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Health and Its Contextual Determinants of Rural Adolescents in California

Author
Curtis, Alexa Colgrove

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Health and Its Contextual Determinants of Rural Adolescents in California

by

Alexa Colgrove Curtis

DISSERTATION

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DEDICATION

This dissertation is dedicated first to the youth who inspired this research and the professionals who persevere daily to make a difference in lives of adolescents. In particular, Jill Haley, Rose Murphy, and Karen Harris, I admire you and thank you for the wonderful work you do.

And then of course, to my family, my husband, Mike, and children, Cody, Grayson, Bobby, and Emma. You all deserve an honorary degree for your contributions of perspective and forgiveness for the many hours I spent consumed by this dissertation. I endured only through your love, support and understanding.

Finally to my parents, Dr. Robert Colgrove and Kathryn Boag Colgrove, who taught and lived the motto, “they won’t care how much you know until they know how much you care”. This work is a tribute to your lifelong dedication to serving humanity.

Aut viam inveniam aut faciam

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ABSTRACT

HEALTH AND ITS CONTEXTUAL DETERMINANTS OF RURAL ADOLESCENTS IN CALIFORNIA

Alexa Colgrove Curtis

Background: Adolescence is a critical developmental period, providing the foundation for both opportunity and risk in adult life. The sociocultural context of the rural community presents unique challenges for rural adolescent health. Patterns of connectedness between the adolescent and the social environment have demonstrated mitigation of risk behaviors in previous studies.

Purpose: To describe the health of rural adolescents, 12 to 17 years, in California and to explore the relationship between health behaviors and connectedness to the social context among middle adolescents, ages 14 to 17 years, in the rural community.

Method: A secondary data analysis of the 2005 and 2003 Adolescent California Health Interview Survey (CHIS) was conducted in an ethnically and economically diverse sample of 663 and 492, respectively. The 2005 CHIS survey was used to examine the rural adolescent health in California. The 2003 CHIS survey was used to examine the influence of social connectedness on health behaviors.

Results: A majority of rural adolescents in California report good to excellent health however significant risk behaviors exist including impaired fitness and nutrition, sexual health risks, substance use, depression, and intra-personal violence. The most influential connectedness factor demonstrating reduced health risk is the home environment, in particular an adult within in the home who “believes the adolescent will be a success”.

Although the majority of rural adolescents can identify a usual source of care, few are certain they can access confidential services. Many adolescents, particularly minority and low income youth, rely upon community health services.

Conclusions: Adolescence is a critical developmental period and adolescents are a potentially vulnerable population. Health risks exist within the rural adolescent population at least equivalent to urban and suburban settings but rural adolescents may be particularly vulnerable related to limited resources to support positive development. Connnectedness to social contexts are important for the health of middle adolescents in the rural community. Further research is required examining health and health behaviors, and relationship to social connectedness in rural adolescents. Research that adequately samples high risk rural adolescents is particularly needed.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Adolescence is recognized as a critical developmental period, providing the foundation for risk, resiliency, and opportunity in adult existence (Graber & Brooks-Gunn, 1996; Savin, 1991; Yohalem & Pittman, 2001). Although there exists tremendous variability in the chronological definition of adolescence in the literature, adolescence globally refers to the ages of 10-24 (American Academy of Pediatrics [AAP], 2000, 2005; Blum & Nelson-Nmari, 2004; Fleming, Towey & Jarosik, 2000; MacKay, Fingerhut, & Duran, 2000; Society for Adolescent Medicine [SAM], 2005; Steinberg, 2002; World Health Organization [WHO],2004). Tremendous developmental discrepancy exist during these ages, therefore, "adolescence" is generally divided into three sub-stages: early, middle, and late (Arnett, 2000; Irwin, Burg, & Cart, 2002; Millstein, Petersen, & Nightengale, 1993; Nienstein & Kaufman, 2002). These sub-stages represent significant points of transition within the spectrum of adolescent development, as both developmental opportunities and risk behaviors increase throughout adolescence (Harris et al., 2006).

Patterns of behaviors and health practices begun in adolescence may significantly impact the health and well-being of the adolescent over the course of a lifetime (Earls, 1991; Yohalem & Pittman, 2001). Currently, the most common causes of morbidity and mortality in adolescence arise from preventable conditions related to lifestyle behaviors (Brindis et al., 2004; Ozer et al., 2003). Critical issues in adolescent health, corresponding to the Healthy Youth 2010 objectives, include obesity, mental health,

substance use, sexually transmitted infections including the human immunodeficiency virus, unintended pregnancy, violence and accidental injury (Brindis et al., 2004; Ozer et al., 2003; Towey & Fleming, 2007). Unhealthful behaviors during adolescence may initiate the trajectory for chronic conditions of adulthood, including cancer, diabetes, heart disease, substance abuse, physical disability and mental health issues (Earls, 1991). Therefore, current research in adolescent health emphasizes preventable causes of morbidity and mortality and adolescent lifestyle health behaviors (Ozer, et al., 2002).

Increasingly, data are emerging supporting the impact of contextual influences on adolescent health (Blum, 2004; Resnick, 1997). Important contexts for adolescent health and development include the family, the school, and the community (Blum, 2004; Resnick, 1997). Adolescents with diminished parental/guardian support and supervision are noted to engage in more unhealthful behaviors, potentially incurring impaired health and developmental outcomes (Brindis, 2004; Miller & Benson, 2001; Ozer et al., 2003; Resnick, 1997; Scaramella & Keyes, 2001). In addition, adolescent connectedness to school and community environments has been identified as an important factor in the reduction of risk behaviors, with greater perceived connectedness corresponding to more positive outcomes (Epstein, Botiv & Spoth, 2003; Kostelecky, 2005; Rountree & Clayton, 1999, Shears, Edwards, & Stanley, 2006). From a developmental-contextual perspective, adolescent connectedness to influential factors, such as the family and school networks, is encompassed within, and influenced by, the larger cultural community (Lerner, 2002).

The sociocultural context of the rural environment presents a unique and frequently challenging setting for adolescent health (Bushy, 2004; Campbell & Gordon, 2003;

California State Rural Health Association [CSRHA], 2005). Unfortunately, the empirical information available on adolescents in the rural setting is limited and underrepresented in the health literature, resulting in inadequate data on the health of rural adolescents. The limited data available on rural adolescent health suggest rural youth maintain health risks at least equivalent to and possibly exceeding those of urban populations (Atav & Spencer, 2002; Levine & Coupey, 2003; Shi & Stevens, 2005; Spoth et al., 2001; Riley et al., 1996). Additionally, the data suggest rural adolescents may experience significant barriers to health care and other positive youth development resources (Bushy, 2004; Campbell & Gordon, 2003; Elliot & Larson, 2004; Leight, 2003; Levine & Coupey, 2003; Warner et al., 2005). Furthermore, ethnic minority rural adolescents may experience even greater barriers to health resources and are potentially at risk for worse developmental outcomes than non-minority rural adolescents (Champion et al., 2004; Gray & Winterowd, 2002; Harris et al., 2006).

Background and Significance of the Problem

The 2003 United Nations Population Fund (UNPF) reports, "the international community is being blamed for neglecting the social and economic needs of the largest generation of adolescents in history, about 1.2 billion out of a world population of 6.0 billion, who will soon enter adulthood." The UNPF Executive Director Obaid called the recent report a "wake-up call to listen to young people and acknowledge their needs" (UNPF, 2003). Results of a national public opinion poll indicate 85% of Americans agree that more attention should be directed to the needs of vulnerable youth; 31% of them agree that youth in their communities are at-risk for serious problems; and 60% of them are concerned that the problems of adolescents are likely to increase (Bowen &

Chapman, 1996). Given that the national adolescent population is estimated to increase until the year 2020, with projected concentrations occurring in California and adjoining southwest regions, the prevalence of high-risk youth is likely to rise proportionately and concomitantly with an increased demand for health services (Ozer, et al., 1998).

Approximately 21% of American citizens reside in rural settings (United States [US] Census Bureau, 2004). Rural communities include a higher proportion of impoverished residents than urban environments, including 50% of America's medically uninsured population (Bushy, 2004; Office of Rural Health Policy [ORHP], 2002). California state statistics for the rural population reflect national trends. In California, rural counties represent 80% of the land mass and approximately 15% of the population (CSRHA, 2005). Similar to the national statistics, the population of rural California is currently increasing, along with increasing numbers of adolescents, ethnic minorities, and immigrant citizens (CSRHA, 2005; Ozer, et al., 1998; Ozer et al., 2003). Rising poverty and an increasing incidence of single–parent families are concurrent sociodemographic realities in California, and nationally, that are likely to have a significant impact on adolescent health and development in rural environments (CSRHA, 2005; Ozer, et al., 1998; Ozer et al., 2003).

According to the National Adolescent Health Information Center (2000), nearly one in five, or 1 million adolescents live in poverty. Poor rural youth are disproportionately disadvantaged due to limited access to health care services, reduced educational resources, insufficient youth development programs, and frequently inadequate basic resources such as communication and transportation (Save the Children, 2002). Lack of these resources, in conjunction with increased economic stress and decreased

parental/guardian support, potentially escalates the incidence and exacerbates the vulnerability of adolescents in the rural community.

Adolescent health issues are largely preventable and modifiable, potentially impacting the long-term health status of the individual and the community. Many adolescent health problems, and subsequent adult morbidity and mortality, manifest from risky habits and behaviors that were initiated during the adolescent years, such as a sedentary lifestyle, poor dietary choices, abusing alcohol and drugs, and engaging in unprotected sexual encounters (Brindis et al., 1999; Ozer, et al., 2003; Steinberg, 2002). High-risk adolescents, including rural, ethnic-minority, lower socioeconomic, and youth with limited parental/guardian support, have been shown to have higher rates of morbidity, mortality, and risky health behaviors in almost every category studied (Atav & Spencer, 2002; Brindis, 2004; Champion et al., 2004; Gray & Winterwod, 2002; Harris et al, 2006; Miller & Benson, 2001; Ozer et al., 2003; Resnick, 1997; Riley et al., 1996; Scaramella & Keyes, 2001; Shi & Stevens, 2005; Spoth et al., 2001).

Adolescents are the least likely population to obtain health care services through traditional, office-based practices (Newacheck et al., 1999). Adolescents consistently demonstrate lower rates of health care access and utilization as compared to younger and older populations (MacKay, et al., 2000), including a relatively high (up to 44%) incidence of deferred medical attention for significant health issues (Elliott & Larson, 2004; Ford, Bearman, Peter, & Moody, 1999). The availability of health insurance, a major determinant of access to and utilization of health care services, is consistently the lowest for adolescents and young adults in America (Newacheck et al., 1999). Significant racial and ethnic disparities exist in health care coverage: Hispanic adolescents have the

highest uninsured rate at 27.7%, followed by an uninsured rate of 12% for African American adolescents (Newacheck, et al., 2004).

The challenge of understanding and improving the health of rural adolescents responds directly to the Healthy People 2010 and the Rural Healthy People 2010 national initiatives (U.S. Department of Health & Human Services [USDHHS], 2000; Gamm et al., 2003). The health needs of populations who live in rural environments differ substantially from those who live in urban and suburban settings, and currently, those health needs are inadequately understood and are not sufficiently addressed in health policy or by the health care delivery system (California State Rural Health Association [CSRHA], 2005; California Rural Health Policy Council [CRHPC], 2003).

Statement of the Purpose of the Study

The goal of this investigation is to advance the understanding of health and its contextual determinants in the rural adolescent population, using data from the 2003 and 2005 adolescent California Health Interview Survey (CHIS). The purposes of the study are to (a) describe the health of rural adolescents, 12 to 17 years, in California, and (b) explore the relationship between health behaviors and contextual factors in middle adolescents, 14 to 17 years, in rural California. Health variables include physical health (health status, adiposity), emotional health, health behaviors (nutrition, physical activity, safety, substance use, and sexual activity), and health care access. The contextual variables are connectedness to the home and school environment, within the rural community. Sociodemographic characteristics are also considered including, age, race/ethnicity, and poverty level. The long-term goal of the investigation is to enhance the health and development of the adolescent population within the rural community.

Assumptions of the Study

The following assumptions underlie the study. Health characteristics of rural adolescents are comparable to urban adolescents, however the environmental context of rurality influences the health and development of the adolescent population. Patterns of health are similar between male and female rural adolescents. Connectedness to home and school within the rural environment is an influential factor in predicting the health of rural adolescents. Socioeconomics and race/ethnicity influence the health of rural adolescents. There are unique and distinct categories of adolescent development: early adolescence (10 to 13 years), middle adolescence (14 to 17 years), and late adolescence (18 to 24 years). Risk behaviors differ between the adolescent sub-categories and increase with age throughout adolescence. Data collected by the CHIS are representative of the rural adolescent population in California.

Content of the Dissertation

The dissertation is comprised of seven chapters, including this introductory chapter. Chapter II explores the positive youth development perspective for conceptually understanding adolescents as a uniquely vulnerable population. Chapter III presents literature relevant to the definition of adolescence and rural adolescent health. Chapter IV offers ethical considerations for adolescent health research in the rural community.

Chapters V and VI are papers that describe the results of secondary data analyses of the 2003 and 2005 Adolescent CHIS. Using the 2005 CHIS data, the paper presented in Chapter V describes the health of rural adolescents, 12 to 17 years, in California. The paper presented in Chapter VI explores the relationship between health behaviors and social connectedness in middle adolescents, 14 to 17 years, in rural California, using the

2003 CHIS data. The 2003 data are used because connectedness was not assessed as thoroughly in the 2005 CHIS. Both papers examine the influence of age, race/ethnicity, and poverty level. The last chapter, VIII, concludes with a summary of the study findings, limitations of the study, implications, and recommendations for further research.

CHAPTER II

CONCEPTUAL FRAMEWORK

This chapter consists of a discussion of the positive youth development perspective for conceptually understanding adolescents as a uniquely vulnerable population during a critical developmental period. The foci of this discussion are the public health conception of vulnerable populations and empirical and conceptual understandings of adolescent risk and resiliency within a vulnerable population framework. In this chapter, an argument will be made for conceptualizing adolescents as a vulnerable population that is consistent with the current theoretical appreciation for positive youth development.

Positive Youth Development Perspective

Adolescence is a critical developmental period establishing the trajectory for adult life. A multitude of biopsychosocial transitions occurs during adolescence creating the potential for vulnerability distinct from the broader experience of childhood. Health and development in adolescence is greatly influenced by an array of external forces, including the family, school, and community environments (Benson, 2002; Lerner, 2002). Adolescents reflect the public health criteria for vulnerable populations because they maintain limited control over the forces that significantly affect critical developmental outcomes. It is imperative for community health providers to remain actively cognizant of adolescent vulnerability in order to protect the health and developmental well-being of the population. An under-appreciation for the potential vulnerability of adolescents can lead to inadequate resource development and availability, and ultimately deficits in adolescent health.

An understanding of adolescents as a vulnerable population is not incommensurate with an appreciation for the positive youth development theoretical perspective. Positive youth development emphasizes adolescent assets including intra-personal, inter-personal, and community resources, and minimizes the focus on adolescent problem behaviors. Positive youth development is founded on the assumption that every young person maintains the potential for successful development (Lerner, Brentano, Dowling, & Anderson, 2002). Advocates of positive youth development may interpret the classification of adolescents as a vulnerable population as a rebuke to the positive youth development movement. This is not the case. To be vulnerable does not infer a lack of potential, but rather a risk for unrealized potential through active or passive neglect of developmental needs. Adolescents maintain limited influence over many of the resources that support essential aspects of positive youth development (Lerner, 2002). Dependence on external resources and limited influence over environmental contexts, exacerbate adolescent vulnerability, not a deficit of innate adolescent potential.

The positive youth development agenda was articulated and advocated by several large, influential research and policy organizations in the 1990s including: the Carnegie Council on Adolescent Development (Carnegie Corporation, 1995), the U.S. Department of Health and Human Services (USDHHS, 1996), the Annie E. Casey Foundation (Annie E. Casey Foundation, 1995), the Robert Wood Johnson Foundation (Roth et al., 1997), and the Office of Juvenile Justice and Delinquency Prevention (Office of Juvenile Justice and Delinquency Prevention, 1995). At the time, the positive youth development movement was a considered a paradigmatic shift from the pervasive preventive science approach (Catalano, et al., 2002; Kuhn, 1970). Preventive science efforts focused on

adolescent problem behaviors and behavior specific interventions, such as sexual risk taking and substance use (Catalano, 2002; Lerner, Brentano, Dowling & Anderson, 2002; Roth & Brooks-Gunn, 2003). Historically, preventive developmental science theories were primarily reductionistic and mechanistic, relying on behavioral theories, psychoanalytical theory or behavioral genetics (Catalano et al., 2002; Lerner et. al, 2002). Philosophically, preventive science was organized from a teleological, organismic perspective of development (Catalano et al., 2002; Lerner et. al, 2002). This perspective assumed a pre-determined, intrinsically driven developmental sequence, such as the "storm and strife" conceptualization of adolescence. The organismic developmentalist may argue that "storm and strife" is an inevitable manifestation in adolescence and preventive science emphasized methods to control and manage undesirable behaviors.

In contrast, the theory of positive youth development emphasizes youth assets, and regards adolescents as resources to be empowered, as opposed to problems to be solved (Catalano et al., 2002). The positive youth development theoretical framework constructs an understanding of development that is contextually and temporally situated, manifesting relative plasticity (Catalano et al., 2002; Lerner et al., 2002). Relative plasticity is a non-teleological approach assuming the capacity for diversity and change throughout developmental transitions (Lerner et al., 2002). The positive youth development perspective emphasizes positive attributes and contributions of the "whole adolescent" in context (Catalano et al., 2002; Lerner et al., 2002). A dynamic, multidirectional relationship between the adolescent and all facets of the environment is assumed (Catalano et al., 2002; Lerner et al., 2002). Influential theoretical fore-bearers of the positive youth development movement include Brofenbrenner and his theory of the

ecology of human development (Bronfenbrenner, 1979), Jessor's work on risk and resiliency (Jessor, 1991), and Lerner's theory of Developmental Contextualism (Lerner, 2002; Benson, 2002).

Actualization of the positive youth development theory emphasizes strengthening youth assets, and is as varied as the communities and populations served (Benson, 2002; Gallagher, Stanley, Shearer & Mosca, 2005). Most of the programs promote the "five Cs" of positive youth development, including: competence, confidence, character, social connection, and caring (Lerner et al., 2002; Roth & Brooks-Gunn, 2003). The desired outcome of positive youth development is considered conceptually as "thriving" (Lerner et al., 2002). An adolescent is understood to be "thriving" if he or she is engaged over time in healthy, positive relationships with the environment (Lerner et al., 2002). "Thriving" is operationalized through behavioral indicators such as academic achievement, prosocial behaviors, vocational skills, delay of gratification, and affirmation of diversity (Benson, 2002; Roth & Brooks-Gunn, 2003). Adolescent "thriving" is fostered by positive youth development resources, such as schools and service clubs, that promote competence and enhance a sense of connectedness to the social and community context (Benson, 2002; Bernat & Resnick, 2006). The optimal product of a "thriving" adolescent is described as "idealized personhood", an adult life involving "culturally valued contributions to self, others, and institutions" (Lerner et al., 2002, p. 15).

Developmental Contextualism and Positive Youth Development

Richard Lerner's Developmental-Contextual Model of Adolescent Development provides a theoretical depiction of the contextual assets that support positive youth development (Lerner, 2002). From the theoretical perspective of the Developmental-Contextual Model, adolescent health and developmental are influenced by dynamic interactions between the adolescent, family, school and social networks (See Figure 1). These contextual interactions are situated within, and influenced by, the concentric reciprocal interactions of the community, society and culture.

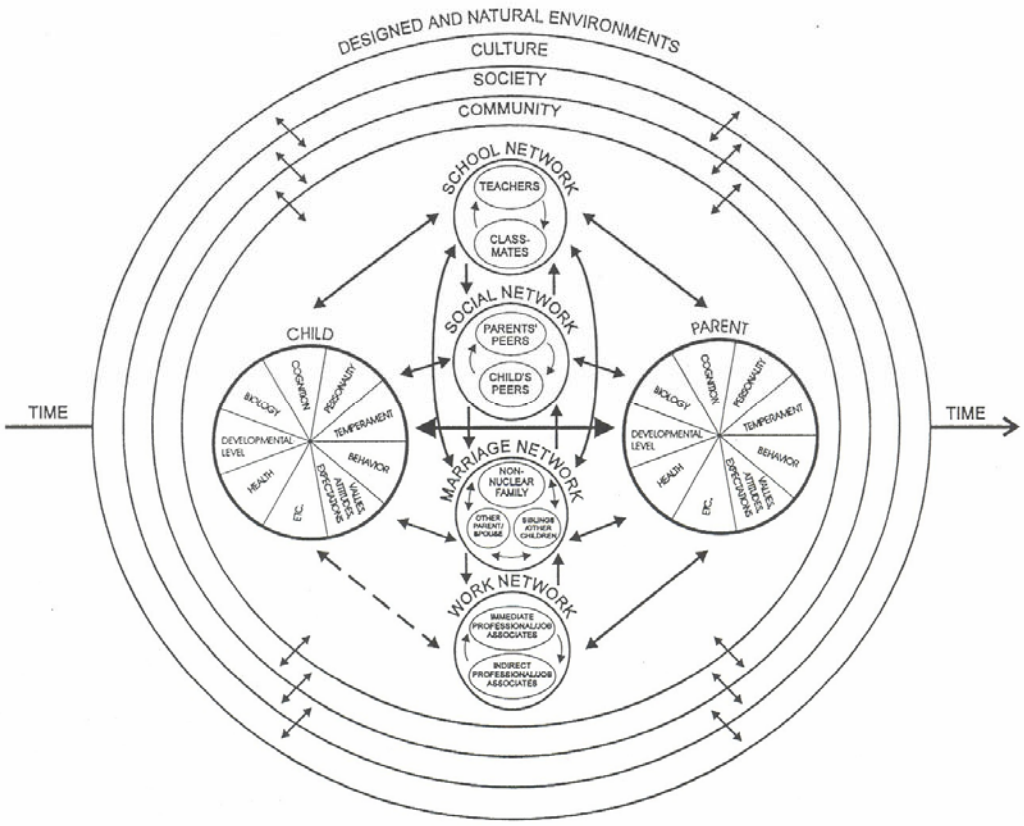

Figure 1. Lerner's Developmental-Contextual Model of Adolescent-Context Relations

Adolescence as a Critical Period

Adolescents are conceptualized as potentially vulnerable persons in part because adolescence is a critical developmental period that may significantly impact the trajectory of adult existence. The journey of adolescence is comprised of a series of significant physical, social, emotional and intellectual transitions and turnings points requiring continual reorganization and adaptation of the biopsychosocial self in relation to contextual environments (Graber & Brooks-Gunn, 1996). Some theorists frame the "developmental imperative" of adolescence as a "transitional imperative" (Yohalem & Pittman, 2001). The transitions of adolescence have been likened to "critical periods" in development (Savin-Williams, 1991), defined in the science of human development as "the time of greatest susceptibility" (Berger, 2000, p. 108). The scientific understanding of critical periods denotes a brief time of susceptibility that incurs a high probability of long-term effects on the system (Savin-Wiliams, 1991). Developmental researcher Patricia Greenfield (2002) explains "sensitive periods" as "developmental windows" "when stimulation often in the form of culture-specific practices, actualizes maturationally specific neural circuits" (p.73). Recent biological research on brain development supports the understanding of adolescence as a "critical developmental period for both normative and maladaptive patterns of development" (Steinberg, 2005, p.73). The process of cerebral synaptic pruning during adolescence partially determines the future capabilities of the adult brain (Steinberg, 2005). The synapses of the brain are refined during adolescence relative to the actual experience and cerebral activity during this critical developmental period (Steinberg, 2005).

Some researchers have refuted the notion of adolescence as a "critical period," or series of critical periods, as understood in developmental research. Advocates of developmental plasticity assume the possibility of human change across the lifespan and therefore support a "weak version" of the critical periods hypothesis (Lerner, 2002). However, even theorists supporting a developmental plasticity hypothesis recognize the existence of "critical times" or periods of enhanced susceptibility for certain aspects of development, including identity formation, formal cognitive operations, reproductive health, sexual orientation and existential awareness, as occur predominately during adolescence (Lerner, 2002; Savin-Williams, 1991).

Whether conceived as "critical periods," "sensitive periods" or "critical developmental times," there is agreement within the literature that the developmental progress, transitions and turning points in adolescence provide the biological and cultural foundation of risk, resiliency, and opportunity in youth that establish the foundation for adult existence (Graber & Brooks-Gunn, 1996; Yohalem & Pittman, 2001). An appreciation of adolescence as a critical developmental period highlights the understanding of adolescent's as a uniquely vulnerable population. This appreciation underscores the importance of promoting and supporting adolescent development through the availability of developmentally sensitive resources for all youth.

Adolescents as a Vulnerable Population

"To be vulnerable is to be susceptible to harm or neglect" through acts of commission or omission (Aday, 2001, p.1). Vulnerable populations are at risk for harm through active or passive neglect, and reciprocally are receptive to positive contextual influences (Aday, 2001, p.1). According to the public health conceptualization of vulnerability, ecological

forces contributing to vulnerability include political, legal and economic climates; cultural norms and beliefs; institutionalized systems; and the physical environment (Shi & Stevens, 2005). Vulnerability is exacerbated by a cumulative constellation of internal and contextual circumstances such as poverty, family dynamics, social disruption, discrimination and disease, and is reinforced by organizational systems that are repressive, unresponsive or ineffectual in addressing the needs of the population (Yohalem & Pittman, 2001). The concept of vulnerability denotes limited resources, opportunity, options, social support, and agency necessary to promote positive development (Yohalem & Pittman, 2001). Frequently cited vulnerable populations in the literature include: racial or ethnic minorities, immigrants and refugees, non-English speaking residents, the uninsured, high-risk mothers and infants, children, the elderly, the poor, the chronically ill, the physically disabled or handicapped, the terminally ill, the mentally ill, persons with acquired immunodeficiency syndrome, alcohol or substance abusers, the homeless, incarcerated individuals, residents of rural areas, and the poorly educated or illiterate (Aday, 2001; Shi & Stevens, 2005).

Adolescents are often implied as a subpopulation of children, but are rarely indicated as a uniquely vulnerable population. In *America At Risk* (Aday 2001), although adolescents are not designated as a specific vulnerable population, they are included as a significant cohort within six of the nine identified vulnerable populations, including high-risk mothers and infants, mentally ill and disabled, alcohol or substance abusers, suicide or homicide prone, abusing families, and homeless persons. While adolescents are a significant cohort within each of these groups, they also have unique developmental concerns that contribute to vulnerability.

An understanding of adolescents as a uniquely vulnerable population, differentiated from earlier childhood and adult populations evolves from recognition of the multiple, complex, individual and contextual transitions that occur during this critical developmental period. The health concerns of adolescents are distinct from those of childhood. The advent of puberty harbingers reproductive care issues such as sexual and contraceptive decision making, and associated vulnerabilities including sexually transmitted infections, sexual assault, and pregnancy (MacKay, Fingerhut & Duran, 2000; Moore, Nord & Peterson, 1989; Vicary, Klingaman & Harkness, 1995). Progressive social independence affords increased environmental exposures including access to vehicles and weapons, fueling three primary causes of mortality in this age group: motor vehicle accidents, homicide, and suicide (Irwin et al., 2002; MacKay, et al., 2000). Adolescent brain development, including a highly attenuated cerebral sensation seeking mechanism and an immature self-regulatory system, increases the vulnerability for significant risk behaviors such as sexual, social and physical risk taking (Steinberg, 2005). Academic, athletic, and social demands intensify, potentially stressing the physical, intellectual, and emotional resources of the developing person. The incidence of depression and other mental health issues escalates dramatically, yet studies demonstrate that relatively few adolescents receive mental health assessment or services (CDC, 2004; Ozer, et al., 2002; Petersen, 1993). Substance abuse rates proliferate during adolescence compounding other risk behaviors and possibly initiating adult addictions and associated morbidity (CDC, 2004; Irwin, et al., 2002; Kelder, Perry, Klepp & Lytle, 1994; Ozer, et al., 2002). Occupational health issues, risks and opportunities, emerge as teens enter the

work force (Greenberg & Steinberg, 1986; McKay, et al., 2000; Mortimer, Harley & Aronson, 2002; Resnick et al., 1997; Steinberg, Fegley & Dornbusch, 1993).

Vulnerability implies susceptibility to poor health because vulnerable populations often lack the necessary physical abilities, social access, educational backgrounds, communicative skills, or financial resources to manage their own health needs (Shi & Stevens, 2005). The common conception of "health" and understanding of "positive health outcomes" can be an obstacle in the recognition of adolescents as a vulnerable population. "Vulnerability denotes susceptibility to poor health" (Shi & Stevens, 2005, p.1) and the majority of adolescents are classified as "healthy" when assessed through traditional medical indicators (Ozer, et al., 2002). Indeed, the relative incidence of disease and mortality in adolescence is comparatively low (National Center for Health Statistics [NCHS], 2005), as expected from a youthful organism with limited cumulative threats and exposures. However, identifying adolescents as a "healthy" population, contingent upon the absence of medical indicators of disease and disability, negates an appreciation for "developmental wellness" or "thriving" (Lerner et al., 2002) and future risk of modifiable disease and preventable death (Earls, 1991). Morbidity and mortality in adolescence from preventable causes remain significant and long-term consequences of conditions and behaviors initiated in adolescence represent the major causes of adult afflictions including: cancer, diabetes, cardiovascular disease, mental illness, physical disability and substance abuse (Earls, 1991). An analysis of the National Longitudinal Study of Adolescent Health (Add Health) data indicated that health risks related to diet, inactivity, obesity, substance use and barriers to health care increase during adolescence, reflecting a decline in health status during the transition between early adolescence and

adulthood (Harris et al., 2006). The frequently quoted adolescent health aphorism, "problem free is not fully prepared" (Pittman, 2000, p. 2) embodies the understanding of adolescent "health" as a process of optimizing germinating potential while minimizing cumulative threats.

Adolescent Health Care and Adolescent Vulnerability

The adolescent population is particularly vulnerable to impaired health care access. Adolescent health care provides physical and psychosocial resources that are integral to positive youth development. However, despite complex health needs, adolescents are the least likely population to obtain care through traditional office-based practices (Newacheck et al., 1999) and consistently have the lowest rates of health care utilization (MacKay, et al., 2000). Health care utilization studies reveal deferred medical attention rates for significant health issues in the adolescent population as high as 44% (Elliott & Larson, 2004; Ford, Bearman, Peter, & Moody, 1999).

Health insurance is a major determinant of access to care, and insurance rates for adolescents and young adults are historically among the lowest within the American population (Newacheck et al., 1999; DeNavas-Walt, Proctor & Lee, 2006). Although the recently improved availability of publicly funded programs for youth (State Children's Health Insurance Program) promised to increase adolescent insurance coverage, overall health insurance rates for youth under 18 dropped between 2004 and 2005 (Brown & Laverreda, 2005; DeNavas-Walt, Proctor & Lee, 2006; Newacheck et al., 2004). Even when publicly funded insurance is available, large numbers of eligible adolescents are frequently not enrolled and are often difficult to retain in coverage programs (Newacheck et al., 2004). Significant racial/ethnic disparities exist in health care coverage, with

Hispanic adolescents demonstrating the highest uninsured rates (27.7%), followed by African American teens (12.0%) (Newacheck, et al., 2004). Early adolescents (10-13) are more likely to be insured than middle adolescents (14-17) (13.7% vs. 11%) (Newacheck, et al., 2004). Late adolescents (18-24) frequently exhibiting the highest risk behaviors are the most commonly under-insured population (29.5% uninsured) as they are caught between the umbrella of parental care and economic self-sufficiency (Arnett, 2002; Bachman, et al., 1996; Cohen, Hao & Coriaty-Nelson, 2004). Although capable of autonomous consent for services, post-majority youth often lack the experience, finances, sophistication, and agency necessary to navigate the complex health care system independently.

In addition, there is limited availability of adolescent focused health programs and practices. The adolescent client is most frequently inserted into the constructs of general pediatrics or family practice (Ozer, et al., 2002) and demonstrates a relatively high dependency on the emergency department as their usual source of care (Ozer, et al., 2002; Wilson & Klein, 2000). As a result, the unique health care needs of the adolescent client are often inadequately appreciated (Akinbami, Gandhi & Cheng, 2003; Brindis et al., 2004; Blum & Beuhring, 1996; Lafferty et al., 2002; Neinstein, 2002). Other barriers to health care for adolescents include transportation and inconvenient service hours; lack of knowledge regarding access to treatment options; a fragmented health care system; the expense of copayments and deductibles; concerns regarding confidentiality; parental consent requirements; language and cultural barriers; and a limited availability of trained adolescent health care providers (Brindis et al.,1999; Elliot & Larson, 2004).

The current health care system is not readily accessible or particularly responsive to the adolescent. Access to health care services is generally determined by adult investment and compliance. Youth with disengaged, overwhelmed, unavailable, or resistant guardians frequently lack entry into the health care system. As with younger children, pre-majority (10-17) adolescents are generally prohibited legally from providing consent for most services. They do not command financial resources. They cannot generate political influence because they lack voting privileges and are devoid of financial and social capital within the cultural power structure. Adolescents are further marginalized because they represent a small proportion of the total population, are more ethnically diverse, of lower socioeconomic status, and frequently suffer from a negative public perception (Brindis & Ott, 2002). Advocacy, program development, funding and health care access for youth are accomplished mainly through the impetus, discretion, and perspective of others. Communities can control access to sensitive services for youth through program availability, funding and development, and policy formation, potentially restricting controversial services such as reproductive care and psychological counseling. As autonomous adolescent social practices and risk behaviors emerge, prevailing adult controls and cultural mores can deter or prohibit the adolescent from accessing support for developing concerns deemed unacceptable by the adult community. For example, positive youth development in adolescence involves sexual development, including sexual identity formation. Sexual identity formation in adolescence frequently includes exploration of sexual practices that may not be an accepted cultural norm of the local community. If an aspect of adolescent development is deemed culturally unacceptable, physical and psychosocial services addressing these practices may be constrained by the

local power structure, resulting in potentially impaired adolescent health. The availability of community based reproductive health services for adolescents is one the most consistent targets of restricted access to controversial services.

Adolescents may be an increasingly vulnerable population in the current wake of health care devolution. Devolution is a strategy of decreasing federal control and over-sight of program administration in an effort to provide states with greater flexibility in the use of federal money (Brindis & Ott, 2002). Many experts fear that devolution may further the constraint of adolescent health and welfare programs and increase adolescent vulnerability, particularly in a shrinking health care economy (Brindis & Ott, 2002; Ozer, et al., 2002). There have been recent reductions in the Federal Budget for sources funding many critical adolescent health programs including the Health Resources & Services Administration (HRSA) which administers the Maternal Child Health block grant (Department of Health and Human Services [DHHS], 2005), Substance Abuse and Mental Health Services (Substance Abuse and Mental Health Services Administration [SAMHSA], 2005), and the Centers for Disease Control (Henry J. Kaiser Family Foundation, 2005). Specific programs affected by these reductions include community based reproductive and psychological health services for adolescents.

As state budgets have tightened, much of the responsibility for funding community health programs has shifted to county or local financial systems (Lucas, 2005; Rural Health Advocate, 2003). Funding for community prevention programs supporting positive youth development is therefore dependent upon the social and economic climate of individual localities (Millstein, et al., 1993). Under this system, the provision of services is dependent on the local economy and the ideology of the prevailing power

structure within the community. In times of economic stress, citizens with the least economic and political capital will be vulnerable to the greatest reduction in services. Local financial constraints can be used as a guise to eliminate politically unpopular youth programs, such as contraceptive services. This is particularly true in remote, rural communities where a conservative ideology prevails (Boyd et al., 2006; Bushy, 2004), and funding and access to health care services is significantly limited (Bushy, 2004; ORHP, 2002). More than ever, as public health care financing shifts to individual localities and the economy tightens, adolescents are particularly vulnerable to policy and program neglect for developmentally sensitive needs.

By definition, positive youth development is dependent on connections and investments within the community (Benson, 2003, Lerner,2002). As a result of economic, social and institutional forces, adolescents are vulnerable to inadequate access to positive youth development programs necessary for the promotion of "thriving", including developmentally appropriate health care services. Adolescents are particularly susceptible to temporal cultural and ideological constructs of "appropriate and acceptable" developmental behaviors as reflections of "thriving". Adolescents embody the criteria established by Aday (2001), and Shi and Steven (2005), as a vulnerable population "susceptible to harm or neglect" (Aday, 2001, p.1) because of inadequate physical capabilities, social access, educational backgrounds, communicative skills, or financial resources to manage their own developmental needs (Shi & Stevens, 2005). As adolescents increasingly engage in autonomous lifestyle behaviors, vulnerability is reinforced by organizational systems that are unresponsive to the developmental reality of youth.

Conceptualization of Adolescent Risk and Vulnerability

There are a variety of descriptors in the literature for subpopulations of adolescents with an increased propensity for impaired transition into adulthood including “at-risk”, “high-risk,” “vulnerable” and “marginalized.” Used interchangeably, these designations are poorly and inconsistently conceptualized and therefore confusing. For the sake of clarity, a consistent set of descriptors for “risk” in the adolescent population should be assumed.

It is reasonable to use the public health conception of vulnerable populations (Aday, 2001; Shi & Stevens, 2005) to describe a group of individuals “susceptible to harm or neglect” (Aday, 2001, p.1) and therefore at increased risk for adverse outcomes. Within a vulnerable population, the unit of interest, be it individuals or families, could be conceived along a continuum of relative risk. Blum, McNeely & Nonnemaker (2002) use “vulnerability” to refer to an interactive process between social contexts and underlying factors that place a young person “at-risk.” Since “risk” is inherent to existence, and arguably existence is dependent on risk, it would seem prudent to avoid the descriptor “at-risk” because nothing is devoid of risk. Of real interest is relative risk. Therefore, within a vulnerable population, an individual or family unit could be considered on a dynamic continuum of “low-risk” to “ high-risk” depending on a plethora of intrinsic and contextual variables such as socioeconomic status, family dynamics, health history and practices.

As presented previously, productive development is conceptualized as “thriving” (Lerner et al., 2002). An individual, through a balance of risk and protective factors can be “thriving” anywhere along the continuum of risk, although available data indicates

that “thriving” is more prevalent among the low-risk population (Bernat & Resnick, 2006). Terminology for the antithesis of “thriving” was not presented in the available positive youth development literature, perhaps the concept could be considered “languishing.” “Resiliency” is a positive balance between risk and protective factors that cultivates “thriving” (Rutter, 1993).

Jessor (1991) developed a conceptual framework for adolescent risk and resilience utilizing a biopsychosocial definition of health, including biology/genetics, social environment, perceived environment, personality, and behavior (See Figure 1). Movement along the risk continuum is influenced both directly and indirectly by these conceptual domains, creating a “web of causation” for risk and resiliency. Jessor presents health outcomes as “health/life *compromising* outcomes” mediated through “*risk* behaviors/lifestyles”. It is more accurate to understand the health outcome as a product of inter-related lifestyle behaviors, rather than “risk behaviors” because the conceptual domains regulate both risk and resiliency. Likewise, inter-related behaviors contribute to the totality of “health/life outcomes” rather than exclusively “health/life *compromising*” outcomes. In accordance with a developmental definition of adolescent health or “thriving”, “health/life outcomes” should be considered from a dynamic developmental perspective. The Jessor’s framework presented below has been modified to incorporate these expanded descriptions. Modifications are presented in italics.

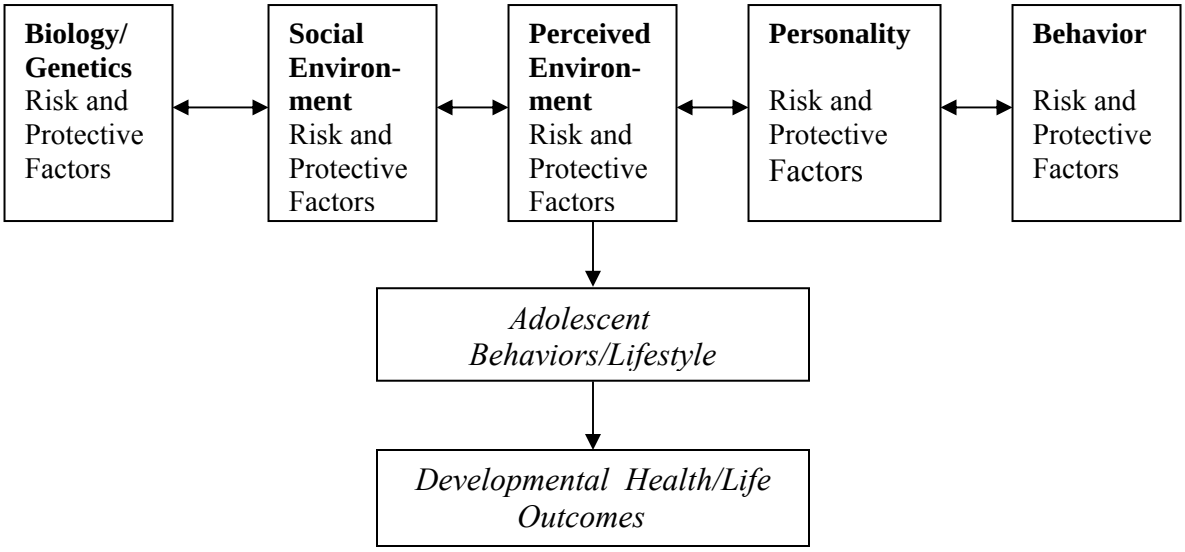

Figure 2. Modified Jessor Conceptual Framework for Adolescent Risk & Resiliency

According to Jessor (1991), placement on the risk continuum, can assume two distinct understandings. Adolescents currently involved in risk behaviors are considered at "high" or "low" risk for adverse health outcomes related to their current risk behaviors. Placement on the risk continuum is dependent on the type, number and frequency of risk behaviors in conjunction with inter-related influences from the risk and resiliency biopsychosocial domains outlined by Jessor. Alternatively, adolescents can be considered at "high" or "low" risk for *initiating* behaviors that influence their movement along the risk continuum and impact ultimate health outcomes. In this case, placement on the risk continuum is dependent on the interaction of influences from the risk and resiliency conceptual domains. Therefore, an appreciation for adolescent health and "thriving" evolves from a developmental perspective based upon the biopsychosocial understanding of risk and resiliency. An understanding of adolescents as a vulnerable population

embeds this dynamic relative risk continuum within a vulnerable population conceptual framework (See Figure 3).

Transitions and Turning Points

Transitions and turning points of adolescence provide momentum for movement along the relative risk continuum. Transitional momentum is dependent upon the risk and resiliency conceptual model and can result in movement forward, backward or maintenance of a risk continuum steady state (See Figure 4). Movement forward along the continuum can be conceived of as a manifestation of "risk." Backward movement can be conceptualized as opportunity, and maintenance of steady state is indicative of resiliency. Both backward movement and maintenance of a steady state could be conceptualized as "thriving."

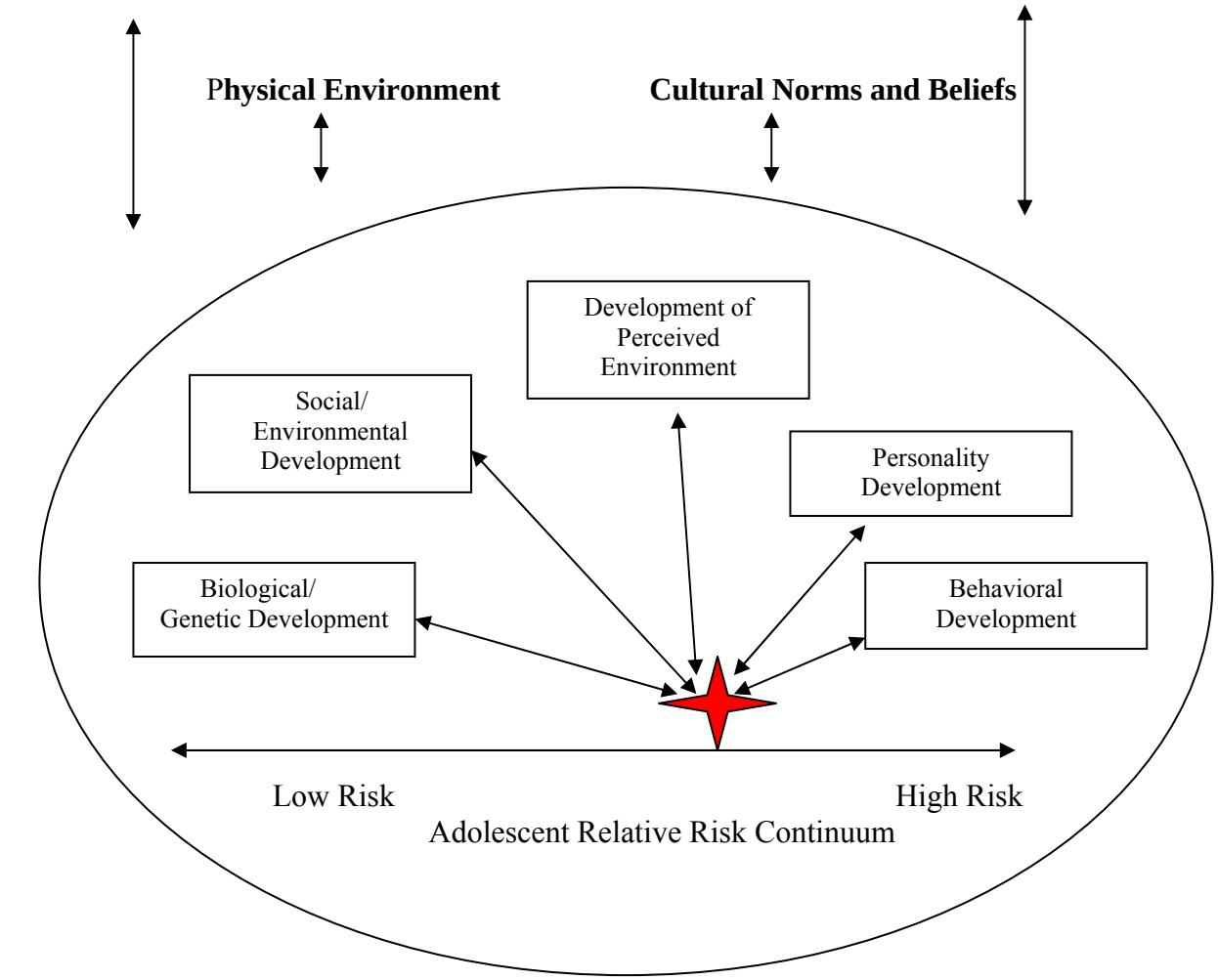

Figure 3. Adolescent Relative Risk Continuum Within A Vulnerable Population Framework

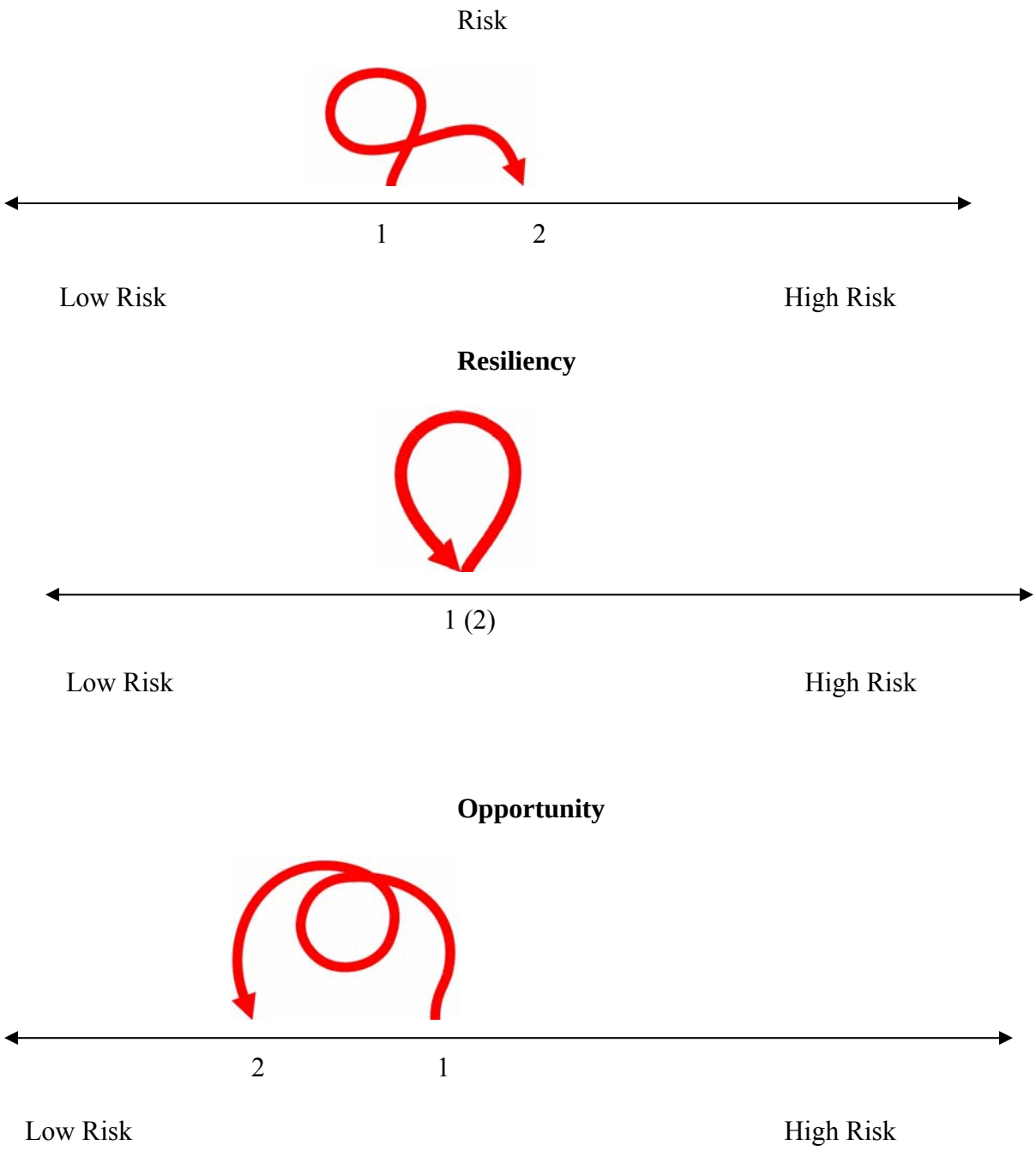

Figure 4. Conceptual Continuum of Risk and Resiliency

Major transitions common to adolescence include promotion through secondary education, puberty, increasing social independence, changes in the dynamics of peer and family relationships, romantic and sexual relationships, driving privileges and increased independent mobility, transitions to the workforce, completion of formal education, entrance into post-secondary education, acquired legal autonomy and responsibility, and financial resource accumulation and accountability. These transitions can dramatically alter the roles, activities, and interpersonal relationships that influence adolescents (Fenzel, et al., 1991). Research indicates that adolescent transitions are significantly affected by both the timing and the context of the developmental experience (Graber & Brooks-Gunn, 1996). Significant change in the personal or contextual level in the human system, as experienced during the transitions of adolescence, increases vulnerability and the potential for both risk and opportunity (Lerner et al., 1996). An understanding of adolescents as a uniquely vulnerable population is informed by the appreciation of the multiple points of significant transition during this critical developmental period.

Risk and Resiliency

Considerable research has been conducted addressing risk and protective factors in youth. Blum (2004) summarized the available literature on risk and resilience in *Improving the Health of Adolescents & Young Adults* along the domains of individual, family, school, peers, and social environment. The biopsychosocial variables listed in Table 1 have demonstrated consistent influence over the health, development, and therefore, "thriving" of adolescents in the current research literature.

Table 1. Biopsychosocial Risk and Protective Factors (Blum, 2004)

Domain	Risk Factors	Protective Factors
Individual	• Biological vulnerability • Health compromising behaviors • Intellectual impairment • Early/late onset of puberty • Aggressive temperament • Impulsivity • Affective disorder • ADHD • Aggressive behavior • Stress reactivity	• Spirituality/ Religiosity • Social skills • Normal intelligence • Late maturation • Higher self-image • Higher self-efficacy • Perceived importance of parents
Family	• Low parental education • Family mental illness • Maternal stress • Large family • Overcrowding • Poverty • Access to weapons • Authoritarian parenting • Permissive parenting • Exposure to family violence	• Connectedness • Parental presence • Parental values: -toward school -toward risk behavior • Two parents • Fewer siblings/child spacing • Family cohesion • Authoritative parenting
School	• Retention in grade • Size of school • Absenteeism • Suspension	• Connectedness to school • Improved academic performance • Consistency of schools attended • School policies
Peers	• Prejudice from peers • Perception of threat • Social isolation • Participation in deviant culture	• Being treated fairly by peers • Having low-risk friends • Peers with pro-social norms
Social Environment	• Arrests by age, type • Community fertility rates by age • Neighborhood unemployment • Single parent/female household • Age at immigration • Exposure to violent media • Exposure to advertising for youth • Access to tobacco, alcohol, drugs, and firearms • Television/Video watching	• Education attainment by age • School enrollment for ages 16-19 • Health care accessible • Health care utilization • Employment rates of adults • Positive support systems • Religious involvement • Access to positive role models • Pro-social media

These factors associated with risk and resilience influence adolescent movement along the risk and resiliency continuum as depicted in Figure 4. The majority of the risk and protective factors listed are contextual forces residing outside of the control, or only partially influenced, by the individual adolescent. The limited influence adolescents maintain over the factors that promote risk and resiliency reinforce the understanding of adolescents as a vulnerable population.

The essential understanding of adolescent risk and resiliency for this paper is the inextricable dependence of the adolescent on the contextual environment. The majority of protective factors in the risk and resiliency literature are extrinsic to the adolescent and operate outside of the adolescent sphere of influence. Available research indicates that "thriving" is sustained by the cumulative influence of positive assets (Benson, 2002). The positive youth development literature emphasizes the importance of asset-building communities that include sustained relationships with adults, peer groups, socializing systems, community level social norms, ceremony and ritual, policy and resource allocation and community based programs to build skills and competencies (Benson, 2002; Grossman & Bulle, 2006; Pittman, 2000). Unfortunately, it has also been noted that the availability of positive adolescent assets decline between grades 6 and grade 12 (Benson, 2002). In every community studied by the Search Institute (a social science research organization responsible for the Healthy Youth/Healthy Communities initiative) a significant proportion of adolescents lack crucial developmental assets (Benson, 2002).

Summary

Adolescence is a critical developmental period comprised of a series of significant biopsychosocial transitions directly influencing current and future wellness. Adolescent

health and development are highly dependent on external assets for the building blocks to promote "thriving." Actualized positive youth development programs are a promising mechanism to promote adolescent thriving, however, these programs are dependent on the community context including political, legal, and economic climates, physical environment, cultural norms and beliefs, and institutionalized systems. As such, adolescents are a vulnerable population subject to potential program and policy neglect.

For example, a possible unintended repercussion of an ideological focus on positive youth development is the marginalization of preventive adolescent health care interventions, such as sexual health education and access to contraception. It has been noted that such services have "sparked controversy" in communities that can then find common ground in the positive youth development approach, focused on skill-building and mentoring relationships rather than prevention behaviors (Gallagher, Stanley, Sheare & Mosca, 2005). The elimination of traditional intervention methods in favor of more socially palatable positive youth development approaches could constrain access to essential adolescent services and prove to be deleterious to the adolescent population.

Adolescents need communities and social relationships to thrive. Positive youth development programs and intervention services are both essential to the development of adolescents. More research is necessary on how best to combine the positive youth development philosophy with prevention based services to create a community–based "best practices" approach to adolescent health. It is essential for community health providers to actively protect and promote adolescent development through the promotion of adolescent health "best practices" because ultimately, a vulnerable adolescent population translates into a vulnerable community.

CHAPTER III

REVIEW OF RELEVANT LITERATURE

The focus of this chapter is to present literature relevant to adolescents in the rural setting. This chapter is formatted into two major sections. The first section, Defining Adolescence, focuses on a proposed definition of adolescence from cultural, social, developmental, and chronological perspectives. The second section, Rural Adolescent Health, focuses on the rural community, health of rural adolescents and the effect of connectedness to family and school resources, and methodological considerations in rural adolescent health research.

Defining Adolescence

Overall, there is tremendous variability in the description and inclusion criteria of the "adolescent" population in the literature. Adolescent populations are variably defined within a span of ages between 9 and 26 years, with little consistency in the designated sub-stages of adolescence, including the descriptors, "adolescent," "youth," "young adult," "early adolescent," or "late adolescent" (Society for Adolescent Medicine [SAM], 2005). Inconsistencies in the chronological definition of "adolescence" are problematic for theoretical dialogue and for the construction of a coherent adolescent research sample. Construction and application of sampling inclusion criteria in adolescent research must reflect an understanding of the "adolescent" as a profoundly developing entity. The developmental experiences, potentials, and understanding of a middle school 13-year old "adolescent" are vastly different than those of an 18-year old high school senior "adolescent." A theoretically and empirically based representation of sub-stages of

adolescence is also essential for the appreciation of critical transitions in adolescent development and health.

Adolescence is a distinct phase of the developmental life cycle in humans and other animal species, from rodents to non-human primates (Elliot & Feldman, 1990; Spear 2000). In human society, adolescence is a complex, multi-system, transitional process, involving progressive movement from the immaturity and social dependency of childhood into adult life, with the goal and expectation of fulfilled developmental potential, personal agency, and social accountability (Greenfield, Keller, Fuligni, & Maynard, 2003; Graber & Brookes-Gunn, 1996; Modell & Goodman, 1990; Steinberg, 2002). The Latin root of the noun adolescence is *adolescere,* meaning "to grow up" (Murray, Bradley, Craigie, & Onions, 1989). However, G. Stanley Hall, recognized as the founder of adolescent science (Arnett, 2002), conceptualized adolescence as a much more dynamic process than simple physical growth, understanding it instead as a physical and psychosocial "rebirth" (Berzonsky, 2000). It has been theorized that earlier stages of psychosocial development coalesce during adolescence into the establishment of a consolidated positive ego identity (Blos, 1979; Erikson, 1968). As such, the process of adolescence is the synthesis of profound corporal development with the evolution of a matured existential essence (Blos, 1979) and integration of the nascent self within family, community, and culture.

Adolescence is recognized by many theorists as a series of complex, inter-dependent transitional events (Graber, Brooks-Gunn, & Petersen, 1996). Transitions throughout the developmental process in adolescence often require reciprocal reorganization of the individual and the context, potentially altering behavior, cognition, emotion, and

relationships (Graber & Brooks-Gunn, 1996; Lerner, 2002). The reciprocal individual and contextual changes that occur in response to the transitions of adolescence present multi-system challenges constituting the basis of both risk and resiliency in youth (Graber, Brooks-Gunn, & Petersen, 1996).

Culture and the Definition of Adolescence

The proposed definition of adolescence is situated within a broad consideration of pluralistic contemporary Western culture. Social markers constructed within North American society will be employed for illustrative purposes. Culture is defined as a dynamic system of shared activities and meanings (Greenfield et al., 2003; Swanson, et al., 2003). It is understood that adolescents are "simultaneously biological and cultural beings" (Miller, 2002, p.151) with culture and biology mutually defining and influencing each other in the process of development (Greenfield, 2002, Lerner, 1992). A variety of "cultures" are subsumed within the social construct of contemporary Western society, fostering the potential for discrepancy in the experience, expectations, and understanding of adolescence (Arnett & Galambos, 2003).

The cultural meaning ascribed to physical puberty and the process of social redefinition during adolescence may vary significantly throughout cultural, social, and historical contexts (Steinberg, 2002; Swanson et al., 2003). For example, achievement of "autonomy" is considered one of the essential normative psychosocial tasks of adolescence (Zimmer-Gembeck & Collins, 2003). However, "autonomy" conceptualized as agency and self-regulation, can be operationalized differently in collectivist and individualist cultures (Zimmer-Gembeck & Collins, 2003). Socialization practices of contemporary Western societies typically emphasize the development of scientific

intelligence, social autonomy and economic success (Greenfield et al., 2003; Friedman, 1999). In contrast, other cultures may inculcate social intelligence as the normative ideal, engender interdependence over individualism and value the maintenance of traditional practices at the expense of economic advancement (Geenfield et al., 2003). While the predominant contemporary Western cultural paradigm promotes an expectation that the process of adolescent development will instill independence, personal accountability, and economic self-sufficiency, there are many cultures that do not implicitly or explicitly ascribe to these philosophical assumptions. In both North American society and globally, independence is not universally promoted over conformity to familial and cultural identity and expectations (Zimmer-Gembeck & Collins, 2003). In these cultures adolescent achievement of agency, self-regulation, and internal initiative, is evinced through interdependent and collectivist orientations. However, it should be noted that marked global and cultural similarities in the conceptualization of adolescent psychosocial development, including the notions of independence and individualism, do exist (Arnett & Galambos, 2003)

The physical experience and philosophical assumptions regarding "adolescence" within any given cultural community will influence the manner in which "adolescence" is defined. The social markers used to delineate the boundaries of adolescence in this discussion are far from universal and are employed as simply illustrative of developmental transitions in contemporary North American society. Discrepant social constructs in alternative cultures would alter the understanding of the boundaries of adolescence, the chronology of adolescent sub-stages, and the experience of developmental transitions.

Although certainly not globally inclusive, the description of movement through adolescence in this chapter does reflect pertinent international trends. The age of first marriage, closely linked to childbirth statistics, has risen globally, with substantially fewer percentages of women marrying before age 20, except in sub- Saharan Africa where early marriage remains prevalent (Blum & Nelson-Mmari, 2004). Also, commitment to formal education has been increasing across continents with a narrowing gender discrepancy between educational experiences and opportunities for girls and boys (Blum & Nelson-Mmari, 2004). The majority of adolescents throughout the world currently engage in formal secondary education (Blum & Nelson-Mmari, 2004). The combination of increasingly delayed marriage and childbirth, and prolonged education incites a suspension of adult roles and responsibilities (or psychosocial moratorium (Erikson, 1968; Mead, 1961)) and therefore an international trend toward the existence and prolongation of "adolescence".

Although it is important to remain mindful of the tremendous individual and cultural variability in the journey through adolescence, it is also essential to devise a common language for the general boundaries and sub-stages within this critical developmental period. Theoretical constructions and research samples employ varied chronological definitions of adolescence and adolescent sub-stages. Lack of consensus of an operational definition of adolescent chronology can be attributed to a number of factors: the appreciated continuity of human development; a recognition of individual, cultural, gender and racial variability; the ascribed relative salience of specific developmental milestones, and a perpetually refined science of human development in a dynamically evolving society. However, benchmarks in adolescent existence can be identified and

delineated to construct a coherent, consistent, yet flexible operational definition of "adolescence" and the sub-stages within adolescence. Any operational definition of "adolescence" must be driven by the science of human physical and psychosocial development (SAM, 2003) and reflective of current cultural understandings and socio-behavioral expectations (Modell & Goodman, 1990).

Chronological Definitions of Adolescence

According to the Oxford English Dictionary, the original 1482 definition of adolescence referred to a period between childhood and adulthood that extended between ages 14 and 25 years in males and 12 and 21 years in females (Murray et al., 1989). Hall's (1904) original conception of adolescence included both genders between the ages of 14 and 24 years. The Adolescent Health Chart from the Centers for Disease Control and Prevention (CDC) currently uses ages 10 to 19 years as the adolescent age range (MacKay, Fingerhut, & Duran, 2000). The American Academy of Pediatrics (AAP) publishes recommendations for Preventive Pediatric Health Care defining adolescence between ages 11and 21 years (AAP, 2000). Healthy Youth 2010 (Fleming, Towey & Jarosik, 2000) and The National Initiative to Improve Adolescent Health issues recommendations for a population aged 10 to 24 years (AAP, 2005). The World Health Organization defines "adolescents" as individuals who are between 10 and 19 years, "youth" as those between 15 and 24 years, and "young people" as those between 10 and 24 years (Blum & Nelson-Nmari, 2004). Encompassing these varied definitions, the broadest chronological understanding of the transitional phase of "adolescence" includes the ages of 10 through 24 years. Accordingly, the Society for Adolescent Medicine (1995) advocates 10 through 24 years as the proposed age range for adolescent health

care, research, and advocacy (See Table 2). It is during this period, the second decade of life and half way into the third that we expect an individual to progress from childhood to adulthood through a plethora of physical and psychosocial developmental transitions.

Table 2. *Chronological Definitions of Adolescence*

Organization/Theorist	Definition of Adolescence (Years)
Historical Definition (1482)	Males: 14-25 Females: 12-21
G. Stanley Hall (1904)	14 to 24
Center for Disease Control and Prevention (2000)	10 to 19
American Academy of Pediatrics (2005)	11 to 21
Healthy Youth 2010 (2000)	10 to 24
National Initiative to Improve Adolescent Health (2005)	10 to 24
World Health Organization (2004)	Adolescents: 10 to 19 Youth: 15 to 24 Young People: 10 to 24
Society for Adolescent Medicine Position Statement (1995)	10 to 25

Chronological Sub-stages of Adolescence

Obviously, tremendous developmental discrepancy exists between the ages of 10 through 24 years, therefore, "adolescence" is generally divided into three sub-stages:

early, middle, and late. These sub-stages represent significant points of transition within the spectrum of adolescent development. Theorists and researchers have differed in their definition of these stages, to the extent that edited texts have been noted to embrace divergent chronological definitions of adolescence within the same published volume (Millstein, Petersen, & Nightengale, 1993).

Nienstein and Kaufman (2002), a frequently consulted clinical authority, designates early adolescence as 10 to 13 years, middle adolescence as 14 to 17 years, and late adolescence as 17 to 21 years. Steinberg (2002) distinguishes adolescent boundaries as "early" (10 to 13 years), "middle" (14 to 18 years), and "late" (19 to 22 years). Elliott and Feldman (1990) describe early adolescence as 10 to 14 years, middle adolescence as 15 to 17 years, and late adolescence as 18 years to the mid-20s (1990). Other prominent researchers advocate separating the designation of "youth" into early adolescence (10 to 14 years), late adolescence (15 to 19 years), and young adulthood (20 to 24 years) (Irwin, Burg, & Cart, 2002). Finally, Arnett (2000) proposes removing the ages of 18 to 25 years from "adolescence" all together in favor of a new distinct phase of human development, the "Emergent Adult." The research and theoretical literature would benefit from a single consistent definition of adolescence.

Proposed Chronological Framework of Adolescent Sub-stages

The most readily recognized hallmark of adolescence is the physical changes that occur during puberty, beginning the visible transformation of a "child" into an "adult". The beginning boundary of adolescence has become younger as the average age of pubertal onset has decreased throughout the years (Grumbach & Styne, 1998). Pubertal initiation begins and evolves with tremendous temporal variability throughout the

population, frequently correlated with ethnicity and body mass index (Styne, 2004). The accepted mean age for the onset of puberty is simplified to 11 years (Grumbach & Styne, 1998), with boys beginning between the ages of 9 and 13.5 years, Caucasian girls between 7 and 13 years, and African American girls approximately one year younger (Grumbach & Styne, 1998). Considerable evidence suggests that an increased body mass index is related to earlier physical maturation in both males and females across ethnicities (Neville & Walker, 2005; Styne, 2004). Delayed puberty in boys is defined as the absence of testicular enlargement by 14 years and the absence of breast development in girls by 13 years (Rosenthal et al., 2002). Although these parameters are complicated by individual, gender and racial differences, they nonetheless argue for a definition of early adolescence, heralded by the initiation of the pubertal process, as between the ages of 10 and 13, and ending at age 14, the accepted boundary of delayed puberty and entrance into secondary education.

The age of 14 years is considered a significant psychosocial benchmark in adolescent development. It is widely purported in the developmental literature that at age 14 an adolescent demonstrates the "ability" to maintain adult reasoning patterns (Petersen & Leffert, 1995). "Ability" for adult reasoning is differentiated from reasoning "capacity" which is highly subject to life experience and other contextual factors (Petersen & Leffert, 1995; SAM, 2003). The reasoning mechanisms of adolescents have been found to fluctuate considerably in response to contextual forces such as peer influence (Petersen & Leffert, 1995; Stienberg & Scott, 2003; Dorn, Susman & Fletcher, 1995). An appreciation for developmental changes in reasoning ability supports a theoretical

separation between the early adolescent (before age 14) from the older adolescent (after age 14).

Culturally recognized milestones can also be employed in the construction of a chronological framework for defining sub-stages within the span of adolescence. High school is a significant, often idealized and romanticized cultural phenomenon in Western society (Modell & Goodman, 1990). The lived experience of a "high school student" is qualitatively different in culture, expectations, exposures and opportunities than that of a middle school student or a high school graduate. Therefore, the beginning of the middle adolescent phase, the classic "teen" years, can be identified as the average age of entrance into high school (age 14) and ending at age 18, generally coinciding with graduation from secondary education and the most common age of legal majority in Western cultures.

The final phase of adolescence begins at the age of majority, accepted in most American states and Canada as age 18. Exceptions in the US are Alaska and Nebraska where the age of majority is 19 years, and 21 years for Pennsylvania and Mississippi (although in Mississippi, an 18 year old may consent for health care) (English, 2002). In many cultures, reaching the age of majority imputes legal autonomy and an expectation of increasing social and economic independence. There is a categorical difference between opportunities, capabilities, and responsibilities in society before and after the age of majority. Therefore, any sub-division of adolescence that combines pre-majority youth and post-majority youth is conceptually flawed. Age 18 also usually corresponds with graduation from secondary education in the US, another significant social indicator of movement away from childhood and into social maturity.

The incorporation of the late teens and early 20s into the definition of adolescence reflects the most current and comprehensive understanding of physical and social development in youth. Although the late adolescent may appear complete in physical maturity, recent research using magnetic resonance imaging (MRI) reveals that the frontal lobe and limbic system of the human brain actually continues to develop through the late teens and possibly even into the early 20s, affecting reasoning capacity, affective states, and impulse control (Beckman, 2004; Spear, 2000). Potentially related to the relative immaturity of the late adolescent brain, combined with increased environmental exposures, and progressive social independence, risk behaviors often peak during the late adolescent period (18-24) (Arnett, 2002; Bachman, Johnston, O'Malley & Schulenberg, 1996).

Socially, many developmental theorists recognize that a prolonged adolescence has become a cultural imperative for transition into adulthood in complex industrialized societies (Arnett, 2000; Graber & Brooks-Gunn, 1996; Steinberg, 2002). Since mid-century the percentage of American youth entering higher education after high school has risen from 14% to 60%, and marriage and parenthood are increasingly delayed into the mid to late 20s (Arnett, 2002). Research on the subjective conception of adult status has noted that the majority of people begin to define themselves as "adult" in the late twenties and early thirties (Arnett, 2002). Clearly, there is considerable variance in the existence and length of the adolescent "moratorium" between industrialized and developing countries. Countries and cultures with a lower socioeconomic status retain less financial reserve to facilitate youth development programs such as prolonged

education, and therefore include more adolescents in the labor force and in adult family roles (Fussell & Greene, 2002).

Social factors such as marriage, parenthood, entrance into the work force and financial independence provide indicators for a terminal point of adolescence (Arnett, 2000; Elliot & Feldman, 1990). The average age for first marriage in the US for men is 27.1 years and 25.3 years for women (U.S. Census Bureau, 2004); the mean age for first childbirth is 24.9 years (with a median of 24.6 years) (Mathews & Hamilton, 2002); and the vast majority of the full time work force is comprised of workers between the ages of 25 and 54 years (Bureau of Labor Statistics, 2003). These averages argue for a conceptual chronological boundary of late adolescence, the process of transitioning into "adulthood," as age 25. Although it is argued that role transitions assume less relevance for the personal conception of adulthood than character qualities reflecting self-sufficiency, "emergence into adulthood" by subjective definition of character qualities is still delayed until the late twenties (Arnett & Galambros, 2003).

The descriptors "youth," "late" and "post-adolescence" have been suggested for this later adolescent developmental phase. Erik Erikson (1968) and Margaret Mead (1961) conceptualized late adolescence as a period of "psychosocial moratorium". Erikson defines a moratorium as a granted delay of obligations and responsibilities. In late adolescence, the "moratorium" functions as an opportunity for young people to try on roles and gather experiential understanding without the obligation of permanent commitment (Erikson, 1968; Mead, 1961). Arnett's (2000) theory of the "Emergent Adult," described as a period of social instability, change and exploration, is a useful conceptualization of the prolonged transitional process and psychosocial moratorium of

late adolescence in contemporary Western society. Although the descriptor "Emergent Adult" accurately reflects this late transitional phase, it is not necessarily a "new distinct" developmental period separate from the current understanding of "adolescence", but rather a direct continuation of the late adolescent process, the transition into adulthood.

Using these three significant transitions within adolescence: the initiation of puberty, entrance into high school, and the age of majority, a framework for the chronological definition of sub-stages within adolescence emerges, delineating "early" adolescence as the ages of 10 to 13 years, "middle" adolescence as the ages of 14 to 17 years, and "late" adolescence as the ages of 18 to 24 years (See Figure 4).

Early Adolescent (10-13)

Child ⟶ *Adolescent*

Initial pubertal transition

Middle school transition

Middle Adolescent (14-17)

"Teenager"

Continued pubertal transition

High school transition

Social independence transition

Late Adolescent (18-24)

Teen ⟶ *Adult*

Completed pubertal transition

Vocational/academic transition

Social accountability transition

Figure 4. Transitional Sub-stages of Adolescence

A Developmental/Social Perspective on Adolescent Development

Development during adolescence incorporates an array of interconnected physiologic, psychological, and cultural processes (Connolly et al., 1996; Graber & Brooks-Gunn, 1996). A brief overview of some of the hallmarks of each stage is presented as an illustration of the dynamic developmental movement through "adolescence". It should be noted, however, that this framework acknowledges the tremendous potential variability in the physical and cultural experience of human development.

Theories of Adolescent Development

Theoretical understanding of adolescent development extends from a range of philosophical perspectives including the biosocial, organismic, and contextual (See Figure 5). Hall's (1904) biosocial conception of adolescent development was based heavily on Darwin's (1859,1979) theories of phylogenetic evolution. This perspective assumes that development is controlled by genetically pre-determined physiologic changes mimicking the stages of human evolution, termed recapitulation (Hall, 1904; Muuss, 1996).

Darwin's work also influenced Freud's (1962) intra-psychic theories of psychosocial development emphasizing energy, drive, and instincts, propelled by biological forces (Muuss, 1996). However, Freud is considered philosophically organismic because of his recognition of contextual influences on biological imperatives (Steinberg, 2002). Organismic theories emphasize teleological pre-determined epigenesis (stage theories) secondarily influenced by contextual forces (Ford & Lerner, 1992; Steinberg, 2002). NeoFreudians, Anna Freud and Peter Blos, expanded Freud's organismic theories into the realm of adolescent development. Erikson's (1968) construction of child development theories around psychological conflicts reflects his Freudian psychoanalytic training; however, Erikson emphasized the social aspects of child development rather than the internal psychic. Although Piaget's conceptualization of "egocentrism" in childhood psychology is compatible with Freudian theory, Piaget focused on the conflict-free, rational aspect of development and emphasized the growth of cognition (Piaget & Inhelder, 2000). Kohlberg's (1980) theory of moral development in adolescence relies heavily on a Piagetian understanding of conceptual-cognitive development, and Kohlberg

is credited by James Fowler as providing the most profound influence for his work on faith development (Fowler, & Dell, 2004). Kohlberg (1980) also inspired Selman's (1980) work on Social Cognition.

The major contextual theorists contributing significantly to the understanding of adolescent development include Margaret Mead, Urie Bronfenbrenner, and Richard Lerner. Mead (1961, 2001) is renowned for her anthropological work on the cultural context of adolescent development published in *Coming of Age in Samoa*. Bronfenbrenner (1979) built upon Kurt Lewin's Field Theory to construct the Ecological Theory of human development emphasizing the interplay between person and environment, and the importance of contextually situated developmental research. Within the same philosophical movement toward contextual understanding in development, Richard Lerner combined the conceptualizations of comparative psychology, the life span view of human development, Reigel's dialectic metamodel of development, and systems theory to construct his theory of Developmental Contextualism (Ford & Lerner, 1992). Lerner's developmental theory emphasizes probabilistic ontogeny, as opposed to predetermined epigenesis. His theory appreciates the potential for human plasticity and recognizes the reciprocal interdependence of biological and contextual forces (Lerner & Castellino, 2002).

Although generally appearing in the educational literature and not frequently cited in discussions of adolescent development, it is important to note the contributions of the social constructionists, particularly Lev Vygotsky (1978). Vygotsky's theories emphasize the fundamental role of social interaction in the development of cognition through the

construction of personal meaning. Vygotsky argues that social learning precedes and directly influences cognitive development.

The classic stage theories as theoretical foundations for developmental science have experienced extensive critique and declining academic consensus throughout recent years. However, newer comprehensive theories of normative development have not emerged to supplant these older, realist and reductionist understandings (Steinberg & Morris, 2001). Recent research in adolescent development has focused most extensively on "mini-theories" and applied developmental science (Steinberg & Morris, 2001). Therefore, until developmental science produces new longitudinal research on psychosocial, cognitive, and biological development in adolescence, applied research remains dominated by potentially flawed classic theoretical perspectives.

Admittedly, from a post-modern perspective, the classic stage theories in adolescent development are limited by a preponderance of realist and reductionist theoretical perspectives, and used exclusively are incomplete and insufficient explanatory models. However, a post-modern orientation does not preclude utilization of this valuable body of scientific work. Instead, a post-modern approach encourages shedding new light on old theories, employing old and new understandings within a prism of perspective and

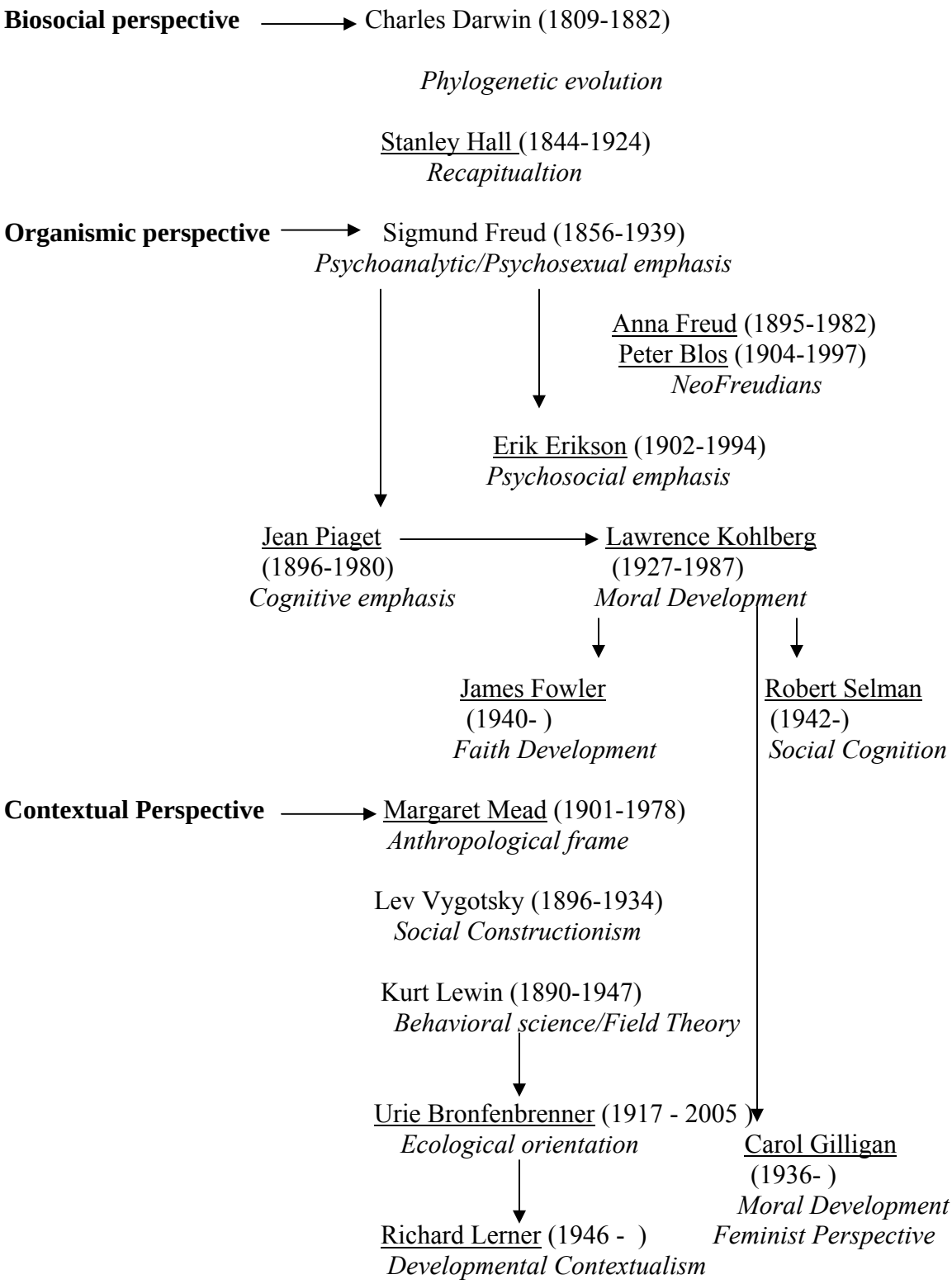

Figure 5. Summary of Classic Theoretical Perspectives of Adolescent Development

subjectivity. It promotes comfort with uncertainty and critical tension, and cultivates an appreciation for both variance and commonality as expressions of reality. Post-modern developmental theorizing in adolescence will attempt to reduce "otherness" and accentuate adolescent voice through validation of differences in subjectivity, gender and sexuality, race and class, and temporal and spacial locations (Huyssen, 1999).

Gender and Adolescent Development

A significant concern in the current understanding of child and adolescent development is the existence of gender biased or gender ignorant theories. The consideration of adolescent development without regard for gender implications is at best an incomplete understanding. The historically influential developmental theorists, including Freud, Erikson, Piaget, and Kohlberg, originally explored their theories utilizing exclusively male samples. As female responses to male calibrated conceptualizations were found to be discrepant, female development was interpreted as stunted, rather than simply unique and gender normative (Gilligan, 1982).

A frequently cited example of gender bias in developmental theory involves Kohlberg's conceptualizations of moral development. According to his postulations, the development of morality progresses in a hierarchical manner through relational morality into social order morality. Kohlberg noted that women more frequently "fail to progress" through the expected stages of moral development and instead appear "stuck" in relational morality. Gilligan (1982) however argued that women define themselves and their social roles through relational intimacy, largely related to the early childhood experience of parenting by another female, a like identity. Boys, on the other hand, also most extensively parented in the early years by a female, accomplish a masculine identity

through separation (Gilligan, 1982). Although women's "failure" to separate was interpreted as faulty development by Kohlberg, Gilligan hypothesized that intimacy and commitment are normative developmental strengths of the female psyche. In Gilligan's words (1982), "relationship [then] requires a kind of courage and emotional stamina which has long been the strength of women, insufficiently noted and valued" (p. xix).

However, recent investigations on gender effects in moral reasoning have not demonstrated the strong gender differentials hypothesized by Gilligan (Jaffee & Hyde, 2000; Walker, 2004). Instead, participants were noted to exhibit considerable variation in moral reasoning influenced significantly by content and context, unrelated to gender (Jaffe & Hyde, 2000). Further work is required to explore and more fairly represent human diversity in development, including gender and cultural influences (Jaffee & Hyde, 2000).

The Developmental Experience within Adolescent Sub-stages

The sub-stages of adolescence, early (10 to 13 years), middle (14 to 17 years), and late (18 to 24 years), although contiguous and susceptible to chronological variability, are developmentally distinct. An overview of the developmental processes occurring during these periods is presented to inform a probabilistic understanding of the transitional experience of the adolescent.

Early adolescence (10 to 13 years). Early adolescence is heralded by the onset of accelerated physical and sexual maturation. Accompanying psychosocial adjustment to pubescent changes evokes a pre-occupation with body image (Radzik, Sherer & Neinstein, 2002). The early adolescent brain experiences continued development of the pre-frontal cortex influencing cognitive ability; synaptic pruning, affecting coordination

and efficiency of thought; and neurotransmitter changes implicated in mood, appetite and sensation-seeking predilections (Casey, Tottenham, Liston, & Durston, 2005; Barnes-Goraly et al., 2005, Luna et al., 2004; Steinberg, 2005). Cognitive function in adolescence evolves from the concrete "operational logic" of childhood to increasing "formal operations" and nascent abstract thought (Piaget & Inhelder, 2000). As the ability of abstraction increases, there is a shift from an objectivist perspective to a relativist orientation (Byrnes, 2003), and emergence of reflective thinking (Selman, 1980). The combination of mesocorticolimbic activity, pubertal hormonal changes, and multifaceted social stressors may cause the early adolescent to be increasingly susceptible to wide mood swings, emotional lability and reduced impulse control (Arnett, 1999; Buchanan, Eccles, & Becker, 1992; Neinstein, 2002; Spear, 2000; Rosenblum & Lewis, 2003).

Social role development emphasizes "industry vs. inferiority," a psychosocial orientation accentuating accomplishment (Erikson, 1968). Emotional conflict with parents escalates (Laursen, Coy & Collins, 1998) coinciding with a shifting emphasis to peer involvement (Bradford-Brown & Klute, 2003; Neinstein, 2002) predominated by unisex relationships with increasing interest in heterosexual group contact (Bouchey & Furman, 2003). There is an amplification of overt sexual curiosity and experimentation (Radzik, Sheres, & Neinstein, 2002) quite possibly related to adrenarche and gonadarche (Harrison, 2003). First awareness of same gender attraction for gay and lesbian youth often occurs during early adolescence (Anhalt & Morris, 1998).

Morality generally functions at a "conventional" level, preoccupied with social norms and expectations, moving toward an appreciation for relational ethics (Kohlberg, 1980; Nucci, 2001). An understanding of social equity shifts from strict adherence to equal

treatment to a more individualized appreciation of human need (Nucci, 2001). Faith ranges from the "literal-mythic," to the "synthetic-conventional" relying heavily on compliance with the beliefs of influential others (Fowler & Dell, 2004)).

In the academic setting, the early adolescent generally moves from the nurturing nest of a single educator primary school environment to a middle school or junior high school environment. Frequently, the new curriculum incorporates a variety of educators and reduced teacher-student relationships, stricter social controls with more punitive consequences, and a more competitive grading environment and increased academic demands (Eccles & Buchanan, 1996; Eccles et al., 1993; Fenzel, Blyth & Simmons, 1991; George et al, 1992). Legally, the early adolescent is still very dependent on adult authority. However at the age of 12 in some states, the adolescent may consent autonomously for reproductive health care services (English, 2002).

Middle adolescence (14 to 17 years). In middle adolescence the teenage body and brain proceeds in development toward full adult stature and complete sexual development. Although there is an increasing acceptance of the pubertal physique, concern over making the body more attractive escalates (Neinstein, 2002). Significant brain development continues during the middle adolescent period including progressive frontal lobe development, continued cerebral myelination and synaptic pruning, and neurotransmitter stabilization (Spear, 2000; Steinberg, 2005). Steinberg (2005) conceptualizes middle adolescence as a period of heightened vulnerability related to a highly attenuated cerebral sensation-seeking mechanism and an immature self-regulatory system. Although full "formal cognitive operations" begin to develop and reasoning capacity becomes more complex, abstract and logical (Piaget & Inhelder, 2000),

efficiency of cognitive process and control of impulsivity remains immature (Steinberg, 2005). While a highly relativistic perspective may predominate, there is an increasing appreciation for the validity of multiple perspectives and maturation of principled moral judgments (Byrnes, 2003; Smetana & Turiel, 2003) including the use of third person or mutual perspective taking (Selman, 1980).

The experience of "imaginary audience" and "personal fable" may emerge in early adolescence, continue through middle adolescence, and then decline in late adolescence (Lapsely, 1990).Current research suggests that classic adolescent egocentric thought patterns, including the construction of an "imaginary audience" and a "personal fable" (Elkind, 1978), originally believed to arise from immature cognitive abstraction, may be better explained as "interpersonally-oriented daydreaming" associated with the process of separation-individuation (Vartanian, 2000). Developmentally propelled narcissism and its counterpart, personal despair, contribute to the potentially tumultuous emotional state of the middle adolescent (Blos, 1979). There is also an increasing scope of emotions during middle adolescence related to progressive cognitive development and cumulative life experience (Rosenblum & Lewis, 2003).

The parental relationship is transformational, characterized by a steadily decreasing frequency of conflict but an increase in the emotional intensity of the disagreements (Larson, et. al., 1996; Laursen et al., 1998; Zimmer-Gembeck & Collins, 2003). Peer involvement peaks during this stage, as heterosexual peer groups develop into cliques and crowds (Bradford-Brown & Klute, 2003) and dyadic intimate relationships increase in prevalence and intensity (Bouchey & Furman, 2003; Bradford-Brown & Klute, 2003; Neinstein, 2002).

Role development emphasizes "identity vs. role confusion," the task of defining "self" and the "self" in relation to society (Erikson, 1968). Conscious sexual identity awareness and formation accelerates (Ryan & Futerman, 1997) and sexual experimentation, activity, and risk behaviors proliferate (Neinstein, 2002). By the end of middle adolescence, approximately one half (47.6 %) of in-school American youth have engaged in sexual intercourse (CDC, 2004). This statistic is probably an underestimate of the amount of total sexual behavior in middle adolescence because it does not include sampling of the highest risk out of school youth. In the gay and lesbian youth populations, initial same gender sexual experience and self labeling as gay or bisexual occurs most frequently in middle adolescence (Anhalt & Morris, 1998).

Morality may assume an "interpersonal normative" perspective emphasizing the concerns and expectations of significant others or move towards a social system perspective, morality governed by law and authority (Kohlberg, 1980; Nucci, 2001). Faith tends to be "synthetic-conventional", adhering to the beliefs that predominate within the social environment, moving increasingly toward an "individual analytical reflective" belief pattern (Fowler & Dell, 2004).

The middle adolescent generally attends high school where academic accountability is emphasized, and the curriculum becomes increasingly more diverse, rigorous and competitive (Eccles & Roeser, 2003; George, et al., 1992). The middle adolescent accrues new legal privileges allowing for increasing independence from adult guardians and may be considered a "mature minor" capable of providing informed consent (Nienstein, 2002).In many states, the 16 year old adolescent may attend "R" rated movies

independently, apply for a driver's license, enter the work force, drop out of formal education, and apply for emancipated status (English, 2002).

Late adolescence (18 to 24 years). As physical growth terminates in adult stature in late adolescence, there is an acceptance of pubertal changes and an integration of body image with personality (Neinstein, 2002). Although the physical stature of the 18 year old adolescent may appear fully developed, the frontal lobe of the cerebral cortex continues to develop into the early 20s (Beckman, 2004; Spear, 2000) and cognitive processes become increasingly complex, abstract (Piaget & Inhelder, 2000) and less impulsive (Beckman, 2004). Reason-based techniques for appreciating the validity of multiple perspectives are further established in late adolescence (Byrnes, 2003). The amplitude of mood swings is reduced and a relative even-temperedness emerges as development of the meoscorticolimbic systems enhances the self-regulatory mechanism, pubertal hormones are stabilized, and there is increased practice and experience with emotional expression (Blos, 1979; Buchanan et al., 1992; Spear, 2000; Steinberg, 2005; Rosenblum & Lewis, 2003).

Role development shifts from "identity vs. role confusion" (Erikson, 1968) as realistic vocational goals are assumed (Neinstein, 2002), to "intimacy vs. isolation" (Erikson, 1968) with concern for establishing long-term interpersonal relationships. Peer group interaction becomes less important to the late adolescent and more time is spent in intimate relationships with increasing sexual activity (Bouchey & Furman, 2003; Bradford-Brown & Klute, 2003; Lerner, 2002; Neinstein, 2002). Gay, lesbian, and bisexual youth first disclose their sexual orientation on average in late-middle to late adolescence (Anhalt & Morris, 1998). Parental conflict continues to diminish in

frequency yet remains high in intensity through the late adolescent period (Larsen et al., 1996; Laursen et al., 1998).

Although the late adolescent frequently exists in a fluctuating and uncommitted social space, or moratorium (Arnett, 2002), the beginning manifestation of a life plan emerges (Blos, 1979). The late adolescent may increasingly include "social system morality" entrenched in law and authority (Kohlberg, 1980; Nucci, 2001) and "societal perspective taking" (Selman, 1980) to the moral reasoning repertoire; or perhaps move into an experience of post-conventional morality, although this advanced level of moral reasoning is limited in early adulthood and beyond (Lapsley, 1990). Late adolescents may tend to negate convention as "nothing but" the expectations of society, and systems of norms may be viewed as arbitrary, inspiring value relativism and situational ethics (Nucci, 2001). Moral judgments throughout adolescence have been found to be highly dependent on content and context, and an individual may use varying patterns of moral processing dependent on the specific situation (Smetana & Turiel, 2003; Walker, 2004). "Synthetic-conventional" spiritual faith is predominant in adolescence, however a transition to "individuative-reflective" spirituality, applying a more personal existential responsibility for beliefs, commitments, and life-styles may occur (Fowler & Dell, 2004).

The late adolescent leaves secondary education for vocational training, collegiate and graduate education, or adult social roles such as employment and parenting, where adult learning styles and individual accountability are expected (Bryde & Milburn, 1990). In most states, the individual assumes full rights and responsibilities of a citizen at the age of 18. Post-majority youth may vote, command personal finances, enlist in the military, consent for health care, legally engage in sexual intercourse, and enter into marriage

(English, 2002). Within the legal system, the post-majority late adolescent is processed as an adult. The late adolescent may purchase cigarettes at age 18, but is generally prohibited from purchasing alcohol until age 21. Risk behaviors, including unprotected sex, substance abuse and risky driving practices peak during late adolescence and then decline during the middle to late 20s (Arnett, 2002; Bachman, et al., 1996). The minimum age to be eligible as an elected representative to Congress is 25 (U.S. Senate, 2004), reflecting a cultural understanding of the transition into "adulthood" existing since the inception of the United States.

Summary

In summary, the purpose of this section of the chapter was to present a developmentally and culturally based chronological definition of adolescence and the sub-stages within adolescence. The intent of the proposed definition is to provide conceptual consistency in adolescent health dialogue and research. As the science of human development evolves, so will the understanding of adolescent development. Likewise, this definition of adolescence remains subject to cultural and temporal influences. However, given an appreciation for continual conceptual evolution, consistency in the description of adolescence is essential to the science of adolescent development and health. See Table 3 for a summary of the stages of adolescence and their concomitant developmental processes.

Table 3. *Summary of the Stages of Adolescence and Their Developmental Processes*

DEVELOPMENTAL PROCESS	EARLY ADOLESCENCE (10 to13 Years)	MIDDLE ADOLESCENCE (14 to 17 Years)	LATE ADOLESCENCE (18 to 24 Years)
Physical	Initiation of puberty	Continued physical growth and development	Termination of physical growth and development
Cognitive	Developing pre-frontal cortex; Concrete thought to increasing formal operations and abstraction	Continued pre-frontal cortex development; Increasing formal operations and abstraction	Completed brain development; Increased formal operations and abstract reasoning
Emotional	Increased emotional arousability; Immature self-regulatory system	Increasing emotional range; Developing self-regulatory system	Increased emotional stability; Mature self-regulatory system
Social	Primarily unisex peer relationships, Increasing peer involvement; Escalating parental conflict *(Industry vs. Inferiority)*	Heterosexual peer groups and dyadic romantic relationships; Transformational parental relationship *(Identity vs. role confusion)*	Less peer group interaction, development of intimate relationships; Reduced parental conflict *(Intimacy vs. Isolation)*
Sexual	Arousal of sexual curiosity and experimentation	Sexual experimentation and activity increase	Sexual identification and intimate relationships
Moral	Conventional morality emphasizing adherence to expectations; Reflective perspective	Interpersonal normative morality or social system morality; Mutual perspective	Interpersonal morality or social system morality; Societal perspective
Faith	Mythic-Literal to Synthetic-Conventional	Synthetic-Conventional	Postconventional/ Synthetic-Conventional to Individuative-Reflective
Academic	Middle School; Increased academic demands, decreased student-teacher intimacy	High School; Increased academic accountability, diversity and competition	College or Vocational Education; Self-directed "adult learning"
Legal capacity	Consent for confidential reproductive services and STI treatment **	Driver's license, terminate formal education, work, apply for emancipation **	Consent for health care, vote, control finances, own property, marry, enter the military, purchase alcohol and tobacco **

Note. **Ages vary by State.

Rural Adolescent Health

The rural community is a unique, and contrary to its idyllic image, a potentially challenging environment for adolescent health. Although, a wide range of rural contexts exist emanating considerable cultural variability, in general, the cultural experience and developmental opportunities for adolescents differ between urban, suburban and rural communities. The purpose of this section of the chapter is to present a conceptual understanding of the rural community as it relates to adolescent health, followed by a review of the rural adolescent health literature. Literature evaluating the health effects of "connectedness" to the family and school, within the rural community is also reviewed. In addition, methodological considerations in rural adolescent health research will be discussed.

Conceptualization of Rural Communities

The conceptual understanding of a "rural'" community is globally and temporally discrepant, incorporating both ecological and socio-cultural factors (Racher, Vollman, & Annis, 2004). Troughten (1999), in *Redefining 'Rural' for the 21st Century*, defines the "rural" community as a continually evolving geographic, social, and cultural construct. Some authors contend that "rural" as a comprehensive descriptor should be eliminated from the literature because intra-rural differences and rural-urban similarities can be considerable (Racher, Vollman & Annis, 2004). Nonetheless, important socio-cultural differences do exist between "urban," "suburban," and "rural" communities that impact adolescent health, and although the rural descriptor is arguably a conceptual simplification, rural issues remain a pertinent consideration in adolescent health research. A broad contemporary North American conceptualization of the "rural" community will

be explored in this chapter as it relates to adolescent health. Investigations for this review of the literature are drawn primarily from the US, Canada, and Australia.

Rural Communities

Rural communities are defined most frequently through census tabulation, geography and locality, and economic/employment base (Racher, Vollman, & Annis, 2004; Rural Policy Research Institute [RUPRI], 2004). Rural descriptions established using geographic designations include the parameters of size, density, and locality (Racher et al., 2004). The most common designation of rural status in the United States is derived through population concentration. The U.S. Census Bureau (2000) classifies rural communities as localities that do not meet the urban designation of a population of 50,000 or more in core census block groups of 1,000 people per square mile and surrounding census blocks with an overall density of 500 people per square mile. The Office of Management and Budget employs a definitional dichotomy of Metropolitan (urban), Non- metropolitan (rural), and Micropolitan (population 10,000-50,000) (U.S. Census Bureau, 2007). Rural continuum codes based on census and density parameters were also created to accurately identify rural regions within large counties that include metropolitan centers (RUPRI, 2004). "Rural-urban commuting areas," are rural communities contiguous with a metropolitan employment center, and "frontier" regions are remote rural areas. Currently, approximately 21% of American citizens reside in rural settings and the population of rural adolescents is steadily increasing, particularly in the West and Southwest (CSRHA, 2005; Ozer et al., 2003, U.S. Census Bureau, 2004).

Rural demographics are different than urban and suburban communities. Rural populations consistently include a greater proportion of residents under the age of 18 or

over the age 55, than metropolitan regions (Bushy, 2004; CSRHA, 2005; Racher et al., 2004). Although historically an ethnically homogenous population, rural counties are experiencing a steady increase in diversity as more immigrants, particularly Asian and Hispanic, are settling in the rural America (ORHP, 2002). A greater percentage of these minority residents in rural settings have limited English language skills when compared to urban populations (18.2% vs. 11.5%) and more rural residents live below the poverty level than urban citizens (21.5% vs. 16.9%) (CSRHA, 2005, 2006). Fewer residents of rural communities are college educated (16.5% vs. 23.1%) and rural citizens are over-represented in the armed forces (CSRHA, 2005).

Socially, rural residents tend to be more politically conservative, adhere to traditional values including religious practices, comply with more explicit gender role behaviors, and frequently maintain a philosophical investment in self-reliance and stoicism (Boyd et al., 2006; Bushy, 2004; Campbell & Gordon, 2003; Quine et al., 2003). The cultural community of the rural population is a complex blend of connection and isolation, referred to in the literature as the "rural paradox of proximity and distance" (Boyd et al., 2006, p. 3). Although relatively isolated geographically, residents of rural localities tend to report a greater connection to the land, the community, and to relationships within the community (Bushy, 2004). In daily activities, rural residents indicate a preference for operating within an extended network of friends and relations rather than reliance on strangers (Bushy, 2004; Weinert & Long, 1990). Examinations of rural community interaction patterns indicate that of three types of social support: (a) informal social network, (b) local community organizations, and (c) formal government institutions, rural

residents prefer the first two levels, while urban citizens tend to utilize the third (Bushy, 2000; Bushy 2004; Weinert & Long, 1990).

Rural Health Disparities

Residents of rural communities experience significant health challenges compared to urban and suburban populations. Rural populations demonstrate higher rates of infant and maternal morbidity and mortality, a greater incidence of chronic disease, and less involvement in preventive care measures (Bigbee, 1993; Bushy, 2004; Gamm et al., 2003; Peek-Asa, Zwerling, & Stallones, 2004; Weinert & Long, 1990). Higher rates of mental illness, suicide, domestic violence, and drug and alcohol dependency have been documented in rural areas (Bigbee, 1993; Bushy, 2004; Gamm et al., 2003; Weinert & Long, 1990). Drug abuse has been shown to begin at a younger age and have more associated pathology, such as multi-substance addiction and psychosis, in rural populations (Grant et al., 2007). Rural residents also suffer a greater incidence of traumatic injury including drowning, motor vehicle and machinery accidents (Bigbee, 1993; Bushy, 2004; Gamm et al., 2003; Weinert & Long, 1990). Despite limitations in available data, trends indicate that the health of rural populations is in decline with regard to crime, substance abuse, HIV infection and AIDS (Clark, Savitz & Randolph, 2001).

Complicating these health concerns, residents of non-metropolitan areas maintain less financial resources and are less likely to be insured than those in metropolitan regions. Less than one quarter of the American population resides in non-metropolitan areas, yet the rural population includes approximately 50% of America's medically underinsured (Bushy, 2004; ORHP, 2002). Although rural citizens maintain fewer financial resources, they may spend 25% more for essential health care services, such as prescription

pharmaceuticals, than urban residents related to limited market availability and increased transportation expenses (Bushy, 2004; Gamm et al., 2003; Clark, Savitz & Randolph, 2001; Snyder & McLaughlin, 2004).

Health care services are less available in rural areas, impairing access to care and further increasing the cost of health management related to transportation expenditures (CSRHA, 2005). Reduced health care availability and lack of transportation are consistently documented barriers to health care utilization in rural communities (Elliot & Larson, 2004; Leight, 2003; Snyder & McLaughlin, 2004). Approximately 40% of America's rural communities are not serviced by public transportation, further impacting access to health care services, particularly for rural youth (CSRHA, 2005).

Issues of health and access to health care in rural communities are exacerbated by poverty. Impoverished rural residents have demonstrated less access to health care services and greater long-term health problems and than the urban poor (CSRHA, 2005). Poor rural youth encounter disproportionate hardship related to reduced educational resources, insufficient youth development programs, limited access to health care, and frequently inadequate basic services such as safe water, electricity, telephone and electronic communication, and transportation (Save the Children, 2002).

Concern for confidentiality is another significant barrier to health care for culturally and developmentally sensitive issues in rural areas (Bushy, 2004; Campbell & Gordon, 2003; Warner et al., 2005). The web of perceived connectedness in rural communities, while providing the possible benefit of increased social support, may accentuate a fear for personal confidentiality and social stigma (Boyd et al., 2006; Bushy, 2004; Campbell & Gordon, 2003; Warner et al., 2005). Confidentiality concerns are particularly relevant

considering the conservative climate of many rural communities. Therefore, although expressing more perceived connectedness to the community than urban citizens, rural residents may experience isolation from personal and professional support for sensitive issues, such as depression and unintended pregnancy, related to concerns over social judgment (Boyd et al., 2006; Bushy, 2004). In a study of health care utilization among adolescents in rural communities, concern over confidentiality and social stigma were primary reasons for deferred professional health services (Elliot & Larson, 2004).

Depicting a conceptual summary of rural health, Bushy (2000) applied the nursing metaparadigm concepts: person, environment, health and nursing, to the rural community (See Table 4). Additions to Bushy's theoretical presentation of rural nursing drawn from the currently available literature on rural health are included in italics. This table illustrates a summary of health related challenges within a rural setting.

Table 4. *Nursing and the Rural Community (Bushy, 2000)*

Concept	Rural Characteristics
Person	Increasing multicultural diversity
	Greater proportion of young and old citizens
	Lower socioeconomic status
	Familiarity among residents
	Preference for business within relationship
	Newcomer (outsider)/old-timer (insider) dichotomy
	Social adherence to traditional values and gender roles
Environment	Greater space between places
	Insufficient public transportation
	Less dense population
	Reduced communication ability
	Diverse geographic terrain
	Orientation to the natural environment
	Seasonal occupations and recreation
Health	Concern for the ability to work
	Reliance on self-care and informal systems
	Higher prevalence of acute and chronic disease
	Higher incidence of traumatic injury
	Higher morbidity associated with substance use
	Lower rates of health care insurance
	Fewer community health resources
	Less economic resources for health services
	Concern for confidentiality regarding sensitive or stigmatized issues
Nursing	Lack of anonymity
	Familiarity with clients
	Broader/generalist practice parameters
	Multiple roles in the community
	Community expectation for adherence to prevailing social values and gender roles
	Lower wages
	Fewer continuing education opportunities
	Reduced avenues for professional support
	Fewer health care referral sources

Note. Sources include: Boyd et al., 2006; Campbell & Gordon, 2003; CASA, 2000; CSRHA, 2005/2006; Elliott & Larson, 2004; Gamm et al., 2003; Glasgow, Morton, & Johnson, 2004; Grant et al., 2007; ORHP, 2002; Warner et al, 2005; Weinert & Long, 1990.

Rural Adolescent Health

A review of the rural adolescent health literature was conducted using PubMed, CINAHL, and PsychInfo databases, employing the search terms adolescent, rural, health behaviors, and health care utilization. Leading adolescent health indicators such as substance use, sexually transmitted infections, injury, and obesity were also searched under the sub-headings of rural and adolescent. Three rural health periodicals were specifically explored using the search term "adolescent" including: *The Journal of Rural Health, the Online Journal of Rural Nursing and Health Care, and the International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy*. Rural research and policy web sites were also searched including: the Rural Policy Research Institute (www.rupri.org), W.K. Kellogg Foundation Rural People, Rural Policy (www.wkkf.org), Center for Rural Studies (www.crs.uvm.edu), the National Rural Health Association (producing the Journal of Rural Health) (www.nrharural.org), and the California Rural Health Policy Council (www.ruralhealth.ca.gov), using the search terms "adolescent" and "adolescent health". Major American epidemiological surveys of adolescent health including the National Health Interview Survey (NHIS), Monitoring the Future, Youth Risk Behavior Surveillance Survey (YRBSS), and the National Longitudinal Study of Adolescent Health (Add Health) were also searched independently for studies concerning rural populations (See Table 5). A summary of these investigations are listed in Tables 6 and 7 at the end of the chapter.

Rural Adolescent Health and Access to Health Care

Although the status of adolescent health and health behaviors has become a prevalent topic in the literature, the specific concerns of the rural adolescent population remain

under-represented. Rural data is consistently collected by the large epidemiological studies, however relatively few investigations targeting a rural adolescent sample are generated. Independent investigations of rural adolescent health remain limited. Studies were sought for this review of the literature that articulated rural health as a theoretical or empirical construct, as opposed to research that included an incidental rural sample.

Fahs et al. (1999) conducted an extensive integrative research review of adolescent risk behaviors intended to ascertain discrepancies and commonalities in rural, urban and suburban samples. After a review of 137 publications the authors concluded that a large gap in the literature exists regarding risk behaviors and protective factors for rural adolescents. There is a particular deficit in the investigation of sensitive issues, such as adolescent pregnancy, in the rural setting (Skatrud et al., 1998).

Table 5. Epidemiological Surveys of Adolescent Health

	NHIS (1957)	Monitoring the Future (1975)	YRBSS (1990)	Add Health (1994)
Author	CDC/NCHS	University of Michigan	CDC	University of North Carolina, Chapel Hill
Design	Cross-sectional; descriptive	Repeated Cross-sectional; Descriptive/ correlational	Cross-Sectional; Descriptive/ correlational	Longitudinal; Descriptive/ correlational
Sampling Design	Multistage cluster	Multi-stage random	Two-stage cluster	Stratified cluster
Sampling Method	Household; Face-to-face	Classroom; Questionnaire with follow-up at home	Classroom; Self-administered questionnaire	Classroom- and home-based questionnaires
Inclusion Criteria	Younger than 18	8-10 grades; College	9-12 grades	7-12 grades; Young adults
Sample per cycle	13,538 annual	50,000 annual	15,214 biennial	90,118 3-wave single administration
Validity & Reliability	Not reported	Yes	Yes	Yes

In the relatively few studies that adequately evaluated a rural sample, rural youth demonstrated comparable levels of risk behaviors as urban and suburban youth. This review suggested that the commonly held notion that rural youth engage in less risky behavior is erroneous (Fahs et al., 1999). In general, researchers noted the unexpectedly high levels of health risk behaviors and barriers to care for adolescents in the rural setting, concluding that more rural adolescent health research is indicated.

The McManus and Newacheck (1989) review article and the Clark et al. study (2001) using the NHIS data, and the Puskar et al. (1999) investigation using Add Health data, reported similar trends in the health, health behaviors, and access to care for rural

adolescents. These articles affirmed that the incidence of risk behaviors and significant health concerns are at least as prevalent, if not more common, among rural youth when compared to the general adolescent population. It was also determined that limited access to health care and reduced health care funding in rural communities additionally contribute to rural adolescents' risk (Clark et al, 2001; McManus & Newacheck, 1989). A NHIS data study indicated that rural adolescents maintain health care insurance rates equal to urban settings, but the rural population still demonstrates significantly less service utilization (Probst, Moore, & Baxley, 2005). These authors concluded that reduced health care utilization among rural youth is more attributable to lifestyle factors such as language barriers, marginal living situations, poverty, insufficient education, and lack of availability of services, than insurance rates (Probst, Moore, & Baxley, 2005). Loda et al. (1997) noted that reproductive health services for adolescents in the Southeast were particularly limited in scope, impairing the provision of culturally sensitive services for adolescents such as contraception and abortion counseling.

Barriers to developmentally appropriate health care services for rural adolescents are consistently documented throughout the literature (Anderson & Gittler, 2005; Elliot & Larson, 2004; Loda et al., 1997; Skatrud et al., 1998). These barriers include: lack of information, inadequate availability of services, lack of transportation, poverty, insufficient insurance coverage, parenting issues, and concerns regarding confidentiality (Anderson & Gittler, 2005; Elliot & Larson, 2004; Loda et al., 1997; Skatrud et al., 1998). Although the data is limited, minority rural adolescents seem to encounter significantly increased barriers to health service access (Champion et al., 2004).

Limited data are available addressing the effectiveness of specific health care delivery systems, services, or interventions among the rural adolescent population. A small, dated study indicated that rural adolescents prefer community based health care services and peer support in accessing health care (Craft, 1987). An Australian qualitative investigation found that adolescent girls indicated a distinct preference for young female practitioners (Quine et al., 2003), and a Canadian qualitative study on confidential services found that rural adolescent females perceive traditional health services as a threat to confidentiality (Kennedy & MacPhee, 2006). Further investigation of rural adolescent health care preferences and health service utilization is indicated.

Levine and Coupey (2003), use the YRBSS data to refute the common conception of "urban" as a definitive risk factor for youth and adolescent risk behaviors. Overall, the analysis demonstrates that rural youth were at least as likely to be involved in substance use and sexual risk behaviors as urban adolescents. These authors, in accordance with other researchers, acknowledge that an "urban advantage" may exist related to enhanced availability and access to adolescent health services and youth development opportunities in the urban environment (Grant et al., 2007; Levine & Coupey, 2003).

Rural Adolescent Health Indicators

Consistent with the general American adolescent population, substance use, sexual risk behaviors, violence and injury, mental health and obesity are significant adolescent health concerns within the rural setting (Atav & Spencer, 2002; Fahs et al., 1999; Lewis et al., 2006; Muscari & Phillpis, 1997). Several investigations have reported greater morbidity and mortality statistics among rural adolescent populations than urban samples. Clark et al. (2001) found that the overall mortality rate of rural youth was significantly

higher than urban statistics and that the health of rural adolescents was in decline in comparison to urban populations. Although more research is needed, data indicate rural minority youth may be particularly vulnerable to health risks and barriers to health care services (Champion et al., 2004; Gray & Winterowd, 2002). Specifically, Hispanic females, reservation dwelling American Indian, and African American populations demonstrated considerable risk behaviors and barriers to health services in the rural setting (Champion et al., 2004; Federman et al., 1997; Gray & Winterowd, 2002; Lewis, 2006; Milhausen et al., 2003).

Substance use. Drug, alcohol and tobacco use among the rural adolescent population is significant (Atav & Spencer, 2002; Felton, 1998; Gibbons, 1986; Groft et al., 2005; Kostelecky, 2005; Stevens, Whaley & Linsey, 1991). One study indicated that almost 50% of in-school rural adolescents had used marijuana and almost 20% had 10 or more experiences with drugs within the last year (Groft et al., 2005). 70% of the population indicated that they had been drunk at least one time in the last 12 months and 27% indicated that they had been drunk 10 or more times in the same period (Groft et al., 2005). These statistics may actually be an under-estimate of the amount of substance use in the rural adolescent population because the sample did not include the highest risk out of school youth.

An extensive analysis on drug use in rural communities was published by the national Court Appointed Special Advocate Association (CASA) with the support of the Drug Enforcement Administration and National Institute on Drug Abuse using Monitoring the Future data. The CASA white paper reported that 83% of eighth graders in rural America were more likely to use crack cocaine, 50% more likely to use cocaine, 34% more likely

to smoke marijuana, 29% more likely to drink alcohol, 70% more likely to become intoxicated, twice as likely to smoke tobacco and five times more likely to use smokeless tobacco than urban youth (CASA, 2000). In a sampling of 10^{th} and 12^{th} graders, substance use rates in rural communities exceeded those in urban areas for cocaine, crack, amphetamines, inhalants, alcohol, cigarettes, and smokeless tobacco (CASA, 2000). These results concur with the analysis by Cronk and Saravela (1997) and Chimonides and Frank (1998), who found more acceptance of alcohol use among rural youth and concluded that rural adolescents were more likely to engage in substance use than urban populations.

Tobacco use remains a refractory public health concern in rural America with incidence rates consistently exceeding urban samples (24.9% vs. 22%) and well above the Healthy People 2010 objectives (12%) (Doescher, Jackson, Jerant, & Hart, 2006). Greater adolescent tobacco use in rural communities, particularly among Native American populations, has been documented in several investigations (Aloise-Young, Wayman & Edwards, 2002; Felton, 1998; Unger et al., 2003). Aloise-Young, Wayman & Edwards (2002) in a large national study of cigarette smoking found that the most adolescent smoking occurs in the Southern United States and the least in the West. A greater incidence of smoking in rural adolescents compared to urban samples (73% vs. 64.4%) was documented in Canada as well (Plotnikoff, Bercovitz, Loucaides, 2004).

In contrast, also using the Monitoring the Future data set, Donnermeyer and Scheer (2001) concluded the opposite; they found that the data revealed less substance use for the more rural location. This analysis, however, only examined two substances, alcohol and marijuana, both demonstrating varying prevalence rates across localities. Substances

that were not considered in the study include tobacco, inhalants, cocaine, and methamphetamines. This discrepancy illustrates the complexity of investigating comparative substance use. Simple rural-urban dichotomies and the generalization of risk behaviors may confound the complexity of the phenomenon (Donnermeyer & Scheer, 2001).

Sexual activity. The available literature on rural adolescent sexual activity is limited. A study of the alternative education population, (students who have transferred from traditional educational settings frequently related to factors such as deviance, school failure, or pregnancy), using YRBSS data noted that within the high-risk adolescent population attending alternative education, rural participants were less likely to report sexual experience than urban students (Shrier & Crosby, 2003). Conversely, examining sexual risk behaviors between rural and non-rural African American adolescents also using the YRBSS data, Milhausen et al., (2003) concluded that rural males and females were more likely to report ever engaging in coitus and not using a condom during last coitus. Rural African American females were more likely to report engaging in early coitus, having three or more lifetime partners and more than 1 partner within the last three months (Milhausen et al., 2003).

Disturbing data from a small Appalachian study documented a 30% sexual victimization rate among the female adolescent participants (Zweig, Sayer, Crockett, & Vicary, 2002). These findings are consistent with an empirical review of adolescent female victimization studies indicating that rural adolescent females are at greater risk for victimization than urban or suburban samples, although the data on rural populations is limited (Vezina & Hebert, 2007).

Another study using a rural Appalachian adolescent sample indicated that education and knowledge regarding human papilloma virus (HPV) among sexually active females was very low (Wang, Simoni & Wu, 2006). Additionally, adolescent health services for reproductive concerns were found to be severely limited in the rural Southeast (Skatrud et al., 1998). The current literature, and lack thereof, on rural adolescent sexual practices, knowledge, and access to services suggests that sexual risk behavior is an adolescent health concern that may be under-addressed within the rural community.

Violence and injury. Violence is another under-recognized phenomenon in rural populations. Data suggest that rates of intimate partner violence may be higher in rural environments than in larger communities (Johnson & Elliott, 1997). Accordingly, acceptance of interpersonal violence has been shown to be higher among rural adolescents than urban samples (Chimonides & Frank, 1998). In a comparison of dating violence among adolescents in rural, suburban, and urban environments, the researchers found rural adolescents, particularly rural females, to be at greater risk for interpersonal violence (Spencer & Bryant, 200). Champion (1999), in a qualitative examination of interpersonal violence in rural Mexican American adolescents, describes intergenerational patterns of violence that are implicitly condoned and supported through behavioral modeling and reinforcement of traditional gender roles. Fear of loss of confidentiality leading to further harm and social stigma are a primary factor for adolescent silence in the face of interpersonal violence in the rural community (Champion, 1999). Factors that may support the emergence and perpetuation of interpersonal violence among adolescents in rural settings include social isolation,

conservative patriarchal ideologies, inadequate social services, and lack of positive youth development resources (Olimb, Brownlee, & Tranter, 2002)

A study of gun violence and rural adolescents indicated that 25% of rural youth reported exposure to gun violence at least once in their lifetime, contributing to symptoms including anger, dissociation, and post-traumatic stress (Slovak & Singer, 2001). In addition, data indicates that rural adolescents exposed to gun violence report significantly higher levels of violent behavior (Slovak & Singer, 2001). Gang activity is frequently associated with community youth violence. In an investigation of gang membership, Dukes and Stein (2003) found adolescent gang participation in the rural community to be surprisingly high. The investigators concluded that gang formation in the rural environment was indigenous in origin, rather than transplanted from urban settings (Dukes & Stein, 2003).

Traumatic injury is the leading cause of morbidity and mortality in adolescence (Ozer, 2003). The incidence of traumatic injury including, motor vehicle crashes, traumatic occupational injuries, drowning, residential fires and suicide are higher in the rural population than urban communities (Peek-Asa, Zwerling, & Stallones, 2004). Rural youth demonstrate a higher incidence of traumatic injuries than urban populations, with rural males experiencing the highest injury rate (Riley et al., 1996). Rural youth also score higher on measures of risk-taking behaviors associated with traumatic injury than urban adolescents (Riley et al., 1996). The YRBSS data indicate rural adolescents are more likely to drive after drinking than urban youth, contributing to motor vehicle accident morbidity and mortality, the leading cause of death in the adolescent population (Greggo, Jones, & Kann, 2005; Ozer, 2003). Consistent with national data, the most

frequently reported non-fatal injuries in the rural adolescent population were related to participation in athletics and recreation (Groft, 2005; Scheidt et al., 1995). More research is needed to explore factors related to traumatic injury and inter-personal violence in rural adolescent populations.

Mental health. Symptoms of high-level depression have been documented in 34% of rural youth, equally distributed between genders, including a 9% rate of suicidal ideation (Peden, Reed & Rayens, 2005**).** These statistics surpass the incidence of adolescent depression documented in national adolescent data (28%) (Grunbaum et al., 2002). However, the rate of suicidal ideation in the study (9%) is lower than that reported in national statistics (19%), suggesting a discrepancy in research methodology and analysis, particularly given that the general rural population is documented to have a higher suicide rate than urban populations (Grunbaum et al., 2002; Peden, Reed & Rayens, 2005; Peek-Asa, Zwerling, & Stallones, 2004). In a qualitative investigation, Australian adolescents identify suicide as a health concern exhibiting more prevalence in rural communities than urban settings (Quine et al., 2003). Limited educational, employment and recreational opportunities were identified by the adolescents as factors leading to increased adolescent mental health risk in rural communities (Quine et al., 2003). Suicide is the third leading cause of death among adolescents in America, with American Indian and Alaskan Natives (frequently rural residents) demonstrating the highest risk (National Adolescent Health Center [NAHIC], 2006). Considerable unmet mental health treatment need has been documented in the rural adolescent population. Available data indicates that two-thirds of rural adolescents do not receive medically indicated mental health services (Anderson & Gittler, 2005). These statistics suggest the need for more research on

depression, suicide, and access to mental health services for adolescents in the rural community.

Obesity. The obesity epidemic, a concern for all of America, is particularly significant among rural adolescents. In a 1998 study from South Carolina, obesity rates of a rural, predominantly African American sample of six grade males was 49% (Felton et al., 1998) and another study of Mississippi middle school youth indicated that 54% of the sample was "overweight" or "at-risk for overweight" (Davy et al., 2004). From the Healthy Kids Project in Oklahoma, 36.5 % of females and 46.6 % of males in grades 9-12 were either "overweight" or "at-risk for overweight" (Moore et al., 2006). Minority rural adolescents including African Americans, Native Americans and Hispanics, are consistently noted to be at greater risk for obesity than rural Caucasian populations (Davy et al., 2004; Felton et al., 1998, Lewis, 2006). In one study, rural freshman college students were classified as overweight through body mass index (BMI) calculations at rates consistent with national college averages (20.5%) (Rozmus, Evan, Wysochansky & Nixon, 2005). Recent Canadian data indicates a rising trend in obesity similar to the American experience, with rural adolescents demonstrating more prevalence in "overweight" and "obese" status than urban samples (Plotnikoff, Bercovitz & Loucaides, 2004). On-going empirical work is necessary to track the trends and explore factors related factors to adolescent obesity in the rural community.

Connectedness and Rural Adolescent Health

Connectedness, conceptualized as engagement and perceived caring within social contexts including the family, school, and community, has demonstrated protective effects for adolescent health (Resnick, 1997). The literature indicates that connectedness,

particularly to family and school, is correlated with reduced health risk behavior among rural adolescents (Epstein, Botiv & Spoth, 2003; Rountree & Clayton, 1999). In particular, smoking practices, alcohol consumption, marijuana, and other drug use were all significantly affected by positive relational influences and bonding to social instiutions (Epstein, Botiv & Spoth, 2003; Kostelecky, 2005; Rountree & Clayton, 1999). Although no discrepancy in the relational influences on risk behavior was found between rural and urban adolescent samples in one study (Rountree & Clayton, 1999) another study indicated that school bonding appears more protective for adolescent substance use in remote areas (Shears, Edwards, & Stanley, 2006). These authors conclude that the importance of school bonding in rural areas may be explained by limited, positive out-of-school activities in rural communities (Shears, Edwards, & Stanley, 2006). School connectedness appears to be less protective against substance use for African American adolescents in rural communities (Shears, Edwards, & Stanley, 2006). Previous research suggests that African American adolescents may be less likely to conform to school social norms out of a concern for acquiring the label of "acting white", therefore possibly lowering the protective influence of school bonding (Shears, Edwards, & Stanley, 2006).

Methodological Considerations in the Rural Adolescent Health

There are two distinct sources of data in rural adolescent health literature. The first source is derived from the large, epidemiological studies of adolescent health (See Tables 5 & 6). These studies collect data from across broad geographic regions, including rural, urban, and suburban environments. The data collected reflects the most prevalent health related concerns of youth, coordinating with the national health objectives for adolescents. A primary advantage of the epidemiological studies is the availability of

data from large, nationally representative samples, increasing the generalizability of the investigations. The epidemiological studies are consistently well funded and institutionally supported, benefiting significantly from the acumen of sophisticated research teams, including expert statisticians to correct for design effects and reduce bias in inherently complex quantitative designs. In the pursuit of policy advocacy and program development in adolescent health, the large epidemiological studies yield considerable influence with governmental and administrative audiences.

The YRBSS, Monitoring the Future, and NHIS are continuous, cross-sectional, investigations of adolescent health and youth risk behaviors providing valuable surveillance information on adolescent health and trends in health indicators. The Add Health study provides data on contextual influences impacting adolescent health and determinants of health behavior consistent with a theoretical understanding of risk, resiliency and connectedness in adolescence. The Add Health investigation is further strengthened by the collection of longitudinal data extending from early through late adolescence. All of these epidemiological investigations collect rural adolescent data. Arguably, the available adolescent health epidemiological data has been under-utilized in the generation of potentially useful research on rural adolescent health.

Although an extremely valuable contribution to the literature, the epidemiological studies have significant limitations. Of primary concern with the large epidemiological design is the ability to represent the highest risk youth. The epidemiological studies generally sample adolescents within schools, in households or using a residential phone contact. All of the studies require active parental consent for participation. This sampling method depends on an adolescent population that is accessible, engaged and receptive to

interaction with the prevailing social system, including the government. Adolescents who may be excluded include the most high-risk adolescent populations, youth who are out of the home, afraid to respond, or prevented from participating through the active parental consent requirement. Exclusion of the highest risk youth results in a probable under-estimate of risk behaviors, thereby reducing the validity of the research results. The lack of representation of the highest risk youth is of particular concern with studies intended to drive policy formation and program development. It is very possible that the highest risk sectors of the adolescent population are under-represented in the epidemiological investigations, resulting in a lack of appreciation for adolescent concerns and a subsequent deficit in program development.

The second source of data in rural adolescent health research is the independent investigations (See Table 7). These studies are generally much smaller in size, focus on a circumscribed geographic locality, and have a more narrowly defined research agenda. The strength of this research is the provision of a local perspective, representing rural cultural diversity, not possible from the large epidemiological studies. Conversely, the small, circumscribed sample size limits the generalizability of the studies. The research teams for the independent studies are usually much smaller than the epidemiological studies, with significantly less funding. There is some concern regarding the consistency of methodological rigor of the independent investigations of rural adolescent health, including relatively small sample sizes, lack of validity and reliability in instrumentation, and the omission of a theoretical foundation for the research. Additionally, the independent investigations frequently employ discrepant definitions of "rural", potentially confounding analysis and comparisons within the literature.

Adolescent health research in general is overly reliant on cross-sectional, self-report, quantitative investigations. The traditional cross-sectional survey design can at best only provide a cropped snapshot of unilateral perspective at a single point in time. Cross-sectional adolescent health data cannot represent the critical transitional experience of adolescent development as it relates to health and health behaviors. More longitudinal and qualitative data are needed in the rural adolescent health research. Longitudinal designs are useful to explore the transitional experience of adolescent health and qualitative research can provide a rich description of the adolescent experience. Qualitative studies are capable of amplifying the unique perspective of the rural adolescent to enhance the conceptual and empirical understanding of rural adolescent health.

The validity of self- report data in adolescent health research has been seriously challenged in the literature. A review of self-report data conducted by Brener, Billy & Grady (2003) from the CDC concluded that the validity of self-report data in adolescent health research is significantly influenced by cognitive and situational factors, such as recall ability and social perception of behavior. However, each behavior is not affected equally, and the reliability of self-report data differs among the specific health behaviors (Brener et al., 2003). Researchers, practitioners, and policy advocates are advised to critically examine self-report data on individual health behaviors and interpret the results with caution (Brener et al, 2003).

Solutions to the threats to validity in adolescent health research may include the use of alternative sampling and consent methods to help capture high-risk youth, the use of multiple informants for data collection, and the inclusion of biometric and psychological

instrumentation to reduce the research dependence on self-report data. Also, more longitudinal and qualitative designs are needed in adolescent health research, particularly among rural populations.

Summary

Health concerns of the rural adolescent are unique and under-appreciated. This review of the literature suggests that adolescent health issues including, obesity, violence and injury, substance use, sexual and mental health, are at least as prevalent in rural settings as in metropolitan communities. In addition, rural adolescents are subject to socio-cultural factors that may limit effective developmental adaptation, such as diminished positive youth development resources, impaired access to health care services, reduced health care funding, confidentiality concerns and social stigma for sensitive services such as mental health and reproductive care. The combination of risk behaviors and reduced support services fosters a culture of adolescent vulnerability unique to the rural environment. This vulnerability fuels a disparity in the health status of the rural adolescent population when compared with urban and suburban populations. More research, from both the large epidemiological investigations and the smaller independent studies is indicated on the health behaviors, correlates to health and health care delivery systems for adolescents in the rural community.

Table 6. *Epidemiological Studies of Adolescent Health*

Study	Authors/(Date)	Journal	Data Source	Findings
Rural Maternal, Child, and Adolescent Health	McManus & Newacheck (1989)	Health Services Research	NHIS	Significant health risks; limited health resources
Alcohol, Tobacco, and other Drug Use among Rural/Small Town and Urban Youth: A Secondary Analysis of the Monitoring the Future Data Set	Cronk & Sarvela (1997)	American Journal of Public Health	Monitoring the Future	More substance use in rural localities
Health Concerns and Risk Behaviors of Rural Adolescents	Puskar, et al (1999)	Journal of Community Health Nursing	Add Health/ YRBSS	Significant health concerns & behaviors
No Place to Hide: Substance Abuse in Mid-Sized Cities and Rural America	National Center on Addiction and Substance Abuse (2000)	CASA Publication	Monitoring the Future	More substance use in rural localities
Rural Children's Health	Clark, Savitz & Randolph (2001)	Western Journal of Medicine	NHIS	Significant health risks surpassing urban statistics; limited health resources
An Analysis of Substance Use Among Adolescents from Smaller Places	Donnermeyer & Scheer (2001)	Journal of Rural Health	Monitoring the Future	Less substance use in rural localities
Risky Behaviors Affecting Rural Adolescents' Health	Snyder & McLaughlin (2002)	Presented at the Rural Sociological Society	Add Health	Report unavailable
Rural and Nonrural African American High School Students and STD/HIV Sexual-Risk Behaviors	Milhausen et al. (2003)	American Journal of Health Behavior	YRBSS	Greater sexual risk behavior among rural African American adolescents
Adolescent Substance Use, Sexual Behavior, and Metropolitan Status: Is "Urban" a Risk Factor?	Levine & Coupey (2003)	Journal of Adolescent Health	YRBSS	"Urban" not necessarily a risk factor; evidence for an "urban advantage"
Parents & Peers: How Much Do They Influence Risky Behavior Among Rural Teens	Snyder & McLaughlin (2004)	Presented at the Rural Sociological Society	Add Health	Report unavailable
Population Density and Alcohol-related risk behaviors among US High School Students	Greggo, Jones, & Kann (2005)	American Journal of Health Education	YRBSS	Driving after drinking was significantly higher in rural communities

Study	Authors/(Date)	Journal	Data Source	Findings
Update: Health Insurance and Utilization of Care Among Rural Adolescents	Probst, Moore & Baxley (2005)	Journal of Rural Health	NHIS	Rural youth have equal rates of health insurance but lower rates of health care utilization

Table 7. *Independent Investigations of Rural Adolescent Health*

Title/Author	Date/Publication	Main Findings	Limitations
Access to Confidential Sexual Health Services (Kennedy & MacPhee)	(2006) *Canadian Nurse*	Qualitative study; adolescent females perceived traditional health services as a threat to confidentiality	Sample limited to 2 Canadian schools
School Bonding and Substance Use in Rural Communities (Shears, Edwards, & Stanley)	(2006) *Social Work Research*	School bonding may be more protective against adolescent substance use in remote communities. Results may be related to limited, positive out-of-school activities in rural communities. School bonding is more protective for girls than boys and less protective for African Americans than Caucasians or Mexican Americans.	California & Utah were excluded from the sample of 4 regions in contiguous US; *n* = 181,351
Prevalence and Degree of Childhood and Adolescent Overweight in Rural, Urban, and Suburban Georgia (Lewis et al.)	(2006) *Journal of School Health*	Overweight adolescent were more prevalent in rural regions and minority populations with the highest incidence among non-Hispanic African Americans.	Sample limited to Georgia; *n* = 3114
Human Papillomavirus (HPV) in Rural Adolescent Females: Knowledge, Protected Sex, and Sexual Risk Behaviors (Wang, Simoni & Wu)	(2006) *Online Journal of Rural Nursing and Health Care*	HPV knowledge was low among this sexually active rural adolescent population. Family connectedness was correlated with reduced sexual activity.	Small sample limited to a single rural Appalachian community; mostly Caucasians; *n* = 159
Adolescent Health: A Rural Community's Approach (Groft et al)	(2005) *Rural and Remote Health*	Health-risk behaviors are relatively prevalent including substance use and traumatic injury; community demonstrates willingness to engage in problem solving.	Sexual behavior was not included in the study; sample limited to a single high school in rural Canada; *n* = 288

Title/Author	Date/Publication	Main Findings	Limitations
Unmet Need for Community-based Mental Health and Substance Use Treatment Among Rural Adolescents (Anderson & Gittler)	(2005) *Community Mental Health Journal*	Considerable unmet treatment need among rural adolescents with 2/3 of adolescents not receiving treatment consistent with professional practice guidelines.	Retrospective chart review; focus mainly on co-occurring disorders; sample limited to Southeast Iowa; *n* = 177
Parental Attachment, Academic Achievement, Life Events and Their Relationship to Alcohol and Drug Use During Adolescence (Kostelecky)	(2005) *Journal of Adolescence*	Incidence of substance use among rural high school seniors was substantial; involvement with alcohol, marijuana, and other drug use were significant; parental attachment reduced drug use	Limited to 2 Midwestern communities; small sample size; high school seniors only; *n* = 133
Depressive Symptoms in Adolescents Living in Rural Areas (Peden, Reed & Rayens)	(2005) *Journal of Rural Health*	Prevalence of high level depressive symptoms was significant (34%) and suicidal ideation (9%) with equal distribution between boys and girls	Convenience sample; limited to Kentucky and Iowa; *n* = 299
An Analysis of Health Promotion and Risk Behaviors of Freshman College Students in a Rural Southern Setting (Rozmus et al)	(2005) *Journal of Pediatric Nursing*	Risk behaviors of college Freshman attending a rural campus were significant but less than reported national data; elevated BMI was consistent with national data	Sample was limited to one rural campus; *n* = 251
Adolescents in Mid-sized and Rural Communities: Foregone Care, Perceived Barriers, and Risk Factors (Elliot & Larson)	(2004) *Journal of Adolescent Health*	Health care is a significant concern among non-urban adolescents. Barriers to care include lack of information, impaired access, poor insurance coverage, parenting issues, and concerns regarding confidentiality	Sample limited to one mid-western county; *n* = 1,948

Title/Author	Date/Publication	Main Findings	Limitations
Rural Mexican-American Adolescent Sexual Risk Behavior (Champion et al)	(2004) *Journal of Rural Health*	Rural Mexican-American adolescent females experience high levels of psychological distress and many risk behaviors but few protective behaviors. Barriers to health care included access and confidentiality	Small sample size from a single rural clinic; *n* = 106
Physical activity, smoking, and obesity among Canadian school youth. Comparison between urban and rural schools (Plotnikoff et al)	(2004) *Canadian Journal of Public Health*	Incidence of smoking, "overweight" and "obese" status, and physical inactivity in rural samples surpassed urban statistics	Canadian study; *n* = 2,697
Gun Violence Exposure and Trauma Among Rural Youth (Slovak & Singer)	(2004) *Victims and Violence*	25% of rural adolescents reported exposure to gun violence which correlates with increased anger, dissociation, post-traumatic stress and violent behaviors	
Predicting Smoking Among Rural Adolescents: Social and Cognitive Processes (Epstein, Botvin & Spoth)	(2003) *Nicotine & Tobacco Research*	Peer smoking norms, adult smoking norms, drug refusal assertiveness, drug refusal techniques, pro-smoking attitudes, and risk taking tendency were associated with rural adolescent smoking. Parental management was significant only for females.	Exclusively early adolescent population; sample limited to rural Iowa; *n* = 1,673
Gender and Gang Membership: A Contrast of Rural and Urban Youth on Attitudes and Behavior (Dukes & Stein)	(2003) *Youth & Society*	Although gang membership was higher in urban school districts than rural school districts, gang membership in rural communities was surprisingly high.	Sample limited to Colorado Springs, Colorado & Reno, Nevada; definition of gang membership was self-determined; *n* = 1,742
Health and Access Issues Among Australian Adolescents: A Rural-Urban Comparison (Quine et al)	(2003) *Rural and Remote Health*	Qualitative exploratory study; 81 focus group interviews (22 rural); suicide and pregnancy as health concerns exhibiting more prevalence in rural communities as compared with urban settings. Limited educational, employment and recreational opportunities were identified as factors leading to increased adolescent risk behaviors in rural areas.	Australian study limited to New South Wales; relatively small rural sample; total *n* = 650

Title/Author	Date/Publication	Main Findings	Limitations
Smoking Behavior Among Urban and Rural Native American Adolescents in California (Unger et al)	(2003) *American Journal of Preventative Medicine*	Smoking prevalence was higher in rural adolescent populations; Native Americans had a particularly high prevalence of smoking	Limited to California; *n* = 22,440
Health risk Behaviors Among Adolescents Attending Rural, Suburban, and Urban Schools: A Comparative Study (Atav & Spencer)	(2002) *Family and Community Health*	Rural students were at most risk for all risk indicators, including: tobacco, alcohol, other illicit substances, intercourse and pregnancy, and carrying a weapon.	Sample limited to Upstate New York; *n* = 2,017
Health risks in American Indian Adolescents: A Descriptive Study of a Rural, Non-reservation Sample (Gray & Winterowd)	(2002) *Journal of Pediatric Psychology*	Non-reservation American Indian students demonstrate average or better health habits than reservation based samples; Indian students were more likely than non-Indian students to report family histories of significant health problems, smoke, feel that life was not worth living and drive with someone under the influence of alcohol	Small sample size; limited to a single southwestern state; *n* = 243
Prevalence of Cigarette Smoking Among Rural Adolescents in the United States (Alois-Young et al)	(2002) *Substance Use and Misuse*	Large national study; indicates incidence of cigarette smoking is larger in rural populations than metropolitan; most smoking occurs in the Southern US; the least in the West	Representative sample of rural youth; not nationally, thus, comparison with national studies is problematic; *n* = 68,270
Adolescent Risk Factors for Sexual Victimization: A Longitudinal Analysis of Rural Women (Zweig et al)	(2002) *Journal of Adolescent Research*	30% rate of sexual victimization. Mother's level of education moderated the relationship between individual risk factors and the probability of reporting victimization	Limited to white Appalachian females in a single school district; *n* = 237
Rural-Urban Differences in the Distribution of Parent-reported Risk Factors for Substance use Among Adolescents (Spoth et al)	(2001) *Journal of Substance Abuse*	Parent-reported cumulative risk for young adolescent substance use was higher in rural populations than urban populations	Parent reported data; Sample limited to a single Midwestern state; *n* = 339

Title/Author	Date/Publication	Main Findings	Limitations
Dating violence: A comparison of rural, suburban, and urban teens (Spencer & Bryant)	(2000) *Journal of Adolescent Health*	Adolescents form rural school districts are at greater risk for dating violence than urban or suburban populations. Rural adolescent females are at the greatest for dating violence	Sample limited to upstate New York *n* = 2,094
Integrative Research Review of Risk Behaviors Among Adolescents in Rural, Suburban, and Urban Areas (Fahs et al)	(1999) *Journal of Adolescent Health*	Large gap in the literature regarding risk behaviors and protective factors in rural populations; limited data indicate risks are at least as prevalent in the rural setting	Review of available empirical data
A Contextual Model of Adolescent Alcohol Use Across the Rural-Urban Continuum (Rountree & Clayton)	(1999) *Substance Use & Misuse*	Adolescent bonding to conventional social institutions reduced alcohol consumption. Multilevel contextual relationship influenced adolescent drinking but not divide along a rural-urban dichotomy	Sample limited to Kentucky, *n* = 2,295
Rural and Urban Adolescents' Perceptions of Mental Health (Chimonides & Frank)	(1998) *Adolescence*	Rural students demonstrated more acceptance of alcohol abuse, were more likely to support interventional violence or punishment, and viewed depression as more significantly unhealthy	Limited examination of mental health parameters; Sample limited to Northern Florida; *n* = 220
Health Risk Behaviors of Rural Sixth Graders (Felton et al)	(1998) *Research in Nursing and Health*	Risk behaviors including alcohol and tobacco use were prevalent in a sample of primarily African American, low SES 6th graders; of particular concern obesity is noted to be well above the national average.\	Limited to a low SES population in 2 school districts in South Carolina; *n* = 352
An Overview of Adolescent Pregnancy in Rural Areas (Skatrud et al)	(1998) *Journal of Rural Health*	Scant empirical literature related to adolescent pregnancy in rural areas; No data were found indicating risk of pregnancy and pregnancy related deleterious health outcomes was reduced in rural areas; Social isolation, lack of resources and concerns about confidentiality were noted to be contributing factors to poor outcomes	Review of available empirical data; limited to 8 Southeastern states

Title/Author	Date/Publication	Main Findings	Limitations
Health Beliefs and Behaviors in Rural High School Juniors (Muscari et al)	(1997) *Pediatric Nursing*	Prevalence of adolescent health issues including violence, substance abuse, poor nutritional and exercise habits, and stressful life events	No questions on sex behaviors; Sample limited to early adolescents of a farming community in Pennsylvania; *n* = 709
Programs and Services to Prevent Pregnancy, Childbearing, and Poor Birth Outcomes Among Adolescents in Rural Areas of the Southeastern United States (Loda et al)	(1997) *Journal of Adolescent Health*	Programs serving rural youth address same high-risk behaviors as urban youth; barriers exist to services for rural adolescents, including, confidentiality. Health services in the rural Southeast address only selected health issues, neglecting sensitive concerns such as abortion	Data limited to the Southeast; data gathered from organizational representatives, not adolescents
Development of Substance Use and Psychiatric Comorbidity in an Epidemiologic Study of White and American Indian Young Adolescents: The Great Smoky Mountain Study (Federman et al)	(1997)	Rural Native American youth demonstrated higher prevalence of tobacco and marijuana use than Caucasians from same area	Data limited to North Carolina; sample limited to early and young/middle adolescents, 9-15; due to small sample size, African Americans eliminated from analysis; *n* = 4,500
Behavior and Injury in Urban and Rural Adolescents (Riley et al)	(1996) *Injury Prevention*	Rural youth have higher proportion of injuries than urban youth with rural males experiencing the highest injury rate. Rural youth scored higher in risk-taking behavior related to injury than urban youth	Sample limited to the Maryland; *n* = 2,712
Alcohol Use Among Rural Adolescents: Predictive and Situational Factors (Donnermeyer & Park)	(1995) *The International Journal of Addictions*	Rural frequency of alcohol use, predictive and situational factors were similar to other national surveys of adolescent alcohol use	Sample limited to one county in Illinois; *n* = 456
Rurality and Gender: Effects on Early Adolescent Alcohol Use (Kelleher et al)	(1992) *American Journal of Disease of Children*	Significant intrarural variation in young adolescent drinking patterns	Sample limited to Arkansas; *n* = 1,601

Title/Author	Date/Publication	Main Findings	Limitations
Prevalence and correlates of alcohol use in a survey of rural elementary school students: the New Hampshire study (Stevens et al)	(1991) *Journal of Drug Education*	Alcohol use in rural young adolescents was significant, increasing with grade and age	Sample limited to 4 New Hampshire school districts; *n* = 1,190
Health Care Preferences of Rural Adolescents; Types of Services and Companion Choices (Craft)	(1987) *Journal of Pediatric Nursing*	Health care service preference and companion choices varied with etiology; adolescents seeking sensitive services preferred the community clinic setting and an acquaintance or no companion	Small sample size; localized to a single mid-western town; older study (included for topical interest); *n* = 166
Patterns of Alcohol Use Among Rural and Small-Town Adolescents (Gibbons et al)	(1986) *Adolescence*	Prevalence of alcohol use is substantial in the rural adolescent population; particularly disconcerting is the early age 12 of initiation	Sample limited to a single mid-Atlantic county; *n* = 650

CHAPTER IV

ETHICAL CONSIDERATIONS IN RURAL ADOLESCENT HEALTH RESEARCH

This chapter addresses the ethical concerns in the design and implementation of adolescent health research, with particular attention given to adolescents in rural populations. Adolescents are a potentially vulnerable population requiring special consideration in health care practice and research. The public health conception of "vulnerability" is to be "susceptible to harm or neglect" through acts of commission or omission (Aday, 2001, p.1). Adolescents are a vulnerable population because they engage in progressively independent lifestyle and risk behaviors without a fully developed or legally sanctioned capacity for informed choice, consent, health care access or advocacy. Minor adolescents are considered a "doubly-vulnerable" population, unduly subject to coercion and harm, with limited authority and access (Kopelman, 2004). The unique circumstances of the rural environment can further compound the vulnerability of adolescents in practice and research.

Ethical Standards in Research

The Code of Research Ethics of the Society of Adolescent Medicine (Society for Adolescent Medicine [SAM], 1999) and the Guidelines for Adolescent Health Research (SAM, 1995, 2003) outline the standards for conducting adolescent health research. These standards reflect the recommendations of the Belmont Report presented by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (aka the National Commission). The Belmont Report established the criteria for ethical research in the United States (Department of Health Education and

Welfare [DHEW], 1978) and became law in the Code of Federal Regulations in 1983 (Lamb, Puskar & Tusaie-Mumford, 2001). Subsequently, organizationally based Institutional Review Boards (IRBs) were developed and charged with the authority and responsibility over the protection of human subjects in accordance with the Code of Federal Regulations (Lamb et al., 2001). The Belmont report established three basic principles of co-equal importance for ethical research involving human subjects including 1) respect for persons, 2) beneficence and 3) justice (DHEW, 1978). These principles will be considered as they pertain primarily to research with adolescents. Specific concerns of adolescents in the rural environment will be discussed.

Respect for Persons

The "respect for persons" principle in the Belmont Report asserts that individuals should be treated as "autonomous agents" while simultaneously protecting vulnerable individuals with "diminished autonomy" (DHEW, 1978, Part B). This is a critical principle in adolescent health research, the importance of balancing respect for the emerging autonomy and developmental needs of the adolescent, with appreciation for the potential vulnerability of inchoate capacities and legal constraints.

Consent. The capacity to consent is at the center of the discussion of respect for persons in adolescent health research. The ability to provide informed consent varies significantly between the stages of adolescence. The post-majority adolescent (18 to 24 years) is expected to reason with adult capacity, supporting the legal authority for informed consent at age 18 in most American states. The early adolescent (10 to 13 years) generally exhibits immature patterns of reasoning consistent with childhood, and the middle adolescent (14 to 17 years) oscillates between more and less mature patterns

of reasoning (Petersen & Leffert, 1995). There is consensus in the literature that by the age of 14 years, an adolescent's cognitive potential for understanding the research process and decision- making ability is similar to adults (Peterson & Leffert, 1995; Susman, Dorn & Fletcher, 1992). On the other hand, it has also been demonstrated that reasoning and decision making in adolescence may be situational and excessively influenced by contextual factors such as social perception, emotion, and financial or social incentives (Petersen & Leffert, 1995; Steinberg & Scott, 2003; Dorn, Susman & Fletcher, 1995). Reasoning in adolescence is also affected by life experience that can vary significantly between adolescents. Adolescents may or may not demonstrate cognitive *capacity* (as opposed to ability) in decision making, related to the combination of developmental cognitive ability, interpersonal skills and life experience (Petersen & Leffert, 1995; SAM, 2003). Therefore, in adolescent health research the *ability* to consent consistent with adult standards may be present, but *capacity* may be significantly influenced by developmental and contextual factors.

The National Commission affirms the right for mature minors to *assent* to research under certain conditions, such as issues over which they maintain legal authority, as in reproductive health (DHEW, 1978). *Assent* is defined as a child's affirmative agreement to participate in research (Office for Human Research Protection [OHRP], 2005)**.** *Consent* is a legally effective agreement for participation from the subject or legal guardian based on information that is provided (OHRP, 2005). A *mature minor* is a developmental and legal distinction most frequently demarcated chronologically at age 15 or above (Neinstein, 2002). A mature minor may be granted the legal capacity to provide informed consent depending on individual state laws (Nienstein, 2002). Minor

consent laws vary between states and it is essential for the researcher to be knowledgeable of the adolescent consent laws of their practicing state as outlined by the *Center for Adolescent Health and Law in the publication State Minor Consent Laws: A Summary* (English & Kenney, 2003).

In some research protocols it may be essential to the research design to obtain data from an adolescent population without guardian permission. An example would be in an investigation of the health behaviors of adolescents who are estranged from their legal guardians, such as street youth. The Commission identified two circumstances critical to allowing the involvement of minor adolescents in research as autonomous agents without guardian permission, including: 1) there should no more than minimal risk; and 2) adolescents enrolled must be mature minors (Rogers et al., 1994). *Minimal risk* is defined as research that does not present greater risk than the subjects are exposed to in daily life or routine physical or psychological examinations (English, 1995).

The Society of Adolescent Medicine (SAM) position paper on adolescent health research urges a consideration of contextual factors for individual research designs that may increase the vulnerability of adolescent participants (SAM, 2003). The Code of Research Ethics established by SAM asserts that both the role of guardians and the capacity of adolescents in research must be respected (SAM, 1999). The position paper states that for low risk research, the capacity of adolescent consent can be assumed (SAM, 2003). For higher risk investigations, the position paper reinforces the SAM Guidelines for Adolescent Health Research (1995) in recommending that an individual assessment of capacity must be completed (SAM, 1995). Koocher (2002) recommends using the CABLES acronym for guiding minor research participation. This assessment

includes a consideration of cognitive, affective, biological, legal, economic, and social/cultural risks to the adolescent as part of the research protocol (Koocher, 2002). The CABLES assessment can be used as a guide in the development of an adolescent research protocol and incorporated into the research design as an individual subject assessment within the consent process.

Confidentiality. Issues concerning confidentiality are also integral to the discussion of "respect for persons" in adolescent health research (Caskey & Rosenthal, 2005; DHEW, 1978, Part B). Legally recognized as persons with limited autonomy, minor adolescents have an ethical and legal right to confidentiality (SAM, 2003). In several landmark court cases, the judicial system has consistently upheld the constitutional right of privacy for minors (SAM, 2003). The requirement of parental consent in the research process may pose a threat to confidentiality for adolescents, particularly in investigations concerning sensitive issues such as sexual and psychological health (Caskey & Rosenthal, 2005). A waiver of parental consent can be obtained for research situations where parental notification would be deleterious to the participant under federal regulation 45 CFR 46.116(d) (SAM, 2003). In a report by the National Commission on Research Involving Children, the Commission stated that under the moral principle to avoid harm, as well as to respect the autonomy of older minors, alternatives to parental consent should be required by the IRB whenever parental permission is not a reasonable requirement to protect the well-being of the child (DHEW, 1977).

According to a comprehensive ethical review and summary of adolescent health research without guardian consent by Levine (1995), mature minor consent should be granted for anonymous surveys under the following conditions:

1. The study was designed with no identifying link between the data and the adolescent;
2. Investigators have ensured the privacy and confidentiality of the participants;
3. The research will be conducted with the assent of the mature minor; and
4. Consideration is given to community consultation in the design of the research.

One protocol for waived parental consent to protect adolescent confidentiality for low risk adolescent health research that has successfully received IRB approval is the solicitation of adolescent assent and the provision of an information sheet in lieu of a signed consent form. Federal regulation 45 CFR 46.117(c) supports the waiver of signed consent in minimal risk research when the consent document would be the only record linking the participant with the study and the principle risk of the study is a breach of confidentiality (OHRP, 2005).

"Community consultation" on the research protocol as suggested by Levine (1995) may be problematic for designs proposing a waiver of parental consent, particularly in rural communities. A waiver of parental consent for adolescent research or health care is not a practice that is universally appreciated or supported by the general public. There is a prevalent sentiment among many conservative cultures, frequently including rural communities, that a waiver a parental consent for a minor violates the rights of the parents (Pasternak, Geller, Parrish & Cheng, 2006). It can be difficult to obtain support for a waiver of parental consent for even low risk research in rural communities, particularly if the protocol uses public entities such as the school system or public health services for sampling, and includes the investigation of sensitive issues.

Confidentiality in adolescent health research can be particularly problematic in rural communities. By definition, rural communities are comprised of relatively small concentrations of citizens. The small population size increases the possibility that the researcher may have experience with a prospective participant extraneous to the research protocol, that research participants could interact, or that the identity of a subject could be ascertained from the research analysis. In most cases, extraneous contact with a research participant must be avoided because it poses a threat to the validity of the research, as well as a threat to participant confidentiality. Given the socially conservative nature of many rural communities, concerns for confidentiality may reduce the participation rate for research concerning sensitive issues (Boyd et al., 2006; Bushy, 2004; Campbell & Gordon, 2003; Quine et al., 2003). For this reason, it is generally prudent for a researcher in a rural setting to avoid research protocols involving personal contact with a participant in a locality where the researcher has professional or personal experience. On the other hand, rural communities commonly maintain a preference and predilection for conducting business among established social and professional networks (Bushy, 2004; Weinert & Long, 1990). It may be easier for an "insider" with connections to the community to obtain organizational cooperation for the adolescent health research protocol. To balance these concerns, it might be necessary to utilize a team approach in promoting adolescent health research in rural communities. It may be more effective to have a researcher from within the cultural community promote the study and establish the research protocol, and another set of researchers gather the data. The exact location of the sampling should not be disclosed in the analysis of rural adolescent health research to reduce the probability of inferential personal identification.

There are times in adolescent health research when a breach of confidentiality may be ethically necessary and possibly mandated by law. If in the process of an investigation, an adolescent discloses a situation that presents a serious imminent danger to the minor subject or others, the researcher may be ethically and legally required to report the situation to local authorities. The protocol for these situations must be clearly delineated in the research proposal and thoroughly reviewed with the participant during the consent process. In small communities with limited resources and inexperience with research protocols, it may be prudent to review the report mechanism with pertinent local agencies such as Child Protective Services before the beginning of data collection.

It has been found that outlining the parameters of conditional confidentiality and mandated reporting requirements may not be an impediment to obtaining honest responses from adolescents (Ford et al., 1997). Studies indicate that participant adolescents do not desire or expect the researcher to maintain confidentiality in extreme circumstances such as the probability of harm to self or others (Fisher et al., 1996; Ford, Thomsen & Compton, 2001). The ability to retain adolescents, particularly high-risk youth, during the consent process is critical to generating an adequate sample size and enhancing the validity of the study. However, the need to retain high-risk youth in research must be balanced with ethical protection of their right to confidentiality and safety.

Beneficence

According to the Belmont Report, the principle of beneficence in research calls for ensuring the well-being of the participants (DHEW, 1978). The two general rules of beneficence are 1) do no harm, and 2) maximize possible benefits while minimizing risks

(Levine, 1995). Beneficent research practice must always maintain the good of the individual and population as the foremost scientific goal. Implementation of adolescent health research is in itself a beneficent endeavor to improve the well-being of adolescents through the continued advancement of adolescent science. Translation of scientific discoveries into public benefit is the primary beneficent goal of the research process (University of California San Francisco [UCSF], 2006).

Validity. The validity of research is essential to beneficence, therefore the proper application of rigorous research methodology is critical. Results that lack validity do not contribute to the well-being of a population and misrepresentation may actually incur harm. Currently, adolescent behavioral health research relies heavily on self- report data and quantitative designs. Quantitative designs are used extensively because they are frequently a cost effective and efficient methodology for data collection and analysis. Using self-report, quantitative survey methods, large volumes of data can be retrieved and analyzed in a relatively short time frame. Although this method provides valuable adolescent health information, there are also several potential limitations.

First, careful consideration must be given to the application of a particular quantitative instrument within each developmentally specific adolescent sampling frame (early adolescence 10-13; middle adolescence 14-17; late adolescence 18-24). An instrument developed for the middle adolescent may be cognitively and conceptually inappropriate for the early adolescent, just as an instrument developed for a 20 year old, late adolescent, may be inappropriate for a 16 year old.

There is some discussion in the literature that Likert response formats potentially threaten the validity of instruments in adolescent populations, particularly with younger

adolescents, related to a diminished ability to make fine discriminations based on limited experience (Dashiff, 2000). There also may be developmental gender differences in the ability to complete questionnaires, with young adolescent boys demonstrating higher frustration levels with lengthy survey instruments (Dashiff, 2000). Additionally, the semantic and contextual meaning of survey questions may vary across developmental ages, within ethnicities and between languages (Dashiff, 2000). These differences may not be adequately reflected by the literal translation of survey questions, particularly considering the continually evolving idiosyncratic nature of adolescent expression (Dashiff, 2000).

The data acquired from quantitative self-report instruments in adolescent research can be subject to contextual factors such as perceived confidentiality, question wording, social perception of sensitive issues, developmental status and gender (Brener et al., 2004; Dashiff, 2000; Durant, Carey & Schroder, 2002; Sieling et al., 1998; Sieving et al., 2005). Response dynamics of adolescent surveys have been demonstrated to vary significantly between application methods and alternative question wording formats (Brener et al., 2004). Sensitivity to situational factors, such as social perception, is particularly relevant in adolescent health research with data collection concerning sensitive subjects in the home and school environments. This situational sensitivity among adolescents may be strongly affected by experimental condition and gender (Durant, Carey & Schroder, 2002). Perceived anonymity, as opposed to confidentiality, in data collection was found to strengthen the validity of adolescent response data (Durant, Carey & Schroder, 2002). Women perceived the questioning of sensitive behaviors as more threatening than male respondents and more frequently chose non-response or

survey termination options (Durant, Carey, & Schroder, 2002). Issues of confidentiality have been indicated as a primary concern for rural adolescents and may further effect the validity of rural adolescent health data (Elliot & Larson, 2004). The potential for reduced validity as a result of contextual factors in instrumentation can potentially confound the research analysis and interpretation.

Strategies that have been found to improve the validity of adolescent responses include providing an enhanced sense of anonymity and confidentiality through increasing the physical distance between respondents in group settings, providing methods for obscuring responses, and supplying envelopes for questionnaire return (Gans & Brindis, 1995). In the home setting, using a tape recorder with headphones for orally administered questions and prompt cards that disguise the answers to the questions, or a laptop with private viewing and coded responses, can increase a perception of confidentiality and improve the validity of the survey response (Gans & Brindis, 1995). In one study, an automated telephone response diary was found to be preferable to a written diary calendar among adolescents reporting sensitive behaviors (Minnis & Padian, 2001). In rural communities, using non-resident researchers may improve the validity of sensitive data related to concerns for confidetiality and social repercussions (Bushy, 2004; Campbell & Gordon, 2003; Elliot & Larson, 2004; Warner et al., 2005). However, this is purely speculative. Given the rural inclination to rely on "insiders" as opposed to strangers, perhaps the rural adolescent would be more inclined to offer honest responses to an established member of the community with the assurance of anonymity. Research is indicated on the validity of rural adolescent data and methodological preferences, particularly concerning sensitive services.

In general, the over-reliance on quantitative survey methodologies in adolescent health research may depict an incomplete or even skewed portrayal of adolescent health concerns. A more balanced methodological approach could maximize the possible benefits of the research process and enhance beneficence. A critical and innovative use of quantitative designs in adolescent health research is indicated, as well as an increase in qualitative studies

Qualitative investigations of adolescent health are unfortunately sparse, particularly within rural populations. Although the large quantitative designs maintain the advantage of representativeness of accessible adolescents and therefore increased generalizability, qualitative studies may provide the opportunity for enhanced experiential and theoretical understanding, particularly among high-risk youth (Faugier & Sargeant, 1997). Qualitative methods in adolescent health research could potentially elicit the voice and unique perspective of the adolescent experience as it relates to health behaviors in ways that are missed by quantitative survey methodologies. It has been suggested that combining qualitative and quantitative methods in adolescent health research may be a productive strategy for improving upon the strengths and limitations of the individual methods (Faugier & Sargeant, 1997). Qualitative analysis could be used to explore the relevant health concepts exposed by the available epidemiological data more deeply or to uncover new concepts for future investigation.

Consent and Validity. The consent process is a central methodological consideration in adolescent health research affecting validity. Sampling of the early (10-13 years) and middle (14-17 years) adolescent is constrained by guardian consent requirements. There are two standard methods for obtaining consent in the minor population, one is active

consent, in which the guardian supplies a specific consent to participate; the other is passive consent in which a guardian provides notification only if they do not wish their adolescent to participate in the research protocol.

Consent requirements dramatically affect adolescent research participation rates. The requirement of active guardian consent has been documented to generate low adolescent response rates in the range of 30% to 60%, whereas passive consent generates much higher response rates, between 93% to 100% (Tigges, 2003). Requiring active parental consent can reduce the validity and the generalizability of the study by biasing the response dynamic (Hollman & McNamara, 1999). It has also been documented that participants in adolescent research requiring active parental consent tend to demonstrate less risk behaviors than non-respondents (Anderman et al., 1995; Dent et al., 1993; Tigges, 2003). In a recent study in Rio de Janeiro on barriers to condom use among adolescents, 81% of the 906 surveys requiring active parental consent were not returned (Geluda, 2005). This trend may be exaggerated in rural communities that maintain and promote more socially conservative cultures (Boyd et al., 2006; Bushy, 2004; Campbell & Gordon, 2003; Quine et al., 2003). Thus, the data return in active parental consent methodologies may inappropriately skew the results to demonstrate less pathology or risk, particularly in rural communities. Protecting research validity through judicious consent processes is essential to the beneficence of the research study. Under-reporting health concerns and risk behaviors in adolescent populations can ultimately result in the limitation of available adolescent health services.

Confidentiality and sensitive issues research. Respect for adolescent confidentiality is rooted in the principle of beneficence as well as respect for persons. The beneficence of adolescent confidentiality is protected by the law and federal regulations overseeing human subject research. A concern for the well-being of adolescents recognizes that it is sometimes necessary to interact with the adolescent participant independent of parental involvement (SAM, 2003). However, as previously discussed, it is equally imperative to recognize situations that require breaching adolescent confidentiality as outlined by mandatory report laws and supported by the research protocol. It is also essential to acknowledge and appreciate the prevalent concern among some parents and communities regarding waived parental consent in adolescent research, particularly concerning sensitive issues.

Much of the research in adolescent health involves surveying youth on sensitive issues such as sexual practices, substance use, mental health, body weight and dietary practices. There is little evidence to support the pervasive colloquial fear that communicating with adolescents about risk behaviors increases the incidence of harmful practices (Celio et al., 2003; SAM, 2003). In a longitudinal study of adolescent male sexual practices, repeated questionnaire application demonstrated insignificant impact on risk behavior (Halpern, Udry, & Suchindran, 1994). Similarly, an investigation of suicide screening found that adolescents, including high risk youth, did not demonstrate changes in levels of emotional distress related to the application of the Profile of Mood States adolescent version (POMS-A) (Gould et al., 2005). Although additional work is indicated in this area, there appears to be significant support for the understanding that survey investigation of health practices does not encourage risk behaviors in adolescents.

However, the scientific documentation that survey methodologies in adolescent health do not promote risky practices has not allayed the fears of the public. The researcher may encounter resistance within conservative rural communities regarding investigations of sensitive issues in adolescent health, such as sexual practices and substance use, particularly when accomplished without the consent of the parents. This resistance may be related to the belief that such inquiries violate the cultural mores of the community and encourages deviance and unsafe lifestyle behaviors. Resistance to adolescent research in rural communities may be reduced through the use of trusted community members in the development, promotion, and implementation of the research process.

Behavioral research may uncover troubling adolescent practices. If the concerns are not of a reportable nature, a protocol can be established to offer information, counseling or referrals as part of the research protocol to increase the beneficence of the research practice (Ensign, 2003; Helweg-Larsen & Boving-Larsen, 2003; Caskey & Rosenthal, 2005). In rural communities however, the lack of available referral sources combined with concerns regarding confidentiality may be problematic. A referral source may need to be developed and implemented as part of the research protocol for communities that are lacking appropriate resources.

Adolescent participation in research may involve risks but it can also be an affirming experience. Qualitative researchers have noted that the research interview can have beneficial effects on participants (Hurtz & Koller, 1999; Moyle, 2002). Participation in qualitative research by high-risk adolescents has been described as pleasurable and even therapeutic (Ensign, 2003;Hurtz & Koller, 1999; Moyle, 2002). Other developmentally empowering practices for adolescents that can increase the beneficence of the research

can be integrated into the research process, such as including adolescents in advisory boards, focus groups, or in post-study evaluations (Caskey & Rosenthal, 2005). These practices afford the adolescent the opportunity to better understand the research process, contribute back to the community and establish positive relationships with adult society (Caskey & Rosenthal, 2005). This could be an important contribution by the research community to adolescents in rural environments where the opportunity for positive youth development activities, particularly for high-risk populations, is less prevalent than in urban settings (Levine & Coupey, 2003).

Avoiding exploitation. In research with adolescents, particularly high-risk youth, it is important to remain cognizant that the participant-researcher relationship is inherently unequal, even when a conscious attempt is made by the researcher to equalize the power dynamic (Ensign, 2003). High-risk youth are particularly vulnerable research participants because of their stage of psychosocial development, frequently diminished socioeconomic status, and their potential for social stigmatization (Ensign, 2003). High-risk adolescents in conservative, rural communities may be particularly stigmatized. The lives of these adolescents, sometimes including multiple risk behaviors, can be intriguing, therefore inciting the potential for voyeurism, sensationalism, and exploitation (Caskey & Rosenthal, 2005). The adolescent health researcher must be consciously vigilant to guard against voyeurism and exploitation to preserve the beneficence of the research process. The researcher must continually question the pertinence and value of the requested information to the research question, research agenda, and potential translation of the data for the benefit of the population under study. Susceptibility to subtle forms of voyeurisms is particularly dangerous in qualitative studies as participants provide narrative

descriptions of the intimate details of their lived existence (Ensign, 2003). Beneficent representation in adolescent health research accentuates and empowers the voice of adolescent concerns, while actively avoiding exploitation.

On the other hand, adolescents, including high-risk youth, can also exhibit significant strengths including resiliency and creativity, and are often eager to contribute to the research process (Ensign, 2003). Honoring adolescents' efforts and their unique contributions to scientific understanding can enhance their sense of efficacy and self-esteem, contributing further to the beneficence of the adolescent health research project.

Justice

The principle of justice in the Belmont Report pertains to the "fairness of distribution" of the research process. The essential concern of the principle of justice is to distribute the risks and benefits of research evenly throughout the population. Participation in research presents risks and inconveniences, but it also has the potential to provide significant benefits. The principle of justice is intended to protect vulnerable populations from abuse in research, but also to ensure that all segments of the population benefit from the advancement of science. According to the justice principle of the Belmont Report the selection of research subjects must be closely evaluated to determine whether some classes of participants are selected simply because of their easy availability (DHEW, 1978). This clause was established to protect vulnerable populations from exploitation, but also to ensure the inclusion of hard-to-reach or otherwise marginalized populations in research protocols.

In response to activist campaigns for equitable research, the NIH has established fair inclusion criteria for federally funded clinical trials consistent with the principle of justice

(SAM, 2003). According to the NIH Guidelines on the Inclusion of Children as Participants in Research Involving Human Subjects, the exclusion of pediatric and adolescent populations in federal clinical trials must be accompanied by reasonable justification (National Institutes of Health [NIH], 1998). However, despite this ruling, adolescents still remain inadequately sampled in research due to complications in the legal, ethical, and sociopolitical inclusion of minor populations, particularly related to sensitive issues (SAM, 2003). Much of the survey research in adolescent health involves data collection concerning sensitive issues corresponding to developmentally normative risk behaviors such as sexual practices, mental health concerns and substance use. The social and political implications of investigating risk behavior in a minor population create challenges for justice in research design and application in adolescent health. Guardians and social institutions are often wary about adolescent research including the discussion of sensitive subjects. The reasons for trepidation range from potential exposure of illegal or socially sensitive practices in the home, to concerns about encouraging unacceptable lifestyle behaviors. Due to the contentious ideological nature of many of the sensitive topics in adolescent health, public institutions such as the school system and public health departments responding to elected boards and community approval can be reluctant to participate in adolescent research programs, particularly within conservative rural communities.

CHR approval. A significant complication in conducting adolescent health research is navigating IRBs that review applications for human subjects research. IRBs have demonstrated reluctance to approve adolescent health investigations, including minimal risk investigations, using a waiver of parental consent or even passive consent (Celio et

al., 2003). It is particularly difficult to obtain IRB approval to sample the high-risk adolescent population including youth without accessible guardians, street youth, or youth in juvenile detention. Although adolescents, particularly high-risk youth, deserve to be sampled under the principle of justice, public policy makers and IRBs may maintain biased beliefs regarding adolescent capacities and therefore limit independent adolescent participation (Petersen & Leffert, 1995). The Society of Adolescent Medicine advocates using the Guidelines for Adolescent Health Research (1995, 2003) to help inform IRBs and public organizations concerning adolescent research protocols, including developmental capacity and ethical parental consent requirements. Although the research proposal will garner extra scrutiny, it is possible to include incarcerated youth in minimal risk research under federal regulation 45 CFR 46.306 (a) if the proposal is supported by the individual state penal code.

Sampling. An important element of "fairness of distribution" in the research process is the provision of adequate sampling of underserved segments of the population. The protections established by organizations, such as the Department of Education and the individual IRBs can severely constrict the ability to access adolescents, particularly high-risk youth, in research. These youth may wish to participate in the research process, understanding articulation of their voice as an essential mechanism to the improvement of opportunity, but are frequently muzzled by adult controls intended as protection.

Within the school system, the *Protection of Pupil Rights Amendment* requires written parental permission before minor students can participate in research funded by the Department of Education collecting information on eight specific topics including mental health and psychological problems; sexual behaviors or attitudes; illegal, antisocial, self-

incriminating, or demeaning behaviors; critical appraisals of individuals with whom respondents have close family relationships; religious practices, affiliations, or beliefs; political affiliations or beliefs; income; and legally recognized privileged relationships such as those with physicians, lawyers or ministers (U.S. Department of Education, 2002). Any research addressing these subjects that is not funded by the Department of Education may be allowed but is subject to approval by the local school district (SAM, 2003). If approved by the local school board, the research protocol must allow parents the opportunity to inspect the research instrument and the ability to withdraw their adolescent from the research process (SAM, 2003). Similar administrative approval is necessary to sample within other community organizations that serve adolescents, such as the Department of Health and Social Services.

Although stringent consent requirements allows for protections of the student, family, and local organizations, it significantly constricts the ability to gather health data within the adolescent population. Data that are not available unfortunately can become construed as issues that do not exist within the community. This may be a particularly prevalent phenomenon in conservative rural communities that may demonstrate resistance to adolescent investigations of sensitive issues, resulting in insufficient adolescent health data generated from these environments. Lack of documentation and recognition of sensitive issues in adolescent health can lead to deficient program development for critical health concerns.

The highest risk youth who do not consistently participate in organizational activities, such as the school system, and may not have accessible or cooperative guardians, are particularly difficult to access through the traditional descending sampling method of

quantitative studies. “Descending methods” are data collection mechanisms used to generate large volumes of data, typically involving the broad distribution of standardized questionnaires (Faugier & Sargeant, 1997). High-risk adolescents may be difficult to access in research using descending methods as a result of unstable social situations and a reluctance to provide personal information for fear of recrimination (Faugier & Seargeant, 1997). In addition, high risk youth are a relatively small percentage of the population, and therefore, difficult to capture statistically (Faugier & Seargeant, 1997). Rural, high-risk adolescents may be further marginalized in a conservative community and therefore may prove to be an even more elusive population to represent in research.

An alternative method for sampling high-risk adolescents is the use of non-random, ascending, selection measures. Ascending sampling methods are intensive data collection techniques frequently used in qualitative investigations using a non-random sampling design among a smaller sample (Faugier & Sargeant, 1997). A potential non-random sample design for investigating the concerns of high-risk youth is to selectively sample from locations known to attract the high-risk adolescent population such as alternative education sites, public health departments, the streets and juvenile hall. Ascending methods, such as snowball sampling, are productive techniques for engaging hard to reach populations. Snowball sampling involves identifying participants of interest who in turn refer other potential participants (Faugier & Seargeant, 1997). The advantage of these non-random sampling methods is the ability to capture the elusive voice of hard to reach populations, such as high-risk rural adolescents. The disadvantage of non-random sampling is a potential increase in research bias and reduced generalizability of the study results.

Rural adolescent populations are inadequately sampled in research for a variety of other reasons. First is the common misconception that the rural environment is inherently protective for youth and the needs of rural youth are less pressing than those of adolescents residing in urban environments. This assumption has been demonstrated erroneous by the available adolescent health data where in actuality, health concerns of rural adolescents have been demonstrated to frequently exceed those of other communities and rural adolescent resources are noted to be severely limited when compared to urban settings (Atav, 2002; CASA, 2000; Fahs, 1999; Levine & Coopey, 2003). Another factor affecting the paucity of rural adolescent health research is the remote location of many rural communities. The vast majority of research is generated from universities in urban centers where the concerns of urban populations are more visible and the urban population is more accessible. Urban regions are by definition more concentrated populations, thus allowing for more efficient sampling. Conversely, acquiring a sufficient sample size among a rural population is more difficult, time consuming and costly. Rural communities also tend to be more socially conservative (Boyd et al., 2006; Bushy, 2004; Campbell & Gordon, 2003; Quine et al., 2003). Citizens have less exposure to research practices and may be skeptical of research protocols generated from large cities that are perceived to maintain an aggressively liberal political agenda. This attitude complicates community and organizational acceptance of the research process in rural communities, particularly concerning sensitive issues, and minor consent practices (Bushy, 2004; Nadar & Gonzalez, 2000). For these reasons, rural adolescents, particularly high-risk youth, are significantly under-represented in research.

To promote justice in adolescent health research, a balance between inclusion and protection of all adolescent subjects must be continually assessed and addressed.

Incentives. Use of incentives in adolescent health research is controversial under the principle of justice considering the recognized developmental propensity of adolescents to be excessively influenced by monetary awards (Petersen & Lefferty, 1995). The guiding principle for remuneration for research participation is that payment should be limited to nominal reimbursement for time and inconvenience (Ensign, 2003). Unfortunately, there exists little consensus in the literature as to what actually constitutes reasonable, developmentally appropriate, nominal reimbursement for adolescents (Ensign, 2003). Research incentives such as food vouchers and pre-paid phone cards of 5 to 10 dollar values have been used successfully in research with high-risk adolescents (Ensign, 2003). Incentives employed within the juvenile incarcerated population require special considerations such as acceptability to the institution and voucher expiration dates.

Political Implications

Research on sensitive issues in adolescent health can be subject to political interference, such as the case of the American Teen Study. The American Teen Study was an investigation designed in 1989 by Ronald Rindfuss and J. Richard Udry of the University of North Carolina. The study was intended to study adolescent health-related risk behavior including sexual activities that may increase the risk of HIV exposure. The study was approved by the University of North Carolina IRB review, scientific peer review, the National Advisory Council of the NICHD [National Institute of Child Health

and Human Development], and was subsequently notified of funding in May of 1991 (Gardner & Wilcox, 1993). However, under pressure from conservative groups, funding for the American Teen Study was rescinded by the Health and Human Services Secretary Lewis Sullivan during the George H.W. Bush presidency (Gardner & Wilcox, 1993). Concurrently, funds intended for the American Teen Study were transferred out of NICHD's budget and into a federal program promoting sexual abstinence education (Gardner & Wilcox, 1993). This type of political interference in scientific funding is a refutation of the Belmont principle of justice in research by disrupting the benefit of research for critical health issues in a vulnerable population. Political activism by the research community demanding a separation of political ideology and control from research funding is needed to protect the interests of vulnerable populations such as rural adolescents.

Summary

Adolescents are an interesting and challenging population to study. Issues in adolescent health remain under-studied related to a variety of ethical concerns in the development and application of the research process. Sampling rural adolescents presents unique challenges resulting in under-representation of their concerns in the research literature. The three basic principles of the Belmont Report, (a) respect for persons, (b) beneficence, and (c) justice, provide a framework for appreciating ethical issues in rural adolescent health research. Using these principles, it is possible to promote increasingly ethical adolescent health research practices and thus, expand our understanding of rural adolescent health, with the ultimate goal to translate scientific discoveries into public benefit.

CHAPTER V

RURAL ADOLESCENT HEALTH AND HEALTH BEHAVIORS

Background: The sociocultural context of the rural community presents unique challenges for rural adolescent health. However, empirical data on rural adolescents are limited, resulting in an under-representation of the health concerns of rural adolescents.

Purpose: To describe the health of rural adolescents, 12 to 17 years, in California.

Method: A secondary data analysis of the 2005 Adolescent California Health Interview Survey was conducted in an ethnically and economically diverse sample of 663.

Results: A majority of rural adolescents report good to excellent health. However, 28% are at risk for or are overweight, and the majority do not eat the recommended servings per day of fruits and vegetables, nor do they meet daily physical activity recommendations. These adolescents report health and safety issues related to lifestyle behaviors including tobacco, alcohol and illicit drug use. 39% report experience with depression. By ages 16-17, 33% of adolescents engage in sexual intercourse, yet only a third of sexually active rural teens acquire STD/HIV testing. Most rural adolescents can identify a usual source of health care, although 76% are not completely sure they can access confidential health services. Racial/ethnic and income differences are identified in health behaviors and health care access to care patterns of rural adolescents

Conclusions: Rural adolescents exhibit health concerns that require attention at the intervention, policy and methodological levels. Research in rural adolescent health should to be expanded to include representative populations of hard-to-reach, high-risk, and ethnic-minority youth.

Key words: Adolescents, rural, health, health behaviors, access to care

RURAL ADOLESCENT HEALTH AND HEALTH BEHAVIORS

Adolescence is the developmental segue into adult life, including the foundation for positive health practices and health outcomes (Graber & Brooks- Gunn, 1996; Yohalem & Pittman, 2001). Adolescence chronologically encompasses the ages of 10-24, separated into three developmental stages including early adolescence (10-13 years), middle adolescence (14-17 years), and late adolescence (18-24 years) (Arnett, 2000; Irwin, Burg, & Cart, 2002; Millstein, Petersen, & Nightengale, 1993; Nienstein & Kaufman, 2002). Although adolescents are generally considered a relatively healthy population, a longitudinal analysis of adolescent health risks suggests a decline in health status from early adolescence into adulthood related to lifestyle behaviors (Harris et al., 2006). Significant socioeconomic and racial/ethnic disparities in adolescent health and access to health care services have also been identified (Harris et al., 2006). The sociocultural context of the rural environment presents a unique perspective of adolescent health, yet empirical data are limited, resulting in an under-representation of the health concerns of rural adolescents.

Background and Significance

The most common causes of morbidity and mortality in adolescence arise from preventable conditions related to lifestyle behaviors (Brindis et al., 2004; Ozer et al., 2003). Critical issues in adolescent health, corresponding to the Healthy Youth 2010 objectives, include obesity, mental health, substance use, sexually transmitted infections including the human immunodeficiency virus (HIV), unintended pregnancy, and accidental injury (Brindis et al., 2004; Ozer et al., 2003; Towey & Fleming, 2007). Patterns of risky behaviors and poor health practices initiated during adolescence present

a significant threat to the health of the American population (Ozer et al., 2003). These adolescent health behaviors may initiate the trajectory for chronic conditions of adulthood, including cancer, diabetes, heart disease, physical disabilities, substance abuse, and mental health concerns (Earls, 1991).

The health of adolescents is influenced significantly by contextual determinants, including resources within the family and community (Atav & Spencer, 2002; Brindis, 2004; Gray & Winterwood, 2002; Harris et al., 2006; Miller & Benson, 2001; Ozer et al., 2002; Resnick, 1997; Scaramella & Keyes, 2001). The Developmental-Contextual Model of Adolescent-Context Relations depicts the dynamic interaction between the adolescent and the broader environmental construct, concentrically including the adolescent, family, community, culture, and society (See Figure 1) (Lerner & Castellino, 2002). The rural community in California is the contextual context of interest for this investigation of the health of rural adolescents.

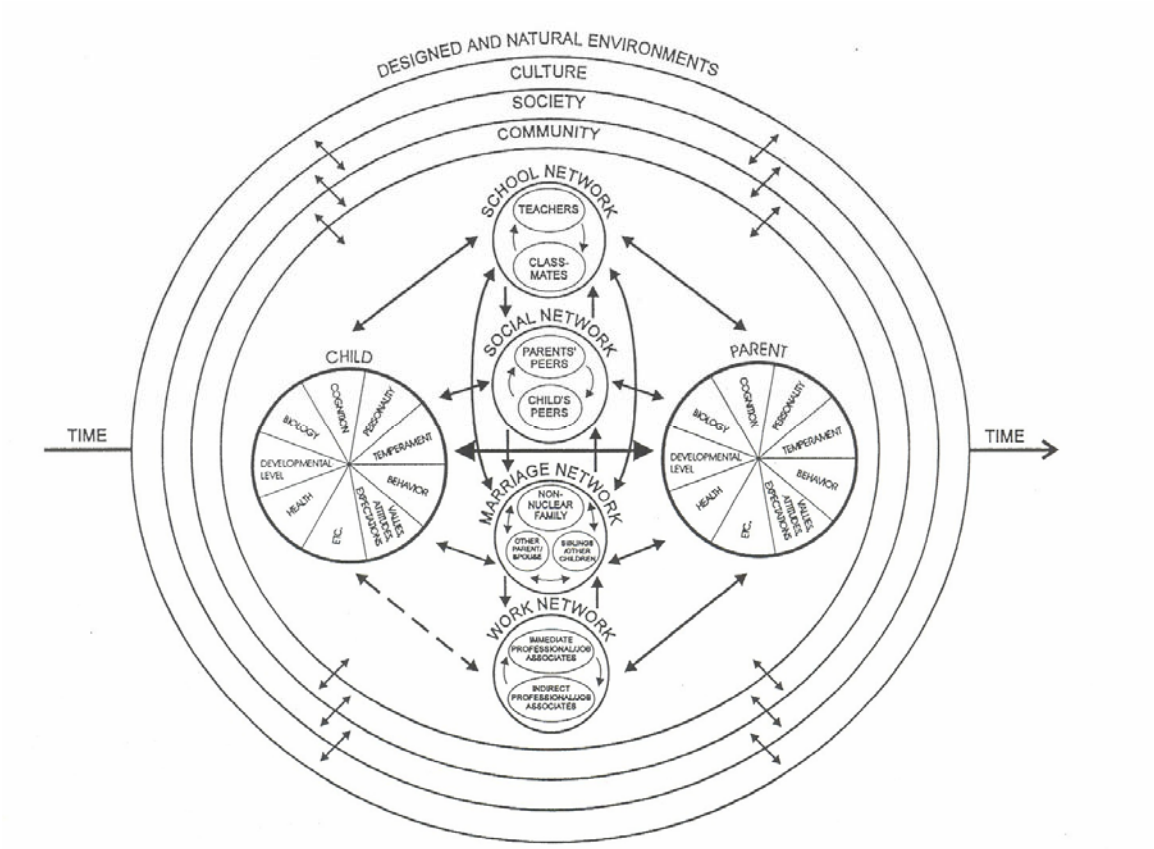

Figure1. The Developmental-Contextual Model of Adolescent-Context Relations

The United States (US) Census Bureau (2000) classifies rural communities as localities that do not meet the urban designation of a population of 50,000 or more in core census block groups of 1,000 people per square mile and surrounding census blocks with an overall density of 500 people per square mile. The Office of Management and Budget (OMB) designates counties as Metropolitan (urban), Micropolitan (population of 10,000 - 50,000), and Non-metropolitan (rural) (Rural Policy Research Institute, 2006). To identify rural communities within larger counties containing metropolitan centers, rural continuum codes were developed based on local census and density parameters (Rural Policy Research Institute [RUPRI], 2006).

The population of adolescents is steadily increasing, particularly in the West and Southwest (Ozer, 2003). In 2000, 20% of American adolescents resided in rural regions (Ozer et al., 2003). Although historically a relatively homogenous population, rural counties are becoming progressively more racially and ethnically diversity as many immigrants, particularly Asians and Hispanics, are settling in rural America (Office of Rural Health Policy [ORHP], 2002; Ozer et al., 2003).

The rural community provides a cultural context for adolescent health that is different from metropolitan communities. Statistically, rural residents maintain lower levels of education, experience greater language barriers for minority populations and more frequently live below the poverty level than urban and suburban populations (California State Rural Health Association [CSRHA], 2005; RUPRI, 2006). Rural communities also tend to be more politically conservative and demonstrate a greater adherence to traditional values including gender roles, inter-personal relationships and sexual behaviors, and a philosophical investment in self-reliance (Bushy, 2004; Campbell & Gordon, 2003).

Rural residents in America may experience significant health disparities when compared to urban populations (Court Appointed Special Advocates [CASA], 2000; Clark, Savitz & Randolph, 2001; Levine & Coupey, 2003; Peden, Reed & Rayens, 2005; Peek-Asa, Zwerling, & Stallones, 2004). Rural populations demonstrate higher rates of infant and maternal mortality, a greater incidence of chronic diseases, and less involvement in preventive care measures (Bigbee, 1993; Bushy, 2004; Gamm et al., 2003; Weinert & Long, 1990). In addition, higher rates of mental illness, suicide, domestic violence, and drug and alcohol dependency have been documented in rural

communities (Bigbee, 1993; Bushy, 2004; CASA, 2000; Gamm et al., 2003; Grant et al., 2007; Peden, Reed & Rayens, 2005; Weinert & Long, 1990). Rural residents also experience a greater incidence of traumatic injury including drowning, motor vehicle and machinery accidents (Bigbee, 1993; Bushy, 2004; Gamm et al., 2003; Weinert & Long, 1990). Despite "inadequacies of available data," trends indicate that the health of rural populations is in decline in regard to crime, substance abuse, HIV infection and acquired immune deficiency syndrome (AIDS) (Clark, Savitz & Randolph, 2001).

Rural settings present compounding challenges to the health of adolescents. Threats to adolescent health are documented within the rural adolescent population at levels at least equivalent with urban samples (Atav & Spencer, 2002; Chimonides & Frank, 1998; Donnermeyer & Park, 1995; Dukess & Stein, 2003; Fahs et al., 1999; Groft et al., 2005; Loda et al., 1997; Muscaria, Phillips & Bears, 1997; Riley et al., 1996; Skatrud et al., 1998; Spencer & Bryant, 2000; Spoth et al., 2001). In several studies, researchers report health risks in rural adolescent populations that surpass urban statistics, including issues such as substance abuse, unsafe sexual practices, motor vehicle and other traumatic accidents, and interpersonal violence (Atav & Spencer, 2002; CASA, 2000; Chimonides & Frank, 1998; Clark, et. al., 2001; Cronk and Saravela,1997; Grant, 2007; Greggo, Jones, & Kann, 2005; Milhausen et al, 2003; Riley, 1996; Spencer & Bryant, 2000; Spoth et al., 2001; Vittes & Sorenson, 2005).

Despite these health risks, many adolescents in rural communities experience significant barriers to health care including, insufficient financial resources, lack of available services, impaired geographic accessibility, inadequate public transportation, and concerns for confidentiality related to sensitive services (Bushy, 2004; Campbell &

Gordon, 2003; Elliot & Larson, 2004; Leight, 2003; Levine & Coupey, 2003; Warner et al., 2005). In a comparison of rural and urban adolescent health, researchers Levine and Coupey (2003) conclude that rural adolescents may be at greater risk for poor health outcomes related to the prevalence of health threats in the rural community and the concurrent lack of resources. Unfortunately, the empirical information available on adolescents in the rural setting is limited. Rural populations remain under-represented in the health literature, resulting in inadequate data on the health of rural adolescents (Fahs et al., 1999; Skatrud et al., 1998).

Purpose of the Study

The purpose of the study is to describe the health of rural adolescents, 12 to 17 years, in California. The research questions are (a) What are the physical and emotional health, health behaviors, and health care access characteristics of rural adolescents in California? And (b) Do physical and emotional health, health behaviors, and health care access of rural adolescents in California differ for specific sociodemographic characteristics (age, ethnicity/race, and poverty level)?

Method

Research Design

The design of this descriptive, cross-sectional study is a secondary analysis of data obtained from the residential random digit dialing administration of the 2005 Adolescent California Health Interview Survey (CHIS).

Setting

All of the 58 California counties are included in the administration of the CHIS. For the purpose of this study, residences included in the analysis of the data meet the operational classification of rural regions established by the Federal Office of Rural Health Policy (ORHP) including rural-urban commuting codes to identify rural communities with larger counties. Rural residence is established from census tract, zip code, and latitude/longitude data attached to the respondent's household (CHIS, 2005).

Sample

Table 8 displays the sociodemographic profile of the sample of 663 rural adolescents in California, of which 52% are females and 48% are males. The mean age is 14.6 years with a range of 12 to 17 years. A majority of the sample are Caucasians (62.7%), 19.5% are Latinos, 3.6% are Native Indians/Alaskan Natives, 2.4% are African Americans, and 1.9% are Asians/Pacific Islanders. Ten percent of the sample report another single or multiple race. The most frequent language spoken at home is English (71%), although 23% of the adolescents speak another language in addition to English in the home.

Among this sample of rural adolescents, 73% of their parents are employed and 27% of the parents are unemployed. Thirty-eight percent of adolescents live in households with incomes below the 200% poverty level, 15% of adolescents live in households with incomes between the 200% and 299% poverty level, and 47% of adolescents live in households with incomes at the 300% or above poverty level. The educational level of the parents of the adolescents includes: 32% with some college or vocational education, 27% with a high school diploma, 22% with undergraduate or graduate degrees, and 19% do not have a high school diploma. The mean household size for the sample is 4.

Table 8

Sociodemographic Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
Age (Years)			*M* = 14.55	*SD* = 1.66
Gender				
Female	346	52.2		
Male	317	47.8		
Race				
White, Non-Hispanic	416	62.7		
Latino	129	19.5		
Other Single/Multiple Race	66	10.0		
American Indian/Alaskan Native	24	3.6		
African American	16	2.4		
Asian/Pacific Islander	12	1.9		
Language spoken at home				
English	473	71.3		
Spanish	30	4.5		
Chinese	1	0.2		
Other Language, including English	154	23.2		
Other Language, excluding English	5	0.8		
Federal poverty level				
0-99%	92	13.9		
100-199%	157	23.7		
200-299%	102	15.4		
300% and above	312	47.1		
Parent current employment status				
Employed	475	72.6		
Unemployed	179	27.4		

Table 8

Sociodemographic Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
Parent educational level				
No high school diploma	125	18.9		
High school diploma	179	27.0		
Some college/vocational	211	31.8		
Undergraduate degree	92	13.9		
Graduate degree	56	8.4		
Household size			*M* = 4.18	*SD* = 1.35

Note. Percentages are adjusted for missing cases.

Measurement of the Study Variables

Adolescent California Health Interview Survey. The CHIS is a biennial random digit dialing telephone survey of adults, adolescents, and children. It is the largest state telephone survey in the US (Brown, Holtby, Zahnd & Abbott, 2005; CHIS, 2005). The primary intent of the CHIS is to provide representative statewide data, as well as county level health information for the purpose of informing health policy and program development in California (CHIS, 2002).

Reliability and validity indicators of the CHIS are currently unavailable, however, CHIS representatives contend that survey items are extracted from previously validated instruments such as the CDC's National Health Interview Survey and the Behavioral Risk Factor Surveillance System (CHIS, 2005; Grant, 2004). The CHIS was constructed by an advisory board consisting of researchers and senior officers from the University of California, Los Angeles (UCLA) Center for Health Policy Research, the California Department of Public Health, the Department of Health Care Services, and the Public

Health Institute in collaboration with Westat, a private firm specializing in statistical research and large scale sampling surveys (CHIS, 2007).

The 2005 Adolescent CHIS consists of 154 items that include Likert and nominal response options with an average administration time of 21.5 minutes (CHIS, 2007).

Sociodemographics. The sociodemographic items include age, gender, race/ethnicity, household size, and language spoken at home. Socioeconomic status is constructed by the parent's employment status, education, and poverty level as calculated from household income figures. Measurement of the parental descriptors is assessed through the Adult CHIS survey, corresponding with the selected residence of the adolescent CHIS participant.

Physical health. Items related to physical health include health status and adiposity. Rating options for health status are poor, fair, good, very good, or excellent. Adiposity is assessed by calculating body mass index (BMI), which is based on height and weight, and reported in percentile: underweight (less than 5^{th}), healthy weight (5^{th} to 85^{th}), at-risk for overweight (85^{th} to 94^{th}), and overweight (95^{th} and above).

Emotional health. Emotional health items include number of days felt depressed in the past 7 days, perceived a need for help with emotional problems and/or received emotional counseling within the past 12 months (yes or no), and psychological distress. Psychological distress is constructed with the Center for Epidemiological Studies Depression (CESD) scale (Radloff, 1977). The CESD consists of the following items assessed within the past 7 days: number of days enjoyed life, could not shake sad feelings, felt depressed, felt happy, felt lonely, felt like a failure, felt sad, and did not want to do usual activities. A higher score indicates greater psychological distress; a

score higher than seven indicates significant psychological distress. Cronbach's alpha internal consistency reliability scores for the CESD range from .85 to .90 in previous studies (Radloff, 1977).

Health behaviors. Measures of health behaviors include nutrition, physical activity, safety, substance use, and sexual activity. The nutritional measures include number of servings of fruits, vegetables, fast food, and soft/sweet drinks consumed per day. Physical activity is assessed by asking how many days in the last week the adolescent is physically active for at least 60 minutes.

Safety items include the presence of a serious injury that required treatment within the past 12 months (yes or no), cause of the most recent injury, and the incidence of driving a car after drinking (yes or no).

Substance use includes cigarette smoking, alcohol use, and drug use. Cigarette smoking items consist of ever smoking cigarettes (yes or no), number of cigarettes smoked within the last 30 days to determine current smoker status, and age of first cigarette to determine the mean age of smoking initiation. The item, ever had more than a few sips of alcohol (yes or no), is used to assess exposure to alcohol use. The item used to assess current alcohol use is the number of alcoholic drinks consumed in the last 30 days. To assess exposure to drug use, adolescents are asked if they have ever tried any illegal substances and incidence of smoking marijuana within the last year (yes or no). Current drug use is assessed by asking adolescents if they have smoked marijuana in the last 30 days (yes or no).

Sexual activity items consist of ever had sexual intercourse (yes or no), age of first sexual intercourse, number of sexual partners in the past 3 months, protection use the first

and last time had sexual intercourse (yes or no), method of birth control protection, ever been pregnant or caused a pregnancy (yes or no), ever used emergency contraception (yes or no), and ever been tested for sexually transmitted diseases (STD) or human immunodeficiency virus (HIV) (yes or no).

Health care access. Health care access includes identification of a usual source of care (yes or no), location of usual source of care, health insurance coverage, incidence of delayed care (yes or no) and if cost was the reason for the delay (yes or no). Certainty of accessing confidential health care services without parental knowledge was assessed using the response options, not at all sure, somewhat sure, or very sure.

Data Collection Procedure

The 2005 CHIS survey employs a stratified sample design arranging the 58 California counties into 44 predefined geographical strata (CHIS, 2007). Households throughout California are selected randomly for participation. Eligible households include residences occupied by individuals, families, multiple families, or multiple unrelated persons. The data collection procedure excludes group quarters, residents of treatment facilities, institutionalized persons, and homeless persons. Other individuals excluded from the data collection process are individuals without a landline telephone connection and minors without a resident parent/guardian to provide consent for participation.

Multiple attempts are made to contact randomly selected households over the telephone. After contact is established, one adult is selected randomly for survey administration. To maximize response rates, an advance letter explaining the study in five languages is mailed to selected households when a corresponding address is available. A

$2 bill is attached to the letter to encourage participation (CHIS, 2007). In the event of a participant's refusal, attempts at refusal conversion are made by telephone and in writing.

The CHIS is administered by Westat, a private firm specializing in statistical research and large-scale sample surveys (CHIS, 2007). Trained interviewers use a computer-assisted telephone interview system to guide the questioning format and response options (CHIS, 2002). Telephone interviews are conducted in English, Spanish, Chinese, Vietnamese, and Korean. Approximately 7% of the adolescent interviews are conducted in a language other than English (CHIS, 2007).

In the 2005 administration, the CHIS elicited a 29.5% household response rate that included 43,020 adults (CHIS, 2007). Adolescents (n = 4,029), 12 to 17 years, were selected randomly from households with participating adults. Active parental/guardian consent is required for adolescent participation; 77% of the parents/guardians granted permission. Of the adolescents who were granted parental/guardian permission, 78% of them agreed to respond to the survey. This resulted in an overall adolescent participation rate of 14.2%; this proportion includes the household response rate, parental/guardian consent, and adolescent participation (CHIS, 2007). This procedure yielded a rural adolescent sample size of 663 for the 2005 CHIS.

Data Analysis

Summary descriptive statistics of frequencies, proportions, central tendencies, and dispersions were computed to describe the study variables for rural adolescents, 12 to 17 years, in California. Depending on the type and levels of data, independent student's *t*-test, one-way analysis of variance (ANOVA), or chi-square analyses were conducted to

compare the proportion or mean score response between study variables in relation to specific sociodemographic characteristics: age, race/ethnicity, and poverty level.

When appropriate, the Fisher's exact chi-square statistic is reported. Post-hoc analyses, using the Tukey procedure for equal variances assumed, were conducted for statistically significant ANOVA results to examine which groups were different. Analyses were conducted using the Statistical Package for Social Science. The sample size of 663 was sufficient to describe differences in proportions and mean scores between study variables. The power for the study was $d = .80$ with the significance level set at $p \leq .05$, two-tailed (Cohen, 1988). The *p*-value was adjusted for multiple analyses using a Bonferroni correction.

Results

Physical Health

See Table 9 for a profile of the health of rural adolescents in California. Ninety percent of rural adolescents in California report their health as good or better. Sixty-nine percent of them have a BMI percentile that is in the healthy weight range, however, 28% of them are at risk for being overweight or are overweight. Three percent of the sample are designated as underweight.

Emotional Health

Sixty-one percent of rural adolescents in California report 0 days of feeling depressed in the past week; 27% of them report 1 to 2 days of feeling depressed in the past week, and 13% of them report 3 to 7 days of feeling depressed in the past week. The mean score on the psychological distress scale (CESD) is 4.00 ($SD = 4.52$). The range is 0 to 24.

Table 9

Health Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
PHYSICAL HEALTH				
Health status				
Excellent	148	22.3		
Very good/good	450	67.9		
Fair	60	9.0		
Poor	5	0.8		
Body mass index percentile			*M* = 61.99	*SD* = 28.34
Underweight (less than 5th)	22	3.3		
Healthy weight (5th to 85th)	454	68.5		
At risk of overweight (85th-94th)	113	17.0		
Overweight (95th and above)	74	11.2		
EMOTIONAL HEALTH				
Days felt depressed in past 7 days			*M* = 0.94	*SD* = 1.68
None	403	60.8		
1-2 days	176	26.5		
3-7 days	84	12.7		
Psychological distress (CESD)			*M* = 4.00	*SD* = 4.52
Needed help for emotional problems				
No	547	82.5		
Yes	116	17.5		
Received emotional counseling				
No	592	89.3		
Yes	71	10.7		
HEALTH BEHAVIORS				
Nutrition				
Servings of fruit per day			*M* = 1.70	*SD* = 1.45
Servings of vegetables per day			*M* = 1.56	*SD* = 1.31
Number of soda/sweet drinks per day			*M* = 1.12	*SD* = 1.33

Table 9

Health Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
Times ate fast food per day			*M* = 0.48	*SD* = 0.67
Physical Activity				
Days per week physically active for at least 60 minutes			*M* = 4.21	*SD* = 2.07
Safety				
Injured enough to seek treatment				
No	527	79.5		
Yes	136	20.5		
Sports-related	61	44.9		
Other	26	19.1		
Falls	26	19.1		
Motor vehicle accident	13	9.6		
Bicycle-related	6	4.4		
Burns	1	0.7		
Ever driven a car after drinking alcohol				
Yes	7	5.3		
No	125	94.7		
Substance Use				
Ever tried marijuana, cocaine, sniffing glue, or other drugs				
No	543	82.9		
Yes	112	17.1		
Marijuana use in the past 30 days				
No	623	95.1		
Yes	32	4.9		

Table 9

Health Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
Marijuana use in the past 1 year				
No	76	67.9		
Yes	36	32.1		
Never used marijuana	551	83.1		
Current smoker				
No	616	92.9		
Yes	47	7.1		
Age of first cigarette (Years)			M = 12.75	SD = 2.72
Ever tried more than a few sips of alcohol				
No	387	58.4		
Yes	276	41.6		
Number of days drank alcohol in the last 30 days				
Never drank	387	58.4		
0	152	22.9		
1-2	80	12.1		
3 or more	44	6.6		
Sexual Activity				
Ever had sexual intercourse				
No	541	83.7		
Yes	105	16.3		
Age at first sexual intercourse	105		M = 14.64	SD = 1.43
Before 15 years	46	43.8		
15 years or older	59	56.2		

Table 9

Health Profile of Rural Adolescents in California (N = 663)

Characteristic	*n*	%		
Number of sexual partners in the last 3 months	105		*M* = 1.50	*SD* = 1.48
0	12	11.4		
1	57	54.3		
2-3	31	29.5		
4 or more	5	4.8		
Used protection first time had sex				
Yes	96	91.4		
No	9	8.6		
Use protection last time had sex				
Yes	91	86.7		
No	14	13.3		
Last protection method				
Condom	85	93.4		
Pill	16	17.6		
Depo Provera	4	4.4		
Emergency contraception	4	8.3		
Ever been or gotten someone pregnant				
No	103	98.1		
Yes	2	1.9		
Tested for STD/HIV				
No	73	69.5		
Yes	32	30.5		

Eighteen percent of the sample report a perceived need for help with psychological problems and 11% received emotional counseling within the past 12 months.

Health Behaviors

The average daily consumption of fruits and vegetables for the sample is about one and a half servings per day; with a median of 2 (Range: 0 to 12) and 1 (Range 0 to 8), respectively. The mean consumption per day of soda/sweet drinks is 1.1 (*SD* = 1.3, *Md* = 1, Range: 0 to 10). The average consumption of fast food is less than once per day (*M* = 0.48, *SD* = 0.67 *Md* = 0, Range: 0 to 5). On average, California rural adolescents engage in 60 minutes of physical activity 4 days per week (*SD* = 2.1, *Md* = 4, Range: 0 to 7).

Twenty-one percent of rural adolescents in California report injury severe enough to receive treatment within the last year. The largest proportion of those injuries are sports-related (45%), 19% of the injuries are related to falls, and another 19% of the injuries are classified as "other." Ten percent of the injuries are related to vehicular accidents and 5% of the driving population within the sample report driving a vehicle after drinking alcohol. Bicycle accidents comprise 4% of the injuries in the sample, and 1% of injuries were from burns.

Seven percent of rural adolescents in California are current cigarette smokers. The mean age of cigarette smoking initiation is 12.8 years. Among this sample, 42% of adolescents have consumed more than a few sips of alcohol. Of the 42% who report previous alcohol consumption, 19% of them drank within the last month; 7% of them had three or more drinks within the last month. Seventeen percent of the sample report having tried some type of illegal substance. Of this proportion, 32% of them report having smoked marijuana within the last year and 5% of them report having smoked marijuana in the last month.

Among rural adolescents in California ages 12-17, 16% of them report having had sexual intercourse, the mean age of their first sexual experience is 14.6 years (*SD* = 1.4). Most of the sexually experienced adolescents are monogamous or report abstinence within the last 3 months (66%); 30% of the sample report having two to three sexual partners within the last 3 months; and 5% of them report having four or more sexual partners within the last 3 months. A majority of sexually active adolescents report using protection the first time (91%) and the last time (87%) that they had sexual intercourse. Condoms were the protection method of choice (93%), followed by the birth control pill (18%), and then, Depo Provera (4%). Eight percent of the sexually active sample reported use of emergency contraception. Two percent of the sample have been or has gotten someone pregnant. Slightly over thirty percent of the sexually active sample indicate they have been tested for STDs or HIV, and conversely close to 70% of them report they have not been tested for STDs or HIV.

Health Care Access

Data for the health care access variables are presented in Table 10. Most adolescents can identify a usual source of health care (84%), primarily a doctor's office or an HMO (66%). Thirty-one percent of rural adolescents in California utilize community health services for care. Adolescents in this sample are primarily covered by private, employer-based or military health insurance (61%), 24% of adolescents are covered by public health insurance programs such as Medi-cal or Healthy Families, 6% of adolescents are partially insured, and 5% of adolescents are uninsured. Eight percent of the sample report having deferred medical care they felt they needed within the last year because of cost. Twenty-four percent of rural adolescents in California feel "very sure" that they can

access confidential health services, however, 76% of them report they are "somewhat sure" or "not at all sure" that they can access confidential health services.

Table 10

Health Care Access of Rural Adolescents in California (N = 663)

	n	*%*
Have a usual source of care		
Yes	555	83.7
No	108	16.3
Usual place of care		
Doctor's office/HMO	365	65.8
Community/public agency/hospital	170	30.6
Emergency room/urgent care	9	1.6
Other care/no one place	11	2.0
Health insurance coverage		
Insured (private/employer/military)	428	64.6
Insured (public)	157	23.7
Partially insured (public)	23	3.5
Partially insured (private)	13	2.0
Uninsured	35	5.3
Delayed/did not get medical care felt needed	56	8.4
Cost reason did not receive care	12	21.4
How sure that you can access confidential health services		
Not at all sure	173	37.8
Somewhat sure	177	38.6
Very sure	108	23.6

Influence of Sociodemographic Characteristics

Age. Age was divided into three groups of adolescence: early adolescents (12 to 13 years), early-middle adolescents (14 to 15 years), and late-middle adolescents (16 to 17 years). This differentiation was created to provide a clearer developmental understanding of relevant health behaviors in adolescence. Statistically significant findings are presented in Table 11. Not surprisingly, the incidence of injury caused by motor vehicle accidents increases with age, with the driving population of adolescents, 16 to 17 years, demonstrating the largest proportion (20%) of motor vehicle injuries versus 5% for the 14-15 age group and 9% in early adolescence. Sports injuries are also more prevalent in the older age groups, 14 to 15 years (69%) and 16 to 17 years (50%), as compared to 39% of 12 to 13 year old age group.

Predictably, the use of illicit substances increases with the age of the adolescent (12-13, 14-15, 16-17, respectively), including any drug use ever tried (6%, 14%, and 30%), marijuana in the last 30 days (2%, 5%, and 8%), current cigarette smoking (1%, 8%, and 12%), ever used alcohol (25%, 40%, and 59%), and mean days of alcohol use within the last 30 days (.32,.63, 1.03). Similar to substance use, sexual intercourse also increases with the age of the adolescent (3%, 12%, and 33%) as well as the use of protection at first intercourse (80%, 82%, and 96%). The incidence of depression peaks in the 14 to 15 age group as measured by the number of days in the last week the adolescent felt depressed (M = 1.2, SD = 1.9). Older adolescents (16-17) (33%) are more confident that they can access confidential health services as compared to younger adolescents (14-15) (15%). The 12 to 13 year old age group was excluded from answering the survey item regarding access to confidential health services.

Table 11

Health of Rural Adolescents in California by Age (N = 663)

Variable	Age (Years) 12-13 *n* = 196 *n (%)*	14-15 *n* = 228 *n (%)*	16-17 *n* = 222 *n (%)*	*df*	χ^2	*p*
Type of Injury				8	15.38	.05
Motor vehicles	2 (8.7)	2 (4.8)	9 (19.6)			
Bicycle	3 (13.0)	1 (2.4)	2 (4.3)			
Falls	9 (39.1)	7 (16.7)	10 (21.7)			
Sports	9 (39.1)	29 (69.0)	23 (50.0)			
Other	0 (0.0)	3 (7.1)	2 (4.3)			
Substance Use						
Ever tried drugs	11 (5.5)	33 (14.3)	68 (30.4)	2	48.17	.0005
Marijuana use in 30 days	3 (1.5)	11 (4.8)	18 (8.0)	2	9.77	.008
Current smoker	2 (1.0)	18 (7.7)	27 (12.1)	2	20.14	.0005
Ever used alcohol	51 (24.9)	93 (39.7)	132 (58.9)	2	51.60	.0005
Days of alcohol use in 30 days	*M* = 0.32 *SD* = 0.60	*M* = 0.63 *SD* = 0.90	*M* = 1.03 *SD* = 1.06	2	*F* = 35.27	.0005
Sexual Activity						
Ever had sex	5 (2.6)	27 (11.8)	73 (32.9)	2	75.40	.0005

Table 11

Health of Rural Adolescents in California by Age (N = 663)

Variable	Age (Years) 12-13 *n* = 196 *n (%)*	14-15 *n* = 228 *n (%)*	16-17 *n* = 222 *n (%)*	*df*	χ^2	*p*
Protection first time had sex	4 (80.0)	22 (81.5)	70 (95.9)	2	6.10	.05
Days felt depressed in past week	*M* = 0.75 *SD* = 1.38	*M* = 1.15 *SD* = 1.90	*M* = 0.91 *SD* = 1.66	2	*F* = 3.25	.04
Very sure can get access to confidential services	0 (0.0)	35 (15.0)	73 (32.6)	2	25.94	.0005

Race/Ethnicity. Significant statistical differences exist in the health of rural adolescents in California when analyzed by race/ethnicity (see Table 12). Mean BMI percentile is the highest for Native Indians/Alaskans (77.3), African Americans (71.6), and Latinos (66.9). These three racial/ethnic groups also demonstrate the highest mean consumption per day of soda/sweet drinks: African Americans (2.1), Latinos (1.4), and Native Indians/Alaskans (1.4). In addition, African Americans (0.81) and Latinos (0.67) demonstrate the highest mean consumption per day of fast food. Among sexually active rural adolescents, Caucasian adolescents are more likely to use oral contraceptives (21%) and obtain STD or HIV testing (41%) compared to the other ethnic/racial groups.

Poverty Level. Significant statistical differences exist in the health of rural adolescents in California when analyzed by poverty level (see Table 13). Poverty level is divided into two categories: adolescents living in households with incomes below the 200% poverty level (poor) and adolescents living in households with incomes above the 200% poverty level (more affluent). Poorer adolescents report a higher mean number of days felt depressed in the past week (1.1) and a higher mean psychological distress (CESD) score (4.5) as compared to more affluent adolescents (0.8 and 3.7, respectively). Similar results are seen in BMI and nutrition. Poorer adolescents have a higher mean BMI (65.9), higher mean soda/sweet drink consumption (1.3), and higher mean times per day of fast food is consumption (0.6). It is important to note, however, the mean BMI percentile for both the below and above 200% poverty level falls within the "healthy" range.

Table 12

Health of Rural Adolescents in California by Ethnicity/Race (N = 663)

Variable		White *n* = 416 *n (%)*	Latino *n* = 129 *n (%)*	Other Race *n* = 66 *n (%)*	Indian/ Alaskan *n* = 24 *n (%)*	African American *n* = 16 *n (%)*	Asian/ Pacific Islander *n* = 12 *n (%)*	*df*	*Statistic*	*p*
Oral contraceptive		12 (20.7)	1 (6.7)	0 (0.0)	3 (60.0)	0 (0.0)	0 (0.0)	4	χ^2 =10.60	.03
STD/HIV testing		28 (41.2)	3 (16.7)	0 (0.0)	1 (16.7)	0 (0.0)	0 (0.0)	4	χ^2 =1.53	.02
Body mass index	*M*	60.11	66.98	58.95	77.33	71.59	46.97	5	*F* =3.84	.002
		(27.55)	(28.68)	(31.81)	(21.08)	(25.26)	(31.27)			
(SD)										
# soda/sweet	*M*	0.98	1.44	1.12	1.42	2.13	0.75	5	*F* =4.88	.0005
drinks per day		(1.19)	(1.69)	(1.06)	(1.35)	(1.59)	(1.42)			
(SD)										
Times eat fast	*M*	0.40	0.67	0.55	0.50	0.81	0.33	5	*F* =4.46	.001
fast per day		(0.64)	(0.74)	(0.68)	(0.59)	(0.66)	(0.49)			
(*SD)*										

Table 13

Health of Rural Adolescents in California by Poverty Level (N = 663)

Variable	Poverty Level		*df*	*t*	*p*
	Below 200%	200% and Above			
	n = 249	*n* = 414			
	M (SD)	*M (SD)*			
Days felt depressed in past 7 days	1.12 (1.85)	0.83 (1.59)	661	2.17	.03
Psychological distress (CESD)	4.47 (4.90)	3.72 (4.26)	661	2.05	.04
Body mass index	65.88 (28.85)	59.66 (27.80)	661	2.75	.01
Number of soda/sweet drinks per day	1.29 (1.38)	1.02 (1.29)	661	2.54	.01
Times eat fast food per day	0.57 (0.66)	0.42 (0.67)	661	2.69	.01

Health care access by race/ethnicity and poverty level. Statistically significant differences exist for health care access when analyzed by race/ethnicity (see Table 14) and poverty level (see Table 15). Caucasian adolescents (64%) tend to use private doctor's offices and health maintenance organizations (HMO) more frequently than Native Indian/Alaskan adolescents (38%), Latino adolescents (40%), adolescents from the "other" racial/ethnic group (41%), Asian/Pacific Islander adolescents (50%), and African American adolescents (50%). The proportion of adolescents who have no usual source care is 4% for Native Indians/Alaskans, 15% for Caucasians, 19% for African Americans, 22% for Latinos, 25% for Asians/Pacific Islanders, and 32% for the "other" racial/ethnic group.

Adolescents who live in households with incomes 200% below the poverty level (more poor) are less likely than adolescents who live in households with incomes 200% above the poverty level (more affluent) to use private doctor's offices and HMOs (65% vs. 39%, respectively), are more likely to use public health facilities (19% vs. 36%, respectively), are more likely to have no usual source of care (16% vs. 22%), and are more likely to delay health care because of cost (13% vs. 41%).

Table 14

Health Care Access by Race/Ethnicity of Rural Adolescents in California (N = 663)

	Race/Ethnicity								
	White *n* = 416	Latino *n* = 129	Other Race *n* = 66	Indian/ Alaskan *n* = 24	African American *n* = 16	Asian/ Pacific Islander *n* = 12	*df*	χ^2	*p*
Usual Source of Care	*n (%)*	*n (%)*	*n (%)*	*n (%)*	*n (%)*	*n (%)*	15	52.54	.0005
Doctor's office/HMO	264 (63.5)	51 (39.5)	27 (40.9)	9 (37.5)	8 (50.0)	6 (50.0)			
Community/public agency/hospital	84 (20.0)	49 (38.0)	17 (25.8)	13 (54.2)	4 (25.0)	3 (25.0)			
Emergency room/ urgent care	5 (1.2)	1 (0.8)	1 (1.5)	1 (4.2)	1 (6.3)	0 (0.0)			
No usual source of care/other care	63 (15.1)	28 (21.7)	21 (31.8)	1 (4.2)	3 (18.8)	3 (25.0)			

Table 15

Health Care Access Poverty Level of Rural Adolescents in California (N = 663)

	Poverty Level				
	Below 200%	200% and Above			
	n = 249	*n* = 414			
Usual Source of Care	*n (%)*	*n (%)*	*df*	χ^2	*p*
			3	50.79	.0005
Doctor's office/HMO	96 (38.6)	269 (65.0)			
Community/public agency/hospital	90 (36.1)	80 (19.3)			
Emergency room/ urgent care	8 (3.2)	1 (0.2)			
No usual source of care/other care	55 (22.1)	64 (15.5)			
Cost or lack of insurance as the reason that care was delayed			1	5.65	.03
Yes	7 (41.2)	5 (12.8)			
No	10 (58.8)	34 (87.2)			

Discussion

The purpose of this secondary analysis of the CHIS 2005 cross-sectional data is to describe the health of adolescents in the rural community, with consideration given to race/ethnicity, poverty level, and developmental stage of adolescence. Overall, the study findings identify a self-reported assessment of good to excellent health for the rural adolescent participants. In general, the pattern of health and health behaviors of the rural adolescent in California are consistent with California statewide and national adolescent data, although discrepancies do exist (Brindis, 2004; CDC, 2007).

The sociodemographic profile of this sample reflects the unique circumstances of the rural community in America (Brindis, 2004; RUPRI, 2006). The sample is disproportionately Caucasian and English speaking as compared to the general California population (Brindis, 2004; RUPRI, 2006). In addition, parent employment status, income level, and educational attainment are relatively low compared to California statewide and national averages (CHIS, 2005; RUPRI, 2006; US Department of Labor, 2007). These socioeconomic factors may impact the resources available for adolescents within the rural community, particularly as the economy tightens and the responsibility for community based health care services is shifted to local communities (Brindis & Ott, 2002; Lucas, 2005; Ozer, et al., 2002; Rural Health Advocate, 2003). Additionally, current adolescent resources and health systems may be challenged as the rural community becomes increasingly diverse over time (ORHP, 2002).

Nutrition and physical activity are concerns for this sample, consistent with California statewide and national adolescent data (Brindis, 2004; CDC, 2007). A significant proportion of the rural adolescent sample is at risk for becoming overweight or

overweight, do not meet the CDC's (2007) recommendation of 60 minutes of daily physical activity, and their consumption of fruits and vegetables is below current dietary guidelines (USDA, 2005). Indian/Alaskan, African American, and Latino adolescents demonstrate the highest BMIs, while concurrently reporting the greatest consumption of fast food and soda/sweet drinks. Adolescents below the 200% poverty level also demonstrate a higher mean BMI, higher mean soda/sweet drink consumption, and higher mean fast food consumption than the more affluent population. Consequently, minority and poor rural adolescents may be at greater risk for obesity induced morbidity related to diet and nutrition as compared to more affluent and non-minority rural adolescents. These findings reinforce the need for further study and community health interventions in the areas of physical activity and nutrition in the rural adolescent population, particularly among ethnic minority and low-income rural adolescents. Targeted approaches to improve physical activity and nutrition might include increasing mandatory physical education within the school system, increasing opportunities and incentives to become physically active in the rural community, increasing the availability and affordability of fruits and vegetables, and further reducing sodas/sweet drinks, fast foods, and other unhealthful dietary choices at school and at home.

Indication of psychological distress in rural adolescents in California is relatively low as determined by the CESD, yet still, 39% of rural adolescents report at least 1 day of depression within the past week. Self-reported depressive symptoms peak in the 14 to 15 age group. Poorer adolescents report greater psychological distress than the more affluent adolescents. 7% of rural adolescents did not receive psychological services they felt they needed within the last year. Unfortunately the CHIS instrument did not address suicidal

ideation or attempt. Nonetheless, given that suicide remains a leading cause of mortality in the adolescent population (NAHIC, 2006) and depression in adolescence is related to significant morbidity including the initiation of substance use (NAHIC, 2007), this study's findings support the need to increase access to psychological services for adolescents in the rural setting, particularly among the 14 to 15 age group and low-income adolescents. The need to increase access to mental health services for rural adolescents is consistent with the 21 critical national objectives for adolescents and young adults (USDHHS, 2007).

Almost one quarter of rural adolescents sampled were injured enough to receive treatment within the previous year. Sports injuries and falls are implicated as the leading causes of injury in this sample of rural California adolescents, followed by motor vehicle and bicycle accidents. Sports injuries are documented as a leading cause of non-fatal injury among adolescents in national data and research indicates that there may be regional (rural/urban) variation in the pattern of sports trauma (Harlos et al., 1999; Lower, 1996; Jiang, Li, Boyce & Picket, 2007; Riley et al., 1996). However, further investigation is indicated to identify the specific mechanism, pattern and longitudinal outcome of sports injuries among rural adolescents in order to develop appropriate prevention interventions. Similarly, more data is needed on the nature of traumatic injury from falls among rural youth. Injury related to falls is identified as a significant source of morbidity among the adolescent population, yet the mechanism for falls is rarely differentiated (Pan et al., 2007) A large proportion of this rural adolescent sample identifies injury within the category of "other". More empirical work is needed to further define the "other" category of adolescent injury in the rural setting.

Motor vehicle accidents remain the leading cause of mortality among adolescents in the United States (CDC, 2007; NAHIC 2007). Although the proportion of motor vehicle injury in this study is relatively low, not surprisingly, the incidence of injury caused by motor vehicle accidents increases with the age of the adolescent. Alcohol consumption is a significant contributing factor to motor vehicle injury and death (CDC, 2007). This analysis of CHIS is consistent with other California statewide data (Brindis, 2004), indicating a prevalence of driving a vehicle after drinking alcohol at 5%, one-half the national average of 10% (CDC, 2007). Although findings from this study suggest relatively high vehicular safety among rural California adolescents, morbidity and mortality from motor vehicular accidents in the rural community remains a pertinent concern. Available data indicates that motor vehicle related injuries and fatalities among youth are generally higher in rural areas when compared to urban settings (Kmet & Macarthur, 2005). It is important to note that the CHIS did not survey motor vehicle fatalities, only injury, perhaps resulting in a skewed understanding of motor vehicle safety among adolescents in the rural community.

Substance use is a pressing concern for rural communities (CASA, 2000). A significant level of substance use among rural adolescents in California is identified in this study, with substance use predictably increasing with age. The proportion of current cigarette smokers among this rural sample (7%) is slightly higher than California statewide adolescent averages (5%) (Brindis, 2004), but significantly lower than national adolescent data (23%) (CDC, 2007). Nonetheless, by the 16-17 age group 12% of rural adolescents are current smokers and the average age of initiation into cigarette smoking among this sample of rural adolescents is (M=12.75). This data argues for continued

tobacco prevention intervention efforts within the elementary and throughout the secondary school environments. Unfortunately, smokeless tobacco was not addressed by the CHIS instrument. National data indicates an 18% use of smokeless tobacco among white male high school students, a significant health concern that should be monitored in future studies of rural adolescent substance use (CDC, 2007).

Patterns of alcohol consumption in this study are similar to national and statewide data (Brindis, 2004; CDC, 2007; NAHIC, 2007). 19% of adolescents ages 12-17 in the study report alcohol consumption within the last month. By age 17, 60% of rural adolescents in this study have consumed alcohol and 30% of the sample has experience with illegal substances. Marijuana is identified as the most commonly used illicit substance among adolescents in the United States (NAHIC, 2007). Marijuana use within the past 12 months among this sample of rural adolescents was 5%, and 18% of the 16-17 age group smoked marijuana within the last 30 days. These statistics significantly exceed the Healthy Youth 2010 target objective for marijuana (1%) (Towey & Fleming, 2007). These study findings support previous investigations concluding that substance use is a public health concern for rural adolescents and that the incidence of substance use escalates throughout adolescence. Continued drug and alcohol education and intervention is warranted in the rural population throughout adolescence, particularly in relation to tobacco, alcohol and marijuana use.

In this sample, 33% of rural adolescents between the ages of 16-17 indicate a history of sexual intercourse, comparable to the 26% of sexually experienced 15-17 year olds in California statewide data (Brindis, 2004). National data suggests a higher rate of sexual intercourse among high school students (47%) (CDC, 2007), yet the differences in rates

of sexual intercourse between state and national data may be related more to sampling methodology than actual behavior discrepancies. The national data (CDC, 2007) was derived from school-based sampling rather than the home-based CHIS telephone survey in California. It is possible that home-based sampling of sensitive topics in adolescent health may affect validity related to confidentiality concerns. Also, CHIS sampling excludes the 18 year old senior high school student included in the national school-based sample, missing a potentially significant proportion of the sexually active high school population.

A significant proportion of the sexually active teens in rural California initiate intercourse before the age of 15 (44%), suggesting a continued need for sexual health information and access to confidential services in early secondary education. The majority of sexually experienced rural adolescents in this sample are either monogamous or remain abstinent over the previous 3-month period, and report consistent use of protection with sexual intercourse. Use of protection with sexual intercourse increased with age in this sample. Condoms were distinctly the preferred method of protection for these adolescents, arguing for increasing condom availability for sexually active teens within the rural community.

On a more disconcerting note, over one-third of sexually active rural adolescents in California reported multiple partners in the last 3 months and only one-third of all sexually active rural teens had been tested for STDs and/or HIV. Ethnic-minority rural adolescents received less STD/HIV testing than Caucasian rural adolescents. Only 4% of the sexually active rural adolescents had ever used emergency contraception. Insufficient STD/HIV testing and minimal use of emergency contraception may reflect a lack of

knowledge, lack of availability or lack of access to confidential services for adolescents within the rural community. In this study, a relatively small proportion of adolescents felt confident that they could access confidential health services. The inability to access confidential health services for issues such as sexual and mental health may increase the health risk of rural adolescents, particularly given that rural adolescents identify perceived threats to confidentiality as a major barrier to access to health care services (Anderson & Gittler, 2005; Elliot & Larson, 2004; Kennedy & MacPhee, 2006). The mean age of sexual debut in this sample is 14.6 years and the peak incidence for depressive symptoms occurred among the 14-15 age group, yet a very small proportion of the 14-15 year old age group felt confident in their ability to access confidential health services. In this study, minority populations report significantly lower rates of STD/HIV testing yet nationally account for the largest proportion of new adolescent HIV diagnoses and the highest prevalence of chlamydia and gonorrhea (CDC, 2007; NAHIC, 2007; Rangel, Gavin Reed, Fowler & Lee; 2006). More research is indicated to understand and improve access patterns to confidential health services for adolescents in the rural community, particularly among minority populations.

The majority of rural adolescents in this study have a usual source of health care and some type of health insurance. However 11% of the sample indicate they are either incompletely covered or uninsured. Over a quarter of rural adolescents in California currently rely on publicly funded health insurance. Racial/ethnic and income differences in health care access patterns were identified in this study. Ethnic-minorities, particularly Native Indians/Alaskans and Latinos, and poor adolescents demonstrated the greatest

reliance on community/public health services. Poor adolescents were also more likely to have no usual source of care and to delay health care because of cost.

Overall, results from this investigation on the health of rural adolescents in California are relatively consistent with California statewide and national adolescent data. Certainly, rural adolescents are no less susceptible to risk behaviors and health risks than the general adolescent population. Specific areas of concern for rural adolescents in California from this study include physical activity, diet and nutrition, substance use, mental health, STD/HIV testing for sexually active adolescents and access to confidential services in general. There are, however, some significant limitations to this study.

First of all, this study is limited to California and not necessarily representative of the rest of the United States rural adolescent population. Also, this investigation relied on a secondary data analysis of the existing CHIS dataset, incurring inherent limitations in data collection and sampling. Although the CHIS adolescent questionnaire covers many essential topics in adolescent health, there are some significant areas of concern not addressed by this instrument, such as suicidal ideation and attempt and motor vehicle fatalities, representing the first and third causes of mortality in the adolescent population (CDC, 2007). Fatalities in general were not addressed by this study as only living adolescents were sampled.

The primary methodological concern for the CHIS is the reliance on a residentially-based telephone survey format, requiring access to a landline telephone and an active parental/guardian consent for participation. The CHIS excludes adolescents without landline telephone service, adolescents without a consenting parent/guardian, incarcerated teens, and adolescents living in group home settings. This sampling

technique inherently reduces the representation of higher risk youth, the population that may be in the most need of health care services. The overall response rate (residence consent x guardian consent x adolescent consent) for the investigation was only 14% (CHIS, 2007), significantly limiting the generalizability of the findings. It has been previously documented that participants in adolescent research requiring active parental consent tend to demonstrate less risk behaviors than non-respondents (Anderman et al., 1995; Dent et al., 1993; Tigges, 2003). The findings of this study may be more representative of relatively low-risk adolescents in rural California than the general population. Non-random sampling techniques, such as selective sampling at locations known to attract high risk youth, and a waiver of parental consent for participation may be required to capture the health profile of the higher risk, harder to reach, adolescents in the rural setting.

This investigation was dependent on cross-sectional, quantitative, self-report data available from the CHIS. Self-report data can be subject to contextual factors such as perceived confidentiality, question wording, and social perception of sensitive issues and therefore may present validity concerns (Brener et al., 2004; Dashiff, 2000; Durant, Carey & Schroder, 2002; Sieling et al., 1998; Sieving et al., 2005). Concern for social stigma in the conservative rural environment may have resulted in under-reporting of certain risk behaviors in a home-based telephone survey. Alternative mechanisms for data collection in adolescent health need to be considered including adolescent interview techniques that increase perceived confidentiality and qualitative methodologies to increase the conceptual depth of risk behavior research. Additionally, a cross-sectional approach to adolescent research is not capable of revealing important trends in

developmental change over time, an essential concept in adolescent health. Longitudinal assessment of health indicators should be employed to improve the understanding of adolescent health as a developmental process.

It is important to take into consideration the age range (12-17) and the mean age (14.6) of the sample in this study. The age range for the CHIS adolescent survey excluded the earliest adolescents (10-11) and late adolescents (18-24). Future research should include both ends of the adolescent spectrum with careful consideration of developmental disparities in the analysis. In a study of "adolescent" health, it can be misleading to "average" the health behaviors of a 12-year-old sixth grader with a 17-year-old senior in high school. For this reason, age-critical health behaviors in this study were analyzed by stage of adolescence: early (12 to 13 years), early-middle (14 to 15 years), and late-middle (16 to 17 years) to provide a more realistic developmental representation of rural adolescent health. Analysis by age in this study supports the data from the National Longitudinal Study of Adolescent Health, suggesting a negative change over time in some indicators of health throughout the stages of adolescence (Harris et al., 2006).

Although there were statistically significant ethnic/racial differences, the small numbers of ethnic-minority rural adolescents and the large numbers of adolescents who self-identified as other/multiple races skew the findings analyzed by race/ethnicity, even when the race/ethnicity data were more broadly categorized as White vs. Non-White. As minority populations in rural localities increase, more research is needed to statistically capture the health concerns of minority adolescents in the rural setting.

This study was a descriptive analysis of the health and health behaviors of rural adolescents in California, it was not a comparison study. Additional research is necessary to compare rural versus urban and suburban populations in California, and rural California with national rural adolescent data.

Despite the limitations addressed above, the CHIS data and this study provide a solid foundation for examining the health of rural adolescents. Continued work with the CHIS, particularly concerning target areas highlighted in this paper, rural/urban comparison studies and trend analyses over time are indicated. In future research the selective inclusion of high risk and minority rural adolescents is recommended.

CHAPTER VI

CONNECTEDNESS AND THE HEALTH BEHAVIORS OF ADOLESCENTS IN RURAL CALIFORNIA

Abstract

Background: Middle adolescence is a critical developmental period, providing the foundation for both opportunity and risk. Patterns of connectedness between the adolescent and the social environment have demonstrated mitigation of risk behaviors in previous studies. The rural community presents a unique social context in which to understand adolescent health behaviors and the influence of connectedness.

Purpose: To explore the relationship between health behaviors and connectedness to the social context among middle adolescents, ages 14 to 17 years, in the rural community.

Method: A secondary data analysis of the 2003 Adolescent California Health Interview Survey was conducted in an ethnically and economically diverse sample of 492.

Results: Connectedness to the social context is significantly associated with health behaviors. The most influential connectedness factor is the home environment. The connectedness variables explain 8% of the variability in sexual activity, 10% in drug use, 6% in alcohol use, 9% in smoking, 7% in personal violence, 7% in partner violence, and 7% in depression. Race/ethnicity and poverty have minimal influence.

Conclusions: Connnectedness to social contexts, particularly home and school relationships, are important for the health of middle adolescents in the rural community.

Key words: Adolescents, rural, health, health behaviors, access to care

CONNECTEDNESS AND THE HEALTH BEHAVIORS OF MIDDLE ADOLESCENTS IN RURAL CALIFORNIA

Adolescence is a critical stage of human development (Savin-Williams, 1991; Steinberg, 2005). The development that occurs during adolescence provides the foundation for risk, resiliency, and opportunity in adult life (Graber & Brooks-Gunn, 1996; Yohalem & Pittman, 2001). Tremendous developmental discrepancy exists during adolescence, therefore, "adolescence" is generally divided into three sub-stages: early, middle, and late (Arnett, 2000; Irwin, Burg, & Cart, 2002; Millstein, Petersen, & Nightengale, 1993; Nienstein & Kaufman, 2002). In this study, early adolescence is identified as ages 10-13, middle adolescence includes ages 14-17, and late adolescence refers to the period between ages 18-24. These sub-stages represent significant points of transition within the spectrum of adolescent development (Arnett, 2000; Irwin, Burg, & Cart, 2002; Millstein, Petersen, & Nightengale, 1993; Nienstein & Kaufman, 2002). Previous research has identified an increasing incidence of risk behaviors and deleterious health practices throughout the three phases of adolescence (Harris et al., 2006).

The patterns of health behaviors begun in adolescence may significantly impact the health and well-being of the adolescent over the course of a lifetime (Earls, 1991; Yohalem & Pittman, 2001). Contextual relationships between the adolescent and the social context, particularly home and school, have been shown to mitigate health risks in previous studies (Blum, 2004; Resnick, 1997). The rural environment presents a unique and underrepresented social context in which to understand adolescent health behaviors.

Background and Significance

Although adolescents are generally considered a relatively healthy population, a longitudinal analysis of adolescent health risks reflects a decline in health status from early adolescence into adulthood (Harris et al., 2006). The most common causes of morbidity and mortality in adolescence arise from preventable conditions related to lifestyle behaviors, including substance use, unsafe sexual practices, poor nutritional habits, inadequately treated mental health concerns and dangerous driving practices (Brindis et al., 2004; Ozer et al., 2003). These health behaviors present a serious threat to the current health of the adolescent population and may initiate the trajectory for many chronic conditions of adulthood, including cancer, diabetes, heart disease, substance abuse, physical disability, and mental health issues (Brindis et al., 2004; Earls, 1991; Ozer et al., 2003).

The sociocultural context of the rural environment presents a unique and frequently challenging setting for adolescent health (Bushy, 2004; Campbell & Gordon, 2003; California State Rural Health Association [CSRHA], 2005). The rural community provides a cultural context for adolescent health that is different from metropolitan communities. Statistically, rural residents maintain lower levels of education, experience greater language barriers for minority populations and more frequently live below the poverty level than urban and suburban populations (CSRHA, 2005; RUPRI, 2006). Rural communities also tend to be more politically conservative and demonstrate a greater adherence to traditional values including gender roles, inter-personal role relationships and sexual behaviors, and a philosophical investment in self-reliance (Bushy, 2004; Campbell & Gordon, 2003). The limited data available on rural adolescent health

suggest rural adolescents maintain health risks at least equivalent to and possibly exceeding those of urban populations, particularly in relation to substance abuse, unsafe sexual practices, motor vehicle and other traumatic accidents, and relational violence (Atav & Spencer, 2002; Chimonides & Frank, 1998; Clark, et al., 2001; Fahs et al., 1999; Grant, 2007; Greggo, Jones, & Kann, 2005; Groft et al., 2005; Levine & Coupey, 2003; Loda et al., 1997; Dukes & Stein, 2003; Milhausen, et al., 2003; Muscaria, Phillipa & Bears, 1997; Shi & Stevens, 2005; Skatrud et al., 1998; Spencer & Bryant, 2000; Spoth et al., 2001; Vittes & Sorenson, 2005). Rural adolescents have been considered at potentially greater risk for poor health outcomes related to the prevalence of risk behaviors and concurrent lack of developmentally appropriate resources in the rural community (Levine & Coupey, 2003). Unfortunately, the empirical information available on adolescents in the rural setting is limited and rural adolescents are underrepresented in the health literature, resulting in inadequate data on the health behaviors of rural adolescents.

Available research indicates that adolescent health behaviors are influenced significantly by contextual determinants (Atav & Spencer; Brindis, 2004; Gray & Winterowd, 2002; Harris 2006; Klein, Slap, & Elster, 1992; Miller & Benson, 2001; Ozer et al., 2002; Resnick, 1999; Scaramella & Keyes, 2001; Steinberg, 2002). Important contexts for adolescent health and development include the home, school, and community (Blum, 2004; Resnick, 1997). Adolescents with diminished parental/guardian support and supervision, and disconnectedness to school and community are noted to engage in more risk behaviors, potentially incurring impaired health and developmental outcomes (Brindis, 2004; Epstein, Botiv & Spoth, 2003; Kostelecky, 2005; Miller &

Benson, 2001; Ozer et al., 2003; Resnick, 1999; Rountree & Clayton, 1999; Scaramella & Keyes, 2001; Shears, Edwards, & Stanley, 2006).

Substantial evidence exists indicating that adolescent connectedness to environmental resources promotes protective effects against unhealthful adolescent behaviors (Blum, 2004; Resnick et al., 1997; Resnick, 2000). In particular, perceived parental/guardian and school connectedness have been found to be consistently protective against adolescent risk behaviors (Brindis, 2004; Resnick, 1997; Scheer, Borden, & Donnermeyer, 2000; Youngblade et al., 2007). Available literature on connectedness in rural adolescent populations have demonstrated similar patterns of reduced health risk in relation to positive contextual connectedness, but the data are limited in comparison to urban investigations (Epstein, Botiv & Spoth, 2003; Shears, Edwards & Stanley, 2006; Rountree & Clayton, 1999).

Conceptual Framework

The Developmental-Contextual Model of Adolescent-Context Relations provides the theoretical underpinning for this study (Lerner & Castellino, 2002). The model is a representation of the dynamic interactions affecting adolescent health and development. In this model, the individual, family and social network systems dynamically affecting adolescent health and development are encompassed within a broader environmental construct, concentrically including the community, society, and culture (see Figure 6).

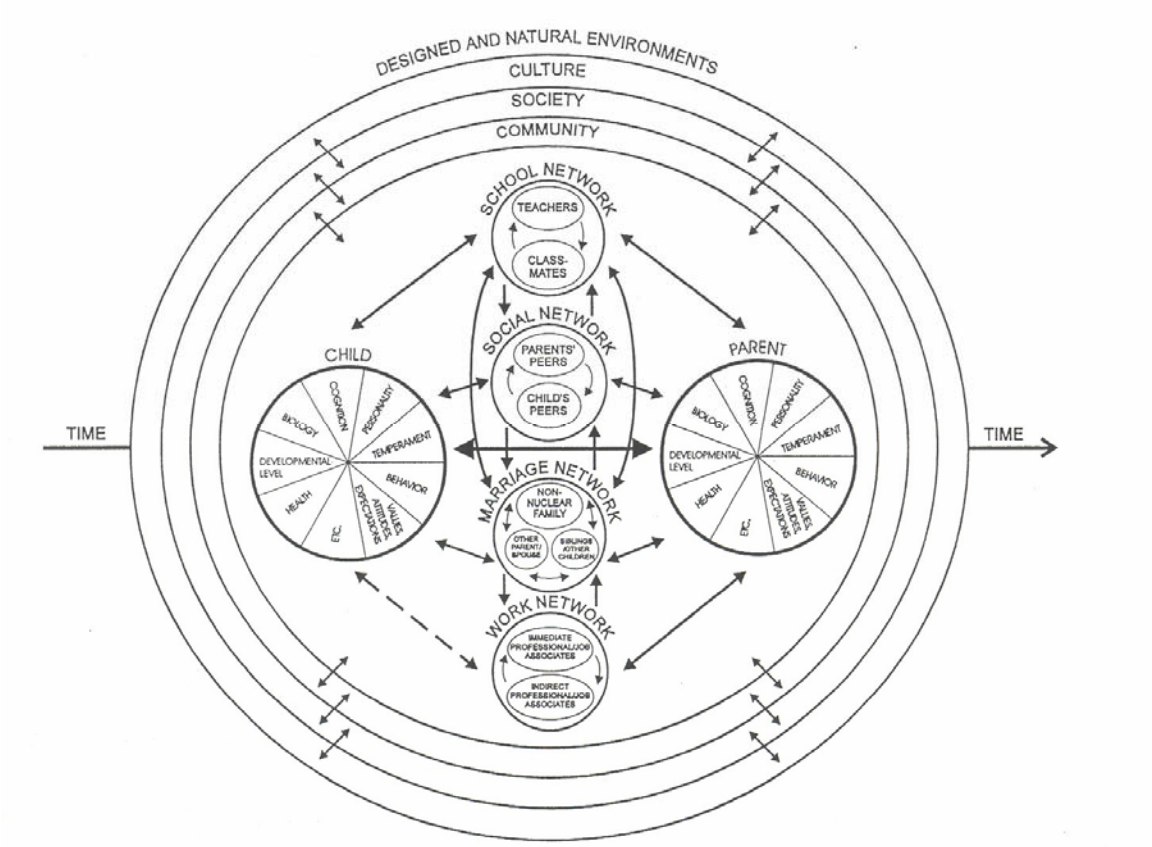

Figure 1. Lerner's Developmental-Contextual Model of Adolescent-Context Relations

The Developmental-Contextual Model depicts connections between the adolescent and resources within the environment that significantly impact adolescent health and development. This model provides a representation of the concept, "connectedness" that has become integral to the study of adolescent health. The connectedness construct conveys a perception of caring, involvement, and commitment between the adolescent and resources within the environment (Grotevant & Cooper, 1998; Karcher & Finn, 2005). The practice of connectedness includes a dynamic exchange of reliable emotional and instrumental support between the adolescent and contextual resources (Rew & Horner, 2003). Contextual factors of interest in this investigation include connectedness between the adolescent and home and school, within the context of the rural environment.

The effects of sociodemographics, including race/ethnicity and poverty level, are also considered.

Purpose of the Study

The purpose of the study is to explore the relationship between adolescent health behaviors and connectedness to the social context among adolescents within the rural community. The intent is to promote the health of the rural adolescent population through an understanding of the influence of the social context. The research question is: Is there a relationship between social connectedness and the health behaviors of rural adolescents in California, controlling for race/ethnicity and poverty level?

Method

Design

The design of this correlational, cross-sectional study is a secondary data analysis of the 2003 Adolescent California Health Interview Survey (CHIS). The dependent or outcome variables are the health behaviors of rural adolescents, ages 14 to 17 years. Health behaviors include health status, body mass index, emotional health, nutrition, physical activity, safety, substance use, and sexual activity. The independent variables are measures of social connectedness between the adolescent and the environment.

Setting

All of the 58 California counties are included in the administration of the CHIS. For the purpose of this study, residences included in the analysis of the data meet the operational classification of rural regions established by the Federal Office of Rural Health Policy (ORHP) including rural-urban commuting codes to identify rural communities with larger counties (Rural Policy Research Institute [RUPRI], 2004; U.S.

Census Bureau, 2007). Rural residence is established from census tract, zip code, and latitude/longitude data attached to the respondent's household (CHIS, 2007).

Sample

Table 16 displays the sociodemographic profile of the sample of 492 middle adolescents in rural California, of which 54% are females and 46% are males. The mean age is 15.4 years with a range of 14 to 17 years. A majority of the sample are Caucasians (61%), 29% are Latinos, 4% are Native Indians/Alaskan Natives, 2% are African Americans, and 2% are Asians/Pacific Islanders. Three percent of the sample report another single or multiple race. The most frequent language spoken at home is English (67%), although 29% of the adolescents speak another language in addition to English at home.

Table 16

Sociodemographic Profile of Middle to Late Adolescents in Rural California (N = 492)

Characteristic	*n*	%	
Age (Years)			*M* = 15.43 *SD* = 1.13
Gender			
Female	228	53.7	
Male	264	46.3	
Race			
White, Non-Hispanic	298	60.6	
Latino	141	28.7	
Other Single/Multiple Race	15	3.0	
American Indian/Alaskan Native	18	3.7	
African American	10	2.0	
Asian/Pacific Islander	10	2.0	
Language spoken at home			
English	331	67.3	
Spanish	15	3.0	
Other Language, including English	140	28.5	
Other Language, excluding English	6	1.2	
Federal poverty level			
0-99%	75	15.2	
100-199%	112	22.8	
200-299%	93	18.9	
300% and above	212	43.1	
Guardian current employment status			
Employed	355	75.8	
Unemployed	119	24.2	

Table 16

Sociodemographic Profile of Middle to Late Adolescents in Rural California (N = 492)

Characteristic	*n*	%		
Guardian educational level				
No high school diploma	83	16.9		
High school diploma	136	27.6		
Some college/vocational	171	34.8		
Undergraduate degree	81	16.5		
Graduate degree	21	4.3		
Health insurance coverage				
Insured (private/military)	310	63.0		
Insured (public)	122	24.8		
Partially insured (public)	14	2.8		
Partially insured (private)	22	4.5		
Uninsured	24	4.9		
Household size			$M = 4.18$	$SD = 1.42$

Note. Percentages are adjusted for missing cases.

Among this sample of middle adolescents in rural California, 76% of their parents are employed and 24% of the parents are unemployed. Thirty-eight percent of adolescents live in households with incomes below the 200% poverty level and 62% of adolescents live in households with incomes above the 200% poverty level. The educational level of the parents of the adolescents varies: 35% have some college or vocational education, 28% have a high school diploma, 21% have undergraduate or graduate degrees, and 17% do not have a high school diploma. The mean household size for the sample is 4.

Sixty-three percent of the sample have health insurance coverage under a private, employer-based or military health insurance, 25% of participants are covered by public

health insurance programs such as Medi-Cal or Healthy Families, 7% of them are partially insured, and 5% of them are uninsured.

Measurement of the Study Variables

Adolescent California Health Interview Survey

The CHIS is a biennial random digit dialing telephone survey of adults, adolescents, and children. It is the largest state telephone survey in the US (Brown, Holtby, Zahand, & Abbott, 2005; CHIS 2007). The primary intent of the CHIS is to provide representative statewide data, as well as county level health information for the purpose of informing and driving health policy and program development in California (CHIS, 2002).

Reliability and validity indicators of the CHIS are currently unavailable, however, CHIS representatives contend that its items are extracted from previously validated instruments such as the CDC's National Health Interview Survey and the Behavioral Risk Factor Surveillance System (CHIS, 2005; Grant, 2004). The CHIS was constructed by an advisory board consisting of researchers and senior officers from the University of California, Los Angeles (UCLA) Center for Health Policy Research, the California Department of Public Health, the Department of Health Care Services, and the Public Health Institute in collaboration with Westat, a private firm specializing in statistical research and large scale sampling surveys (CHIS, 2007).

The 2003 Adolescent CHIS consists of 172 items that include Likert and nominal response options with an average administration time of 21 minutes (CHIS, 2005).

Sociodemographics

The sociodemographic items include age, gender, race/ethnicity, household size, and language spoken at home. Socioeconomic status is constructed by the parent's

employment status, education, and poverty level calculated from household income figures. Measurement of the parental and income descriptors are assessed by the Adult CHIS, which is attached to the selected residence of the respondent adolescent.

Health Behaviors

Physical. Items related to physical health include health status and adiposity. Rating options for health status are poor, fair, good, very good, or excellent. Adiposity is assessed by calculating body mass index (BMI), which is based on height and weight, and reported in percentile: underweight (less than 5^{th}), healthy weight (5^{th} to 85^{th}), at-risk for overweight (85^{th} to 94^{th}), and overweight (95^{th} and above).

Emotional. Emotional health is assessed by asking how often in the past week the adolescent felt depressed. Response options are none of the time, sometimes, a lot of the time, or most of the time.

Nutrition and physical activity. The nutritional measures include the number of servings of fruits, vegetables, fast food, and soft/sweet drinks consumed per day. Physical activity is assessed by asking how many days in the last week the adolescent has been physically active for at least 30 minutes.

Safety. Safety items include the presence of a serious injury that required treatment within the past 12 months (yes or no), cause of the most recent injury, ever driven a car after drinking (yes or no), have been in a physical fight in the last 12 months (yes or no), and have ever hurt by a boyfriend or girlfriend (yes or no).

Substance use. Substance use includes cigarette smoking, alcohol use, and drug use. Cigarette smoking items consist of ever smoked cigarettes (yes or no), number of cigarettes smoked within the last 30 days to determine current smoker status, and age of

first cigarette to determine the mean age of smoking initiation. The item, ever had more than a few sips of alcohol (yes or no), is used to assess exposure to alcohol use. The item used to assess current alcohol use is the number of alcoholic drinks consumed in the last 30 days. To assess exposure to drug use, adolescents are asked if they have ever tried any illegal substances (yes or no). Current drug use is assessed by asking adolescents if they have smoked marijuana in the last 30 days (yes or no).

Sexual activity. Sexual activity items consist of ever had sexual intercourse (yes or no), age of first sexual intercourse (younger or older than 15), number of sexual partners in the past 3 months, used protection the first and last time had sexual intercourse (yes or no), method of birth control protection, ever been pregnant or caused a pregnancy (yes or no), ever used emergency contraception (yes or no), and ever been tested for sexually transmitted diseases (STD) or human immunodeficiency virus (HIV) (yes or no).

Connectedness. Connectedness items are categorized by type: home and school. Home connectedness items include parental marital status, adolescent lives with both parents in the same house, an adult at home is present after school, perceived parental knowledge of adolescent's free time, and the presence of an adult at home "who talks with you about your problems," "who believes you will be a success," and "who expects me to follow rules." School connectedness is assessed by the item: "there is an adult at school who cares about me." The response options for the connectedness variables are not at all true, a little true, pretty much true, or very much true. Response options were collapsed into true (pretty much true and very much true) and not true (a little true and not at all true).

Data Collection Procedure

The 2003 CHIS survey employs a stratified sample design arranging the 58 California counties into 41 predefined geographical strata (CHIS, 2005). Households throughout California are selected randomly for participation. Eligible households include residences occupied by individuals, families, multiple families, or multiple unrelated persons. The data collection procedure excludes group quarters, residents of treatment facilities, institutionalized persons, and homeless persons. Other individuals excluded from the data collection process are individuals without a landline telephone connection and minors without a resident parent/guardian willing to provide consent for participation.

Multiple attempts are made to contact randomly selected households over the telephone. After contact is established, one adult is selected randomly for survey administration. To maximize response rates, an advance letter explaining the study in five languages is mailed to selected households when a corresponding address is available. In the event of a participant's refusal, multiple attempts at refusal conversion are made by telephone and in writing.

The CHIS is administered by Westat, a private firm specializing in statistical research and large-scale sample surveys (CHIS, 2005). Trained interviewers use a computer-assisted telephone interview system to guide the questioning format and response options (CHIS 2002). Telephone interviews are conducted in English, Spanish, Chinese, Vietnamese, and Korean. Approximately 7% of the adolescent interviews are conducted in a language other than English (CHIS, 2007).

In the 2003 administration, the CHIS elicited a 33.5% household response rate that included 42,044 adults (CHIS, 2005). Adolescents (n = 4,010), 12 to 17 years, were

selected randomly from households with participating adults. Active parental/guardian consent is required for adolescent participation; 84% of the parents/guardians granted permission. Of the adolescents who were granted parental/guardian permission, 83% of them agreed to respond to the survey. This resulted in an overall adolescent participation rate of 19.2%; this proportion includes the household response rate, parental/guardian consent, and adolescent participation (CHIS, 2007). This procedure yielded a rural adolescent sample size of 773 for the 2003 CHIS. For developmental consistency, a middle adolescent sample (14-17) was used in this study, yielding a final sample size of 492 rural adolescents. Early adolescents (12 to 13 years) were excluded from the study because of the discrepancy in risk behaviors between the early and middle to adolescents. Late adolescents (18-24) were not sampled using the CHIS adolescent questionnaire.

Data Analysis

Summary descriptive statistics of frequencies, proportions, central tendencies, and dispersions were computed to describe the study variables for middle adolescents, 14 to 17 years, in rural California. Pearson correlations were conducted between the health behavior variables and the connectedness variables. Linear regression analyses were conducted to examine the unique and combined contributions of the connectedness variables on health behaviors, controlling for race/ethnicity and poverty level.

Categorical variables were dummy coded as 0 (negative health behavior and connectedness absent) and 1 (positive health behavior and connectedness present). Race/ethnicity was coded as 0 (Non-White) and 1 (White). Poverty level was coded as 0 (above the 200% poverty level) and 1 (below the 200% poverty level). In order to control for race/ethnicity and poverty level, hierarchical regression analyses, using blocks, were

conducted. Race/ethnicity was entered as the first block, followed by poverty level, and then, the connectedness variables were entered as the last block. The health behavior variable was entered as the dependent variable.

Analyses were conducted using the Statistical Package for Social Science. The sample size of 492 was sufficient to detect relationships among the study variables. The power for the study is $d = .80$ with a medium effect size of $R^2 = .13$ (Cohen, 1988). The significance level was set at $p \leq .05$, two-tailed.

Results

Health Behaviors

Physical. See Table 17 for a profile of the health of middle adolescents in rural California. Ninety-two percent of the sample report their health as good or better. Sixty-seven percent of them have a BMI percentile that is in the healthy weight range, however, 30% of them are at risk for being overweight or are overweight. Three percent of the sample fall into the underweight category.

Emotional. Fifty-six percent of the sample report that they have not felt depressed in the past week, however, 43% of them report being depressed "sometimes," and 35% of them report being depressed "a lot or most of the time."

Nutrition and physical activity. The average daily consumption of fruits and vegetables for the sample is about one and a half servings per day. The mean consumption per day of soda/sweet drinks is 1.5. The average consumption of fast food is less than once per day. On average, middle adolescents engage in 30 minutes of physical activity 2 days per week.

Table 17

Health Behaviors of Middle to Late Adolescents in Rural California Health (N = 492)

Characteristic	*n*	%		
Physical:				
Health status				
Excellent	90	18.3		
Very good/good	366	74.4		
Fair	31	6.3		
Poor	5	1.0		
Body mass index percentile			*M* = 61.58	*SD* = 29.26
Underweight (less than 5th)	16	3.3		
Healthy weight (5th to 85th)	328	66.7		
At risk of overweight (85th-94th)	77	15.7		
Overweight (95th and above)	71	14.4		
Emotional:				
Never	283	57.5		
Sometimes	170	34.6		
A lot/most of the times	39	7.9		
Nutrition:				
Servings of fruit per day			1.42	1.50
Servings of vegetables per day			1.42	1.18
Number of soda/sweet drinks per day			1.50	1.69
Times ate fast food per day			0.65	0.87
Physical Activity:				
Days per week physically active for at least 30 minutes			2.10	2.38

Table 17

Health Behaviors of Middle to Late Adolescents in Rural California Health (N = 492)

Characteristic	*n*	*%*
Safety:		
Injured enough to get treatment		
No	417	84.8
Yes	75	15.2
Sports-related	35	46.6
Other	23	30.7
Falls	9	12.0
Motor vehicle accident	6	8.0
Bicycle-related	2	2.7
Ever driven a car after drinking alcohol		
Yes	11	7.6
No	133	92.4
Ever been physically hurt by a boyfriend or girlfriend		
No	443	88.0
Yes	59	12.0
Physical fight in the past 12 months		
No	395	80.3
Yes	97	19.7
Substance Use:		
Ever tried marijuana, cocaine, sniffing glue or other drugs		
No	388	79.3
Yes	101	20.7
Marijuana use in the past 30 days		
No	446	91.2
Yes	43	8.8

Table 17

Health Behaviors of Middle to Late Adolescents in Rural California Health (N = 492)

Characteristic	*n*	%		
Current smoker				
No	448	91.1		
Yes	44	8.9		
Age of first cigarette (years)			*M* = 12.99	*SD* = 2.43
Ever tried more than a few sips of alcohol				
No	247	50.2		
Yes	245	49.8		
Number of days drank alcohol in the last 30 days				
Never drank	247	50.2		
0	123	25.0		
1-2	71	14.4		
3 or more	51	10.4		
Sexual Activity:				
Ever had sexual intercourse				
No	372	76.4		
Yes	115	23.6		
Age at first sexual intercourse				
Before 15 years	42	36.5		
15 years or older	73	63.5		
Number of sexual partners in the last 3 months			*M* = 1.06	*SD* = 1.09
0	27	23.5		
1	74	64.3		
2-3	7	6.1		
4 or more	7	6.1		

Table 17

Health Behaviors of Middle to Late Adolescents in Rural California Health (N = 492)

Characteristic	*n*	*%*
Used protection first time had sex		
Yes	100	87.0
No	15	13.0
Use protection last time had sex		
Yes	98	85.2
No	17	14.8
Last protection method		
Condom	84	76.4
Pill	25	22.7
Depo Provera	1	0.9
Emergency contraception	2	4.3
Ever been or gotten someone pregnant		
No	107	93.0
Yes	8	7.0
Have been tested STD/HIV		
No	72	62.6
Yes	43	37.4

Safety. Fifteen percent of the sample report having an incidence of injury severe enough to receive treatment within the last year. The largest proportion of those injuries are sports-related (47%), 12% of the injuries are related to falls, and 31% of the injuries are classified as "other." Eight percent of the injuries are related to vehicular accidents. Eight percent of the driving population within the sample report driving a vehicle after drinking alcohol. Bicycle accidents comprise 3% of the injuries in the sample. Twenty

percent of the sample report having been involved in a physical fight in the last 12 months and 12% of them report being hurt by a boyfriend or girlfriend.

Substance use. Nine percent of the sample are current cigarette smokers. The mean age of cigarette smoking initiation is 13 years (*SD* = 2.4). Among this sample, approximately 50% of middle adolescents have had a few sips of alcohol. Of those who report previous alcohol consumption, 29% of them had 1 to 2 drinks within the last month and 21% of them had three or more drinks within the last month. Twenty-one percent of the sample report having tried some type of illegal substance. Of this proportion, 9% of them report having smoked marijuana within the last month.

Sexual activity. Among this sample of middle adolescents in rural California, 24% of them report having had sexual intercourse of which 37% of them had sexual intercourse before age 15. Most of the sexually experienced adolescents are monogamous or report they have not had sexual intercourse within the last 3 months (88%); 6% of them report having two to three sexual partners within the last 3 months; and 6% of them report having four or more sexual partners within the last 3 months. A majority of sexually active adolescents report using protection the first time (87%) and the last time (85%) that they had sexual intercourse. Condoms were the protection method of choice (76%), followed by the birth control pill (23%), and then, Depo Provera (1%). Four percent of them have used emergency contraception. Seven percent of the sample have been or has gotten someone pregnant. Thirty-seven percent of the sample report they have been tested for STD and/or HIV and 70% of them report they have not been tested for STD and/or HIV.

Connectedness. A majority of the sample live in a two parent household (61%). Seventy percent of adolescents report there is an adult at home who knows about their free time (70%), is present after school hours (82%), talks to them about their problems (87%), believes they will be a success (96%), and expects them to follow the rules (97%). Seventy-three percent of adolescents report there is an adult at school who cares about them. See Table 18 for a display of the connectedness results.

Table 18

Connectedness of Middle Adolescents in Rural California (N = 492)

Characteristic	*n*	*%*
Home:		
Parents marital status		
Married	296	60.2
Separated/divorced/deceased/other	148	30.1
Never married	48	9.8
Lives with both parents in the same house		
Yes	298	60.6
No	194	39.4
Parental knowledge of adolescent free time		
Not true	148	30.1
True	344	69.9
Adult at home present after school hours		
Not true	88	17.9
True	404	82.1
Adult at home talks to you about your problems		
Not true	63	12.8
True	429	87.2

Table 18

Connectedness of Middle Adolescents in Rural California (N = 492)

Characteristic	*n*	%
Adult at home believes you will be a success		
Not true	19	3.9
True	473	96.1
Adult at home expects you to follow rules		
Not true	13	2.6
True	479	97.4
School:		
Adult at school cares about you		
Not true	134	27.2
True	358	72.8

Note. Percentages are adjusted for missing cases.

Relationship between Connectedness and Health Behaviors

Bivariate correlation matrices were constructed to examine the associations among social connectedness variables and health behavior variables relevant to middle adolescents, 14 to 17 years. The four categories of health behavior variables are sexual activity, substance use, safety, and depression. The connectedness variables are (a) home: lives with both parents in the same house, an adult at home is present after school, parental knowledge of the adolescent's free time, and the presence of an adult at home "who talks with you about your problems," "who believes you will be a success," and

"who expects me to follow rules;" (b) school: "there is an adult at school who cares about me;" Attention is given to statistically significant correlations greater than .20.

Sexual activity. Having an adult at home who believes the adolescent will succeed is significantly associated with age at first intercourse (-.21), ever had sex (-.21), and used protection the first time had sexual intercourse (.35). An adult who expects the adolescent to follow the rules correlates significantly with the number of sexual partners (-.27), used protection the first time had sexual intercourse (.26), used protection the last time had sexual intercourse (.23), and getting tested for STD/HIV (-.22) (see Table 19).

Substance use. Parents' knowledge about the adolescent's free time correlates significantly with ever tried drugs (-.24), ever tried alcohol (-.24), and current cigarette smoker (-.25). An adult who believes the adolescent will be a success correlates significantly with ever tried drugs (-.21) and current smoker (-.20) (see Table 20).

Safety. Ever been hurt by a partner has a statistically significant correlation with parents' knowledge of the adolescents' free time (-.22).

Table 19

Pearson Correlations Between Sexual Activity and Connectedness (N = 492)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age first intercourse	--												
2. Ever had sex	.99**	--											
3. # of sexual partners	-.04	.00	--										
4. Protection first time sex	.08	__[a]	.07	--									
5. Protection last time sex	-.01	__[a]	.07	.57**	--								
6. Tested for STD/HIV	.03	__[a]	.16	-.13	-.13	--							
7. Lives with both parents	-.14**	-.15**	.01	-.09	-.04	.02	--						
8. Free time	-.17**	-.18**	-.16	.12	.16	-.02	.09	--					
9. Believe will succeed	-.21**	-.21**	-.08	.35**	.16	.05	.01	.15**	--				
10. Follow rules	-.07	-.09	-.27**	.26**	.23*	-.22*	.02	.11*	.16**	--			
11. Adult at school cares	-.05	-.05	-.10	-.09	-.02	.10	.04	.08	.11*	.07	--		
12. Talks about problems	-.06	-.06	-.13	.11	.08	.05	.04	.20**	.30**	.24**	.15**	--	
13. Adult present after school	-.14**	-.14**	-.11	-.07	.02	-.04	.10*	.17**	.13**	.09*	.13**	.12**	--

*$p < .05$. **$p < .01$.

[a]Cannot be computed because one of the variables is constant.

Table 20

Pearson Correlations Between Substance Use and Connectedness (N = 492)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age first smoked	--											
2. Ever tried drugs	-.05	--										
3. Alcohol	.09	.47**	--									
4. Smoking	.09	.39**	.39**	--								
5. Lives with both parents	.00	-.15**	-.06	-.10*	--							
6. Free time	-.03	-.24**	-.24**	-.25**	.09	--						
7. Believe will succeed	-.02	-.21**	-.18**	-.20**	.01	.15**	--					
8. Follow rules	-.01	-.04	-.13**	-.08	.02	.11*	.16**	--				
9. Adult at school cares	-.06	-.07	-.14**	-.08	.04	.08	.11*	.07	--			
10. Talks about problems	.01	-.17**	-.15**	-.16	.04	.20**	.30**	.24**	.07	--		
11. Adult present after school	-.07	-.16**	-.18**	-.15**	.10*	.17**	.13**	.09*	.24**	.12**	--	

*$p < .05$. **$p < .01$.

Table 21

Pearson Correlations Between Safety and Connectedness (N = 492)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Physically hurt by partner	--											
2. Injury need treatment	-.02	--										
3. Physical fights	-.13**	-.09	--									
4. Driving after drinking	.14	.04	.01	--								
5. Lives with both parents	-.10*	.02	.10*	.09	--							
6. Free time	-.22**	.01	.18**	-.10	.09	--						
7. Believe will succeed	-.12**	-.06	.14**	.08	.01	.15**	--					
8. Follow rules	-.02	-.00	.17**	-.09	.02	.11*	.16**	--				
9. Adult at school cares	.00	-.03	.14**	-.06	.04	.08	.11*	.07	--			
10. Talks about problems	.03	-.02	.15**	-.01	.04	.20**	.30**	.24**	.07	--		
11. Adult present after school	.01	.01	.10*	-.14	.10*	.17**	.13**	.09*	.24**	.12**	--	

*$p < .05$. **$p < .01$.

Table 22

Pearson Correlations Between Depression and Connectedness (N = 492)

Variable	1	2	3	4	5	6	7	8	9
1. Depression	--								
2. Lives with both parents	-.04	--							
3. Free time	-.24**	.09	--						
4. Believe will succeed	-.19**	.01	.15**	--					
5. Follow rules	-.04	.02	.11*	.16**	--				
6. Adult at school cares	-.03	.04	.08	.11*	.07	--			
7. Talks about problems	-.22**	.04	.20**	.30**	.24**	.07	--		
8. Adult present after school	-.04	.10*	.17**	.13**	.09*	.24**	.12**	--	

*$p < .05$. **$p < .01$.

Depression. Depression correlates significantly with parents knowing about the adolescent's free time (-.24), having adult at home to talk with about the adolescent problems (-.22), and having an adult at school who cares about the adolescent (see Table 22).

See Table 23 for a summary of the regression analyses for connectedness predicting six models of health behaviors: (1) ever had sexual intercourse (sexual activity), (2) ever tried illicit drugs (drug use), (3) number of days in the past 30 days had at least one alcoholic drink (alcohol use), (4) current smoker (smoking), (5) physical fight in the past 12 months (personal violence), (7) ever been physically hurt by a girlfriend or boyfriend (partner violence), and (6) how often felt depressed in the past 7 days (depression). The predictor variables are the home and school connectedness variables. The *F*-statistic for each of the six models is significant. Beta weights and adjusted R^2 are also displayed in the table.

The connectedness variables explained 8% of the variability in sexual activity, 10% of the variability in drug use, 6% of the variability in alcohol use, 9% of the variability in smoking, 7% of the variability in personal violence, 7% of the variability in partner violence, and 7% of the variability in depression in middle to late adolescents, 14 to 17 years, in rural California. Individual connectedness variables that contribute significantly to the fit of the sexual activity model are the adolescent lives with both parents in the same household (-.11), the parent is aware of the adolescent's free time (-.12), and an adult at home believes the adolescent will be a success (-.19). The beta weight of each connectedness predictor variable is in parenthesis.

Table 23

Regression Analysis for Connectedness Predicting Health Behaviors (N = 492)

Variable	*B*	*SE B*	*β*
Sexual Activity: $R^2 = .08$, $df = 7, 486$, $F = 7.16$, $p = .0005$			
Lives with both parents	-0.11	0.04	-.12**
Aware of free time	-0.12	0.04	-.13**
Believe will succeed	-0.41	0.10	-.19**
Expects me to follow rules	-0.11	0.12	-.04
Talks about problems	0.06	0.06	.05
Adult present after school	-0.09	0.05	-.01
Adult at school cares	-0.01	0.04	-.01
Drug Use: $R^2 = .10$, $df = 7, 488$, $F = 7.16$, $p = .0005$			
Lives with both parents	-.10	0.04	-.12**
Aware of free time	-.16	0.04	-.18**
Believe will succeed	-.32	0.10	-.16**
Expects me to follow rules	.08	0.11	.03
Talks about problems	-.09	0.06	-.07
Adult present after school	-.09	0.05	-.09
Adult at school cares	-.02	0.04	-.02
Alcohol Use: $R^2 = .06$, $df = 7, 491$, $F = 5.72$, $p = .0005$			
Lives with both parents	-0.06	0.05	-.06
Aware of free time	-0.21	0.05	-.20**
Believe will succeed	-0.23	0.12	-.09
Expects me to follow rules	-0.04	0.14	-.01
Talks about problems	-0.04	0.07	-.02
Adult present after school	-0.10	0.06	-.07
Adult at school cares	-0.01	0.05	-.01

Table 23 (Continued)

Regression Analysis for Connectedness Predicting Health Behaviors (N = 492)

Variable	*B*	*SE B*	β
Smoking: $R^2 = .09$, $df = 7, 491$, $F = 8.06$, $p = .0005$			
Lives with both parents	-0.04	0.03	-.07
Aware of free time	-0.12	0.03	-.19**
Believe will succeed	-0.20	0.07	-.13**
Expects me to follow rules	-0.02	0.08	-.01
Talks about problems	-0.05	0.04	-.06
Adult present after school	-0.06	0.03	-.08
Adult at school cares	-0.02	0.03	-.03
Personal Violence: $R^2 = .07$, $df = 7, 491$, $F = 6.53$, $p = .0005$			
Lives with both parents	-0.06	0.04	-.08
Aware of free time	-0.11	0.04	-.12**
Believe will succeed	-0.14	0.10	-.07
Expects me to follow rules	-0.31	0.11	-.12**
Talks about problems	-0.06	0.06	-.05
Adult present after school	-0.04	0.05	-.03
Adult at school cares	-0.09	0.04	-.10*
Partner Violence: $R^2 = .07$, $df = 7, 491$, $F = 5.88$, $p = .0005$			
Lives with both parents	-0.06	0.03	-.09*
Aware of free time	-0.16	0.03	-.23**
Believe will succeed	-0.22	0.08	-.13**
Expects me to follow rules	-0.00	0.09	.00
Talks about problems	0.11	0.05	.11*
Adult present after school	0.05	0.04	.06
Adult at school cares	0.01	0.03	.01

Note. R^2 reflects a correction based on the number of subjects per variable

*$p < .05$. **$p < .01$.

Individual connectedness variables that contribute significantly to the fit of the drug use model are the adolescent lives with both parents in the same household (-.12), parent's knowledge of the adolescent's free time (-.18), and an adult at home believes the adolescent will be a success (-.16). Individual connectedness variables that contribute significantly to the fit of the alcohol use model are parent's knowledge of the adolescent's free time (-.20). Individual connectedness variables that contribute significantly to the fit of the smoking model are parents' knowledge of the adolescent's free time (-.19) and an adult at home who believes the adolescent will be a success (-.13).

For the personal violence model, the individual connectedness variables that contribute significantly to the model's fit are parent's knowledge of the adolescent's free time (-.12), an adult at home who expects the adolescent to follow rules (-.12), and an adult at school cares about the adolescent (-.10). Individual connectedness variables that contribute significantly to the depression model include the parent's knowledge of the adolescent's free time (-.20), an adult at home who believes the adolescent will be a success (-.13), and an adult at home who talks to the adolescent about his or her problems (-.16). For the partner violence model, the individual connectedness variables that contribute significantly to the model's fit are lives with both parents in the same household (-.09), parent's knowledge of the adolescent's free time (-.23), an adult at home believes the adolescent will be a success (-.13), and an adult at home who talks to the adolescent about his or her problem (.11).

Individual connectedness variables that contribute significantly to the depression model include the parent's knowledge of the adolescent's free time (-.20), an adult at

home who believes the adolescent will be a success (-.13), and an adult at home who talks to the adolescent about his or her problems (-.16).

After controlling for race/ethnicity and poverty, results indicate these sociodemographic factors do not influence significantly the variability in health behaviors that can be explained by home and school connectedness. There are three exceptions. These exceptions are for personal violence and depression, where race/ethnicity and poverty level account for 1% or less of the variance and for partner violence, where poverty level accounts for 1% of the variance. These results indicate clearly that the connectedness variables account for most of the variance in the health behaviors of middle adolescents in rural California. The contribution of the connectedness variables, however, range from 6% to 10%. Thus, there is 90% of variance in adolescents' health behaviors that remains unexplained.

Discussion

The purpose of this cross-sectional, correlational study was to explore the relationship between adolescent health behaviors and social connectedness among middle adolescents ages 14 to 17 years. A secondary analysis of the 2003 CHIS data was conducted. Overall, the pattern of health behaviors of this sample of middle adolescents is consistent with California statewide and national adolescent data (Brindis, 2004; CDC, 2007). In addition, this sample of adolescents describes very high levels of connectedness to adults within their homes and relatively high connectedness to the school environment.

A significant majority of the sample describe their general health as "good" or better. However, as indicated by analysis of health behaviors, this sample is at risk for becoming overweight or are overweight and they do not meet the CDC's (2007) recommendation for daily physical activity or nutrition. Injury is a significant source of morbidity, with the majority of injuries occurring from athletic participation. A quarter of the sample engaged in physical fights and the proportion of partner violence is 12%. This relatively high incidence of partner violence is consistent with other investigations among rural adolescents and requires further investigation (Champion, 1999; Spencer, 2000). Significant numbers of the adolescents are sexually active, use alcohol, drugs and other illicit substances, feel depressed, and are not confident that they can access confidential health services for their concerns. However, connectedness does contribute to positive health behaviors.

Social connectedness is significantly associated with adolescent health behaviors and contributes to the variability in adolescent health behaviors. Race/ethnicity and poverty have minimal influence. The most influential connectedness factor is home

connectedness. Home connectedness contributes significantly to the reduction of sexual activity, substance use, and personal violence. Conceptually, home connectedness involves two types: (a) supervision through knowledge of the adolescent's free time and expecting him or her follow the rules, and (b) affective support by believing that the adolescent will be a success, and being available to talk to the adolescent about his or her problems. The home connectedness factor that contributed most consistently to positive health behaviors is "an adult at home who believes the adolescent will be a success".

A counterintuitive study finding is the negative correlation between having an adult who expects the adolescent to follow the rules and STD/HIV testing. In this sample, having an adult at home who expects the adolescent to follow the rules was associated with the sexually active adolescent not receiving testing for STD/HIV. This home connectedness factor, however, is positively associated with a reduced number of sexual partners and an increased use of protection with sexual intercourse. This unexpected inverse association between STD/HIV testing and an expectation of following the rules may be related the high degree of uncertainty about accessing confidential health services. Perhaps, adolescents who are expected to follow the rules, often including abstinence from sexual intercourse, are afraid of the disclosure of their sexual practices in the process of obtaining STD/HIV testing. These same adolescents use condoms during sexual intercourse at a relatively high rate, and thus, may not perceive a need for STD/HIV testing. Further research is recommended for a better understanding of STD/HIV testing and the use of confidential health services for sexually active middle adolescents in the rural community.

Another confusing finding in this analysis is a positive association between connectedness variables and physical fights. No conceptual explanation for this correlation can be offered and therefore the issue requires further investigation. Physical violence among the sample in general was disconcertingly high, suggesting the need for more research on rural adolescent violence.

School connectedness had a positive, but limited association with only two of the health behaviors: personal violence and depression. Perhaps when home connectedness is strong, as in this investigation, it supersedes the influences of school connectedness. In this sample, the majority of the participants live with both parents, 96% indicate that their parents believe they will be a success, and 97% are expected to follow the rules by an adult at home. In contrast only 73% believe that someone at school cares about them. It is quite possible that the effect of school connectedness may be substantially greater among adolescents without such strong support from home. The effect of home and school connectedness should be evaluated within high risk rural adolescent populations with less parental support, potentially excluded from this sample.

Although consistent positive associations between adolescent health behaviors and connectedness, particularly in relation to home connectedness, were found in this study, it is important to note that only 10% of the variance in the health behaviors analyzed is attributable to the connectedness variables. 90% of the variance in adolescents' health behaviors remains unexplained. Further research is indicated to identify other important contributors to the health behaviors of middle adolescents in rural California, such as parental health behaviors, peer involvement, self-efficacy traits and the availability of community resources.

A major limitation to the study was the measurement of the connectedness variables. As a secondary data analysis, the study was limited by the measures available in the pre-designed survey. Although the home and school connectedness constructs appear to offer sufficient conceptual depth, the depth of community connectedness constructs is lacking. Future research on the effect of contextual connectedness on rural adolescent health behaviors would benefit from more sophisticated measures of community connectedness including community involvement and mentoring relationships.

This investigation is limited to California and therefore not representative of the national rural adolescent population. In an attempt to conceptually narrow the developmental range of the adolescent population in rural California to the middle adolescent age group, 14 to 17 years, the sample size was reduced from 773 to 492. This reduction in sample size may have impacted the power of the study to detect relationships among the study variables, although the power of the study was sufficient for analyses.

The primary methodological concern for the CHIS is the reliance on residentially-based telephone survey format, requiring a landline telephone and active parental/guardian consent for participation. The CHIS excludes adolescents without a landline telephone service, adolescents without a consenting parent/guardian, incarcerated teens, adolescents living in group home settings, and homeless teens. The overall response rate was only 19%, limiting the generalizability of the findings. It has been previously documented that participants in adolescent research requiring active parental consent tend to demonstrate less risk behaviors than non-respondents (Anderman et al., 1995; Dent et al., 1993; Tigges, 2003). Therefore, as suggested by the analysis of the parental connectedness variables, this investigation may be most representative of

relatively low risk rural adolescents. Sampling techniques such as selective sampling in settings known to attract high risk rural adolescents, may be required to capture the health behavior profile of the higher risk, harder-to-reach adolescents in the rural setting.

As with much of the available research in adolescent health, this study was dependent exclusively on quantitative self-report data, potentially inciting validity concerns (Brener, Billy & Grady, 2003). Self-report data can be subject to contextual factors such as perceived confidentiality, question wording, and social perception of sensitive issues (Brener et al., 2004; Dashiff, 2000; Durant, Carey & Schroder, 2002; Sieling et al., 1998; Sieving et al., 2005). Concern for social stigma in the conservative rural environment may have resulted in under-reporting of certain risk behaviors in a home-based telephone survey. Alternative mechanisms for data collection in adolescent health need to be considered including adolescent interview techniques that enhance perceived confidentiality and qualitative methodologies to increase the conceptual depth of risk behavior research. A qualitative research methodology may yield a conceptually richer understanding of the health behaviors and health concerns of rural adolescents. Lastly, a cross-sectional approach to adolescent research is not capable of revealing important trends in developmental change over time, an essential concept in adolescent health. More longitudinal investigations on the effects of social connectedness on rural adolescent health behaviors are warranted.

Despite these limitations, the CHIS data provides a solid foundation for exploring the relationship between connectedness and the health behaviors of middle adolescents in rural California. The study findings contribute to the limited literature available regarding the influence of contextual contexts on rural adolescent health.

CHAPTER VII

SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

This dissertation offers a perspective of rural adolescent health from a conceptual and empirical perspective. Conceptually, a developmental and chronological definition of adolescence is presented. The proposed definition identifies three stages of adolescence (early [12-13], middle [14-17], and late [18-24]) and promotes an appreciation for the profound biopsychosocial transitions and turning points of adolescence. The need for a consistent, developmentally determined, definition of adolescence in the theoretical and empirical literature is argued.

Adolescence is defined as a critical developmental period and adolescents are identified as a uniquely vulnerable population, separate from the commonly accepted broader categorization of children. Adolescents are considered a vulnerable population related to the significant impact of contextual factors on critical developmental processes. Richard Lerner's Developmental-Contextual Model of Adolescent-Context Relations is presented as a theoretical depiction of the contextual influences potentially effecting adolescent health, including the family, school, and community. It is argued in this dissertation that an understanding of adolescents as a vulnerable population is not incommensurate with the positive youth development perspective. Although every young person maintains the potential for successful development as espoused by proponents of positive youth development, the vulnerable adolescent population is nonetheless at-risk for unmet needs and adverse outcomes related to limited control over contextual influences.

The rural community is defined as a unique environment for adolescent development. A review of the rural adolescent health literature indicates that health behaviors and health risks in rural adolescent populations are similar to those of urban samples. In several studies, reported health risks in rural adolescent populations surpass urban statistics, including substance abuse, risky sexual practices, traumatic accidents, and relational violence. It has been suggested that rural adolescents may be at greater risk for poor developmental outcomes as a consequence of the prevalence of health risks and the relatively limited community resources. Resources for adolescents in the rural environment may be reduced related to fewer financial assets, a less educated citizenship, limited diversity in youth services, impaired geographic accessibility and a frequently conservative culture in the rural environment constraining access to sensitive services. However, the literature available on rural adolescent health is limited when compared to urban investigations.

More research in rural adolescent health is called for under the principle of "Justice" from the Belmont report. The under-representation of rural adolescents in the empirical literature does not promote "fairness of distribution" of research and may potentially impede the advancement of rural adolescent health. In addition, this dissertation identifies a significant under-representation of the high risk rural adolescent, potentially the most vulnerable population. Another significant ethical issue in rural adolescent health research discussed is the maintenance of confidentiality and increasing perceived anonymity in adolescent research including sensitive subjects within the conservative rural environment.

The empirical presentation in this dissertation is intended to further contribute to the rural adolescent health literature. An analysis of the 2003 and 2005 California Health Interview Survey (CHIS) was conducted for rural adolescent populations. The 2005 survey was used to provide the most contemporary data on rural adolescent health in California. The 2003 survey was used to investigate the relationship between connectedness to social contexts and adolescent health behaviors. The 2005 data was not used to evaluate connectedness and adolescent health because the later survey did not include the more comprehensive connectedness variables contained in the 2003 survey.

Overall, these studies indicate that significant health concerns exist within the rural adolescent population including impaired fitness and nutrition, sexual health risks, substance use, depression, and intra-personal violence. These health risks were consistent with other studies of adolescent health. Risky health behaviors may begin relatively early in adolescence and increase with age. Differences in health and health behaviors between race/ethnicities and poverty level were detected in the rural community, particularly related to fitness and nutrition, depression, and access to health care. Connectedness to the family demonstrated the most frequent positive influence on adolescent risk behaviors including substance use, sexual activity, and depression. In particular, an adult at home "who believes in you" demonstrated the most consistent positive health effects. Connectedness to school demonstrated effects only for depression and intra-personal violence. Although significant health concerns were documented surrounding sensitive services, a minority of adolescents in the rural setting indicated certainty that they could access confidential health services. A relatively large percentage of rural adolescents,

particularly minority and low income youth, identify community health resources as their primary health provider.

Limitations

The sample in this study represents a relatively low risk rural adolescent population as indicated by the very high rate of parental supervision and support documented in the 2003 data. The residence-based random digit dialing sampling requiring active parental consent and excluding adolescents without a landline telephone, residing in group homes and incarcerated populations, most likely precluded the inclusion of higher risk adolescents. Therefore this study does not represent the highest risk, and potentially most vulnerable, youth in the rural community. That being said, the risk behaviors and potential for adverse health effects among the most supported rural adolescents is significant.

Implications for Nursing and Health

This dissertation argues for the promotion and protection of developmentally appropriate adolescent health resources in the rural community. Services for adolescents in the rural community should address fitness and nutrition, sexual risk behaviors, substance use, depression, and intra-personal violence. Community based resources are a potentially effective mechanism for the provision of services for adolescents, and may be particularly useful in reaching minority and low-income populations.

Unfortunately, services for adolescents in the rural community are threatened by financial and ideological pressures. In general, less financial resources for the support of adolescent health services flow into the rural community. As the economy tightens, the most vulnerable populations are at the greatest risk for impaired access to services. In

addition to financial constraints, confidential services for adolescents addressing critical issues in adolescent health are frequently politically unpopular within the conservative rural community. There is the potential within a conservative environment to exploit the positive youth development movement as an excuse to eliminate controversial intervention services for adolescents. The reduction in available services for rural adolescents potentially jeopardizes the health of the population and the community. A best-practices community health policy approach is warranted incorporating tenets of both positive youth development and preventive science in adolescent health. Political health policy activism is necessary to protect and improve services for this vulnerable population.

Recommendations for Future Research

Further research is indicated on the health, health behaviors and access to care for adolescents in the rural community. The CHIS provides an effective framework for many future investigations in adolescent health as it provides a relatively large and diverse sampling of rural adolescents in California. Data from this dissertation indicates that future studies in rural adolescent health should consider fitness and nutrition, sexual risk behaviors, substance use, depression, intra-personal violence and access to confidential services. Also indicated are rural and urban comparisons and trend analysis within the rural adolescent population. Enhanced sampling techniques need to be considered to help capture the high-risk adolescent population. Sampling high risk adolescents in rural California could be improved by selectively sampling within settings knows to include the high–risk population such as alternative education, juvenile hall, and community health clinics. Also, a waiver of parental consent can be obtained to access adolescents

with unavailable or resistant guardians. These sampling approaches would provide a more comprehensive understanding of the health concerns of adolescents within the rural community.

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Committee on Human Research

Project Summary Sheet

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Study Title

Health and Its Contextual Determinants in Rural Adolescents

Principal Investigator

Catherine M. Waters Title: Associate Professor

Department: Community Health Services

Phone: (415) 502-7995 Fax: (415) 476-6042 E-Mail: catherine.waters@nursing.ucsf.edu

Address: Box 0608

Contacts

Name	Position	Box	Phone	E-Mail
Waters, Catherine M.	PI	0608	(415) 502-799	catherine.waters@nursing.ucsf.edu
Curtis, Alexa	Co-PI		(530) 913-350	ACurtis@ucsf.edu

Human Subjects Training

The PI and Co-PI must complete the UCSF online training course: Protecting Human Research Subjects

Name	Last Completed
Waters, Catherine M.	12/3/02
Curtis, Alexa	12/2/03

Review Details

Approval Number	Status	Received	Reviewed	Approved	Expires
H9243-29889-01	Approved	10/11/2006 1	11/7/2006 12:	11/7/2006 12	11/7/2007 1

Attachments:

Special Study Information

Site: Campus

Populations: Minors

How many subjects will be enrolled here: 1,000

Will subjects be paid: No

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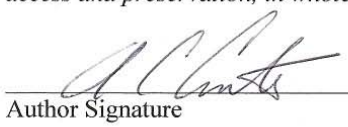

Author Signature

12/28/07

Date