Favela ou Comunidade? How demarcating informal settlements from the top-down or the bottom-up can identify, address, and perpetuate health disparities

By

Guillermo Ramos Douglass-Jaimes

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Committee in charge:

Professor Rachel Morello-Frosch, Chair
Professor Nina Kelly
Professor Jason Corburn

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Abstract

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Place-based effects on health have been well-documented; however, narrow constructions of place, neighborhood and individual- as well as community-level identity hinder our ability to more fully understand the ways in which place affects health outcomes for diverse populations. Informal settlements in Rio de Janeiro (colloquially referred to as *favelas*) have been demarcated by local and federal government agencies with fixed boundaries for administrative purposes, including identifying areas for infrastructure improvements, renewal or removal. However, local and federal administrative boundaries often do not match each other, and the collective lived experience of residents of these *favela* communities tend not to be clearly bounded by those official designations.

This dissertation sets out to address the following questions:
1) How do administrative boundaries of informal settlements overlap, or not, with the terms and definitions used to describe these places by the people who live there?

2) How do residents of informal settlements in Rio de Janeiro operate to either reinforce or push back against these officially designated boundaries?

3) Do narrow constructions of place conceal demographic disparities in access to municipal infrastructure?

In my dissertation I first examine how informal settlements in Rio de Janeiro are places constructed by top-down institutional forces, such as administrative processes employed by the State through the national census and local government efforts to push marginalized residents into these areas, as well as removing these parts of the city entirely. Further, I examine how residents contest and reshape the boundaries of their communities, both in pushing back and challenging the official categorizations of the State, as well as embarking on their own boundary-setting practices by mapping and documenting their communities for themselves with the goal of improving community health and well-being. Through these processes of contested place-

making, residents help to identify community needs and provide resources for themselves that the State has been unwilling or unable to provide. Running throughout this work is an understanding that place and identity are socially constructed and socially contested, both dynamically responding to pressure exerted by the State from the top-down and community members from the bottom-up

I dedicate this dissertation to my husband,
my family, and my chosen family.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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CHAPTER ONE

Introduction

> Others would say *favela*, we say *morro*, and *morro comunidade*. People say different things. Before I would say, I lived in a favela…but now I say *comunidade…morro comunidade*. Many people generalize that the people that live in a *morro* is a *favela*. I see *favela* and *morro* differently. From my point of view, I see a lot of prejudices. The favela is not *favelado*[1].
>
> *—Ana, age 20, April 2015*

> No, this is not a *comunidade*, this is a *favela*…I work with young people and twenty-somethings…I have a commitment to tell them the truth. And young people need to understand that they live in a *favela* and that a *favela* can one day become a *comunidade*. But right now that is not so. We can't lie to them and even less make them feel ashamed of being from the *favela*. They need to know the truth.
>
> *—Orlando, age 48, April 2015*

The quotes above were spoken by Orlando and Ana during interviews I conducted in April of 2015. We talked in a small office of the residents' association, perched on the hill near the entrance to the *comunidade*, the *morro*, the *favela*, known as Morro dos Prazeres (**Figure 1-1**). This is a section of Rio de Janeiro that is officially registered by the municipal government as a *favela*, an area that is also recognized by the federal government as an *aglomerado subnormais* (AGSN)[2]—a designation that meets the United Nations operational definition of a slum. These terms are understood as describing parts of cities that lack access to municipal infrastructure, have questionable legal ownership of the land, and are considered to house the city's poor and marginalized. However, with so many terms used to, ostensibly, describe the same patches of earth, do they mean the same thing? Are these terms interchangeable? Are these depictions of marginality even accurate? Moreover, the competing descriptions given by Ana and Jose reflect deeper differences in how these terms apply to places like Morro dos Prazeres. The competing terms reflect how residents, researchers, and government agencies are struggling to decide how to characterize the part of town Ana and Orlando call home.

Over fifty-four percent of the world's nearly seven and a half billion people live in urban areas, a figure that is projected to reach sixty percent by 2050 (UN 2015). However, much of this urban growth is taking place in parts of cities that are under or un-serviced with critical municipal infrastructure that has long provided the health benefits of urban living. These areas, which the United Nations refers to as slums, currently house 880 million people, a number that is projected to grow as the world's urban population increases (UN 2015). However, nations have made commitments to improve the quality of life of the poor, and reduce poverty rates, as well as the number of people living in slums. The Millennium Development Goals, signed by 189 nations,

[1] *Favelado* is the Portuguese word for *favela* resident. However, this term is used more broadly to describe residents of informal settlements when speaking of conditions in non-Brazilian contexts. But more important to this, the term is often used pejoratively to describe residents.

[2] *Aglomerado subnormais*, translates to subnormal agglomerations, or informal clusters.

called for improving the lives of slum dwellers by 2020 (UN-Habitat 2004). Brazil, one of those signatories, has positioned the Census as the tool for tracking that progress (Instituto Brasileiro de Geografia e Estatística 2010).

Figure 1-1: Image overlooking a portion of the community of Morro dos Prazeres, Rio de Janeiro

Photo by Guillermo Douglass-Jaimes, 2015

This dissertation examines how places deemed informal by the State are spatially and conceptually represented by the Brazilian governments and residents. The State represents these places through top-down censuses, registries of informal settlements[3], and governance strategies; whereas residents do so through bottom-up place-based identity movements, and their everyday lived experiences and movement within and between neighborhoods. I explore how and when dichotomous representations of formal or informal align and misalign across these different vantage points. Further, I problematize these dichotomous representations and demonstrate how this simplistic characterization of urban spaces can conceal critical knowledge about racial and economic disparities as well as boundary information that may ultimately hinder community access to resources. However, rather than reject state data based on the critiques of their simplistic divides of what is formal and informal, I reorient the State's data through what I call a sideways glance to reveal those hidden disparities. This sideways glance questions how well the State's designations of formal and informal describe urban areas based on their characteristics, such as the extent to which adequate infrastructure is provided, which is claimed to be part of what differentiates these areas. In doing so, I highlight racial disparities, which can inform how social and spatial factors influence and drive disease burdens.

In this introduction, I first I discuss the challenges presented by having multiple terms that

[3] I use informal settlements as an umbrella term, to describe areas lacking in municipal infrastructure and questionable legal ownership. I discuss this further in the next section.

describe informal settlements, the critiques that scholars and residents raise regarding the naming and classification of these places, and how I have chosen to engage with these terms. Then I look at the understanding of place and how articulations of place inform studies of health; followed by a discussion on the census tract as a unit of measure that underpins many large-scale health studies and an examination of their limitations. I then detail my methods on how I looked at the question of misalignment of formal and informal parts of Rio de Janeiro, followed by my approach of taking what I call a top-down, bottom-up, and sideways glance to highlight those misalignments. I then give a brief overview of the chapters in this dissertation and end with a discussion of the contributions this work makes to the literature.

Situating the dissertation in the literature

What is informal and who is informal

Ana and Orlando's competing views over how to refer to Morro dos Prazeres reflects a shift taking place in the valuing of communities like theirs. While *favela* is both the official term used by the municipality of Rio de Janeiro, and, for over a century, the most popular colloquial term, critics have argued that its connotations of poverty, disease, vice, and marginality render it pejorative. In fact, many residents use the term *favela (*or its variant *favelado*) to describe a state of disorder (Valladares 2008, 21; Neto and de Mello Pimentel Lourenço 2010, 137). The term is viewed so negatively in the northeast Brazilian city of Salvador, that one cannot utter the word without quickly being corrected with a more acceptable term, such as *comunidade*, *bairro* or *morro*. Cariocas' (residents of Rio de Janeiro) reactions to the term are more mixed. *Comunidade,* the Portuguese word for community, has recently taken hold in academic and civil society circles, as well as in some government agencies, as a stand-in to describe these parts of the city. However, the use of the term *favela* is not universally viewed negatively. The ideas of residents like Orlando reflect a view shared by many who continue using the term *favela* and want the stigma removed, rather than the term.

Each of the people and groups mentioned above have different motives for using the term *favela* or not—a topic which I explore more in more depth in Chapter 2. As a researcher, I have struggled over how to describe the parts of cities the UN calls a slum. Globally, these areas have been described as squatter settlements and shantytowns. For the most part, these have also been deemed pejorative in some academic and civil society circles. Thus, I acknowledge the problematic nature of the terms slum and *favela* and will use informal settlements as an umbrella term to describe these communities in general. However, I do use the term *favela* when describing those areas officially designated as such by the municipal government, and when referring to the discourse around the term. Further, I use the bureaucratic term *aglomerado subnormais* (AGSN) when referring to those boundaries officially classified in the Brazilian census. Lastly, I use the term slum when describing its use by the UN.

Categorizations of informality, who decides the boundaries and labels?

The labeling, researching, and writing about these informal settlements is rife with messiness and contestation. The use of multiple terms to describe the informal city reflects the imprecision of what the term slum attempts to describe (Gilbert 2007). Geographer Alan Gilbert (Gilbert 2007) raised concerns about the Millennium Development Goals for *Cities without slums,* which he argued, due to the ambiguity of the term slum, would make achieving such a goal difficult as

well as open to nefarious interpretations such as slum removals. Gilbert goes on to lament the resurgence of the term slum, such as through Mike Davis' widely popular book *Planet of Slums* (Davis 2006). Davis's account is further criticized for painting a bleak and universalizing picture, which leaves the impression that informal settlements face the same challenges, and are composed of the same features, wherever in the world they happen to be. Others have shared Davis' suggestion that the estimates for populations livings in slums were likely underestimated (Gilbert 2007; Simon 2011). Licia Valladares has raised similar critiques over the use of the term *favela* (Valladares 2008).

Connecting place to health

Place is relational, dynamic, and socially constructed

Controversies over place naming are not unique to Brazil's informal settlements. These contestations, rather, reflect what geographers—and sociologists—have contended about place. For Thomas Gieryn, "…place is space filled up by people, practices, objects, and representation" (Gieryn 2000). As a sociologist, Gieryn centers the role of people within places, filled with the messiness of the human experience that entails contestations over *who* gets to decide *which places* have *what meaning*. This definition for place un-bounds it from the notion of crisp territories that one often associates with places, particularly those represented on administrative boundary maps (Harvey 2006, 58). Scholars in the field of public health (Cummins et al. 2007) have built on this conception of place to explore its links to health by thinking about place relationally, thus rendering place as fluid and dynamic, and able to vary over time and space. Moreover, Cummins et al. make explicit the co-produced origins of place that are constituted by the built and natural environment, as well as social processes.

Through the above understanding of the links between place and health, we can examine how informal settlements are viewed as sites that produce poor health. Informal settlements often lack municipal infrastructure, such as safe drinking water, sanitation, garbage collection, and electricity (UN-Habitat 2004). Moreover, informal settlements are thought to have an overabundance of substandard building patterns, such as, narrow streets and passageways, as well as dense, cramped living conditions (L. W. Riley et al. 2007; Unger and Riley 2007; Vlahov et al. 2011). They are often situated precariously on ecologically sensitive land such as steep hillsides, bottoms of valleys, and marshlands, all of which create environmental hazards (landslides, flooding) and often provide habitat for infectious disease vectors (Barcellos and Sabroza 2000; Reis et al. 2008). Residents of informal settlements are often described as living in poverty, with lower levels of formal education, and are socially marginalized. Additionally, the processes and policies that push and pull people into informal settlements can mitigate or exacerbate the poor-health-producing conditions mentioned above (Diez Roux and Mair 2010). The descriptions provided above fit into the framework of social determinants of health (Krieger 2001; Macintyre, Ellaway, and Cummins 2002; Chen et al. 2006; Cummins et al. 2007; Diez Roux and Mair 2010). Under this framework, contextual factors such as the natural and built environment come together with the compositional factors of race, ethnicity, gender and so on of the people who live there; and the social processes which compel and repel people from these places to produce unequal health burdens.

While the conditions described above may hold true in many areas falling under the labels of

informal settlements, a growing understanding has emerged that informal settlements are highly variable. Consequently, these communities require more precise characterization, particularly through disaggregated data (Vlahov et al. 2011). Moves to characterize informal settlements requires an approach to place that is flexible enough to contain the dynamic, fluid, and variable qualities of place, yet collecting data at this level is costly and rare. Ecological studies can provide details about the localities they examine and make comparisons and inferences on the applicability to larger geographical units. However, health studies reliant on data from health districts are limited by the boundaries of their catchment areas which act as reporting zones, and can rarely transpose their findings to smaller area units (Goodchild 2011, 29). The results can conceal intra-community differences, which in places like Brazil can be highly variable within relatively small areas.

Scholars who link place to health have often conceptualized this relationship through the concept of neighborhood and community. In building on the work of Robert Park and Ernest Burgess, Sampson et al. (Sampson, Morenoff, and Gannon-Rowley 2002) defined neighborhood as a "subsection of a larger community—a collection of both people and institutions occupying a spatially defined area, influenced by ecological, cultural, and sometimes political forces" (Sampson, Morenoff, and Gannon-Rowley 2002, 445). However, no such administrative district, zone, or boundary could be consistently said to represent such an area. This reality has led many researchers to rely on the smallest spatial statistical unit available to inform the examination of place and health, the census tract.

Understanding the Census

Data availability and reliance on administrative boundaries

Brazil's 2010 census was the first time that it counted "everyone"[4] within its borders, including the historically excluded informal settlements, which the Brazilian government demarcates as AGSN. The Brazilian Census Bureau (Instituto Brasileira de Geografia e Estatísticas—IBGE) met with local representatives and moved to align its definition of AGSN with that of the UN slum designation and with municipalities like Rio de Janeiro who had been tracking and registering *favelas* for decades prior (Chapter 2). Thus the Brazilian government has stated that the Census is used to monitor the progress toward achieving its international commitment to the Millennium Development Goals ("Por que fazer o Censo de 2010?" 2010), and satisfying demands of the populace that helped elect a populist leftist president.

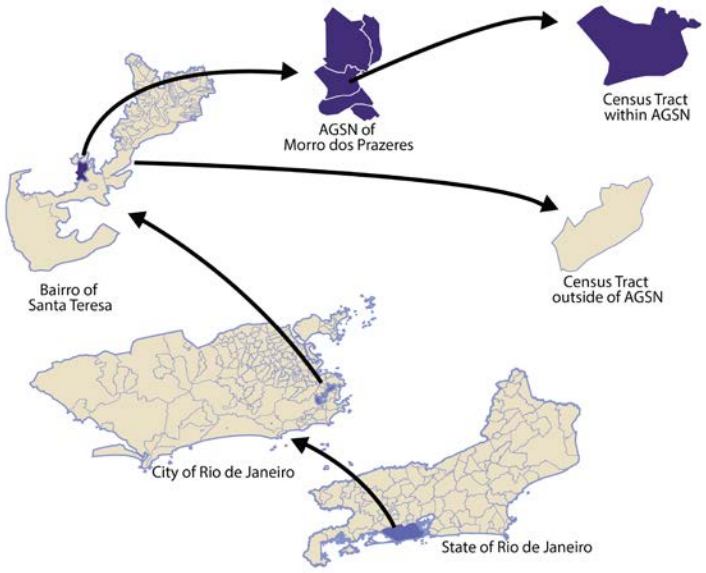
The Oxford English Dictionary defines a census, "as an official count or survey, especially of a population." A census is assumed to be a fully accurate count of populations, or rather, they are treated as such. These counts are enumerated spatially to census tracts, a boundary that has no meaning in the everyday lives of its residents. Yet this boundary that has become the standard spatial unit of describing places—a single unit that contains the elemental demographic information about places. These spatial units get packaged into statistics of administrative neighborhoods, cities, regions, nations, and the world. Most any study that deals with places relies on census figures to describe the people who live there—and their racial, ethnic, gendered, class descriptors. How many times have you read a report that did not include a population count

[4] I say "everyone", here in quotes to signify that the census claims to count everyone, and how the findings are treated as true. I elaborate this further within this section.

drawn from the Census for the locality under investigation? Whether ethnographies, ecological health studies, policy briefs, any study dealing with people in a particular location will inevitably attempt to describe who lives there, and how they may differ from the broader population, if at all. Often censuses provides the best estimates of these figures. Thus, whether intentional or not, census data lends credibility to the depiction of places.

Within administrative practices of place depiction, the state's various organs rely on census data to make decisions about where and how resources ought to be distributed. These spatially attributed counts are also used in apportioning legislative representatives in democratic states, such as Brazil ("Por que fazer o Censo de 2010?" 2010). However, administrative bodies view spaces differently from each other based on their individual functional needs (such as water districts, sewer districts, health districts and so on) (Harvey 2006, 60). In Brazil, the state carves out scales of ordering, with the federal government at the top, followed by states, then cities, onto administrative neighborhoods known as *bairro*, ending at the smallest recognized territorial unit, the census tract—a spatial unit lacking an autonomous administrative or representative body (**Figure 1-2**)[5].

Figure 1-2: Diagram of nested spatial units found in the Brazil census



The census tract is viewed as the smallest spatial component that can be constituted and organized into the larger administrative units. Census boundaries are drawn to respect the administrative borders at all scales above, so that a census tract can only fall inside of one neighborhood, inside of one city, inside of one state (although, small inconsistencies may arise for non-standard districts such as postal codes, and phone areas, and health care catchments areas). However, when data from these larger spatial units are combined with the Census, we cannot disaggregate information below the smallest spatial area with meaningful information.

[5] This representation of nested administrative units is seen from the perspective of the federal government as reflected in the Brazilian census, which includes a spatial designation for AGSN. These do not reflect other federal or local spatial designations.

For example, data from health districts cannot be disaggregated unless such information is made available. Often these data are aggregated for privacy concerns, rendering the aggregated data layer as the highest resolution possible for examination; this then requires that the data from the Census must also be aggregated to be meaningfully engaged with the other layers of data.

Understanding the spatial dynamics of disease burden is important. By using state gathered data such as the Census combined with health data scholars have identified where disease burdens are located (S. Santos, Chor, and Werneck 2010; Marlow 2014; Bortz et al. 2015). However, as previously noted, there are limitations to identifying health disparities at the sub-health district scale. As demographic and health data become publicly available, particularly in Lower and Middle Income Countries (LMIC), these data can help us to understand the distribution of disease burdens better (Vlahov et al. 2011). Brazil presents a special case in comparison to most accounts, as it has a rather robust data-gathering regime that incorporates sophisticated geospatial analytical tools (Bianchini 2011). However, with this growth in data availability, and the reliance on the administrative boundaries standing in for neighborhoods, may result in inaccurate representations of the dynamics of place and neighborhood health impacts. Of particular concern, is the representation and distribution of population variability across neighborhoods in places like Brazil, where high concentrations of poverty and wealth, and stigmatized populations are located adjacent to each other (De Oliveira 2012, 21). Thus, an analysis that can highlight these disparities is critical for ensuring that scarce resources are spent on the areas in most need, as well as for better understanding the dynamics of the problems that governments, policymakers, and researchers are looking at. I expand on these limitations below.

Modifiable Areal Unit Problem and ecological fallacy

The limitations of census data are made clear by looking at the methodology of the Census. It is a snapshot of the social reality and a representation of localities. It is an attempt to define the extent of the nation and the people who reside in those spaces. Geographers have highlighted the limitations of such data. Critical geographers have noted the statistical incongruities that emerge when boundaries are redrawn, known as the Modifiable Areal Unit Problem, or MAUP for short (Openshaw 1984a). This problem can be articulated using the concept that readers may be more familiar with, gerrymandering—the idea that we can draw up districts of voters and in doing so end up with very different representations of the people who live there.

Further, the challenge of the quality of census data is reflected in the ecological fallacy, (Openshaw 1984b) the misrepresentation that can arise when attempting to make causal inferences from aggregated data, often in cross-sectional studies. This issue lies at the center of what this dissertation attempts raise. The ways that governments draw up districts can work to conceal or reveal disparities. The Census provides such a challenge in its representation of averages of population, and averages of income, over areas, the result of the average described over that space can be compared to other areas, but while it may be interesting to know where the highest or the lowest average wages are, those averages conceal internal inequalities. Measures such as the Gini index[6] have been developed to address these sorts of ecological fallacies but as yet only work on issues of income and issues such as of racial segregation, when looking at dichotomous depictions of race (Kim and Jargowsky 2005).

[6] The Gini index is a statistical measure of inequality that represents the distribution of variables such as income, across an areas, such that higher values represent greater inequality and lower values represent less inequality.

How does an area that no one identifies with have so much power?
As noted above, governments treat census data as facts, regardless of the controversies surrounding their accuracy. Similarly, business interests, policy makers, researchers, and civil society often rely on the state's population data for their own planning purposes and, in similarly, treat these data as facts, facts, which science and technology studies (STS) scholars have argued are socially constructed (Jasanoff 1994, 12–13). This point is underscored by controversies that often erupt around the accuracy of their counts, such as concerns raised by residents of informal settlements that they are undercounted (Alvim 2014). Yet, these criticisms do not deter states from accepting their counts as true.

Misalignment
How well do these designations of informal settlements match the lived experience of their residents? The misalignment between the state's classification and popular conception of informal settlements is an example of what STS scholars Bowker and Star (Bowker and Star 2000) call torque. The concept of torque articulates the strain placed on the lives of individuals whose personal conception of race is misaligned from the state's rigid categorization—the greater the misalignment, the greater the strain. Bowker and Star highlight the range of these strains in their examination of South African apartheid era racial classifications. These ranged from strained family relations between interracial couples that could not legally live together (2000, 203), to the lethal consequences such as race-based medical care that leaves those deemed racially ambiguous without emergency medical care until their racial classification could be determined (2000, 197). Torque can also be applied to the various dimensions of place mismatch, including the spatial extent of administrative boundaries, how they differ from popular understandings of neighborhood; as well as the conceptual mismatch of what a place designation means and the implications of being from one place or another. Finally, place-based identities, which often combine racial classifications and place designations, increase the potential for misalignment with official state categories, as well as across residents' conceptions.

Research Approach

This dissertation examines how the State, researchers, civil society, and residents represent places are, and how these representations shape our understanding of health. I do so by using a mixed methods approach to answering questions about the misalignment of informal settlement categorizations, which requires an understanding of the various dimensions that affect the lives of people in places. Thus, I have approached my work as an interdisciplinary pursuit, engaging with the fields of geography, sociology, urban planning, public health, critical race studies and science and technology studies. My work takes as a priori that the complicated multi-dimensional world we live in cannot be easily distilled from a single dimension or perspective without perpetuating the inequalities that are manifest within our social world (Haraway 1988). Thus, I employ a mixed methods approach combining geospatial analysis and statistical analysis, informed by qualitative research interviews, participant observation, ethnography, and document review to examining the alignment and misalignment of place and race categories. This work is informed by my time in Brazil, as well as conversations and time spent with the staff from the Center for Health Promotion (Centro de Promocão de Saúde - CEDAPS) in Rio de Janeiro, and interviews and conversations with residents of Morro dos Prazeres, through what Jason Corburn calls street ethnography (Corburn 2005). These conversations and experiences shaped my

analysis of the 2010 Brazilian census data (IBGE), and comparisons with the municipal informal settlements registry data (SABREN), community mapping data (YLDM).

Being a dark skinned, queer, able-bodied, cisgender US born Latino male of Mexican parents, I have lived with the understanding that narrow definitions of race, class, gender and sexuality have insufficiently captured my own lived experience. As a non-Brazilian, I do not claim insider status in doing this research. However, as a person who is often perceived as having ambiguous racial features, I understand the strains caused by not aligning to prescribed racial categories. Thus, I come to this work, as Donna Haraway (Haraway 1988) would say, situated from a vantage point which informs my work to move beyond a one-dimensional analysis of the material and social world.

Theoretical Contribution: Top-down, bottom-up, sideways glance

This dissertation takes a three-pronged approach, what I call a top-down, bottom-up, and sideways glance to examine the discordance between classifications of place and race between the state and residents of informal settlements. The following section discusses this approach in more detail.

Top-down

I define a top-down view as one that is reliant on aggregate data over boundaries defined primarily, but not exclusively, by the state. The work of James Scott highlights this top-down view employed by modern states through the tools of legibility. In doing so, he revealed how states impart their control over territories and the people residing in them (Scott 1999). This tradition of looking at the tools used by the state for this top-down view has followed a trajectory from the work of Foucault (cite), whose examination of the state's statistical data on suicides, and other ways in which the state control is grounded in numbers. As Theodore Porter describes in *Trust in Numbers* (Porter 1996), objectivity is a socially constructed artifact. Thus, I place this work is in conversation with those that would seek to question the view from above.

Top-down approaches to characterizing informal settlements are inherently reliant on objective measures. Whether demarcated through observational checklists, or through calculations of building patterns (Weeks et al. 2007; Jankowska, Weeks, and Engstrom 2011), these objective measures enable automated classification.

Bottom-up

Bottom-up approaches for slum characterization rely on observations from the street level, the human level. They principally rely on close-up investigations yielding information on the quality of construction, and the types of building materials used. Further, close-up monitoring from the ground level provides details on visible infrastructure. Ethnographic research while often focusing on the social relations of people within places can often provide rich detail on these places. These observations can be informative in identifying what is plainly missing, such as when the lack of public infrastructure becomes apparent (Cummins et al. 2007, 1834). For example, low-hanging electrical wires that terminate in the jumble of wire balls colloquially referred to as *gatos* would be an indicator that the electricity is not officially or legally provided to the community. It may indicate that the level of service is diminished in these areas for political or economic reasons. Similarly, observations of water pooling in the street makes it

clear that drainage is either inadequate or nonexistent. Potholed or overly narrow roadways indicate impediments to mobility. As I argue in Chapters 2 and Chapter 3, bottom-up approaches reflect how communities create their identities through their lived experience and their everyday engagement with place, such as by using community mapping to assert a sense of territorial boundary over their community to address collective health and social problems.

The bottom-up view has additionally long been practiced through ecological studies, investigating how diseases manifest under natural conditions within places. Thus taking a close up view that is not afforded by looking from above. Much like ethnography, ecological studies rely on their informants. Ecological studies within informal settlements have revealed that conditions can vary. Work done in Salvador's Pau da Lima community—a federally recognized informal settlement, and the site of ongoing collaborative research involving residents as partners in identifying diseases—has been the source for multiple publications related to slum health (Unger, Ko, and Douglass-Jaimes 2016). One such survey of Leptospirosis[7] cases revealed differences in disease incidence within the community, such that homes located at the bottom of the valley in the flood plain exhibited a higher number of cases than those at the top of the hill (Reis et al. 2008). Thus, location matters, such as proximity to topographic features that produce microclimates of disease. This work highlighted key mechanism for disease transport and the high variability of disease production within localities, yet the ability to run such an experiment would be unfeasible over a larger area such as a city.

Sideways glance

Finally, in this work, I argue that the state's own numbers can be helpful in highlighting inequalities that are missed when the state's data is used uncritically. This approach can be used to empower communities that have been made to be on the fringes of power, to take up the tools of the state to dismantle the systems of oppression that produce these inequalities. Though censuses are often criticized as inaccurate for, intentionally or not, miscounting people and places, the state, treats them as true, and thus imbues them with power. Through this approach, I accept their claims as socially constructed fact. However, I reorient the state's numbers by taking a sideways glance to highlight gradients of disparity that are missed when looking at the state's official classification schemes. In doing so, to demonstrate where and when the state's own classifications break down.

Chapter Overview

In Chapter 2, I analyze the different terminology ascribed to informal settlements in Rio de Janeiro. I look at which state entities collect statistics data pertaining to the informal city as well as grass-roots and community-based approaches to documenting the informal city and how these may or may not match up. My methods include a qualitative analysis of the terminology of informal settlements describing the terms that are used to refer to informal settlements (slum, *favela*, *aglomerados subnormais*, *morros*, *comunidades*, *bairros*). Moreover, I provide a context for the critique of these terms by geographers and sociologists, from the standpoint of their

[7] Leptospirosis is a vector borne disease carried by rats and spread by urine stagnant water, such as open sewers or potholed streets or trash, which collect water. This treatable disease is has a high mortality rate as its symptoms mimic those of dengue which is untreatable. The effect is that many people die thinking they had dengue when if provided treatment they would likely have survived.

imprecision, as well as their use in perpetuating stereotypes and social marginalization. This discussion takes place under the backdrop of two recent mega-sporting events, which accelerated the pace of “slum-upgrading” projects in Rio de Janeiro over the past few years. This chapter looks at the contestations over the process of slum upgrading, through a historical perspective. It looks at the well-studied Favela-Bairro program and subsequent Morar Carioca program, as well as the recent pacification efforts under the auspices of the UPP- Police Pacification Units.

In Chapter 3, I take the bottom-up approach to understanding how community residents perceive health threats and resources in one informal settlement—one that is recognized by the federal government and the local government as matching the UN Habitat’s criteria for a slum. I argue that that community gathered data could serve as evidence of the discordance from the top-down view by the state. I take advantage of available spatial data from a community-mapping project organized by the Center for Health Promotions to see what these reveal about residents’ perceptions of the boundaries of their community. How do residents draw the line between their community and others? I utilized community gathered mapping data to represent the community’s boundaries based on what they considered worthy of mapping in a community mapping project. This project takes data collected by youth mappers, utilizing smartphones to take pictures and take note of areas within their community that they felt were needed improvement, constituted health threats, or were considered sources of health protection. I aggregate the data that youth mappers gathered over several years through multiple mapping runs and compare the extent to which the boundaries of the community that residents perceive as their own, overlapped with the local and federal designations for informal settlements. I make comparisons between the areas mapped by youth participants, which ultimately fall outside of the officially recognized AGSN and *favela*. The spatial differences hint at the deeper impacts that mismatching spatial designations of informal settlements, one being the claims of undercounting residents of the favela, and the resulting disparities in resource allocation. Finally, I highlight the challenges in collecting data from below, as well as challenges for outsiders to interpret this data without involving voices from those who participated and organized the community data gathering effort.

In Chapter 4, I discuss the importance and relevance of state data as a socially constructed fact, and the power imbued in those numbers. I use the tools of the state, namely the 2010 Brazilian census, to examine how well the criteria within the operational definitions of informal settlements reflect the results of the Census, and if the divide between formal and informal is as stark as the naming conventions suggest. However, rather than confining myself to the dichotomous designations of place boundaries, I use the components of infrastructure provision to create new categories of place not spatially contingent but materially present to see whether the disparities are manifest. Thus, I demonstrate how such data can be used to articulate spatial inequalities in access to municipal infrastructure that a top-down view often obscures. This sideways glance, as I call it, is informed by characterizations of inequalities from ecological studies and ethnographic research that reflects the bottom-up view, which have highlighted the intra-urban variability of disease presence and social dynamics within neighborhoods. Further, this research examines if the spatial distribution of infrastructure reveals socio-demographic inequalities outside of the "slum-divide,” and using the racial data collected for the first time in the 2010 Census, whereas previous censuses have not asked the race question explicitly but, rather they relied on estimations based on samples.

In Chapter 5, I discuss the implications for governance and resource allocation through social programs and the use of place making from the top-down, and bottom-up. Moreover, what are the implications for understanding the links between place and community health? I discuss the future of Rio de Janeiro and its informal settlements. With the 2016 Olympics recently concluded, I contemplate the physical and social transformations that have taken place in Rio de Janeiro and assess the impacts and implications of these mega events, in these processes for transformation. Finally, I conclude by asking, why are bottom-up views important for this process.

Novel Contributions

Ana and Jose's differing characterizations of their home, Morro dos Prazeres, contain deeper insights into the meaning of a place from the perspective of its residents. Do the tools of the state adequately reflect those dynamics? Do conceptualizations of place and identity differ from top-down categorizations by the state and the lived experience on the ground? The most marginalized in society face disproportionate harms based on where they live and who they are. Therefore, governments, policymakers, and researchers must use available tools to characterize better how people are impacted and move beyond these simple dichotomous representations of the haves and have-nots to understand better who is having *not* and *where*, *when* and *why*.

Each chapter of this dissertation takes a different perspective to examine the ways in which depictions of informal settlements align from the top-down and the bottom-up, and how taking a sideways glance can reveal inequalities that remained otherwise hidden to the state. Further, I have explored the question of how the parts of the city deemed informal are named, and how those names frame the conversations about those communities and the people who live in them. These questions impact the lives of their residents across all scales, from determining who is allowed to be present in the formal and informal city, to what resources get distributed to these communities, and how who is present in these places may reflect which people are prioritized.

This work is an attempt to move beyond the dichotomous representations of informal settlements, what has often been termed the slum-divide. Rather, this work contributes to the better understanding of disparities in informal settlements across social and spatial gradients. Further, this work has highlighted the ways in which current methods for looking at place-based health disparities are limited when attempting to use data from the Census and attempts to demonstrate how depictions of place can be unpacked to highlight intra-urban disparities. Additionally, no study has so far sought to look at the implications of spatial disparities in infrastructure provision outside of the slum-divide along racial divisions. Previous attempts have relied on the formal/informal designation to look at racial differences, or in constructing new cohesive units of but have not included a direct examination of the racial makeup. Therefore, the first of its kind to explicitly ask the question of how racial categories layer on to these differences of infrastructure provision, which are one of the main drivers for the designation of formal and informal settlements.

This work is further grounded in the understanding that positions of marginality can and do shift. I highlight these shifting conditions in Chapter 2. This shift is not happening through some natural progression, but rather residents are actively engaged in re-imagining what it means to be from the informal city through mapping, to make their communities better and healthier, to assert

their claims on the land as part of the city, to be viewed with respect, and be given the full rights of citizenship. Yet these moves are not taking place in a vacuum. The political, economic and social forces swirling around Rio de Janeiro have produced complex interactions that make doing this work challenging, which only highlights the importance of looking at these issues through an interdisciplinary and multi-faceted approach.

The names and boundaries that are used to describe and define these places are fraught with their own histories and politics. They are reflective of the larger social, economic and political struggles that are taking place, struggles that can produce improvements in local health, or that may conceal health inequalities if distinctions between places are too broadly defined.

CHAPTER TWO

Naming and Framing Informal Settlements in Rio de Janeiro

Abstract

The criteria used to demarcate informal settlements in Rio de Janeiro is reliant on metrics that are socially constructed and in large measure driven by specific policy agendas shaded by a history of marginalization and exclusion. This demarcation process can be useful to governments, NGOs and communities alike for data collection, as well as temporal and spatial evaluation of living conditions, community health, land tenure and municipal infrastructure to inform interventions that can improve health and well-being. Yet informal settlement designations can reinforce the marginalization and stigmatization of these communities and impose false notions of community homogeneity—which has implications for resource allocation and political power. This chapter examines processes taking place to demarcate formal and informal neighborhoods through top-down state demarcations on official municipal planning maps and through the national census, as well as from the bottom-up through on the ground cultural appropriation and reappropriation of urban spaces. Additionally, this paper aims to uncover how the political frame of *'favela'* erects barriers through divestment, segregation, and structural racism, while simultaneously creating opportunities through identity social movements, and targeted slum upgrading programs. This chapter contributes to the academic discussion of informal settlements by providing a context for the critique of the term *favela*, from the standpoint of their imprecision, as well as their use in perpetuating stereotypes and social marginalization.

Introduction

Like many megacities, Rio de Janeiro, Brazil is described as a city divided between the haves and the have-nots. This social and economic divide has been articulated in colloquial terms, such as *asfalto* (paved) to signify the "formal," or officially recognized parts of the city, and *favela* to describe the "informal," or areas considered to have unregulated construction, illegal occupation of land, and typically understood to lack urban infrastructure—such as water, sanitation, trash collection and electricity. However, the term *favela* has increasingly been viewed as perpetuating stereotypes of a homogeneously poor and violent place. Consequently, residents, grassroots community organizations, academics, and some government agencies have substituted the term *comunidade* (community) to describe these places; while others have reasserted their use of *favela* as a source of pride, for marketing purposes, or to perpetuate the pejorative connotations of the term. These seemingly contradictory moves to re-affirm or disengage from the *favela* reflect the shifting conditions of the places these words describe and the people who live there as some of these places are gentrified and others increasingly marginalized.

However, the divided city is more than just an abstract concept. Municipal and federal governments in Brazil have defined, delineated, and codified informal settlements through top-down processes articulated in planning maps, slum registries, and the national census. Though the municipal and federal governments differ in how each defines these areas and their spatial extents, it is the federal census that officially affirms the demographic and built environment features of the informal city. The 2010 census—lauded as the most comprehensive census conducted in Brazil and the first since 1953 to collect data from Rio's informal communities—confirmed disparities between the formal and informal city. However, results also revealed that the standard categorizations of the informal do not sufficiently delineate homogeneous communities with inadequate infrastructure and low socioeconomic status, as is often believed.

Recently, these classification efforts gained further prominence. In September 2000, Brazil signed on to the Millennium Development Goals. In doing so, it committed to improving the lives of slum dwellers by 2020. The federal government positioned the Census as the tool for tracking that progress ("Por que fazer o Censo de 2010?" 2010). Further, in the run up to the 2014 World Cup and the 2016 Olympics, Rio de Janeiro invested heavily in its "slum upgrading program" to support social programs that alleviate poverty and improve infrastructure in the informal settlements that house 22% of the city's 6.3 million inhabitants. Coupled with national poverty alleviation programs, and Brazil's expanded economy, public and private investments through this program have corresponded to improved living conditions for many residents of these informal settlements. On top of the improvements to the urban environment, Brazil has also witnessed a burgeoning black pride movement and affirmative action policies that have shifted the social status of Afro-Brazilians. However, the extent to which UN goals can be achieved rests on whether metrics for measuring these goals correspond to what is actually taking place on the ground. Mismatches between local and federal classifications raise questions on the extent to which the United Nations' slum designation matches with the lived reality on the ground and the category's ability to adequately track progress towards achieving those goals.

Census data has been useful in aiding the allocation of state resources in achieving poverty alleviation goals, but inaccuracies in these designations and comparability sub-nationally and

internationally raises the following questions: 1) Does the Brazilian government's classification of urban informal settlements (AGSN) adequately capture the extent of poor communities with inadequate infrastructure in Rio de Janeiro? 2) Do state categorizations reflect the local experience of informal settlements? If not, how does this impact resource allocation for physical and social infrastructure development? Lastly, 3) when these slum-upgrading programs have achieved their goals, can and should these communities be de-listed from the slum registries? To examine these questions, I applied a relational view of place, articulated by Cummins et al. (2007) as a framework for looking at territories of informality. This chapter examines where and when place categories overlap or mismatch. It takes a top-down view between local and national scales of governance, and a bottom-up view of residents, whether through organized social movements, through civil society actors, or in the everyday speech and practices of individual Brazilians. In doing so, it demonstrates how much as race is socially constructed with no grounding in biology, so too is place socially constructed, often with a tenuous connection to geographic boundaries that are overshadowed by the meaning that people and institutions ascribe to it. Therefore, whether an area is designated as formal or informal— *asfalto, favela, AGSN,* or *comunidade*— people shape the meanings of those terms.

Place and Health

Where you live has increasingly been understood as a determinant for how long and how well you will live. In recent years, scholars have articulated these associations under the framework of social determinants of health, arguing that a multitude of compositional factors—the conditions that make up these places—and contextual factors, such as the characteristics of the people who live there shape social and spatial disparities of health (Krieger 2001; Diez Roux and Mair 2010; Chen et al. 2006; Cummins et al. 2007; Macintyre, Ellaway, and Cummins 2002). The theories linking place and health highlight the intertwining roles of the physical environment (both the natural and the built environment); the social environment; the processes and policies that push and pull people into certain areas; and individual factors that mitigate or exacerbate these health producing conditions (Diez Roux and Mair 2010). In other words, health disparities are the product of where you live, who you are, and how those two conditions are treated by the societies in which they exist. Thus, the theory of social determinants of health draws attention to the role of the state, market forces, and the infrastructures that uphold and reproduce who lives where which subsequently determine how they can access the amenities available in those places.

Informal settlements embody the characteristics that produce socio-spatial health disparities. By definition, informal settlements refer to parts of the urban landscape that are regarded as lacking municipal infrastructure such as safe drinking water, sanitation, garbage collection, and electricity, as well as poor quality dwellings and *irregular* building patterns that can inhibit mobility and exacerbate the deprivation of critical infrastructure (UN-Habitat 2004). Informal settlements are associated with narrow streets, cramped living conditions, and presence of trash and stagnant water, conditions which provide habitat for infectious disease vectors (L. W. Riley et al. 2007; Unger and Riley 2007; Vlahov et al. 2011). Further, the people who live in informal settlements are often described as living in poverty, with lower levels of formal education, as well as being faced with social marginalization, limiting residents' abilities to address their health needs.

In examining the links between place and health, we must answer the question, what is a place? For Gieryn, "…place is space filled up by people, practices, objects, and representation" (Gieryn 2000). In other words, place is a space that has been given meaning. Yet this eloquently stated concept conceals the complex dynamics that manifest in contestations over what group of people gets to decide the meaning that is attached to which parts of spaces. Expanding on this conception of place, Cummins et al. (2007) argued for taking a relational view of place wherein places are considered dynamic and fluid—over time and across space—co-produced by social processes as much by the environment (both built and natural). A relational view of place sees the provision of resources, infrastructure and demarcations of political boundaries as arising from contestations, which ultimately privilege some at the expense of others. As a result, social distance alters the impact of Euclidean distances—such that marginalized residents proximate to urban amenities face additional barriers, or are effectively barred from accessing those services due to social stigmas that exclude them.

Stigmatizing people and place

Goffman (1963) describes 'spoiled identities', using the term stigma to denote the attributes that marked certain members of society as different resulting in their social exclusion and marginalization. Though Goffman focused his work on three domains—abominations on the body; blemishes of individual character; and tribal stigmas centered along racial, national, and religious affiliations (Goffman 1963, 5)—Wacquant (Wacquant 2007, 80) believed tribal stigmas applied to territorial stigmas. In his comparative ethnographic work, Wacquant described the overlapping territorial stigmas of US urban ghettos (namely in Chicago) and the banlieue of Paris, though he contrasted the multi-ethnic make-up of the banlieue to the homogenously black-space of the US ghetto yielding different weights of stigma attached to their residents. Whereas the multi-racial makeup of banlieue residents afforded them the option of concealing their territorial stigma when outside of their neighborhood, the stigma of the black ghetto carried on to blacks in Chicago beyond the borders of the ghetto and even to those that had never resided there.

Researchers focused on Brazil have documented territorial stigmas applied to areas regarded as a *favela*, whether or not they are officially classified as such. These territorial stigmas draw from the realities of their higher concentration of poverty, inadequate infrastructure, disease, crime and violence and layer on histories of racism and discrimination to paint these places and the people who live there as homogenously destitute, uneducated, unsophisticated, untrustworthy, and dangerous. These stigmas result in employment discrimination, such as residents who are often unable to obtain official government identification for lack of an address (which also leaves them unable to receive mail), and renders them ineligible for government jobs (Oliveira 2003). Similarly, *favela* residents have limited access to quality services including education and healthcare (J. Perlman 2010). The geography of many of these communities built on steep slopes, marshlands, and other precarious spaces, coupled with the lack of planning and public infrastructure create real world challenges of navigating informal settlements both in the *irregular* street patterns and their often unmarked streets.

In Brazil, the stigma of being from the *favela* builds on the long history of racial exclusion in Brazil, where the processes of racism and colorism have resulted in many more (though not exclusively) black Brazilians concentrating in these places of informality. The first use of the term *favela* dates back to the end of the 19th century, and is ascribed to Morro da Favela (now

known as Morro da Providência) when soldiers conscripted to put down a separatist movement in Canudos in the Northeast province of Bahia were promised land in exchange for their loyalty to the Republic. The government's failure to deliver on its promises spurred the veterans to claim the land on the hills around Rio de Janeiro, where they built their homes clinging to the rocky hills much like the *favela* plant they had clung to the hills of Canudos (Levine 1992; Campos 2005; Segre 2010; J. Perlman 2010). However, some of the oldest informal settlements in Brazil, known as Quilombos, were communities of freed or escaped Afro-Brazilian slaves; these settlements were common throughout Brazil as well as in and around Rio de Janeiro since at least the seventeenth century (Torres 1990; Levine 1992; Campos 2005). Thus, the *favela* simultaneously became associated with a black space intentionally constructed away from the state as well as neglected by it.

The connection of marginalized people to marginalized places comes into focus with the term *favelado* (translated as "slum dweller," though originally meaning "*favela* dweller"). The term intertwines the pejorative connotations of poverty and criminality that are ascribed to the *favela* with the identity of those who reside, or are perceived to live, in the *favela* (Valladares 2008, 21; Neto and de Mello Pimentel Lourenço 2010, 137). Racial stigma is intertwined with the *favela*, as Afro-Brazilians are often assumed to be from the *favela* until they prove otherwise (Telles 2004; J. Perlman 2010). The 2010 Census confirmed that Black and mixed Brazilians were over-represented in areas identified as informal settlements, or aglomerados subnormais (AGSN), (16.4% and 49.4% of the total population respectively) compared to areas not identified as AGSN (9.5% and 31.25% respectively) (Snyder et al. 2013).

It is perhaps the actual and perceived violence in the *favela*, which has been the dominant stigma over the past three decades. The social and physical separation of the *favela* contributed to its expansion as the base of operations for the growing number of drug gangs, which proliferated in the early 1980s following the end of the dictatorship and its heavy-handed approach to crime. Drug gangs took advantage of the state's absence from the *favela* and their geographic features of steep hillsides, and limited entry points, making them easier to defend against police action (Moraes, Mariano, and Franco 2015). Additionally, the proximity of many *favelas* to major populations of wealthy Brazilians provided them with strategic locations for conducting trade in illicit drugs. Throughout the 1980s and into the 1990s, drug gangs were emboldened in taking new territory, spilling over with gunfights on the beaches and other tourist areas. Resulting levels of violence were said to have reached 80 deaths per 100,000 (Cano, Borges, and Ribeiro 2012, 4).

Though violence in Rio de Janeiro has been perceived to be the domain of the *favela*, a spatial analysis revealed similar mortality rates by homicide inside and outside of *favela*s between 2006 and 2009 (Barcellos and Zaluar 2014). Barcellos and Zaluar's analysis of homicide victims' addresses taken from the municipal health departments' Mortality Information System (*Sistema de Informações sobre Mortalidade* - SIM) revealed that areas just outside of *favela*s, in particular between those controlled by rival drug gangs and paramilitary groups, had the highest homicide rates in the city. However, the authors note their finding could result from the difficulty in locating addresses in *favela*s due the practice of residents giving nearby addresses for resident's association, or another reference point. Alternatively, though not mutually exclusive, the authors' note their findings could indicate that competing groups are battling for territorial control in these liminal spaces.

Residents of informal settlements have further concerns regarding violence, in the form of extra-judicial killings meted out by the country's militarized police force (J. Perlman 2010, 167; Vargas and Amparo Alves 2010, 615). Vargas and Amparao Alves (2010) described how intersections of class, race, gender, and place make low-income, young, black Brazilians residing in *favela*s the most vulnerable population to violence. In State of Rio de Janeiro, Vargas and Alves noted that in the first eight months of 2003 police killed 900 people, of whom 75 percent were killed in predominantly black communities of Rio's *favela*s (Vargas and Amparo Alves 2010, 615) (Vargas and Amparo Alves 2010, 615). While their work focused on extra-judicial killings in São Paulo, they noted this to be a nationwide problem, with young black Brazilians being the most vulnerable.

Defining informality from above and below

The task of demarcating urban informal settlements has been the purview of the Brazilian Institute of Geography and Statistics (Instituto Brasileira de Geografia e Estatísticas—IBGE) at the federal level and the Pereira Passos Municipal Institute of Urbanism (Instituto Municipal de Urbanismo Pereira Passos—IPP) at the municipal level for Rio de Janeiro. Each agency uses their own terms to define informal settlements, with mostly overlapping definitions. The IBGE utilizes the term aglomerados subnormais (AGSN), a term which first appeared in the 1991 population census, but emerged in the previous decade through meetings with the IBGE, community representatives, academics, and NGOs (Instituto Brasileiro de Geografia e Estatística 2011, 26). The IPP utilizes the term *favela*, often translated as "slum," despite criticisms that the translation is inaccurate (Valladares 2008).

The IBGE, and the IPP focused on three aspects of urban life to construct their definition for informal settlements: 1) land tenure, the officially recognized ownership or occupation of the land; 2) neighborhood characteristics, features such as the built environment at the neighborhood level as well as at the individual household level; and 3) population characteristics, which describe the residents of these areas (**Table 2-1**). In each of the definitions, areas demarcated as AGSN, or *favela*, are described as places where formal title to the land either is in question or only recently legitimized. In the case of the *favela* designation, the areas are described as unlicensed or as non-compliant with legal standards, closely matching the United Nation Human Settlement Programme's (UN-Habitat) definition of slums (UN-Habitat 2004, 8). Regarding the neighborhood characteristics, the AGSN designation applies to groupings of at least 51 housing units, whereas the IPP and UN-Habitat make no claims as to the minimum number of households. Both the *favela* and AGSN designations identify areas with narrow and uneven streets as well as lacking public services. The IPP describes residents as a low-income population, which is less pejorative than the characterization by UN-Habitat, which defines the residents of slums as "squatters"; the IBGE makes no official distinction on the population's demographic characteristics in their definition.

Table 2-1: Terms describing informal settlements and their definitions pertaining to land tenure, and neighborhood, housing and population characteristics

Term (Defined by)	Land Tenure	Area Characteristics	Dwelling Characteristics	Demographic Characteristics
Informal Settlement (OECD)	Occupants have no legal claims, or illegally occupied land	Unplanned settlements and areas	Out of compliance with building regulations	—
Slum (UN-HABITAT)	Insecure residential status	Inadequate access to safe water, sanitation, and other infrastructure	Poor housing structural quality; overcrowded	Residents described as "squatters"
Aglomerado Subnormais (IBGE)	Illegal occupation at present or in the last ten years	Minimum of 51 housing units; narrow and uneven roads; scarcity of public services	Parcels of inconsistent shape and size	—
Favela (IPP)	Unlicensed construction	Precarious urban infrastructure; narrow and irregular roads	Residential lots of irregular shape and size	Occupied by low-income population

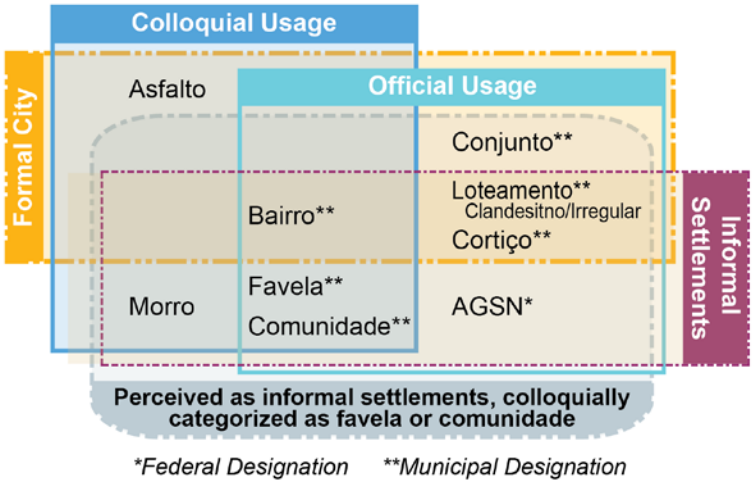
(Source: "Armazém de Dados - Informações Sobre a Cidade Do Rio de Janeiro" 2012; Instituto Brasileiro de Geografia e Estatística 2010; UN-Habitat 2004; Directorate, OECD Statistics 2001)

The municipal government's ongoing program for registering *favelas* takes a literal top-down view. The Gerência de Estudos *habitacionais* (Management of Housing Studies), a team within the IPP, monitors the annual spatial changes of *favela*s. They rely heavily on visual and spatial analysis of orthophotos—aerial photographic maps taken at uniform scale—from around the municipality to construct preliminary boundaries for *favela*s. The agency updates the low income housing registry—Sistema de Assentamentos de Baixa Renda (SABREN)—annually, deciding whether to register changes to or designate new areas as a *favela*, based on subsequent field studies that determine if the criteria for slum designation have been met (Instituto Municipal de Urbanismo Pereira Passos - IPP 2012). Some have criticized a lack of official process for de-listing an area from the *favela* designation other than through physically removing the people and structures they built from the landscape (Valladares 2008, 22). However, while the IPP has not de-listed communities that no longer meet the criteria for *favela*, they have established new designation of *comunidade urbanizada* or *urbanized community*, to indicate when a *favela* has been urbanized and argues that keeping the community listed in their database allows for future comparison (Instituto Municipal de Urbanismo Pereira Passos - IPP 2012).

In addition to the multiple terms used officially to describe informal settlements, everyday Brazilians use colloquial terms to describe these same places, though they do so with less precision than either the federal or the municipal governments. **Figure 2-1** organizes into a Venn diagram the most common words used to represent urban areas as formal and informal and whether officially used by the federal or the local government, or colloquially by Brazilians. I

collected the usage of these terms as described in the literature, government documents, and through conversations with NGO staff and favela residents while in Brazil[8]. This diagram highlights the overlapping application of the terms used to describe the informal city. Though only one term for informal settlement is used at the federal level, AGSN, the municipal government of Rio de Janeiro describes urban spaces with terms that can have overlapping conditions associated with informal settlements including *loteamento (clandestino* or *irregular*), *cortiço,* and *conjunto*. I explain the meaning of each of the terms below.

Figure 2-1: Terms used to differentiate between formal and informal settlements by official and colloquial usage noting how these terms often have overlapping meanings.



Loteamentos clandestinos and *loteamentos irregulares* ("clandestine" or "irregular" allotment) are subdivisions that may have incomplete registration with the municipality due to the inadequate provisioning of municipal infrastructure or remain officially clandestine when no record of the subdivisions exists. In some instances, residents paid for their land through fraudulent transactions when the supposed owners did not have legal claim to the land sold (Lara 2010). In cases where the original landowner of the subsequently developed *loteamento* cannot be found, applying the *favela* designation can assist in regularizing the allotment. This process takes advantage of the constitutional provision that allows occupation of under-utilized land (Instituto Municipal de Urbanismo Pereira Passos - IPP 2012). It is interesting that the government would utilize this legal precedent to aid in the regularizing of these parcels. The municipal government registers *loteamentos* in the SABREN database, though their designations are not mutually exclusive to *favela* designations. Additionally, there is no comparable federal designation for these areas.

Conjuntos habitacionais—public housing, where residents legally reside in dwellings that are officially part of the formal city though often colloquially referred to as *favelas* (Valladares 2008,

[8] These informal conversations took place primarily between March and May of 2015 with staff from the Center for Health Promotions in Rio de Janeiro, and residents of the community of Morro dos Prazeres while I was in Brazil conducing fieldwork that informed the contents of the study detailed in Chapter 4.

16; J. Perlman 2010, 34). The quality of these households can vary, despite being built by the government. Some have either not been provided with full connections to municipal infrastructure, or fallen into disrepair in effect cutting access to these services (J. Perlman 2010). Even well provisioned *conjuntos* are stigmatized because of the stigmas attached to their residents who are primarily poor and black. One of the most famous *conjunto*s was featured in a 2002 film *Cidade de Deus* or *City of God* (Diken 2005). Many viewers (and media coverage as well) interpreted this film as emblematic of the violent and drug-filled life in the *favela*. However, Cidade de Deus was an example of early efforts to relocate *favela* residents into government-built housing. Nonetheless, the stigmas attached to area residents area coupled with the state's abandonment cemented the image of Cidade de Deus with *favela*.

Finally, a term that has fallen out of use, *cortiço* (usually translated to mean tenement), ranges from large homes divided to accommodate multiple families, to modern skyscrapers that may or may not have municipal services. Unlike most other terms, *cortiço* often refers to a single building. The famed *cortiço* of São Vito in São Paulo has also been described as a "vertical *favela*". The 27-story building gradually fell into disrepair, while its low-income residents subdivided their units, and resorted to procuring utilities illegally. The building was finally demolished in 2008 (Congreso Internacional Arte y Entorno 2011).

Colloquially, Brazilians refer to the formal city as *asfalto*; officially, government records and laws lack any such term. Rather the formal is an unspoken default category. The term *bairro (neighborhood) approximates an official designation for the formal city. Bairros* are administrative neighborhoods within Brazilian municipalities. The urban upgrading program Favela-Bairro (discussed in a later section) provides a rare instance of the municipal government specifying the formal as a category, as its programmatic name suggests a transformation of the favela into a neighborhood. Though all parts of the city pertain to a *bairro*, the above-mentioned program name reflects the colloquial usage of bairro as the formal city. However, *favela* residents are often more likely to divulge the name of their *bairro* than of their *favela* to avoid stigmas attached to their home[9].

*Comunidade*s or *comunidade*s *carentes*, as noted earlier, have been the preferred terminologies of many NGOs, academics, and others seeking to serve the needs of Rio's informal settlements (Freire 2008, 109). In addition to the usage of *comunidade urbanizada*, some groups within the IPP have started to use *comunidade* in lieu of *favela*, more generally. Rio Social, an arm of the IPP responsible for implementing the social programs grouped under the term Morar Carioca, uses the term *comunidade*s in defining the catchment area of those communities receiving the Police Pacification Units (UPP, described below) intervention. The UPP uses this term without explicitly defining it, while also calling them *comunidade*s *carentes* or disadvantaged communities. However, when looking at maps produced for Rio Social, the boundaries demarcating the program's area of operation, match up with the boundaries for areas the IPP designated as *favela*s.

[9] A similar process has been described by Wacquant (1993:5) in French Banlieue residents who often identified their home neighborhood generically as the northern suburbs rather than face the stigma of revealing the location of their homes.

The colloquial distinctions between *favela*, *loteamento* and *conjunto*, and increasingly *comunidade*, are not clear and are often grouped under the name *favela* by non-*favela* residents, with its pejorative connotation and implications for residents (J. Perlman 2010, 153). Further, ethnographic research conducted by Freire (2008) described how *favela* residents navigate the terms *favela*, *bairro*, and *comunidade*. Each term highlighted specific aspects of the community in which an individual resided, noting that *favela* was most often used when highlighting the community's negative aspects or referring to people of lower socio-economic status, while *comunidade* and *bairro* were used when attempting to emphasize the positive attributes (Freire 2008, 109).

Lastly, *morro* (translated as "hill") is used colloquially to describe informal settlements (Unger and Riley 2007, 2), though often ascribed to those built on hillsides. In my conversations with residents of the *favela* and AGSN of Morro dos Prazeres, many residents distinguished their community apart from a *favela*, arguing that *favela* applied informal settlements built on the flatlands. The term *morro* is further reflected in many of the community names for informal settlements, such as Morro da Providência (the first *favela)* and Morro dos Prazeres (the site of my research discussed in Chapter 4). However, I have not systematically verified if this moniker is applied only to informal settlements.

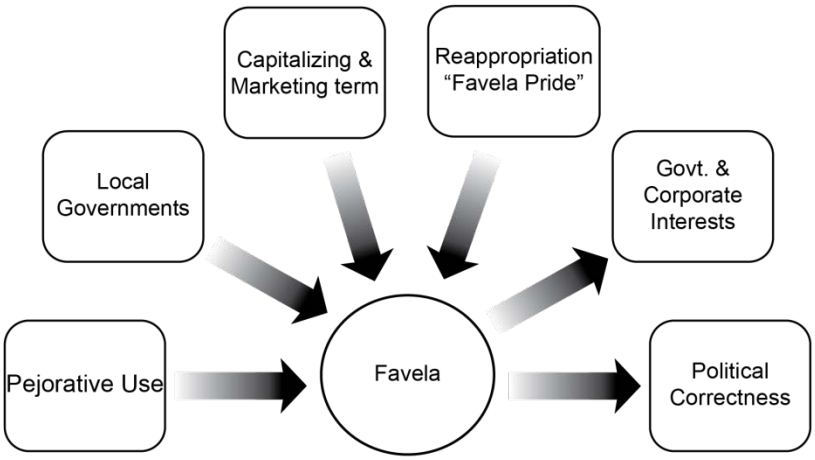
Creating *comunidade*

The previous section talked about how these terms are used officially. This section talks about attempts to re-frame these terms. Residents, civil society groups, and researchers have attempted to (re)frame the negative image of the *favela*. These movements can be placed on a spectrum from embracing the term *favela* to distancing from it. I put on the far left in **Figure 2-2** the continued use of the term *favela* in a pejorative sense. This occurs in everyday speech, including media sensationalization of violence, crime and health threats. Moves to embrace the term draw from that identity a sense of pride, as seen in social movements promoted by community organizations, and individual residents who use the *favela* moniker to describe their communities with pride. Additionally, *favela* is used pragmatically to describe conditions of informality–with its pejorative weight applied intentionally or not–and often justified as an attempt to draw attention to the negative attributes the term implies to make them visible with the hope of improvement.

Civil society groups and academics have led grassroots efforts in Brazil to reject the term *favela* by calling for and using more neutral or positive terms such as *morro*, *comunidade* or *bairro* (Oliveira 2003; Castro 2011). CEDAPS has been actively engaged in using and promoting the term *comunidade* to describe the areas where they work—informal settlements and low-income communities not classified as informal. Two of their recent projects, AIDS e *Comunidade*s (AIDS and Communities) and Mapeamento Digital de Risco Socioambientais Guiado pela Juventude (Digital mapping and social and environmental risks directed by youth) have worked to create a sense of community and emphasized the perspective of the residents who live in those communities. CEDAPS's mapping work involved organizing local youth and provided them with smartphones with the capability of linking photographs, notes, and a precisely geolocated point on the earth of the community asset or challenge being identified. By documenting their communities' challenges, CEDAPS was able to produce maps that would be publicly available

on the internet (Mapeamento Participativo do Território / *Mapa Falante*) (Discussed in Chapter 3).

Figure 2-2: Movements to use or not use the term favela



Arrows indicate the direction of use so that arrows directed toward the center indicate intentional use of the term while arrows away indicate intentional avoidance of the term.

Informal not inferior

Alan Gilbert (2007) challenged the use of the term slum in the UN Millennium Development Goals for failing to accurately describe the places of urban poverty. Its definition applies an absolute measure of deprivation such as poor housing quality with little regard to relative measures. Around the world standards used to classify slums, differ, as some forms of housing deemed acceptable in one country are unacceptable in another. Within localities the criteria for slum designation are rarely universally met, as housing conditions vary across cities and within neighborhoods. Additionally, as housing quality and construction standards improve over time, previously acceptable housing that has not kept pace with those changes is deemed to be a slum through a relative comparison (2007, 699). Further, if we wish to address the aforementioned conditions, why create ambiguity with a spatial demarcation that creates a dichotomous view of urban spaces? As a result, Gilbert goes on to argue, the word's pejorative connotations are too often extended to residents of these areas. David Simon (2011) echoes Gilbert's critiques by elaborating how these "emotive or pejorative" designations work to propel social exclusion of their inhabitants (Simon 2011). Marking these places through official designations helps to reify the differences setting these places apart from the rest of the city, as well as the stigmas attached to the people that live there (Gilbert 2007). Valladares (2008) has argued that these same criticisms apply to the term *favela*.

The notion that informal settlements in Rio de Janeiro are in any way homogeneous, composed entirely of marginalized people who are poor, black and disconnected from the formal city, has been called into question (J. E. Perlman 2006; Preteceille, Valladares, and Henriques 2000; J. Perlman 2010; S. Santos, Chor, and Werneck 2010). On average, residents of the informal city

were poorer, less educated, and had access to lower quality municipal infrastructure than their formal city counterparts. However, the formal city demonstrated more heterogeneity along these measures, than the informal city with conditions that match the operational definition of the informal city (Snyder et al. 2013). Similarly, though the informal city had a greater burden of tuberculosis than the formal (Marlow 2014), low-income areas of the formal city were also found to have high incidences of tuberculosis, particularly in areas adjacent to federally demarcated informal settlements. Thus, poverty and poor health are not limited to the informal parts of the city.

Consequences of inconsistent demarcations

The IBGE acknowledged that its aglomerado subnormais (AGSN) designation for informal settlements fails to identify informality in rural areas and smaller and less wealthy cities. However, the IBGE does not state its limitations in capturing this divide in places like Rio de Janeiro, aside from applying their definition to clusters of households with more than 50 households (Instituto Brasileiro de Geografia e Estatística 2011). Further, the IGBE aligns its definition for AGSN with the Millennium Development Goal's slum designation; and sub-nationally with municipalities such as Rio de Janeiro and their *favela* designation (Instituto Brasileiro de Geografia e Estatística 2011; Instituto Municipal de Urbanismo Pereira Passos - IPP 2012). Even so, differences persist in how these various terms are deployed to characterize places lacking in essential municipal services such as water, sanitation, electricity, and regular garbage collection.

Comparisons between the overlap of the official boundaries of AGSN and *favela* revealed inconsistencies (Preteceille, Valladares, and Henriques 2000; O'Hare and Barke 2002). Analysis of the official boundaries of AGSNs from the 2000 Census and the limits of *favela* provided by the IPP revealed that almost 98% of *favela* households were classified as AGSN by the IBGE, while 90% of households that were located in AGSN's were classified as *favela*s by the IPP (Preteceille 2000). However, a result of the collaboration between the IPP and IBGE to classify informal settlements in Rio de Janeiro has reduced this discrepancy to just 3% (Instituto Municipal de Urbanismo Pereira Passos - IPP 2012). Though they do not elaborate, the authors suggest the AGSN requirement for a minimum of 51 households as one reason for the discrepancy. That these differences have been minimized shows the utility of the IBGE's 2010 Census for policy makers, allowing for more robust analyses in the fields of health, urban development, and others.

Repercussions of this mismatch can be seen in the challenges noted by community members that work with the Centro de Promoção da Saúde (Center for Health Promotion- CEDAPS) who, while conducting their own community census, determined that the 2010 Census undercounted the population of the neighborhood of Morro dos Prazeres by almost one-half. These concerns reflect the serious ramifications for residents of areas that are undercounted, as census population counts are used for determining the number of representatives for municipal legislatures as well as for determining the distribution of federal funds to the states ("Por que fazer o Censo de 2010?" 2010, 2).

Communities officially demarcated as AGSN or *favela* are defined as existing outside of the formal city where residents lack legal claim to their land. Yet the 1934 Brazilian Constitution

codified the colonial practice of granting de facto property rights to residents able to prove their continuous occupation of previously unoccupied lands—thereby complicating the use of land tenure in distinguishing between formal and informal (Fischer 2008, 222–27). The question of land tenure has been hotly debated between those arguing that formal land tenure rights are a means to upgrade informal neighborhoods (De Soto 2000), and those who challenge the assumptions that conferring land tenure rights will alleviate the adverse conditions of poverty, poor infrastructure, and marginalization (Roy 2005). Further, even without legal land tenure, robust real estate markets for land and homes already exist in the informal settlements of Rio de Janeiro (J. Perlman 2010, 297).

(Re)framing *favela*

Researchers and community advocates have noted that the *favela*s are not homogeneous spaces, and assert that government agencies started to use words like *comunidade* or *comunidade cariente* out of what could be characterized as political correctness. This contrasts with commercial interests that have held on to the favela moniker while marketing these spaces to tourists and potential new homebuyers (a topic I expand upon in the subsequent section).

Reframing what it means to be an informal settlement reflects the shifting conditions and the subsequent re-valuing of these places and in particular the *favela.* Janice Perlman (2006; 2010) argued that the marginalization of residents of Rio's *favelas* has only deepened in the intervening years between her first study of 600 favela residents in 1968 and the latest round of studies in 2008. She attributed the lack of social mobility to the drug-related violence and the limited effectiveness of state interventions to alleviate poverty and provide adequate housing between the mid-1960s and early 2000s. Marked by the dictatorship, this period saw greater repression and outright efforts to remove *favelas* from the urban landscape. However, Pearlman contended the years following the end of the dictatorship were punctuated with the greatest level of instability. This period saw an increase in the number of favelas due in part to the government's failure to provide adequate housing for new residents of Rio de Janeiro. In revisiting *favela* residents some thirty years later, Perlman examined the social mobility of residents. She painted a bleak picture of limited advancement while at the same time noting the residents' optimism that their conditions would improve. This optimism appeared to be rooted in modest gains in the martial condition of many respondent's (2010, 335). However, Perlman also saw this optimism linked to an internalization of their successes or failures in life, which acted to deflect a critical examination of the structures of racism and prejudice, which have limited many *favela* dwellers' social and financial advancement that if dwelt on could foster a sense of hopelessness.

Recent national surveys of residents of *favelas* have reflected an even more positive outlook. Meirelles and Athayde (2014) positioned the *favela* as a place of opportunity, where nationally the 11.7 million people who reside in *favela*s, if consolidated into an independent nation would have a gross domestic product on par with Bolivia and Paraguay (approximately 30 billion USD in 2013). Through their survey of 2,000 residents from sixty-three favelas throughout Brazil, they paint a picture of rising standards of living, and hope for continued growth. In the short span of eight years that separate Perlman's and Meirelles and Athayde's studies, Brazil's economy was briefly ranked sixth in the world by GDP edging out the United Kingdom in 2011. Brazil's newfound wealth was partly the result of higher commodities prices, which fueled investments in

social spending such as the Bolsa Familia[10] program had in part contributed to pulling households out of poverty and expanding the middle class. Taking advantage of Brazil's rising stature, Rio de Janeiro's bid to host the world cup in 2014 and the Olympics in 2016 was successful. It is perhaps in this time period that Meirelles and Athayde's work reflects the rising tide of the Brazilian economy reaching the shores of the *favela.* However, Brazil's recent economic downturn and political turmoil threaten the extent to which these poverty alleviation and urban upgrading programs will continue. Falling commodities prices weakened Brazil's commodities export oriented economy severely reducing the government's ability to fund the commitments it made toward social programs. Further, the recent ouster of the nation's first female president, and rising signals a shift in national commitments to the poverty alleviation platform that had been central to her Worker's Party platform.

Pacification and investment

Federal and local governments have intervened in Rio de Janeiro's informal settlements for more than a century, vacillating between removal, containment, and integration of residents with the larger city (Valladares 2008; E. Riley, Fiori, and Ramirez 2001; Neto and de Mello Pimentel Lourenço 2010; Castro 2011). Frequently public health concerns have been used to justify these interventions, whether merited or not (Corburn 2013). Prior to Rio hosting the World Cup and the Olympics, these efforts were accelerated.

Direct investments in Rio de Janeiro's officially recognized *favela*s and *loteamentos* through the *Favela-Bairro* ("*Favela* to Neighborhood") program have had an impact directly on these places. An outgrowth of the city's 1992 master urbanization plan, Plano Diretor, the *Favela-Bairro* Program aimed to improve living conditions of the urban poor through a broad mix of social infrastructure, land tenure, and social development components. These measures included: risk reduction of geological and environmental disasters, such as landslides and floods; increasing transit access; reduction of vector-borne disease; and increases installation of and improvements to municipal infrastructure, such as water connectivity, gutters, sewage and outdoor lighting, and road repairs (F. Soares and Soares 2005, 13). However, the *Favela-Bairro* program has been criticized for not prioritizing expedience over necessity, by focusing their efforts on areas where programs could be more easily established (E. Riley, Fiori, and Ramirez 2001, 526).

As noted above, Rio's successful bids to host the World Cup and the Olympics prompted the city to invest further in its informal settlements by building on the success of the Favela-Bairro Program. However, in order to make this next phase of urban investments successful, the city would need to assert state control over these areas. Particularly, violence had been seen as a major impediment to resident's ability to access public services (F. Soares and Soares 2005, 36). As such, to achieve these aims, a Police Pacification Units or UPP's were established with the stated mission to provide security, focusing on removing gangs that have been the de facto security force in these communities. Areas prioritized for UPP expansion tended to be close to

[10] Bolsa Familia ("Family Grant"), is a conditional cash transfer program that provides a monthly payment to female heads of household for sending their children to school, got them immunized, and other such conditions. The program has benefitted nearly 11 million families who earn less than R$120($US68 in 2010) per capita monthly income with children up to seventeen years old. Additional assistance is provided childless families earning less than R$60 (US$34) per capita without any conditions (F. V. Soares, Ribas, and Osório 2010). Though not specifically targeted at residents of informal settlements, many of them have benefited from the program.

venues for the World Cup and Olympics, areas heavily visited by tourists, such as the famous beaches in the South Zone, downtown Rio de Janeiro, and the heavily invested port area, to name just a few (Steinbrink 2014, 136).

The UPPs were deployed in 12 *favela*s and expanded to 40 by the end of 2014. Each deployment started with an initial, often bloody confrontation with drug gangs, whereupon the UPP regained control of a favela, and installed a permanent community based police force. The communities selected to receive UPP forces had the following characteristics: 1) poor communities, 2) few institutions or high informality, and 3) the presence of armed criminal groups (Cano, Borges, and Ribeiro 2012). It has been argued that the selection for installation of UPPs has prioritized communities close to venues for the World Cup and Olympics, whereas some of the most violent areas exist just outside the city limits in Baixada Fluminense, which has no UPP (Cano, Borges, and Ribeiro 2012). However, the impacts of the UPP cannot be understated. An initial assessment in 2012 revealed of the first 12 communities to receive UPP forces saw a 75% and 50% percent average reduction in homicides and robberies (respectively) after just the first year of operation. Criticisms remain, suggesting that the criminal elements have only relocated, pushed out of the communities with UPP, and leading to increased crime and violence on the outskirts of the city.

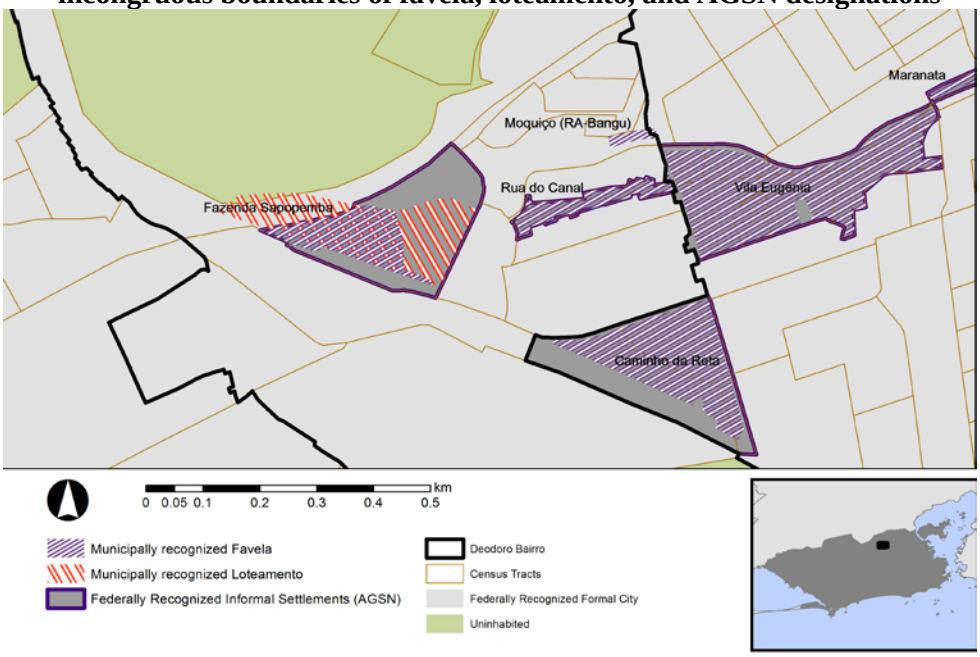
Marketing the favela

With the city providing municipal services and increased security to communities under UPP control, spaces previously considered too dangerous and unseemly for respectable Brazilians were no longer off-limits. While *baile funk* music parties had long drawn the more adventurous residents of the *asfalto* to *favelas*, the UPP's visible security enticed more visitors to communities with the UPP, stimulating the demand for new restaurants, shops and hotels, along with rising property values. Thus many residents and outside investors have capitalized on the cultural cachet of the *favela* and it's sense of controlled danger, to bring cultural tourists, mostly from outside of Brazil, though increasingly from within, to interact with these spaces (Zeiderman 2006, 17). The '*favela* experience' has been marketed via tours and cultural products like music, dance or food that originate in the *favela* (Williams 2008; Castro 2011). Taking advantage of the reduced security risks for outsiders the *favela* has been marketed as a hip and affordable place to live, lending credence to rumors that David Beckham, famed footballer (soccer for the Americans) purchased a one-million Real ($333,000 USD) home in Morro do Vidigal (*Jornal Extra - Extra Online* 2014). The veracity of this rumor has been denied and likely originated with the motive to inflate real estate prices and rent, but these denials have not stopped the origin of additional rumors claiming that Madonna has also bought into the neighborhood (Roper 2015).

While some residents have benefitted from these changes, through either increased business activity, or having sold their homes to outsiders for a healthy profit, many have been unable to afford new homes anywhere but the periphery of the city. Some residents have been forced out by speculative investors through a process known as *remoção branca* or white removals— a process akin to gentrification, in that residents are pushed out by market forces, but also implies a break from familiar forms of state-backed displacement through *favela* removals (Ost and Fleury 2013). As such, many *favela* residents pushed out when they are unable to afford rising rents are or when their landlord sells their property to wealthy Brazilians or foreigners who seek

to take advantage of the new perceived safety of these communities, especially those within proximity to the desirable communities of Rio de Janeiro's Southern and Central regions.

Figure 2-3: Neighborhood of Deodoro, highlighting the overlapping and incongruous boundaries of favela, loteamento, and AGSN designations



Erasing the favela *from the map*

The Prefecture of Rio de Janeiro continues to use the term *favela* in its official government statistics, providing open-access statistical data, digital maps, and files that demarcate the boundaries of these communities ("Armazém de Dados - Informações Sobre a Cidade Do Rio de Janeiro" 2012). Yet official promotional materials for the 2014 World Cup left out the term *favela* (Steinbrink 2014, 135). Steinbrink suggested that this move was a deliberate attempt to erase *favelas,* although he notes that in its place was the politically correct term of *comunidade*s. Promotional materials highlighting the city's preparedness to host the 2016 Olympics, available on the IPP's official website, take special care not to use terms like *favela*, or slum, in their Portuguese and English editions. These communities are mostly absent from discussion except for two references in Portuguese and one in the English version of the Olympics prep documents. While referencing a sanitation project in the city's west zone, the Portuguese version describes the project area of Complexo Esportivo de Deodoro as "uma das regiões mais carentes da cidade," which translates to "one of the most disadvantaged areas of the city". This additional description was missing in the English version ("Rio 2016 Olympics and Legacy: Quick Guide to Public Policies" n.d.). The second mention describes "áreas carentes do *bairro,*" which is translated as "deprived parts of the neighborhood" in the English version, in reference to increased incentives for youth to become involved with sports in the region surrounding this sports complex ("Rio 2016 Olympics and Legacy: Quick Guide to Public Policies" n.d., 44). It should be noted that the *bairro* of Deodoro has four IPP recognized *favela*s, one *loteamento,* and two AGSN communities—all overlap with each other (**Figure 2-3**).

Many favela residents have welcomed moves by Google and Microsoft to place their communities and businesses on public maps in the hopes of generating new business ("Google, Microsoft Expose Brazil's Favelas - WSJ" 2015), though some are reluctant to embrace this formal recognition. Google's prominent role in the mapping of *favela*s has found itself encouraged to simultaneously "better" classify and display these communities and also conceal them (Novaes 2014, 201). As the city prepared to host the 2014 World Cup and the 2016 Olympics, tourist maps were drawn that conspicuously left off *favela*s by either removing their names or representation, while city leaders have also pressured Google to remove the term *favela* from Google Maps (Bowater 2013), which has assented by inserting a green park-like shading in some areas where these communities exist. This is a dramatic turn for Google, as they had invested heavily in mapping these communities' *irregular* streets and continue to update their street view functions, which makes these communities more visible to outsiders, with the stated goal of better integrating these communities and the hope of monetizing these newly mapped places through potential ad revenues (Travelmail Reporter 2013).

Conclusion

The state, *favela* residents, and residents of the *asfalto* recognize the *favela* as a place-based social formation, though each brings their own definition to delineate its spatial and social boundaries. This chapter asked if the official classification of informal settlements captures the extent of poor communities with inadequate infrastructure. In examining the evolving social positions of residents and the material structures within the *favela*, the evidence I have presented in this chapter suggests that the official designation misses many areas that are similarly challenged. Scholars challenged the notion of the *favela* as a homogenous space of poverty and material deficiency. Residents have organized and gained tenancy rights, pushing back against government efforts to remove them from their homes and their homes from the landscape. While outsiders may continue to see the *favela* as a dangerous space to be avoided, in fact the boundaries of *favelas* have historically been porous in terms of socioeconomic, cultural, and political interactions among residents and non-residents, including so-called outsiders who take up temporary or permanent residence. Shifting engagement with the term *favela* reflects the shifting value the state, civil society, and everyday Brazilians have historically attached to the informal city—shifting values that also correspond to shifts in attempts to open, fund, invest in, and ignore these areas.

The processes that have been used to demarcate the city of Rio de Janeiro as formal and informal have enduring consequences for those residing in the informal parts of the city by emphasizing the stigmas that subtly reinforce the idea that the formal city exists, and the informal city is a problem that needs addressing. Though the built and natural environment mediate the meanings that are attached to these places, residents can and are shifting what it means to reside or assume the place-based identity of informal settlement-dweller and will likely be doing so for the foreseeable future.

Local and federal governments have relied on the official boundaries, and systematically gathered data, such as the Census, of informal settlements, to determine where to implement slum upgrading and social programs. These same data are useful in monitoring progress toward improving the living conditions of informal settlement residents. However, researchers and

policymakers must be mindful of the data's limited accuracy to describe the communities and the people who live there. Further, the very terms used to categorize people and places shape and reify the categories under examination. Perhaps the ambiguity conveyed by the term *comunidade* might be better suited for thinking of informal settlements as dynamic places where the conditions that set them apart from the rest of the city, once addressed allows them to fit into the broader urban fabric without the oft-associated pejorative connotations. Whether official designations of informal settlements ought to be removed once the conditions have been addressed remains a topic that will require more study when urban upgrading programs can be shown to be effective. However, simultaneous moves to embrace or reject the term *favela* should give pause to researchers as they decide how to describe these communities in their work. Undoubtedly many Brazilians perceive the term *favela* as pejorative, however, whether researchers should emulate efforts to replace the derogatory terminology with that of *comunidade*, or reclaim the *favela*, is still up for debate.

CHAPTER THREE

Blurring Boundaries through Precise Mapping

Abstract
Community mapping with low-cost handheld GPS devices, digital cameras and smart phones have increasingly been deployed by community-based organizations to identify environmental and health threats as well as available resources to address those concerns. Though mapping by community-based organizations is not new, the availability of low-cost precise mapping tools has allowed for a greater sophistication and proliferation of mapping projects. Yet, as in the case of the Mapeamento Digital project spearheaded by the Centro de Promoção de Saúde (CEDAPS), a Rio de Janeiro based health promotion organization, effective mapping for social change went far beyond the hardware and software of geographic information systems and relied on deep community ties and organizing. This chapter analyzes data from the Mapeamento Digital project as well as interviews with key participants in the mapping project, in order to understand how community members' conceptualizations of environment, place, and health influenced their perceptions and articulation of environmental and health hazards and community resources. Lastly, this project highlighted challenges faced by low-income communities, and in particular those in low and middle-income countries, that continue to lack access to sophisticated mapping tools; even when the tools were available, the lack of infrastructure in these communities inhibited their full utilization and further adoption.

Introduction

In April of 2010 a devastating landslide took the lives of at least 27 residents in Morro dos Prazeres—a neighborhood of Rio de Janeiro that is officially recognized by the municipal government as a *favela*[11] (Cabral 2010). In the aftermath of the tragedy, the mayor of Rio de Janeiro authorized the forced removal of residents of Morro dos Prazeres, along with other informal settlements that had been similarly affected by landslides (Phillips 2010). However, residents pushed back against their eviction and demanded instead that the government address environmental and health concerns to prevent a future disaster. One of the groups involved in this community organizing was the Centro de Promoção de Saúde (CEDAPS–Center for Health Promotion), a community based organization that works with poor communities to develop strategies for improving public services for health promotion (CEDAPS 2016), particularly in informal settlements.

This chapter explores how CEDAPS used community based participatory mapping to identify neighborhood threats and resources to help residents of areas designated as informal settlements develop strategies for improving community health through collective action. At the same time, CEDAPS viewed this process as an organizing tool to create and solidify a sense of community among participants as well as further demarcate the boundaries of their communities. As I discussed in Chapter 2, the spatial and conceptual boundaries of informal settlements are contested. This chapters aims provide empirical evidence on whether or how the boundaries of informal settlements differ between their residents and the federal and municipal government agencies. This presence of a disconnect has repercussions for place-based health policy as well as understandings of spatial distributions of health disparities that rely on the administrative boundaries of informal settlements.

This chapter addresses the following questions: 1) What did the inclusion of mapped places and the way they were described by residents say about the way health was conceptualized by community members? 2) Did participation in community mapping change resident's perceptions of or ways of delineating the geographical boundaries of their community? 3) How important were precise community boundaries, and were they reflective of residents' perceptions, in ways that promoted health? These questions are answered with the community mapping data gathered by youth participants organized by CEDAPS, and interviews conducted with residents and CEDAPS staff. The spatial analysis of the community mapping data is used to answer questions on the geographic extent of the community boundaries in relation to their administrative boundaries. The interview data speak to how the process of mapping shifted residents' perceptions of their community and its significance for promoting health.

Place and health

Where you live is increasingly understood as a determinant for how long and how well you will live. In recent years the framework of social determinants health has been used to explain how

[11] *Favelas* are areas demarcated by the municipal government that have a higher concentration of poverty, tenuous property rights, and lack essential municipal services such as electricity, sanitation, water, or garbage collection. This designation can be more broadly understood as informal settlements or slum-communities that overlap with federal designations of *aglomerados subnormais* or subnormal agglomerations.

place can impact human health. Spatial disparities of health can be explained by the coming together of contextual factors, such as the characteristics of the people that live in these places and the compositional factors or the conditions that make up these places (Macintyre, Ellaway, and Cummins 2002; Krieger 2001; Chen et al. 2006; Cummins et al. 2007; Diez Roux and Mair 2010). These theories linking place and health highlight the intertwining roles of the physical environment—both the natural and the built environment; the social environment; and the processes and policies that push and pull people into certain areas; and individual factors that can mitigate or exacerbate these health producing conditions (Diez Roux and Mair 2010).

Informal settlements seem to be just the spatial agglomeration where the multiple detrimental factors explored in the social determinants of health come together. By definition, informal settlements are characterized as having a lack of municipal infrastructure such as safe drinking water, sanitation, garbage collection and electricity, as well as poor quality dwellings and irregular building patterns that can inhibit mobility as well as exacerbate the deprivation of critical infrastructure (UN-Habitat 2004). The people who live in informal settlements are often described as living in poverty, with lower levels of formal education, as well as facing social marginalization. The conditions described above have been well linked with poor health, whether directly as the result of the increased presence of disease vectors or indirectly as the result of the limitations residents face in addressing their health needs (L. W. Riley et al. 2007; Unger and Riley 2007; Vlahov et al. 2011). Many of the health threats in informal settlements have a strong connection to adverse health outcomes, whereby narrow streets, cramped living conditions, the presence of trash and stagnant water have been found to provide habitat for infectious disease vectors (L. W. Riley et al. 2007). This phenomenon is well known and has been understood since the end of the 19th century (Corburn 2009). In this chapter, the limitations of neighborhood boundaries are explored as well as their importance for health promotion. Although the effects of infrastructures like narrow streets are well known, the effect of boundaries is understudied and this paper fills that important gap.

Recent research examining the slum divide—as officially demarcated by the Brazilian government—found that residents of the informal city are poorer, less educated, and have access to lower quality municipal infrastructure than their formal city counterparts (Snyder et al. 2013). Additionally, health differences were evident as demonstrated by comparisons of tuberculosis rates between the formal and informal city (Marlow 2014), though low income areas of the formal city were also found to have a high incidence of tuberculosis, particularly in areas adjacent to *aglomerados subnormais*—AGSNs (the term used by the Brazilian Institute of Geography and Statistics for officially demarcated informal settlements) (Instituto Brasileiro de Geografia e Estatísticas, IBGE).

Community-Based Participatory Mapping

Though the particulars of community mapping processes vary widely, Parker (2006, 470) provides a compelling definition, describing it as, “a map produced collaboratively by residents of a particular locale, often featuring local knowledge and resources.” The maps produced from community mapping projects have been used to assert local claims on natural resources through “counter mapping” (Peluso 1995), challenge land claims (Harris and Weiner 1998; Lydon 2003), identify local hazards, and build community resilience and resistance to eviction (Appadurai

2012). Further, the mapping process has been seen as an end in and of itself where the act of mapping served to create group cohesion for organizing purposes (Amsden 2005).

Community mapping projects aimed at highlighting the connections between place and health have wrestled with the how to properly represent socially relevant spatial units. Neighborhoods have been conceptualized along notions of collective identity-making as well as impositions of identity through imposed boundaries (Sampson et al. 2002). While relying on the theory that collective knowledge results in a more accurate depiction of community, the methods for mapping vary from simultaneously coordinating group mapping activities or aggregating personal representations of the boundaries of one's community. Both approaches rely on the assumption that collective map-making will ultimately aggregate each community member's depictions of their lives at the center of their neighborhood (Coulton et al. 2001). Whether the aggregation of individual conceptions of place are negotiated by participants in the collective map-making process, or negotiated by the mapping software in post-aggregation, the resulting maps are assumed to reveal the general boundaries of a community. Further, community mapping processes have revealed what has long been understood, that neighborhoods are not static, and the conceptual boundaries of neighborhood for residents rarely match formal administrative boundaries (Matthews 2011).

Territorial divisions in Rio de Janeiro

Various terms are used to describe the spatial divisions of Rio de Janeiro, most used to describe places of poverty and marginalization, places that lack access to municipal infrastructure, and or have questionable property rights. These terms differ between local and national agencies, and by the residents of these areas. Among the most commonly used term in Rio de Janeiro is *favela*, which the municipality of Rio de Janeiro uses and often translates as slum (Instituto Pereira Passos, n.d.). The federal government uses the term *aglomerados subnormais (AGSN),* which translates to subnormal agglomerations or informal clusters. The federal government defines AGSN similarly to Rio de Janeiro municipal statistical arm, the Instituto Pereira Passos' (IPP) *favela* designation, but limit its application to areas with at least 51 households (Instituto Brasileiro de Geografia e Estatística 2011). There is no federal designation for clusters of fifty or fewer households that otherwise meet the criteria for informal settlements.

In addition to the *favela* designation, the IPP catalogs urban growth of other low-income areas with questionable land tenure and potentially lacking municipal infrastructure. Two such categorizations are *loteamentos clandestinos* (clandestine allotments) whose construction were not officially registered with the city; and *loteamentos irregulares* (irregular allotments), which may have been registered but failed to provide adequate infrastructure that is required by law (Lara 2010). Residents typically buy a parcel from a large landowner, which they then build their own homes. The responsibility of providing adequate infrastructure, however, falls on the land owner, prior to parceling the lots. Though the overlap between *loteamento clandestino* or *irregular* and *favela* designations are minimal, they are not mutually exclusive.

Finally, residents of some the places that are officially labeled as *favela or* AGSN, may use additional terms to describe their communities. Among them, the term *morro,* which translates to hill, commonly refers to the occupied areas on the hillsides. CEDAPS partners with community organizations and residents' associations from areas that may be labeled as described above.

Given that many of the previously described terms have been perceived as pejorative (to some, not all), they have followed a recent trend to describe the areas they work in as *comunidades,* which translates to community. However, CEDAPS uses the term *territórios* (territories) to describe their project areas, a concept of space classification derived from the work of Milton Santos, renowned Brazilian geographer. Santos described *territórios* as areas that have some control exerted over them, be they by the state, or other forces, and can have multiple overlapping control (M. Santos, De Souza, and Silveira 1994). For the purposes of this chapter, I have described the areas mapped by CEDAPS as *territórios*; the areas that they are parts of as *comunidades*; and *favelas*, AGSN, or *loteamentos* when describing these areas through their official designations.

Urban investments

Several urban investment programs have been implemented in Rio de Janeiro, with three major endeavors happening in the past thirty years, the Favela-Bairro program, Morar Carioca, and UPP Social—the social development arm of the UPP (police pacification units - Unidades de Polícia Pacificadora). The name Favela-Bairro signified the transformation of the *favela* into a *bairro*, or formal part of the city. The project had the goal of integrating *favelas* of between 100 and 500 households into the formal city through investments in infrastructure such as water, sanitation, trash collection, and electricity provision (Freire 2008; Handzic 2010; Neto and de Mello Pimentel Lourenço 2010, 142; Segre 2010). Among the most recent programs has been the installation of community police forces and social investment that was included under the banner the Police Pacification Units or UPP. This multipronged effort started with a massive show of force that aimed to remove gangs who had acted as the de facto power in these communities. Once these areas were under control of the UPP forces, social programs were brought in. Recently this program has been placed under the banner of Morar Carioca—a public health-focused program started in 2010 with the stated goal of integrating informal settlements in Rio de Janeiro into the formal urban fabric. Critics argued that prioritizing the communities located near the World Cup and Olympic venues rather than those most in need highlighted the true beneficiaries of the UPP (Steinbrink 2014, 136). Steinbrink argues that *favelas* chosen to receive UPPs did not have the highest crime rates, which underscored that the intended beneficiaries of the program were not residents of the selected communities.

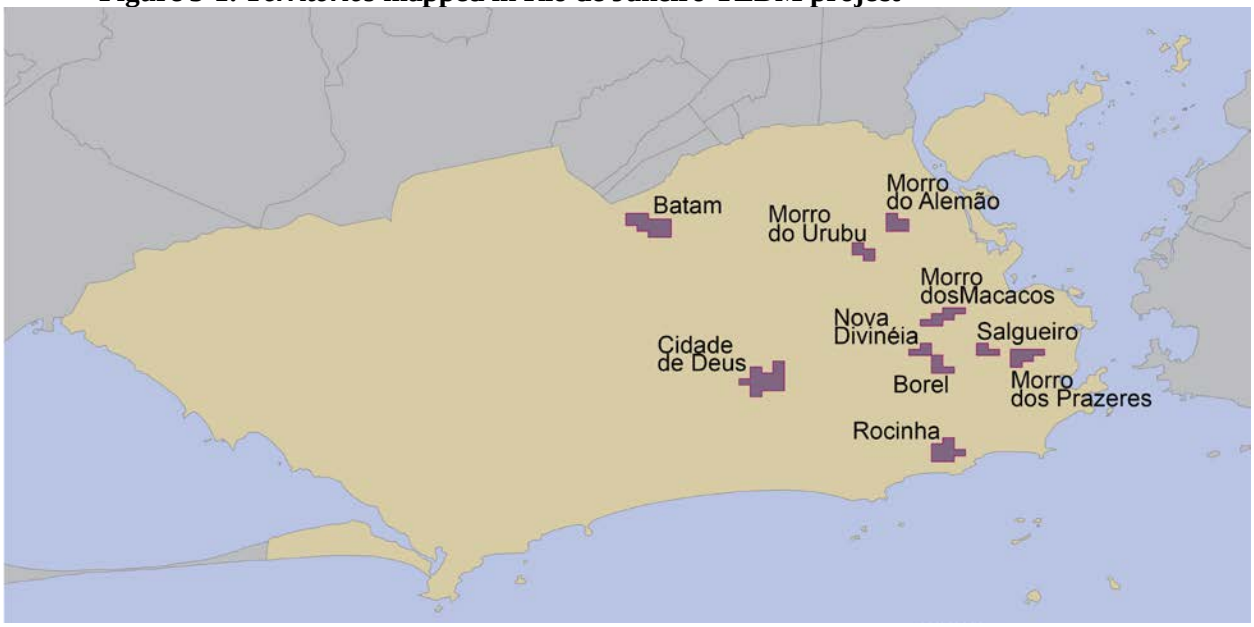
Paper maps to digital maps

CEDAPS has, for a nearly two decades, utilized community mapping to identify community needs, resources, and areas of concern in the *comunidades* they work in. This mapping has provided important information for residents of informal settlements, as the government does often not map them. Furthermore, the rare existing maps often lack important features pertinent for health and well-being of local residents, such as health posts, nurseries, and safe places to play. Additionally, the maps that do exist often misrepresent the boundaries and subsequent realities of residents' neighborhoods (Novaes 2014). In speaking with project staff at CEDAPS, they reiterated the importance of community mapping for reflecting to residents the realities of where they live.

The process of community mapping has allowed CEDAPS to learn from and with communities about health threats, such as trash piles, that can harbor mosquito vectors of malaria and dengue,

as well as resources for maintaining and or improving health such as social spaces, day cares, schools and health posts. Among the tools that have been used for years is an asset mapping process known as *Mapa Falante*, or the speaking map. The *Mapa Falante* involved a low-tech strategy of gathering residents who collectively drew a map of their community on a large piece of paper, where they indicated the location of health threats as well as health resources. This allowed residents to articulate their conceptualization of their community's challenges and opportunities. However, CEDAPS staff felt the lack of precision in this mapping exercise, limited the effectiveness in communicating the challenges faced by the communities[12].

Figure 3-1: *Territórios* mapped in Rio de Janeiro YLDM project



Following the flooding and landslides of 2011, CEDAPS partnered with UNICEF, MIT and Public Labs to develop a sophisticated and user-friendly smart phone based community mapping tool that allowed residents to pinpoint the exact location of areas of concern. MIT developed the application to be installed on low-cost smart phones for mapping locations, and which later developed into the community Youth Led Digital Mapping (YLDM) project. Morro dos Prazeres was the pilot community for this innovative community mapping project, which later expanded to nine additional *territorios* (**Figure 3-1**). Approximately 200 local youth from these 10 *territorios* were trained by CEDAPS staff over the course of 4 years to identify and document the health hazards and community resources; their goal was to use the data they gathered to press local officials to address the concerns they would find. The trainings provided common ground for discussing risk, and coupled that discussion with how those risks are perceived, which led youth participants to consider the types of health impacts they might encounter in their daily lives. Through this collaborative process for identifying community threats and assets, one of the most prominent issues that emerged was trash. Other issues noted included open sewers (categorized as sanitation problems), broken sidewalks, and dangling electrical wires. From this

[12] Revealed during conversations with the executive director of CEDAPS and the lead program manager for the community mapping project during informal conversations at CEDAPS offices in downtown Rio de Janeiro.

process, participants generated a list of the pre-defined categories for mapping (**Table 3-1**). CEDAPS provided local youth with smart phones, which they used to photograph and geotag locations they identified as risks or resources in their communities. Mapping participants were also given the option to add assets and threats to the predefined list by entering information on the smartphone app. The resulting data was then uploaded to a server hosted by UNICEF for view by anyone from around the world with access to the internet (UNICEF 2016).

Table 3-1: Assets and threats mapped by YLDM

Assets	Social spaces (such as plazas, areas for play, as well as nurseries and schools) Community Change (areas improved, including since previous mapping, such installed sanitation, walking bridges installed, and trash cleared)
Threats	Sanitation problems Accumulation of garbage Collapse risk Walking hazards Faulty stairs Obstacles to reaching safety points Powerline problems Problems with vegetation

CEDAPS subscribes to a holistic view of health that aligns with the concept of social determinants of health, which not only connects the interactions between physical environment and social institutions that can affect human health, but acknowledges "pathways by which societal conditions affect health and that can potentially be altered by informed action" (Krieger 2001, 697). CEDAPS based their youth-led digital mapping of social and environmental risks (YLDM) on the understanding that place influences health, and sees the boundaries of those places as dynamic. This falls in line with how Cummins et al., (2007) articulated a relational view of place, which serves as a counter to a traditional view of place— conceptualized by the fixed boundaries, such as the official state-recognized *favela*. In elaborating a relational view of place, Cummins et al. argued that spaces should be thought of as "nodes in networks" and in multiple scales; 'distance' should be considered not in Euclidean distance as miles and kilometers, but rather socio-relational distance and access to places and resources. A relational view of place looks at places as dynamic and fluid both in terms of boundaries and trends. With this understanding, how do community member framing of health and perceptions of their community's boundaries differ from government agencies? How can these differences highlight areas for addressing the pressing health concerns of local residents? I propose that community mapping can shed some light on the answers to these questions.

This chapter combined the geospatial data on health threats and resources gathered by YLDM participants, data from the national census and low-income housing registry, and semi-structured interviews to understand how and when residents' territorial conceptions of place matched with administrative boundaries of informal settlements. Though the YLDM data available on the web

provided an interesting view of the problems and assets that were identified, the categories are less obvious to the outside observer. Thus, I integrated responses from semi-structured interviews with CEDAPS staff and community residents to better understand the meaning and results of the mapped data.

Methodology

Spatial Analysis of community-based participatory mapping (CBPM) data.
The mapping data for the YLDM project are available online (http://rio.unicef-gis.org); however, there is no readily available method of downloading the data. As I was not a participant in the community mapping, I relied on CEDAPS staff to provide me access to their mapping data, which they provided on excel spreadsheet that referenced the data for all the mapped locations, and contained information about the latitude and longitude of each mapped location, and a brief description of what each point represented. However, this list did not include all the information available on the website. In order to obtain the relevant data, I worked with a colleague of mine to write a screen scraping script to obtain the full description for each mapped location as well as the coded itineraries that classified each location (**Table 3-1**). In the analysis presented here, I utilized 1,164 of the 1,784 geotagged locations[13] collected under the YLDM project between August 2011 and April 2015 to compare how well the spatial patterns of community mapping matched with local and federal designations of informal settlements. Over 200 youth residents from 14 to 21 years old from 10 *territórios*—locations are depicted in **Figure 3-1**— who were trained and participated in the YLDM project, uploaded pictures with embedded georeferenced location information together with a title, brief description and standardized tags to reference what was captured to the UNICEF Voices of Youth mapping website.

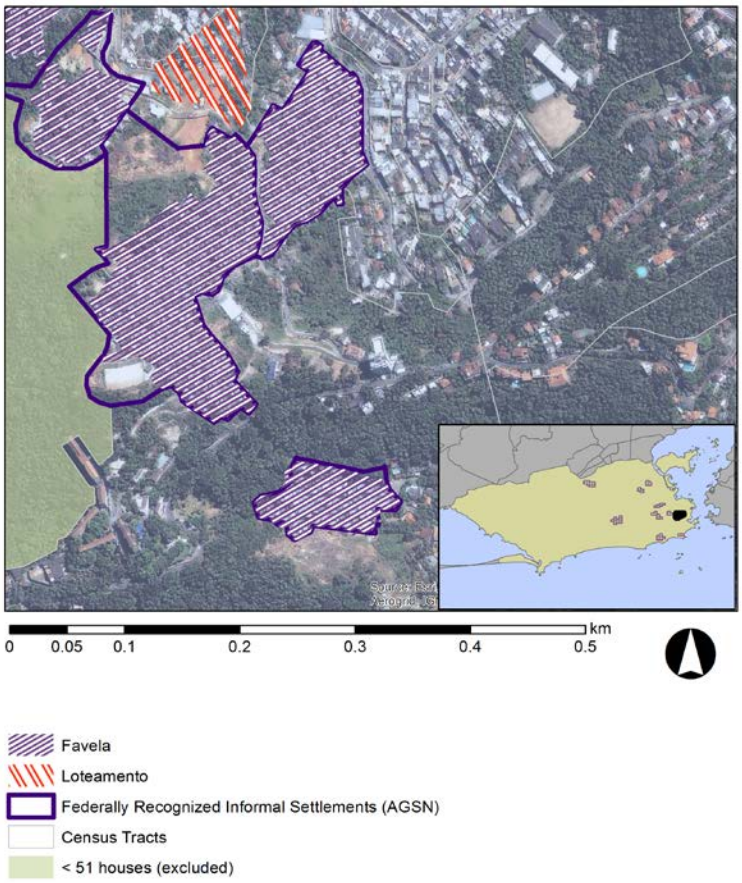
In order to make comparisons between what the youth mappers perceptions of their community to the official boundaries of informal settlements, I rasterized the point data of mapped locations and overlayed the results onto a map with the official boundaries. I worked under the assumption that the mapped locations reflected what youth mappers thought were important (either assets or threats), as such, I treated these as de facto boundary markers. To create the rasterized representation of the mapped locations, I used ArcGIS 10.3 Spatial Analyst Point Density tool to set with a 30-foot buffer around the geo-tagged mapping locations. The 30-foot buffer was used to account for potential errors in representing the mapped locations as gps devices, including smart phones with gps capabilities have been well documented to be imprecise (Wu et al. 2010). The resulting density map displayed areas that had greater mapping coverage in darker colors than areas with less coverage. I then compared the boundary of the community gathered data with boundaries for informal settlements as categorized by the Brazilian census bureau (IBGE) and the municipality of Rio de Janeiro's statistical arm—the Instituto Pereira Passos (IPP) *favela* registry, known as SABREN (Registry for Low-Income Areas).

[13] Though CEDAPS facilitated additional community mapping projects during this time period, whose data are available at the same UNICEF-hosted site, these were excluded from this analysis because different protocols for mapping were used. Additional "test tags" taken from CDEAPS's office and other recognizable locations not part of the official mapping were excluded.

Comparing the Spatial Boundaries of Census Tracts, Designated Communities, and Community Mapping

In order to compare how community definitions overlap, I assigned the mapping points for every *território* to their corresponding census tracts. This was done by selecting the buffered points in the YLDM data and spatially joining them to the census tract from the 2010 Brazilian Census using ArcGIS 10.3. Similarly, YLDM data were spatially joined to the AGSN boundaries from the IBGE and *favela* boundaries from the IPP. I then visually compared these census tract boundaries to the boundaries of AGSN, *favela*, and *loteamento* in order to understand how the areas mapped by community members compared to the officially designated boundaries of these communities.

Figure 3-2: Morro dos Prazeres *território*, AGSN, *favela* & *loteamento* overlap



Interviews with key participants

I conducted semi-structured interviews with sixteen key participants in the YLDM project, residents of Morro dos Prazeres, and a representative from the IPP (**Table 3-2**). I conducted formal interviews with staff from CEDAPS at their offices in downtown Rio de Janeiro, as well as multiple informal conversations while being hosted in their offices, on several site visits accompanying staff to Morro do Prazeres, and other community events between March 6 and April 20, 2015. I focused my questions to staff on the role of community mapping in their health

advocacy work as well as the steps and intent of the community mapping.

Table 3-2: List of semi-structured interview participants

Interview Participants	Number of participants
CEDAPS staff	**6**
Community members who participated in mapping project	**5**
Community members who did not participate in mapping project	**4**
Representative from IPP	**1**
Total	**16**

I conducted interviews with community members in Morro dos Prazeres at the office of the Morro dos Prazeres Residents' Association. The five community members that had previously participated in the project were asked to describe their participation in the mapping project and how they defined their community, as well as how they defined health threats and health resources. Four community members who had not previously engaged in the community mapping project were asked to describe physical changes they saw in the community after the mapping project as well as changes in attitudes and perceptions toward the community. Additionally, one official from the Rio de Janeiro municipal statistical arm, the Instituto Pereira Passos (IPP) was interviewed at the IPP office in Largo de Machado section of Rio de Janeiro. The official spoke on the topic of community mapping in general as well as his responses to the utility of mapping informal settlements and some of the challenges for doing so.

Results

The YLDM mapping participants identified issues related to a lack of quality municipal infrastructure, such as areas of trash accumulation, poor drainage, and downed power lines. Additionally, environmental hazards such as landslide areas were identified, as were social threats, such as areas that were perceived unsafe for women to walk alone, or areas where many adult males hang out. Additionally, the youth identified community resources such as childcare facilities and places where children can play sports.

Overlapping boundaries of informality

Table 3-3 highlights the results of overlaying the mapped locations on the spatial boundaries for census tracts, AGSN, *favelas*, and *loteamentos*. Data from the ten *territórios* mapped in the YLDM project corresponded to 21 *favelas* as defined by the IPP. Based on the provided information in the IPP SABREN database, these *favelas* corresponded to the IBGE's AGSN designation, with 13 of the mapped *favelas* defined as equivalent; 6 *favelas* defined as reasonably equivalent to an AGSN, and one not recognized as an AGSN. All of the mapped communities

were listed as having an established (UPP). Additionally, just under half (10) of the mapped *favelas* were listed as having received the Favela-Bairro program[14].

Table 3-3: Overlapping boundaries of *territórios* mapped by YLDM project

Degree of boundedness to AGSN/Favela	Territorios	Census Tracts mapped	AGSN mapped	*Favelas* mapped	*Loteamentos* mapped	Mapped points
Tightly Bounded	**Borel**	**12**	**1**	**1**	**0**	**91**
	Nova Divinéia	**8**	**3**	**3**	**0**	**118**
	Salgueiro	**8**	**1**	**1**	**0**	**78**
Somewhat Bounded	**Morro do Alemão**	**10**	**3**	**3**	**1**	**99**
	Morro dos Macacos	**23**	**2**	**2**	**0**	**46**
	Rocinha	**24**	**1**	**1**	**0**	**47**
Loosely Bounded	**Batam**	**21**	**2**	**2**	**3**	**178**
	Cidade de Deus	**34**	**5**	**5**	**2**	**143**
	Morro do Urubu	**11**	**2**	**1**	**0**	**102**
	Morro dos Prazeres	**12**	**2**	**2**	**0**	**262**

Figure 3-2 provides a closer look at the *territorio* of Morro dos Prazeres and the various administrative boundaries that cut across the area. Spatially, the *favela* of Morro dos Prazeres did not fully match the boundary of its corresponding AGSN, even though the SABREN database indicated that they are equivalent. However, this difference was primarily an artifact of different intentions in describing these spaces. Whereas the IPP utilizes aerial images to delimit only the inhabited portions that meet the criteria for designation of *favela*, the IBGE's use of census tracts that are classified as AGSN or not require that a continuous surface be categorized on the land. It is thus understandable that the IPP excluded non-visibly inhabited areas were from their *favela* designation. Additionally, the adjacent *favela* of Morro do Escondidinho spatially matched its AGSN boundary.

Mapping outside the box

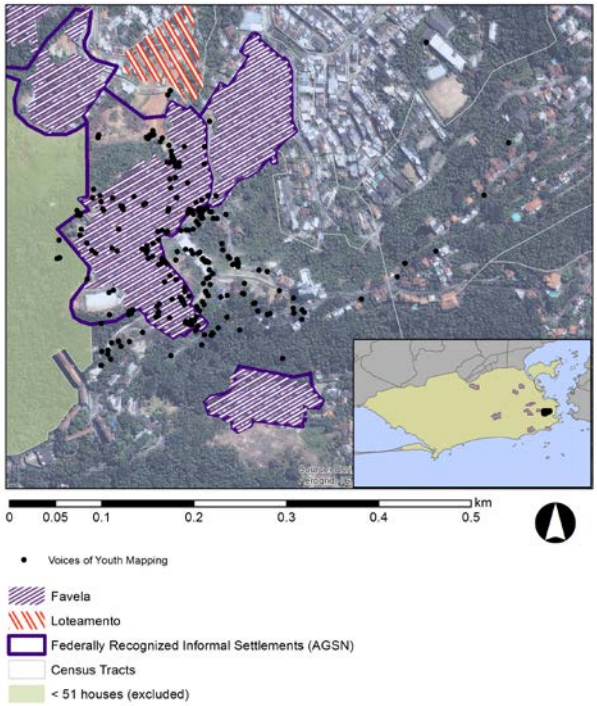
Plotting the locations identified by youth residents shows that, at least for the youth mapping participants, their definition of community boundaries were not limited by the strictly defined administrative boundaries of their corresponding neighborhood. We see in

Figure 3-3 how the locations mapped by the YLDM participants cut across those boundaries. However, to provide a better visual comparison of the extent of the overlap across these boundaries, the point locations mapped by YLDM participants were spatially interpolated based on the point density (**Figure 3-4).** This method draws a boundary around each point out to 30

[14] Favela-Bairro program was launched in 1992 with the goal of integrating medium sized *favelas*, those between 100 and 500 households, into the "formal" city (Freire 2008; Handzic 2010; Neto and de Mello Pimentel Lourenço 2010, 142; Segre 2010)

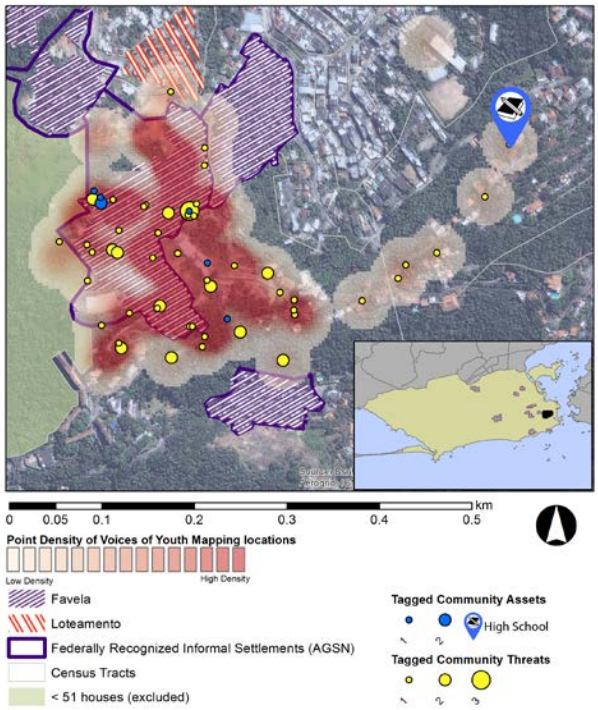
feet and creates a continuous surface that highlights areas of high density to convey the areas that YLDM participants considered as their community. One youth participant stated, "We wanted to map all of the community. We had the priorities, in some form we wanted to look at places to play and other places that needed to be improved, the sanitation; those were what we were looking at." In the ten *territórios* that were included in the mapping project, participants included areas outside these official boundaries of AGSN and *favela* to varying degrees. What is striking is that areas mapped outside the administrative boundaries were not only places perceived as assets or resources, but areas where youth wanted to see improvements (**Figure 3-4**). Of particular note is the furthest mapped location, which was the local high school that many youth participants attended, and the string of points mapped was the road used to access the school.

Figure 3-3: Morro dos Prazeres YLDM project point locations



Continuing in my examination of Morro dos Prazeres demonstrated two interesting points about how distinctions between formal and informal can be blurry, while distinctions between informal spaces appear to be precise (**Figure 3-4**). There is a substantial portion of the mapped areas that fell outside the *favela*/AGSN designated area. However, there is also a strong demarcation between the neighboring *favela*/AGSN of Morro do Escondidinho. When asked why Morro do Escondidinho was not included, the mapping participants noted the separateness of Escondidinho, one respondent said, "…Morro do Escondidinho is another community. They have their own residents' association. The street is known as the dividing line between our two communities." Overall, respondents' answers suggested that the distinction between the two communities was obvious, as such, residents of Morro dos Prazeres did not map Morro do Escondidinho. This indicates that youth mappers observed a clear boundary for their community between another AGSN/*favela* whereas such a boundary was not seen between the favela/AGSN of Morro dos Prazeres and the adjoining officially recognized formal city.

Figure 3-4: Morro dos Prazeres YLDM project mapped point density view of community



The spatial distribution of the community-mapped areas varied across the ten communities, however, the extent to which the community mapping of the *territórios* overlapped with the administrative boundary of AGSN can be explained as tightly bounded, somewhat bounded, and loosely bounded (**Figure 3-5**). I describe the communities mapped almost entirely within the administrative boundaries of their AGSN as tightly bounded. Communities mapped mostly within the administrative boundaries as somewhat bounded. Lastly, I describe as loosely bounded, those communities with a significant mapped portion outside the administrative boundaries of AGSN. For the areas that I described as tightly bounded—Salgueiro, Nova Divinéia, and Borel—the mapped areas conformed closely to their informal settlement designations. This process held even for Borel, which consisted of a school located outside its administrative boundaries. Morro do Alemão, Morro dos Macacos, and Rocinha are somewhat bounded to their informal settlements designations, as few mapped areas fell outside the officially designated informal settlements. Though the official boundaries covered a much larger area for Morro do Alemão and Rocinha, the mapping did not cover a substantial area. Finally, Batam, Cidade de Deus, Morro do Urubu, and Morro dos Prazeres were loosely bounded to their informal settlements, with the territories mapped showing extensive overlap outside the *favela*/AGSN designation.

In addition to the matches and mismatches to the officially designated informal settlements, Batam, Cidade de Deus and Morro de Alemão included an urban designation known as

loteamento, which in the case of Batam, overlapped on top of some portions of the *favela*/AGSN designated areas (**Figure 3-5**). Cidade de Deus, famous for being the setting for the 2002 film of the same name, contained only a narrow strip officially designated as *favela*/AGSN, though the area has been the site of a massive government funded housing project (F. Meirelles et al. 2003). Areas mapped in Cidade de Deus followed a linear orientation, where mappers walked along major roadways, with no extensive clustering (**Figure 3-5**).

Which numbers count?
Differences in the spatial extent of informal settlements between AGSN designation and mapped *territórios* emerged in all but one case. In the AGSN of Rocinha, the population estimates increased from 23% to 635% when census population figures are used for all census tracts that were included in the youth mapping project (**Table 3-4**). Similar patterns were seen for differences in households, from 32% increase for Salgueiro, to a 662% increase for Cidade de Deus, with Rocinha again remaining the same. Morro dos Prazeres presents the most spatial mismatch, yet the population and household increase is only 82% and 100% respectively.

Table 3-4: Population in *territórios* mapped, by AGSN designation, and for all census tracts included in YLDM project

		Population			Households		
Degree of spatial matching to AGSN/Favela	**Territorio Mapped**	**All Census Tracts mapped**	**AGSN Census Tracts (only)**	**% difference Mapped>AGSN**	**All Census Tracts mapped**	**AGSN Census Tracts (only)**	**% difference Mapped>AGSN**
Tightly Bounded	Borel	8461	6012	+40.7%	2590	1744	+48.5%
	Nova Divinéia	5592	3308	+69.0%	1856	1060	+75.1%
	Rocinha*	19707	19707	+0%	6813	6813	+0%
	Salgueiro	3454	2810	+22.9%	1009	764	+32.1%
Somewhat Bounded	Morro do Alemão	4657	3218	+44.7%	1376	886	+55.3%
	Morro dos Macacos	16271	9166	+77.5%	5016	2601	+92.8%
Loosely Bounded	Batam	14237	4060	+250.7%	4492	1269	+254.0%
	Cidade de Deus	27596	3756	+634.7%	8536	1121	+661.5%
	Morro do Urubu	6199	1791	+246.1%	2004	522	+283.9%
	Morro dos Prazeres	6189	3410	+81.5%	2100	1051	+99.8%

Residents of Rio de Janeiro's informal settlements have disputed the population counts collected by the IBGE in 2010 census (Alvim 2014). This was reiterated during interviews with residents of Morro dos Prazeres, as well as CEDAPS project staff. One resident of Morro dos Prazeres stated:

> *…I don't know but the census data is outside of reality… they think that we are very small, [the IBGE] says that only about half the people live here. The IPP is closer to the places, they consult with the territory they are closer to see the real data*.

Residents described not personally being counted during the Census, and insisted that census takers miscalculated the number of households in the area, particularly noting that due to typical building practices in Morro dos Prazeres, which, as another resident described, has "houses built on top of each other", making it difficult to accurately surmise the number of households. One resident who did not participate in YLMP recounted that he served as a census taker in 2010 and noted his distrust of the official count, stating:

> …I don't believe that there are 2,300 residents [in Morro dos Prazeres]. I don't believe it at all…I was a census taker…I had to go from house to house to get the data. Asking how many people lived there, how many appliances they had…There were two of us working as census takers and each of us got at nearly that same number [2,300]. So there is no way that the community could be so small.

Thus, the resident believed that the population of Morro dos Prazeres should have been at least twice as large as the official estimate. Even a representative from the IPP noted that there were questions on the legitimacy of the IBGE's numbers, but whatever his personal feelings, he noted, "Generally we work with the Census from IBGE that is the source of information. We [the IPP] don't have the capacity to do studies like that."

Benefits of mapping

Overwhelmingly, residents who I spoke with reported feeling great about being involved in the mapping project and about the result of community members coming together to collect the trash they had mapped, as well as the central trash repository they built. One resident recounted:

> The results were given in presentations and you could have told someone there is trash there, but when the person sees the map and the young people involved and you hear them talking about the situation you feel *caramba*, *puxa* (damn, wow)! It's marvelous!

Though the results of YLDM highlighted problems that most residents were already aware of, such as the community's trash problem, what surprised most participants was the extent of the problem. By making the problem more legible to community residents, CEDAPS and the Morro dos Prazeres Residents' Association were able to mobilize community members to address the problems. One participant recounted:

> We organized…we created and made Reciclação (described below), the mapping was vital! It was a diagnostic project, really…it allowed us to identify the problems…We made a garden, a graffiti walkway and a tourist route…improved the area…The mapping was [just] the first step.

As noted in the previous quote, several short- and long-term positive benefits came out of the YLDM project including material changes in the community and changes in attitude. Following the first round of mapping in 2011, the community organized to collect the trash from the areas that had been highlighted in the mapping project. One participant estimated that they collected four tons of trash. In collaboration with government agency partners, open sewers were closed, holes in the street repaired and a communal trash sorting area was established. But perhaps the longest lasting effect has been the development of a project called *Reciclação*—a compound of the Portuguese words for recycle and action. Through the *Reciclação* project, residents were hired to distribute nylon bags throughout the community, which provided residents a place to deposit their trash and recyclables. Residents employed by the project collected the bags and brought them back to a central facility in Morro dos Prazeres that separates the recyclables and prepares them for recycling elsewhere in the city. At the time these interviews were conducted, the project was not yet self-sufficient and relied financial support from Instituto Brasil Foods. However, the main organizer, Cris, was confident that they would be able to support their operations without outside assistance through the funds generated from their recycling operation in the coming years.

Among the intangible changes was a general sense of raised awareness of the trash problem and increased feelings of community pride. "[Residents] feel more respected and it makes them feel good for taking care of the *comunidade*…opening up more spaces to live and spend time with friends like inside and outside."

Safety concerns

Violence between rival gangs, paramilitary forces, and the state police forces has taken a heavy toll on the residents of informal settlements. In recent years the municipality of Rio de Janeiro has installed police pacification units, known by their Portuguese acronym UPP, which has reduced some forms of violence within the communities where they have been installed, while also creating new forms of harm as some residents have been caught in the crossfire of police action (J. Perlman 2010). This violence has also impacted the ability of groups like CEDAPS to work in these communities. Though most of the communities CEDAPS works in have received a Police Pacification Unit (UPP) (**Table 3-5** details the communities that have received UPP forces), the presence of these units has not guaranteed safety for their staff or community residents.

During interviews, several CEDAPS staff discussed that rather than using the presence of the UPP as an indication of a stable community, they relied on extensive community engagement and relationship building with residents of the areas they work in. CEDAPS staff described the process by which residents often inform them when police activity has taken place or is expected, or when recent violence between rival gangs has occurred. CEDAPS staff described that the community members know to avoid certain areas and are recognized as being able to be in the community without raising suspicion of gang members that may still be active in the area and putting themselves in danger.

Yet during the course of my fieldwork accompanying CEDAPS staff, I witnessed two incidents that highlighted these safety concerns. While accompanying a group of youth on a demonstration mapping run, a young man chastised me for taking pictures of the graffiti artwork on the

Caminho do Graffiti—a path that had been painted by Rio based graffiti artists as part of an effort to draw in tourists. The youth mappers I was accompanying quickly defused the situation as they reminded him that our walk and picture taking was part of the ongoing community mapping project. It was only when we reconvened with the other groups that I learned he was a known drug dealer. After speaking with staff from CEDAPS and the local residents' association leader I learned that recent UPP activity had taken place, leaving residents on edge. This incident highlighted the importance of working with community members to stay abreast of local security conditions, which may limit what areas can be accessed.

Table 3-5: *Favelas* located within mapped territorios, and social programs present

Territorio	*Favela*	*Favela* equivalent to AGSN	UPP present	Favela-Bairro
Batam	*Batam*	≈	✓	×
	Rua Duarte Coelho de Albuquerque, nº 184	=	✓	×
Borel	*Borel*	=	✓	✓
Cidade de Deus	*Moquiço (RA - Cidade de Deus)*	=	✓	×
	Pantanal I (RA - Jacarepaguá)	=	✓	×
	Praça da Bíblia	≠	✓	×
	Santa Efigênia	≈	✓	×
	Travessa Efraim	=	✓	×
Morro do Alemão	*Morro do Alemão*	≈	✓	×
	Relicário	≈	✓	×
	Vila Matinha	≈	✓	×
Morro do Urubu	*Morro do Urubu*	≈	✓	✓
Morro dos Macacos	*Morro dos Macacos*	=	✓	✓
	Parque Vila Isabel	=	✓	✓
Morro dos Prazeres	*Morro do Escondidinho*	=	✓	✓
	Morro dos Prazeres	=	✓	✓
Nova Divinéia	*Borda do Mato*	=	✓	✓
	Nova Divinéia	=	✓	✓
	Parque João Paulo II	=	✓	✓
Rocinha	*Rocinha*	=	✓	×
Salgueiro	*Salgueiro*	=	✓	✓

= The IPP recognizes these *favelas* as being equivalent to the AGSN boundaries
≈ The IPP recognizes these *favelas* as being reasonably equivalent to the AGSN boundaries
≠ The IPP notes these *favelas* are not recognized as AGSN
✓ Present
× Absent
(Source: SABREN)

A different incident occurred on a visit to Vila Cruzeiro, a community in the north of Rio de Janeiro that was the site of a *Mapa Falante* community asset mapping exercise in a different part of town, not part of the YLDM. In that instance, residents who were slated to attend did not show up to the training because of rumors of impending action between the UPP and drug gangs. The sole participant who showed up confided in me how she deals with these all too frequent gun battles by going to the room furthest to the back of her house where she watches television to take her mind off of the sound of gunshots around her.

Discussion

Shifting memories and justifications for mapping

Youth participants did not discuss the floods as an impetus for the mapping project, possibly due to their age, the prevalence of other issues that are more pressing, or because they weren't impacted. Adults remembered and recalled its impact on the community, but even they often acknowledged the flooding after I asked if the flooding was the impetus for the mapping effort.

Precision vs. Accuracy and Limitations

Imprecision of mapped community boundaries are compounded by the imprecision of the mapping tools. Global Positioning Satellite (GPS) coordinates recorded by smart phones, while typically accurate, can give less than reliable readings under certain circumstances, including hilly terrain (Wu et al. 2010). Additionally, though the YLDM project was useful in highlighting threats such as walking hazards, accumulation of garbage, sewage problems, landslide risk, downed powerlines, and faulty stairs, these served as a qualitative tool rather than quantitative tool for representing the extent to which these problems were distributed throughout the community. Additionally, the way that the data are displayed and categorized makes it challenging to perform more rigorous quantitative analysis. Neither the mapping process nor the categorization of points that were mapped in the YLDM project were conducted systematically, thereby limiting the ability to make spatial inferences about the locations of community hazards and resources. Despite these limitations, the data have been used to call attention to problems in the community by providing a visual representation of the extent of the problems noted, with the Reciclação Project providing a clear indication of this success.

The use of smart phones in the YLDM project provided a level of precision that was not available with the *Mapa Falante* paper-based asset mapping process. Among the additional benefits of smart phones was the ability to include photographs of positive and negative attributes that were geotagged and uploaded to a web server. This process of sending residents out into the community to capture visual evidence of the conditions of their community was particularly valuable as it offered greater precision of the location of community harms and assets, as well as letting residents take note of areas with which they were not as familiar.

Discrepancy in numbers

The disparity between the IBGE's census and community members perceptions, has left residents mistrustful of the IBGE, not just for misrepresenting their community—a complaint directed toward outsiders by many people I interviewed—but specifically the repercussions of an undercount which would have resulted in a loss of political representation and financial resources from the state, as census counts determine how both of these are apportioned ("Por que

fazer o Censo de 2010?" 2010). My analysis did not answer the question of whether the discrepancy involved counting households, people within the officially designated AGSN, or some combination of the two. When community members voice their concerns that the data used to describe where they live are inaccurate, we must also be critical of how we apply findings based on those counts. If we are to use these data, we must make explicit these shortcomings and develop strategies that take into account perceived discrepancies. Further, though the 2010 Brazilian census is described as the most comprehensive, it should not supplant more costly and time-consuming ecological studies from these localities.

The discrepancies described above were also noted in the boundary comparisons, which examined differences in populations covered by government versus resident definitions of community boundaries (depicted in **Figures 3-5** and **6**). It is possible that at least part of the discrepancy between the official population figures from the IBGE could be due to differences in how residents view their communities, and their corresponding boundaries.

The digital divide persists.

This project highlighted challenges faced by low-income communities, and in particular, those in low and middle-income countries, that continue to lack access to sophisticated mapping tools. Even when the tools are available, the lack of infrastructure in these communities inhibits their full utilization and further adoption. For example, the communities that have partnered with CEDAPS in the YLDM project continue to request smart phones for other mapping projects, and CEDAPS makes every effort to accommodate the requests of their community partners for additional community mapping, but they are limited in staff and equipment to meet the demand. Even though many Brazilians, including residents of informal settlements, have smart phones capable of running the YLDM app, UNICEF, which hosts the data on their server, does not currently make the app available to the general public. Though I did not get a clear answer for why, CEDAPS staff indicated that this was so that UNICEF could have better control of the quality of the data and focus attention on the communities they worked in. Thus, community partners wishing to use the app must rely on CEDAPS for accessing the mapping technology.

Technology gaps also affect organizations like CEDAPS, which are not only the result of a lack of technology, but also a lack of personnel with technical capacity. CEDAPS staff recounted that in the early 2000s they had a staff member who used ArcGIS to produce maps for them. When she left, they were unable to replace her with someone with the same set of skills, and have since relied on web-based mapping tools such as GoogleEarth, and in recent years, a São Paulo based mapping platform called MootiroMaps[15]. CEDAPS has further relied on partnerships with international NGOs, such as UNICEF, and academic partners to produce more sophisticated maps. CEDAPS staff has started using the system to digitize the *Mapa Falante* maps they generate in community meetings when the smartphone based mapping is either impractical or unavailable. These maps are available online for viewing by anyone with an Internet connection. However, as was noted in my interviews with residents of Morro dos Prazeres, few have seen the results of their mapping work outside of the presentations that were given in the community, as no one that I spoke with (aside from the CEDAPS staff) had looked at the maps on their own

[15] MootiroMaps (http://maps.mootiro.org/)—a web-based community mapping database—supports community mapping projects by allowing anyone to set up an account and start creating their own maps.

using the freely available UNICEF-hosted website. Some respondents said they did not know they existed; others expressed little need to see them since they saw the mapping results in the presentations made by CEDAPS. With no internet access at home, expensive connections at neighborhood internet cafes, and restricted internet access at school, community members have been limited in accessing the maps on their own.

Conclusion

The YLDM project worked to both create a sense of community and reinforce this new way of viewing the informal city from the perspective of the residents who live there. In analyzing the results of the youth mapping project, the youth identified issues related to a lack of quality municipal infrastructure, such as areas of trash accumulation, poor drainage, and downed power lines. Mapping participants identified environmental hazards such as landslide areas, as well as social threats, such as areas that they perceived to be unsafe for women to walk alone, such as areas where many men hang out. Additionally, the youth identified community resources such as childcare facilities and places where children can play sports. These issues were identified both within and adjacent to the administrative boundaries of their communities, thus suggesting that the line that separates their community from the formal city is blurred. The links between place and health were quite evident in the findings of the youth mapping participants. In attempting to link these data with the 2010 national census data (the most extensive ever conducted in Brazil, which included information on informal settlements), discrepancies in how residents view their community boundaries call into question the strength of the claims that researchers and policy makers can make about the accuracy of the administrative boundaries used to define informal settlements.

The YLDM further highlighted that the distinctions between formal and informal administrative boundaries may impact communities and their ability to access resources from the state. This work provided a novel way to characterize neighborhoods and provided a comparison between how actively engaged residents see their community and how that compared to the official boundaries as articulated by the local and national government agencies.

This study highlighted the limitations of relying on census data to meaningfully capture neighborhoods for use in studies on disparities of health. Yet these data also suggested that the administrative boundaries of informal sentiments are not without meaning, as they did seem to reflect distinctions between informal settlement communities and in some cases appeared to capture distinctions between the formal and informal city.

The YLDM community mapping project worked to bring community members together to identify the assets and resources in their community from their perspective, while also utilizing technology that helped them translate that perspective for themselves and other residents, by bringing the birds eye view that maps provide to reiterate the extensiveness of the problems they identified. The results provided motivation for other community members to take action, as well as provided them with information that government agencies could understand.

Much as maps have the power to communicate complex socio-spatial problems to government agencies (Elwood 2006, 326), the same effect could be seen on community members. While the mapping could be seen as a mere confirmation of what residents already knew, plotting the

points on the map brought the scale of the problem into focus and motivated community members to take action. Thus, the mapping itself acted as a transformative process for bringing community members together, and the technology served as a translation tool to articulate the current conditions.

Figure 3-5: *Territórios* mapped—degree of boundedness to informal settlement designation

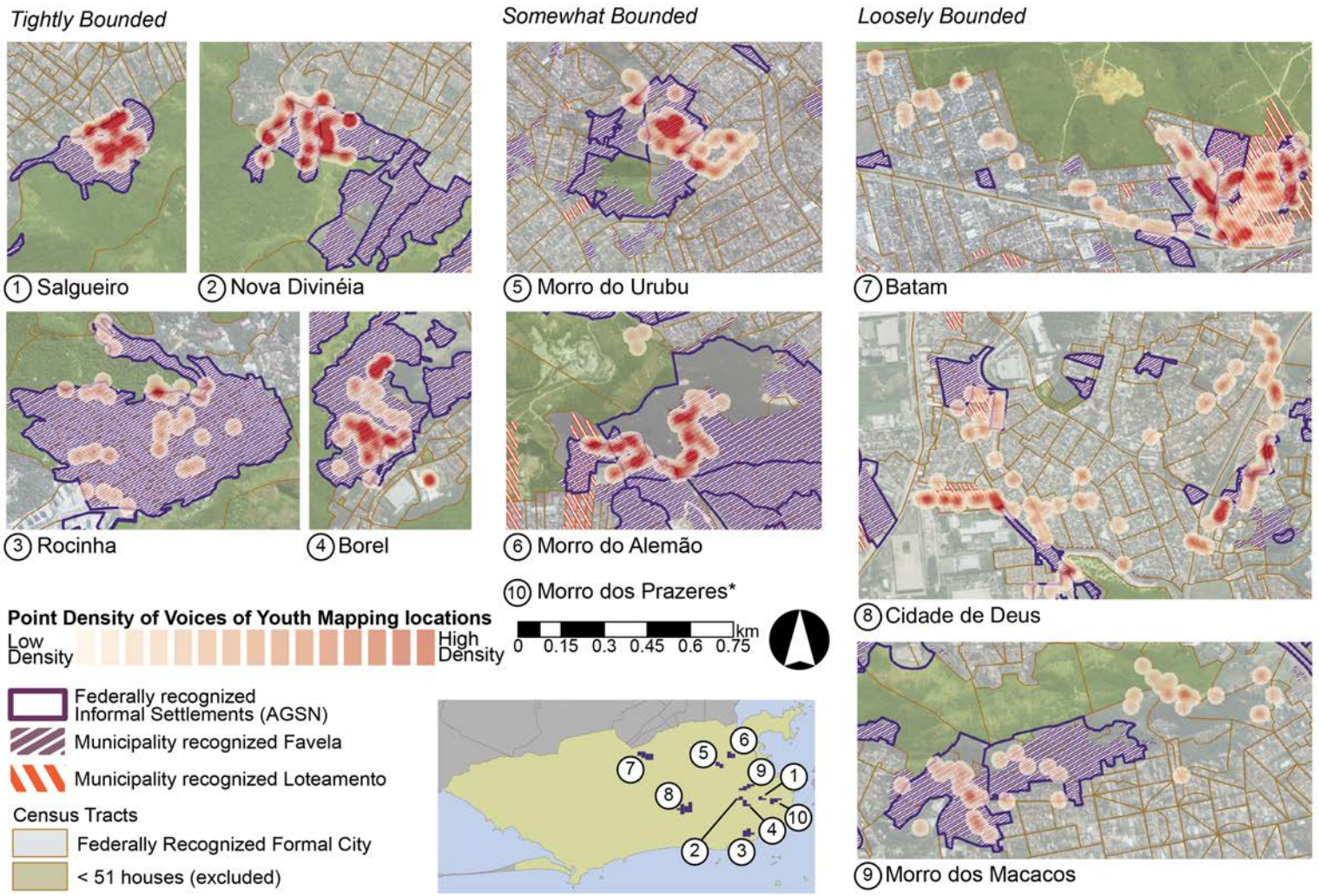
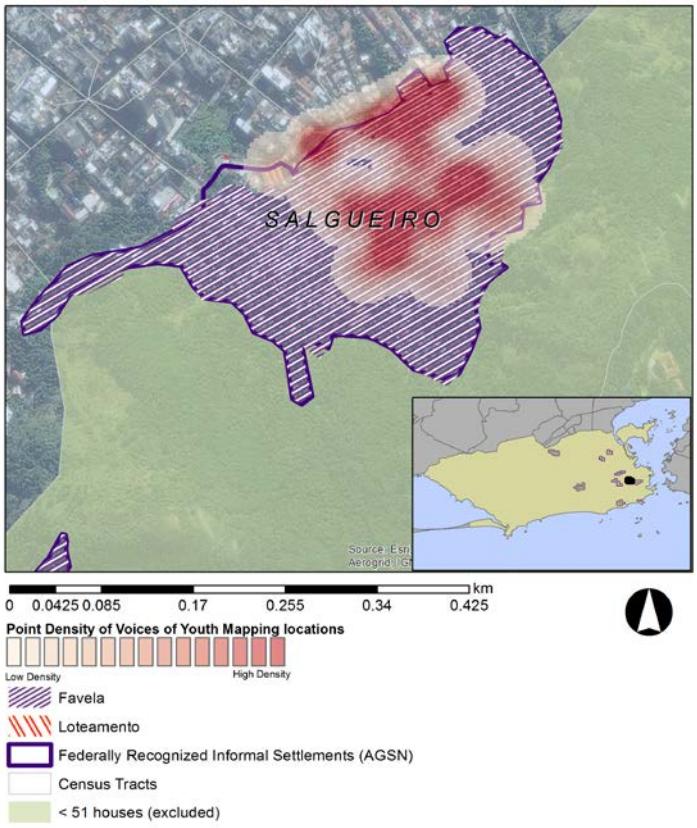


Figure 3-6: Salgueiro – YLDM project mapped point density view of community



CHAPTER FOUR

Infrastructure and the environment of inequalities: A spatial analysis of the mismatch between government categorized and non-categorized informal settlements in Rio de Janeiro

Abstract

Place and race classifications in the Brazilian Census have been useful to highlight deep economic and welfare disparities. The Brazilian Census designates places as rural or urban, with the urban further divided into the formal and informal—defined primarily by their lack of essential municipal services and categorized as subnormal agglomerations (aglomerados subnormais, AGSN); whereas race is divided into five categories, white, black, mixed, Asian and indigenous. These simplistic divisions across race and place do not correspond well with the everyday classifications by Brazilians of themselves. Similarly, a closer examination of data from the 2010 Brazilian Census reveals that areas demarcated as AGSN are not synonymous with the parts of city with the lowest level and poorest quality of municipal infrastructure. This paper seeks to answer whether using the results from within the 2010 Brazilian Census to look beyond the formal/informal divide we can better highlight disparities in access to adequate infrastructure; and if disparities in infrastructure provision correspond to racial disparities where black and mixed Brazilians have been well documented as occupying marginalized social positions. Using data from the 2010 census on municipal infrastructure provision in Rio de Janeiro is used to determine how well the federally designated AGSN category identifies census tracts lacking in these essential municipal services, I use a Principal Components Analysis to develop a relative measure of adequate infrastructure quality (RIQ) and look at the resulting deciles to make these comparisons.

Introduction

Worldwide, 880 million people live in informal settlements (Way 2015). Global estimates for informal settlement population are determined through meticulous counts or population projections over urban spaces categorized by national governments (Tatem 2014). Governments use terms like slums, shantytowns, squatter settlements, and other local variations to describe the parts of cities that lack essential municipal infrastructure and where legal ownership of the land occupied by residents is in question. Brazil's 2010 census, widely viewed as one of the most comprehensive projects to date, counted everyone within its border and classified informal settlements, with inadequate infrastructure, under their technical term of aglomerado subnormais (subnormal agglomerations–AGSN). However, critics contend the differences in operational definitions of the term slum and its local variants create problems for international and subnational comparability of the spaces they demarcate, as well as perpetuating pejorative connotations carried by these terms.

In this chapter, I explore the overlap and mismatch of areas officially designated as informal settlements. I examine whether the federal designation for informal settlements matches the criteria laid out in its operational definitions. Further, I examined if the disparities of income and other social marginalization faced by black Brazilians are reflected in where they live, such that black Brazilians are over represented in areas matching the operational definitions of slums regardless of their official classification. This paper re-examines the categories of urban infrastructure within the Brazilian Census to determine if demographic disparities are present. I use a principal components analysis to recategorize the Census, and then examine available variables that include measures of race.

Disaggregating health inequalities

Areas with inadequate municipal infrastructure have been linked to poor health outcomes. These areas often have greater levels of poverty that limits residents from taking health protective measures (L. W. Riley et al. 2007; Vlahov et al. 2011). Given the growing understanding that informal settlements reflect highly variable conditions, researchers have called for better characterizing these communities and the challenges they face by using disaggregated data (Vlahov et al. 2011). Few Lower and Middle-Income Countries (LMIC) have access to this type of data. However, Brazil presents a special case, as it has a rather robust data-gathering regime that incorporates sophisticated geospatial analytical tools (Bianchini 2011). One approach suggested for closing this gap is an understanding of the boundaries of slum communities.

The categorization of informal settlements by the Brazilian Institute of Geography and Statistics (Instituto Brasileira de Geografia e Estatísticas—IBGE) is rooted in the social and political history of Brazil. Among the factors that operationally define AGSN, and thus distinguish them from non-AGSN census tracts, are inadequate infrastructure and tenuous claims to land rights in these communities. While the IBGE's operational definition for AGSN is supposed to be comparable to the United Nation's slum designation, the former adds a lower population limit, such that a minimum of 51 households must be present to be officially designated as such. The IBGE further coordinates with municipal governments to verify the inclusion of informal settlements as AGSN, including Rio de Janeiro's Pereira Passos Municipal Institute of Urbanism (Instituto Municipal de Urbanismo Pereira Passos—IPP) which maintains a registry of informal

settlements designated as either *favela* or *loteamento*—however, only the *favela* designation is said to align with the AGSN.[16] The IPP's low income housing registry (Sistema de Assentamentos de Baixa Renda, SABREN) indicates when a *favela* matches the boundaries of the AGSN as equivalent, reasonably equivalent, or not recognized as AGSN (Instituto Pereira Passos, n.d.). However, the IPP demarcates areas meeting their operational definition as *favela,* to encompass only the built environment that reflects inadequate access to municipal infrastructure and urban non-compliant building patterns. Whereas the IBGE, in applying their designation of AGSN, must ensure that no parcel of the national territory is excluded. Thus their census tracts, often includes uninhabited lands and portions of cities that would otherwise not meet the operational definition of informal settlements.

Comparisons between the overlap of the official boundaries of AGSN and *favela* revealed inconsistencies (Preteceille, Valladares, and Henriques 2000; O'Hare and Barke 2002). Preteceille et al. (2000) compared the official boundaries of AGSNs from the 2000 Census and the boundaries of *favela* provided by the IPP and found that almost 98% of *favela* households were classified as AGSN by the IBGE, while conversely only 90% of households that were located in AGSNs were classified as *favela*s by the IPP. The results of this collaboration between the IPP and IBGE to classify informal settlements in Rio de Janeiro, as they conform to the UN-Habitat's definition of 'slum' has reduced this discrepancy to just 3%, though they do not elaborate what aspects of the definition resulted in this discrepancy (Instituto Municipal de Urbanismo Pereira Passos - IPP 2012).

Neighborhoods have been conceptualized along notions of collective and imposed identity-making through contested and imposed boundaries (Sampson et al. 2002). However, rather than building on these conceptions of neighborhood, researchers often utilize geographical statistical units such as census tracts (Sampson, Morenoff, and Gannon-Rowley 2002, 445). Researchers looking into the connection between place and health have addressed the limitations of census data by selecting relevant census tracts to construct homogenous local neighborhoods (S. Santos, Chor, and Werneck 2010). By combining contiguous census tracts with similar socioeconomic indicators, the authors were able to carve up administrative neighborhoods in Rio de Janeiro to produce homogeneous sub-regions that could be used for exploring sub-municipal disparities, even within larger federally recognized informal settlements. Other researchers have directly looked at disparities in health by combing data from national and municipal mortality and birth registries along with census data from 2000 and 2010 (Bortz et al. 2015). The authors key findings were that health generally improved over the decade between censuses, while also identifying disparities in mortality across the city. Though the authors were able to describe differences between the well-off South zones and the less affluent Northern and Western zone of the city, they were unable to disaggregate health inequalities in Rio de Janeiro beyond the lowest resolution of spatial data, and thus were unable to identify disparities within these regions.

Ecological studies conducted within informal settlements have revealed that conditions can vary. Work done in Salvador's Pau da Lima community—a federally recognized informal settlement, and the site of ongoing collaborative research involving residents as partners in identifying diseases, has been the source for multiple publications related to slum health (Unger, Ko, and

[16] For a more complete discussion on the comparison between slum, AGSN, *favela,* and *loteamento* designations, refer to Chapter 2.

Douglass-Jaimes 2016). One such survey of Leptospirosis cases revealed differences in disease incidence within the community, such that homes located at the bottom of the valley in the flood plain exhibited a higher number of cases than those at the top of the hill (Reis et al. 2008). Thus, location matters, such as proximity to topographic features that produce microclimates of disease. This work highlighted key mechanisms for disease transport and the high variability of disease production within localities, yet the ability to run such an experiment would be unfeasible over a larger area such as a city.

The examination of intra-urban disparities has been the focus of several scholars, including some of those mentioned previously. In the Brazilian context, scholars have sought to identify variability of socioeconomic conditions that have been correlated with greater vulnerability to disease and health threats. These intra-urban disparities have utilized census data and have examined the differences across the slum divide, relying on comparing officially designated informal settlements to the rest of the city. For the most part these studies have found that while differences between the formal and informal city exist, the variability of socio-economic factors within the formal city indicates that official designation of informal settlements does not sufficiently explain the spatial dynamics of poverty, inequality and social vulnerability. While Weeks et al. (Weeks et al. 2007) and subsequently Jankowska et al. (Jankowska, Weeks, and Engstrom 2011) have looked at characterizing the degree of "slumness" of census tracts in Accra, Ghana, their work relied on census-enumerated areas (EA) as their unit of analysis. Both created a weighted average over household metrics within Ghana's census that are tied to the operational definition for slum put forth by the United Nations in order to determine areas of greatest vulnerability. The authors note the special circumstances where urban areas of Accra would almost entirely be classified as slum, thereby rendering the term meaningless. Thus, their relative measures that identified areas of greatest vulnerability are a step toward prioritizing areas for future investment.

Intra urban racial disparities

In Brazil, skin color is often used to stand in for race. This practice dates back to the earliest census conducted in Brazil, dating back to 1872, categorized the populous by *cor* (Portuguese for color). Only in 1991 was the question rephrased for respondents to give their *raça* (race) or *cor* (Nobles 2000). The terms for racial categorization that persist in the national census retain their connections to skin color: *branco*—white for those with European ancestry; *preto*—black for those with African ancestry; *pardo*—brown, used to describe people of mixed black and white heritage; *Amarelo*—yellow for people of Asian ancestry; and *indigena*—indigenous, surprisingly the only racial category that does not refer to a color (Nobles 2000). The erstwhile term *caboclo,* which translates to copper color, had previously been used to describe those of indigenous or mixed European and indigenous ancestry. Further, 2010 was the first time the Census asked each respondent the question of racial self-identification. Before 2010, these numbers were calculated based on samples (Chiavegatto Filho, Beltrán-Sánchez, and Kawachi 2014).

Brazilians, however, do not limit themselves to these five official race categories. In the 1950 census, when given the chance to self-identity through an open-ended question, Brazilians responded with 135 terms, primarily indicating gradations of lightness and darkness of skin color. (dos Santos, 2006, p. 34) Most importantly, perhaps, the preferred terms for self-categorization

are *moreno* typically used by mixed Brazilians; and *negro* for black. (Nobles, 2000; Telles, 2004; dos Santos, 2006) However, these terms have been thought to be far more expansive than their census corollaries, as *negro* can be used to apply to anyone with African ancestry including those identified as mixed. Whereas *moreno* typically applies to those of mixed heritage and can apply to anyone with dark hair or eyes, so would include many people that would otherwise have been thought of as white.

Formalizing the informal

For over a century, different government authorities in Rio de Janeiro have attempted to deal with the informal settlements. This engagement has vacillated between erasure, containment, and integration with the larger city. These competing approaches have shifted not in a progressive fashion but rather in response to competing political and socioeconomic demands and pressures exerted internally and externally. Rio de Janeiro's hosting of the World Cup finals and the Olympics in 2014 and 2016 respectively, have spurred efforts for upgrading and integration of informal settlements over the past decade relying on the reestablishment of the state's police force through the Police Pacification Units, or UPP's. The UPPs were established with the stated mission to provide security, focusing on removing gangs that had been the de facto security force in these communities ostensibly, and through this increases security would allow the upgrading programs to be implemented. (Chapter 2). The IBGE has stated as one of the goals of the Census, to measure the progress toward achieving poverty alleviation and improving living conditions of informal ("Por que fazer o Censo de 2010?" 2010). Thus, proper characterization of the built and social environments of informal settlements is vital for measuring progress toward achieving their goals.

A sideways glance at the Brazilian Census

The Brazilian Census is a rich data source that produces the numbers that are of interest to the state. As with many censuses, these data are analyzed and used to determine the distribution of financial resources, infrastructure investments, and apportioning of elected representatives by district ("Por que fazer o Censo de 2010?" 2010). Thus, even with criticisms of incomplete counting of residents (Alvim 2014), its numbers are treated as facts. It is this common-sense understanding that motivated this study design to look at infrastructure quality based on the Brazilian Census' own figures. Ranking and then re-labeling census tracts by their relative level of infrastructure provision, provides a view of racial disparities in access to these resources beyond the dichotomous formal/informal divide. The result is an emergent view of social and spatial gradients of disparities, highlighting the complex processes of racial and economic exclusion taking place in Rio de Janeiro.

Methods

The 2010 Brazilian Census provides the highest resolution of statistical and spatial data for the entire country. Though a national study would be informative, this study focuses on Rio de Janeiro, an area that is large enough to provide insight into the gradations of infrastructure provision, as well as detail that reveals who gets left behind when we focus on simplistic formal/informal divide. This research relied on the use of federal spatial and statistical data from

the 2010 census, which provides a wealth of information about who is benefiting from state infrastructure investments over the past few years, and what areas are still in need of investment.

Data for Rio de Janeiro is presented at the census tract level and divided between areas classified as *aglomerado subnormais* as informal (AGSN), referred to in this paper as informal settlements. Its antipole is referred to here as the formal city—though no official designation for this part of the city exists. Census tracts that had no or an extremely low number of people (populations fewer than 10) living in them were excluded from the analysis as well as those not meeting the criteria for inclusion as AGSN (51 or more households and inadequate infrastructure), therefore census tracts with 50 and fewer households were excluded from this analysis (**Table 4-1**). In sum, I compared the traditional categorization of formal versus informal and then show gradations of formality through a more holistic approach to assessing infrastructure provision in the formal areas of Rio de Janeiro.

Data Sources

Publicly available data from the 2010 Brazilian Census were downloaded from the Instituto Brasileiro de Geografia e Estatística (IBGE) website (http://www.censo2010.ibge.gov.br/) as CSV files, prepared in Microsoft Excel then exported for analysis in STATA v.12.1 (StataCorp, College Station, USA). **Table 4-1** displays the variables that were included in this analysis. A unique reference ID for each census tract allowed for matching up of spatial reference data that was used for this analysis. Separately on the same website, spatial references for areas demarcated as informal (AGSN) were downloaded containing the matching identifier for each census tract, as well as a unique identifier for each federally recognized informal settlement. Both spatially referenced data sets were linked to census results and to each other in ArcGIS 10.3 (ESRI, Redlands, CA), in order to make comparisons by AGSN status.

Variables selected for analysis related to social, economic and physical characteristics that contribute to higher morbidity and premature mortality in Rio de Janeiro. The data categorize census tracts within informal settlements as AGSN (though not all informal settlements meet the criteria laid out by the Brazilian Census Agency, IBGE, and census tracts not meeting those criteria as non-AGSN. The data categorize census tracts within informal settlements as AGSN, a cluster of 51 housing units based on the following criteria:

a) Illegal occupation of the land, or construction on land owned by others (private or public) at present or having received land title in the past 10 years or less and,

b) either

1) Construction outside of existing municipal patterns, reflected by the presence of narrow and uneven roads, and development not overseen by regulatory agencies, with land parcels of inconsistent shape and size, or

2) a general scarcity of public service

Because data on legal or illegal occupation of land is absent in the Census[17], only the four infrastructure variables are used to construct a compositional score for the purposes of ranking census tracts by their level of adequate infrastructure provision.

Table 4-1: Demographic and housing indicators from 2010 Brazilian Census.

Variable name	Variable description
Demographic indicators	
Permanent private households	Total number of permanent private households
Population in private households	Total population in permanent private households
Population younger than 5 years of age	Proportion of population younger than 5 years of age
Population over 60 years of age	Proportion of population older than 60 years of age
Housing conditions and household indicators	
Adequate sanitation*	Proportion of households connected to public sewage network (dumped into a septic tank without runoff, cesspool, ditch, or lacking sewage connection)
Adequate water*	Proportion of households connected to water municipal water distribution network
Adequate trash*	Proportion of households with home trash removal service (private or public) or collected in home and taken to location where trash is removed by private or public service
Adequate electricity*	Proportion of households with access to electricity and exclusive electric meter
Rented homes	Proportion of permanent private households rented by head of household
Owned Homes	Proportion of permanent private households owned outright or with mortgage by head of household
Inhabitants per household	Average number of inhabitants per household
Adult literacy	Proportion of adults 25 year and older who are literate
Mean income	Total income of households per census tract divided by total households of census tract
Mean income less than 2xs minimum wage	Households with income less than 2 x minimum wage**
Mean income greater than 5xs minimum wage	Households with income greater than 5 x minimum wage**

***Indicates that variable was used for constructing relative infrastructure quality score (RIQ)**

[17] Though census respondents are asked if they own or rent their own homes, these answers do not correspond to legal land tenure as defined in the census criteria for determining informal settlements. Thus, this variable is reported for comparison purposes, but not included in comparing the operational definition of conditions associated with informal settlements.

****Minimum wage of R$510.00; equivalent to US$289.77, in 2010**

The 2010 Brazilian Census includes a value for adequate infrastructure by census tract. Adequate water infrastructure is based on the number of households connected to the municipality's general water supply. The adequate trash variable is based on the number of households served by a public or private trash collection service, or collected in a household and taken to a location where it is collected by a public or private service. Adequate sanitation is based on the number of households where wastewater from household washrooms is linked to general sewage network or a septic disposal system. Moreover, adequate electricity is based on the number of households that have electricity and an electric meter for use exclusively by the household.

Principal Components Analysis

The Census provides information on the number of households per census tract that meet the criteria of adequate infrastructure: water, electricity, sanitation, trash collection. A simple ranking of census tracts by their levels of infrastructure would be desirable, however devising a ranking across four dimensions of adequate infrastructure provision poses challenges as previous work demonstrated that the provision of these resources is neither uniform nor consistent. In order to make comparisons, a relative metric was devised by collapsing these four variables into a single relative infrastructure quality score (RIQ). Hence, these attributes are examined through principal components analysis (PCA) to assist in grouping those that are similarly provided (i.e. well provided with adequate infrastructure, or not well provided with adequate infrastructure). The resulting composite scores represent the quality provision of adequate infrastructure for each census tract were calculated using a PCA to characterize the demographic differences across census tracts by their level of infrastructure provision. To calculate this score, the percentage of households with adequate infrastructure was calculated by dividing the number of homes that had adequate infrastructure by the total number of households in each census tract. The variables were standardized prior to inclusion in the PCA using the Stata std command, where each variable value was subtracted from the variable mean and then divided by one standard deviation from the mean. A varimax rotation was then applied to the four normalized variables. The first two components had eigen values above one and explained 42% and 25% of the variance respectively. Further a Kaiser-Meyer-Olkin test was run and all four variables included in the PCA were above 0.5, justifying the use of PCA (**Table 4-2**).

Table 4-2: Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	kmo
Adequate water (normalized)	0.6209
Adequate trash (normalized)	0.6693
Adequate electricity (normalized)	0.6251
Adequate sanitation (normalized)	0.5974
Overall	0.6192

The values generated for the normalized percent inadequate infrastructure variables using Kaiser-Meyer-Olkin

With a composite score calculated for each census tract, the data were subsequently categorized in one of five ordinal rankings of RIQ1 thorough RIQ5 to represent five classes of infrastructure provision in the formal city. Census tracts that had 100% of households provided with adequate infrastructure were labeled as RIQ1. The remaining data were divided into quartiles and categorized as RIQ2, RIQ3, RIQ4, and RIQ5, with RIQ2 representing the next best level of

infrastructure provision, and RIQ5 representing census tracts with the lowest proportion of households having adequate infrastructure.

Bivariate Analysis
Census variables were compared using bivariate analyses across the five RIQ score categories. All variables were continuous and tested with a student's t-test at the 95% confidence interval using STATA v.12.1 (StataCorp, College Station, USA). Subsequently, the average percent of households with adequate infrastructure were calculated along with standard deviation by census tract to compare the differences between newly categorized census tracts by relative infrastructure quality (RIQ).

Geospatial Analysis
The results of the composite RIQ reclassified census data were mapped using ArcGIS 10.3 (ESRI, Redlands, CA) and visualized in a choropleth to indicate the spatial distribution of adequate infrastructure provision. Areas with greater level of adequate infrastructure provision categorized as RIQ1 are colored in brown, and get progressively lighter up through RIQ 3. The two least categories of census tracts with the lowest levels of infrastructure provision are colored in purple with the lowest having the deepest hue. Census tracts colored in light green represent those that were excluded from analysis because there was no population reported or had fewer than 51 household.

Results

The IBGE delineated 10,504 census tracts within the municipality of Rio de Janeiro, of which 2,227 are located in one of Rio's 764 AGSN's (**Table 4-3**). To adequately compare across these categories, 697 census tracts (155 in AGSN, and 542 outside AGSN) were removed from my analysis because they were uninhabited, or they contained fewer than 51 households—the minimum number of households necessary for the IBGE to report demographic and other variables used in my analysis. Remaining were 2,072 AGSN census tracts and 7,735 non-AGSN census tracts.

Table 4-3: Census tracts by AGSN/Non-AGSN designation included in analysis

	Informal	**Formal**	**Total**
Census Tracts Total	2,227	8,277	10,504
Total Census Tracts Excluded (0 Population or <51 Households)	(155)	(542)	(697)
Total census tracts included in analysis	2,072	7,735	9,807

Traditional categorizations of formal and informal parts of the city were compared followed by a closer look at the formal city broken into five categories ranked by relative levels of infrastructure provision. On average, households in the formal city had better infrastructure than those in the informal city, with the greatest disparity being in electricity provision, 99.2% in the

formal to 67.4% in the informal (**Table 4-4**). I created five categories based on the ranking of the PCA score to take a closer look at the formal city. The top ranked group, RIQ1, was constructed with those census tracts with all households having universal coverage of the four infrastructure variables, water, trash, sanitation, and garbage collection. The next best category in the formal city had near universal coverage as well. Whereas the parts of the formal city ranked under RIQ5, the worst ranked in the formal city, had electricity provided at nearly the same rates as the informal city (67.2% vs. 67.4% respectively), and had less sanitation provision in the formal (78.7%) compared to the informal city (86.7%).

Table 4-4: Comparison of re-categorized census tracts based on adequate infrastructure in Categorized AGSN and non-AGSN census tracts stratified by relative infrastructure quality (RIQ) in the municipality of Rio de Janeiro

	Citywide (Pre-PCA)		**Formal City only**				
Variable name	Formal (SD)	Informal (SD)	**RIQ 1 (SD)**	**RIQ 2 (SD)**	**RIQ 3 (SD)**	**RIQ 4 (SD)**	**RIQ 5 (SD)**
Housing Indicators % (SD)							
Adequate sanitation	96.6 (12)	86.7 (26.5)	100 (0)	99.8 (0.92)	99.3 (1.92)	97* (5.92)	78.7* (28.3)
Adequate water	98.9 (5.9)	95.7 (15.6)	100 (0)	99.1 (6.59)	99.5 (3.46)	99 (4.14)	96.2* (11.2)
Adequate trash	99.7 (2.5)	97.4 (10.4)	100 (0)	100 (0.1)	100 (0.2)	99.9 (0.4)	97.8* (6.9)
Adequate electricity	92.2 (12.1)	67.4 (24.2)	100* (0)	98.8* (1.2)	95.8* (1.8)	88.4* (4.5)	67.2* (19)

***Indicates value was statistically significant to the .05**

Household characteristics

Census tracts in the formal city had an average of 221 homes, whereas those in the informal city averaged 204 homes. However, the average population of census tracts in the informal city was slightly higher with 664 people compared to 630 in the formal.

Population density (population per sq. km) and household density (households per sq. km) were higher in the informal city (44,776 people/km^2, 14,052 households/km^2) than the formal city (26,696 people/km^2, 10,657 households/ km^2) (**Table 4-5**). However, a closer look at the formal city revealed both population and household density were progressively lower for each level of reduced infrastructure quality. Census tracts with the worse infrastructure provision in the formal city had the lowest densities, averaging only 15,662 people/ km^2, and 5,289 households/ km^2). The best provided for parts of the formal city had the highest densities overall, with 46,706 people/ km^2, and 19,701 households/ km^2).

Table 4-5: Household characteristics by formal and informal city as well as the five categories of infrastructure quality, Rio de Janeiro, Brazil 2010

	Citywide (Pre-PCA)		Formal by RIQ score				
Variable name	**Formal (SD)**	**Informal (SD)**	**RIQ 1 (SD)**	**RIQ 2 (SD)**	**RIQ 3 (SD)**	**RIQ 4 (SD)**	**RIQ 5 (SD)**
Household Indicators							
Permanent private households *(N)*	1,711,654	421,839	182,389	476,844	462,379	392,544	197,498
Owned Homes % (SD)	66.6 (15)	77.1 (16.9)	63 (17)	64* (14.3)	65.9* (13.2)	69.2* (14.6)	72.8* (16.4)
Inhabitants per household mean (SD)	2.84 (0.4)	3.29 (0.4)	2.6* (0.4)	2.67* (0.4)	2.83* (0.4)	3.01* (0.3)	3.16* (0.4)
Population Density pop/sqKm mean (SD)	26,696* (36,689)	44,776* (40,824)	46,706* (53,379)	37,230* (48,621)	21,385* (22,380)	15,306.0* (15,819)	15,622 (19,350)
Household Density HH/sqKm mean (SD)	10,657* (17408)	14,052* (13,425)	19,701* (25,396)	15,666* (23,543)	8,271* (10,272)	5,372* (7,274)	5,289 (7,938)

***Indicates value was statistically significant to the .05**

When looking at residents per household, a pattern of increasing number of inhabitants per room as the quality of infrastructure declined. The informal city had the highest average number of residents per household (3.29). Residents of RIQ5 had the highest household density in the formal city (3.16) and those in RIQ1 had the lowest average residential density of 2.6 residents per household.

Census respondents in the formal city report declining levels of home ownership as the quality of infrastructure improves. Areas with the lowest quality infrastructure RIQ5 have the higher average home ownership rates (72.8%), declining for each step along the RIQ to only 63% of households owning their own homes in the best provided for parts of the city RIQ1. The highest reported homeownership rates were found in the informal city, where 77% of respondents reported owning their own home.

Socioeconomic characteristics

The results show that though the divide between formal and informal persists, gradients emerge in the formal city with residents of the wealthier, more established parts of the city being older, more highly educated, and having higher incomes (Error! Not a valid bookmark self-reference.).

Table 4-6: Socioeconomic characteristics of the formal and informal as well as the five categories of infrastructure quality, city of Rio de Janeiro, Brazil 2010

	Citywide (Pre-PCA)		Formal by RIQ score				
Variable name	**Formal (SD)**	**Informal (SD)**	**RIQ 1 (SD)**	**RIQ 2 (SD)**	**RIQ 3 (SD)**	**RIQ 4 (SD)**	**RIQ 5 (SD)**
Demographic Indicators							
Population (N)	4,886,952	1,378,362	476,371	1,281,403	1,317,181	1,187,778	624,219
Younger than 5 years of age % (SD)	4.91 (2)	8.08 (2.3)	4.09 (2.1)	4.06* (1.7)	4.58* (1.6)	5.62* (1.7)	7.14* (2.1)
Over 60 years old % (SD)	18.3 (7.7)	7.59 (3.1)	21.1 (8.3)	21.4* (7.4)	19.5* (7.1)	15.1* (5.3)	11* (5.4)
Education % (SD)							
Literacy 15-24 year olds	99.4 (1.1)	98.3 (1.9)	99.7 (0.8)	99.6* (0.8)	99.5* (0.9)	99.2* (1.12)	98.7* (1.8)
Literacy 25 year and older	97.8 (2.6)	91.7 (4.5)	99.1 (1.37)	98.8* (1.5)	98.3* (1.6)	97.1* (2.15)	94.4* (4.3)
Income							
Mean monthly income $R (SD)	3,987 (3,289)	1,238 (334)	5,303 (3,730)	5,126* (3,506)	4,224* (3,274)	2,671* (2,291)	1,922* (1,609)
Households earning less than 2 times minimum wage** % (SD)	54.1 (27.9)	88.5 (6.43)	38 (26.7)	39.8* (25.9)	52.2* (25.7)	69.9* (19.5)	78.4* (18)
Households earning income greater than 10 times minimum wage** % (SD)	6.65 (11.4)	0.14 (0.5)	11.1 (14)*	9.78* (12.3)	7.15* (12)	2.5* (7.07)	1.44 (5)

***Indicates value was statistically significant to the .05**
****Minimum wage of R$ 510.00; equivalent to US$289.77, in 2010**

One or the more dramatic differences across the newly categorized census tracts are the differences in the proportion of children under five years of age and the proportion of elderly over the age of sixty. Census tracts in RIQ5, with the lowest quality of infrastructure, have the highest proportion of children under the age of five, with a mean of just over 7% in the informal settlements and 7% in the formal city. This is almost twice as high as the proportion of children under the age of five in the best provided for parts of the city, RIQ1, (4.1%).

When looking at the proportion of the population over the age of 60, we see a reverse trend than we saw with children under five with a greater proportion of adults over 60 increasing as infrastructure provision improves. In the best provided census tracts in the formal city, RIQ1, 21% of the population is over 60; roughly two times greater than the proportion of the over 60 population in the least provided for parts of the formal city (11%); and nearly three times for those in the informal city (7.6%).

Adult literacy rates differ across the newly categorized census tracts following the trend of increasing levels of literacy as infrastructure provision increases. Though literacy levels lag behind in the informal city (91.7%) even compared to least well-provided parts of the formal city, RIQ5 (94.4%). The best provided for parts of the city, RIQ1, had the highest rates of adult literacy with the smallest variation (99%).

Stark differences in median household income —as reported in the Brazilian Census in the local currency the Real—were observed in the formal city along the gradient of infrastructure provision. Households in areas with the lowest quality infrastructure in the formal city (RIQ5), on average earned well under half the monthly income ($R1,922) compared to those in the best provided for parts of the formal city, RIQ1 ($R 5,303). Yet, even the areas with the lowest quality infrastructure in the formal city earned on average more monthly income than residents in the informal city as a whole ($R1,238).

Spatial distribution of inadequate infrastructure

Figure 4-1 and **Figure 4-2** demonstrate the different views of Rio de Janeiro when the city is mapped dichotomously as formal versus informal or along a spatial gradient of infrastructure provision. **Figure 4-1** shows the distribution of federally recognized informal settlements across Rio de Janeiro. The map reveals that fewer federally recognized informal settlements are located in the city's south or west. However, **Figure 4-2** with its infrastructure gradient display reveals many areas of the city's west zone that are lacking in adequate infrastructure—far more than are elucidated by looking only at federally recognized informal settlements.

Figure 4-1: Federally recognized informal settlements (AGSN) in municipality of Rio de Janeiro

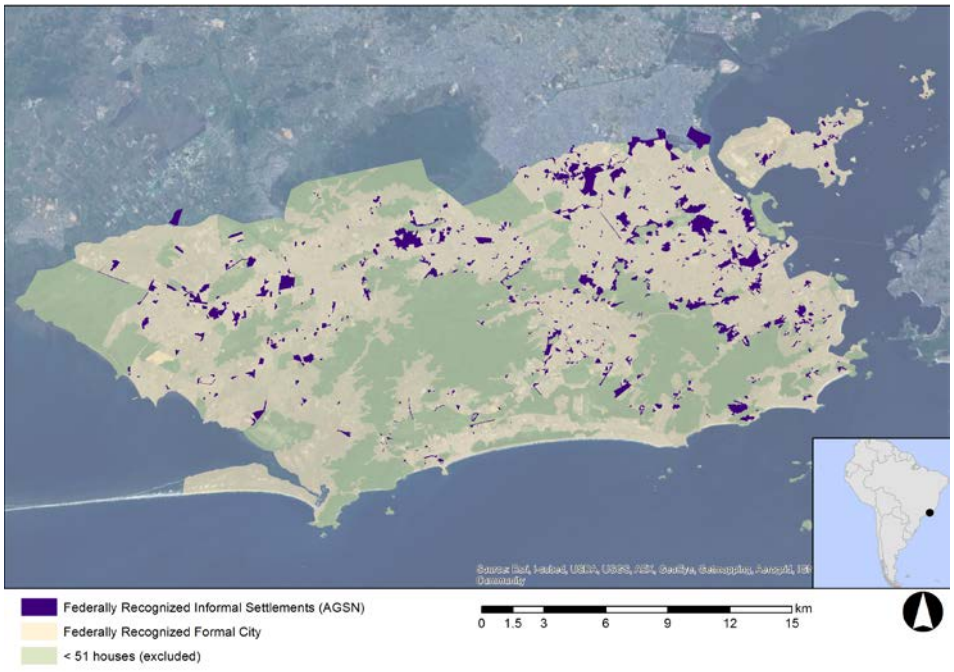


Figure 4-2: Census tracts, stratified by relative infrastructure quality (RIQ) in the municipality of Rio de Janeiro

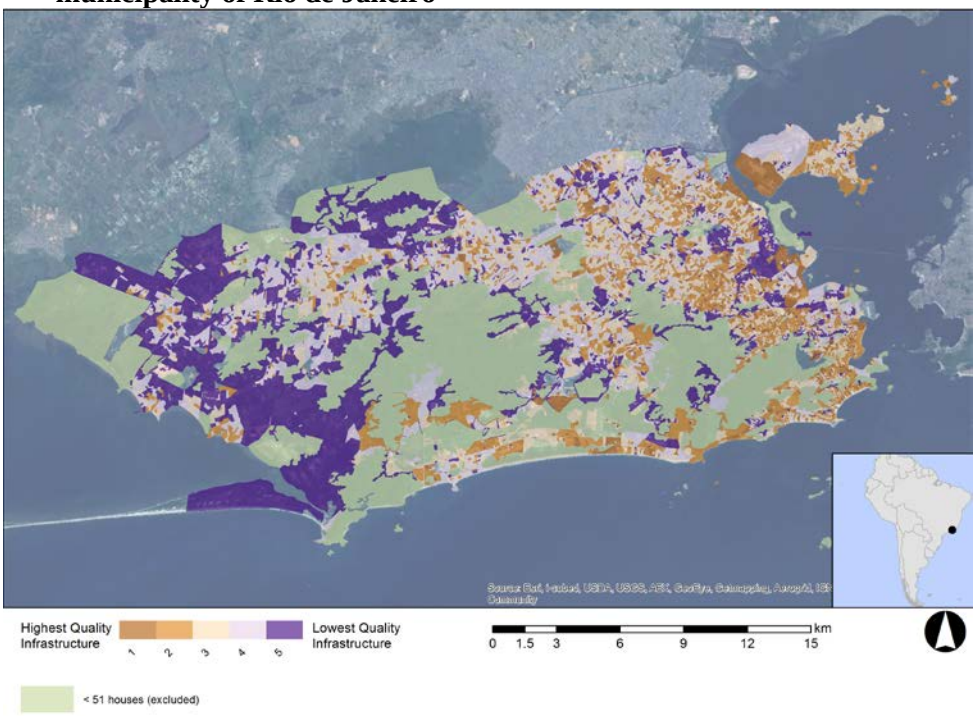
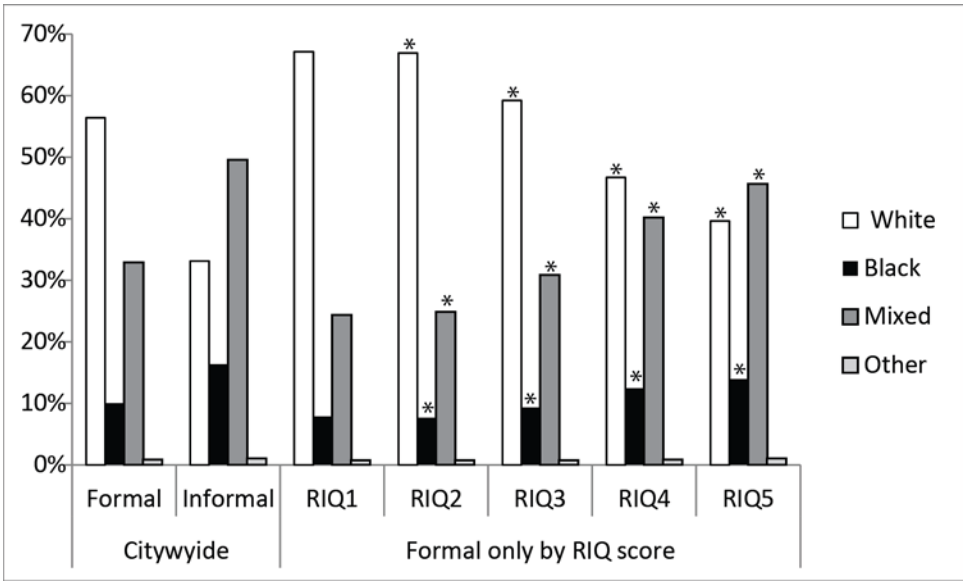


Table 4-7: Percentage of population by official census racial categories, national figures and for the municipality of Rio de Janeiro.

	Brazil		Rio de Janeiro			
			Citywide		*Formal*	*Informal*
	population	*%*	*population*	*%*	%	%
White	91,051,646	47.7	3,234,812	51.2	56.4	33.1
Black	14,517,961	7.6	724,197	11.5	10	16.3
Mixed	82,277,333	43.1	2,307,104	36.5	32.8	49.5
Other	2,902,258	1.6	46,484	0.8	0.8	1
Total	190,755,799	100	6,320,446	100	100	100

Source: 2010 Brazilian Census

Figure 4-3: Distribution of population by official census racial categories across categories of informal/formal city and across Relative Infrastructure Quality Score



Citywide percentages of total population by census race category divided by total population in formal or informal designated census tracts. Values represent proportion of population identified by race to the total of the spatial category. All values in percent. *indicates that values are statistically significant to .05. Source 2010 Brazilian Census.

Racial disparities

The racial breakdown of Rio de Janeiro matches closely with the national breakdown by race, though the city is slightly more white and black than the nation as a whole (**Table 4-7**). Racial disparities are present between the formal and informal city, and a gradient of racial disparity emerges in terms of the Relative Infrastructure Quality (RIQ) score, with the areas with better infrastructure being whiter than areas with worse infrastructure in the formal city (**Figure 4-3**). While a greater proportion of black and mixed Brazilians in the informal city is unsurprising, a closer look at the formal city reveals some disturbing patterns. Non-white Brazilians are present in greater proportions in areas with lower quality infrastructure in the formal city. The proportion of black and mixed Brazilians nearly doubles from the best provided for parts of the city, to the least (RIQ1: 7.8% black, 24.3% mixed; versus RIQ5: 13.9% black, and 45.6% mixed). The areas with worse infrastructure within the formal city still have a lower average proportion of black and mixed residents than the officially designated informal city (16.3% black, 49.5% mixed). For white Brazilians, the trend is reversed, such that the proportion of whites increases as the quality of infrastructure increases.

Discussion

Researchers that have looked at the spatial distribution of Rio's informal settlements have attempted to dispel the myth that *favela*s are homogenous and can be equated with poverty (O'Hare & Barke, 2002; Preteceille, Valladares, & Henriques, 2000). The analysis of census data conducted in this paper confirms this view. Though it would be disingenuous to deny that stark

inequalities exist between informal settlements and formalized settlements in Rio de Janeiro, these inequalities are not isolated to the informal/formal divide, but can be seen throughout the city. By disaggregating data from the formal city along relative measures of infrastructure provision, a gradient of social indicators of wealth, age and income emerge. The parts of the formal city with the best relative infrastructure quality scores have the highest proportion of the top income earners as well as the highest rates of adult literacy and near complete adequate coverage for critical infrastructure.

It then becomes clear that better quality infrastructure correlates to higher social indicators, which is expected. However, this trend becomes disturbing when we look at who lives in these parts of the city. Non-whites (mixed and black Brazilians) were more represented in the informal city than the formal city. Of those that do live in the formal city, both groups are disproportionately represented in the parts of the city with the worst quality of infrastructure. This disparity is highlighted when compared to white residents of Rio de Janeiro who experience a reverse trend that is their representation in the city increases as the quality of infrastructure improves. The positively correlated trends in representation across the gradient of infrastructure quality for white residents and inversely relationship for non-white residents highlights the disparities that have been observed between white and non-white Brazilians in other areas of social life. These patterns could be linked to historic issues of racism and/or white privilege in the provision of housing, access to neighborhoods and economic opportunity (Fischer 2004; Schwarcz 1998; S. A. dos Santos 2006). Additionally, black, and mixed Brazilians are at greatest risk of succumbing to violence at the hands of the police, and are under-represented in elected office, academia, media, and other positions of power (S. A. dos Santos 2006, 37–38). Two seemingly contradictory trends emerged when looking at household and population density as well as residents per households. While on average the informal city had higher densities than the formal city across all of these measures, a contradictory pattern emerged when looking closer at the formal city. The parts of the formal city with the best infrastructure connections had higher household and population densities than even the informal city; however, inhabitants per household were the lowest of any other category of infrastructure provision examined. This pattern was reversed for census tracts in the formal city with the worst quality of infrastructure, which had the lowest population and household densities but nearly as high residents per household as the informal city. The high densities in the best provided for parts of the formal city can be explained by their high number of condominiums. This would explain both high density and better provisions of infrastructure. Whereas the lowest densities in the formal city can be explained by the much larger census tracts that occur in the newly expanded west zones of the city.

Limitations

Four main issues could work to limit the findings presented here, namely: 1) the reliance on areal data can result in scale and aggregation errors, known as the modifiable areal unit problem (MAUP); as well as logical fallacy in the interpretation of statistical data known as ecological fallacy, 2) the strong link between wealth and resource allocation driving the patterns that are reflected in this research, and 3) the fluidity of race identification and classification in Brazil. As with all analyses reliant on areal data, including the Census, the results can differ depending on how these areas are carved up on a map (Openshaw 1984a, 8). Since census data cannot be

disaggregated beyond the census tract, some level of uncertainty about the actual spatial distribution of the data remains. This issue is particularly important for calculating population and household densities. Spatial data also inherently faces problems of ecological fallacy, as averages calculated for areas cannot be assumed to apply equally to their component parts (Openshaw 1984b). This then limits the extent to which the resulting trends found for individual variables can be said to overlap when looked at collectively. Therefore, the finding that non-whites lived in areas with worse infrastructure compared to whites would not necessarily mean that non-whites lived in households with worse infrastructure compared to whites. However, the patterns described in this study do conform to broader the social dynamics of race and class. Further, this does not preclude wealth and class being the major driver of the differences noted in this paper. Though even here, the patterns observed are reflected in both the formal and informal city, however, slight class influences could be observed. Further, race categorizations in Brazil have been found to be fluid, both with differences in self-identification over time and differences in categorization by others based on socioeconomic status. So any exploration of race satisfied over what could essentially be considered an economic measure, means this type of comparison could reflect a tautology, as wealthier and better-connected Brazilians would identify themselves with whiteness compared to poor and less well-connected Brazilians who might identify more with Blackness, along a gradient of social exclusion (Loveman, Muniz, and Bailey 2012).

The cross-sectional nature of this analysis precludes answering this critical question directly and more work is needed to better understand the links between race/ethnicity and access to adequate infrastructure. Another limitation is that the Brazilian Census approach to characterizing the adequacy of infrastructure does not provide information on how residents themselves perceive the extent to which these provisions meet their needs. Indeed, it is possible that in some areas critical infrastructure amenities exist, but in fact, services are inadequate, infrequent or too intermittent.

Attempting to identify spatial patterns of the parts of the city most lacking in adequate infrastructure, is challenging without a neighborhood scale approach. Rio de Janeiro's western expanse has the highest proportion of residents living in areas with the lowest levels of adequate infrastructure, yet this part of the city also has the fewest officially recognized AGSNs. This could be explained by the fact that the western part of the city is also the area that has experienced growth most recently in the city's history. Additionally many *loteamentos*, or settlements that may have been purchased illegally or have not been properly registered, may account for the low levels of infrastructure provision. Lastly, the northeast section of Rio de Janeiro has the largest number of people living in areas with the lowest quality infrastructure that are officially recognized as AGSN.

Conclusion

This work developed a relative comparison of adequate infrastructure provision within the city of Rio de Janeiro based on the criteria that the federal government uses for their operational definition of informal settlements, through their publically available census data. This work is limited in that there are no practicable mechanisms for coding census tracts as being legally occupied (one of the components of the operational definition of AGSN). The mere classification of areas as informal can be important, as they also reflect additional concerns of security due to

the control that many *favela*s fall under drug gang control, as well carrying additional burdens of social exclusion. However, these concerns are not exclusive to the *favela*, nor are all *favela*s equally under the same threat. There need for ranking and determining which parts of the city ought to be prioritized for infrastructure investments is clear, but in making those determinations, both policy makers, and researchers must move beyond the binaries of formal and informal so as not to run the risk of perpetuating the inequalities that I have discussed in this chapter.

This work contributes to the literature challenging the dichotomous view of cities as formal and informal and argues for moving towards examining areas by conditions that produce poor health. By looking closer at the operational definition for informal settlements, namely the AGSN category in the Brazilian Census, this work has highlighted the substantial presence of areas not categorized as informal that appear to face similar challenges to those officially classified as informal. Further, this study provided evidence for the need for better highlighting racial disparities at the sub-administrative neighborhood level, particularly in the context of better defining place-based health disparities. Disaggregating data reveals intra-urban inequalities. Though other researchers have found these inequalities between slum and non-slum communities, this work reveled that socioeconomic differences can be characterized as a gradient of inequality when looking at the city by the characteristics used to create operational definition of informal settlements. To my knowledge, no study has looked at disparities reflective in racial composition by gradients of infrastructure provision, beyond looking at differences between the formal and informal city, or across administrative zones of the city. The findings here support the need for more detailed ethnographic work that has been conducted in various communities throughout the city, and is consistent with perceptions of residents that the formal and informal divides do not respect the administrative boundaries that demarcate one from the other.

Government data that is made publicly available do not yet allow researchers to explain the connections between place and health at a higher resolution than health catchment areas used for reporting health data. This can result in missing intra-urban inequalities that are apparent when analyzing data that do reflect these health relevant data at the sub-neighborhood level. Much work has been done to characterize neighborhoods and consider the spatial units that are meaningful for residents. However, countries like Brazil, which have been collecting and publicizing detailed information at the census tract level, can reveal much about the state of inequalities that contribute to poor health. These data can act as tools for highlighting those disparities, particularly as their comprehensive nature allow for detailing conditions that would be impractical to conduct robust ecological studies.

Measuring progress toward achieving health goals requires accurate counts and measurements. As nations move away from the practice of ignoring residents of informal settlements when conducting their census counts, these data have given health advocates, and local governments new tools to better identify health disparities across urban environments. Researchers can use data from the top to hint at these disparities, but how we represent our categories whether aggregated or disaggregated can either highlight or obscure those disparities.

CHAPTER FIVE

Conclusion

This dissertation has highlighted the complexity, interconnections, and contestations over racialized spaces in Rio De Janeiro's informal settlements and how designations of place through boundary-making shift across scales of governance, and between residents (Chapter 2). Naming and framing are more than just about how communities and places are defined by the top-down or from the bottom-up. The processes of categorizing informal settlements can reinscribe pejorative connotations that are rooted in a history of slavery and exclusion, and which perpetuate stigmas of both people and places in informal settlements (Chapter 2). The use of precision mapping tools can work to blur the lines of what residents see as inclusive of their communities (Chapter 3). Finally, reliance on the state's data, which depict urban spaces dichotomously as formal and informal, can conceal inequalities, and particularly obscure which areas lack adequate infrastructure when their formal urban designation implies otherwise (Chapter 4).

In this conclusion, I revisit the theoretical frames of top-down, bottom-up, view of informal settlements and combining these perspectives in what I call sideways glance, where the state's data can be re-oriented to reflect the nuances that emerge from the bottom-up view. These views provide critical nuance and implication for governance and resource allocation through social programs and the use of place-making. I then summarize key findings and present suggestions for translating them into work on the ground. I also discuss the limitations of this work as well the implications of recent mega-events in Brazil (the World Cup and Olympics) and the recent ouster of the Workers' Party president, Dilma Rousseff who had supported many state-based efforts to enumerate and upgrade informal settlements in Rio de Janeiro. I conclude with some final remarks.

Revisiting the top-down, bottom-up, and sideways glance

Early in my doctoral studies, my colleagues at UC Berkeley and the State University of Rio de Janeiro and I embarked upon an analysis of the 2010 Brazilian Census to answer questions about the social and spatial determinants of health across Rio de Janeiro's informal settlements (Snyder et al. 2013). This census was the first time the Brazilian government counted people living in informal settlements throughout the country, published information on who lived in these places and the conditions in which they lived. The Census relied on an official category that designated areas with inadequate infrastructure as *aglomerado subnormais*, or AGSN. Even as a non-Brazilian, I could see how this bureaucratic term was not one that I would want to be used to describe my community. While discussing our findings with Katia, the executive director of the Center for Health Promotions (CEDAPS), I substituted the term AGSN with *favela*, the colloquially popular term to describe these areas. She responded with what I can only describe as a gentle nudge, as she repeated what I said but substituted her preferred term, "*comunidades*," the Portuguese word for community. This interaction left me wondering if the differences in infrastructure provisions that my colleagues and I found between AGSN and non-AGSN corresponded with perceptions of residents of *comunidades*, *favelas*, *morros*? Do the state's views of informal settlements match those of their supposed residents? If not, where do these misalignments occur? Moreover, what are the socioeconomic and political ramifications of such

a mismatch?

To answer the questions posed above I employed, what I call the top-down, bottom-up, and sideways glance. This entails taking the state's perspective, the top-down view, which it sees as true and combining with the bottom-up view, the street view, the human-scale view. By combining the top-down and bottom-up view with a sideways glance of state data, the incongruities of place designations are revealed with the robustness that policy makers often seek. These incongruities reflect deeper underlying racial and class divisions that are concealed when only looking at state categories of place from above, and are often dismissed as anecdotal or too context specific when portrayed from the bottom-up. While much work has been done to bring to light the disparities of our world through community-based and participatory research, these methods often face formidable resistance by the state and its reification of census categories that marginalizes local knowledge. Thus, a sideways approach to analyzing state data provides a strategy for integrating the view from above with the on-the-ground community knowledge about the boundaries and socioeconomic characteristics of informal settlements. This method also highlights the following:

Key Findings and Implications for Policy

Dichotomous representations of informal settlements conceal inequalities. The spatial distribution of municipal infrastructure reflects the social marginalization of black and brown Brazilians in Rio de Janeiro (Chapter 4). Disparities between white and non-white Brazilians (black and mixed) have been well-known, yet these disparities are often conceptualized as spatially manifest along the "slum-divide." Alternatively, the presence of white Brazilians in the informal city and the presence of black and mixed Brazilians in the formal city are often portrayed as proof that racial disparities are only class disparities in disguise. The work done in this dissertation revealed that the dichotomous view of urban spaces as either formal or informal distort what it means for black and brown Brazilians to be in the formal city. By re-orienting the Census data, such that census tracts were ranked relative to each other along the criteria used in the operational definition of informal settlements, a new picture emerges. Statistically significant differences emerge along a gradient from census tracts with the best municipal infrastructure to the worst, with whites heavily concentrated in the former, and blacks and mixed Brazilians in the latter. These findings highlight the existence of a gradient of racial disparity correlated with quality of municipal infrastructure. This work is the first time such a study has been done. However, results align with other studies and theories of racial disparity where whites are considered the most privileged and blacks the least.

Using a relative measures of the criteria used in the operational definition of a slum, identified areas meeting those criteria that were not officially recognized as informal settlements. When these were examined along a gradient of disparity of adequate infrastructure provision, racial inequalities were made clearer, as black and brown Brazilians were represented in higher proportions in the areas with the worst level of municipal infrastructure. Before doing this, the assumption had been that class was an issue but not race. These findings suggest otherwise and indicate that this is a citywide problem.

Youth community mapping revealed porous boundaries between the favela and asfalto and clear boundaries between favelas. In Chapter 3, I compared the competing views of the state

and residents of communities recognized as AGSN to see how they matched. Taking advantage of the community mapping data that the Center for Health Promotions (CEDAPS) had been working together with youth residents of the comunidades they worked in, I was able to depict, how youth saw their community, and how that related to the official administrative boundaries of the *favela*, and AGSN that they lived in. The results were surprising and unsurprising. Unsurprising the borders between the AGSN and non-AGSN did not seem to matter as much in many of the communities the youth mapped. Particularly community assets like schools located outside of the AGSN designated areas were perceived as part of their community. So much so that the routes to these facilities included mapped locations of areas that the youth wanted to improve. This finding is important as it signifies that community resources located outside of officially designated informal settlements are likely to be utilized by their residents. However, this comes with a caveat that should be strongly adhered, namely geographical features, which could inhibit access to these resources; particularly the steep slopes that can limit mobility for those who cannot otherwise easily get around. Additionally, social barriers can further limit access to these resources.

The surprising result is that residents of one favela/AGSN see clear demarcations between their and neighboring favela/AGSN. These youth mapping data reflected this crisp line between Morro dos Prazeres and Morro do Escondidinho (Chapter 3). This finding would suggest that community resources placed in one favela/AGSN may not be accessible to residents from a neighboring favela/AGSN even if they remain proximate to each other. The territorial divisions between non-state powers such as drug gangs and paramilitary forces suggest could a role why these boundaries are so pronounced, while boundaries between the favela/AGSN and the asfalto are not.

People give places their meaning, but which people? In Chapter 2, I explored the various terms used to describe the informal city and found that this reflects discordance between how the state sees place and their residents. These disconnects, however, repeat across government actors, and amongst residents, each with their own point of view. Residents are divided, with moves to push back on the term *favela*, due to its pejorative connotations, as well as moves to embrace and reclaim the history of resistance and resilience. However, organized and concerted efforts to ascribe meaning to Rio de Janeiro's *favelas* takes shape for different reasons. Tourist guides, hostel owners, and others who financially benefit from the *favela* tourism have perpetuated the terms use and are capitalizing on it a recent image of the as a cool and chic place to visit. Some residents of informal settlements engage in a political act to use the term favela but to do so as a sense of pride. Still, others have implicitly agreed that the term cannot be reclaimed and move to use terms like *comunidade*. Ultimately, questions about what these areas ought to be called and who gets to name them, reflect deeper meanings of power relations and how the people who live in and ascribe meaning to those places are valued. The policy implications are evident when these naming contestations are taken together with the findings from the studies mentioned above. Based on the operational definition of AGSN, areas that are also most in need of improved municipal infrastructure are not listed under the categories that would grant them priority for slum-upgrades. We must understand that these spaces are dynamic, they grow, they shrink, new people come in, and these changes occur much faster than the decennial census can track. Hence, we must consider how we use our findings that we are not cementing the disparities that we find, rather that we illuminate the conditions that produce those disparities and

update our analyses to reflect the changes that have resulted.

Limitations

Limited data resolution of the Census. To better understand the social and spatial dynamics of health disparities we need to understand how those disparities are present in urban areas. We need high-resolution data; that can reflect intra-urban and intra-neighborhood contexts to help us identify what areas are the most vulnerable. Census data are typically the highest resolution data collected by states, though they are also limited by their reliance on areas that are not meaningful to their residents, and the relatively long gaps between their collection (typically a decade).

Census data insufficiently reveal the nuances of disparities that come from the interactions of race, class, gender, and place. Moving beyond the dichotomous representation of place as either formal or informal, we can begin to reveal the nuanced disparities occurring across places like Rio de Janeiro and see how these disparities occur along gradients. Similarly, in order to better understand how an individual's identity is linked to their access of to health protective resources, we must move beyond the simplistic representations of identity.

The Census is the building block of knowledge about places. A census is a powerful tool that can be considered part of the infrastructure of the modern state. This unseen and under-acknowledged tool wields enormous power over decisions on how to spend scarce resources. This makes undercounts and miscategorization of places so damaging to the informal city. While efforts to improve the accuracy of the Census should be pursued, its limitations need to be acknowledged, and the decisions based on these censuses should be scrutinized.

Translating community knowledge, interpreting community insights. Community mapping serves as a tool that allows community members to speak for themselves and represent their world through and the meaning they attach to it. These insights can be quite powerful, particularly when collected and translated onto a map. Community mapping takes advantage of the effectiveness of maps to communicate complex socio-spatial problems to government agencies (Elwood 2006:199). Yet outsiders may not fully grasp the meaning behind the community mapping without the benefit of engaging with the people who took part in the mapping exercise.

Recession, impeachment, and implications for poverty alleviation and slum upgrading

At the time of this writing, Brazil has been facing economic and political turmoil. Since 2014 Brazil's economy has been in a recession, considered the worst in recent history, with unemployment rates above 11.5%, and a contraction of GDP by at least 9% (Kiernan and Jelmayer 2016). Though the causes of the economic downturn can be linked to falling international oil prices, and commodities prices, (Allen 2016), the faltering economy left Dilma Rousseff, the nation's first woman president, vulnerable to attacks from her critics who alleged that in the run-up to the 2013 elections, she concealed lost state revenue with money from the state-owned petroleum company, Petrobras. While no one has accused her of personally enriching herself, the same cannot be said for her accusers in the Brazilian Congress; of the 594 members of Congress, 353 are under investigation for corruption (Beauchamp 2016).

Months of protests clashing in the streets followed the first presidential impeachment vote on May 2016, which suspended President Rousseff from office. Moreover, on August 31, 2016, the final impeachment hearing took place just ten days after the Summer Olympics and concluded in Rio de Janeiro, by replacing Rousseff with Vice President Michel Temer from the Brazilian Democratic Movement Party (PMDB).

In the wake of these events, many questions have emerged on the ability of Brazil to continue to meet its goals of reducing poverty and integrating informal settlements into the city. The economic decline that preceded the political turmoil already raised questions about how the programs discussed in this dissertation would continue to be funded. However, the shifting political climate ushering in a conservative government can be read as a rejection of the wealth distribution efforts that Brazil embarked upon, such as the Bolsa Familia conditional cash transfer program, and Favela-Bairro slum-upgrading programs. One commenter suggested that Temer's recent remarks to "pacify and unify" the country (Brasil 2016) ominously suggest he would want to expand the Police Pacification Units (Peregrino 2016), a program which has been much criticized for targeting Black Brazilians. Though how Temer sees pacifying the country playing out is not clear, he detailed plans to balance the budget through austerity measures that would cut state spending on education, health, and another social programs with 17 billion USD in spending cuts and tax breaks (Agencies 2015).

Only time will tell what the full impacts will be on Brazil's poverty alleviation and "slum upgrading" programs. With new elections slated to take place in 2018, just two years before the next census, we can only wonder if the turbulent decade that sits between the 2010 and 2020 censuses will be reflected in those results. Moreover, as long as Brazil continues on the path of open data, I aim to analyze those results.

Final Thoughts

This dissertation sought to answer the question; do the boundaries of informal settlements as articulated by the national census and the municipal registry of informal settlements match up with the lived experience and colloquial conception of residents of Rio de Janeiro? Various organs of the state rely on these designations for prioritizing where state funds ought to be allocated, implementing so-called slum upgrading projects, as well as apportioning electoral representatives. These resource distributions are not just based on the population counts, but also the makeup of the population, so, for example, areas with a larger proportion of school-age children should be given greater education resources. Moreover, areas with a larger proportion of low-income residents should be directed poverty alleviation resources. Similarly, areas with a higher proportion of dilapidated or absent housing infrastructure ought to be prioritized for such programs that address these concerns.

There is a common imperative to better prioritize resource allocation by identifying areas and people who are most in need. However, critiques and controversies over where state resources have been distributed suggests that some of those most in need are being left out. Further, given the reliance on state data to determine where resources ought to be allocated, indicate that how these tools are employed needs to be re-examined. Thus, by combining this top-down, and bottom-up view to produce a sideways glance, we gain greater clarity of the connections that

people have to places and can start to make better assessments of how place impacts and influences health, as well as identifying who is most vulnerable.

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