality jobs? Hardly none. Just a few they got in there.

Here Mabel invokes California's origins as Mexican territory that the U.S. colonized and subjugated as the basis for a legitimate claim for Mexican entitlement to economic and occupational equality in America. Instead, as she points out, Latinos are assimilated into the higher ranks of the occupational hierarchy only in token numbers. The more personal consequences of these social structural dynamics for herself was a life of working long

hours in unskilled, low-paying, and physically taxing jobs to provide the sole source of income for her family. Experiences such as these are therefore constructed as exacting material consequences on the everyday lives and health of people of color, constituting sources of stress, and forming an experiential basis for which they conceptualize working class and poverty status as direct cardiovascular risks.

And finally, those who live with CVD point out that their experience of their environment, such as the social conditions of their housing, constitutes another major source of psychological and physical strain. For example, Lynn, a woman with hypertension who lives in a single-resident occupancy hotel, describes the stress of living in high-density housing without the luxury of privacy and space:

> where I'm living now, I'm tense ... there's a lot of people live close to each other, and they're always in your business, or want to know what you're doing. And I feel like I don't have space, and I need to go to myself, and then I tense up, you know. When I'm tense, it goes to my heart ... There's a lot of people there, the drugs, there's the screaming and yelling ... you want to scream and yell back. And I'm like, "No. This is not good for my body." I'm a quiet person. I don't like a lot of junk and noise around me ... it's like everybody is into everybody's business, and I don't like that. I don't know how I lived there four and a half years ... I can't take a whole lot any more. I just can't.

In this vivid description of her living environment, Lynn expresses—and even embodies during the interview itself—the feelings of frustration, anger, and tension that they cause her. The concentration and density of people, the lack of privacy and private space that are often inevitable in such situations, the combativeness and intrusion of her neighbors, are all triggers for emotional and physical distress for Lynn. She points out this risk exacerbates her hypertension in the face of already existing risk factors, such as her obesity, and increases her dependency on her blood pressure medication

It is as a result of these sources of class-based risk, some epidemiologists and most lay experts assert, that class stratification inevitably affects health behaviors. Moreover, they, and in particular people with CVD, are clear on the complex and multiple class formation processes through which classed representations of groups are made to have material consequences. But, at the same time, these largely structural causal accounts of cardiovascular risk and disease simultaneously include contradictory explanations of individual responsibility. Epidemiologists recognize the roles of economic stratification yet also invoke more reductionist explanations to account for what are perceived as individual-level pathologies of attitudes, knowledge, and behavior. For example, they discuss the impact of social class on individuals' awareness of health issues, their knowledge of when and how to engage with the biomedical system, and an agential attitude toward the consumption of health information and health care services.[18] Epidemiologists also understand class differences as stemming from variations in the prevalence of risk factors—such as smoking and unhealthy dietary habits—that they theorize have something to do with lack of health education, problematic "role modeling," and a aberrant cultural environment in which such risky behaviors are tolerated and even promoted. Similarly, people of color with CVD fuse structural and more individualistic explanations for class differences in the same contradictory manner. For example, Sharon, who considers herself middle class, speculates that:

> someone who's lower class might be not as well educated or might not have the resources that I have ... not to sound terrible, but there are people who have been on welfare for generations and they don't have much money and they have a tendency to eat more inexpensive and junk food, and they're hurting their bodies

[18] I conceptualize these class-mediated differences as *cultural health capital*, discussed further in Chapter 6.

> and they don't know it. That's all they can afford. And people aren't taught a lot of health information in school, and if they go to the average school and they don't have a doctor that really cares about them because he sees a glut of people and he doesn't have much time, they're going to suffer because of it ... I'm treated a little better, and I do have more information and I would see a better type of doctor because I can afford it. And I'm not just, you know, seen for five minutes and that's it. And I can afford better food. I have less prejudice.

Here, Sharon contextualizes the health-related "choices" of the poor by noting the structural constraints they face in diet, lifestyle, and health maintenance, yet occasionally lapses into reductionist language, alluding to generations on welfare and living in a social milieu in which people "wouldn't know any better." The ways in which such discursive constructions of the poor are entangled with efforts to offer more structural explanations by both scientists and lay experts reflect the pervasiveness of ideologies that in effect "blame the victim" and echo "culture of poverty" arguments.[19] In this case, the lack of knowledge and awareness that leads to risk behaviors and unhealthy lifestyles are conceptualized as at least partly rooted in deviant local cultures and pathological environments, from which individuals should pull themselves out by their own bootstraps. The ready availability of these rhetorics to serve as familiar, convenient, and safe explanations, though partial ones, for the class stratification of cardiovascular risk is, then, a measure of their success in manufacturing consent to class and health inequality.

However, as scientists and even lay experts themselves invoke highly

[19] As Katz (1989: 16-35) points out, culture of poverty arguments were originally developed and articulated by intellectuals more often regarded as liberal (e.g., Lewis 1959; 1966), who advocated for more generous and active intervention by the government on the part of the poor. They stressed the structural foundations and adaptive functions of a culture marked by lack of participation and integration into mainstream institutions, apathy and hostility, feelings of helplessness and dependence, present-time orientation and failure to defer gratification, and various behavioral pathologies often related to sex and familial relationships. However, the resonance of such characterizations with convenient and individualizing discourses on poverty and "the undeserving poor" (Katz 1989) rendered them readily subject to appropriation, and further elaboration, by the conservative right.

individualistic explanations for class differences, they tend to temper these with more structural accounts, thereby qualifying the individualism of health ideologies and behavioral mandates. In providing explanatory accounts for health behaviors that are rooted in the structural dynamics and consequences of class stratification, they dismiss the image of the freely choosing, rational human actor. Their constructions of class attempt to disrupt the notion that lifestyle habits are a matter of "choice," in favor of arguments that health-related behaviors are constrained by local material contexts and societal economic policies and factors.

In sum, both epidemiologists and lay experts view class formation as a structural and potentially modifiable aspect of social life, and as processes that clearly mediate the effects of biological and genetic causes of CVD. People of color with CVD do provide more complex and nuanced understandings of class-based mechanisms, but both groups of participants offer perspectives on the lived effects of class that highlight the limitations of risk factor epidemiology and health promotion rhetoric. As Diane observes,

> I almost feel like to a certain extent that it isn't even scientific. I think it's really just socioeconomic. I think that the things that go on, like you said, in the community. I mean if you have to go to a school every day where the windows are broken out and it's cold and the cafeteria food is horrible ... I don't care how much you meditate. I don't care how many vegetables, how many servings you eat a day, that still wears on you ... People have to live in a society where everyone is cared for in the same way and treated the same way. I mean, if it's okay for certain kids to go to school with, you know, one book between six kids, other kids have computers on their desks. I mean we've got to look at those kind of things. To me it's so obvious. And there's a high rate of depression—you can look around and you can see why ... It's just people behaving normally to really abnormal situations. Who wouldn't be stressed out? You know, who wouldn't be obese or have high blood pressure or whatever ... So, to me it's almost not scientific.

This does not mean that differences in risk factor prevalence among groups of varying socioeconomic status are considered *in*significant to cardiovascular health, or that cultural factors of various sorts do not play a part in shaping health behaviors that ultimately impact CVD. Rather, researchers and people with CVD concur that class differences work *through* multiple *structural* dynamics—including access to health care and information, nutritious foods, experiences of economic insecurity, constrained occupational and educational opportunities, and their lived environments—that then shape cardiovascular risk factors and behaviors. This stands in marked contrast to their perspectives on sex and gender, which is characterized by significant in the ways in which epidemiologic and experiential accounts frame cardiovascular risks related to differences of gender.

D. Constructions of Gender

My research reveals significant agreements between epidemiologists and people living with CVD on the operationalization of sex and gender, yet indicate deep differences in the ways in which "gender" as a dimension of difference is conceptualized. While epidemiologists overwhelmingly and consistently construct gender differences in cardiovascular risk as attributable to *biological*, hormonal distinctions between men and women, people with CVD view these differences as rooted in the *structural* effects of gender formation and gendered relations of power.

The Binary Categorization of Sex/Gender

Numerous feminist and other scholars (e.g., Chodorow 1978; Martin & Voorhies

1975; Oakley 1972; Rosaldo & Lamphere 1974; Unger 1979) have argued for the conceptual distinction between biologically determined or defined "sex" as "female" or "male," from the cultural and social processes that construct one as a "man" or "woman," or one's "gender."[20] Moreover, some (e.g., Clarke 1998; Fausto-Sterling 1985) also argue that this binary classification itself is a cultural construction, and that indeed given biological realities, it is more accurate to consider sex as a continuum, or at least a categorical system of more than two groups. But for the two groups of participants in my research, sex and gender are clearly operationalized as dichotomous and self-evident, and the categorical dilemmas encountered in the characterization of class background and in racial-ethnic identity are non-existent here. My direct queries of both groups of participants reveal that measuring and identifying one's sex or gender is never an issue. Epidemiologists respond with genuine confusion when I asked them how they defined or measured "gender" or "sex," as illustrated by an exchange between myself (JS) and Anita (AY):

> JS: Can we take a step back for a second? How do you conceive of the variable of gender or sex? How do you conceptualize it?
> AY: Conceptualize what is so-called "woman" or "man"?
> JS: Yes, or the variable of gender.
> AY: A person who's not a man is a woman. It's just two levels of category. Are you asking—what are you asking?

Similarly, when I asked men and women with CVD to "describe your gender identity," their responses reflect their perception of the query as almost ridiculous. For example:

> JS: Okay. The other thing I wanted to ask you about is your gender. First of all

[20] For a discussion of the debate over the distinction between "sex" and "gender" and its consequences for biomedical research, see Fishman, Wick, and Koenig (1999).

how do you identify yourself in terms of gender?
SC: I'm a girl [laughs]!

These kinds of clumsy and awkward exchanges over sex and gender measurement and identity indicate the extent to which these dimensions of "difference" are seen as a matter-of-fact. For both groups of participants, gender categorization and identity is transparent, self-evident, and clearly dichotomous. That there are but two categories of gender (one is "a woman or a man," or a "girl" or a guy) that are exhaustive and mutually exclusive is taken for granted.

The "Estrogen Connection": Sex/Gender as Biological Difference

Such binary and essentializing constructions of gender clearly have consequences for epidemiologic practices of studying the role of sex/gender in CVD risk. Epidemiologic studies regularly limit samples to just men or just women, stratify samples by sex, or gather data from both men and women but conduct statistical analyses separately for each sex. My interview and observational data indicate that sex/gender is considered such a central axis of analysis and treated in these ways because of its definition as a *biologically* meaningful difference. In epidemiologic conferences, presenters rarely explicitly justify their engaging in such practices, but their interpretations of sex/gender-differentiated results most often rely on biological explanations. In interviews, epidemiologists asked to explain the significance of sex/gender in CVD causation predominantly cite physiological differences between women and men. In fact, prevailing themes related to sex/gender in these interviews were hormone replacement therapy and menopause—or as one epidemiologist put it,

addressing "the estrogen connection." One researcher, Max, in fact juxtaposes the questionable existence of sex differences in the effects of lifestyle factors (among which he includes diet, smoking, obesity, and physical activity) on women and men with the almost certainty that hormonal differences do, in contrast, have a significant impact: "obviously of course we'll always look at [gender] and measure it, but yet I think there's very little evidence that the response to diet and lifestyle variables really differs in any important way by gender ... unless there are specific reasons to think that there are differences such as looking at hormones in men and women, obviously that, there's likely to be some differences."[21] A frequently mentioned "basic epidemiological fact" about CVD is that women tend to develop heart disease at lower rates than men at any age or do so later than men by approximately ten years. It is exploring the possible mechanisms for this fact, then, that largely seems to drive the epidemiologic study of the ways in which CVD is hormonally, physiologically, and biologically sexed. Rarely did epidemiologic researchers discuss at any length or even invoke alternative understandings of gender differences and their effects on CVD risk.

It would seem that recently publicized clinical trial results (e.g., Hulley, Grady, Bush et al. 1998) that have shown hormone replacement therapy not to be efficacious for CVD prevention would potentially threaten the stability of the biological construction of gender differences. In fact, two epidemiologists raised this issue in my interviews with them. Of these, one responds to this clinical trial data by reiterating "the basic

[21] Later, Max elaborates further, "I think in most situations, I don't think it's necessary to have equal power, sufficient [statistical] power in men and women separately ... If somehow or other the disease really seemed inherent—to be behaving differently in men and women, then where there was a strong hormonal contribution, then in that situation you might want to have adequate power in the separate groups."

epidemiological fact" (that women tend to develop heart disease later than men), discussing how women often have other medical conditions when they do get cardiovascular disease, addressing the widely held misperception by women that their number one threat is breast cancer, and voicing the interpretation that had exclusion criteria for the trial been stricter, its results might have been different. Thus she reacts by reiterating the very statistical basis for the hypothesis that gender differences in CVD arise from biological differences of sex, stressing that CVD is still a major problem for women, and providing an alternative explanation of the negative results of recent clinical trials. The second epidemiologist responds by stating that "it hasn't been discounted that the woman's natural hormone milieu is one of the things that protects her," and by arguing that perhaps hormone replacement therapy is not as efficacious as "natural" estrogen, thereby further reinforcing the construction of sex/gender differences as biological.

Thus, for the most part inside epidemiology, the default construction of "gender" is as sex, as a *biological* characteristic. A few epidemiologists in fact acknowledge that the term "gender" is used interchangeably with "sex," often as an alternative terminology thought to be (or that they think *others* think is) more politically correct. Its use is therefore an adaptation of the scientific vocabulary to the socio-political context of the times without altering the underlying conception itself. One such epidemiologist, Lena, for example, says, "I think ['gender' is] the PC word to use, and I think that's another reason why maybe more people in medicine will use 'gender,' too. That's sort of the correct term to use. I don't know if there's a lot of thought put behind it. It's just using another term." This mirrors a practice common in the biomedical and biological

disciplines and literature (e.g., Lewine 1994; Pearson 1996). Researchers refer to the multiple, infinitesimal, and perhaps immeasurable biological differences between the two sexes. Given this, then, epidemiologic techniques of limiting study samples to just one sex, stratifying samples, and analyzing data separately by sex represent the best ways to account for such complex and potentially unknowable differences. Therefore constructions of sex/gender differences shape not only ideas about CVD risk but also the consideration of study designs and analytic methodologies used in the conduct of CVD research. In these ways, cardiovascular epidemiology contributes to processes of gender formation, as representations of innate, "natural" differences of sex shape the distribution of research dollars and resources along particular lines (see Omi & Winant 1994; Shim 2000).

In marked contrast, men and women with CVD very rarely mention cardiovascular risks rooted in biological differences of sex. The sole exception is Sharon, who speaks extensively and somewhat fearfully of her understanding of the consequences of her sex for her cardiovascular risk:

> I went for a regular checkup at a clinic and the doctor told me ... that women can have heart attacks after menopause, and because they've been shielded by estrogen, when they do have a heart attack, if they do, it can kill them—unlike a man ... And he said that I had hypertension and that I was at high risk for dying ... I would like to be healthier so that when I do become menopausal, I don't just fall over and die. I mean, after the doctor told me, I saw this ad with this beautiful older woman and she was a corpse, and they said, "You know, if you're a woman and have a heart attack, this can happen to you." ... It was an ad for taking care of yourself so that you don't wind up like that if you're female, because a lot of people don't know that. I didn't know that.

Sharon expresses a high level of alarm about the increased risk that menopause poses for

women, and especially for those women like herself who already have pre-existing risk factors for heart disease such as hypertension. Her concern, fueled by warnings from her physician and public service announcements on television, is that the accompanying reduction in estrogen levels produces a sudden and precipitous increase in risk can be especially hazardous for women (who have enjoyed some degree of hormonal protection all along) than for men. Her understanding of the role of gender in cardiovascular risk, then, is clearly mediated by the construction of male-female difference as hormonal, or biological, in nature. However, while Sharon's account is striking in its level of alarm and anxiety, none of the other participants living with CVD whom I interviewed invoke biological constructions of gender as sex to account for their cardiovascular risk. Instead, their discourses regarding CVD causes are peppered with notions of gendered dynamics and roles as significantly contributing to their cardiovascular risk; I examine such structural constructions of gender next.

Gender as a Structural Force

Amidst the predominantly biological construction of gender differences in cardiovascular risk by epidemiologists discussed above, a few researchers do speculate that some *social* aspects of gender relations may plausibly impact cardiovascular health. Three epidemiologists I interviewed express some ambivalence about the "estrogen connection," including Lena, who argues, "I am just very uncomfortable using the word 'sex.' For me again, it's, 'Oh, we're going to interpret these findings in biological terms.' And it's not necessarily—why would my body be operating very differently than a man?" These scientists articulate far more uncertainty about attributing causal significance to

sex differences in CVD research than the vast majority of epidemiologists I interviewed and observed. Sheila, another epidemiologist who questions the almost exclusive biological construction of sex/gender, comments that

> There are definite things we know are biologically different between ... [the] two sex groups. And it's easy just to tout everything off to that biological difference without actually exploring or thinking about some of the other possibilities that could explain for it ... I mean, so there can be a mechanism that acts independently of biological differences ... until it's explored, I think the safest bet is to give everything that you possibly think that accounts for the differences and not just restrict yourself to what you think is the easiest answer, because it may be totally wrong and I think it's misleading in medical research, and especially things that are implied in terms of policy to make sweeping generalizations that haven't been explored yet. And then for every paper to echo the same sentiment, so people begin to think it's fact, and it's not. So I think that's real frustrating in doing gender research. And even racial research ... I think ... people realize that there are so many things, whereas in gender, biology is the easy explanation and not many people contest it.

When pressed, Sheila speculates that processes related to gender discrimination and perhaps the stress of both attempting to conform to as well as resisting normative gender roles can be reasonably hypothesized to affect cardiovascular health.

Additionally, three other researchers very briefly discuss the possibility that gender socialization and gendered behaviors—such as those related to social support, responses to stress or hostility, and health behaviors—can mediate relationships between certain risk factors and CVD risk. For example, Carolyn suggests that the possibility of these gender differences, combined with the paucity of information about CVD risk in women, warrants separate statistical analyses for women and men, even if no variations in disease outcomes are expected or found:

> certainly you want studies to include both men and women, or you want good

> studies on men and good studies on women of varying social class and race-ethnicity. It no longer makes sense to really combine them because even if ... you haven't found gender differences in the outcome, there's still such a dearth of prevalence or incidence data on, you know, kind of the absolute values of health behavior and risk factors in women ... that you don't want to combine them because the levels are very different. The age of onset of health behaviors are very different. So, you know, to me ... you want things separate by gender ... because there are differences, there are probably different mechanisms. Certainly, you know, hormonal status, menopause—things that are gender-specific have to be considered in cardiovascular risk. And just knowledge in starting to present all the information for women is really important because that descriptive epidemiology hasn't even been done on a number of groups of women.

Here and in subsequent elaboration, Carolyn includes the possibility that gendered differences in "attitudes and beliefs and knowledge"—that is, behavioral factors related to gender rather than biological distinctions of sex—may contribute to the male-female differential in age of onset and incidence on which epidemiologists so often focus. In her view, however, such gendered differences tend to be mediated through health behaviors and are articulated only briefly amidst a much larger and extended discussion of biological differences.

Similarly, in my observation at scientific meetings, again while the overwhelming proportion of researchers either implicitly or explicitly attribute gender disparities to differences of sex, a few did present research on the effects of gendered social relations. For instance, one study investigated the cardiovascular effects of multiple roles that African American women fulfilled at work, in the household, and as caregivers. But while such examples of alternative conceptualizations do exist, they are relatively isolated instances. Moreover, scientists express little hope that the conceptual work developing expanded notions of gender differences will ever become a priority for the mainstream epidemiologic research agenda. Biological differences between women and men are

perceived as so clear-cut and potently related to CVD as to displace scientific inquiries into the social and cultural dimensions of gender.

However, participants of color with CVD widely view risks as rooted in the *structural* effects of gendered relations of power. They trace multiple manifestations of such gender dynamics to inequalities in the distribution of cardiovascular risk between women and men. The dynamics most commonly cited include: the sex and racial segregation of the labor market, gender discrimination in the workplace and in health care, the gendered and racialized division of social reproduction, and the experiences and consequences of domestic violence.

First, almost all of the women I interviewed who had been or currently are in the workforce describe interlocking dynamics of race, class, and gender that they point out stratify their educational opportunities as working class women of color, and that structure a racially and sex-segregated labor force and market. Those employment opportunities most readily available to them have been restricted to low-paying jobs, with little potential for advancement, minimal job stability, and little power over the conditions of their hours, pace of work, or the nature of the work process. For instance, Juanita was a data-entry worker; Bonnie Joe had been a seamstress; Mercedes had worked as seamstress and cleaning offices; Carmen is an office assistant providing secretarial services for six others; Yolanda just started working part-time as a hotel desk clerk; and Mabel had worked as a housekeeper, home health aide, a cannery worker, and in food service. Social processes and forces of racism and racialization, classism, and sexism intersect to define and structure the terms under which people of different classes, races, and sexes are made to do different kinds of work. Particularly with the shift from a

manufacturing economy with relatively better-paying jobs to a service economy with increasingly bifurcated occupational and income hierarchies, such dynamics contribute to what Piven and Cloward (1993: 397) call "the rise of a predominantly female and minority service sector proletariat."

Second, once in the workplace, many of the participants counter, on an everyday basis, the assumptions and ideologies of gender roles in male-dominated work environments. Sharon, for example, criticizes that

> women are treated a little more shabbily than men are and they're expected to be perfect ... men are socialized to expect help from people around them, and women ... have to be perfect people or, you know, they're not a good person. And that's changed a lot, but it's still true. And that's pretty stressful. It's a kind of prejudice ... If you're assertive, then you're not a good person or you're considered aggressive, even if it's not so. If you get angry, it's not okay. That adds to stress, too. The way that you're treated and how you have to deal with things because you're female. I've always thought that I could just be a person and not have to worry that I was a female, and be treated as an equal ... Applying for a job as a chef and being told that chefs are men ... It's really aggravating. It makes you fume.

Juanita, who first began working outside the home as a young mother in the 1960s, encountered a great deal of resistance from her own family to her desire to work, rooted in normative ideals of appropriate gender roles. Such experiences of gender discrimination exacerbated the impact of managing work and household duties on her health, contributing to her heart disease, and exemplify the deep intersections of race and gender in relation to work and home. When I ask her if being a woman made things different for her, she responds:

> it made it harder ... Well, just the fact that I'm black. I was black back then and female back then which, you know, all these rights and things weren't easily

> acknowledged back then, you know ... I wanted to go to work ... [my ex-husband] refused. He said I could never work ... I didn't do nothing but watch TV and stay pregnant ... that's how he wanted it—barefoot and pregnant ... But I just got so tired of that. I said, "I'm going to work anyway." ... He said, "I tell you what, if you go to work you gonna have to start cleaning, washing, doing everything." ... I got lucky and got a job as a file clerk ... he wouldn't help me do anything after that ... He was determined for me not to work and made it as hard as possible.

Here, Juanita highlights the interconnections between her gender and race, pointing out that several dimensions of social power intersected and worked synergistically (rather than independently) to create particular kinds of experiences and risks for her. Carmen points out that ideologies of gender roles can also have consequences for the diagnosis, treatment, and the social experience of accounting for CVD among women:

> how doctors treat you ... they can understand a man being overweight because ... they might think, "Well, he's got a family to take care of. He's got a stressful job. He's got this, he's got that. Maybe that's why he's overweight. Maybe that's why he's got hypertension." For a woman, I think that they think, "Well, there's no reason in the world why she should be like that," ... possibly what they think—and this is only a perception on my part—is that we don't have that thing of having to be the provider, even though as a single woman I have to provide for myself ... and number two why I can't do something about—I mean that I should be able to have more willpower to do something about my weight because I don't have any outside factors, you know, family or job or whatever stresses to deal with ... sometimes when they make an off-hand remark or something like that, and then you think, "Well, hey! But why it should be any different for a woman than a man?"

Third, gender becomes a significant structural contributor to cardiovascular distress in the unequal division of both paid and unpaid reproductive labor. Feminist scholars (e.g., Brenner & Laslett 1986; Glenn 1992/1996) have termed this kind of labor social reproduction, referring to the array of activities involved in the cultural, social, and physical maintenance of people, families, and households on a daily basis and

intergenerationally. The occupations of several of the women I interviewed exemplify the kind of service work that results from the commodification of reproductive labor: Mercedes' work as a seamstress and janitor, and Mabel's labor as a housekeeper, home health aide, and food service worker. Women of color are disproportionately employed to carry out such lower-level "public" reproductive labor.

Another aspect of the gendered and classed dynamics of social reproduction is manifested in the "private" sphere: participants with CVD speak of the cardiovascular effects of the dual burden of fulfilling duties at work as well as family and household responsibilities at home. Three of the women, Yolanda, Lee, and Geline, assumed primary responsibility for caregiving and sometimes financial support for their aging parents, a frequently all-encompassing and emotionally exhausting situation in which women often heed familial expectations about the role of daughters, manifesting dynamics of ethnicity and culture as well. And though they all appreciate the opportunity to have cared for their parents, they readily acknowledge the stress and physical toll of their experiences, and directly attribute their cardiovascular conditions to them. Many of the other women I interviewed are single mothers describe extensively the emotional and physical toll of bearing sole responsibility for financial support and parenting of their children. For example, Mabel says:

> It's not funny raising kids ... my husband was never around ... So I had to do everything myself ... I think that's what developed me for having high blood pressure. I had too much jumping to do and running around ... raising my kids by myself ... my husband and I got divorced ... And then I had to start going to work and then I had to start to support them. And it was hard to take them—babysitter, and then going to work, and then everything was rush, rush to me. And I think that's where I developed this high blood pressure. I started getting sick, you know. All this running around, all this worrying about money, money, money.

> Mostly money ... I was getting only minimum wages, and you know at that time I was only getting $3 an hour. You can't live on $3—and I was paying $280 a month at that time for an apartment ... All that I guess brought it up on me. I guess what you go through when you're young like, if you have a hard life, it stays on you ... I had to go through all kinds of strings because ... [my husband] would hide from me, not to pay child support ... that's also a lot of anxiety, too ... working in those factories ... Make sure that you get up in the morning, take your kids to the babysitter, wait for the bus to get there in time to work ... you had to punch in for work, and if you're not there in time, two or three times, they fire you. So, all of this is too much tension for one person that's raising her kids. I think that has a lot to do, too, with high blood pressure. You're constantly on the go. You have no time for yourself. And it's hard. And I had no one around to help me. So it made it worse ... But I think all of that is what caused me to have the high blood pressure that I'm having right now ... I think it affected me all—my whole body.

Even those mothers who share parenting and household duties with another person find that the gendered division of that labor is highly unequal. For example, Diane argues that this is a major reason why the cardiovascular risks for women and men differ in significant ways:

> my husband works a full-time job. I also work a full-time job. But for some reason, he goes home and when he's home, it's like total down time. He gets to just relax and watch television and possibly help my son with his homework ... And I realize that when I go home, I don't sit down. I immediately put my bag away, wash my hands, go in the kitchen and start cooking dinner. And it's just like that until about 9 o'clock. So, I'm thinking, god! ... if I could really work all day and go home and just relax, I'd be a different person. And so I was trying to make him see the difference, and he was like, "Well, I do things, too." "Yeah, but it's not the same. Mine just is constant. Because even on weekends, I mean you may mow the lawn, okay, great, whatever. But I have to sort of oversee everything else getting done." ... Of course there are some marital relationships that have changed the norm, but they are few ... women still do much more at home. And so if you add work to that then you have much more, and I think that, to me, is a contributing factor.

Lee concurs, saying that

> I think that the dynamics going on in our home is that I tend to take on everything. So then I tend to be the worried one [laughs], while he [her husband] says, "Oh, she's going to take care of it." So he's not going to worry about it. "Oh, she's planning that," or "She's calling that person or calling—" you know ... It's a gender thing ... It's a lot of pressure. I think so. And then I'm sure that's the stress portion of the blood pressure.

Geline elaborates on how practical considerations in response to gender inequity in work and pay further promote the unequal division of reproductive labor:

> Finding the time, you know, with children, and having to shuttle them around, and you know, not always being convinced that when you're tired from work, exercise would make you feel better [laughs]. So, it's very difficult. And, you know, I mean, it's a lot of tension I have to deal with because [of] those things ... I think that as a mother, it's not myself that I count first. It's my children and then my husband, even though on that score, you know, if you asked me intellectually, I would respond and say, "Oh, me first before him." But just roles ... men have more possibility to get higher paying positions in terms of practical questions about how your family's finances are set up. You know, you would tend to give in more, you know, to subordinate yourself more to the situation that allows for more income to be brought in. You know, like I wouldn't jeopardize my husband's work standing by insisting that he do more of the doctor's visits for my kids or the sports—driving around and stuff like that ... I would tend to look more for a job situation set-up that would allow me to have a little bit more flexibility than that. You know, so it's like you're just set up to think of others first ... the self-motivation [to exercise and do other forms of risk reduction] is already a struggle ... And then I think the conditions around your role as a mother ... that contributes to it greatly.

Thus, in addition to gendered power relations in the workplace and the commodified forms of reproductive labor, women view the gendered division of social reproduction in the home as a significant source of cardiovascular risk.

Moreover, the intersections of gender with race in reproductive labor create chronic stresses that are unique to women of color. Diane points this out:

> in all honesty, a lot of African-American women, and possibly other women of

> color, ... we live and deal with a lot of stress. And I think sometimes that it's not always internal factors, but external factors. I think that we're constantly in this feeling of being tense, and I think that that sort of contributes to it ... Internal meaning more like what we eat—and I think that our diets play a part in it, you know what we eat—lots of food and possibly greasy foods, and being overweight. Those kinds of things I think contribute definitely, but I think even more so, external factors.

Diane then gives two examples of experiences involving her son for these "external" factors that she feels contributes to the differential stress-related hypertension of African American women. First, she relates how her son was labeled as being "overly aggressive" by his teachers who then maintained that he had learning disabilities and needed to be tracked into special education. She contested them throughout his childhood and insisted that he remain in the mainstream classroom (he is now doing well in college). Second, when her son was a teenager, he was given a bike for his birthday, and while riding it in the neighborhood, was stopped by police who thought that it had been stolen.[22] As she sums up,

> I mean, just those kind of things, and they're like compounded daily. Those, I think, contribute greatly. I think a lot of women and people of color—and men—have to deal with that. And I think that if you don't have the education to know that you have rights and that you don't have to deal with it, it's even more stressful. I really thought about the number of mothers who would have said, "God! I trust this teacher and they're saying that my kid has disabilities. Let me do what they say to do." And that really scared me and kept me up like lots of nights. And even now I have flashbacks, like, god! that was so scary. And I realized that it probably happens a lot. So those kind of factors really contribute to—feeling like you're just constantly having to battle, you know. That's just a hard feeling to have to deal with all the time.[23]

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[22] A highly significant detail of her narratives is that these experiences happened to her son; thus the intersections of race with gender are reflected not only in her experience as a mother of color, but also in those of her son as an African American boy.

[23] Such experiences lead Diane to view her gender and its contribution to her hypertension as secondary to that of race: "in all honesty, if I had to say which was more of a hindrance, being a woman or being African American, I would have to say being African American ... race is just the bigger issue, you know. And then,

Finally, one of the most glaring forms of gender domination and the cardiovascular risk posed by it emerges from the alarmingly prevalent narratives of domestic violence, and its reverberations for parenting and family relations. Lynn, for example, explains:

> What makes me tense is my past, in that I can't change it because I was married, divorced—it will be 21 years in January. My husband used to beat me ... three children, divorce and then have them taken away from you—I don't know if that's a thing that I'll never get over, or is that the reason why I got hypertension, or if I was going to have it if it I had a normal life anyway ... I worry about that all the time. I worry that the kids—they know me, but blame me for it ... that bothers me, even today.

People with CVD—and particularly the women interviewed—understand gender relations as relations of power, and experience their manifestations as embodied sources of distress, grief, regret, and anger that they explicitly construct as significant risks to their cardiovascular health. They understand these experiences as mediated through the idiom of stress, anxiety, and depression—all associated with cardiovascular disease incidence and outcomes. Thus, even while gender identity seems self-apparent, uncomplicated, and manifestly binary to participants who draw upon their lived experiences of risk and illness, it does not necessarily lead to biological constructions of gender as sex nor does it displace social constructions of gender, as it seems to do for

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being female, is the second issue." Other women of color, however, seem to disagree. Carmen, for example, points how gendered assumptions then make accounting for cardiovascular disease more difficult for her as a woman per se, but not because she was Latina: "I think just being a woman, you know, makes it extremely difficult—just having to deal with everyday life, you know. I don't necessarily think it's a case of being a Latina woman, but just having to deal with a very male-oriented society." This kind of parsing out of which of their experiences and perceptions can be attributed to their race and which to gender may be reflective of tendencies to dichotomize and disaggregate, characteristic of Western epistemology, rationality, and scientific thinking that emphasize reduction to elemental, presumably independent and separate parts as a means of understanding. It is significant that epidemiologists likewise attempt to tease out the "independent" effects of, say, race and class on health status.

epidemiologists. Thus the lived and embodied experiences of gender power and inequality clearly implicate structural notions of gender and gender formation processes that act, in concert with other dimensions of "difference," as critical sources of cardiovascular risk.

E. Conclusions

Epidemiologists construct the concept and effects of "race" in multiple different ways, from some mentions of race as biology, to pervasive allusions to cultural difference, to infrequent references to structural dynamics. In the words of Ernst (1999: 7),

> Racial discourses work well not despite their logical inconsistencies, ambiguities and mixing up of premises but *because* of them. They are destructively all-pervasive precisely because they are overdetermined and multivariant, creating the possibility for different arguments or perspectives (moral, biological, cultural, etc.) to be accentuated within different contexts and depending on the aims pursued.

As the most popular scientific interpretation of race, the cultural prism illustrates the revival of elements of the ethnic paradigm (Omi & Winant 1994) of talking about difference, but with an important and consequential twist. Whereas previously, race as ethnicity was based on the assumption that we were all the *same* under the skin, its current epidemiologic incarnation seemingly turns this assumption on its head, suggesting instead that cultural differences between racial groups are centrally responsible for producing *differences* under the skin. Approaching racial differences through the prism of culture is a conceptual device that facilitates collective work and represents a relatively

stable interpretation of racial disparities for epidemiology.

However, people who live with CVD do not share the perspective that cultural differences between racial-ethnic groups in and of themselves account for their own cardiovascular risks. In contrast, they tend to locate the risk of race squarely in its structural dimensions. Their position is *not* that cultural differences are *in*significant to health, but that the connections of culture and ethnicity to health behaviors and risk exposures are profoundly influenced by structural and societal dynamics. In addition, unlike most epidemiologists, lay experts tend to think of and experience racial difference and identity in intersectional ways, as the interplay of race with class and gender. Such constructions seem likely to lead, therefore, to more structural understandings of the effects of socially-defined racial difference—that is, attending to processes of racial formation—rather than the notion that race is a distinct attribute of individuals, whose impacts are separable from those of other dimensions of difference.

Both epidemiologic researchers and those with CVD agree that it is largely through *structural* dynamics of class that people in different socioeconomic positions are exposed to cardiovascular risk. They understand class formation as structuring differential access to resources that enable people to sustain their own health, and differential exposure to risks of economic insecurity, chaotic living conditions, and constrained occupational and educational opportunities. At the same time, however, epidemiologists and lay experts periodically invoke more individualistic explanations for socioeconomic differences that indict health-related practices and the cultural, educational, and social milieus within which they are fostered. These linkages among social class, education, lifestyle habits, and health knowledge have proven particularly

effective in maintaining both health ideologies that individual choices and risky behaviors are to blame for health inequalities, and class ideologies that individual attributes and twists of fate are responsible for socioeconomic differences. Additionally, lay experts' continual references to the intersections of race and class in their responses to questions of class and racial identity point to the critical gap between their own understanding of the interlocking processes of racial and class (as well as gender) stratification and the more fragmented views and reductionist tendencies of scientists'. However, in the end, both groups clearly see socioeconomic disparities in CVD incidence and risk as a product of systemic class formation processes and forces taking place "outside" the body and in the social spaces between bodies.

Lastly, sex/gender initially seems the least problematic of the three variables or dimensions of social power, at least on the issue of operationalization. Researchers readily explain *how* they think about class and race as variables, why they believe them to be important or not to the study of cardiovascular risk, and in what ways. People with CVD similarly describe in detail class backgrounds and their racial-ethnic identities, and often invoke the fluidity and "messiness" of those categories in lived experience. But the operationalization of sex/gender, in contrast, is unambiguously and uncontestedly seen as binary and transparent, hardly posing a categorical problem.

However, analyzing the conceptualization of sex and gender reveals striking divergences between the constructions of epidemiologists and those of lay experts. The role of gender differences in cardiovascular disease causation is usually interpreted by scientists as composed largely of hormonal differences, a construction that has historically proven to be extremely robust and particularly effective in reifying

fundamental dichotomies between the two biological sexes (Oudshoorn 1994; Oudshoorn & Wijngaard 1991). Epidemiologists' use of "gender" as a more politically correct alternative to "sex," a practice mirrored in the biomedical and biological disciplines and literature (e.g., Lewine 1994; Pearson 1996), has the effect of equating the two. Their construction of *gender* as physiological differences practically synonymous with the biological differences of *sex* is thus more often than not taken for granted and "naturalized." However, those with CVD rarely subscribe to this perspective. For them, the "risk" of gender lies not in its reference to sex differences, but is rooted in a society structured by normative ideals of gender roles and gendered and intersectional power relations, including the gendered, racialized, and classed division of paid and reproductive labor, gender discrimination, and domestic violence.

Those who live with CVD assert the links between their health and the manner in which their social relationships and environments are racialized, classed, and gendered in complex, layered, and—critically important—*intersectional* ways. They view themselves as members of *groups*, and their positions in society as *relational*; that is, they understand their lived experiences as marked by the ways in which representations and ideologies of "difference" shape the histories of social relations and structural dynamics *between* their own group and others. Health inequalities emerge as the effect of larger social relations and structural contexts on oppressed populations. Race, social class, and gender matter because they mutually act to shape the conditions into which people are born, the opportunities they have throughout their life course, the problems or risks they encounter at different stages of life, and perceptions, attitudes, and treatment by other people and institutions. Inequalities in access to resources like knowledge, money, power, prestige,

and social connections—effected through social relations and structures—influence multiple health outcomes, including cardiovascular ones, and therefore act as fundamental causes of disease (Link et al. 1998; Link & Phelan 1995; 1996).

In contrast, the constructions of "difference" circulating in cardiovascular epidemiology tend to cultivate the ideology that any health inequalities that happen to fall along racial, class, or gender lines must be due to individual *biological* or *behavioral* characteristics since their causes are not viewed as *socially* skewed, the result of *relational* dynamics of power. In short, essentializing practices often characteristic of epidemiologic knowledge production accomplish three things that can contribute to domination. First, they further stabilize the notion that race, class, and gender are features of and dynamics occurring within *individual* bodies. Second, they construct and *naturalize* supposed differences between those categories of bodies. And third, they consequently obscure the *social relations* of power that produce health inequalities. Through such processes and effects, epidemiologic conventions and practices can be seen as resonating with and mutually reinforcing ideological discourses about the place and effects of race, class, and gender that exist within the sciences[24] and permeate contemporary U.S. culture. In the U.S., the meanings attached to race, class, and gender—and to specific racial, class, and gender groups—form taken-for-granted sets of beliefs used as tools and justifications for, on the one hand, domination and privilege, and on the other, oppression and exclusion. In the arena of health and illness, these ideologies structure particular histories of experiences and life conditions that in turn shape exposure

[24] Although the social sciences have been and continue to be one of the few sites where atomism and individualization are challenged.

to injury and disease and abilities to access resources. In these ways, racial, class, and gender formation in cardiovascular epidemiology tend to maintain existing structures of privilege and distribution of wealth and resources.

Thus the interplay between socially constructed discourses on difference and the material relations they structure and through which they become consequential produce people's positions within racial, class, and gender orders. Race, class, and gender privilege or disadvantage are social phenomena that mutually construct, reproduce, and synergistically operate to exert direct effects on the structuring of forms of social organization that shape daily life, from educational and employment segregation, to encounters with the agents and agencies of the state (police, welfare, health care), to private lives of families and households. In turn, these tightly bundled and interlocking forms of social organization, practices, and institutions constitute the everyday worlds that help to shape epidemiologists' and "lay" people's perceptions of the dynamics of race, class, and gender in general, and with respect to health and cardiovascular risk in particular.

These findings on the conceptions of "difference" constructed from embodied and lived experiences highlight some of the incompatibilities that can arise when epidemiologists attempt to measure and study socially constructed relations and intersections of power in some scientifically manageable way. Such efforts are premised on principles and methods that work to identify and separate out the effects of different factors and determinants on what are most often conceived of as individual health outcomes. As a result, social forces, structural processes, and intersections among race,

class, and gender become transposed into traits of individuals, a routine set of requisite epidemiologic variables, and conceptions of "difference" constructed as separable and distinguishable from one another. Thus although epidemiologists are able to articulate more structural views on social class—a dimension of difference they clearly locate in the "external" environment, they persist in interpreting gender as a biological characteristic and race as a cultural attribute of individuals, and either neglect or actively work to tease apart the intertwining of multiple dimensions of inequality. At least some of what lay experts feel and know in their bodies undermines their cardiovascular health becomes decontextualized and over-simplified. In turn, epidemiologists must contend with the conceptual and methodological difficulties that inevitably arise as identities, experiences, and health outcomes fail to consistently align with epidemiologic measures and predictions.

Yet the scientific basis of epidemiologic claims about the effects of race, class, and gender in CVD means that such claims carry a great deal of social credibility and cultural legitimacy, becoming consequential for the regulation and governance of what counts as "risk" and "cause" in cardiovascular disease. In these ways, then, the various constructions of race, class, and gender, the sites in which they are crafted and mobilized, and the relative legitimacy and consideration given to them, become pivotal to our current understanding of CVD incidence and distribution. These constructions become embedded within and shape policies and programs designed to address cardiovascular risks and inequalities, that in turn institutionalize, routinize, and validate particular constructions of "risk," "difference," and "risky" populations. Moreover, these knowledge production practices and their consequences influence our conceptions of

future theoretical and methodological possibilities and therefore the research agendas of epidemiological science. As such, conceptions of bodily "differences" like those constructed in cardiovascular epidemiology become increasingly important to those mobilized in everyday life. In short, epidemiology serves as a key contemporary site of racial, class, and gender formation (Omi & Winant 1994), an active participant in the construction of "difference" and its social organization (Shim 2000). In the following chapter, I examine some of the work practices through which it does so, and analyze how standard techniques and disciplinary norms of epidemiology effectively enable the individualization of race, class, and gender and the ritualized incorporation of categorical racial, socioeconomic, and sex attributes in cardiovascular epidemiology.

Chapter Five
Producing Credible Scientific Knowledge About "Difference": Epidemiologic Paradigms, Practices, and Technologies

A. Introduction

Sociocultural studies of science, technology, and medicine (e.g., Callon 1985; Clarke 1998; Epstein 1996; Fujimura 1996; Garrety 1997; Latour 1987) assert that both scientific practices as well as their products—knowledge claims, scientific facts, and the content of what counts as "science"—bear the imprint of social, political, historical, and economic forces, and that science and society are mutually constituted. In the previous chapter, I outlined the particular constructions of race, social class, and sex/gender that characterize epidemiologists' and lay experts' accounts of cardiovascular risk and disease causation. Although there is much heterogeneity and variation within these two sets of accounts, there are also broad patterns distinguishing the meanings that scientists invested in these dimensions of "difference" from those constructed by people of color with embodied experiences of cardiovascular disease. In this chapter, drawing mostly on in-depth interviews with epidemiologists and published commentaries about epidemiologic methods and paradigms, I analyze the paradigms, practices, and technologies of the epidemiologic science of cardiovascular disease. My goal is to draw linkages between how the science is concretely practiced—under what conditions and constraints, and with what tools—and the actual contents of the scientific claims being produced. In particular, I examine how the core practice of individualizing social differences and including them in research has been ritualized and why it persists, even though many epidemiologists I

interviewed regard it as a research tool or technology that is imprecise, ambiguous in the findings it produces, and otherwise generally inadequate to the tasks of epidemiologic research.

I find that despite significant uncertainty among epidemiologists regarding the effects of race, social class, and sex/gender on cardiovascular risk, and the mechanisms through which they shape cardiovascular disease outcomes, these are conceptualized as individual rather than social attributes—self-assignment into one of several racial-ethnic categories, socioeconomic status, and sex—and routinely included in epidemiologic studies. How are we to understand the processes of knowledge-making that give rise to such constructions of "difference" and their durability, ubiquity, and consequential nature? I argue that the inclusion of individual-level rather than socially-defined variables of "difference" in epidemiologic research is institutionalized as a routine practice because of the ways in which it is continually (even though often only provisionally) defined as the "right tool for the job" (Clarke & Fujimura 1992b). Clarke and Fujimura argue that scientific work is enabled or constrained by the availability and accessibility of specific tools for scientific jobs—including the conditions of workplaces and workers; research materials, techniques, and instruments; theories and models; funding and sponsorship; regulatory groups; and audiences and consumers of the work. The meanings of "rightness," "tools," and the nature of "jobs" are situational and mutually constructed in interactions among the multiple social worlds which populate the arena of cardiovascular disease. Thus further analysis of the social worlds/arenas map offered in Chapter 3 point to how relationships between and within the social worlds of federal agencies, epidemiology, social movements, and the public become significant in

shaping how credible epidemiologic claims are constructed and thereby the very content of the claims themselves.

Despite their conceptual and methodological drawbacks, individualized measures of race, socioeconomic status, and sex have become a routinized set of variables whose inclusion has become critical to and requisite for the production of credible claims in cardiovascular epidemiology. I first examine the processes of routinization themselves—introducing the in vivo code of "the usual suspects" approach and using the concept of the black box (Latour 1987; Latour & Woolgar 1986)—and identify some of their consequences. I then explore the numerous ways in which the practice is constructed as a "good enough" tool for the job of epidemiology and contributes to the production of credibility. This set of variables helps to fulfill certain methodological requirements; its conceptual and interpretive flexibility allows for multiple social worlds to meet their needs and interests; and it has emerged as a provisionally "good enough" practice to comply with regulatory mandates and deal with various economic and disciplinary constraints. As such, more than being merely a technical and methodological issue, the use of this set of variables is central to the institutionalization of an approach to thinking about human and bodily "differences" in cardiovascular epidemiology, and subsequent ideas about what constitutes disease "risks" and "causes," and, further, how inequalities in incidence can be addressed.

B. The Individualization and Routinization of Race, Socioeconomic Status, and Sex in Epidemiology

As described in Chapter 3, the multifactorial model of disease causation argues

that chronic illnesses like cardiovascular disease are the outcomes of complex interactions among multiple risks and determinants of disease agents, the environment, and the host (Evans 1978; Gordis 2000; Lilienfeld & Lilienfeld 1980; MacMahon, Pugh & Ipsen 1960; Susser 1985). Based on this model, then, epidemiologic research seeks to identify characteristics of the "host" that increase the likelihood that a category of individuals defined by those characteristics will develop some condition or disease. As Waldby (1996:101) explains,

> This conceptualisation of disease aetiology means that epidemiological science can only proceed through the specification and classification of sub-populations. If the social topography of disease is taken to indicate a pattern of disease aetiology constituted at least in part through host factors, then hosts must be categorised according to these factors.

Thus, the conceptual framework of the multifactorial model—that posits that differences in host characteristics, among other factors, determine disease—enables the biomedical relevance of racial, class, and sex/gender classifications and their inclusion in epidemiologic research.

This model and its associated practices have proven extremely robust and mobile historically. Racial categories and sex are habitually recorded in disease surveillance data[1] and, together with socioeconomic indicators (most often income, occupation, and/or education), are routinely included in epidemiologic studies of chronic conditions. For example, the American Heart Association explicitly lists race and sex as risk factors for cardiovascular disease (American Heart Association 2001b), while numerous studies have affirmed an inverse relationship with socioeconomic status and a gradient in its

[1] Notably, current U.S. disease surveillance and vital statistics databases do not include information on socioeconomic status or social class (see e.g., Krieger & Fee 1993; Krieger, Williams & Moss 1997).

incidence[2] (Diez-Roux, Nieto, Tyroler et al. 1995; Kaplan & Keil 1993). Moreover, risk factors common to many chronic illnesses, such as obesity, sedentary lifestyle, smoking, and alcohol use, have been shown to be associated with race, socioeconomic status (SES), and sex (NCHS 1998). Specifically such epidemiologic findings are increasingly being used as the scientific basis for promoting healthy habits, identifying individuals perceived to be at higher risk for some chronic disease, and intervening with clinical therapies to treat such risks (e.g., Armstrong 1995; Becker & Nachtigall 1994; Waldby 1996).

However, as discussed in Chapter 3, because most epidemiologic findings emerge from research in which the unit of analysis is the individual, processes and dynamics of disease risk and causation are systematically reduced to that level. Below, I first explore some of the dimensions and implications of the individualization of "difference," and then their routinization in cardiovascular epidemiology.

The "Usual Suspects" and Their Consequences

Epidemiologists designate some groups, defined by their race, socioeconomic status, and sex, to be at disproportionately higher risk for cardiovascular disease because of the demonstrable associations of such characteristics with cardiovascular risk behaviors. Underwriting such attributions is the tacit and/or explicit assumption that these factors, despite their occasional designation as "social" variables, are *individually*

[2] In this inverse relationship, as socioeconomic status decreases, the incidence of CVD increases. As well, research indicates that—rather than being a threshold effect, where above or below some SES level, CVD incidence changes—this relationship is true across the socioeconomic spectrum, such that even at relatively high levels of socioeconomic status, incremental increases in SES are associated with decreases in CVD incidence and risk.

mediated, the independent characteristics and outcomes of behavioral choices of decontextualized persons. They presume that characteristics of one's social environment, as incorporated in the multifactorial model, are exogenous to the individual—that one's circumstances can be taken as given, as if individuals were dropped into a set of conditions that are not socially constructed nor patterned (Krieger 1994). In this fashion, epidemiologic knowledge contributes to the routinized construction of race, class, and gender as *individualized, unitary, demographic* attributes of *race, socioeconomic status,* and *sex*, which in turn exert powerful consequences on the ways in which we conceptualize and think about such differences in everyday life.

Such differences of racial or ethnic category, socioeconomic status, and sex are then included as a part of a standardized set of statistical adjustments or controls.[3] This procedure refers to a common technique in which associations between a set of factors and some outcome are tested using an analytic method called regression. Conventionally, regression requires controlling or adjusting for variables (termed "confounders") hypothesized to be associated with both the primary input measures and the outcomes so that they do not exert an "extraneous" or distorting effect on the principal associations under study. For instance, as one researcher explained to me, an investigation into the effects of hormone replacement therapy on CVD incidence would customarily adjust for race and educational attainment, as these are often independently associated with both the use of hormone replacement therapy and CVD.

In epidemiologists' accounts of their methods, the major justification offered for this technique of adjusting and controlling for race, SES, and sex is that it will eliminate

[3] I discuss this further below.

the effects of these potential confounders and allow one to measure the "main" effects more accurately. In fact, some of the epidemiologists I observed presenting their methods sometimes gloss over the details of this part of their analysis: rather than listing specifically the variables for which they adjusted their results, they refer simply to "controlling for the usual suspects." The characterizations of racial-ethnic category, socioeconomic status, and sex as the "usual suspects" are indicative of the extent to which their inclusion is viewed as a routine and unremarkable standard operating procedure in epidemiology. As Carolyn catalogues, "Well, it's hard to believe that you wouldn't ask—I mean you have to ask gender if you have both ... You have to ask race/ethnicity ... unless you've limited it to a homogeneous race/ethnicity group. You need a measure of socioeconomic status, otherwise ... the interrelationship between ethnicity and social class is going to be confused."

I argue that this practice of adjusting or controlling for a ritualized set of variables has important consequences for the examination of the causal effects of those factors—including race/ethnicity, social class, and sex/gender—alluded to as the "usual suspects."[4] The "usual suspects" approach reinforces *individual* rather than social definitions of race, socioeconomic status, and sex as scientifically legitimate, applicable in epidemiology, and conceptually appropriate for thinking about what I assert are group distinctions and dynamics. Their validity is further enhanced by the frequent characterization of demographic differences in interviews and in public presentations of research as "traditional CVD risk factors," discursively claiming their conceptual and methodological equivalence to other accepted, individual risk factors such as blood pressure and elevated

[4] Other "usual suspects" for which results are routinely adjusted include age.

cholesterol. As a result, the inclusion of race, SES, and sex in epidemiologic analyses becomes taken-for-granted and increasingly routinized.

In my analysis of interview and observational data, individualized variables of race, SES, and sex as demographic statistical controls very often serve as their first-resort explanations for any differences in outcomes seen among participant groups. In cases where these "usual suspects" can at least partially account for group differences in outcomes, this is perceived not as an outcome to be further investigated, but as an expected result, precisely because of the construction of these socio-demographic variables as the "usual suspects." Anita, for instance, describes this phenomenon:

> We sometimes do adjust for race which I think is such a mistake ... we've also been criticized because of the adjusted rate. For example, Oakland has a higher proportion of Blacks. That community, once you adjust the rates, you adjust that community towards the same standard population of the other communities, [and] you kind of discount the problems in that community, because there are more Blacks.

As Anita points out, at times, adjusting for racial, class, and other differences in fact "adjusts away" the very disparities and distinctions to which epidemiologists should attend. That is, if variations in risk and incidence may be attributable to differences in the composition of populations, the "usual suspects" approach may in fact erase evidence of this by smoothing out demographic divergences from place to place, community to community, and statistically "equalizing" their racial, socioeconomic, and sex population proportions.

In turn, such an erasure serves to focus causal, etiological investigations on factors *other than* the effects of race, social class, and sex/gender. As Lena explains, social inequalities such as minority status and social class are "never taken seriously" nor

considered to be "the real cause" of cardiovascular risk and disease. Instead, adjusting for their effects through the inclusion of the usual suspects is "taken as the first step" in analyses geared toward evaluating *other* potential causal dynamics. And while at least some studies do seem interested in differences by race/ethnicity, socioeconomic status, and sex per se, the net effect of their findings in fact seems to reinforce the notion that adjustment for these and other "usual suspects" is warranted and a obvious step in investigating CVD etiology. That is, any statistically significant results obtained from research aimed at investigating socio-demographic disparities are then used as additional confirmation of the necessity to control for such differences in other epidemiologic work.

A third side effect of the "usual suspects" practice is that it eliminates the opportunity to explore *intersections among* race/ethnicity, social class, and gender. For example, as one epidemiologist explains, examinations of racial differences in the treatment of cardiovascular risk factors would likely control for the effects of socioeconomic status. In this situation, however, interactions between race and SES rarely enter the analytic lens given that confounding between race and class are of much greater concern.

Finally, when epidemiologists do study socio-demographic variations, the "usual suspects" approach encourages making assumptions about what mechanisms produce them, rather than directly and explicitly investigating a range of possible race-, class-, and sex/gender-related dynamics. For example, I observed at epidemiologic conferences and in researchers' accounts of their work that those who find results that diverge significantly by race often propose other kinds of differences (in addition to cultural constructions, socioeconomic and physiological differences are favorites) as explanations

for such findings, often *without*, or perhaps as a substitute for, actually studying those differences directly. As a result, those very variables that are being used as controls fade from the investigational arena, and become technical details and routines warranting only a general mention in describing analytic procedures, rather than the focus of study in and of themselves. Racial, socioeconomic, and sex differences in cardiovascular risk factors themselves rarely are revealed, and are ultimately erased by "controlling for" their effects on the risk and disease phenomena under study.

I argue that the cumulative consequence of these technical processes within cardiovascular epidemiology is that differences of race/ethnicity, social class, and sex/gender are decontextualized from lived experience through their separation and individualization into attributes of race, SES, and sex. Social processes, forces, and relations associated with the definition and construction of human "differences" are extracted out from under the epidemiologic lens. Rather, the phenomena considered more legitimate and appropriate objects of study are often those associations that remain *after* adjusting for the effects of social differences. Variables of race, socioeconomic status, and sex are conceived as technically important as the "usual suspects" for statistical adjustment, but much less often as substantively interesting in and of themselves. This may be because their *social* dynamics are difficult to conceptualize and operationalize, as discussed in Chapter 4. Additionally, this may also be because their effects are perceived as less manipulable or amenable to intervention, with any such intervention efforts seen as political endeavors rather than scientific work. Such circumscription of the "job" of the epidemiology of CVD etiology (see Clarke & Fujimura 1992b)—limited to the "objective" and apolitical study of determinants and

causes perceived to be preventable and subject to remediation—serves to further the individualization and decontextualization of social "differences" in cardiovascular disease.[5]

In the end, the lack of explicit discussion of systematic associations found between CVD risks or outcomes and race, SES, and sex often reflects a truncated investigation, a kind of terminal analysis[6] that leaves the impression that such associations are simply to be expected given the populations in question, and thus require no additional study. Such consequences further concretize the notion that non-intersectional and individualistic constructions of "difference" like measures of racial categories, socioeconomic status, and sex, account for and help "explain" the distribution of health and illness, pushing aside uncertainty and ambiguity over what *exactly* about one's race, class, and sex/gender shapes risk for CVD and how. However, paradoxically, the technical routine of the "usual suspects" approach is simultaneously subjected to some fairly fundamental questioning, which I explore next.

Disputing the "Unseen Hand"

Based on my analysis of interviews with epidemiologists and published commentaries by many prominent members of the discipline, and as discussed in Chapter 3, there is a small but growing movement within epidemiology to critically question the conventional and routinized measurement and inclusion of race, socioeconomic status, and sex. Their disputes over the "usual suspects" technique focus primarily on two sets

[5] Additional analysis of the individualization of "difference" and contributors to this phenomenon are taken up throughout the remainder of this chapter.
[6] I am indebted to Adele Clarke for suggesting this terminology.

of issues. First, some of the scientists I interviewed argue that the simple inclusion of the "usual suspects" in epidemiologic analyses by itself fails to shed light on the dynamics and origins of socio-demographic inequalities in cardiovascular risk and disease. While such questions are never raised with regard to the inclusion of sex/gender, it happens occasionally for socioeconomic status, and quite often in the context of race, where researchers assert that epidemiology must move beyond simply including it as a variable and attempt to measure some of its mechanisms. For instance, according to Karen, ideally "the question is always what does one believe may be the mechanism of why there are different responses. Are they genetic? Then you need to look much more at genetic lineage. Are they more habits and socialization and cultural issues? ... So I think in measuring things, one needs to be mindful of what is it you are trying to get at here." Lena argues that "asking *about* the proxies I think is a good way to kind of learn more about it, instead of keep sticking in our dummy variables of race, ethnicity" (emphasis added).

Published commentaries also provide points of contestation against what one account calls the "unseen hand" (Anonymous 2000) that guides the inclusion of presumptions of racially deterministic analysis and interpretation. For example, in that account, printed in a newsletter from the Epidemiology and Prevention Council of the American Heart Association, a "Statement of Opinion" on "Race, Genes, and Causal Inference" (Anonymous 2000: 11) argues that:

> Serious discourse on race in our society does not usually start from biological determinist premises. At least not when these premises are stated explicitly ... In practice, however, analytic methods are often used that channel the investigation into a deterministic path ... The existence of this 'unseen hand' ... can be inferred from two, closely related, observable features of this literature. First, the field has

> in general embraced a transparently fallacious idea that 'control' for social characteristics can be achieved by using self-reported education and income. Second, the explicit inference is routinely made that specific genes explain population differences in complex phenotypes, like hypertension, left ventricular hypertrophy and atherosclerosis, when no direct or indirect evidence exists to suggest this is the case.

Also Krieger (1992) notes the tendency for controlling for the "usual suspects" to smooth out the very demographic differences that should be a focus of etiological research. She also argues that instead of merely controlling for features like race and class, samples of class and racial groups and case histories should be used, effectively changing the traditional approach to the unit of analysis. These scientists, like those I interviewed, therefore believe that the simple inclusion of race (and less often socioeconomic status) as demographic variables sheds little light on exactly how such dimensions of "difference" shape cardiovascular well-being.

Second, epidemiology favors measures that are stable, easily quantifiable, and seemingly objective. That is, epidemiologic measurement and the knowledge that is constructed through it are seen by the epidemiologists I interviewed as most trustworthy when those measures are constant and replicable over time, and are measurements of bodily symptoms or features produced through quantifying technologies relatively (or seemingly) less subject to human interpretation, such as a blood pressure reading or body-mass index, calculated using weight and height. However, as the researchers discuss in Chapter 4, racial, socioeconomic, and sex/gender differences do not fulfill these criteria. For example, they point out that racial classifications and socioeconomic status not only vary over time, but also, since the mechanisms through which they shape cardiovascular risk are unclear, their ritualized measures may fail to capture or serve as

good proxies for those dynamics relevant to the incidence and development of CVD. Furthermore, perceptions of one's own race and gender may differ from those of others, including epidemiologists. Perceptions of *relative* wealth or poverty may be as or perhaps more important than absolute income or other measures of SES. Also, gender identification can differ from one's biological sex; biological sex, moreover, is not, strictly speaking, a binary variable (e.g., Dreger 1998; Fausto-Sterling 1993). In short, all three dimensions of "difference" are arguably "subjective" in some way or another, as well as multiple, intersectional, and fractured in lived experience. Thus, operationalizing and using such variables are viewed by epidemiologists as simultaneously fraught with uncertainty and methodological and other difficulties.

Because of the sources of methodological and conceptual imprecision that often accompany the measurement and inclusion of race, social class, and gender in studies of CVD, epidemiologists constantly face doubt about what their data and analyses are telling them—whether their measures are actually capturing the most relevant phenomena and disease mechanisms, whether those phenomena they seem to reflect are "real," or whether something else is actually going on. In the absence of good measurement tools that specifically operationalize those aspects of racial, class, and gender difference that impact cardiovascular health, epidemiologists find themselves constantly making do with blunt classification systems, fairly primitive analytic methods, and proxy variables that many, if not most, acknowledge are imprecise. As a result, researchers puzzle at length about the multiple, possible interpretations of their data, the additional questions that their work often raises, and the ambiguity of how they can obtain answers to them. Thus, the practice of adjustment for demographic characteristics is often implicitly represented as

producing significant uncertainty and ambiguity, and as not a very good "tool for the job" of generating clear and authoritative knowledge on the effects of social difference on cardiovascular risk and disease.

Black Boxing the "Usual Suspects" Approach

Yet, as indicated above, the inclusion of individual rather than social attributes of race, socioeconomic status, and sex persists as a routine epidemiologic convention embedded within current practice. As such, it can be argued that this practice is increasingly being "black boxed" (Shim 2002).[7] The concept of the black box (Latour 1987; Latour & Woolgar 1986) originates from cybernetics, where it is used in diagrams as a quick way of alluding to some complex process or piece of machinery: in its place, one draws a box and indicates only the input and the output, thereby sidestepping the need to detail the contents of the box itself. Latour argues that black boxes are created when many elements and processes are made to fit together into an automaton, or a conglomeration that in fact acts as one. This metaphor captures critical aspects of the character of technoscientific facts and routinized procedures: hidden inside "is an entire social history of actions and decisions, experiments and arguments, claims and counterclaims—often enough, a disorderly history of contingency, controversy, and uncertainty" (Epstein 1996: 28). The process of constructing and closing the black box and rendering invisible this unruly social history involves the continuous and everyday

[7] Susser and Susser (1996) also use the concept of the black box to characterize chronic disease epidemiology; however their usage of the concept turns on its definition as investigating the relationships between exposures (i.e., the inputs) to health outcomes (i.e., the outputs) without necessity for complete understanding of intervening factors or pathogenesis. In contrast, I use the concept of the black box to trace the dynamics and implications of technoscience, specifically of using the multifactorial model to legitimate epidemiologic constructions of race, socioeconomic status, and sex as significant individual determinants of health.

use of discursive techniques and actions to strengthen the case being made. For example, scientists "take observations ... present them as discoveries ... and turn them into claims ... which are accepted by others ... and may eventually become *facts* ... and, finally, *common knowledge*, too obvious even to merit a footnote" (Epstein 1996: 28). Over time, such "facts" then themselves act as *obligatory passage points* through which scientists who follow along later must pass through in order to further their own scientific claims and interests. That is, they must demonstrate compliance with disciplinary conventions (Becker 1982). As a result, with a black box that has embedded itself as taken-for-granted knowledge and a standard procedure, its history and all the elements incorporated into it cannot be easily picked apart nor disputed piece by piece without potentially incurring quite significant costs.

In cardiovascular epidemiology, while there may be controversy over how specific factors should be operationalized and incorporated into epidemiologic analyses, the general categories of inputs to be included in order to produce credible outputs seem relatively settled and self-evident. That is, incorporating individual-level risk factors and characteristics that include race, SES, and sex into analyses are relatively taken-for-granted procedures in generating estimates of CVD incidence and predictions of cardiovascular health status. As alluded to above, scientists take epidemiologic observations (for example, "the incidence of chronic diseases and their risk factors are associated with race, socioeconomic status, and sex"), transpose them into claims ("it is important to examine the potential roles of racial, socioeconomic, and sex differences in chronic disease"), that are accepted by others ("the significance of racial, socioeconomic, and sex differences in chronic disease"), and may eventually become facts ("risks for

many chronic diseases include racial, socioeconomic, and sex differences"). The work of epidemiologists sustains the facticity of the role of demographic differences in cardiovascular risk, further promoting perceptions of their legitimacy, credibility, and widespread utility. Since risk factors *are* statistically associated with disease incidence, this kind of epidemiologic research seemingly enables the prediction of future probability and distribution of health or illness based on demographic (and related behavioral) classifications of individuals and groups. At the same time, the ways in which such work is presented as a "terminal analysis" sufficient unto itself also serves to obscure considerable uncertainties about exactly *how* such inequalities are produced. That is, what exactly *about* race, class, and sex/gender contributes to cardiovascular disease? Epidemiologic techniques and knowledge thereby help to construct a seemingly intelligible and orderly story about the unequal distribution of cardiovascular health. Thus, the black box of the requisite racial, socioeconomic, and sex inputs becomes concretized as its continued use leads to its acceptance as epidemiologic routine.[8]

A central finding here therefore is that this particular black box—of transposing social relations of race, class, and gender into standardized racial categories, SES, and sex and then including them as demographic adjustments in epidemiologic analyses—can exist quite robustly even though its interior is frequently opened up and challenged by epidemiologists themselves. Rather, black-boxing seems to be achieved through the very routinization of its use in myriad, everyday epidemiologic work contexts. Thus, while

[8] Numerous scholars (Jordan & Lynch 1992; Latour 1987; Pinch & Bijker 1984; Turkle 1984; Wenger 1988) have participated in discussions of the stabilization of scientific facts and artifacts and the construction of black boxes and variants of them. Although I find concepts of translucent, glass, and other kinds of alternatives to black boxes provocative, here I want to focus on why, with all of the problematics and uncertainties of the "usual suspects" approach in epidemiology, it still remains a ritualized—that is, opaquely black boxed—practice.

users of the "usual suspects" approach may insist that the inner workings of this black box are uncertain, problematic, and potentially even scientifically irrational, the techniques themselves still continue to *function* as a black box.[9] This is the work they do in the larger worlds and arenas that use epidemiologic data and analyses.

The now widely-used practices from the discipline of epidemiology embed this particular black box in numerous and heterogeneous sites and contexts, and legitimate its particular representations and operationalizations of what I argue are social relations of power structured by race, class, and gender. The invocation of "the scientific method," criteria, and values of universalism and control authorize these conceptualizations of race, class, and gender over alternative ones. The incorporation of epidemiologic findings into public health practices such as risk assessments and health promotion activities affirms the notion that standardized racial categories, measures of socioeconomic status, and sex are significant to the distribution of health and illness, and stabilizes their construction as individual, coherent, and non-intersectional traits. Moreover, the methodological "toolbox" of epidemiology and its epistemological assumptions are simultaneously black-boxed. When confronted by questions of racial, socioeconomic, and sex disparities in disease, epidemiologic constructions and techniques emerge as the logical means for better understanding them, deleting discussion and debate about the appropriateness of epidemiologic paradigms and approaches to addressing such issues.

Why and how is it that such practices have become so black-boxed, even if the

[9] Jordan and Lynch (1992) make a similar argument regarding the plasmid prep, a genetic engineering technique that is relatively standardized, reproducible, and ritualized, but that often presents problems to its users like establishing its efficacy, accounting for discrepant results, and explaining how the technique actually works in concrete practice.

content and validity of the black box are routinely contested? I argue that it is because the individualization of race, class, and sex/gender and their inclusion in epidemiologic research are integral to the construction of scientific credibility and the management of uncertainty in cardiovascular epidemiology. In the following section, I propose and explicate a number of reasons for how this particular practice contributes to the production of credibility in the eyes of both the public and the epidemiologic/scientific community.

C. The Routinized Inclusion of Variables of "Difference": Producing Credibility and a "Good Enough" Tool for the Job

In this section, I continue the social worlds/arenas analysis first discussed in Chapter 3, through an examination of how the relationships between social worlds in the arena of cardiovascular disease produce a host of technical issues, political and economic contingencies, and organizational/institutional elements that influence how cardiovascular epidemiologists do their work. In my analysis of epidemiologists' accounts of their methods and practices, I find that the individualization of race, social class, and gender, and their ubiquity and persistent use in research on cardiovascular risk and disease are attributed, at least in part, to their utility in fulfilling what I term "methodological contingencies." The validity of specific claims in epidemiology—as in many other kinds of science—is contingent upon meeting a series of processual requirements and standards.[10] Methodological contingencies are therefore those technical

[10] Gieryn (1999: 2) makes a similar point. He notes that in credibility struggles questions emerge that go to the heart of who is a scientist and what is scientific: "Is your training or expertise scientific? Did you follow methodologically proper scientific procedures? Would most other scientists agree with you?"

procedures and criteria that exist as part of the practice and scientific culture within the social world of epidemiology, upon whose satisfactory completion social and scientific credibility rests. Additional criteria stem from concerns to maintain the public authority and scientific status of epidemiology, a function of the interactions and relationships of epidemiology with other social worlds. I argue that through their ability to minimally comply with these contingencies, the use of individualized variables of race, SES, and sex promotes the production of credible epidemiologic claims. That is, by providing relatively technically convenient ways to nominally satisfy a range of methodological contingencies posed by the concerns of various social worlds, such demographic variables persist in epidemiologic work. These include first satisfying what I term the "measurement imperative" in epidemiology, the mandate that all potentially relevant factors be measured in some fashion and included in data collection and analysis. Second, the "usual suspects" approach helps to manage uncertainty through its "boundary object" (Star & Griesemer 1989) properties that allow for "triangulation" (Star 1985; 1986). Third, the inclusion of individualized variables of race, socioeconomic status, and sex also fulfills political and regulatory requirements of the U.S. National Institutes of Health that mandate the representation and analysis of racial and sex difference in research. Last, economic limitations and the lack of infrastructure and organizational support for interdisciplinary collaboration in epidemiology constrain the use of other "tools for the job"—including the kinds of theoretical models, data, and domains of expertise—that are available to epidemiologists. In the face of these contingencies, constraints, and conventions of practice, the "usual suspects" approach becomes constructed as a convenient and "good enough" alternative. I next discuss each of these

contingencies.

Fulfilling the Measurement Imperative

The work of epidemiologists often involves research on indeterminate phenomena using uncertain methods. In cardiovascular epidemiology, for example, part of the objective of much research is to determine the complex etiology of one or a set of related diseases whose causes are multiple, can be synergistic or counteracting, may both overlap with as well as act independently of others, and may vary from person to person, perhaps in both random and systematic ways. In the face of such ambiguities, grounds for the credibility of a piece of research must be carefully constructed. One way in which a case for credibility can be built is through the comprehensive inclusion and measurement of all possible contributing factors to the phenomena under question. Investigators therefore not only include those factors that are fairly well established and measured using the best available techniques, but also experience pressures to quantify and incorporate *all* other variables that *may* play a role and that often can only be measured with much less refined procedures. I call these pressures the *measurement imperative* in epidemiology, to point to the mandate to include and measure, as exhaustively as possible, all likely contributing, intervening, and mediating factors. The degree to which researchers can meet this mandate outlines one basis for judging the thoroughness of a research study, and therefore for assessing its credibility.

Sheila explains how epidemiologists go about fulfilling the measurement imperative, explaining the scientific function that the imperative fulfills:

I mean, anything that you definitely know already has been an established risk

> factor for cardiovascular disease, you definitely should measure at least in the most standard method, especially if you're looking for anomalous factors, you want to make sure that you've got the best measurement possible for the well-established ones so you can actually see something with the anomalous risk factors. Things like blood pressure, age, gender, and race. So that's how I began doing it. And then there are other things that are putative risk factors that haven't been well established but have been suggested by different sources that, if possible, you know, you'd like to measure at least to add more evidence to that literature, or help to minimize the some of the residual confounding—if that factor is actually associated with your outcome, you want to eliminate its impact.

Here, Sheila notes the inclusion of the "usual suspects" of race and gender as "well-established" "risk factors" for CVD. Lance also walks me through a similar calculus, using the example of a study of the cardiovascular effects of oral contraceptives or hormone replacement therapy among women:

> if you're trying to determine whether one particular factor is etiologic ... like oral contraceptives and hormone replacement in women, then you obviously want to get a very good history of the exposure to that particular variable. And then ... to get some kind of assessment of the major [conventional] risk factors ... you'd at least want to know the blood pressure status, hypercholesterolemia (ideally you'd want to know about subfractions), smoking, diabetes, obesity, physical activity, diet (if you can get it in a reasonable way, but diet takes a fair amount to get good information on), family history ... body weight (like obesity, lack of obesity). And race, gender, age—basic demographic data. And also certainly measures of social class or education—those types of things have been shown in a variety of studies to be involved in risk and those are some of the things for which the role is still being elucidated. But you want to have that information as well.

What Lance and Sheila describe is a systematic process whereby an inventory of variables that are known or considered possibly to bear on the factors or outcome of interest is generated, and data about each are collected as comprehensively and through as many measures as is feasible. As Lance summarizes, "We've got something of a list of them," indicating the embeddedness and standardization of certain variables—that is, as "usual suspects"—in epidemiologic research.

As the body of evidence accumulates that something about race, social class, and sex/gender may play a role in cardiovascular risk, the measurement imperative compels researchers to include measures of these differences in their study design and statistical analyses. As discussed above, however, epidemiologists, when explicitly asked to consider the validity of conventional operationalizations of demographic differences, express significant uncertainty that their measures and the knowledge they produce are telling the whole story. Yet individualized variables of race, socioeconomic status, and sex remain crucial to the construction of credibility in part because the measurement imperative mandates that *some* aspects of these differences be measured in *some* fashion. In short, inadequate measurement is better than no measurement at all. Thus, epidemiologists—from those who agree that current measures are ambiguous to those who are most emphatic that they are fundamentally flawed—make do with crude classification systems and methods of representing race, social class, and gender, and habitually include them in their research. The practices of adjustment for demographic characteristics are then alternately explicitly represented as the "wrong" tool for the job of producing knowledge on the effects of social difference on cardiovascular risk and disease, as above, *and* as embedded within current epidemiologic practice and hence implicitly viewed as "good enough" and indeed, taken-for-granted techniques in epidemiologic research. It is under such conditions that there can exist significant uncertainty over the adequacy and appropriateness of current measures of race, social class, and sex/gender *simultaneously with* the routinized inclusion of race, socioeconomic status, and sex.

Managing Uncertainty: Boundary Objects, Triangulation, and Technical Downshifts

I further argue that the routinization of race, socioeconomic status, and sex in cardiovascular research is promoted because the inclusion of these variables helps to manage uncertainty and fortify legitimacy in epidemiologic work. I found three interrelated aspects of these demographic differences that help to tie them to the production of credibility: the "boundary object" properties (Star & Griesemer 1989) of individualized variables that permit their use in many different contexts and for different purposes, the subsequent ability to "triangulate" results across diverse lines of work (Star 1985; 1986), and "technical downshifts"[11] in which scientists push aside epistemological questions that can fundamentally threaten their work in favor of preoccupations with technical and methodological issues.

First, I argue that the persistence of race, socioeconomic status, and sex in cardiovascular epidemiology is due to the ability of the "usual suspects" approach to minimally satisfy the needs of many different social worlds in the broader arenas in which epidemiology is active, promoting the routinization and institutionalization of this approach in diverse contexts. As such, the practice can usefully be conceptualized as a *boundary object* (Star & Griesemer 1989), comprising both an object and processes that have dual properties of flexibility and integrity (Shim 2002). Star and Griesemer (1989: 393) define boundary objects as representations of nature that

> inhabit several intersecting social worlds ... *and* satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites ...

[11] Thanks to Adele E. Clarke for suggesting this terminology.

> They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation.

The utility and durability of a boundary object derives from its flexibility, coupled with its robust capacity to preserve its basic character across potentially diverse domains of work.

Similarly, demographic variables are able to mean different things in practice to different groups of researchers without undermining their basic integrity. Their "interpretive flexibility"—the ability for technoscientific objects to mean different things to different people in different times and places (Pinch & Bijker 1984)—is evidenced by their plasticity: the *combination* and *definitions* of variables deemed to be of consequence can be adapted for different situations and contexts. This helps to sustain the relevance of measures of race, socioeconomic status, and sex in epidemiologic research on cardiovascular disease. That is, the specific operationalizations of various factors, their relative weight or relevance, and even their interpretations can vary from site to site without requiring complete agreement. The meanings of various "risk factors" may diverge for members from different social worlds (and among members within the same worlds), but the nature of epidemiologic constructions of difference as boundary objects allows for continued coordination without the need for substantial conceptual or methodological agreement. For example, the variable "race" has multiple meanings that may differ from or conflict with others. Yet its inclusion can serve as a way to measure the cardiovascular effects of racism (e.g., Krieger & Sidney 1996; Krieger, Sidney & Coakley 1998), as a proxy for genetic (e.g., Borecki, Higgins, Schreiner et al. 1998; Williams, Rao, Ellison et al. 2000) or physiological (e.g., Dries, Exner, Gersh et al.

1999; Gump, Matthews & Räikkönen 1999) differences, *or* as an indicator of possible cultural or behavioral patterns (e.g., Crespo, Smit, Andersen et al. 2000). Moreover, its inclusion also fulfills the desire for health professionals to provide better targeted and "culturally competent" medical care, as well as the needs of activists to materially demonstrate the inequalities in health across various social groups. All these social worlds support the inclusion of the variable of "race" in epidemiologic research, albeit for quite different political and conceptual purposes. Similar dynamics occur for socioeconomic status and sex. The relative under-determination of the kinds of demographic measures or variables to be used in research in general in turn allows for the ability to more precisely define and operationalize them within the context of a particular research study. As Star and Griesemer (1989) note, boundary objects tend to be weakly structured in common use and more strongly structured in their use within specific sites.

As boundary objects, then, race, SES, and sex in epidemiologic analyses allow for multiple meanings and interpretations by people from very different social worlds. The heterogeneity of meanings of "difference" is, of course, indicative of the complexity of social processes and relations of race, class, and gender, whose manifestations and implications for health the use of individualized variables is attempting to reflect. However, because of the lack of credible methodological alternatives (which I discuss later in this chapter), the need for demographic measures to encompass all these diverse meanings is nominally satisfied by the individual-level variables of race, socioeconomic status, and sex. This boundary object status then supports the standardization of their use in heterogeneous sites of activity, and contributes to their construction as a "good enough" and credible enough tool for epidemiologic research.

The routinization of race, socioeconomic status, and sex in multiple research contexts in turn both enables and is further legitimized by the strategy of triangulation (Star 1985; 1986; see also Shim 2002). Triangulation involves the gathering of data across diverse sciences in support of a theory or conjecture. By collecting corroborating evidence from several different areas of research, Star (1985; 1986) finds that the local uncertainties from one field were obscured and often rendered invisible. "Lines of evidence became entangled" and it became impossible "for researchers to trace a simple *path* of uncertainty, responses, or negotiation of anomalous results" (1985: 408). In the face of deep ambiguities, work from one domain of research called upon evidence from multiple other lines of work in order to maintain its own credibility and viability. Often this meant that evidence from different realms was accepted in an uncritical fashion, using results from one to correct for the uncertainties and bolster the validity of results from others. In so doing, Star finds that triangulation had several unintended yet important consequences: obscuring local uncertainties while emphasizing the ultimate "truth" of a multifaceted model, and minimizing specific results in favor of generalized, simplified findings.

Triangulation is in fact an acknowledged practice in epidemiology: as one textbook states, "the epidemiologist ... attempts to integrate the data necessary for his [sic] analysis of a particular disease from diverse disciplines" (Lilienfeld & Lilienfeld 1980: 48). As the technical appropriateness of including race, SES, and sex in cardiovascular epidemiology becomes black boxed, such procedures embed themselves in more and more institutional contexts. In turn, results from numerous epidemiologic, clinical, or basic research enterprises that find significant racial, socioeconomic, and sex

differences in cardiovascular risk can draw upon the results in other research settings to shore up their credibility and elide local ambiguities. Research in molecular biology and genetics, clinical and social science research into behavioral and "lifestyle" factors, and clinical practices of risk assessment and health promotion all reinforce each others' cases for scientific validity. For example, cardiovascular epidemiologists can use racial populations to examine the role of genetic differences (e.g., Borecki et al. 1998; Williams et al. 2000), physiological differences (e.g., Dries et al. 1999; Gump et al. 1999), as well as racial discrimination (e.g., Krieger & Sidney 1996; Krieger et al. 1998). In addition, not only epidemiologic researchers, but also basic and clinical scientists, medical clinicians, social scientists, public health officials, community activists, and the public all work with various incarnations and combinations of racial, socioeconomic, and sex variables, usually in a taken-for-granted manner. Thus, the inclusion of race, SES, and sex as individual-level attributes is collectively supported by multiple lines of research, becoming naturalized in the process of triangulation.[12]

Finally, a third important mechanism facilitating the routinization of individual-level measures of difference is the subsuming of epistemological questions within technical, often internal methodological debates (Star 1985; 1986; see also Shim 2002). Differences in epistemology, definitions, and interpretations of social differences are often eclipsed by a focus on improving disciplinary techniques. For example, debates over how best to measure race/ethnicity and SES are quite prominent (e.g., Cooper 1994; Hahn & Stroup 1994; Krieger & Fee 1994; McKenney & Bennett 1994; Schulman,

[12] Fujimura and Chou (1994: 1023) argue that such self-authentication *across* disciplinary boundaries—where "unlike the verification exercise of triangulating data to confirm a single point, researchers are actively combining ideas, data, and apparatuses in ways not circumscribed by any one discipline"—is indicative of what they term an "epidemiological style of practice."

Rubenstein, Chesley et al. 1995),[13] and often displace considerations of what exactly is meant when we include them in analytic models. Moreover, in my interview and observational data, epidemiologists often represent those study results that report that race, socioeconomic status, and sex are not significantly related to some measure of health, or are associated in unexpected ways, as rooted in methodological nuances or weaknesses, comprehensible only to professional insiders. In this fashion, more fundamental ambiguities around the meanings of demographic variables and the role such classifications play in the incidence of cardiovascular disease are bypassed in favor of technical, methodological deliberations: "Higher-level uncertainties thus became transformed into more manageable, lower-level ones" (Star 1985: 412).

The fact that such debates may miss epistemological issues for the most part passes by unnoticed by the epidemiologists I interviewed, with one exception: as Sheila explains,

> I think a lot of people are saying, "You know, we really need a better definition of what race is, and we should spend some time really thinking about what's going on, and really give a better definition of race." I know a lot of books have been written on this, etc. and I think it's kind of an exercise in futility. Does it matter? Do we have to actually be able to put everybody in little boxes that fit our ability to classify them? Or is it more relevant kind of how they're viewed by society as a whole and just use that as our idea of what race is ... I don't think there's such a thing as "truth" when it comes to race. I think we need to accept that as a norm. But I think the U.S. is fascinated with race, from historical experience in terms of race [it] was *so* important ... legally and socially ... It was just so important, that is why I think we spend so much time trying to define it. And I don't think that's relevant.

As Sheila points out, an almost singular focus on how to "measure" race and operationalize it displace larger questions of its *social* construction and consequentiality.

[13] Although, interestingly, measurement is not seen to be problematic or even at issue for sex/gender.

Such technical downshifts also result in subsuming fundamental disputes and differing, incompatible visions of the objectives and limits of science, and glossing over power struggles in the conduct of science. Concentrating attention on refining and standardizing methods emphasizes *how* things should be done and *why*, and makes information from different research settings more compatible, allowing for "a longer 'reach' across divergent worlds" (Star & Griesemer 1989: 407).

To conclude, Casper and Clarke (1998: 277) argue that in order for a scientific tool that is neither particularly "right" nor "wrong" to persist within an arena, "first, it must be 'good enough' at least minimally to satisfy all of the social worlds in that arena. Second, it must do important work for the actors and/or worlds with the most power and resources. And third, it must to some degree be standardized and stabilized, however wobbly." By virtue of the boundary object properties of integrity and flexibility, and through strategies of triangulation and the displacement of epistemological questions with methodological ones, individualized variables of race, SES, and sex do indeed serve the basic needs of multiple social worlds. Fundamental uncertainties about how to define and operationalize "differences," use them in epidemiologic research, and interpret results can be managed, especially in the face of methodological contingencies that must be satisfied. Crucial claims are being transformed into scientific common sense: that race, class, and gender can validly be conceptualized as independent and individual rather than social attributes of race, socioeconomic status, and sex; that as individualized traits they play significant roles in cardiovascular disease etiology and distribution; and that those constructions constitute tenable measures of CVD risk. The uptake of these claims by multiple social worlds then has several important effects. First, local research

contingencies regarding the inclusion of race, class, and sex/gender are increasingly met by conventionalized measures of racial categories, socioeconomic status, and sex as individual-level phenomena. In turn, more certainty about their rightful place in epidemiology is subsequently produced. The most successful efforts result in the eventual construction of black boxes that routinize such techniques as credible and "good enough" tools for the job of understanding the distribution of CVD risk—even in the midst of significant uncertainty and questions regarding their adequacy and appropriateness.

Political Credibility and Regulatory Mandates Regarding Research Representation

Scientific work is also constrained and enabled by sponsorship and regulatory groups, and audiences and consumers of the work (Clarke & Fujimura 1992b). In the case of cardiovascular epidemiology, political and regulatory conditions within which scientific research is conducted have served to further stabilize the "usual suspects" technique as an adequate, and therefore widely embedded, tool for the job.[14] Among the epidemiologists I interviewed, the most prominently mentioned issues in this regard were bureaucratic mandates to include racial and ethnic minorities and women in biomedical research, which they believe has become highly politicized. One example of such a bureaucratic mandate that epidemiologists refer to is the 1993 National Institutes of Health (NIH) Revitalization Act which stipulated that all NIH-funded clinical research

[14] Casper and Clarke (1998) make a similar argument with regard to the Pap smear: although the technology itself was particularly resistant to stabilization, the laboratory around it was much more amenable to standardization. Thus by achieving organizational, economic, and technological stability in the settings in which the Pap smear was used, the tool became (provisionally) constructed as good enough and hence the right one for the job.

must include women and minorities unless a clear and compelling rationale that such inclusion is inappropriate can be provided. Epstein (forthcoming: 8) argues that such legislation was made possible because of a revolution in scientific common sense, "from a regulatory emphasis on protection of 'vulnerable' groups from research risks and toward affirmation of the rights of autonomous individuals to choose to assume such risks." In addition there was a growing perception that previous biomedical research had been largely focused on white men, and that this raised concerns about the generalizability of study findings to other populations. This striking shift in the defining of demographically diverse and inclusive research as ethically appropriate and scientifically warranted was brought about through a convergence of women's health, AIDS, and minority health activists, supported by key members of Congress. As a result, the inclusion of measures of race, SES, and sex has become one way to demonstrate demographically diverse representation in research, and thus is crucial not only to the production of scientific credibility, but also to the fulfillment of regulatory criteria and the construction of *political* credibility.

As with the meanings of race, social class, and sex/gender in epidemiology, the degree to which representational concerns are articulated differ for different dimensions of diversity. I observed virtually no explicit calls for the inclusion of individuals from diverse class backgrounds by epidemiologists. However, because of the widespread agreement that socioeconomic status significantly stratifies cardiovascular risk and health, it seems taken for granted that socioeconomic status must be included in epidemiologic analyses. In contrast, the often implicit claim that women and men differ biologically led to a moderate number of arguments for the inclusion of women in

cardiovascular epidemiologic research. But these were tempered by observations that significant progress has been made in this respect, driven more by curiosity about the etiology of sex differences in CVD than by specifically socio-political or equity concerns.

In contrast, the inclusion of racially diverse populations is a very frequently invoked issue in interviews with epidemiologists and at scientific meetings, and proves to be an extremely contentious matter. On the one hand, the need to include people of color in epidemiologic research has been codified in the American College of Epidemiology's Statement of Principles:

> Epidemiologists have a critical role in reducing the marked health disparities among United States racial and ethnic groups, because we play a major role in framing the research questions, designing the studies, and interpreting the data that serve as the basis for understanding the phenomena, designing interventions, and setting the public health agenda. (Schoenbach, Greenberg, Buffer et al. 1995: 503)

The pragmatic justifications for such inclusion advanced by this Statement were echoed by some epidemiologists I interviewed. They claim that financial and other practical concerns—the combination of the increasing diversity of the U.S. population, the empirically observed differences in behaviors and treatment responses between different racial groups, and efforts to reduce spending on health care—create an imperative to maximize research representation along racial lines. On the other hand, other epidemiologists argue that any current concerns about racial equity in research representation originally stem from the efforts of social movements, the increase in epidemiologists of color, and some amount of cultural willingness to face the legacies of racial and social hierarchy.

While epidemiologists widely acknowledge that peoples of color, women, and the

poor and working classes have for the most part been under-represented in cardiovascular epidemiologic research, they are almost unanimously opposed, not to the idea or intent of the mandates themselves, but to the *ways* in which such regulations require representative samples. Scientists I interviewed argue that such requirements serve not to bolster scientific credibility but rather to make the results of research more politically credible. Many epidemiologists refer to the demands and even pressures of the current social and political context of identity politics as contributing to the token inclusion of women and people of color in order to satisfy the regulatory mandate, but without sufficient statistical power—that is, in numbers far too small to render useful and credible conclusions about differences or about the group in and of itself. Although ensuring statistically valid comparisons between sex and racial/ethnic groups was the original intent of the NIH Revitalization Act, epidemiologists perceive and have witnessed that in practice, such requirements are not enforced. Rather, researchers believe that such mandates have now devolved to a bureaucratic and scientifically untenable rule satisfied by the nominal inclusion of minorities in study samples without regard to statistical power. As Karen explains:

> I think the concept is an essential and important one, the concept that we cannot just study white men and think we have the answers to everything. You must study each of these populations separately ... The reason for doing what I call stratified sampling by either gender or race, would be because I suspect what I want to test, that the effects may not be the same of the particular, if you will, black box intervention. If indeed that is my question, then it becomes totally a sample size problem. I need to be able to say, what's the least effect I expect in any one of the populations, and do I have the ability to test that effect if it's there?

Karen argues that the implementation of the NIH regulation does not in fact resolve these methodological contingencies:

> My soap box, as an epidemiologist, is that NIH has been specifically mandating how scientists need to write proposals and need to do studies in order to get funded. Unless you have a good justification for why you do or don't include certain kinds of people, you are not even likely to get past the review step. This is particularly true with gender, and it's true with all of the different ethnic categories ... I personally think that's a huge mistake. I would much prefer more studies that are targeting specific ethnic groups, men separately and women separately. What's happening with the mandate that you have to check the little boxes that you include everyone ... [is that] people comply. So they will say that they are going to get some Hispanics, they are going to get Asians—whatever that is ... they will say they are going to get African Americans. And the list goes on. Ultimately, any given study, unless you make a specific effort to target it, has such small numbers of those individuals in the study, that if, in fact, there is a gender difference, there is an ethnic difference, and you want to identify, describe and detect it and advance the science, it dilutes the main effect by having people from each group, just a couple of them; none large enough, in order to fully answer the research question ... the [NIH] reviewers don't seem to be picking up that what you're getting is what you ask for. 'Yes, I will include everyone.' Have I demonstrated that I will have enough Asian people, enough African Americans, in my study, so I can draw a conclusion about such individuals? No. This is what I think is one of our biggest problems right now, in terms of the science we are doing, the proposals we write, and the studies we carry out ... with the mandate that has been passed down, people do the knee-jerk reaction and say, 'Yeah, I'm going to get everybody. Isn't that nice?' It's a waste of money. It's a waste of research dollars.

Researchers in fact discursively contrast "political" considerations, which they believe guide the regulatory framework regarding representation in research, in explicit opposition to "scientific" criteria. These debates are illustrative of protectionary boundary-work (Gieryn 1995; 1999: 435) where scientists try "to get science close to politics, but not too close," struggling to maintain autonomy over research agendas or methodological techniques, while simultaneously recognizing that "key to the legitimation of scientists' cultural authority is the perceived pertinence of science for political decision making." Thus, on the one hand, such regulatory mandates to include people of color and women in cardiovascular research, in their current form, are often

perceived by epidemiologists to be the wrong tools for the job of producing *scientifically* credible knowledge about the effects of differences on CVD. Yet, on the other hand, as *bureaucratic* obligatory passage points (Latour 1987), they become methodological contingencies to be satisfied solely, epidemiologists argue, for the sake of *political* credibility.

However, the divisions between scientific and political or social credibility are not as clear as these commentators indicate: almost all of the epidemiologists I interviewed in fact support increased research among populations previously under-represented in epidemiologic research on *scientific* grounds, arguing that the historic lack of attention to groups of color, women, and the socioeconomically disadvantaged in health research has hampered its generalizability and applicability. Indeed, epidemiologic science has for much of its history attended to methodological criteria related to the representativeness of research populations. For example, researchers are often concerned about the degree to which a recruited sample "looks like" the intended study population, whether any sample biases arose during recruitment and retention, and external validity (or generalizability) of a study. Currently, the characteristics of the study sample used to determine whether significant differences exist between the sample and the population to which the study hopes to refer almost always include race (and to a lesser extent, socioeconomic status).[15] Related elements of accounting for external validity in both oral and written presentations include describing sample sizes, recruitment methods, the location and character of recruitment sites, and detailed justifications for selecting these methods and sites. Figures that capture how successful recruitment efforts were (e.g., recruitment "yields"

[15] Interestingly, comparability is viewed as untenable across sex lines; that is, results from a sample of women are almost never seen or even considered to be generalizable to men, and vice versa.

for each site, response and refusal rates) are often calculated and included. Researchers also regularly analyze the degree to which the actual sample "looks like" the intended sample by comparing the characteristics of those who refused or did not respond to recruitment strategies to those of people who agreed to participate. For longitudinal studies, the concern for research representation also involves inspecting how well participants were retained, and whether those retained "look" similar to or different from those lost to follow-up.

Finally, epidemiologists almost always present a profile—usually referred to as the "baseline characteristics"—of their study samples as part of recounting their research methods, providing the audience with the opportunity to "eyeball" an assessment of the generalizability of the study. The attributes most often used to characterize study samples include the racial/ethnic, sex, and age composition, the prevalence of cardiovascular disease risk factors, and somewhat less often, measures of socioeconomic status. Researchers also often include an evaluation of external validity in their account of the weaknesses and limitations of their studies. Thus both political as well as scientific concerns promote the habitual use of individualized variables of demographic difference, and based on my ethnographic observation at multiple scientific meetings, contribute to the almost ritualized public accounting in research presentations of the extent to which criteria related to diversity were met.

The Economics of Research: The Adequacy of Theoretical Models and Epidemiologic Data

A fourth set of important structural factors shaping the nature of epidemiologic

knowledge is the economic conditions present in the situation within which such knowledge is produced. Specifically, I argue that the current scale and priorities of research funding of federal entities like the National Institutes of Health constrain the research materials—that is, the kinds of empirical data that are collected and the conceptual models that in turn are built upon such data—available to epidemiologists. Ultimately this results in the standardized use of racially categorical, socioeconomic, and sex inputs into epidemiologic research.

The epidemiologists I interviewed agree that coming to some conclusions about causality and especially about the causal role of social factors require data sets based on very precisely defined and multiple socio-demographic categories as well as long-range longitudinal study designs, which are notoriously expensive to collect. When I ask epidemiologists how they would design their ideal study and what kinds of data they would collect, many speak at length about the need for adequate statistical power to conduct separate analyses for carefully defined racial-socioeconomic-sex groups in order to address questions of social factors and conditions and their role in CVD causation. As Max points out, "Ideally, it would be good to have sufficient detailed individual data on all demographic groups, but this is often not practical. I think the current techniques are sufficient, but the bigger problem is adequate data, which needs to be massive for the ideal study."

The epidemiologists I interviewed also advocate longitudinal research, following individuals and communities for extended periods of time, even generations. For example, Anita suggests examining cultural adaptation and lifestyle changes across generations in order to understand the cardiovascular risks of immigrants. Sheila

advocates beginning data collection during pregnancy and following those children from birth until death. These and other epidemiologists I interviewed however, almost unanimously end their descriptions with comments about the financial obstacles to doing such research, specifically the enormous costs and resources required to maintain contact with cohorts of individuals and to gather such in-depth data at regular intervals. However, the alternative—studies that are cross-sectional, where data is collected from individuals (or the units of analysis) only at one point in time, like a snapshot—are inappropriate for analytic procedures designed to assess the predictive value of or to attribute causality to different sets of variables. That is, the most readily available and inexpensive kind of data to collect represents the "wrong" research material for the job. Sheila, for example, describes the potential of path analysis, a technique that "helps you figure out what's predictive of what," but then points out that

> once again, the problem with a lot of path analysis is the study design is inadequate to do the path analysis. If you don't have a cohort study or a longitudinal study, path analysis is irrelevant because everything is looked at cross-sectionally. It makes no sense. I mean, you can define whatever causal model you want but the study design doesn't allow you to define causality. And I've seen it in a lot of path analyses also that are done cross-sectionally and they say, "Oh, this is the causal of that," and you can't say that.

Further, even if the scale of research funding could be enhanced to accommodate the collection of more complex and larger data sets, a crucial tool for the job would still be missing: more advanced data collection methodologies and analytic techniques to handle and test more complex etiologic hypotheses about the significance of social "differences" in CVD. Some of the epidemiologists I interviewed discuss gathering data that chart complex changes not only in the economic life chances, experiences, and health

of people but also in the histories of the environments and communities in which they live.[16] Mia, for example, uses what she terms "ecological models," that

> bridge this gap between looking at the macro influences like ... neighborhood socioeconomic status and neighborhood disease prevalence ... [as well as] individual determinants and individual outcome ... the ecological model that says, well sure, there are these individual attributes. But you can also take into account all these neighborhood attributes, more of the context, the contextual model, as they call it, in addition to individual stuff ... it's a relatively new sort of way of knowing about individual health behaviors versus more conventional epidemiology.

In theory, such a model "probably will explain a lot of what's going on on the individual level" by "accounting for these neighborhood, these environmental, sociological kinds of influences as well as individual influences." However, in practice, she acknowledges that "it's much more complicated ... I'm still trying to figure out how to assess those [influences], how to make them work." Sheila concurs that existing methods are quite rudimentary and ultimately inadequate to model the complex, synergistic, and intersecting dynamics that characterize the impacts of race, social class, and sex/gender on cardiovascular risk and disease. When I ask if she feels like she has the methodological tools to do the kind of research she would like to do, she replies tepidly, indicating that she perceives them to be inadequate to the job of modeling a longitudinal conceptualization of health that takes seriously the notion that the experience of social inequalities over a lifetime result in *cumulative* health effects:

> They're okay. I mean like in terms of socioeconomic status and the highly correlated data, especially if you try to do things on individual's neighborhood to ... larger spatial units, they have some hierarchical modeling techniques you can

[16] This is not to say that cohort studies are not being supported and funded; however the extent to which they can employ more emergent methodologies is constrained by the relative scarcity of economic resources and political will.

> use. But I mean it's still not perfect. You know, we still don't have a way that perfectly gives us what we want to do, so I think there's still definitely some methodological development that we still have to do in terms of measuring things, as well as doing analysis using this information. I mean we can collect tons of information, but how do we analyze that? How do we take into account, you know, your parents' economic status and your childhood economic status, and yours now, currently, and then yours when the event happened? How do we correlate all those things together and try to measure what our lifetime socioeconomic status was? ... I don't think conceptually we've got it all worked out yet. And I think it's mainly because we haven't figured out some of the steps along the way either. It's all kind of one big mess that we're trying we're trying to understand what it is, sort out the pieces of stuff.

However, epidemiologists I both interviewed and observed almost uniformly perceive that such methodological problems "are the kiss of death for funding," in the words of one of them. Thus the conceptual models and analytic techniques for examining the effects of race, class, and gender in cardiovascular risk and disease remain in the nascent, developmental stages, representing crucial tools for the job that have not yet been elaborated, much less widely accepted and stabilized. As a result, existing methodologies that include simplistic measures of race, SES, and sex, although often regarded as inadequate and therefore even scientifically irrational, continue to be used as stop-gap and "good enough" techniques to nominally account for "differences" that epidemiologists know to be significant, though in ways they cannot conclusively state.

For all their uncertainty, then, individual-level, demographic variables of racial category, socioeconomic status, and sex have to a significant degree become systems that represent standardized ways of classifying the world (Bowker & Star 1999). According to Bowker and Star (1999: 11-12), a standard, or classification system, "spans more than one community of practice (or site of activity) ... Standards are deployed in making things work together over distance and heterogeneous metrics ... Standards have

significant inertia and can be very difficult and expensive to change." The practices by which race, socioeconomic status, and sex are categorized and included in epidemiologic research—such as being boundary objects—have the ability to bring together scientists from diverse lines of work. They further allow for comparisons between individuals and studies from different geographic, social, and historical contexts. And perhaps most significantly, there are very high costs to accommodating alternatives to current methodologies, because they have been embedded in multiple sites and technologies throughout the infrastructures of epidemiologic research. These sites include, among others, national survey instruments, the digital design of databases and computer programs, ongoing research studies and protocols, the training and expertise of workers, and the technical, organizational, and political cultures of government agencies and health bureaucracies. Each of these sites of institutionalization have both shaped and been constituted by the specific ways in which socio-demographic differences have conventionally been collected, measured, recorded, stored, analyzed, and interpreted. As a result, such conventions have been co-produced along with the practices and infrastructures of epidemiologic work, and importantly, standard definitions of what counts as legitimate and "doable" (Fujimura 1987; 1996) research. All of these elements structure the social world and work of epidemiology and consequently the kinds of knowledges produced. Even though emergent methods of measuring or analyzing the effects of "difference" may be highly sophisticated or greatly improved over current modalities, they often represent the "wrong" tools for the jobs of epidemiologic investigators trying to do large-scale, generalizable, comparable, and credible research testing causal hypotheses.

Because of these economic and infrastructural constraints of conducting such long-term data collection, scientists often rely on pre-existing data bases either built by other researchers in the course of a study, or collected, often at regular intervals, by government agencies (often referred to as administrative data sets). However, the categories and methods of measurement used to collect such data are most likely to be precisely those that are not very novel, advanced, or nuanced. Instead, they are selected because they are conservative, safe, and comparable to those used in previous rounds of data collection. Lena, for example, who uses secondary data sets, discusses the drawbacks of being "stuck with what I have," including the absence of some racial groups who she would like to study, and the lumping together of ethnic groups that she considers to be extremely heterogeneous in important ways. Thus, the very data sets that represent a significant resource for epidemiologists struggling to produce new knowledge amidst a competitive political-economic market are most likely those that use relatively established, sometimes even ossified conceptualizations and operationalizations, particularly of race and class. This practice of using secondary data in many ways institutionalizes a conservative bias in research regarding the role of "difference" in cardiovascular disease. Strategies scientists use to conform to the constraints of the economic contingencies posed by research funding, usually by governmental agencies, thus have the effect of curbing the use of newer conceptual and methodological techniques that might offer a better understanding of the effects of race, class, and gender on cardiovascular risk. They not only discourage innovation, but build that discouragement into disciplinary conventions. Lena describes her own experience with this culture of conservatism in the kinds and measures of data deemed tenable and

defensible:

> It would be kind of nice to have people that are thinking a lot about it [new methods of measurement and analysis] and theorizing a lot about it, to get with the people that are designing the surveys, you know. But that's a huge bureaucratic process ... it's really hard just to get like a new question on a survey ... the National Health Interview Survey has been going on since the '50s, you know ... just getting education on the death certificate was huge ... I just witness people that I've worked with that have been involved in kind of redesigning some surveys and ... you've got people who have been there for decades, you know, who have done the same thing, the same reports are produced from the same survey, and it's just I think the inertia of getting people to change. And issues of class and race are politically charged and this is a center that, its mandate is not to do research. Its mandate is to report on the health status of the country. So, I mean I think those issues are always very sensitive. There's ownership issues within the organization. Who owns what data set and authority issues. And I just think it's just a hard thing to do for a lot of different reasons ... I'm not trying to put them down. I think they do a really excellent job with their stuff. It's just, to come in and say, "Oh, we need to have Marxist measures of social class on this survey," it's just not going to happen. You know, we're a classless society, supposedly. I mean we don't have social class. Talking about owning the means of production, it's just not going to happen [laughs].

At the same time, socio-demographic changes in society often work to render obsolete those racial categorization schemes selected at the outset of data collection; by the time publishable analyses have been conducted the constructions of what groupings make sense and are socially and scientifically important have in the interim shifted. As Carolyn explains,

> You know, twenty years ago you had white/non-white on a lot of vital records ... and then you started getting different ethnicities. Now you ... actually maybe have a category of mixed ethnicity. So, all of these things are more precise and more reflective. But then, at the same time, you get societal and demographic changes and people would look at the immigration and the intermarriage and the increasing diversity and the heterogeneity within ethnic groups now. You're Asian American, right? ... there are very few studies on cardiovascular disease in Asian Americans. That might have been good 20 years ago when the bulk of Asian Americans was Chinese and Japanese. What do you do now where it's, what, 50 different groups? And the catch is 50 different groups with—look at the

> smoking rates in Filipino men compared to maybe Japanese men, I'm mean it's probably the difference between 20% and 90%. So, increasing heterogeneity now begs the question and calls for new study populations ... Before we were just actually pleased to even see something that looked across ethnic groups ... people become more cognizant of issues, but at the same time the rapid changes in the makeup of our society.

Despite the epidemiologic significance of such population shifts, however, changing the demographic variables used in research would, it is argued, incur excessive financial, logistical, and scientific costs in the form of redesigning study instruments, recollecting and recoding data, and discarding data that could not be updated. Thus economic considerations, by shaping the kinds of data collected, deeply impact the research materials available to epidemiologists, operate to constrain the ability to develop a finer-grained understanding of the racial, class, and gender orderings of cardiovascular risk, and in turn further the routinized use of individualized variables of demographic difference in epidemiology.

The Constraints of Human Resources, Disciplinary Cultures, and Research Sponsorship

Finally, other tools for conducting epidemiologic work—specifically the availability of human workers, disciplinary cultures, and research sponsorship—impose constraints on the development of credible alternatives to the use of racial, socioeconomic status, and sex classifications. As a result, I find that these conditions contribute to the constitution of individual-level variables of difference as "right" or at least "good enough" tools for the job, reflecting the ongoing construction of the meanings of "rightness." First, epidemiologists point to an acute lack of the "right" kinds and the

"right" mix of human workers for the job of producing knowledge about differences in cardiovascular risk and disease. They consistently and repeatedly mention the critical need for interdisciplinary research in order to advance epidemiologic knowledge about the health effects of social factors such as race and social class (and infrequently, for gender). The scientists I interviewed almost uniformly argue that the very kinds of advances crucial to better illuminating the nature of race, social class, and gender, and their effects for CVD risk lie at least partly outside the boundaries of their own expertise and of their discipline's research agenda. Thus without collaboration with scientists from other disciplines, they believe that the epidemiology of CVD inequalities is doomed to use the same methods replicating the same, predictable results. Sheila, for example, diagnoses the problem of research on class differences in this way:

> I think that within that [measuring socioeconomic status] whole realm, things are a little hazy, especially in epidemiology because I don't think we've spent enough time trying to get better measurement of those variables. We've left it to the sociology realm, we've left it to the psychology realm. And we really need to spend more time doing more collaborative work with them ... We've exhausted what we already know. The traditional stuff is not explaining things enough, that we need to start exploring some other novel pathways.

Sheila also argues that the nature of chronic diseases like cardiovascular disease indicate that multiple causes, accumulating over decades, are responsible. Therefore, she foresees that unless significant interdisciplinary and organizational cooperation can be achieved, little marginal benefit is to be gained from conducting more conventional research. Mia concurs: "I think the great gains in knowledge and understanding of human experience and how to improve it really come when ... you're able to get beyond what you do and think about ... other ways to do things, to look at it in a bigger picture or look at it from

different angles." Yet among the epidemiologists I interviewed there is wide agreement that not enough collaborative research is being done. In a larger sense, then, this problem is one of not having the "right" human resources with the appropriate combination of disciplinary skills and frameworks to develop useful and credible epidemiologic methods and tools with which to conduct research on social disparities in CVD. In the absence of such collaboration and advances, then, epidemiologists opt to use measures of difference that, while imprecise, are relatively uncontroversial, standardized, comparable across contexts, and therefore nominally credible.

Additionally, I argue that the technical criteria for what counts as credible epidemiologic science create a rather insular work culture within the discipline, further deterring interdisciplinary collaboration. The epidemiologists I interviewed frequently speak about the widespread reluctance of their colleagues to explore alternative methodologies and frameworks being used by researchers in other disciplines. For example, Karen observes that, even though evidence mounts that socioeconomic status is among the most significant predictors of cardiovascular health, as epidemiologists, "we sort of pretend it doesn't exist. Let someone else worry [about it] ... cardiologists do their research, the behavioral scientists do theirs ... The clinicians run around and do their things, the theorists are over here and do their things." Sheila concurs with the notion that cultural boundaries dividing disciplines work against interdisciplinary possibilities, saying that "people are unwilling to move away from traditional epi[demiology], and ... people are afraid to move away from traditional sociology research, or traditional psychology research. So as a result there's no overlap that we meet in which to explore these different levels of understanding chronic disease."

I argue however that it is not only cultural tendencies to stick with what one knows, and/or personal aversions to the methods and paradigms of other fields, but also disciplinary commitments to certain ways of conducting research that work against collaboration. That is, as epidemiologists, these researchers are trained and socialized to value a set of paradigms, practices, and technologies that together constitute the discipline of epidemiology. The methodological contingencies I discussed earlier in this chapter that codify technical requirements to be satisfied in order for research to be taken as credible scientific work, embody implicit, tacit assumptions about the kinds of work and the range of concerns that characterize "epidemiology," further naturalizing boundaries between epidemiology and other disciplines. For example, Mia, an epidemiologist who, in our interview, fantasized about using in-depth ethnographic methods in an intensive, small-scale study of the lived environments of communities, summarizes: "I think researchers get really stuck sort of in ... our way, our epistemology, our ontology, this is *how* we do ... this is *what* we do ... That's sort of how we define ourselves is by what we do." Even more specifically, Sheila identifies some of the technical incompatibilities between epidemiology and two disciplines, psychology and sociology, with whom potential collaborations might be productive:

> In terms of psychology and sociology, I think they're good at developing their scales and questionnaires, but the thing is that they don't have outcomes usually. They're just looking at things cross-sectionally, and if you're trying to study something that has a health component or an outcome component that is not also measured by a scale, but is measured by hard criteria, then you have to do something different with the questionnaires to measure things adequately enough to cover a period of time that's not just now, you know. Some of them have attempted to do that, and some of them are very good at that, but most of them—I think it's mostly methodologic, because the samples are too small, everything's cross-sectional, how they measure their outcomes are intermediate markers—if they do longitudinal studies—it's always an intermediate marker. You never

> know if they had a hard outcome, so as a result, I mean, it's—their methods are usually not strong enough to make the inferences in the health realm that they need to make. And I think that's what's limited them in their studies from achieving the goals as well. So they're not actually complementary of epidemiological methods. They're, you know, kind of just in their own world doing their own thing.

Thus, in order for interdisciplinary collaboration to occur, Sheila realizes that "researchers have to shift their paradigm ... work with something that is non-traditional within their fields." In short, they must accept methods that may be fundamentally discordant with the criteria by which credible epidemiologic knowledge is understood to be produced. Moreover, researchers I interviewed also suggest that funding agencies can do far more to encourage and indeed compel epidemiologists to work with other scientists. For example, Sheila says,

> I think I kind of agree with the statement, you know, if you present the problem, the methods will come, but until we make it a priority, they won't ... I think collaborations need to be more encouraged actually by funding agencies because institutions—people won't do it with their own institutions. People are too focused on their own particular issue that they don't take the time out to, you know, meet other people ... I think that those kind of things need to be encouraged more by the funding agencies ... more forced collaboration than there is so people will quit putting out a lot of junk, and really add information to the field.

By constraining the kinds of workers and expertise brought to bear on the study of social differences in cardiovascular risk and disease, work cultures, disciplinary commitments, and research sponsorship together operate to impede the development of alternative conceptualizations and measures of race, class, and gender that are sufficiently credible to most epidemiologists. As a result, they resort to using individual rather than social variables of racial category, socioeconomic status, and sex, promoting its routinization in increasing numbers of scientific contexts. Moreover, such routinized

inclusion—itself shaped by social ideologies of individualism and reductionism that function to veil social relations and processes of power—furthers the notion that race, social class, and gender, and their effects on health, are intelligible and comprehensible as individualized attributes, despite the ambiguities and uncertainties that their use continually raises in practice.

D. Conclusions

Epidemiologists perceive numerous obstacles to accomplishing conceptual and methodological advances: the intrusion of political and regulatory requirements to include certain populations that in fact counter efforts to design research based on scientific criteria; the lack of theoretical models and measurement technologies to gather appropriate data; and the lack of techniques to analyze such data and evaluate more complicated causal hypotheses. They observe that the culture of science and the social, political, and economic aspects of the relationships between epidemiology, governmental funding sources, and social movements and the public are simply not set up, at the current time, to support the simultaneously interdisciplinary, exploratory, and large-scale work that they envision must happen for significant progress to occur. Such forces help to mold a disciplinary culture and set of methodological contingencies that are largely conservative, valorizing known measurement strategies, comparable and stable forms of data, and proven conceptual and analytic models. These forces serve to embed within the organization of epidemiologic work inducements to reinforce disciplinary boundaries and disincentives to cross them by supporting a currency of credibility often incompatible with the frameworks, methods, and priorities of other disciplines of research called upon

under collaborative scenarios. As a result, in order to produce credible epidemiologic research, epidemiologists routinely resort to the "usual suspects" approach, where individual, rather than social, attributes of racial categories, socioeconomic status, and sex are incorporated as statistical adjustments and controls, a technique I argue directly counters efforts to understand the effects of racial, class, and gender differences in cardiovascular risk and disease.

Methodological contingencies—having the "right" measurement and analytic techniques, theoretical models, and data—exist in part as standards of practice that convince fellow scientists and other audiences of the plausibility of the claims being made. Professional reputations and scientific credibility are judged by the research technologies used, and the extent to which their strengths and weaknesses have been considered and addressed. This accounts for the meticulous and almost routinized manner in which I observed epidemiologists recount their methodological choices and limitations in both oral and written presentations of their findings, beginning with sample recruitment and inclusion criteria, and proceeding through research protocols, measurement techniques, and analytic methods. Credibility also derives from the ability to compare one's results to those of others, and to otherwise claim a contribution of one's own research to the body of epidemiologic literature (and not insignificantly, to cement a place for oneself within the community of epidemiologists). As Karen describes, "On the one hand, I would like to be adventuresome and develop all my own categories of measurement. On the other hand, there's this real desire to want to be able to compare research with previous research. If you are not careful in developing your categorization, then you are not able to compare so well." There is, therefore, an inherent conservative

bias to use methods that others have used before, and for which there is a solid basis for their "good enough"-ness. However, like any kind of contingency, methodological ones are provisional, negotiated, and achieved orders that are constantly being tested, contested, and sometimes re-articulated (Clarke & Fujimura 1992b). Conflicts occur around even fairly standardized techniques in epidemiologic research, and the definitions of the "right tools for the job" continue to undergo construction as various elements of the arena in which CVD epidemiology is produced interact with each other.

Epidemiologists are not unaware of the potential costs to knowledge production when using the same tools over and over again. According to Sheila, "I think it's more ... of a conceptual barrier, being unwilling to consider [social environment, psychological factors] as a true risk factor ... because they won't buy the measurement techniques." But while she acknowledges the significant intellectual and cultural obstacles to accepting new methodologies, she expresses frustration that such reluctance only perpetuates the repeated use of existing research technologies, continued suspicion of newer ones, and the duplication of essentially the same research claims: "I get frustrated because more studies are being done that do the same thing, without offering solutions, or exploring other possibilities or designing studies that could answer those questions. And this has been going on since the 1950s [laughs], so that's what I think the most annoying thing about it is." Another epidemiologist, Mia, who proposes incorporating ethnographic, "anthropological" methods, notes that, "Of course when you do that [more qualitative kinds of research], you get very specific to a particular community and things that you find in that community may or may not be typical of other communities. Sometimes they are, sometimes they aren't." Thus even as Mia describes the kind of study that she might

design and conduct if given the freedom to chose methodologies based on their appropriateness and potential to reveal something of use, she perceives that these methods may not satisfy conventional epidemiologic criteria regarding validity, generalizability, and credibility.

There is, however, another set of costs: as epidemiologic standards and practice routinize the individualization of social relations of race, social class, and gender, they effect critically important consequences for the lived experiences of "difference" and of disease. That is, the paradigms, practices, and technologies examined in this chapter constitute power moves: power lies in how validity, methods, and the political economy of research are mutually constructed to reinforce each others' cases, and to build synergistic and overlapping reasons for why certain types of research are not conducted, and why particular questions, directions, and agendas are not pursued. The ultimate outcomes for the construction of racial, class, and sex/gender "differences" shape ideas about the legitimacy of such "differences" as targets of biomedical surveillance and intervention, and about the responsibilities of individuals for their cardiovascular health. Such ideas, I argue, contribute to the continued stratification of health and the maintenance of health inequalities. I turn next to these consequences.

Chapter Six
The Reproduction of Inequalities in Cardiovascular Health: Biomedicalization and Cultural Health Capital

A. Introduction

In the previous chapter, I examined how and why the epidemiologic inclusion of individualized conceptions of "difference" has become a routine and "good enough" tool for the job of studying cardiovascular inequalities. Throughout, I have argued that social, political, and economic as well as scientific considerations shape the classificatory and technical practices of cardiovascular epidemiology. This chapter is concerned with the reverse proposition: that the classification of human variation embedded within the epidemiologic endeavor in turn shapes multiple social processes through which categories of difference are constructed, experienced, and made to be consequential (see Bowker & Star 1999). Here, arguments last raised in Chapter 4, that science constitutes a crucial site of racial, class, and gender formation (e.g., Haraway 1994; 1997; see also Omi & Winant 1994; Shim 2000), are germane to this research. Constructions of "difference" can be analyzed as engaged in the representation and organization of "different" kinds of bodies, and in the production of racialized, classed, and gendered power relations. As such, debates about the social etiology of cardiovascular disease and the production of epidemiologic knowledge about the role of "difference"—how "difference" itself is defined, and what kinds of causal processes are deemed the legitimate purview of epidemiology—can operate to reproduce, exacerbate, and/or attenuate inequalities in health.

In this chapter, I address the following questions: What are the linkages between epidemiologic and embodied constructions of "difference," and various kinds of knowledge claims about cardiovascular disease causation, risk assessment, and reduction? In what ways has epidemiologic knowledge been "applied" to human bodies and subjectivities in efforts to reduce disease and sustain health? What are some of the consequences of such efforts for health and social inequalities? My analysis reveals that the answers to these questions pivot around two primary arguments.

First, in the process of producing epidemiologic knowledge, "differences" of race, social class, and sex/gender have become increasingly *biomedicalized* (Clarke, Fishman, Fosket et al. 2000; Clarke, Shim, Mamo et al. 2002), that is, appropriated by the jurisdiction of biomedicine and subsequently subject to biomedical logics, technologies, and intervention. As we seek in the current era to identify more and more of our health risks and treat them, existing tendencies within epidemiology to erase the social, structural, and historical contexts within which people live, work, get sick, and die are exacerbated. Classifications of race, socioeconomic status, and sex have re-emerged as appropriate and legitimate biomedical concerns, and been re-articulated as markers of risk and potential pathology and targets for needed intervention. The definition and identification of such "differences" have therefore become embedded within present mandates and tools to properly understand, assess, and reduce one's cardiovascular risks, representing an example of biomedical governmentality and effecting fundamental changes in sociocultural views of individual subjectivities and "different" kinds of bodies.

Second, I argue that stratified biomedicalization—where the processes and

technologies of biomedicalization are applied unevenly to "different," unequal groups—is furthered by the dynamics of what I term *cultural health capital*. Parallel to the concepts of cultural and social capital, cultural health capital comprises a set of attitudes, competencies, and knowledges that can be used in multiple interactions and contexts in which health-related commodities, services, and resources are exchanged. It can be deployed to enable self-care and compliance with risk reduction mandates, and parlayed into increased or more focused attention from biomedical providers. The imperative to accrue and mobilize cultural health capital therefore works, in essence, as another form of biomedical governmentality. Through this concept, I argue that we can better understand both the consequences of epidemiologic knowledge and current ideologies of health on "different" groups, as well as the generational reproduction of health inequalities. In this chapter, I explicate both of these findings, and illustrate how classificatory practices embedded within epidemiology operate to sustain and reinforce social, political, and cultural relations of power and reproduce social inequalities in health.

B. The Biomedicalization of Cardiovascular Risk and Surveillance

The concept of biomedicalization, framed by myself and colleagues (Clarke et al. 2002), argues that recent technoscientific changes in the organization and practices of biomedicine have both broadened and extended processes of medicalization in new and important ways. Medicalization refers to those processes through which aspects of life previously outside the jurisdiction of medicine come to be construed as medical problems.[1] By conceptually redefining particular phenomena in medical terms, medicine

[1] See, for example, Conrad (1975; 1992), Conrad and Schneider (1980a; 1980b), Freidson (1970), Pfohl (1978), Schneider and Conrad (1980), and Zola (1972/1997).

became a new agent for the social control of deviance. Biomedicalization retains medicalization's notion of expanding medical jurisdictions, but asserts that technoscientific innovations like computerization, molecular biology, and genomics are expanding the institutional, economic, political, cultural, and social scope of biomedicine such that its assumptions, logics, and techniques have become dominant aspects of everyday contemporary life. These innovations effect a number of consequences that fundamentally change individual, clinical, and institutional practices of biomedicine and health. Five overlapping consequences, we argue, are constitutive of key historical processes of biomedicalization: major political economic shifts; new modes of risk and surveillance medicine; increasingly technoscientific innovations and practices of biomedicine, a process we call technoscientization; transformations of biomedical knowledge production and distribution; and transformations of bodies and identities. In the sections below, I examine the latter four processes of biomedicalization that I have found are most prominently manifest in cardiovascular epidemiology, beginning with the elaboration of risk and surveillance and technoscientization of biomedicine, then followed by the transformations in the responsibilities for biomedical knowledge, and finally the biomedicalization of identities and subjectivities.

The Technoscientific Assessment and Surveillance of Cardiovascular Risks

In biomedicalization theory (Clarke et al. 2002), we argue that concepts, practices, and discourses of risk and surveillance have become increasingly pervasive. Risks are calculated and assessed in order to rationalize surveillance, and it is through data collection enabled by surveillance that risks can be conceptualized and standardized

(e.g., Howson 1998a; 1998b; Lupton 1995). Constructions of risk factors and techniques of self-surveillance have emerged through the production of epidemiologic and biomedical knowledge and been increasingly routinized and standardized as habits of daily life that people now practice upon themselves. Significantly, these practices are, "in the quintessential Foucauldian sense, no longer contained in the hospital, clinic, or even within the doctor-patient relationship" (Clarke et al. 2002: 30). Rather, they are often explicitly designed for people to practice upon themselves, as the responsibilities for surveillance, regulation, and disciplining of biomedical risk devolve to the individual. As such, they constitute what Foucault termed "technologies of the self"—that is, they "take the form of the elaboration of certain techniques for the conduct of one's relation with oneself, for example, requiring one to relate to oneself epistemologically (know yourself), despotically (master yourself), or in other ways (care for yourself)" (Rose 1996: 29). Biomedicalization thus elaborates through daily and continuous lived experiences and practices of "health" designed to evaluate, manage, and treat "risk" itself among individuals and even entire populations (Fosket 2002; Press, Fishman & Koenig 2000). Here in this section, I make two arguments: First, cardiovascular epidemiology is emblematic of new modes of risk and surveillance made possible through new technoscientific innovations that further the biomedicalization of individuals and populations. Second, the subsequent decontextualization of people from their social and historical conditions then contributes to an epidemiologic science and set of practices that construct racial, class, and gender differences as individualistic traits.

As I reviewed in Chapter 3, the history of cardiovascular epidemiology is marked by a series of significant investigations that placed large samples of individuals and entire

communities under the epidemiologic gaze. Such studies revolutionized the wider discipline of epidemiology as well as associated fields of public health, clinical medicine, and social science, and more deeply, they shaped our ideas about how population science could be and should be conducted. This production of epidemiologic knowledge is itself made possible only through new computer and data management technologies and complex social arrangements that accompany them, illustrative of the extensive technoscientific transformations in how biomedical research, and biomedicine in general, are conducted, a process we term technoscientization (Clarke et al. 2000; Clarke et al. 2002). Such developments and the subsequent knowledge produced have contributed to the identification of cardiovascular risk factors, comprised of a core set of six modifiable determinants and a range of other risk factors.[2]

My interviews with epidemiologists and with people of color living with CVD indicate that these risk factors, identified only within the last 50 years, have become well codified among scientists, clinicians, and the wider public. Both groups of participants were, for the most part, easily able to list many if not all of these factors and they played prominent roles in the narratives of people of color with CVD about their efforts at risk reduction and health promotion. This finding suggests the extent to which evaluation of one's risks and self-surveillance have become a common part of everyday life.

These risk factors and their calculation have further been standardized in another technoscientific means of biomedicalization: risk assessment tools that aim to predict one's probability for some cardiac event or cardiovascular disease (e.g., D'Agostino,

[2] Modifiable risk factors include high blood pressure, high serum cholesterol, obesity, sedentary lifestyle, diabetes, and smoking; other factors frequently mentioned include age, family history, sex, menopause status, and less frequently, race (see, e.g., American Heart Association 2001b).

Grundy, Sullivan et al. 2001; Pignone & Mulrow 2001). Used to enable the "diagnosis" of risks and their treatment in pre-symptomatic or asymptomatic bodies, such technoscientific practices of risk assessment are of particular salience in the biomedicalization era. These tools synthesize epidemiologic data, ostensibly meaningful only at the population level, and transform them into equations and then risk calculations that are then deemed meaningful at the individual level (Rockhill, Spiegelman, Byrne et al. 2001). The questionable practice of applying population level data to individuals in order to predict and treat disease risks (see, e.g., Gifford 1986) is not lost on a few of the epidemiologists I interviewed. For example, Sheila cautions:

> I think a lot of [these risk assessment tools] are taken out of the context in which they were developed. Something is not valid if it was developed in a limited, narrowly defined population that is not a probability sample, and it's applied to another population. I don't think people really understand what the limitations of something is. They think that it can be employed in every study, and I think that's probably the greatest disadvantage of prediction issues. I don't think it's the fault of people who develop them, it's more the fault of people who use them.

Yet because risk assessment is seemingly based on vast amounts of cumulative scientific knowledge and data, this enhances their legitimacy and authority for those who use them.

In abstracting these data into a standardized set of questions and response choices, such instruments are decontextualized from the knowledge on which they are presumably based; as a result, questions about validity, applicability, and the origin of the information often cannot be answered by the user of the technology or by their health care providers. Furthermore, while risk assessment tools give the illusion of providing knowledge to the consumer/patient, most in fact conclude with instructions to take information to physician, represented as the professional with the expertise to interpret results and

recommend risk reduction strategies. Although the line between expert and lay appears to shift as a result of consumer's use of risk assessment technologies, their use often ultimately reinforces and sustains the distinction. For example, Karen, an epidemiologist and a clinician, worries that:

> I'm a little bit concerned, because anyone can put anything out there. At times I think people can get a lot of different pieces of contradictory information ... [I would guide patients] to make sure that they take whatever information they get and include it in bringing it in, talking with the health care provider about what pertains to them and what is relevant to them.

Sheila, another researcher who is also a physician, concurs:

> I am all in favor of people being advocates of their own health, and if there's something the medical community, the research community can do to help people become better advocates for their own health, then I'm all for it. But by the same token I think there's a lot of misinformation that's put out there, and consumers don't have the skills to distinguish between what's right and what's wrong in terms of risk profile. That's why I think nothing should be interpreted without the help of a physician ... you should have a regular health care person involved ... in your life in order to help you interpret those results and see whether or not it's actually valid for you or not.

As Radley, Lupton, and Ritter (1997: 9) argue, "Paradoxically, just as health matters appear from one perspective to escape the confines of medicine, to become an issue for lay persons to deal with either collectively or as individuals, so these issues reflect back upon medicine in ways that not only challenge it, but open up new avenues for its expertise." In so doing, risk assessment tools and their use—as much as they offer opportunities for individuals to gain self-knowledge and understand their conditions—often work to reinforce "expert"-"lay" distinctions and traditional power relations in medicine, and to valorize professional, scientifically-based authority over other forms of

knowledge.

Epidemiologic knowledge production has thus been instrumental in establishing and standardizing practices and technologies of risk classification, assessment, and treatment, and in legitimating their application. Individuals are constructed not as the *potential* objects of medical control, as under the germ theory of disease, but as the *de facto* objects of *epidemiologic surveillance* under the assumption that people must be carefully monitored for the development and progression of risk factors (see Armstrong 1995). Further, technoscientific moves towards the increasingly precise identification of health risks and development of new technologies of surveillance offer expanded justifications for ongoing *intervention*, often in pre-symptomatic or asymptomatic bodies—that is, even in those individuals who do not yet manifest disease or whose illness is already under good control. As Petersen and Lupton note (1996: 59), "despite the inevitable uncertainties and 'fuzziness' of epidemiological knowledge, it tends to be taken up by contemporary public health practitioners and presented to members of the lay public via health education and health promotion as a set of objective and given 'truths.'" As such, cardiovascular epidemiology, in providing the scientific basis for techniques of risk assessment, in turn can help to sustain the power of expert authority and facilitate the surveillance and disciplining of human difference (see Rose 1996: 19). The construction of epidemiologic knowledge and its application in clinical practice can therefore be seen as an example of a power-knowledge relation: the production and centralization of knowledge in order to maximize discipline over individual and social bodies (Shim 2000).

Importantly for biomedicalization and the construction of race, class, and

sex/gender, risk assessment technologies also result in decontextualizing individuals from their history, material conditions of existence, and sociocultural and political understandings of the world. As I discussed in Chapter 4, people of color with CVD argue that such variables as racial identification, educational attainment, and gender are relevant for the study of CVD because of the particular, specific, and multiple ways they structure their social conditions of life. As socially constructed differences, race, class, and gender matter to the cardiovascular health of lay experts because they shape social environments and structural processes that make up their lived experiences. However, in cardiovascular disease risk assessments, race and sex (but interestingly not socioeconomic status) are included as universal, individualized, demographic variables, repeatedly cited as markers of risk by epidemiologists I interviewed, and specified as such in CVD risk assessment instruments (e.g., D'Agostino et al. 2001; Pignone & Mulrow 2001; Wilson, D'Agostino, Levy et al. 1997). Although many of the researchers assert that social class as one of the most significant predictors of cardiovascular health, SES did not appear in any of the CVD risk assessment tools I was able to gather. Race and sex are, however, almost invariably included. This may reflect the differences in the social constructions of socioeconomic status—as an obviously social and structural variable—versus race and sex—as biological and cultural differences—in contemporary epidemiology, as described in Chapter 4. Such conceptual distinctions manifest themselves in risk assessments, then, in the inclusion of race and sex as variables intrinsically tied to the bodies and behaviors of individuals, and the exclusion of socioeconomic status, which is viewed as socially modifiable and therefore extrinsic, although it is still measured at the individual level.

In so doing, epidemiology "performs sociocultural and political functions ... constructing and perpetuating both material and symbolic distinctions between social groups" (Petersen & Lupton 1996: 59). More specifically, epidemiology constructs and perpetuates *particular* definitions of these distinctions, as reducible to the individual, and sustains a general approach to their study. By abstracting individual-level socio-demographic data, combining them into large databases, and generating risk equations and assessment tools, epidemiologic knowledge contributes to the formation of claims about risks, behaviors, demographic characteristics, and other attributes that are seen as generalizable (enough) and applicable (enough) to almost everyone. Thus the individualized manifestations or outward characteristics of processes of racial, class, and gender formation are stripped of their social production and construction in order to be inputted into calculations of risk. Cardiovascular risk assessment and surveillance therefore intensify the extent to which socio-demographic attributes like race, class, and gender are considered to be traits of individuals, their biologies, and/or behaviors, rather than signifying relations of power and inequality.

Moreover, by *individualizing bodies* and socio-demographic differences, epidemiology as a regime of power-knowledge at the same time acts to *disindividualize power*, investing it not so much in particular practitioners, interactions, or relationships, but in the much more diffuse, constant, and pervasive acts of knowledge construction and production (see Foucault 1977). In the move from the individualization of bodies to the production of standards of risk and pathology, functions of surveillance and regulation are uncoupled from particular persons in dominant positions and instead located within diffuse behavioral norms, health imperatives, and processes of self-governance. Such

consequences help explain how even well-meaning providers, politicized and self-aware patients, and advocacy organizations can inadvertently contribute to the continued domination of racialized, classed, and gendered individuals and groups. That is, because they are already embedded in power-knowledge relations, processes, and architectures of knowledge production, those involved in the delivery and consumption of advice and services based on epidemiologic knowledge often reinforce imperatives of individual-level accountability for health, and individualized constructions of risk.[3]

The production of epidemiologic knowledge on cardiovascular disease and the classification schemes of people and individuals deemed to be of biomedical relevance are part of the complex of social practices that render subjects governable in the modern/post-industrial welfare state. That is, epidemiology is a way of knowing that takes up and transforms problems and issues arising from economic, political, and social forces and dynamics, and makes "these problems thinkable in new ways and governable with new techniques" (Rose 1990: ix). Epidemiology, in short, functions as a regime of power-knowledge (Shim 2000) and a form of governmentality, and in so doing, furthers biomedicalization.

The Knowledge Imperative and Cardiovascular Risk Awareness

A second, related aspect of biomedicalization that is particularly relevant to the production of epidemiology is contemporary shifts in the distribution of biomedical

[3] Castel (1991: 281) argues that the innovation in medicine to conceptualize populations as combinations of factors of risk dissolves the notion of a subject, or concrete individual. In contrast, I argue that the individual-level identification and measurement of risks—including those associated with race, socioeconomic status, and sex—is what in fact enables epidemiologists and others who use and mobilize the knowledge claims of epidemiology to think of intervening in and "treating" risk in populations.

information and the responsibility for grasping such knowledge (Clarke et al. 2002). As the extension of biomedicine into daily life gradually escalates, people are increasingly subject to a kind of knowledge imperative: held responsible for acquiring biomedical knowledge that is relevant for them given their demographics and risk factors, and for using it to manage their own health. The currency of this set of expectations is evident throughout my interview and ethnographic data. For example, most of the participants with CVD can readily identify what epidemiology defines as the traditional, established factors that place individuals at cardiovascular risk, such as diet, lack of physical activity, obesity, and family history. In addition, these respondents discuss the various ways in which they experience, accept, and/or reject a sense of responsibility for taking control of their own education and awareness regarding their hypertension or heart disease. Webb says, almost tongue-in-cheek, "My health has become one of my interests. It's become one of my hobbies. And I want to ... keep informed about my health ... Attitude [towards knowledge] is everything. You've got to grasp it for yourself."

Only in rare instances did participants ignore or dismiss the imperative to educate themselves about their cardiovascular conditions and risk management options. One of the few examples of explicit refusal is Bonnie, a Black woman with congestive heart failure and hypertension, who specifically chooses *not* to seek out information about her conditions, nor to take up medical advice regarding lifestyle change:

> I didn't go to no library and read up on the books. I went by what they told me at the hospital. Every now and then I'd read something in the newspaper ... It didn't matter to me. I had it [heart failure]. It wasn't going away, so I wasn't going to worry myself with just getting all this information that I couldn't do nothing with it anyway. Because a lot of times you get too much information, and it just blow your mind ... So, I accepted the fact that I had a heart condition. I said, "I got to find a way to live with it." And I'm not going to scare myself that this'll happen

> and this'll happen and this'll happen. I said, "Whatever happens, happens. I'll have to deal with it when it happens" [laughs]. To heck with all that information ... Why should I compile all this information? I'm not a doctor. What am I going to do with it? And I have a sister. Oh, she want to know everything. And then she's worried about this and she's worried about that. I said, "If you wouldn't read all that crap, you wouldn't be all that worried."

Bonnie's own approach to "risk management" was to avoid unduly worrying herself by "compil[ing] all this information." This illustrates the ways in which individuals with CVD negotiate with biomedicalized discourses to work out a pragmatic approach to the achievement and performance of health (see, e.g., Lock & Kaufert 1998). Their pragmatic responses are constrained by material conditions and structural forces,[4] but in other ways are shaped by their cultural and personal perspectives on health and biomedicine. From Bonnie's point of view, it is the responsibility of her medical providers to collect and pass along relevant information, and her right to decide what advice to incorporate into her life based upon what is pragmatic and reasonable for her. However, Bonnie's choices do not free her from the admonishments of her sister and her doctors who continue to urge her to educate herself and to take up the recommendations of professional experts.

This responsibility for self-knowledge is also evident in my analysis of dominant expert constructions of the "problem" of the lack of fully informed, scientifically savvy, and self-initiating health care "consumers." Among the epidemiologic, public health, and clinical communities, there is a widespread perception that the levels of public awareness about the magnitude and impact of cardiovascular disease are dismally low. Interviews with epidemiologists and published commentaries indicate the fear that the public has slid

[4] One such structural condition is access to cultural health capital, a concept I introduce later in this chapter.

from a relatively high level of anxiety—around the mid-twentieth century when public discourse about the epidemic of heart disease was at its height—into a feeling of dangerous and misguided complacency as death rates for CVD have dramatically improved. Early in 2000, reports began to circulate that the incidence of heart disease had continued to decline and was at its lowest levels for some time (e.g., American Heart Association 1999). For epidemiologic and public health professionals, such media reports pose a double-edged sword, welcomed as signaling a reduced burden of cardiovascular disease and the efficacy of prevention strategies, yet suspected of lulling the public into the belief that heart disease is no longer a major public health problem. Moreover, when compounded by recently rising rates of diabetes, uncontrolled hypertension, obesity, and physical inactivity (e.g., Cooper, Cutler, Desvigne-Nickens et al. 2000), and by the widespread acknowledgment of the difficulties of behavior modification, these reports fuel public health anxieties that prevention and risk reduction messages are increasingly failing to resonate with the populace.

Women are often singled out as an especially misguided group, far more fearful of breast cancer than of cardiovascular disease, which statistically speaking is their "real" health threat. A new American Heart Association survey (Robertson 2001) repeated a poll, last conducted in 1997 (Mosca, Jones, King et al. 2000), on women's knowledge of CVD risk, the extent to which they worry about it, where and when and how they receive information, and the accuracy of their self-perceptions of risk. Results indicate that overall, only one-third of women correctly identify heart disease as the number one killer of women, and although a majority of older women tend to be more concerned about heart disease, nearly three-fourths of younger women are more worried about breast

cancer. My interviews with cardiovascular epidemiologists support this representation of women as particularly misinformed about their risk for cardiovascular disease. For example, Karen, a clinician and an epidemiologist, says, "clearly, [women] fear breast cancer so much more than heart disease. And yet, the numbers, if you line up the numbers of breast cancer to heart disease, there is a huge difference. And yet, women don't seem to know it."

To epidemiologists and health professionals, the sizeable public miscalculations of their relative risks for disease, their seeming lack of knowledge of risk factors, and their difficulty in making significant changes in behavioral risk management and prevention represent latent risks. They see populations of risky bodies who do not understand where their true vulnerabilities lie, with unrealistic expectations of the ability of epidemiologic and other health sciences to pinpoint with certainty where risks are to be found and how they can be managed. The implications that stem from these epidemiologists' constructions of the problem are that the messages of scientists and public health authorities have not been filtering through to the public, that it would be wrong to lower our level of vigilance against CVD and ill-advised to cut back on research and intervention, and that there is much work to be done to correct the misunderstandings of the public.

Surveys aimed at measuring public awareness of some set of scientific facts, are emblematic of a strand of research that tends to focus on the deficiencies of "lay" understanding compared against some authoritative body of knowledge whose objectivity and veracity are taken-for-granted. The need to ensure more "accurate" public understanding is justified as integral to fostering "better" personal decision-making on

health-related behaviors, such as diet and smoking. As Wynne (1995: 378) points out, assumptions of how people will use and apply scientific knowledge have implicit within them tacit models of social agency:

> Laypeople often have no social freedom or power to use available scientific knowledge in the way they are assumed to have by experts. In other cases they may deliberately eschew the freedom even if they have it, or they may be uncertain whether or not they have it and therefore be unwilling to risk the consequences of testing their power ... If available knowledge is useless, or even (socially) dangerous, there is no point in taking on the often considerable costs involved in assimilating it.

Irwin and Wynne (1996), among others, argue that a "public ignorance" framing of the "problem" impugns the general public rather than the institutions, practices, assumptions, organization, control, and conduct of science. Again by displacing concerns about the dynamics and distribution of power and resources to maintain health with an individualized emphasis on people having and understanding the "right" information, discourses surrounding the production, distribution, and application of epidemiologic knowledge sidestep the question of "who, under what circumstances and with what resources, are able to influence their own health and that of others?" (Radley et al. 1997: 12). Instead, the problem is constructed as one of the public "misunderstanding" and "misapplication" of epidemiologic science, and of the need for individuals to more fully accept their responsibility to acquire biomedical knowledge and use it to promote their own health. This is, we argue, a foundational move of biomedicalization (Clarke et al. 2002) that contributes to the promotion of a certain kind of informed, autonomous, responsible individual—that is, the production of a particular kind of identity and subjectivity, to which I turn next.

The Consequences of Biomedicalization for Identities and Subjectivities

A final element of biomedicalization highlighted in the production and contemporary uses of epidemiologic knowledge is its profound impacts on the ways in which people think of themselves, their behaviors, and their bodies, and engage in processes of identity formation (Clarke et al. 2002). One way that is particularly relevant here is the creation of health-related identities through technoscientific means such as risk assessment. After many of my interviewees were diagnosed with cardiovascular disease, they developed an acute sense of being "at risk," manifested in both their greater attention to and perceptions of their bodies, and simultaneously in their sense that they were unable to discern all that was going on inside them. Since being diagnosed, many participants had learned how to detect on their own and without medical equipment or monitoring when their conditions had worsened or improved, and had developed complex taxonomies of symptoms, triggers, and management techniques. For example, Geline explains that at the time that she was first diagnosed with hypertension, she "was still totally unaware" and thus surprised by the diagnosis. After that, however, her sense of risk was significantly heightened by her previous diagnosis and other risk factors that had since been identified:

> I was more conscious ... of being borderline hypertensive and also with family history, being quite predisposed on both paternal and maternal sides, so I tended to be more conscious of things ... it was really I think being set up like that, you know you're a candidate for that because of family history and because of beginning your own individual history with hypertension.

Yet despite this new consciousness, almost all of the participants acknowledge that they feel very much that their bodies harbored perils whose existence and progression are, for

the most part, invisible to them. Heightening their sense that unseen risks lie inside their bodies, some had been quite shocked to be diagnosed with CVD given their own assessments of their health and medical histories, and many had been told that cardiovascular disease is a "silent killer." A few of the participants express very significant anxiety about the possible catastrophic consequences of their cardiovascular risk that might befall them, ranging from heart attacks to shortness of breath, blindness, and loss of physical mobility.

A second aspect of biomedicalization's transformation of identities is through the imposition of new health mandates and behavioral imperatives that become incorporated into one's sense of self. In biomedicalization, increasingly what is being articulated is the individual moral responsibility to be and remain healthy (Clarke et al. 2002; see also Crawford 1985; 1994; 1999; Edgley & Brissett 1990; Williams 1998; 1999). The focus is no longer on illness, disability, and disease as matters of fate, but as matters of self-transformation. Epidemiology provides the knowledge claims and the scientific basis upon which expert authority can define how not only physical but also psychic, mental, and even moral self-transformations can be accomplished. This aspect of biomedicalization is evident in the experiences of those I interviewed. Many of the people of color with CVD speak at considerable length about how they had been told to monitor their blood pressure, fat and salt intake, and to exercise other methods of behavioral self-surveillance. For example, Carmen, a Latina with hypertension as well as severe arthritis that significantly circumscribes her ability to exercise, describes the pressures she experiences from her health care providers to lose weight:

Well, I've been getting [pressure] mostly from the doctors that I've spoken to ...

> all pretty much tell me the same thing—they tend to take your condition less seriously if you're overweight. And I have a feeling that they seem to think that your weight problem is something that you force upon yourself, you know. And so, that's almost like a recurring theme, that if you lose weight, your blood pressure will probably stabilize ... I don't know if that's necessarily true [laughs], but you know, it gets to be almost a mantra with them ... I'm still going to have the stresses in my life ... I mean those stresses from my job, from my personal life and everything else, those are still going to be there ... it bothers me that they emphasize the fact that losing weight is going to make you all better ... to me it's almost like a vicious circle ... I've gotten to the point where I just say, "Forget about it. I'll be the way I am," you know. And whatever is going to happen is going to happen.

Here Carmen alludes to the oppressive uniformity of the "message" she receives from her physicians and others involved in her health care. Even though she expresses skepticism in its validity, such experiences of judgment and unrelenting surveillance weigh heavily on her, impacting how she thinks about her body, her health, and her ability to maintain it.

Other participants with CVD, such as Lynn, wholeheartedly take up dominant health imperatives. Lynn is an African American woman who developed hypertension while relatively young, and she describes the constant vigilance and disciplining required not only to abide by the behavioral imperatives dictated by her physician but also to allay her own acute sense of being "at risk":

> when I'm eating the way I'm supposed to, drinking a lot of water, forcing my body to walk, I feel good ... It's just hard work. You have to do it ... Exercise is a little difficult, but I'm seeing walking does it ... but every now and then ... I have a taste for sugar [laughs]. And I eat a little piece of candy, and I say, "Aaah! There it goes back into your blood again!" ... I know with hypertension, it can lead to many things like blindness in the eye from the arteries exploding from too much pressure, heart attacks, stroke. There's just so many things, you know, and I know that to force myself to walk, drink a lot of water, eat right and take my medication will keep it down. It's like a thing that you have to keep doing, consistent—keep doing, keep doing. I have to remind myself, "Get up, you lazy! Do it because this is your life!" ... See, if you care about yourself, and if you're

> really in tune that you want to live, then you have to be determined, you know because—it's hard work. Initially it's hard work, but once you get into it, you can make that hard work turn fun ... the pressure on the heart and taking no medicine, eating whatever you want whenever you want—it'll kill you. It will kill you.

I also found that those with CVD often express guilt and frustration in themselves when recounting how they "slip," "indulge," or are otherwise undisciplined in maintaining behavioral changes that biomedical professionals recommended or that they themselves decided to take up. As Joe concedes, "My health is bad because I probably don't care as much. I could probably do better. I exercise. But it's not good. I could do better. My diet is not—my diet is not good because I eat what I want [laughs] ... I don't restrain—I don't punish or abuse myself ... [But] I know better, so my conscience bothers me about that."

Dominant health imperatives work in other ways to normalize the constant surveillance and disciplining of multiple aspects of ourselves. Not only do health promotion discourses encourage self-surveillance, but also the surveillance of others. Many of the participants describe at length the behavioral transgressions of family members, friends, and others, often in judgmental ways, imbued by the same ideologies of individualism that tend to underwrite many epidemiologists' conceptions of "difference." Finally, many of those participants who counter health promotion discourses, arguing that they cannot necessarily modify or reduce the sources of stress in their lives, at the same time believe that they could learn to better handle their stress. For example, Lee says, "stress I see is always in your life—it's how you cope with it. So learning better ways of coping [is necessary], which is probably my downfall." In comments such as this, lay experts indicate that although structural factors do take their

toll on their health, they still believe that transforming how they react to and manage such sources of stress is vital. As Diane summarizes,

> On a very basic level, I think that diet is the first place. And I've done it, you know, I've cut back on sodium almost altogether. Diet, exercise ... you know, rather than taking the elevator, take the stairs. Little changes in your life so that it becomes more of a way of living ... it becomes like it's a routine ... I walk whenever possible. And I try to take breaks every day and just give myself time just to not do anything, which is hard for me. But those are things that I think that you can start on some minimal level, that anyone, regardless of what your economic level, can do those kind of things ... But I think on a larger scale, I have to find a better way to deal with the stress factors that are, you know, that are external, that I really feel like I'm powerless to control in the big picture, but I have to be able to better control how I relate to those stress factors and not take them on so personally all the time.

In these ways, health becomes something to work *towards* (Conrad 1992; Edgley & Brissett 1990), an ongoing project composed of public and private performances (Williams 1998; 1999), and an accomplishment in and of itself (Crawford 1994; 1999). Rather than just a matter of maintaining control over one's bodies, desires, activities, and risks, biomedicalization discourses embedded within the generation and application of epidemiologic knowledge encourage the transformation of one's body and of one's awareness and attitudes towards one's self. It is in the enactment and achievement of such performances of health—the demonstration of one's cognizance, and the ability to transform oneself—that the impacts of epidemiologic knowledge work to shape identity and subjectivity.

I also find that the biomedicalization of identities is *stratified* in significant ways. Many of the people with CVD I interviewed are well aware that epidemiologic and biomedical research indicates the significant influence of sex and particularly race and SES on cardiovascular risk. As I discussed in Chapter 4, people of color conceptualize

multiple social processes structured upon such differences as sources of cardiovascular risk, but they also occasionally take up the representations of those differences as cultural, behavioral, and biological pathologies that tend to circulate among epidemiologists. For example, risky behaviors such as dietary tastes and practices, smoking, and physical inactivity become tied to and embedded within constructions of race, socioeconomic status, and sex, and perceived as the "natural" and expected attributes of some group, rather than shaped by socially-constructed power relations *between* groups. Such attributions then intensify the imperatives for individuals from groups perceived to be especially "risky" to comply with behavioral mandates and their surveillance by experts, others, as well as themselves. In this fashion, individualized constructions of "difference" facilitate stratified notions of risk and pathology, that contribute to the construction of some people, defined by their demographics and behaviors, as epidemiologically legitimate targets for risk assessment and intervention. Epidemiology, as "a 'normalizing' science" (Epstein 1996: 47), thus helps to underwrite processes of stratified biomedicalization (Clarke et al. 2002), where the processes through which risks, health, and illness are defined, classified, assessed, and treated are applied unequally to "different" groups and populations. These in turn exert profound consequences upon the subjectivities of those targeted and implicated by these discourses and practices, that is, upon the relations we have with ourselves (Foucault 1986).

In sum, processes of shaping identity and subjectivity and of shifting responsibilities for acquiring health-related knowledge to individuals, as well as the technoscientific transformation of biomedicine and new modes of risk and surveillance, all denote the ways in which cardiovascular epidemiology has promoted

biomedicalization. Such phenomena, by converting symptoms, characteristics, and experiences into individualized and biomedical terms, serve to further the biomedicalization of individuals' sense of themselves, their perceptions of risk, and their experiences of their bodies and conditions. The goals of risk assessment—the definition, identification, and classification of risks and risky bodies—in turn legitimate cardiovascular epidemiology's interest in and frameworks for studying socio-demographic differences, and biomedicine's concern for treating and managing their effects. In these ways, epidemiologic claims and the practices they support participate in the representation of racial, socioeconomic, and sex differences as biomedical risks, and how they are experienced as such for people of color with CVD. In so doing, cardiovascular epidemiology and risk assessment contribute to processes of racial, class, and gender formation.

Within this era of risk and surveillance, the choices that we make about our health-related behaviors—an ever-increasing domain of life—are "imbued with self-referential meaning ... an emblem of our identity, a mark of our individuality" (Rose 1990: 227). Epidemiologic expertise achieves biomedicalization "not through the threat of violence or constraint, but by way of the persuasion inherent within its truth, the anxieties stimulated by its norms, and the attraction exercised by the images of life and self it offers to us" (Rose 1990: 10). It identifies new behaviors and habits that comprise "techniques of the self," that is:

> the ways in which we are enabled, by means of the languages, criteria, and techniques offered to us, to act upon our bodies, souls, thoughts, and conduct in order to achieve happiness, wisdom, health, and fulfillment. Through self-inspection, self-problematization, self-monitoring, and confession, we evaluate ourselves according to the criteria provided for us by others. (Rose 1990: 10-11)

This biomedical governmentality to "know thyself" and "heal thyself" relies on neo-liberal and consumerist discourses to be "proactive" and "take charge" of one's health. However, some groups, defined by their "risky" demographics and behaviors, are seen as particularly lacking the requisite knowledge, skills, and resources to carry out such imperatives, at the same time that they are perceived to be in particular need of surveillance, education, and other disciplinary technologies of biomedicalization. In an effort to draw out the dynamics and distribution of power and resources to maintain health (see Irwin & Wynne 1996), I introduce the concept of *cultural health capital* below.

C. Introducing Cultural Health Capital: Mobilizing an Interactional Resource

Underwriting the ubiquitous imperatives of Western health discourses are expectations to take charge of and advocate for our own health and to modify lifestyles and change health behaviors in accordance with scientific knowledge about disease prevention. Embedded within and shaping such directives are cultural and social mandates to buy into biomedical systems of care, to possess and exercise the ability to navigate within them in appropriate and informed ways, to acquire health-related knowledge, and to adopt an instrumental and rational attitude toward one's own health. I argue that the unequal distribution of what I call cultural health capital stratifies our capacity to take up health behaviors and adopt risk reduction mandates, but that discourses of individualism and ideological dynamics associated with relations of power veil the role that this form of capital plays in producing inequalities in health. In this

section, I outline some of the distinctive aspects of cultural health capital, including how it is mobilized in health-related interactions and with what consequences, how it is accumulated and transmitted, and how individualized imperatives of health erase the structural dynamics of cultural health capital, furthering stratified biomedicalization.

The concept of cultural health capital emerged inductively from my analysis of interview and observational data on constructions of racial, class, and sex/gender "differences" in cardiovascular risk. While the general notion of capital has a long intellectual history, the concept of cultural health capital offered here extends more recent work on cultural capital (Bourdieu 1980/1990; 1983/1986). Bourdieu (1980/1990; 1983/1986) proposes the concept of cultural capital as a way to understand how hierarchical social systems endure and reproduce themselves over time, often without explicit resistance or recognition on the part of the individuals stratified by those systems. He argues that cultural practices and symbols of all kinds—ranging from styles of dress, eating habits, mannerisms, verbal skills, aesthetic tastes, educational credentials, and even science—serve as resources in the struggle for social privilege. Culture thus is a form of capital or resource that, when accrued and deployed, can be converted into other kinds of capital and used as a key asset in establishing, maintaining, and negotiating one's place within social relations of power. The concept of cultural capital serves to expose some mechanisms through which social hierarchies are sustained. Rather than accepting the meritocractic notion that those able to acquire characteristics like educational credentials, cultural refinement, an understanding of the scientific world are self-evidently entitled to their economic and social success, cultural capital theory underscores how access to such resources is differentially distributed, and how these

resources legitimate the existing social order and serve to reproduce stratification.

I offer a parallel concept of *cultural health capital* to contribute to an explanatory framework for understanding how power is exercised in health care institutions and interactions, particularly how contemporary mandates for cultural and scientific competencies contribute to the persistence of social inequalities in health.[5] Distinct aspects of cultural health capital include several characteristics. First, an ability to acquire and consume scientific and biomedical information is crucial to cultural health capital. This requires a basic level of literacy[6] on health issues that in turn is dependent upon a familiarity with scientific epistemology, a facility for understanding such scientific domains as human biology and physiology, as well as some amount of technological sophistication. Given the wide range of health conditions considered today to be curable, controllable, or otherwise subject to surveillance and management, the fund of knowledge that one must call upon in the pursuit of health constitutes a significant

[5] The concept of *social capital* is also tangentially related to cultural health capital. Bourdieu (1983/1986: 119) defines social capital as "the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition." Coleman (1990) and Putnam (1993) describe social capital slightly differently: as features of social structures and organizations that facilitate the actions of others (Coleman 1990), or facilitate coordinated actions as evidenced by indicators like levels of trust, perceived reciprocity, and density of membership in civic associations (Putnam 1993). Through these social ties, and the people and networks to whom one is connected, individuals can access economic resources, cultivate knowledge and cultural refinement, and otherwise benefit from them in ways that directly and indirectly enhance their social standing and power. A growing body of research has begun to explore the role of social capital in the distribution of health (e.g., Kawachi, Kennedy & Glass 1999; Kawachi, Kennedy, Lochner et al. 1997; Lomas 1998; Veenstra 2000; see also Kawachi & Berkman 2000). This body of work is important in that it takes seriously the notion that *social relations* between and among individuals and groups are consequential for health. However, with some notable exceptions (e.g., Kawachi & Berkman 2000), much of this field does not explicitly address the potential for power to systematically structure the degree to which individuals, groups, and communities are able to accrue social capital. It is in this respect that I extend these theories with the concept of cultural health capital.

[6] There is increased interest in health literacy and growing research into its elaboration, definition, and consequences (see e.g., Ad Hoc Committee on Health Literacy 1999; Gazmararian, Baker, Williams et al. 1999; Williams, Baker, Parker et al. 1998; Williams, Parker, Baker et al. 1995). Functional health literacy is defined as a constellation of skills that enable patients "to perform basic reading tasks required to function in the health care environment, such as reading labels on prescription bottles, understanding information on appointment slips, completing health insurance forms, and following instructions pertaining to diagnostic tests" (Williams et al. 1995: 1677).

body of information. Second, cultural health capital is marked by a proactive stance toward acquiring this self-knowledge. It encompasses a self-initiating attitude toward translating and applying accumulated information to our own bodies, lifestyles, and circumstances, an attitude that itself requires a sense of control and mastery over one's own life. In these ways, cultural health capital comprises the ability to take an instrumental approach toward the evaluation, management, and reduction of our health risks, and the ability to exercise a scientific rationality in decision-making about our "lifestyle choices" and health-related practices. Third, this set of aptitudes and capabilities acts as a form of capital that can be mobilized in multiple interactions and contexts in which health-related commodities, services, and symbols are exchanged, and used in the accumulation and exercise of power in health-related arenas. All of these capacities can be parlayed as resources in the maintenance of health.

As alluded to above, one of the significant ways in which cultural health capital functions as a valuable asset in accessing various kinds of health-related resources is by providing individuals with the ability to strategically navigate biomedical systems of understanding as well as institutions of care, and to acquire information and knowledge about their risks and conditions. Through its deployment in health care interactions, it facilitates the successful uptake of health promotion mandates and the performance of a well-informed, sophisticated, and self-motivated health care consumer. The cognitive, behavioral, and attitudinal expectations personified by an idealized image of the health care consumer emerge throughout interviews with both epidemiologists and people living with CVD. For example, one epidemiologist, Karen, describes how she believes individuals should manage the sometimes overwhelming amounts of medical information

available in print, television, online, and other media:

> I think when you go to the authentic sources—meaning organizations that have scientific reviews before they place them, so they are scientific statements—that's what I would guide patients to look for ... Just the information alone I think is always a good thing, but I like to encourage patients to assimilate it with their overall health care ... I think it's a very exciting time, because I think the health care profession has been very, very guilty in maintaining a level of mysticism that doesn't help the public take care of their health in the best way. It develops this sort of dependency—"Would you fix me; would you give me a pill?"—rather than, "Your health is your business, and we are consultants to you, for your health."

In Karen's articulation, individuals are expected and encouraged to seek out knowledge on their own, to be able to properly assess its scientific value and legitimacy, and to assimilate it within their self-care regimens. However, Karen cautions that the health care provider is still the appropriate final arbiter of what information is relevant to the individual and what is not. Thus the highly desired consumer is proactive and informed, yet still ultimately deferential to the expertise of the medical professional.

Additionally, cultural health capital includes behavioral, psychological, and cognitive patterns, as well as individualized demographic characteristics and other cues of social and economic status. Verbal skills, educational attainment, and other elements of social status contribute to the facility with which individuals can interact with biomedical "experts." The possession of cultural health capital affects such interactions both directly—by equipping the individual with the kinds of vocabulary, demeanor, and social skills that are often demanded in such interactions—and indirectly—by enhancing the perceptions that health providers have of the individual.[7] Moreover, demonstration of

[7] The relevance of a sense of competence is also noted by Kotarba and Bentley (1988) who observed that individuals, before deciding to act upon concerns of various health risks by joining workplace wellness programs, must feel confident in their ability to fit in interactionally.

self-knowledge in the form of being cognizant of our health-related conditions and measurements (such as blood pressure, cholesterol, and weight) and whether they fall within accepted norms are also consequential for our interactions with biomedical institutions and agents. Individuals with access to cultural health capital are able to use such knowledge to avoid stereotyping and attributions of blame, immorality, noncompliance, and other kinds of representations that could make clinical encounters demeaning, contentious, and problematic. Cultural health capital provides the tools necessary to act in what is considered to be a "rational" manner, and as importantly, to *appear* to do so to gain access to multiple types of health resources.[8] These skills facilitate more approving, selective, and cooperative attention from medical professionals, and can therefore be translated not only into increased biomedical attention, but also more collaborative decisionmaking, more equal power in biomedical encounters, and therefore more control over whether, how, and how much we are biomedicalized. That is, cultural health capital can be used to draw and retain the clinical gaze when we desire it, and to divert it when we do not.

One example of this potential for cultural health capital to serve as a means of exchange is the experience that Joe, an African American with hypertension and coronary heart disease, had following his heart attack. Joe relates how the particular skills that he and his wife had and the ways in which they behaved enhanced the attention and care they received:

> [My wife] worked just brilliantly at that—setting it up, meeting doctors and going

[8] For example, one study (van Ryn & Burke 2000) found that physicians' perceptions that African Americans and Hispanics were more likely to lack social support (even when controlling for self-reported level of social support), to fail to comply with medical rehabilitation, and to abuse drugs and alcohol were predictive of their recommendations for revascularization.

> there and everything ... In spite of her being a layman about a lot of stuff, she has a natural ability to become very smart and know how to talk with doctors and get the best out of people. I got the best treatment I could have got. I probably couldn't have gotten any better. Had I been with anyone else, it might not have come off so good ... We probed [the doctors]. We nailed them down. We got in the room one on one, especially my wife. She didn't make them feel uncomfortable. She went beyond probably what they were probably used to ... She's also a very successful real estate broker who is self-taught and in business, so she was very easy with them—they got to like her, they got to like me, and they probably did some things that went beyond, that took more time and referred better. Thought about the best doctor, and got personal with us. I do think that they did things that they may not have normally did, and I felt that constantly.

Joe's narrative indicates that he and his wife are able to mobilize considerable "charisma," as he called it, motivation, and savvy, and parlay them to receive special attention and commitment from his medical providers. Thus, one way in which cultural health capital serves as an asset is by being mobilized within health-related interactions to claim, preserve, and negotiate one's status and power. Those with sufficient cultural health capital benefit in part because they are able to conform to an image of an ideal consumer of health care, knowledge, and practices.

Conceptualizing health-related cultural, social, and scientific skills, competencies, and knowledges as a form of capital clearly gestures to the nature of cultural health capital as a resource, and to its holder as an actor with some measure of agency and a means of exchange. It can then be exchanged for services, commodities, and other more intangible resources that affect our health, such as time and favor from clinical providers, consideration of individuals' own perspectives and circumstances, as well as attention from insurers and other institutions and agents inevitably involved in the process of obtaining care. Currently cultural health capital can be held in the capacity to relate to one's own body, to engage with health care providers and institutions, and to take care of

their health in particular ways that are rooted in Western scientific rationality and individualism. Specifically, they legitimate biomedically-based and individualistic ideas, values, and perspectives on health, while simultaneously de-legitimating alternative customs and philosophies. As such, cultural health capital is embodied within resources and cultural symbols that can be mobilized and exchanged within a system and in ways that often function to reproduce inequality. In the next section, I discuss how stratified access to cultural health capital functions to reproduce hierarchies in health-related knowledges and practices, and to promote processes of stratified biomedicalization.

The Accumulation and Transmission of Cultural Health Capital

I find that the acquisition of cultural health capital is cultivated in and through the enactment of particular health practices, such as consuming biomedical knowledge claims, exercising approaches to decisionmaking marked by scientific rationality, and engaging in risk assessment and reduction practices. Bourdieu (1983/1986) asserts that cultural capital is developed only in and through enacting cultural practices—that is, by appropriating or consuming cultural goods, including scientific theories and knowledge, and more familiar cultural products like music, art, and fine dining. This process of what he terms embodiment or incorporation, "insofar as it implies a labor of inculcation and assimilation, costs time, time which must be invested personally by the investor ... The work of acquisition is work on oneself" (Bourdieu 1983/1986: 244). In a similar fashion, cultural health capital is acquired through the continual "performance" of health (Williams 1998) via dietary practices, exercise and physical activities, expressions and desires of self-control and self-improvement, and in other ways discussed earlier in this

chapter. Through such embodiment, cultural health capital cultivates not only the aptitude for self-knowledge but also the potential for self-transformation.

However, what is central is that cultural health capital is not a property inherent to individuals, but rather a social system of symbolic and cultural resources that functions as a means of exchange and whose distribution serves to reproduce health-related inequalities. Acquiring and possessing cultural health capital require time, energy, money, and access to a wide range of other resources whose distribution is itself stratified. Specifically, those who are already economically, educationally, socially, and politically advantaged are much more likely to possess cultural health capital and the skills to strategically mobilize and deploy it. As access to cultural health capital leads to added opportunities to enact and thereby acquire it, it can be seen as an interactional subjectivity that is continually reproduced and regenerated each time it is mobilized and deployed. Like other forms of power, then, the possession of cultural health capital promotes its own accumulation.

Given the stratified dynamics of its accumulation, then, cultural health capital contributes to the stratification of health across populations, as well as reflects and sustains extant social hierarchies in other domains of life. Cultural health capital thus plays a powerful role in maintaining privilege along race, class, gender, and other dimensions of social inequality. Many of the participants in the study, both epidemiologists and people of color with CVD, implicitly and explicitly articulate this argument. For example, one epidemiologist, Lena, maintains that:

> people of different social classes have access to different resources. You know, income and wealth. It's different educational levels, social capital. It's different occupations. And all of these things are going to allow you to either purchase or

> know about or sort of be able to access the things that you need to be able to live well, whether it's knowledge or a safe house, or living in a safe neighborhood or having the appropriate connections, having the wealth that when something bad happens, you're all right ... So I think it's just all about sort of just having more resources to take advantage of what is out there to just live healthy.

Here, Lena contends that privilege and advantage come not only with the economic means to maintain health, but also access to non-monetary resources as well.

The stratified access to and accumulation of cultural health capital is also critically tied to its modes of transmission. Bourdieu (1977) argues that the ability to efficiently accumulate cultural capital are differentially distributed: the process of appropriating material and symbolic cultural goods and the time requisite for this process depend mainly upon the cultural capital embodied within the family. That is, the most available and convenient means of accumulating cultural capital is through the continuous and often unconscious inculcation within one's family and immediate social networks. This mode of transmission provides a critical mechanism through which the stratification of cultural capital and prevailing distributions of social status and life chances are reproduced generation after generation. Similarly, cultural health capital is transmitted from generation to generation through role models provided by parents and community, and lifelong fostering and encouragement of what are defined as healthy behaviors. Both cardiovascular epidemiologists and people of color living with CVD frequently cite factors such as "role modeling within the family" and emphasize how health-related behaviors and habits, particularly diet, are shaped by one's upbringing. In addition, cultural health capital lays the foundation for its own reproduction: those who enjoy better access to such resources are better and more efficiently able to acquire additional capital.

Furthermore, in the contemporary era, cultural health capital is inculcated not only within the family and intimate social networks, but also through mass media, broader networks of acquaintances and even unfamiliar persons, interactions with health providers, encounters with health promotion discourses, and engagements with medical technologies and their marketing campaigns. Interviews with people of color reveal that mandates for CVD prevention and lifestyle modification are embedded in numerous sources and come in countless forms: public service announcements about cardiovascular risk factors, direct-to-consumer advertisements for cardiac medications, health education posters in drugstores and other public venues, conversations with health care providers, friends, children and other family, and very significantly, from within themselves. Moreover, the participants also report passing along these prescriptions for healthy living onto their family, friends, and even strangers they have just met. Their narratives of these encounters indicate that they prompt participants to continually consider and negotiate whether and how to assimilate health promotion messages into their own lives. The transmission of such aspects of cultural health capital is thus pervasive and lateral as well as inter-generational.

The ways in which cultural health capital is accumulated and transmitted reflect the intertwining of systems of cultural health capital with processes of biomedicalization (Clarke et al. 2000; Clarke et al. 2002; see also Greco 1993; Lupton 1993; 1995; Nettleton 1997; Petersen 1991; Radley et al. 1997). In the era of biomedicalization, the distribution of cultural health capital has become increasingly consequential to the health of individuals, as modes of risk and surveillance, new technoscientific biomedical practices, the imperative to acquire knowledge, and the impacts of biomedicalization on

identity all accord differential benefits to those with access to the skills and competencies described above. The transformations that we argue are constitutive of biomedicalization promote a "market" in which cultural health capital is a valued resource. For example, as entry into clinical care is now often strictly regulated and increasingly stratified, risk identification and management based on biomedical knowledge have emerged as technologies that we first must apply to ourselves: self-surveillance, self-evaluation, and self-intervention represent the initial and primary lines of defense required in the (new) public health and contemporary biomedicine. As described in this chapter, participants with CVD relate how their sense of being "at risk" places profound significance on taking responsibility for their own health. They discuss at length their efforts to educate themselves about their conditions, and to exercise behavioral habits and abide by risk reduction mandates, including numerous dietary changes, regular exercise, weight loss, and stress management, that require constant cognizance, vigilance, and discipline. Every individual is thus presumed to have acquired "a preventive capacity structured around the possibility of self-transformation and, before that, of self knowledge" (Greco 1993: 361).

These kinds of skills and capacities constitutive of cultural health capital are therefore underwritten by the expectation that knowledge leads to action, and then to health, in a linear and relatively simplistic fashion. This view is expressed by those epidemiologists such as Lance and Karen who wonder why behavioral change campaigns prove so unsuccessful; Karen, for example, discusses the limited impact that community cardiovascular risk reduction campaigns have had:

what I think is happening is even when you do a community study, you have to

> intervene on each patient in the community. You can't assume by just doing media stuff and so on. In other words, education alone does not result in behavior change. You need to have the education, the counseling and the skill building for the behavior change. So all of the major cardiovascular community trials, the results are zilch! ... That's really very worrisome.

Karen dismisses the efficacy of these community public awareness campaigns, and argues instead that intervention must be focused on the individual. Such a perspective is also echoed by people of color themselves. For example, David, an African American with hypertension and congestive heart failure, says: "I believe people must manage themselves. The health care system can only offer treatment, and they can offer educational factors, but in the end it's the person who must manage themselves and be prudent as far as smoking, excessive drinking, and excessive ingestion of fatty foods." Sharon, a Latina with hypertension, concurs, saying that people would make better dietary choices and thus live longer and healthier lives if only they knew better. Even though Sharon lays blame on social institutions, like the educational system for its failure to teach self-health, and on larger social conditions like poverty, for her the dominant conceptualization of health is as the outcome of individual qualities that people possess—including the ability to know something and act upon that knowledge in a rational, appropriate way. Just as Sharon herself is well aware of the importance of diet and therefore maintains a healthy one, those who indulge in junk and fast food would do otherwise, she suggests, if they only knew better. Such beliefs and discourses of the individual, rational actor thus sustain the dominant epidemiologic perspective that neglects the role of the structural distribution of cultural health capital in the performance and achievement of health. Like cultural capital, the structural and stratified nature of cultural health capital is largely made invisible, and instead, health behaviors, knowledge,

and status are perceived to be the outcome of individual aptitudes, motivation, and intelligence.

On the other hand, others do acknowledge the more ecological factors that shape cardiovascular risk behaviors. Mia, for example, like Karen, is an epidemiologist troubled by the inability of many public health campaigns to effect behavioral change. But in contrast to Karen, Mia locates the issue at more "macro-contextual" levels:

> a lot of these more individually-based approaches of saying, "Okay, you need to quit smoking now," don't really work. People ... don't change their behavior, and you wonder, well, why don't they change their behavior? And it's because there's a much larger issue going on. Everything around them is encouraging them ... to sustain whatever their ... health-compromising behaviors were.

Thus Mia criticizes conventional approaches in epidemiology that disregard the role of community- and structural-level dynamics that compel and constrain choices that appear on their surface to be individual ones. Another participant, Webb, an African American who has severe hypertension, points to how encounters with medical personnel and institutional cultures can have the effect of imparting either a sense of control—crucial to the cultivation of cultural health capital—or a feeling of helplessness. He describes contrasting experiences at two medical institutions, Bay County Hospital and Valley General Hospital, to illustrate his point:

> you get the feeling that when it comes to chronic conditions that they [at Bay County Hospital] give you inadequate treatment and they say, "Well, of course he died. He was sick." ... There's not encouragement to save your life. You know, it's like, "Here are the pills. This is the best we can do." ... At Valley General Hospital, oh yeah, they gave me steady prescriptions, but they look for related conditions ... They scheduled me to see doctors specializing in those conditions, and they listen to me about what was going on with my treatment, with the medicine. They solicited feedback. It was a situation where you always felt that something could be done, that there were options. And when you're dealing with

> something like this, it's good to have options. You may not follow them, you may not exploit them. But that puts the responsibility back on you ... And if we don't follow through, then *we* don't follow through, you know. And it's better that way. But when you're given a situation: "That's the best there is. This is as good as it gets ... and if you can't handle it, forget it. You're through." Well, you can't help but be resentful. You know, in most things, in dealing with most problems, you gotta have a notion of empowerment ... unless you feel empowered, and unless there's a feeling of enthusiasm for you being empowered: "We're going to give you these tools, and they're really cool tools, to make a difference in your life," that's cool! I mean that works ... That's got a lot more than, "Look, we've done the best we can. The rest is up to you." Well, what is the rest?

As Webb summarizes, to manage a health condition like severe hypertension, "You need a lot of tools. You need a lot of confidence. You need a lot of knowledge, and you need a lot of support ... although education is a powerful tool, it's no guarantee ... In a lot of ways with health care, you've got to feel confident. You've got to feel that knowledge is an asset." Such resources, skills, and perspectives derive from cultural health capital.

Thus cultural health capital both constitutes and helps to maintain complex webs of power and inequalities by race, class, gender, and other dimensions of social hierarchy. Inequalities in access to cultural health capital differentially enable individuals and groups to understand, incorporate, and implement the messages of preventive care and public health regarding risk reduction and other health-related practices. Although the shift to biomedicalization is accompanied by a profusion of tools, knowledges, and cultural imperatives, it is sustained by an ideological infrastructure that asserts that incorporating such skills, knowledge, and mandates into our everyday lives is a matter of individual will rather than the structural distribution of cultural health capital. Thus, through the promotion of scientific rationality and the ideology of individualism, the role of cultural health capital in stratifying access to health knowledges, resources, and

practices is veiled. Widespread expectations to comply with health mandates ignore that the ability to do so is shaped by a set of both material and non-material resources whose distribution is highly stratified. The invisibility of these dynamics therefore sustains the notion that being a proactive, sophisticated, and ideal consumer of health is more a matter of individual will than structural conditions. The distribution of, and access to, cultural health capital has become a decisive structural determinant of the distribution of health itself. At the same time, however the operation and structural distribution of cultural health capital has been made invisible by discourses on health and risk as individually determined. The reproduction and regeneration of health inequalities thus depends upon an ideological infrastructure based on individualism, which I analyze below.

The Ideology of Individualism: Success Stories and Pathologizing/Romanticizing "Ethnic" Behaviors

Contemporary health-related mandates reflect individualistic cultural norms of rationality and enterprise, and are historically continuous with past and present public health discourses that were often animated by distinctions of race, class, and gender (e.g., Shah 2001). Health promotion rhetorics are ubiquitous in the lives and experiences of the study participants, and within them, I find that issues such as hygiene, fitness, and other health practices and behaviors have been remediated into middle- and upper-class norms of behavior, and notions of civic and moral responsibility for health achievement and maintenance (see also Greco 1993; Lupton 1993; 1995; Nettleton 1997; Petersen 1991; Radley et al. 1997). I analyze the growing significance of such discourses in everyday life as an ideological infrastructure and a strategy of power that seeks to erase the

structural and differential distribution of cultural health capital. Instead it promotes the notion that cultural health capital is readily accessible to everyone, and that opportunities to acquire it are widely available. Here I discuss two closely related mechanisms that veil the stratification of cultural health capital and reinforce the ideology of individualism. The first strategy involves highlighting what I call "success stories," and the second entails mostly pathologizing but occasionally romanticizing supposedly "ethnic" characteristics.

First, many epidemiologists' narratives are sprinkled with examples of individuals who were able to overcome numerous barriers to acquire biomedical knowledge and incorporate valorized health practices into their everyday lives. In these success stories, accessing information about CVD risks and applying it to one's own life are widely represented as learned skills and behaviors. In this way, they are seen as universally accessible to all individuals, and subsequently, cultural health capital is constructed as something that can be readily acquired regardless of or despite one's social position.

One example of a success story was told during the oral presentation of clinical trial results from an exercise intervention designed to reduce CVD risk among a working class community of Latinas, whose knowledge of the health benefits of exercise and mental "readiness for exercise" at the outset of the study were deemed to be extremely low. Indeed, the success story motif structured the overall organization and underlying moral of the presentation. The researcher who presented the trial's findings concluded that the group undergoing the experimental exercise intervention "dramatically increased their self-efficacy score" for exercise. She continues,

I think that was a function of our whole philosophy ... which was to really try to

> empower them, to gain the confidence to learn some new skills, and to do so in a context of the very overwhelming life barriers that they had ... low-income Latina women, even with these very extreme life circumstances, can definitely increase their exercise and fitness. Once they're informed about the importance, they're very interested ... So, what we do need to do is to provide programs that really help them with the barriers ... And the level of education and information we're starting at ... really is shockingly low. And if you think about, the Spanish language media doesn't really emphasize health information in the same way that we do, and if you've not sat through all those years of elementary science education, you're really starting from a very low point. It's really difficult to explain to somebody why it's important to lower your cholesterol when they don't understand what blood level is and what it does. So you really have to go back to the anatomy and physiology, and start from there.

In this presentation, the researcher does acknowledge the many barriers that the participants had to overcome to engage in regular exercise and to acquire the information deemed necessary to understand the relevance of exercise for their health. However, she chooses instead to highlight that such barriers *can* be overcome and that behavioral modifications *can* be effected. As importantly, she argues that attitudinal changes—the more intangible aspects of disposition, confidence, and self-control that I underline are consequential components of cultural health capital—can also be produced. As such, like the low-income Latina participants whose behavioral and attitudinal shifts made the clinical trial intervention "effective," success stories serve to emphasize the possibility of individual transformation and triumph over structural obstacles. Additionally they underwrite the notion that others' "failures" are therefore inexplicable, and the outcomes of biomedical and behavioral irrationality.

A second strategy whereby the ideology of individualism is enforced while camouflaging the stratification of cultural health capital, is the frequent pathologizing, yet occasional romanticizing, of behaviors perceived to be "ethnic" in origin. One example of the pathologizing practice can be seen in my discussion with a researcher at a poster

presentation of her research on the disparities in CVD risk factors between Black and White women. My field notes describe our interaction:

> One of the findings of her study is that Black women have more traditional CVD risk factors. When I ask her why she thought this was, she responds that socioeconomic status, including occupational category, combined family income, educational level, and insurance status "might have a lot to do with it." She also hypothesizes that diet, sedentary lifestyle, culture, education, and perhaps access to health care may play a role. The researcher then adds that she was involved in another study in which investigators were exploring what prompts people experiencing cardiovascular symptoms to see a medical provider for evaluation. She notes this to me, she said, because Black women have been shown to have high rates of delaying care and of symptom recognition, which to her sounded a bit like "blaming the victim," a characterization that she apparently had shared with the rest of the research team in a meeting. Her thinking then was that delaying care had more to do with lack of time, child care, transportation, access to care, and so on. She then relates that two nursing coordinators at the center who were Black had told her that that was not it, that "Black women could come in but don't." They argued that there were also poor White women who had as many barriers yet still sought treatment for symptoms. The principal investigator subsequently speculates to me that maybe "there is a Black culture, welfare moms, or whatever, with low education who maybe missed out on the public health messages of the past ten years."

Here, the researcher advances a version of what Omi and Winant (1994) critique as the "bootstraps model" in ethnicity theory, first given comprehensive expression by Glazer and Moynihan (1975). The "bootstraps model" explains group differences in status in terms of group norms: the relative ability for "other" groups to conform to behavioral and cultural norms mandated by the white majority is seen as dependent solely upon the groups' values and completely unaffected by larger social, political, and economic dynamics. In my encounter with the epidemiologist, she attributes the propensity of Black women to delay care and their lack of skill in symptom recognition to pathological norms and a culture internal to the group. These unenlightened cultural values, she speculates, account for why public heath messages regarding lifestyle modification and

appropriate care-seeking had bypassed a generation of Black women.

This epidemiologist does acknowledge the role of the cultural milieu in shaping the health behaviors and knowledge of low-income Black women—suggestive of the function of the cultural environment in the intra- and inter-generational transmission of cultural health capital. However, in doing so, she invokes clearly racialized, classed, and gendered constructions of this setting. These constructions advance racist, classist, and gendered arguments by reducing the issue of risk factor prevalence and delayed care-seeking to one of a pathological culture combined with insufficient education, neglecting the powerful influence of stratified educational and economic opportunities and material conditions on the capacity to acquire and act upon health-related knowledge. And by asserting that the Black women in that study—like the White women participants—could be educated to conform to the ideal-type health care consumer, the principal investigator sustains the more individualistic belief that the ability to benefit from health promotion and education is open to anyone who desires knowledge and possesses sufficient motivation to seek it for themselves, regardless of social status or material circumstance. Such claims effect and valorize a kind of race- and class-blindness with regard to health-related self-knowledge, self-efficacy, and self-transformation.

A final example of the pathologizing tendency is another excerpt from the oral presentation describing the exercise intervention for working class Latinas. The presenter recounts:

> "We developed very simple, very colorful educational materials; we used a lot of the American Heart Association children's—both kindergarten and elementary school—materials. We had to have a lot of hands-on learning." ... She then shows a picture from one of the educational materials that depicts a fictional character named Maria ... educational messages about the cardiovascular and other health

> effects of exercise are transmitted through stories of who she is, where she lives, why she would want to exercise ... The women were also "very interested" in telenovelas, Spanish-language soap operas from Mexico, and the PI says that if we are interested in them we should tune into Channel 19 on our hotel televisions, and "you don't have to speak Spanish to know what's going on." The audience laughs at length. She continues, "So one thing that they really enjoyed doing was doing skits, where they would pretend to be Maria and we would have a role-play of how to convince their husbands that they really needed to exercise and not cook them dinner instead." The audience laughs again.

Embedded within this description of the exercise program are multiple racialized, classed, and gendered representations of Latinas as infantile, uneducated, emotional, irrational, and powerless to resist traditional gender roles perceived to be inherent to their ethnic culture. These remarks also underline how cultural health capital requires skills and competencies that go beyond the capacity to simply comprehend biomedical knowledge. The lack of cultural health capital among the Latinas operates as a racialized, classed, and patriarchal mode of domination that reproduces in the medical gaze their deviance from the idealized, informed, and empowered consumer of medical expertise, health care resources, and health-related projects.

At the same time, I found that health researchers occasionally extol the virtues of other "traditional," "ethnic" practices; such customs defined as "natural" and culturally intrinsic are considered to be quite compatible with health promotion messages and therefore to exemplify those behaviors that should be encouraged and retained.[9] During interviews and ethnographic observation, a common topic in which this issue arises is the association of increased incidence of CVD to length of residence in the U.S. among Latina/o and Asian Pacific immigrants and their children. An extremely common and

[9] For an analysis of acculturation models used in health behavioral research on Mexicana/Chicana (Mexican-origin) women, see Segura and de la Torre (1999).

indeed often the only explanation offered for this phenomenon is that acculturation is accompanied by the adoption of less healthy diets, more sedentary lifestyles, and other cardiovascular risk behaviors. For example, Karen observes that "among Mexican-American women in this country ... it's usually not culturally acceptable for women ... to be smoking. So [women smokers] are very few in numbers ... [however] in a younger population that is more acculturated [they may] have picked up our nasty habits." Thus with regard to smoking, Karen is quite approving of the cultural norms that Mexican immigrant women supposedly bring with them to the U.S. Mia also notes that epidemiologists often assume that Latino immigrants retain their traditional plant-based diet, a cultural behavior that works to their cardiovascular benefit.

By valorizing select "ethnic" and cultural practices, these examples work to deflect characterizations of the narrators and the health promotion strategies themselves as being overtly oppressive with regard to race, class, or gender. Contemporary health discourses seem to disapprove of most "ethnic" practices but endorse and even romanticize others. They thus simultaneously encourage cultural "outsiders" to discard old habits, adopt risk-reducing lifestyles and a rational and enterprising worldview, and conform to behavioral and cultural norms of the white majority, while retaining select aspects of their "traditional" culture deemed to be of worth. These discourses thus deploy contradictory rhetorics of both assimilation and cultural pluralism.[10]

Additionally, much of the discourse surrounding racial and class inequalities in cardiovascular health implicates differences in the patterns and prevalence of risk factors

[10] These two discourses—assimilationism and cultural pluralism—not coincidentally, are the two dominant currents of thinking about race and ethnicity during the period of the 1930s through 1960s (Omi & Winant 1994).

and behaviors between racial and socioeconomic groups. For example, my data indicate that "modifiable risk factors" such as smoking, obesity (and related measures such as body-mass index), physical activity, and diet are often used to "explain" some percentage of the "excess risk" of groups of color and lower socioeconomic status. Epidemiologists continually note that such groups have higher rates of high-fat, high-sodium diets, obesity, sedentary lifestyles, and smoking, lower levels of health knowledge and literacy, lower compliance with medical regimens, inappropriate care-seeking, and lower use of hormone replacement therapy for postmenopausal women. The net effect of this practice is to discursively represent those risk factors as the products of *individualized* lack of knowledge, lifestyle choices, and the inappropriate use of health care. These kinds of effects then reinforce and sustain the notion that health status and care are largely the result of individual effort rather than the systematic consequence of distributions of material, social, and cultural health capital.

Veiling the role of cultural health capital in the stratification of access to health information, the ability to comprehend its implications for health-related behaviors, and the capacity to adopt public health messages into everyday life becomes an ideological tool justifying individualism and personal responsibility for one's health. Although individual learning, self-education, and self-transformation are certainly possible and indeed often desirable, there are multiple structural barriers to absorbing health knowledge and realizing its benefits through self-surveillance, lifestyle modification, and the appropriate use of health professionals. The layers of health inequality are deep and complicated, and without equal access to cultural health capital, individuals, groups, and communities have strikingly differential capacities to take advantage of the health-related

knowledges that proliferate or the potential gains to health status that they offer.

Furthermore, much like the promotion of a so-called "race-blind" policy and the "bootstraps model," accentuating the opportunities for cultivating cultural health capital, despite individual circumstances and adversities, helps to sustain individualistic ideologies about race, class, and gender, and dismisses more relational and structural understandings of their causal roles in the social production of health. As Bourdieu argues with respect to cultural capital, symbolic systems like culture encourage the dominated to accept such symbols and criteria as self-evident and taken-for-granted aspects of everyday life and therefore act as instruments of domination, knitting together dominant classes and groups. In so doing, cultural systems serve to legitimate social hierarchies (Bourdieu 1977; see also Swartz 1997). Similarly, the ideology of individualism and the system of cultural health capital it undergirds facilitate the consolidation of hegemony (Gramsci 1971): they comprise part of the "common sense" and the taken-for-granted ideas and practices through which society gives consent to the ways in which it is ruled.

D. Conclusions

In this chapter, I argued that the constructions of race, social class, and sex/gender that are prevalent in cardiovascular epidemiology are examples of stratified biomedicalization, where technoscientific definitions of risk and pathology have subjected particular kinds of differences and particular individuals and groups to the surveillance and intervention of biomedicine. As such, I posited that epidemiology is a form of Foucauldian power-knowledge, a domain of knowledge production mobilized to

exercise control over individual bodies. By understanding and studying humans as atomistic and individualized bodies, cardiovascular epidemiology attributes inequalities in cardiovascular risk to biological, cultural, and socioeconomic differences of individuals, rather than the product of socially-constructed power relations between groups. Epidemiology as a regime of power-knowledge at the same time acts to invest power not so much in individuals but in the much more diffuse and pervasive acts of knowledge construction, surveillance, and regulation via behavioral norms and processes of self-governance.

I also contended that cardiovascular epidemiology contributes to the formation of biomedicalized identities and subjectivities in particularly stratified ways. The mobilization of race, socioeconomic status, and sex as markers of cardiovascular risk serve to inscribe individuals' perceptions of themselves as "at risk" in racialized, classed, and gendered ways. In addition, this heightens people's sense that, as racially, socioeconomically, and gender-implicated individuals, they must maintain particular vigilance regarding their individual responsibilities to monitor, maintain, and intervene in one's own health in accordance with contemporary imperatives of behavioral modification, risk reduction, and other performances of health. In biomedicalization, such individualized responsibilities extend to the accumulation and appropriate deployment of biomedical information and the assumption of proactive and neo-rational subjectivities in the pursuit of health. These mandates are viewed as especially necessary for precisely those "risky" individuals and groups who disproportionately lack the skills and competencies to comply with them. In these ways, I argue that cardiovascular epidemiology and the health imperatives based on its claims, rather than working to

dominate citizen subjects, instead act to educate and solicit them "into a kind of alliance between personal objectives and ambitions [regarding health, body, and behavior] and institutionally or socially prized goals or activities" (Rose 1990: 10). That is, "individuals are to become, as it were, entrepreneurs of themselves, shaping their own lives through the choices they make among the forms of life available to them" (Rose 1990: 226). As a regime of power-knowledge and as a form of governmentality, epidemiologic claims about "difference" mediates and shapes relations between self and self, between self and others, within institutions and communities, and between self and state. In so doing, cardiovascular epidemiology often furthers processes of stratified biomedicalization and operates to reproduce inequalities in cardiovascular health.

Finally, I offered the concept of cultural health capital, and argued that its distribution and the obfuscation of its dynamics likewise work to sustain the social stratification of health. Cultural health capital includes the understanding of scientific rationality and epistemology, a general level of literacy on health, and the facility to consume health and medical information and adapt it into one's own life. It also encompasses verbal and social skills, educational credentials, demeanor and behaviors, and other cues of social and economic status that can serve as resources in health-related interactions. Cultural health capital enables the adoption of a proactive stance towards the accumulation and application of knowledge with the objective of self-transformation; these twin elements of self-knowledge and transformation resonate with major currents of biomedicalization (Clarke et al. 2002). Taken together, this complex of attitudinal, behavioral, and educational attributes serves as a resource for individuals that they can mobilize and use to garner health-related goods and services.

Cultural health capital operates not only visibly, but importantly also invisibly in the reproduction of health inequalities. Its modes of transmission involve social processes that are largely taken-for-granted, and it is mirrored and reinforced by other markers of social distinction that themselves are taken to be self-evident. Moreover, it is sustained by a wider ideological infrastructure that continually fosters the idea that individual fates are the outcome of individually-determined attributes and mechanisms. As the unequal distribution of cultural health capital reinforces the inequitable organization of health-related goods, services, and care, the public health and biomedical systems can reproduce, rather than level, the stratified distribution of cultural health capital and related social hierarchies based on race, class, gender, and other dimensions of social power.

One way in which these systems of care both constitute and maintain power structures is by spotlighting "success stories" in which individuals proved able, against great odds, to successfully acquire cultural health capital. Another mechanism is by objectifying characteristics, beliefs, and behaviors perceived to be intrinsic to cultural, ethnic, and class groups, and alternately identifying them as sources of pathology or as an exoticized set of protective factors. Such strategies of power target particular racial, ethnic, class, and gender groups as being either especially problematic or particularly commendable in the context of self-surveillance and risk reduction mandates. Cultural health capital is one way in which behaviors, attitudes, knowledge, and other matters of health and illness are employed as signifiers in distinguishing between social groups (e.g., Radley et al. 1997). Thus, together, these processes involving cultural health capital mobilize health imperatives and discourses to contribute to the reproduction of

stratification.

The differential and systematic distribution of cultural health capital in the contemporary U.S. points to the multiple structural processes underwriting ideologies of health and risk. This analysis is therefore aimed at enhancing and providing a useful complement to sociocultural scholarship on health promotion, risk, and surveillance. However, highlighting the structural organization and salience of symbolic and non-material resources in the capacity to heed mandates to transform ourselves into sophisticated, proactive, and well-informed consumers of health goods, services, and knowledge also points to the limits of cultural health capital. There still remain intransigent material barriers to accessing those resources that can benefit health: structural conditions and life chances are profoundly consequential to determining health status. At the same time, the possession of cultural health capital—that complex of knowledge, skills, and competencies that provide a foundation for understanding and adopting public health messages—plays a critical role in the production and stratification of health, a role that thus far has been relatively neglected.

Chapter Seven
Conclusions and Implications

A. Introduction

Despite over a century and a half of medical and epidemiologic research into the causes of social inequalities in diseases of the heart, vast, systematic differences persist in who develops cardiovascular disease, who lives with it, and who dies from it. Racial, socioeconomic, and sex categorizations of various forms have consistently been a part of the epidemiologic endeavor, in which population variations are identified and mined for clues to the etiology of disease. However, persistent disparities in cardiovascular disease incidence and outcomes along racial, socioeconomic, and sex lines have raised public concerns and prompted research explicitly aimed at uncovering the causes for such inequalities. When considering such concerns and research, the meanings of race, class, and sex/gender must be understood as socially constructed, invoking particular conceptions of bodily and social "differences," and mobilizing a broad scope of social, political, economic, institutional forces that render such "differences" consequential and thus "real" (see Thomas & Thomas 1970). Grasping the array of such constructions, who holds which conceptions, and the dynamics of power that underlie such social formation processes (Omi & Winant 1994) is therefore critical.

I began this research guided by the central concern to understand what happens to "race," "class," and "gender" when they are incorporated into scientific and lay accounts on health and disease. I chose to examine the scientific discipline of epidemiology in particular, for a variety of overlapping reasons. First, epidemiology has constructed for

itself a very public role by virtue of framing its claims and disseminating them as scientific knowledge and recommendations to be taken up by the populace for its own good. Second, epidemiology by most accounts is considered the basic science of public health, a field that, historically and contemporarily, emerges from and sustains social processes I find central to the construction of "difference": efforts to classify groups and populations, struggles over definitions of people and bodies as "problems," and interventions that are simultaneously scientific and political. Finally, and related to these, epidemiologic knowledge has come to have a kind of everyday salience, and represents one form of scientific expertise that people regularly encounter, and with which they must increasingly interact and negotiate. This was important because I was interested in understanding lay experts' constructions and experiences of "difference" and how they might provide alternative standpoints and bases of knowledge production.

To sharpen the focus of my dissertation even further, I chose, after much consideration, to examine causal accounts of only cardiovascular disease. My reasons for selecting this disease focus were again multiple. First, cardiovascular disease has a major impact on overall morbidity and mortality in the United States (American Heart Association 2001a; NCHS 2001), the location of my research. Second, cardiovascular disease has personal significance for me. I am, by most all scientific accounts, a "high risk" individual, given a very strong family history for cardiovascular disease. Third, over roughly the latter half of the twentieth century, epidemiologic studies of cardiovascular disease have played a central role in the development of the discipline, both in terms of the kinds of investigational designs and data accorded scientific legitimacy, the elaboration of more sophisticated methods, and debates over the

etiological roles of genetic, biological, lifestyle, environmental, and social factors in disease distribution. Cardiovascular epidemiology also seemed to represent a "best case scenario" in terms of understanding the relevance of social factors: social epidemiology, a movement whose emergence I explored in Chapter 3, got its start through studies of cardiovascular risk and disease, and the range of behavioral and stress-related factors being linked to CVD seem as obvious a set of circumstances as any in which to consider the influence of social, cultural, political, and economic conditions. Finally, at the same time, these factors also readily resonate with health promotion mandates and imperatives regarding "lifestyle choices," whose discourses, assumptions, and consequences I wished to contest.

I did not start off with the a priori idea that I would find vast distinctions in how scientific epidemiologists and lay individuals articulate, define, and interpret socio-demographic differences. In undertaking this research, I was motivated by some fairly exploratory questions, among them: What do racial, class, and gender differences that I take to be socially constructed "look" like in epidemiologic research? What do they look like in lived experience? I was interested in how scientific epistemologies, standards of proof, criteria for legitimacy and validity, and practices would condition how "difference" would be considered and managed in epidemiologic investigations. I also wanted to explore whether lay experts' own analytic frameworks, biographies, lived experiences, and embodiment of cardiovascular disease would shape their conceptions of "difference" and its role in health and well-being, and how. Finally, I hoped to be able to understand how these conceptions were constructed, and their interplay, overlaps, consonances, and contradictions. In doing so, what I have found could indeed be

characterized as a science-lay divide.

This chapter, by way of conclusion, describes and analyzes this divide through a summary of my key findings. I then explore their implications for several areas of theoretical and sociological inquiry, including racial, class, and gender formation theory; science, technology, and medicine studies; and the sociology of health and illness. Next I propose possible strategies to address the profound consequences of and modify the science-lay divide, beginning with retooling the conceptual models and methods of studying "difference," diversifying the production of knowledge on health and enriching definitions of expertise, and rethinking funding priorities, criteria, and disciplinary cultures and epistemologies. Lastly, I conclude with some reflections on the future directions of the study of health inequalities, and possibilities for additional research.

B. Summary of Key Findings

In analyzing the construction, mobilization, and consequences of various meanings of racial, class, and sex/gender differences in knowledge production about cardiovascular risk, I find that a basic social process is the production and maintenance of a science-lay divide. Five inter-related empirical findings emerged, each of which is briefly summarized in this section, and further elaborated in the next two sections by considering their theoretical and policy implications:

1. The epidemiology of cardiovascular inequalities is one contemporary manifestation of bio-power and a domain of power-knowledge, but one that must work to maintain its public authority and credibility in the face of scientific and social challenges, and the potential segmentation of its own discipline.

2. The embodied and biographical narratives of lay experts indicate how they variously negotiate and make meaning out their lived experiences of "difference." Such experiences testify to how racial, class, and gender formation processes produce structural dynamics that are central to shaping cardiovascular health and to the stratification of cardiovascular risk.
3. Epidemiologic knowledge production is characterized by a kind of conceptual devolution in which the structural and multi-dimensional understandings of "difference" that circulate among people of color with CVD are reduced to individual-level, descriptive, demographic variables. This is, I argued, the enactment of individualism in cardiovascular epidemiology.
4. Further, this individualism is standardized. Despite widespread acknowledgment that they are flawed conceptually and methodologically, these demographic variables are ritualistically included in epidemiologic research. This black-boxing is sustained by their construction as "good enough" tools for the job of studying cardiovascular inequalities given the need to produce credibility in the face of a wide array of technical, political, and economic contingencies.
5. The application of epidemiologic knowledge to the daily life of people of color with CVD enacts biomedicalization in provisional and uneven ways. People with CVD understand, negotiate, and take up the implications of epidemiologic claims for their own lives in variously pragmatic, purposeful, and/or resolute ways. But they do so within a context that constantly demands the mobilization of cultural health capital, the dynamics of which serve to exacerbate existing health inequalities and the continued stratification of cardiovascular risk.

First, I argued in Chapter 3 that the epidemiologic gaze constituted an example of Foucauldian bio-power (Armstrong 1983; Shim 2000), a mutually productive combination of power and knowledge, in which epidemiologic practices, biomedical technologies, and social ideologies place human bodies, their behaviors, sensations, physiological processes, and pleasures under surveillance and discipline (Foucault 1978). Even from the beginnings of the contemporary history of cardiovascular epidemiology in Framingham, Massachusetts, the study of CVD incidence and risks has been constituted and shaped not only by scientific and technical considerations, but by social ideas, and logistical and political contingencies present in the social arena of cardiovascular disease. I offered a map of this arena and described some of the social worlds that most clearly participate or are implicated in the production of knowledge about social inequalities in CVD, with a particular focus on the world of the public. Currently, epidemiology has become a veritable knowledge production industry, and the public and policymakers increasingly turn to its science for guidance on cardiovascular risk identification, assessment, and management. But, public reactions to and frustrations with the often contradictory and piecemeal claims emanating from epidemiologic research—perceptions which scientists attribute to an unsophisticated consumption of scientific knowledge—work to undermine the social credibility and authority of the claims being produced. At the same time, the relevance, validity, and utility of its claims have been subject to greater scrutiny by scientists within the social world of the epidemiologic discipline. A sub-movement of social epidemiologists has contested many of the conceptual, technological, and methodological standard operating procedures of mainstream epidemiology, especially notions of causal inference, validity, and individualization.

However, because of the prevailing conventional wisdom regarding the construction of scientific credibility, social epidemiology still occupies a relatively subaltern position with respect to the larger discipline.

Second, in Chapter 4, I analyzed how the embodied knowledges of people of color with CVD point to the significance of racial, class, and gender formation processes (Omi & Winant 1994) for cardiovascular health. While their constructions of social "differences" and their effects on cardiovascular risk are highly variable, expansive, and even contradictory and paradoxical, lay experts tend to speak of race, class, and gender in structural terms in their accounts of disease causation. They invoke such dynamics as racialized interactions and apartheid, the oppression of "double consciousness," stratified access to economic, educational, and informational resources, racial and sex segregation in the labor market, and the gendered division of reproductive labor as being profoundly consequential for their health. They also tend to speak of their experiences as racialized, classed, and gendered individuals and as members of differentiated groups in deeply intersectional ways. Although I frequently queried them about the effects of race, class, and gender on their health and in their lives one by one and in turn, their responses consistently complicated and defied any notion of discrete categories. Their experiences of risk, illness, and inequality thus repeatedly bore witness to the overlapping and interlocking co-constitution of race, class, and gender. In short, macro-structural and micro-social processes of racial, class, and gender formation—the linkages between how such "differences" are defined and represented, and their institutional, organizational, and interactional manifestations (Omi & Winant 1994)—are conceptualized by lay experts as fundamental causes (Link & Phelan 1995; 1996) of the social production and

stratification of cardiovascular risk and disease.

Third, in contrast, epidemiologists, in practice, tend to conceptually devolve "differences" of race, class, and gender to individualized, demographic variables. Despite extensive research that finds there is no genetic basis for race (e.g., Cavalli-Sforza 1974), my interview and observational data showed that epidemiologic researchers often implicitly and sometimes explicitly resort to biological interpretations of racial differences. They also widely construct "race" apolitically as cultural or "ethnic" differences that affect CVD via risk factor behaviors. Various aspects of this cultural prism and behavioral interpretation—its discursive opposition to biology, perceptions of its empirical observability and verifiability, its resonance with health promotion ideologies, and finally its conceptual flexibility—make it a popular, and scientifically and politically safe, construction for race. Epidemiologists almost exclusively construct sex/gender difference in biological, hormonal terms; their use of the language of "gender" is in most cases due to its perception as a more politically correct lexical choice. Little note is being taken, it seems, to an emerging literature that asserts that sex/gender is not the clear, biological binary that we imagined it to be (e.g., Chase 1998; Dreger 1998; Fausto-Sterling 1985; 1993; Kessler 1990). Finally, class appears to be somewhat of a different kind of "difference." Epidemiologists, generally speaking, agree with lay experts that class differences stem from structural forces that stratify access to resources and opportunities, and exposure to risks of stress and environment; they are able to speak rather extensively to class-based social processes. However, *in practice* most utilize individual-level variables of income, education, and/or occupation.

The use of such variables realizes and actualizes in practice the precepts of

individualism. Individualism, within this context, is the notion that phenomena related to disease and illness—ranging from causes, progression, manifestations and symptoms, outcomes, treatment and amelioration—can be understood at the level of the individual. These researchers therefore enacted the belief—*even if* they took issue with it—that research on the etiology of cardiovascular disease can be conducted with the individual as the basic unit of analysis, that potential factors and determinants can validly be conceptualized and measured at the individual level, and that treatment and prevention efforts can be predicated on individual change and aimed at individual actors. Thus the scientists I interviewed and observed effect and enforce the individualization of "difference," a pattern that is characteristic, I would argue, of much of the rest of the discipline.

Fourth, once individualized, and in part because they are individualized, conceptions of "difference" as demographic variables are being standardized in cardiovascular epidemiology. I found that this is occurring despite seemingly fundamental disputes about the basic legitimacy and appropriateness of these variables. Critiques of individualism in CVD epidemiology arise both within and outside the discipline: the measurement and operationalization of race are common sources of debate and contention, prompted by increasing multiraciality and ethnic diversity, the social fluidity of racial categories, problematic measurement techniques, and significantly, by political pressures from communities of color for proportional representation in health research. Similarly, epidemiologists also agree that current conventions for measuring socioeconomic position and status fail to encompass many of the important ways in which class affects the distribution of CVD. And while the

operationalization of sex/gender is seen as uncontroversially and naturally binary and its measurement as self-evident, some researchers I interviewed did question whether possibly relevant dynamics of the social organization of gender were being missed by the default construction of gender as sex. Yet although such critiques are, to varying degrees, articulated and even widespread within epidemiology, I found that the use of variables expressive of an epidemiologic individualism largely functions as a standard operating procedure in research on CVD.

In Chapter 5, I proposed that multiple technical, political, and economic requirements posed within epidemiology and by numerous other social worlds are defined as necessary for the production of credibility, and promote this ritualized use of this "usual suspects" approach. Among the technical requirements are two kinds of "methodological contingencies." First, the measurement imperative mandates that all potentially significant factors be measured and included in data collection and analysis. Second, the need to manage uncertainty is accomplished through the boundary object (Star & Griesemer 1989) properties of the "usual suspects" practice that allow for triangulation (Star 1985; 1986). Also, political and regulatory requirements include the representation and analysis of racial and sex differences in health, which the inclusion of individualized variables of race, socioeconomic status, and sex helps to fulfill. Finally, economic constraints and the lack of organizational and funding support for interdisciplinary collaboration in epidemiology inhibit the availability of appropriate theoretical models, data, and domains of expertise that constitute other "tools for the job." As a result, the "usual suspects" approach becomes constructed as a convenient and "good enough" alternative. Thus the use of individualized variables of race, SES, and sex

allows for research to minimally comply with these contingencies, contributing to their construction as "good enough" tools for the job and promoting their black-boxing (Latour 1987; Latour & Woolgar 1986). That is, by providing relatively convenient ways to nominally satisfy a range of methodological, political, and economic contingencies, thereby helping to build credibility, practices that work to individualize "difference" persist in epidemiologic work.

The existence of contestation, however, is critical in highlighting the fluidity and socially constructed nature of epidemiologic science. Although at present the use of individualized variables of "difference" is standardized, and for that very reason, may be a difficult practice to change, my research also indicates that as a racial, class, and gender project (Omi & Winant 1994), epidemiology is unstable. The complex of criteria and requirements that currently define social credibility and scientific adequacy are a negotiated order (Strauss 1978; Strauss, Bucher, Erlich et al. 1964) or a processual ordering (Strauss 1993), and thus always under flux.

Lastly, in Chapter 6, I turned to elaborating the consequences of epidemiologic practices around the standardization of individualism in CVD causation. I focused on two kinds of social phenomena: subjective experiences of risk, identity, and responsibility, and the reproduction of health inequalities. I found that the application of epidemiologic knowledge to the everyday experiences of cardiovascular health resulted in the increasingly technoscientific calculation and surveillance of cardiovascular risks, intensified mandates to acquire health-related knowledge and self-awareness, and profound impacts on identities and subjectivities through new and acute perceptions of risk and moral responsibilities for health that become incorporated into one's sense of

self. These processes, I argued, are representative of several trends that constitute biomedicalization (Clarke et al. 2000; Clarke et al. 2002), where technoscientific innovations produce new ways for individuals and groups to be subject to the biomedical gaze and intervention. Additionally, biomedicalization is stratified; that is, the types and forms of biomedical attention and disciplining vary systematically for different groups. Thus I found that in epidemiologic knowledge production around and discourses on the treatment of cardiovascular risk, people of color, the poor and working class, and women were particularly singled out as requiring surveillance, education, and intervention. I offered the concept of cultural health capital as a way to understand how such stratified biomedicalization is effected, and to draw out the power relations and dynamics embedded within these discourses of self-surveillance, health maintenance, and awareness. Cultural health capital is a set of resources and skills, including the ability to acquire self-knowledge, exercise "rationality" in health decision-making, the motivation for self-transformation, and the capacity to strategically mobilize cues of educational attainment, social status, and biomedical knowledge in order to successfully negotiate biomedical encounters and interactions. I argued that access to, the accumulation of, and transmission of cultural health capital is highly stratified. However, dominant cultural ideologies of individualism—manifest in the discursive valorizing of "success stories" and the pathologizing of "risky," often "ethnic" practices—serve to obfuscate the operation of cultural health capital in the reproduction of health inequality.

In this exploration of the science-lay divide on cardiovascular disease causation, and the construction, negotiation, management, and consequences of conceptions of racial, class, and sex/gender "differences" that structure it, I have demonstrated how

racial, class, and gender formation processes profoundly shape cardiovascular health. I have also argued that cardiovascular epidemiology, as a racial, class, and gender project, operates to enforce ideologies of individualism in "official" knowledge production on CVD risks and causes, and shown how the outcomes of such enforcement, in the form of specific scientific practices, have been standardized. In so doing, this research illustrated and illuminated the importance of epidemiologic knowledge and bio-politics in social, cultural, political, and ideological organization and domination. At the same time, I have documented the emergence of significant contestation and debates around the meanings and scientific management of social "differences," that I believe signify the contingent nature of current epidemiologic practice. Finally, I analyzed some of the consequences of the divides between "expert" and "lay" conceptions of "difference" for lived experience. Below, I offer some thoughts about the implications of this research for social theory.

C. Implications for Social Theory

This research into the meaning-making around "differences" of race, class, and gender and the knowledge production practices of an "expert" science lies at the intersection of several fields of sociological inquiry. A major result of this dissertation then is its articulations of overlaps and potential synergism among and between these theoretical perspectives. These perspectives include theories of racial, class, and gender formation and intersectionality; science, technology, and medicine studies; and the sociology of health and illness. The theoretical implications of my research for each of these fields is described in this section, and extended further on the following section on

policy implications.

Racial, Class, and Gender Formation Theory

One of the key findings in this research has been the ways in which racial, class, and gender formation processes (Omi & Winant 1994) work both to stratify cardiovascular health as well as to shape the production of knowledge about its determinants that I argue in turn promote further health inequalities. In this dissertation, I have taken seriously Omi and Winant's (1994: 56-57) assertion that "to interpret the meaning of race is to frame it social structurally" and "conversely, to recognize the racial dimension in social structure is to interpret the meaning of race." By asking both scientific and lay experts what they believed race, class, and gender *mean* in the domain of health, I intended to glean their conceptions of, as well as articulate through my own analysis, how "difference" *works* in the world. At the same time, by pointing to how race, class, and gender are relevant in the social structuring of health and biomedical science, I offered an interpretation of the meanings of these "differences," that is, what kinds of difference these "differences" make.

I have elaborated on racial formation theory by arguing that a scientific discipline—that of cardiovascular epidemiology—constitutes a racial, class, and gender project. Epidemiology as currently and conventionally practiced tends to devolve "differences" of race, class, and gender into a set of individualized, demographic variables whose inclusion in cardiovascular research is being standardized. I argued that such reductionist and simplistic conceptions in turn narrow the scope of "official" knowledge about the causes of racial, class, and sex differences in CVD to individual

biological, behavioral, and demographic factors. Subsequently, the applications of this knowledge in medical institutions, health-related ideologies, and advice for everyday life result in the predominance of such strategies as heightened surveillance and behavioral change. While these forms of intervention are often not explicitly marked as racialized, classed, and gendered, they effect processes of social formation by disregarding the notion that deeper social, political, and structural forces of power are consequential for health. As a racial, class, and gender project, therefore, epidemiology "is simultaneously an interpretation, representation, or explanation of [racial, class, and gender] dynamics, and an effort to reorganize and redistribute resources along particular [racial, class, and gender] lines" (Omi & Winant 1994: 56; see also Shim 2000). The assumptions, techniques, outcomes, and application of epidemiologic knowledge production, to paraphrase Omi and Winant (1994: 56), connect what race, class, and gender mean in the particular discursive practices associated with epidemiology and science, and the ways in which both social structures and everyday experiences are organized along racial, class, and gender dimensions, based upon those meanings.

This research also speaks to the co-constitution of racial, class, and gender politics and science. Omi and Winant (1994) trace the modern rationalization of racial hierarchy and exploitation as based initially on religious justifications, then on scientific ones. However most recently, with science's understanding that so-called "racial" groups were characterized by greater genetic and biological diversity within them than between them, they contend that politics is now the predominant terrain in which the evolution of racial awareness is played out. But in an interesting counterpoint to this argument, I show in Chapters 4 and 5 that the disavowal of political interest is precisely the grounds on which

epidemiologists assert their authority to speak about the science and nature of racial "difference." Politics, epidemiologists argue, only get in the way of the rational, systematic, and credible pursuit of how exactly racial difference matters. However, a starting premise of science, technology, and medicine studies is that science *is* politics. Thus, scientific knowledge production has always already been a terrain of social, cultural, and political struggle, and the cardiovascular epidemiology that I explored here is only one contemporary manifestation of how science continues to participate in racial, class, and gender formation processes. The assertion by many, but not all, epidemiologists that their science is not and should not be political is, in fact, itself a political move. The previous chapters have illustrated how many other aspects of the content and conduct of science—the questions it takes to be legitimate, its assumptions, and its practices—as well as our reactions, negotiations, uptake, and refusals of its claims, also constitute political processes and effect political consequences. This research showed how maintaining, challenging, and revising particular meanings of race, class, and gender occur within the production of science itself, and in our everyday experiences of and encounters with health and biomedical science. Such domains lie largely outside of conspicuously political contestations between social movements and the state. In fact, because epidemiology explicitly seeks to fortify its authority by insisting on the distinctiveness and neutrality of the epidemiologic enterprise and the separation between scientific work and overt politics, both social movements and the state turn to its science as impartial, rational arbiters in conflicts over the allocation of health-related resources. As such, the trajectory of the politics of "difference"—"the pattern of conflict and accommodation which takes shape over time between ... social

movements and the policies and programs of the state" (Omi & Winant 1994: 78)—can be understood to be configured by epidemiology as a regime of power-knowledge.

My research also demonstrates how epidemiologic and biomedical knowledge production helps to sustain such racial, class, and gender hegemony through its participation in the construction of "common sense," power-laden notions about the "natural" effects of "difference" for health. With the concept of hegemony, Gramsci (1971: 12) captures the sense that the domination of subordinate groups is achieved not only through the application and threat of coercion, but also through "the 'spontaneous' consent given by the great masses of the population to the general direction imposed on social life by the dominant fundamental group." This consent occurs through the creation and maintenance of general systems of values and ideas that support the social hierarchy. Power, in Gramsci's terms, is therefore constructed and exercised in diffuse ways by multiple institutions in society that sustain and disseminate dominant norms and worldviews. Omi and Winant (1994) extend these arguments by incorporating class- and gender-based conflicts with their notion of racial projects, as overlapping, intersectional, "building blocks" of hegemony. My analysis of epidemiologic knowledge production serves to show how the "logic" of health and sickness that prevail in epidemiology are embedded within and organize individualizing scientific practices, conceptions of cause, lifestyle and behavior-focused discourses, and ideas about risk reduction and prevention. Such "common sense" in turn is underwritten by mutually reinforcing meanings of race, class, and gender, yet obscures its ideological roots through its appeal to scientific neutrality and rationality. By helping to elicit and build consensus on the "naturalness" of social inequalities in health and the indisputability of their individual-level origins,

epidemiologic knowledge contributes to the legitimation of ideologies of individual racial, socioeconomic, and sex differences and operates as a hegemonic strategy.

A final key implication of my research for racial formation theory is the ways in which intersecting racial, class, and gender projects are consequential for cardiovascular risk and health. As Collins (1998: 205) suggests, I have used intersectionality here as a heuristic device, "to think through social institutions, organizational structures, patterns of social interactions, and other social practices." In so doing, I have identified in Chapter 4 a range of projects—from macro-level structural processes such as intertwining dynamics of racial, class, and gender segregation in the paid and unpaid labor force, to micro-level interactions in which "common-sense" notions of "difference" inflect and pattern social relationships—that lay experts point to as fundamental causes of poor health. As I will discuss in more detail below, by empirically tracing how such things as "race," "culture," "class," "economic status," "sex," and "gender" are constructed and signified in these experiential accounts, and their consequences for cardiovascular health, I have demonstrated some of the racial, class, and gender formation processes that link representations of "difference" to the structure of large-scale societal forces and everyday experiences.

Science, Technology, and Medicine Studies: The Social Production of Scientific and Situated Knowledges

This dissertation has also drawn upon and extended several theoretical strands in the field of science, technology, and medicine studies (ST&MS). There are two implications that I want to highlight here. First, I elaborate on two useful concepts in

ST&MS: Latour and Woolgar's black box (Latour 1987; Latour & Woolgar 1986) and Star and Griesemer's (1989) boundary object. Second, I reflect on the ramifications of my findings on "lay" conceptions of disease and public understandings of science. (A third implication relevant to ST&MS—the biomedicalization processes effected by cardiovascular epidemiology—is elaborated in the next section.)

First, a central theoretical implication of this research is the ability of scientific claims to function as black boxes despite having fundamental questions and uncertainties about them being raised by the very people who use them. Latour (1987) explains the concept of the black box as a claim or as an assemblage of conceptual and/or material parts that act as one, whose content is unquestioned, and that has become a self-evident fact used to build other claims. However, in the case of the epidemiology of CVD, I found that the "usual suspects" approach—transposing race, class, and gender into a set of racial categories, SES, and sex, and then including them as demographic adjustments in epidemiologic analyses—operates as a black box even though its cover is frequently opened and its interior regularly challenged by epidemiologists themselves. Its status as a black box is solidified as its use is routinized in multiple lines of work, promoting the selection of epidemiologic inputs of race, SES, and sex, and the production of outputs of claims about "difference" and CVD. In short, this is not a Latourian story about scientific entrepreneurs successfully persuading fellow epidemiologists of the validity of demographic variables. Scientists do not have to completely believe in the black box in order to use it. Instead, when faced with multiple technical, political, and economic contingencies that must be met in order to construct credible science, epidemiologists construct the use of individualized, demographic variables as a "good enough" tool for

the job (Clarke & Fujimura 1992b), and construct the "job" itself in terms that are solvable (at least nominally) by the tools they have at hand (see Fujimura 1987). My research therefore lends support to major themes in more critical social and cultural studies of science[1]: that the "playing field" in which debates about the meanings of race, class, and gender for cardiovascular health are waged are not even, shaped as they are by social, organizational, and political elements and criteria that deeply affect the kinds of epidemiology deemed credible.

Within this theoretical strand in ST&MS, my research also has implications for Star and Griesemer's (1989) observations on boundary objects. As representations of nature that are both flexible enough to be adapted to different needs and robust enough to maintain a common identity, boundary objects facilitate collective work and the coming together of social worlds. But in the case of individualized demographic variables of "difference," their use has been seen as neither theoretically nor methodologically robust, with many epidemiologists harboring fundamental doubts about their validity and methodological adequacy. However, in *use*, these variables offer nominal flexibility and therefore some ability to embody whatever meanings that researchers wish to attribute to them, despite their individualized operationalizations. As, or perhaps even more, importantly for the "usual suspects" approach in cardiovascular epidemiology is the existence of multiple regulatory, political, economic, and technical conditions—like mandated race/sex diversity in study samples, financial constraints on longitudinal research, lack of support for theoretical and methodological development for their own

[1] See critiques of actor-network theory, e.g., by Fujimura (1996; 1992), Hess (1997), Star (1991), Star and Griesemer (1989), and Watson-Verran and Turnbull (1995). Works in this more interactionist tradition of ST&MS include Baszanger (1998), Casper (1998), Clarke (1998), Clarke and Fujimura (1992a), Figert (1996), Fujimura (1996), Garrety (1997), and Star (1995; 1989).

sake, and so on—that need to met in order to maintain credibility. The inclusion of individualized, demographic variables becomes the most convenient way to nominally satisfy such conditions that characterize the social world of epidemiology and its relationships with the social worlds of funders and the public. Thus ironically, this practice serves to manage uncertainty and potential disagreement among different social worlds, even though its inner workings *themselves* are often viewed as ambiguous, problematic, and conceptually and methodologically inadequate. As such, it still functions as a boundary object, facilitating collective work and contributing to the common identity of a scientific discipline like epidemiology.

The robustness of this particular boundary object, then, comes not from basic agreement on its theoretical content nor even the validity of standardized methods. In fact, the conceptual integrity of the boundary object can be quite minimally present, a necessary but not sufficient condition for managing uncertainty. Instead, my work highlights the possibility that integrity *in theory* and integrity *in practice* may be two very different estimations, and that the latter can be enhanced by the ability of the boundary object to meet the constraints of a host of technical, political, and economic forces shaping definitions of credible scientific practice.

Second, my empirical analysis of constructions of "difference" and causes of cardiovascular disease that circulate in the narratives of people of color speaks to a growing concern around indigenous or "lay" knowledges, competing knowledge systems, and the public understanding of science. Numerous ST&MS scholars (e.g., Epstein 1995; 1996; Watson-Verran & Turnbull 1995; Wynne 1995; 1996a; 1996b) have commented on the implications and importance of considering the knowledges of lay experts and

non-scientists in developing policies and other forms of decision-making and intervention. As Wynne (1995: 363) states:

> even a technically literate person may reject or ignore scientific information as useless in the absence of the necessary social opportunity, power, or resources to use it; yet scientists may assume, in a different model of social agency, that such public "neglect" reflects technical ignorance or naivete. The implicit structures of social agency will also affect people's interest in available knowledge, hence their "literacy" in the first place. Thus an indigenous social parameter—the tacitly perceived usefulness or relevance of scientific knowledge in the layperson's own social context—directly shapes public uptake of science, and hence the public's observed "understanding" of science.

As I described in Chapters 4 and 6, the uptake of epidemiologic constructions of cardiovascular risk and the causes of disease is uneven, situationally variable, and even contradictory. Among people of color with CVD there are of course differences in terms of how they construct the meanings of race, class, and sex/gender for their health, and the degree to which they incorporate epidemiologic knowledge into their own accounts of causation. But in general, they disagree with dominant, scientific constructions of "difference." However, at the same time, they often do concur with and take up prescribed interventions such as developing better coping skills and implementing lifestyle modifications that follow from such constructions. Those who must live with CVD pragmatically take up various tools and modes of risk surveillance and management in the face of their perceptions of the limited possibilities for more profound transformations in social structures that can fundamentally change their lived experiences of "difference."

An analysis of how people of color construct the meanings of and experience "difference" highlights the lack of contextualization of cultural and behavioral

differences in the frameworks of epidemiologic science and biomedicine, and a myopia regarding biological differences associated with sex. Lay experts instead exhibit a reliance on their embodied and biographical knowledge to formulate theories of disease causes and the relevance of biological, behavioral, cultural, and social processes for their cardiovascular health. Despite epidemiology's tendencies to rationalize the definition of how and upon whom to intervene, social and political conceptions of "difference" and understandings of the socially constructed nature of purported disease "causes" and "risks" flourish in the experiential narratives of lay experts. Such conceptual divides point to the possibility that the lack of people's identification with the institutions deploying scientific knowledge may be attenuating their trust of them, in turn constraining their uptake of its claims and other outward signs of public "understanding" (e.g., Wynne 1996).

Extending such critically important scholarship on indigenous knowledges, this research has shown how interactions and contestations between "expert" and "lay" frameworks are "not a matter of lay public 'cultural' responses to 'meaning-neutral' objective scientific knowledge, but of cultural responses, to a *cultural* form of intervention—that is, one embodying particular normative models of human nature, purposes and relationships" (Wynne 1996a: 67-8; see also Irwin & Wynne 1996; Lave 1988; Martin 1987; Watson-Verran & Turnbull 1995). I would add—following from the implications of my research for racial, class, and gender formation theory—that encounters between scientific and lay knowledges are also *political* contestations as well. How individuals with CVD construct the meanings and health consequences of being from particular racial, class, and sex/gender groups is intimately tied to—and indeed

indistinguishable from—their conceptions of the social relations and historical and ongoing experiences of interactions among those groups. Similarly, epidemiologic definitions of "difference"—even as explicitly individualizing and non-relational as they often are—have a sub-text of how such "differences" matter and should be managed, that in turn is underwritten by conceptions of the processes and forces contributing to inequalities and by accompanying ideologies legitimating power and hierarchy.

Sociology of Health and Illness: The Social Production of Health Inequalities

Finally, my research has several theoretical implications for the sociology of health and illness. As a case study of how inequalities in health—in this case, in cardiovascular disease—are socially produced, this project contributes to scholarship on the concept of social conditions as fundamental causes of disease (Link, Northridge, Phelan et al. 1998; Link & Phelan 1995; Link & Phelan 1996). I have examined how complex and intersectional social processes and forces related to the signification and organization of race, class, and gender structure life chances, exposure to stressors, access to information and resources, and myriad other factors that make up the contexts within which cardiovascular health can be promoted, maintained, and/or undermined. These social conditions and dynamics, therefore, constitute fundamental causes of disease, determining how people defined as "different" are then differentially placed "at risk of risks" (Link & Phelan 1995). This research thus adds to our understanding of how health inequalities, and health and illness in general, are socially produced, the outcomes of relations of power based on social constructions of "otherness" and "difference" that exact material, real consequences (see Thomas & Thomas 1970). Epidemiologists,

however, manifest a persistent focus on proximate causes, or attest to institutional and cultural pressures to do so from within their discipline. This, I argued, contributes to the exacerbation of health inequality. Lay experts, in contrast, appear to understand implicitly the concept of social conditions as fundamental causes of disease. Based on their lived experience, they are better able to complicate the individualized, standardized constructions of "difference" that tend to prevail in epidemiologic science.

Second, the epidemiologic practice of operationalizing racial, class, and gender differences as individualized, discrete, and static attributes exemplifies the phenomenon of stratified biomedicalization. I and colleagues (Clarke et al. 2000; Clarke et al. 2002) have previously argued that biomedicalization is a theoretical framework that seeks to extend medicalization theory—a central concept in the sociology of health and illness—with the insights offered by the sociology of knowledge, the Foucauldian turn, and science, technology, and medicine studies. With the notion of stratified biomedicalization, we draw attention to the ways in which technoscientific and organizational innovations in biomedicine have systematically different effects on groups constructed to be "different." This research revealed how as epidemiologic knowledge production contributes to the identification and standardization of risk factors and behaviors, cardiovascular disease itself is increasingly biomedicalized. By constructing race, class, and gender in cultural, behavioral, and biological terms, epidemiologic knowledge production translates social, political, and structural dynamics and consequences into risk factors and other disease mechanisms over which biomedicine has claimed jurisdiction. These translations in turn serve to place particular segments of the population under increased epidemiologic and biomedical surveillance, stratifying

biomedicalization, and providing the ideological infrastructure that renders such practices legitimate, appropriate, and self-evidently necessary.

Further, the narratives of people of color with CVD illustrate the dimensions and uneven consequences of biomedicalization. To varying degrees, they incorporate into their sense of themselves the notion that they are bearers of sometimes imperceptible and insidious risks. Most also attempt to assimilate at least some practices of health promotion and risk reduction into their everyday lives, and often take on the contemporary duty to acquire and implement biomedical knowledge about their risks and their management. Such biomedicalization, uneven and impartial as it may be, encourages particular conceptions of risks and causes of disease—as individual, biological, and behavioral—and favors individualized kinds of interventions such as self-surveillance and lifestyle modification. However, as described earlier, lay experts' uptake of proscriptions and prescriptions for health maintenance often occurs alongside their general dismissal of individualized conceptions of risks and "difference" dominant in epidemiology. Thus despite the ubiquity of biomedicalization processes, people with CVD still rely on the authority of their embodied and biographical knowledges. These tensions and contradictions thus provide a useful site of analysis of biomedicalization and the critical role of lay expertise, and the theoretical intersections of science, technology, and medicine studies and the sociology of health and illness.

A final contribution to the field of sociology of health and illness is the concept of cultural health capital. Drawing on the work on cultural capital by Bourdieu (1977; 1980/1990; 1983/1986), I inductively developed a parallel notion that operates in the domains of health and institutional health care. Cultural health capital captures a

complex of attitudes, knowledges, skills, and interpersonal and interactional resources upon which individuals can draw in order to exercise agency and "stage" health-related "performances" (see, e.g., Williams 1998). Rather than a property of individuals, however, cultural health capital refers to a system of social and cultural resources and symbols that can be mobilized as a means of exchange for other health-related resources. Access to such capital constitutes an increasingly critical asset amidst contemporary discourses of health promotion and citizenship. Thus the concept of cultural health capital broadens our conceptions of the kinds of resources—not only material, but also symbolic, cultural, and interactional—necessary to achievement of health.

As I discussed in Chapter 6, cultural health capital has highly racialized, classed, and gendered dimensions. The attributes that make up cultural health capital—the ability to activate and exercise scientific rationality, a proactive and instrumental approach towards one's body and health, vocabulary, demeanor, and numerous other cues of social and economic status—become easily fused to stereotypes of people of color, the poor and working class, and women as uninformed, passive, and noncompliant. Further, as a form of capital that is transmitted intergenerationally and laterally, and that promotes its own accumulation, cultural health capital is marked by stratified access, accrual, and mobilization. The systematic, differential nature of its circulation and transmission in turn operates to reproduce and exacerbate extant health inequalities. The distribution and consequentiality of this kind of capital therefore provides another way to understand and analyze the social patterning of health and illness, and ideological veiling of such dynamics provided by dominant cultural narratives of individualism. The operation of cultural health capital thus sensitizes us to the dynamics of power in the maintenance of

health, and the workings of racial, class, and gender formation processes to further stratified biomedicalization. Moreover, it does so by pointing to the linkages between micro-level interactional and macro-level structural processes; this research and the development of the concept of cultural health capital therefore provides an important beginning in understanding and tracing the connections between multiple different levels of social action and their consequences for the experience and stratification of health.

D. Implications for Health Research and Policy

My exploration and analysis of the origins, dimensions, and ramifications of the science-lay divide in constructions of race, class, and gender raise some critical policy implications, several of which have already been proposed as reforms to the practice of epidemiology by many others (e.g., Berkman & Kawachi 2000; Diez-Roux 1998a; 1998b; Kaufman & Cooper 1999; Krieger 1994; 1999a; 1999b; Krieger & Zierler 1996; Marmot, Ryff, Bumpass, et al. 1997; Nieto 1999; Popay & Williams 1996; Rose 1985; Susser 1998; Susser & Susser 1996a; 1996b; Williams 1997). However, this dissertation offers substantive and empirical evidence for how the lack of these reforms has impoverished research on cardiovascular health inequalities, and an analysis of how this has shaped our state of knowledge. The implications of this project for health research and policy fall most notably in three areas: retooling the conceptual frameworks and methodological techniques for studying inequalities in health; diversifying participation in knowledge production processes and our understanding of what constitutes "expertise"; and rethinking research funding mechanisms, priorities, and disciplinary boundaries.

Retooling the Conceptual Models and Methods of Studying "Difference"

In this dissertation, I found that many epidemiologists can clearly identify numerous weaknesses in their models and methods, yet they continue to routinize the very individualized variables of "difference" that are a major focus of their critiques. Avoiding such individualization though requires significantly revamping some of their most commonly used research technologies. In the absence of fundamental advances in these research technologies, however, disciplinary and public pressures to demonstrate nominal validity are instead fulfilled through the ritualized inclusion of individualized variables of race, socioeconomic status, and sex. Thus even though numerous "tools for the job" of studying inequalities in cardiovascular health are perceived to be inadequate and ambiguous, they are still critical to the production of credibility along technical, political, regulatory, and economic lines. To take structural and social dynamics into account in studying "difference" and inequalities requires, therefore, retooling some of the most traditional conceptual and methodological instruments of epidemiology. Recommendations on what specific kinds of new and improved methods should be used in health research are outside the scope of this dissertation. However, some general implications for conceptual models of disease causation and methods of data collection and analysis can be outlined.

First, my analysis of epidemiologic constructions of "difference" indicated that their devolution and individualization is inextricably tied to their conceptualization as having effects on cardiovascular risk and disease predominantly at the individual, behavioral, and biological levels. One rather obvious policy implication, then, is to reverse this reductionist tendency in health research, and instead take up an overall

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conception of social conditions as fundamental causes of disease (Link & Phelan 1995; 1996). As Lena, a social epidemiologist, explains,

> We always ... want to get closer and closer to the body, finding things about biological or metabolic processes that are risk factors ... I'm not skeptical about those risk factors as being risk factors, because I know they're really important and they have been very predictive in disease ... [But] I think we're missing the broader picture ... when you're focusing more and more on the proximate risk factors, necessarily you're not focusing on what drives those factors at a population level ... researchers don't really believe that social factors are fundamental causes of disease ... when we're identifying these things that are closer to the more proximal risk factors, then we start, I think, focusing on the mechanisms of how that happens. It's great to understand the mechanisms, but mechanisms will change over time, and these sort of basic patterns of social equality and health outcomes will always remain the same. I mean it's dynamic ... [CVD] used to be a disease of the affluent. Then the mechanisms sort of changed and over time as we find out more and more about it, persons with more resources are more able to take advantage of the new knowledge, the new technology, you know, everything, so it almost increases the inequalities, I think, over time ... But just basically focusing on the more proximate causes just doesn't leave room for the big picture.

As Lena points out, in order to better reflect how cardiovascular disease is impacted and the kinds of factors that determine its incidence and distribution, health research must consider multiple levels of causation at the same time. Many commentators (e.g., Kaufman & Cooper 1999; Krieger 1994; Krieger & Zierler 1997; Susser & Susser 1996), particularly within social epidemiology, have argued that epidemiologic and other health research is inclined to be rather theoretically impoverished, and that the field would be better served by (greater) attention to explicating conceptual models of disease causation. My dissertation supports the notion that emphasis on methodological dilemmas and debates tends to displace epistemological considerations. Both factors such as demographic "differences," as well as the dynamics and mechanisms of cardiovascular disease, must be understood as social, structural, historical, and institutional processes,

and efforts to construct and operationalize them as such—no matter how provisional, uncertain, or tenuously credible—must be supported.

Second, and related to the first implication, scientists must begin to consider seriously the notion that not everything that counts can be counted; that is, they must begin retooling the standards and definitions of what counts as "data." Lay experts' conceptions of the relationships between their experiences of "difference" and their cardiovascular health underscore that complex, intersectional dynamics of stratification and social inequality—ranging from access to educational and employment opportunities, discrimination, the division of social reproductive labor, and the like—must enter into health research in some fashion. Such dynamics, obviously, present enormous methodological dilemmas for researchers seeking quantifiable, stable, and "reliable" (in the conventional, statistical sense) data points. One possibility is to consider how health research might take better advantage of existing qualitative traditions and "theory-methods packages" (Fujimura 1986; 1996); indeed a basic principle of scientific research is that the choice of (qualitative or quantitative) methods should be based on their appropriateness for the research questions being asked. Qualitative methods are sometimes currently used as a kind of supplementary method for pilot studies, or in advance of more quantitative investigations. However, the concept of biomedicalization sensitizes us to the potential consequences of inviting epidemiologic and biomedical knowledge production processes to scientize what currently is the purview of "subjective," experiential, and embodied knowledge, and indeed marginalized and dismissed as such.[2] Token inclusion would clearly be less transformative of the

[2] Many empirically grounded, feminist qualitative studies examining biomedicalization make precisely this point (see, e.g., Fosket 2002; Mamo 2002).

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epidemiologic endeavor than integrating qualitative methods into health research in a truly synthetic and interactive way (see Popay & Williams 1996). The use of qualitative research must be on terms that emphasize equality, shared power, and the partiality of all knowledges—all commitments of feminist qualitative research. Another possibility I explore below, therefore, is to implement explicit efforts to share the power inherent in the production of knowledge by involving lay experts in all stages of the research process, from articulating research questions to generating policy implications.

Diversifying the Production of Knowledge on Health and Enriching Definitions of Expertise

I echo here calls for the greater inclusion of lay knowledge in research on public health (e.g., Popay & Williams 1996). According to Popay and Williams (1996), there are three ways in which lay knowledge is relevant to health research and practice: the possibility that lay perceptions of health status predict future health; lay conceptions of the relationships between individual behaviors and life conditions—that is, the linkages between agency and structure; and lay theories about etiology. Based on the research described in this dissertation, I would argue that the latter two are intimately intertwined with each other in the case of cardiovascular disease. Etiological frameworks and epidemiology's examination of population variations shape assumptions about the linkages between personal behavior and structural circumstances—or the absence thereof—and in turn, ideas about agency and structure within the domain of health help to organize theories of etiology. Conventional etiological stories that place individual health behaviors and risk factors as central protagonists must be broadened with a sense

of how social conditions and community resources both limit and offer avenues for exercising agency to modify such risks and to respond to them, especially in ways that traditional epidemiology might not see or recognize. Contextualizing individual behaviors—as many social epidemiologists have been arguing we must do—means a fuller understanding of how people with CVD experience risk and illness, and what factors they believe promote, harm, and otherwise produce health. My analysis of the knowledges of people who live with cardiovascular disease demonstrates the conceptual richness of their understandings of disease determinants, and the potential of incorporating their constructions of "cause" and "difference" to deepen the complexity and improve the accuracy of epidemiologic models and frameworks.

To accomplish this would require the participation of lay people who can describe from their own biographical experiences some of the social conditions and processes that have shaped their cardiovascular risks and impacted their health. This in turn would necessitate fundamental changes in the status accorded to such knowledge. In conventional epidemiology to date, what Popay and Williams (1996: 765) calls "epistemological hegemony ... not only discounted certain forms of knowledge from taking part in scientific discussion, it also disempowered groups of people working outside the dominant paradigm from making any contribution to debate over the policies which science could inform." Diversifying the production of knowledge on health would therefore involve the reconstruction of meanings of "expertise" and its modes of legitimation: valid and applicable knowledge should be understood to emerge not only from the application of the scientific method, but also from the analysis of embodied experience (see, e.g., Funtowicz & Ravetz 1992; Jasanoff 1990; Knorr-Cetina 1989;

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Wynne 1996a). Such an epistemological stance has guided my research described in the preceding chapters, where I have used the term "lay experts" to signal the necessity to accord status to knowledges constructed from biographical experiences as one kind of "expertise."

However, where the participation of lay experts would come from and how their input could most effectively be incorporated is unclear. Currently, although there are some national organizations aimed at education and awareness, I am not aware of any politically oppositional, widely visible groups clearly defined as taking on cardiovascular disease. The American Heart Association, perhaps the most prominent advocacy group, is highly scientized, founded in 1924 by cardiologists in order to facilitate the sharing of study results and promote further research. It currently counts among its membership a significant number of clinicians and researchers. In addition, it sponsors scientific conferences, and issues scientific statements regarding research priorities and clinical treatment. There are, of course, general health advocacy organizations that are quite politicized and more nearly mimic grassroots activist groups, especially those working on behalf of the health of women and communities of color (e.g., the National Women's Health Network and the National Black Women's Health Project). But despite its assumed widespread pertinence as the most frequent cause of morbidity and mortality, cardiovascular disease does not have associated with it a nationally prominent activist community rooted in the experiences of those with CVD specifically. In this context, then, the process of bringing lay experts into the production of epidemiologic knowledge may, at least at the outset, have to look somewhat different than in other cases such as AIDS, breast cancer, and environmental activism. In those instances, activists fashioned

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collective identities and commitments, and organized successfully to make their voices and perspectives matter in setting priorities for, designing, implementing, and interpreting research (e.g., Altman 1996; Arksey 1994; Brown 1987; Brown & Mikkelsen 1990; Bullard 1992; Epstein 1995; 1996; Kaschak & Tiefer forthcoming).

In addition, the case of socio-demographic inequalities in cardiovascular disease presents somewhat of an interpretive and strategic dilemma for social movements. Efforts to establish a legitimate scientific basis for investigation into racial and sex/gender differences often selectively mobilize assertions of potential biological differences (see Epstein 1995; 1996; forthcoming), and may have the effect of hardening and reifying demographic categories. Given this set of circumstances, it is imperative that the terms and conditions under which lay experts participate in knowledge production work to ensure the serious consideration of their structural, relational, and intersectional discourses of "difference" and disease causation. To be clear, however, I am not arguing that the knowledges and perspectives of people of color with CVD are more authentic, authoritative, and closer to "reality," and less partial, than those of science. Still, what is clear from my research is that lay experts' analyses of the structural processes that give rise to the conditions within which they become ill—that place them "at risk of risks" (Link & Phelan 1995)—are viewed by many epidemiology "outsiders" and by a growing number of "insiders" as plausible, upstream mechanisms of disease. They are, however, given almost no serious consideration in conventional scientific frameworks and practices.

At the same time, another policy implication is to assess the means by which lay organizing could be encouraged, and for extant organizations to consider working

towards bringing more oppositional politics into their ranks, so that the everyday knowledges and analyses of structural causes of cardiovascular disease revealed in this dissertation can begin to have a voice and influence in shaping social movements, interests, and demands. Here, the ground-breaking paths forged by AIDS, breast cancer, and environmental activists can serve as powerful examples of the strategies, possibilities, and limitations of the participation of lay experts in policymaking and scientific practice. Their efforts have culminated in such changes as the routine formation of consumer advisory boards for research studies or the inclusion of lay advocates in decisionmaking. However, there is a cautionary tale here, in that such moves are often made by pharmaceutical companies, hospitals, and other health institutions, social worlds in which lay participation may reinforce or promote biomedicalization processes, or have other less than desirable consequences. In the case of cardiovascular disease, where my analysis of constructions of "difference" and their role in the distribution and incidence of risk and disease indicated a sizeable science-lay divide, lay organizing and activism may have to take place outside of the institutions, frameworks, and assumptions of the current biomedical complex, particularly given the absence of a nationally recognized politicized group. Moreover, as numerous ST&MS scholars (Epstein 1995; 1996; Laird 1993; Nelkin & Pollak 1979) point out, the results of lay participation in science-making are complicated: some are simply attempts to coopt the public, expert-lay divisions can be replicated within social movements themselves, and lay activists might come to question the scientific value added of a more participatory and democratized science. The inclusion of lay expertise in CVD research and policy, then, is also likely to encounter similar difficulties, with the added epistemological

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complexities of meanings of "race," "class," and "gender" mentioned above.

In order for lay activists to have a measurable effect on how health research is conducted, epidemiology as a discipline must eventually change its own paradigms and practices. Enriching the definitions of "expertise" and "knowledge" would involve transforming what counts as "science" and what the boundaries of science are (Wynne 1996a), which in turn necessitates some reconsideration of the disciplinary cultures, and organizational infrastructure of health research. I turn to these policy implications below.

Rethinking Funding Priorities, Criteria, and Disciplinary Cultures

A third set of policy implications emerges from my findings that a wide range of political, economic, and organizational conditions not only constrained the development of alternative theory-methods packages in the epidemiology, but in fact encouraged the ritualized inclusion of individualized variables in order to build credibility. Replacing such practices with more carefully considered, theoretically grounded, and complex factors requires, therefore, addressing the conditions which reinforce and perpetuate them. This project suggests that one place to begin is with policies surrounding research funding—its priorities, the criteria by which proposals are judged, and prevailing definitions of feasibility and fundability.

First, I found that the execution of bureaucratic mandates to include racial and ethnic minorities and women in biomedical research may result in the inclusion of token diversity in research samples, without sufficient statistical power to reveal new and useful knowledge about the role of race, ethnicity, and sex/gender in health. Rather than simply requiring the inclusion of racial minorities and women, as epidemiologists perceive the

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current practice to be, funding criteria could more frequently reward explicit considerations of statistical power, even if research is conducted among only a few or in one under-represented group(s). Criteria could also explicitly mandate that researchers offer justifications for the particular groups that *are* chosen, as well as requiring rationales for why groups are *not* chosen, so that data collection and interpretation are guided by plausible, potential causes of differences rather than by convenience or a priori perceptions that differences might, or must, exist. That is, funding agencies could ask that investigators articulate the range of possible interpretations of any differences that might be found, and propose ways to analyze and weigh their relative likelihood as explanations for study results. Such measures may at least partially preclude the widespread but ineffectual tendency of health research to attribute disparities to unknown or uncertain mechanisms and to issue instead repeated calls for more future research.

Second, my findings also suggested that under the current scale of research funding, researchers find it almost impossible to undertake the long-range longitudinal studies that they feel are necessary to obtaining definitive answers about the effects of social factors and environment on CVD causation. Funding criteria and priorities that obligate funders to only short- to middle-range commitments, encourage financial parsimony, and inadvertently favor cost efficiency over conceptual and methodological advances should therefore be reconsidered. Funding agencies must rethink the time horizon of research and the scale of their funding: the epidemiologists I interviewed and observed almost unanimously argue that extensive, and expensive, cohort studies and more time- and labor-intensive data collection (including qualitative methods) have the best hope of contributing to our understanding of the intersecting roles of biology,

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behavior, and social context. One way to both address a frequently mentioned flaw in funding and potentially significantly reduce costs so that more high-priced longitudinal studies could be supported is to move away from disease-specific funding. Although this dissertation has focused on cardiovascular disease, many of its mechanisms are linked to those of other diseases, such as various forms of cancer, diabetes, and cerebrovascular diseases. Thus one study could, with sufficient financial and personnel support, examine multiple disease factors, processes, and outcomes.

Third, funding priorities and criteria also dissuade epidemiologists from using or developing emergent analytic techniques or new conceptualizations and models of disease processes and social factors. In addition, their discussions of collaboration and barriers to it point to how the disciplinary worldviews and commitments to which they and their fellow colleagues have been socialized lead almost inevitably to the distrust of alternative methods, insularity, and boundary-building and defense. Experimentation with unproven techniques and models is sorely needed to advance research in social inequalities in health; yet given that methodological "robustness" and credibility are central criteria for most funding agencies, it is no surprise that any such methodological uncertainties are seen as "the kiss of death for funding," as one epidemiologist put it. Grant programs, rather than rewarding conceptual and methodological conservatism, should explicitly encourage and support exploratory research in the use and elaboration of new conceptualizations of socio-demographic factors and disease mechanisms, and new models and analytic techniques. In these respects, the extent to which funders can promote transdisciplinary collaboration will be important. Epidemiologists, at least many of those I interviewed and observed, seem open and even eager to explore how

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sociologically-grounded concepts of stratification and "difference" might be used in health research. "Basic" social science research in theory-building around health inequalities can also lead to improved and new methods.[3]

Shifts in funding criteria and priorities, if structured right, could no doubt support more meaningful forms of representation in study samples, more longitudinal research, and greater interdisciplinary collaboration. Certainly there are scientists whom I have interviewed and observed whose scientific and political worldviews would inspire them to undertake more exploratory and epistemologically unconventional research, and experiment with uncertain methods, if only their profession rewarded such efforts. However, placing the source of the problem solely at the feet of funders would be erroneous. Framing the problem as one of funding is, in many ways, parallel to explaining the lack of people of color and women in positions of power in society by appealing to the "pipeline" issue: under-representation is often rationalized by asserting that the problem lies not with intention or motivation but with the lack of qualified candidates in the "pipeline." Similarly, the lack of more diverse methods, models, and types of data in cardiovascular epidemiology has been justified by arguing that there simply are not enough theoretical and methodological options available to researchers, rather than undertaking the work to find and develop such options and begin needed transformations in scientific frameworks and practices.

One important transformation in this regard would have to be a serious examination of the intersections of different dimensions of "difference" and the

[3] There are some encouraging signs in this respect. For example, the National Institutes of Health, spurred by recent efforts by the NIH Office of Behavioral and Social Sciences Research, launched in December 2001 a program to fund research on the social and cultural dimensions of health. See Conclusions section for additional detail.

consequences of group-based identities. My research has shown that the health effects of race, class, and gender cannot readily nor meaningfully be distinguished from each other, and that in lived experiences of cardiovascular disease, it makes little etiological sense to do so. On a technical level, of course, studying intersectionality would require, again, ensuring sufficient statistical power to compare different race-class-sex groups. But conceptually and epistemologically, such efforts would also require a fundamental shift in how epidemiologic science thinks about and treats "difference" in the context of health. While there are social processes consequential for cardiovascular risk that are predominantly racialized, classed, or gendered, attending to their interlocking dynamics constitutes a basic reconceptualization of the nature of "difference" and inequality as mutually constituted, sometimes synergistic, group-based, and relational. Effecting such epistemological transformations in the practice of epidemiology would require not only better and different kinds of funding and funders—they may be, in fact, neither necessary nor sufficient conditions for promoting such changes—but the scientific will to engage with lay and other forms of expertise, and basic reconstitutions of what defines "science." Therefore, this set of policy recommendations concentrating on the funding and disciplinary cultures of epidemiology in the end returns to the epistemological and indeed ideological issues outlined above regarding the boundaries between conceptions of "difference," disease causation, "expertise," and the social production of cardiovascular health and knowledge.

E. Conclusions

For many reasons, this is a pivotal moment in which to observe epidemiology and

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how it responds to pushes from within and outside its professional boundaries: a number of formal and informal campaigns are aimed at highlighting issues of inequality in health, such as the growing community of epidemiologists who are adopting the principles of "social epidemiology" in their work, burgeoning research in women's health, and the President's Initiative to Eliminate Racial Disparities in Health. Current debates about the meanings and consequences of "difference," and the conceptual and methodological challenges of the kind I have described have the potential to destabilize public perceptions of objectivity upon which the cultural authority of epidemiologic science rests. At the same time the convergence of increasing research in epidemiology and concerns about the unequal distribution of CVD can foster the growing prominence of epidemiology as a field of credible and necessary expertise.

Since I began this research, there has been a steady stream of health-related research and policy events that are also deeply *political* phenomena, raising fundamental questions of what we mean when we refer to differences of "race," "ethnicity," "culture," "class," "socioeconomic status," "sex," and "gender." These events are demonstrative of the ways in which the production of scientific knowledge and the boundaries of "science" are sites for the contestation, negotiation, and organization of "difference" and inequality. To briefly describe just a few examples:

- Since 2001, Ward Connerly and the organization he heads, the American Civil Rights Coalition, are seeking to put on the November 2002 California ballot a measure to bar state agencies from collecting, analyzing, sorting, or acting on any data on race, ethnicity, or national origin (see, e.g., Schevitz 2002). Connerly is perhaps best known for spearheading the campaign to eliminate the consideration of race and

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gender in public education, public contracting, and public employment in California, a battle in which he was ultimately successful against the opposition of numerous grassroots organizations. His latest measure to eliminate the collection of racial data is called the Racial Privacy Initiative. It however makes a key exemption for medical research subjects, allowing state agencies to continue to classify and analyze them by race, ethnicity, and national origin,[4] on the apparent basis that it remains important to explore the medical and treatment implications of any racial differences.

- There have been significant disputes throughout the late 1990s and early 2000s over the proper role of "race" in health and biomedicine (e.g., Exner, Dries, Domanski et al. 2001; Fullilove 1998; LaVeist 1996; Schwartz 2001; Wood 2001). Recent findings over potential differences in the efficacy of pharmacological therapies (e.g., Yancy, Fowler, Colucci et al. 2001) and in the use of various cardiovascular disease-related treatments (e.g., Ayanian, Udvarhelyi, Gatsonis et al. 1993; Escarce, Epstein, Colby et al. 1993; Wenneker & Epstein 1989; Whittle, Conigliaro, Good et al. 1993) have raised contentious debates over the definitions of "racism" and the nature of "race" in biomedicine, and made their way into mainstream media (e.g., Stolberg 2001). Such ongoing and recurring contestations about "racial profiling" (Schwartz 2001) in medical research and treatment allude to epistemological questions about the meanings of "race" and how it should be constructed and operationalized.
- In June 2000, the Office of Behavioral and Social Sciences Research at the National Institutes of Health convened a conference titled, "Toward Higher Levels of Analysis: Progress and Promise in Research on Social and Cultural Dimensions of Health."

[4] The measure also exempts the Department of Fair Employment and Housing, in order to comply with federal mandates and funding requirements.

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This conference had approximately 900 registered attendees for the public portion, and produced a final report that made key recommendations to improve social science research and integrate health research across multiple levels of analysis. A direct result of these efforts was the establishment of two new funding programs in late 2001 and early 2002. The first supports methodology and measurement research—into research design, data collection techniques, measurement, and data analysis techniques—in the social and behavioral sciences. These include: developing innovative multi-disciplinary, multi-method, and multi-level research designs; issues in research relating to diverse populations; generating designs to study the effects of changes in economic, social, environmental, physical, or political contexts; the study of potentially sensitive behaviors; and ethics in research (NIH Office of Behavioral and Social Sciences Research et al. 2002). The second funding program supports research on basic social and cultural constructs and processes used in health research, including "the implications of different conceptualizations and measurements of social stratification systems and processes ... for understanding health at the individual and higher levels of aggregation (e.g., community)." It is also intended to fund explorations into the social etiology of health and illness "to improve understanding of how macro-level (societal) factors, such as social policies, structures, and cultural norms, are linked to micro-level (individual) factors, such as a person's behaviors, and ultimately to health" (see NIH Office of Behavioral and Social Sciences Research et al. 2001).

In 2001, the Institute of Medicine (IOM), a part of the National Academy of Sciences, released its report on sex differences in health (Wizemann & Pardue 2001).

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Provocatively titled *Exploring the Biological Contributions to Human Health: Does Sex Matter?*, the IOM Committee on Understanding the Biology of Sex and Gender Differences concluded that sex differences rooted in biology did indeed matter, and proposed numerous recommendations to remedy what they saw as a deficit in research into the mechanisms and origins of such differences. But aside from brief discussion of the conceptual and linguistic conflation of "sex" and "gender," and the need to clarify their distinctions, no mention was made of gender. Almost one year later, the IOM released another report, entitled *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Smedley, Stith & Nelson 2002), that documents racial inequities in medical treatment and explores how people of color experience the health care environment.

What is clear from these recent historical events is that questions regarding the nature of "differences" like race, class, gender, and more recently, sexual orientation, in health and illness will continue to engage our empirical, intellectual, and policy attention.

Based on my research into the present state of the discipline of epidemiology, it appears that it is currently experiencing a period of unstable equilibrium during which conflicts and problems with the neglect of disparities, individualizing techniques, and the like expressed by members of the scientific community and from outside it become framed as the need for conceptual and methodological reforms. In response, some changes in the practice of epidemiology are being made, though often in a token and symbolic manner. This parallels, in many ways, Omi and Winant's (1994) conceptualization of the trajectory of racial hegemony. Initially, an unstable equilibrium exists, followed by a phase of crisis in which racial movements place demands on the

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state to make changes in the current racial order. In response, state institutions adopt strategies of absorption and insulation:

> *Absorption* reflects the realization that many demands are greater threats to the racial order before they are accepted than after they have been adopted in suitably moderate form. *Insulation* is a related process in which the state confines demands to terrains that are, if not entirely symbolic, at least not crucial to the operation of the racial order. These policies then become ideological elements ... State agencies might argue, for example, that they have already met reasonable movement demands, while movement groups might claim that reforms don't address the problem, don't go far enough, etc. (1994: 86-7)[5]

In the epidemiologic and biomedical sciences of "difference," absorption seems to be occurring now with modifications in epidemiologic practice that have a surface affinity to the demands being made—for example, regulatory changes that mandate the inclusion of women and minorities in government-funded research, changing standards of practice regarding the necessity to include measures of race, socioeconomic status, and sex in data collection and analysis, and some experimentation with alternative methods. However, as I have argued, the widespread acceptance and routinization of such modifications is both conceptually and methodologically problematic, and should not be black-boxed. Finally, insulation processes are present in the discourses promoting the separation of science from politics. Insulation can also be seen as many epidemiologists interpret these changes as scientifically flawed and symbolic gestures to political concerns that illegitimately have overridden their own expert judgment. They therefore have incorporated such concerns into their practice in a largely token manner through the routinized use of individualized measures of demographic "difference." This "usual

[5] See also Gramsci's (1971) notion of cooptation, and Poulantzas' (1975) discussion of politico-juridical ideological discourse.

[illegible]

suspects" approach then becomes ammunition for both sides of the conflict. It provides a way for many mainstream epidemiologists to argue that the demands to attend to the dimensions and causes of inequalities have been met. At the same time, it serves as an example mobilized by social epidemiologists, other scholars, and activists to argue that such nominal reforms cannot hope to answer fundamental questions of why inequalities in cardiovascular risk and disease occur and how they are produced.

Symbolic interactionist studies of health and illness, and social constructionist studies of science, technology, and medicine teach us, if nothing else, that meaning-making is a fluid, unstable, socially emergent enterprise. Thus I view these conclusions about current definitions of the nature of race, class, and sex/gender in cardiovascular health and the current status of the discipline of epidemiology as provisional, being constantly remade and unmade, and actively sustained and revised. Yet at the same time, racial, class, and gender formation theory also alerts us to the recycling of certain representations of "difference," and the persistent ways in which they are linked to institutional and organizational processes whose outcomes constitute a vast web of racial, class, and gender projects. These theoretical perspectives sensitize us to the nature of our knowledge of cardiovascular disease as a social enterprise in two overlapping senses: first, in the sense that its practices and content are shaped by processes that are often simultaneously scientific *and* thoroughly social; and second, in the sense that as a product of social interactions and relationships itself, it is an under-determined phenomenon. The enormous changes over its historic or even recent past highlight just how fluid a science it is, the uncertain outcome of a multitude of interactions, negotiated orders (Strauss 1978; Strauss et al. 1964), and revised meanings.

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In light of this, then, ongoing social research is necessary in several areas. First, while my dissertation has concentrated its focus on the sites of the production of epidemiologic knowledge, future research should also examine its application in clinical practice and biomedical treatment. Do epidemiologic constructions of the effects of sex, gender, race, ethnicity, culture, and class on cardiovascular health shape how providers practice medicine, and if so, in what ways? How do epidemiologic findings shape clinicians' conceptions of the boundaries between and relevance of human categories and groups? How do providers' understandings of social and bodily "differences" in cardiovascular risk and disease influence what they observe, what questions they ask of patients, and what conclusions they draw regarding diagnosis and treatment?

Another related area of research could also examine the implications of epidemiologic conceptions of "difference" for pharmaceutical research, development, and treatment, and vice versa. Given my data on the individualization of "difference," "risk," and interventions, the idea of chemoprevention—prevention in a pill—has been a growing and exceedingly attractive option for many.[6] Currently cholesterol- and blood pressure-lowering drugs are widely prescribed: approximately 13 million people are prescribed statins or other lipid-lowering medications (NHLBI 2001), and nearly 27 million take anti-hypertensives (American Heart Association 2001a). Moreover, recent amendments to therapeutic guidelines established by the National Cholesterol Education Program (run by the National Heart, Lung, and Blood Institute) and the American Heart Association and American College of Cardiology (by their Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) have

[6] See, for example, Fosket (2002) for an analysis of chemoprevention in breast cancer research.

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increased even further the population for whom pharmacological risk reduction is deemed appropriate, tripling it in the case of cholesterol-lowering drugs. Particularly interesting also are recent moves by pharmaceutical companies to explore the potential for tailored drugs for specific groups, based on epidemiologic and genetic studies of "druggable differences"[7] in metabolism and efficacy. One such drug, BiDil®, manufactured by Nitromed, Inc., has already received FDA approval to be tested for treatment of heart failure specifically among African Americans.[8] Pharmaceutical products such as BiDil have the potential to effect a kind of commodification of difference to be sold in global marketplace (Jameson 1984). In addition, their emergence plays a prominent role in contentious debates over racial difference and disease, and the necessity, scientific validity, or obsolescence of race-based medicine and genomics. Analysis of these and other clinical applications of epidemiologic science on cardiovascular disease would help to articulate the material consequences of epidemiologic representations of racial, class, and sex/gender differences for biomedical interventions, and how biomedical domains of power-knowledge participate in processes of racial, class, and gender formation.

Another area deserving further attention is the elaboration of cultural health capital. Individuals with CVD were frequently called upon to mobilize a set of skills, attitudes, and competencies whose distribution and access is highly stratified, in exchange for a wide variety of health-related resources, such as medical attention and

[7] This was the term used by an executive from a major pharmaceutical company, speaking at a 2001 scientific conference at which I conducted participant observation, to characterize genetic differences that lent themselves well to pharmacologic intervention.

[8] Clinical trial data on BiDil's effects in a study population of whites and African Americans had previously failed to win FDA approval. However, subsequent re-analysis of the data revealed greater efficacy among African Americans, and on this basis the FDA earlier this year granted approval to begin a clinical trial among a larger sample of African Americans.

information. Within knowledges and discourses of cardiovascular risk and disease, such imperatives were particularly strong, however, additional case studies are needed to ascertain whether and how cultural health capital operates similarly or differently in other illness contexts. Also of note is that although these kinds of health imperatives are very pervasive and often experienced as onerous, people of color with CVD still relied heavily upon their biographical experiences to understand how their social conditions constitute fundamental causes of disease. At the same time many were able to mobilize various resources constituting cultural health capital in order to meet their health-related needs. Here, therefore, it appears that people with CVD deploy cultural health capital quite strategically—less an indication of the level of their belief in qualities such as Western scientific rationality, a proactive stance towards self-knowledge and self-transformation, and cues of economic status, than a pragmatic understanding that exhibiting such traits brings results. Through its mechanisms of transmission, mobilization, and ideological veiling, cultural health capital in the context of cardiovascular disease contributes to the reproduction of social inequalities in health, and thus to link micro-interactional and macro-structural dynamics in health. But future research can help to elaborate further on these functions and consequences of cultural health capital as a meso-level social process, and in other contexts and with other populations.

Finally, additional research is needed into the role and consequences of lay knowledges for epidemiologic knowledge on cardiovascular disease. Analyses of the participation of activists in the construction of scientific knowledge (Epstein 1995; 1996; Laird 1993; Nelkin & Pollak 1979) sensitize us to the possible depoliticization and attenuation of lay knowledges when they become incorporated under the auspices of

"improving" science. This is *not* to say, however, that such efforts should not be made, but rather that attention should be given to *how* and with what consequences lay experts can be included in the construction of "official" knowledge. Therefore, the examination of the cases of breast cancer, AIDS, and other arenas of health activism, and additional research into whether and how the case of cardiovascular disease may or may not be different, and whether these other instances can serve as models for the broader participation of lay expertise in CVD research would be critically important.

To conclude then, cardiovascular risk and disease is a critical site at which racial, class, and gender formation processes, technical and structural conditions of scientific knowledge production, and lived and biographical experiences converge to create a science-lay divide over the causes of disease, conceptions of "difference," and the possibilities for remedying health inequalities. Such convergences create a fertile place from which to generate sociological insights into the production of health inequalities, the construction of scientific certainty, conceptions of lay expertise, fundamental causes of disease, and critical meso-level processes in health like racial, class, and gender formation, biomedicalization, and cultural health capital. Furthermore, this dissertation has shown that an empirical and theoretical analysis of this site also provides greater understanding of the institutional and everyday politics of knowledge (see Cozzens & Woodhouse 1995), and the nature of relations and mechanisms of power in the contemporary world. As such, this research is an attempt to provide the basis for an intervention into the production of "official" science on cardiovascular health, an effort to re-merge the political and the technical, and to reject the categorization of knowledges as either "expert knowledge" or "mere opinion," a separation that Haraway (1997: 24) calls

the "founding gesture of what we call modernity." Understanding the possibilities for pursuing social justice in our everyday lives requires that we re-examine how science and epidemiology construct and legitimate knowledges that constrain the prospects for social change.

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Appendix: Interview Guides and Questionnaire

Initial Interview Guide for Epidemiologists

Revised Interview Guide for Epidemiologists

Interview Guide for People of Color with Cardiovascular Disease

Background Information Questionnaire for People of Color with Cardiovascular Disease

INITIAL INTERVIEW GUIDE FOR EPIDEMIOLOGISTS

1. How did you get involved in cardiovascular epidemiology/research?

2. What characteristics of individuals do you think are important in understanding and studying cardiovascular outcomes and health?
   - Why?

3. What do you think are the general issues about heart disease risk factors that are, for the most part, "settled" and widely accepted?

4. I've noticed that, over time, that many more studies are focusing on the distribution of heart disease across different population groups, and paying attention to the measurement of racial, social class, and gender differences. What do you think explains this emerging set of concerns?

5. How do measures of race, ethnicity, social class, and gender fit in your own research?
   - How do you conceive of these variables or measures when considering research design, analysis, or interpretation?
   - What have you found when using those measures? What answers do they provide?
   - What new issues or questions do they raise?

6. What do you think are some of the new things we are learning about the etiology and progression of heart disease that comes from studies that look at racial, socioeconomic, and gender differences?

7. What questions remain unanswered on issues of demographic differences in heart disease incidence?
   - How best might we approach these questions?
   - What does the research community need to do?
   - Do you think current research techniques and practices are sufficient to address them?

8. What are some of the important studies/publications in the field of cardiovascular epidemiology and demographic inequalities?
   - In what ways are these studies important?

9. Can you think of a recent study that dealt with demographic differences that you thought was innovative, creative, especially perceptive?
   - What about the study(ies) impressed you?

10. Do you think this kind of research has impacted outcomes and survival? In what ways?
    - Do you think research into inequalities in heart disease has led to changes in

clinical treatments?
- Do you think these concerns around disparities and differences are important for future advances in treatment? In what ways?
- Do you think these concerns will impact future outcomes and survival for different groups and populations? In what ways?

11. Now thinking about cardiovascular disease more broadly, what do you think are some of the more important general issues that have yet to fully explored that you haven't already mentioned?
    - How do you think they can best be studied?

12. I've noticed an increasing number and availability of various risk assessment tools for heart disease, that can be used by individuals to measure their risks and help decide what to do about them. What do you think about these assessment tools?

13. Is there anything else you want to add?

14. Are there other researchers working on differences in heart disease who you would recommend I interview?

15. If I need further information, may I contact you again?

REVISED INTERVIEW GUIDE FOR EPIDEMIOLOGISTS

1. How would you characterize yourself professionally, and how would you characterize the research that you do?

2. What do you think are the general issues about cardiovascular disease risk factors that are, for the most part, "settled" and widely accepted?

3. What characteristics of individuals do you think are important in understanding and studying cardiovascular outcomes and health?
   - Why?

4. I've noticed that, over the past several decades, that many more epidemiologic studies are focusing on the distribution of heart disease across different population groups, and paying attention to the measurement of racial, social class, and gender differences. What do you think explains the emergence of concerns about these disparities?

5. Thinking about these recent studies that examine racial, socioeconomic, and gender differences, what's the value added to our state of knowledge when we include these variables?
   - What do we learn about the etiology of heart disease from including them?

6. What are some of the important studies/publications in the field of cardiovascular epidemiology and demographic inequalities?
   - In what ways are these studies important?

7. Are there any issues in the area of cardiovascular disease differences that you would like to measure or study?
   - Why do you feel these are important issues to pursue?
   - Which issues are we able to pursue now?
   - Are there any particular challenges to answering other questions? What are they?

8. What questions remain unanswered on issues of demographic differences in heart disease incidence?
   - How do you think they can best be studied?
   - Do you think current theories and research methods are sufficient to address them?
   - What does the research community need to do to answer these questions? What specifically are we currently able to do?
   - Are there any particular challenges to answering those questions? What are they?

9. Do you think that issues of racial, socioeconomic, and sex or gender differentials in cardiovascular disease are the proper domain and object of study for epidemiology? Why or why not? In what ways?

- [If YES] What conceptual or methodological advances do we need to make in order to fully explore and understand these issues?

10. When I first described my research to you, I mentioned that I was particularly interested in how racial, socioeconomic, and gender variables and differences are studied in cardiovascular epidemiology. I'd like to ask a series of questions about this. First, how do measures of socioeconomic status or social class fit in your own research?
    - How do you conceive of these variables when considering research design, analysis, or interpretation?
    - What have you found when using those measures? What answers do they provide?
    - What new questions or issues do they raise?

11. Second, how do measures of race or ethnicity fit in your own research?
    - [Probe as in #10]

12. Third, how do measures of sex or gender fit in your own research?
    - [Probe as in #10]

13. What, if anything, is the public role of epidemiological research? How do you think the results of research are used by others outside of the epidemiologist community (public health, policy decisionmaking, others kinds of activities in the public/political realm)?

14. Can you think of a recent study that dealt with demographic differences that you thought was innovative, creative, especially perceptive?
    - What about the study(ies) impressed you?

15. I've noticed an increasing number and availability of various risk assessment tools for heart disease, that can be used by individuals to measure their risks and help decide what to do about them. What do you think about these assessment tools?

16. I'd like to end the formal interview by asking you how you identify yourself in terms of race or ethnicity?

17. Is there anything else you want to add?

18. Are there other researchers working on differences in cardiovascular disease who you would recommend I interview?

INTERVIEW GUIDE FOR PEOPLE OF COLOR WITH CARDIOVASCULAR DISEASE

1. Can you tell me a little bit about your hypertension (htn) or your heart disease (hd)? How did you find out about it?

2. Were you surprised when you found out you had it? Why or why not?
   a. Did you think you were at risk for htn/hd before you were diagnosed? Why or why not?
   b. Where did you get this kind of information before your diagnosis?
   c. What was your opinion of those sources of information? How did you feel about them?
      - Did you find them useful or not?
      - Did you believe in them, or trust them?

3. Now if you could think to when you first found out about your condition, who diagnosed your htn/hd? What did you find out about htn/hd and its risk factors from that person?
   a. Did that person give you all your information about your condition then, or did you go to other places? ["Sources of information"]
      - Probes: other providers, family, friends, written materials, internet, support groups.
   b. Why did you choose to go to these sources for information?
   c. What's your opinion of these sources of information?
      - Do you find it useful or not?
      - Do you believe in it, or trust it?

4. So now, what do you know about the causes or risk factors for htn/hd?
   a. First of all, what do you think are the causes or risk factors for htn/hd in general? ["general causes"]
   b. Do you think these causes or risk factors apply to <u>your</u> own case? What do you think are the reasons why <u>you</u> got htn/hd? ["own causes"]

5. What do you think are the general ways a person can deal with or reduce their risks for htn/hd? ["general management strategies"]
   a. What, if anything, do you do to improve <u>your</u> htn/hd or prevent it from getting worse? ["own management strategies"]

6. Now I'd like to ask you a series of questions that have to do with your economic situation, your gender, and your race and ethnicity. First, I'd like to ask you to think about your gender. How do you think being a *woman/man* made things different for you? Harder? Easier?
   a. How has it affected your life?
   b. For example, how has it affected your work life, your life at home, your life in the

community?
- Probe: for specific experiences and benefits/disadvantages

7. Do you think there are connections between these experiences and your health and your htn/hd specifically?
   a. Do you think it affects how you take care of yourself or how well you can take care of yourself? How?

8. Do you think that there are risks or causes for htn/hd that are unique to *men/women*? Different for individuals of your gender? More or less of an issue for your gender?

9. Next, I'd like to ask you to think about your economic situation, or your class background. Can you tell me what your economic background is like?

10. Do you think that there are risks or causes for htn/hd that are unique to *social class*? Different for individuals of similar economic background? More or less of an issue for people of your socioeconomic background?

11. What does being *class* mean to you? How has it affected your life?
    a. For example, how has it shaped or influenced your work life, your life at home, your life in the community?
    b. Are there any sorts of benefits or disadvantages or sources of stress that come out of being *class*?
       - Probe: for specific experiences and benefits/disadvantages

12. Do you think growing up like that had an effect on your health?
    a. Do you think there are connections between these experiences and your health and your htn/hd specifically?
    b. Do you think it affects how you take care of yourself or how well you can take care of yourself? How?

13. Finally, I'd like to talk about your racial background. How do you describe your race or ethnicity? What's your racial or ethnic background?

14. Do you think that there are risks or causes for htn/hd that are unique to *their racial group*? Different for *their race*? More or less of an issue for people who are *their racial group*?

15. What does being *race* mean to you? How has it affected your life?
    a. For example, how has it shaped or influenced your work life, your life at home, your life in the community?
    b. Are there any sorts of benefits or disadvantages or sources of stress that come out of being *race*?
       - Probe: for specific experiences and benefits/disadvantages

16. Do you think growing up like that had an effect on your health?
    a. Do you think there are connections between these experiences and your health and your htn/hd specifically?
    b. Do you think it affects how you take care of yourself or how well you can take care of yourself? How?

17. Scientists are now finding out that htn/hd occur more often in Blacks, Latinos, and Asian Pacific Islanders, and among poor and working class folks. Why do you think this is?
    a. Why do you think we see more of these kinds of diseases and conditions in these groups?
    b. Why do you think scientists are paying more attention to these issues now?

18. Is there anything else you want to add?

19. If I need further information, may I contact you again?

BACKGROUND INFORMATION QUESTIONNAIRE

Instructions: This questionnaire is designed to collect background information from study participants. Some of the questions are of a personal nature, and so it is entirely your choice whether or not you answer a specific question. Your participation in this study will not be affected by your responses. However, since this information may be important to the objectives of this study, we would appreciate any information you feel comfortable sharing. Your name does not appear on this questionnaire, and your anonymity will be strictly protected.

Please choose a first name (not your own) to protect your anonymity:_____

Please identify or describe your heart condition(s): _____

_____

When were you diagnosed with your first heart condition (month/year)? _____ /_____

What is your occupation or former occupation? _____

What is the occupation or former occupation of your partner/spouse with whom you share income (write "N/A" if not applicable)? _____

Please estimate your annual family income (check one box below):

- ☐ Less than $15,000
- ☐ $15,001 to $25,000
- ☐ $25,001 to $35,000
- ☐ $35,000 to $50,000
- ☐ $50,001 to $75,000
- ☐ More than $75,000

Please indicate your highest level of education (check one box below):

- ☐ Some high school
- ☐ High school degree
- ☐ Some college
- ☐ College degree
- ☐ Postgraduate education or degree

Please estimate the combined value of all the assets (such as a home, car, financial assets) that you own:

- ☐ Less than $10,000
- ☐ $10,001 to $25,000
- ☐ $25,001 to $50,000
- ☐ $50,001 to $75,000
- ☐ $75,001 to $100,000
- ☐$100,001 to $250,000
- ☐ More than $250,000

When were you born (month/year)? _____ /_____

Please indicate your sex: ☐ Female ☐ Male

How would you describe your race and/or ethnicity? _____

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