

SOCIAL VULNERABILITY, ENVIRONMENTAL INEQUALITY,
AND CHILDHOOD ASTHMA IN PHOENIX, ARIZONA

by

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ABSTRACT

Asthma is a pressing children's environmental health issue in Arizona, the US and the world. In this dissertation, I address racial/ethnic, socioeconomic, and spatial inequities in childhood asthma in Phoenix, Arizona. Using quantitative analysis, I investigate the relationships between socioeconomic status, race/ethnicity, indoor hazards, ambient environmental hazards and asthma hospitalization rates at the zip code level in metro Phoenix. I find distinct socio-spatial inequalities in asthma hospitalizations, with criteria pollution being the most important predictor. I then explore the nexus of race, class and place by conducting fifty-three in-depth interviews with parents of children with asthma in an upper class Anglo suburban enclave (Ahwatukee) and the poor and minority central city (South Phoenix). Drawing off a vulnerability framework adapted from social studies of natural hazards, I focus on the experiences of households coping with asthma. Two important resources emerge as salient for coping: health care and the environment. Comparing experiences between South Phoenix and Ahwatukee, I investigate how access to, and control over, asthma resources differed between the two areas. My findings highlight the coupling of race/class/health in place and how historical legacies of racism and discrimination shape contemporary experiences with asthma. In conclusion, I offer a hybrid environmental justice approach that combines quantitative and qualitative methods and can be applied in other settings.

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CHAPTER ONE

INTRODUCTION AND REVIEW OF LITERATURE

Introduction

The air is thick with particulates as I exit the Loop 202 freeway east of downtown Phoenix during rush hour and drive the short block to interview Gwendolyn. Gwendolyn is a single African-American parent with three children, all of whom have asthma. She speaks in a tired voice, explaining that her youngest, Gracilyn, is eleven and was diagnosed with asthma when she was five years old. Gwendolyn feels that air pollution, combined with complications at birth, caused Gracilyn's asthma. Though she is concerned about pollution, Gwendolyn lives in the shadow of the freeway on a busy street because the apartment management accepts her public housing voucher and because the apartment is located along a bus route. Gwendolyn's job does not provide health insurance, and since she earned approximately \$10,000 last year, her household qualifies for Arizona's Medicaid program. Gwendolyn has a high school education and works full time in data entry, relying on the city bus for transportation. It takes her about an hour and a half to travel to Gracilyn's clinic via bus. Gracilyn has not seen her primary care doctor in over a year, even with a weeklong hospitalization at the County Hospital several months ago. Despite frequent asthma exacerbations, Gracilyn has not been prescribed a preventative medication and has only her 'rescue' medication, which she uses multiple times per day indicating that her asthma is poorly controlled. I ask Gwendolyn about the future of Gracilyn's asthma and she reports that she is hopeful it will improve.

It is again at rush hour several days after meeting Gwendolyn that I travel to a suburban area on the southern edge of Phoenix to interview Faith. Faith is an Anglo registered nurse in her mid-thirties who energetically explains to me that her son Phillip was diagnosed with asthma at two years of age and is now six. After two episodes of coughing and wheezing that sent him to the emergency room, Faith spoke with his pediatrician about seeing a specialist for asthma. The specialist conducted allergy testing on Phillip and told Faith that he did not suffer from allergies and therefore it would not be necessary to remove the carpet in the home and get rid of Phillip's more than one hundred stuffed animals. Faith, however, is more than willing to take these steps. The household earns over \$150,000 a year and Phillip and his sister attend a premiere private school. In the last year, Phillip started swimming on a competitive team as part of his asthma management strategy. When I ask about Phillip's future, Faith remarks that it is "truly bright" and she is optimistic that starting him on Advair, a powerful preventative steroid, as soon as he is allowed (i.e., when he turns eight) will reduce his symptoms completely.

The vignettes of Gracilyn and Phillip provide an introduction to this dissertation by illustrating contrasting experiences with asthma within the city of Phoenix. In what follows, I address racial/ethnic, socioeconomic, and spatial inequities in childhood asthma in metropolitan Phoenix, Arizona. Asthma is a respiratory condition resulting in coughing, wheezing, and tightness in the chest, thought to be caused by genetic factors interacting with social and environmental triggers (Halfon and Newacheck 2000). Asthma affects children in many ways: it can impact sleep, and reduce abilities to play,

and participate at school. It can also result in school absences, emergency room visits, and contribute to obesity (Spencer 2000; Mitchell 1991).

I focus on asthma for practical and theoretical reasons. Practically, asthma is an important children's health concern in Arizona (Arizona Department of Health Services 2003) and in the rest of the United States and the world. Metropolitan Phoenix ranks in the top five large US cities for asthma-related deaths (*Asthma is a problem in Phoenix and Tucson* 2003). Asthma is particularly troubling for Phoenicians under age twenty one, a population which is hospitalized for asthma at a rate four times that of all other ages (Arizona Asthma Coalition 2003). In Phoenix, approximately eight percent of the metro Phoenix population have asthma (Rimsza, Bartels, and Bannister 2006). At a more local level, previous research conducted in a low income Latino neighborhood in Phoenix found that sixteen percent of children (ages 0-18) had a parental report of doctor's diagnosis of asthma; this is twice the national average (Grineski 2003). Studies show prevalence rates of six to sixteen percent for asthma and/or undiagnosed breathing problems for children in US central cities (Donnelly, Donnelly, and Thong 1987; Joseph et al. 1996; Maier et al. 1997); according to a national study, nearly nine percent of children in the US had asthma in 2001 (Rudestram et al. 2004). Racial/ethnic minority groups are more at risk for experiencing asthma symptoms (Akinbami, Rhodes, and Lara 2005). Theoretically, I am interested in asthma as a condition that connects humans and their environments, and has a complex etiology of social, genetic and environmental factors.

In this study, I explore sociospatial patterns of inequality in uncontrolled asthma at the zip code level using statistical analysis for metropolitan Phoenix (i.e., Maricopa

County), Arizona. Moving from a zip code level scale to a household scale, I investigate the nexus of race, class, place and health using narratives that I collected from fifty-three parents of children with asthma. I interviewed parents residing in the historically poor/minority central city and a newer, upper-middle class suburban enclave. My research approach combines ideas from vulnerability analysis, environmental justice and critical social geography. This approach emphasizes situated, spatial and historical contextualization of contemporary experiences in the city. It complements the narrative tradition in sociology in that it recognizes the validity of lay understandings about health and environments. Moreover, it places asthma narratives and statistical analysis in context by considering political, economic, environmental, and sociocultural forces.

Three research questions orient this research:

1. Do sociospatial inequalities explain patterns in uncontrolled childhood asthma?
2. How do parents have differential control of children's asthma?
3. How have historical geographical processes influenced inequalities associated with asthma control?

As these three questions suggest, the focus of this research is asthma control.

Controlled asthma means the child is not experiencing coughing, shortness of breath, or wheezing; waking up at night from asthma; having reduced activity levels; having episodes of asthma that require a unplanned doctor's or emergency room visit, and missing school (American Academy of Pediatrics 1999, 77). The rest of this chapter will address my approach, which includes a review of literature related to (1) health inequalities and asthma, (2) vulnerability analysis, (3) environmental justice, and (4) critical social geography.

My Approach

Health inequalities and asthma

A review of literature related to childhood asthma reveals disparities along the dimensions of race/ethnicity, social class and environment (Spencer 2000; Kearns and Gesler 1998; Fitzpatrick and LaGory 2000). Health status and access to resources are significantly lower for urban minority populations than for others (Fitzpatrick and LaGory 2000). Racial/ethnic minority children in the United States tend to be at higher risk for being diagnosed with asthma than are Anglo children, and their asthma tends to be more severe (Ortega and Calderon 2000; Akinbami, Rhodes, and Lara 2005).¹ Quantitative studies have yet to reveal a definitive cause for their high risk and severity although cockroach allergens, household smoking, air pollution, poor access to quality healthcare, and underutilization of inhaled anti-inflammatory medications are most commonly found in statistical studies (Ortega and Calderon 2000).

Researchers struggle with separating the effect of race from other confounding predictors, like urban residence and social class, in quantitative studies. Some demonstrate that race is most salient: Miller (2000) finds that asthma prevalence, emergency room use and hospitalizations decline with increasing income for non-African American, but not for African American, children. Others indicate that race-based differentials are explained by urban residence (Aligne et al. 2000) or exist only among the very poor (Smith et al. 2005). I argue that separating the effects of race/ethnicity, class and place is an exercise in statistical abstraction because historical-geographical contingencies have fused these characteristics in the contemporary US milieu. For Gwendolyn and Faith, race, class and place are indivisible as African-American

Gwendolyn lives in poverty in the central city and Anglo upper class Faith dwells in the suburbs.

Accessing healthcare is an important facet of asthma control that varies by race/ethnicity, class, and place. For example, in Phoenix, the poor/minority area south of the Salt River has been designated as a primary care health professional shortage area (Department of Health and Human Services 2000). A shortage of access to primary care and lack of health insurance, along with other factors, contribute to the overuse of emergency rooms by low-income minority children with asthma (Boudreaux et al. 2003). In a study of children with asthma on Medicaid, Fredrickson et al. (2004) find that parents prefer primary care treatment to the emergency room but report difficulties in using primary care - such as trouble obtaining urgent appointments, limited continuity of care, the perception that doctors preferred they use the emergency room, and difficulties obtaining medicines - as the reason for emergency service use. Healthcare providers identify many barriers to care for low-income racial/ethnic minority children and these include financial difficulties, lack of healthcare coverage, coverage limitations (e.g., plan not covering asthma equipment like peak flow meters), lack of knowledge about asthma and treatment, transportation barriers, culture and language, and a lack of continuity of care (Lara, Allen, and Lange 1999; Butterfoss, Kelly, and Taylor-Fishwick 2005). For Latinos, some point to the primacy of cultural and language factors but others recognize that low-income Latinos lack the medical resources necessary for good asthma control. Berg et al. (2004) find that when Mexican-American households in San Diego do not take their children to get medical treatment for asthma, it is because of a lack of resources, including finances, childcare, transportation, and insurance.

African-American and Latino children are at increased risk for discrimination in healthcare. Within private practice, race/ethnicity is associated with physician noncompliance to national guidelines for children's asthma treatment (e.g., African-American and Latino children receive fewer inhaled steroids controlling for symptom severity among many other variables) (Ortega et al. 2002). Using controls like provider type, age, and gender, a study of children on Medicaid in Massachusetts finds that Latino and African American children are more likely to receive suboptimal asthma care than are non-Latino white children (despite the fact that all the children have the same health insurance). Latino children with asthma are thirty-nine percent less likely than non-Latino white children to see a specialist for asthma and forty-one percent less likely to obtain a follow-up visit within five days of being seen in the emergency room for asthma. African-American children are sixty-four percent less likely than non-Latino white children to receive timely follow-up care after being seen in the emergency room for asthma (Shields, Comstock, and Weiss 2004).

Racial/ethnic discrimination in healthcare is symptomatic of a hegemonic system of white privilege in the US where whiteness systematically confers advantage across a host of experiences ranging from neighborhood hazards to healthcare (Pulido 2000). In addition to influencing healthcare, white privilege systematically places racial/ethnic minority persons, and those living in poverty, in more hazardous places (Pulido 2000). Places can be defined as hazardous due to both the quality of the indoor environment (within the home) and the ambient environment, both of which are addressed in asthma literature. Within the home, mold/dampness (Maier et al. 1997), environmental tobacco smoke (Crain et al. 2002), and allergens associated with furry pets, cockroaches, dust

mites, and rodents (Lanphear et al. 2001) trigger and/or cause asthma. In metropolitan Boston, homes in high-poverty areas are more likely to have elevated cockroach allergen levels than homes in the low-poverty areas (Kitch et al. 2000). Some cite substandard inner city housing as contributing to poor indoor conditions by increasing risk for exposure to allergens, moisture, fungi, rodents, insects, pesticide residues and indoor air pollutants (Matte and Jacobs 2000; Eggleston et al. 1999).

Poor air quality is significantly linked to asthma in children (Neidell 2004; Yu et al. 2001; Gilliland et al. 2000; Zhu, Carlin, and Gelfand 2003). Thompson et al. (2001) find small associations between asthma emergency room visits in Belfast, Ireland and increased levels of benzene, particulate matter, nitrous oxide, nitrous dioxide, carbon monoxide and sulfur dioxide when pollutants are analyzed independently. Wilson et al. (2005) find that elevated levels of sulfur dioxide and ozone are associated with increased visits to the emergency room for asthma on a daily basis in Portland, Maine. Peel et al. (2005) investigate emergency room visits for asthma, chronic obstructive pulmonary disease, upper respiratory infection, and pneumonia in Atlanta and find links with ozone, nitrous dioxide, carbon monoxide, particulate matter, and organic carbon levels. Migliaretti and Cavallo (2004) use nitrogen dioxide and total suspended particulates as proxies for urban traffic pollution when studying Torino, Italy. They find significant effects between asthma hospitalizations for children and each pollutant tested separately with controls such as temperature, humidity, and seasonality. When both are included in the model, the effect of total suspended particulates is confounded by nitrogen dioxide and statistically insignificant (Migliaretti and Cavallo 2004).

The qualitative literature related to asthma has tended not to focus on inequalities, but instead on identity, attitudes and perceptions of adults with asthma and of parents of children with asthma. This literature is shared among the disciplines of sociology, medicine, and nursing. Sociological studies generally deal with identity and acceptance of asthma diagnoses. Using interviews with seven adults with asthma, Snadden and Brown (1992) find that patients require knowledge and mentoring to facilitate acceptance of asthma in their lives. Adams et al. (1997), using interviews with thirty adults with asthma, discover that willingness to accept the identity as an asthma sufferer influences views and practices related to medications. The nursing and medical literature addresses patient experiences in order to improve the quality of patient care (e.g., Dalheim-Englund, Rydstron, and Norberg 2001; Horner 1997). For example, Kieckhefer and Ratcliffe (2000) use focus groups with parents of children with asthma to uncover parental fears and receive parental recommendations as to how providers can improve care. Another focus for sociologists, physicians, and nurses is parental perceptions of children's asthma causation (e.g., Conway and Hu 1999; Peterson, Sterling, and Stout 2002). A recent study of this sort examined lay perceptions of asthma causation among indigenous Alaskans. Wind, Van Sickle and Wright (2004) report significant associations between health and place as environmental conditions dominate responses to questions of asthma causation. To those interviewed, increased asthma among Yup'ik children represents a weakening of the collective physical body because of outside influences, such as development, pollution, and automobiles. This study highlights the importance of perceptions of place to local understandings of asthma (Wind, Van Sickle, and Wright 2004). Authors wonder at the end of article if similar findings would be

found in other, non-indigenous cases. This qualitative asthma literature provides a general understanding of asthma experiences on a phenomenological level, but does not delve into the experiences of injustices or managing asthma in political economic context.

In sum, the quantitative asthma literature demonstrates that race, ethnicity, social class, and environment are important dimensions of socio-environmental inequality tied to a host of asthma outcomes. A gap exists in the qualitative literature whereby inequality is not explicitly studied. In contrast, I will employ both quantitative and qualitative methods to travel farther ‘upstream’ in search for explanations behind these patterns of inequality.

Vulnerability analysis

A review of the health inequalities literature reveals a general need for a more contextual approach to understanding inequality. The dominant paradigm, bolstered by countless quantitative sociological studies, posits socioeconomic position (SEP) as a fundamental cause of health disparities (Wilkinson 1996; Link and Phelan 2000; Phelan et al. 2004; Gilligan 2005; Lutfey and Freese 2005; Phelan and Link 2005). The fundamental cause argument suggests that social causes are not proxies for ‘true’ causes, but are the causes themselves because socioeconomic disparities in health remain despite changes in the diseases and risk factors. SEP embodies an assortment of resources, such as money, knowledge, power, and social connections that protect health (Phelan et al. 2004). The link between low SEP and poor health has been theorized to be a function of relative or absolute material deprivation and/or the stress of a low position on the social hierarchy (Wilkinson 1996; Stronks, van de Mheen, and Mackenbach 1998; Link and

Phelan 2000; Frank et al. 2003; Wen, Browning, and Cagney 2003). The focus of the fundamental cause perspective is on consequences, not causes, of inequality

What is missing from these studies is a systematic study of power relations in broader context. The exception is Coburn (2004) who advances earlier work by tying neoliberalism and global capitalism to growing poverty and income inequalities which in turn link with class-based health differentials. He conceives of unidirectional flows of explanation connecting neoliberalism and health inequalities through comparisons between nations. He finds that countries with social democratic forms of welfare regimes have better health. His critique of health inequalities research includes the challenge to move beyond SEP as the fundamental cause and consider a wider array of ‘upstream’ social determinants of health (Coburn 2004).

Scaling down from the international level, geographer Susan Craddock (2000, 154) addresses weaknesses in the health inequalities literature by examining the “interaction of institutional, cultural, social economic and historical contingencies of place” in her study of HIV risk in Malawi, Africa. She develops a poststructural feminist political economic model of vulnerability, part of which I adopt in this analysis, testing its applicability to non-infectious disease in a First World urban context. Her model combines the rigorous conceptualization of political economy borrowed from vulnerability scientists studying risk and natural hazards with a poststructuralist perspective that recognizes the role of social identity and culture in defining disease risk. She states, “Diseases, in other words, are cultural products, given a specific moral lexicon depending on symptomology and the ideological needs of a society at a given moment in

time” (Craddock 2000, 154). In the case of children with asthma, the medical paradigm focuses on genetics and pharmaceuticals, not pollution and housing reform.

Craddock’s expanded model of vulnerability includes the notion that women often face different and more serious risks because of political economic and discursive processes (Craddock 2000). Feminist geographers also contribute to the project of inserting feminist thought into vulnerability analysis. They argue that women lead more spatially restricted lives than men and this gendering of space reduces women’s access to knowledge and is used by men to reproduce power (Spain 1992). They assert that the contemporary city embodies gender and is quite literally “man made” (Peet 1998).

The core of Craddock’s model is vulnerability analysis, which is a type of political ecology focused specifically on risk, hazard and endangerment. Political ecology has been defined as a way to “understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods” (Watts 2000, 257). To date, environmental health implications have yet to be fully investigated by political ecologists. Mayer (1996) asserts that political ecology could be very useful in studies of disease and it has been employed occasionally in the study of infectious diseases (see Kalipeni and Oppong 1998; Craddock 2000). However despite its lack of application, the political ecology of environmentally associated disease is ripe for exploration. As an approach directed toward socio-environment interactions, political ecology necessitates mutual consideration of biophysical and social aspects of disease. When applied to disease, a political ecological approach can illustrate how global political economics influence health in local areas (Mayer 1996; Harthorn 1998).

Specifically, the vulnerability perspective is concerned with how social relations of production shape differential access to resources for coping with environmental risks. Vulnerability is produced through unequal exposure to risk and unequal access to resources (Bolin and Stanford 1998). Wisner and colleagues (2004, 11) define vulnerability as “characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard.” Important characteristics include social class, gender, age, race/ethnicity, language/literacy, and migration/residency (Bolin and Stanford 1998).

Social class is a central component to vulnerability and a general indicator of access to resources. The bundling of social class with other vulnerability characteristics, like race/ethnicity and gender, adds specificity. It is not always the case that people with low social class will have the most difficulty coping with stressors. Race/ethnicity can be closely tied to social class, but it is important as a separate category when racial/ethnic groups live in socially isolated, economically marginalized communities and are persistently discriminated against. Gender is a hierarchal structure of unequal access to social and economic resources; gender effects are difficult to separate from others, like those due to class, as characteristics combine to disadvantage certain households (Bolin and Stanford 1998). An individual’s age, or the age composition of a household, is tightly bound to social class, with elderly households sometimes being more vulnerable to risks. Old age is related to vulnerability in that a lack of mobility, frailty, physical challenges, and reliance on fixed incomes often accompany aging in the US. Language/literacy overlaps with race/ethnicity and migration/residency, but should be considered separately as it conditions access to information, like how to sign up for social

services. Migration/residency is closely coupled with language/literacy and race/ethnicity but more distinctly marks people as politically vulnerable. Recent policy changes that “intentionally disadvantag[e] an already vulnerable low income population” (Bolin and Stanford 1998, 119) have aggressively reduced the social services available for undocumented residents. Residency is not a characteristic that is homologous within households and it cannot be assumed that all people in the same household have the same rights.

As a relational term, vulnerability is different than poverty: it involves a combination of factors that determine the degree to which someone’s life and livelihood are at risk by an event (either chronic stressor or perturbation). It is space and time specific (Wisner et al. 2004). “Vulnerability can be interpreted as a loss of effective power in the creation of one’s own future: one is effectively harnessed to be a part of someone else’s proposed future” (O’Riordan and Timmerman 2001, 436). However, processes that generate vulnerability are countered by the capacities of people to resist, avoid, and adapt to those processes and create security (Wisner et al. 2004). Analyzing the capacity of people to cope, or “act within the limits of existing resources and range of expectations to achieve various ends” is a way that the vulnerability researchers recognize agency of households in the face of structural constraints (Wisner et al. 2004, 113).

Households use self-protection and social protection measures to cope (Wisner et al. 2004). Vulnerability researchers use the term ‘self-protection’ to refer to actions taken by individual people or households to reduce risk for themselves or their members. Self-protection measures used by households with asthma include removing carpet, moving

away from hazardous neighborhoods, moving out of substandard housing, and giving children preventative asthma medications. Abilities to self-protect relate to social class, culture, and preferences (Wisner et al. 2004).

Social protections occur at a level above the household and can be non-monetary social relations (e.g., assistance from family), or provisions from the government or institutions (e.g., health insurance). Access to institutional/governmental provisions is a function of systems of domination and household members as ‘citizens’ with ‘rights’ in relation to the state (Wisner et al. 2004, 97). Social protections in the US have been declining in the neoliberal age (Morgen and Maskovsky 2003). In this age, the business class, suburbanites and other elites have coordinated efforts to dismantle social protections in accordance with new ideological and political economic imperatives of neoliberalism (Morgen and Maskovsky 2003). This decline in social protection influences poor household abilities to cope with risks and increases the gap between the poor and the wealthy, who do not rely to the same extent on social protections.

Adding Pierre Bourdieu’s notions of ‘cultural and social capital’ to a vulnerability analysis helps better elucidate the influences on households’ abilities to protect. Bourdieu asserts that a focus solely economic capital (i.e., money) neglects the roles of heredity, accumulation, and inertia in conditioning opportunity (Bourdieu 1986). He offers cultural and social capital as additional forces to be considered. Social capital relates to social connections; it depends on the depth and breadth of social networks, and the volume of capital held by people in the networks. Cultural capital is embodied and relates to long lasting dispositions instilled through investments of time by others. It is also institutionalized through systems of formal recognition such as educational degrees

or national languages (Bourdieu 1986). “Cultural capital is the degree of mastery one has of the cultural practices which a given society recognizes as legitimate” (Callinicos 1999, 289), and therefore directly relates to power.

Vulnerability researchers generally use *household* to delineate their unit of analysis. Households are economic decision-making units that share common eating arrangements, resources and assets, and live under the same roof (Wisner et al. 2004). In this study, I use the term household with the understanding that it refers a multiplicity of familial types, including nuclear families, extended families, and foster families. Vulnerability analysis is useful for policy makers because it can delineate circumstances that both put people at risk and reduce their ability to respond to hazards (Cutter 2003). Vulnerability analyses suggest targeted interventions for specific groups in specific places.

While developed in the field of natural hazards, the perspective has utility for health inequalities research as is evidenced by Craddock (2000). It moves the discussion upstream from SEP as a fundamental cause to broader discussions of political economy and global-local articulations. Vulnerability research operates off the premise that disasters are not caused by only ‘natural’ events *per se* but are products of social, political and economic practices (Wisner et al. 2004; Hewitt 1983). The same claim can be made for diseases, especially those intimately associated with environmental conditions, which form at the confluence of physical processes in the human body, local environments, sociocultural phenomenon, and political-economic forces.

Genetics play a role in the development of asthma and the dominant paradigm among pulmonary researchers recognizes complex interplay between genetic background

and exposure to multiple environmental stimuli (Kleeberger and Peden 2005). However, looking through a poststructural lens forces the consideration of how dominant paradigms construct bodies at risk and the social power inherent in the constructions. Constructing asthma as a primarily genetic condition suggests interventions and treatment that are complimentary with the dominant medical paradigm focusing on individual behavior and the capitalist logic favoring externalization of pollution risks from production. Research at the confluence of genetics and environment illustrates the complexity behind the separation of genetics from environment, with genetics influencing susceptibility to environmental factors (e.g., pollution) and environmental factors influencing genetics *in utero* (Peden 2005).

A number of similarities can be identified between sociology of disaster and sociology of disease literatures. These links make transparent the ways in which disease and disaster are similarly constructed and understood. Early in their development, both fields conceptualized their object of study as a discreet event that interrupted ‘normal’ life, such as Michael Bury’s (1982) notion of illness as a ‘biographical disruption’ and disasters as ‘isolated misfortunes’ (reviewed in Hewitt 1983). Later, both fields re-theorized disaster and illness as ongoing situations with varying impacts depending on social characteristics. Aspects of disease and disaster have been understood from perspectives that separate ‘natural’ events (e.g., hurricanes or diabetes) from social processes. This reductionist scientific approach has influenced interventions in the field of medicine toward behavior modification and education instead of social reform; disaster mitigation strategies focus almost exclusively on reducing physical risk without considering social risk. Actors are assumed to rationally choose hazardous environments

or unhealthy behaviors, or be ignorant to risks. Sociologists studying both subjects plea for consideration of social factors along with biophysical and biomedical ones when making policy decisions (Bolin and Stanford 1998; Link and Phelan 2000)

Sociologists of disaster and disease use similar social constructionist notions to explore their respective phenomena. Disaster researchers claim that natural hazards are disasters primarily because people reside in areas where they occur. Similarly, medical sociologists, especially those who study disability, posit that people are ‘ill’ or ‘disabled’ only when their characteristics are constructed as such. For example, being in a wheelchair is not a disability when high-rise buildings have elevators and motorized doors. A one hundred year flood is a not disaster when people do not dwell in the flood plain. Hewitt (1983) notes that most disasters are characteristic, rather than accidental features of places and societies. In the same way, certain illnesses, like asthma, AIDS or tuberculosis, cluster in certain social spaces due to systems of power and resources, instead of being randomly distributed (Farmer 2003).

In review, I use the vulnerability approach to undertake a rigorous examination of power and context in producing health inequalities. I do so by investigating access to resources and coping strategies, while considering gendered experiences and, secondarily constructions of dominant knowledges. While the approach has not been applied to health inequalities in the First World, it is ripe for application because it addresses weaknesses in the health inequalities literature.

Environmental justice

Environmental justice research centers on concerns over the societal distribution of environmental risks and hazards and their disproportionate health impacts. The

quantitative branch of the field rests firmly on geographic information system (GIS) technologies and the development of complex techniques for representing hazards, minority groups and their relations in space (Cutter, Scott, and Hill 2002; Mennis and Jordan 2005). Qualitative environmental justice research focuses on the historical development of environmental injustices (Bolin, Grineski, and Collins 2005; Boone 2002; Pulido, Sidawi, and Vos 1996) and social movements for environmental justice (Kebede 2005; Schlosberg 2004; Di Chiro 2004; Brown et al. 2004; Capek 1993). The qualitative studies offer important findings related to racism and urban development, and how social groups mobilize for environmental justice, but do not include research into the experiences of people dealing with environmental inequalities. The exception is Farquhar et al. (2005) who combine the study of a social movement with in-depth interviews. They investigate parental perceptions of the role of the physical environment on children's asthma by interviewing ten low-income parents in Detroit, Michigan and assert that the views of community members should be considered in the assessment of stressors within the a risk assessment frame (Farquhar et al. 2005).

Quantitative environmental justice research has demonstrated that minority and lower-class urban neighborhoods suffer from unequal distribution of hazards across the United States (Brown 1995; Szasz and Meuser 1997), from New Jersey (Mennis and Jordan 2005) to Los Angeles (Pastor, Sadd, and Morello-Frosch 2004). Environmental injustices are also found in Phoenix where low-income and minority populations face disproportionate burdens from technological hazards (Bolin et al. 2000). After a proliferation of spatial studies depicting patterns of environmental inequalities across the US, researchers called for examinations into how such patterns developed (e.g., Cutter

1995). Hurley (1988) studied the historical formation of environmental injustices in Gary, Indiana, but the field was slow to follow. Since then, a small but growing number of qualitative historical studies examine the production of environmental inequalities through time, such as Pulido et al. (1996), Pulido (2000), Boone (2002) and Bolin, Grineski and Collins (2005). These historical studies place contemporary environmental inequalities within a framework of environmental racism and uneven development, calling into question the ways in which ‘race’ and ‘space’ are constructed in quantitative environmental justice research.

In environmental justice research, environmental racism has been popularly conceptualized in terms of individual, intentional discriminatory acts, e.g., racist citing decisions that place industrial facilities in neighborhoods because residents are African American. Therefore, scholars investigate the ‘the chicken or the egg?’ problematic; that is, the intentionality of citing decisions that place industrial facilities in minority neighborhoods (e.g., Been 1994). This contrasts with other social studies of race, where the focus is on systemic hegemonic forms of racism, like the urban segregation literature (Pulido, Sidawi, and Vos 1996; Pulido 2000).

As an alternative to the conventional understanding of racism employed in environmental justice research, Pulido (2000, 13) conceives of race as a dynamic sociospatial process and a ‘material/discursive formation’ whereby racial meanings dialectically relate to racial stratification and shape social and spatial structures. Pulido (2000) introduces the notion of ‘white privilege’ to studies of environmental racism as a way to foster historical and structural understandings of race. White privilege refers to the benefits that accrue to white persons because of their whiteness. Because of the close

linkages between race and class in the US, 'white privilege' also includes class privilege. It is different from overt racism as the concept recognizes that whites do not necessarily *intend* to hurt others, but that they accrue benefits by maintaining the status quo, continually unaware of their white-skin privilege (Pulido 2000). "As an unmarked category against which difference is measured, whiteness never has to speak its name, never has to acknowledge its role as an organizing principle in social and cultural relations" (Lipsitz 1995, 369). In the US, whites' ignorance and lack of reflection has produced and maintained a system that would not be allowed to thrive in more racially conscious societies (Pulido 2000). I adopt Pulido's notions in my analysis of environmental racism in Phoenix.

In addition to a more nuanced framing of race, considering health outcomes - instead of proxies for health - is the next step in quantitative environmental justice research (Buzzelli In Press). The environmental justice literature is replete with studies refining techniques for imputing risk (e.g., Cutter, Hodgson, and Dow 2001). Imputation of risk conflates both hazard exposure and health risk into one measure, e.g., pounds of industrial emissions per census tract. Two discreet sources of data usually inform the imputation of risk: Toxic Release Inventory (TRI) data (e.g., Bolin et al. 2002; Cutter, Hodgson, and Dow 2001) and municipal pollution monitoring stations (e.g., Jerrett et al. 2001; Buzzelli and Jerrett 2004). TRI was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990 (EPA 2005b). This legislation serves to inform people of chemical hazards in their neighborhoods. EPCRA requires industries to provide the locations and quantities of chemicals stored on-site to state and local governments². The

information is then made public in the TRI (EPA 2005b). Conducting environmental justice research using only TRI data is limited by the fact that facilities are not regularly audited to check the accuracy of reported emissions. TRI also does not contain information about non-industrial sources of pollution, like automobiles. It is, however, the only publicly available source of industrial air emissions data and is used effectively in research studies (e.g., Perlin, Sexton, and Wong 1999).

Because of these limitations, some researchers use data from municipal pollution monitoring stations in their analyses. They map the stations and then use average levels of criteria pollutants at each site to interpolate a pollution surface in GIS (e.g., Jerrett et al. 2001). Kriging is a geostatistical technique for interpolation that estimates values of points that are between sampling points using spatial autocorrelation; the sampling points in this context are monitoring stations. Municipal monitoring networks rarely conform to the assumptions of kriging, that is that the points are liberally and equally distributed across the spatial extent of analysis. This results in large standard errors (Jerrett et al. 2003). Environmental justice studies rely on kriged data to suggest relationships between people and hazards, but are limited by the quality of the data. Collaborating with scientists in other fields who spatially and temporally model pollution is one way to improve the quality of the pollution data used in environmental justice studies.

In other fields, scientists, such as engineers, computer scientists, and toxicologists, are refining techniques for modeling pollution over time and space (for information on Phoenix see Lee, Grossman-Clarke, and Fernando 2002; Lee, Fernando, and Grossman-Clarke In Review). These techniques have been developed to inform pollution reduction strategies and determine non-attainment areas for regulated

pollutants.³ However with current GIS capabilities, these models can be paired with other types of data and used in sociospatial environmental justice studies. They overcome limitations associated with TRI data and interpolated surfaces as they take into account how pollution moves through space by considering population and housing density, roads, water sources, land use and meteorology.

In addition, environmental justice researchers generally do not combine pollution, sociodemographic and health data in multivariate models. Within the field of air pollution epidemiology, there is a small but growing interest concerning the confounding role of socioeconomic status on the relationship between health and ambient pollution. Several studies demonstrate that persons with low SEP are more susceptible to health effects from pollution (Pope et al. 2002; O'Neill et al. 2003; Neidell 2004). For example, Neidell (2004) finds a strong link between asthma hospitalizations for children and carbon monoxide emissions on a month-by-month basis in California. He also finds that the effect of pollution is greater for children of lower socioeconomic status than for those of higher socioeconomic status, measured using education levels in zip codes. Combining statistical techniques from air pollution epidemiology with the theoretical framework and spatial analysis techniques of environmental justice results in powerful tools for examining health and environmental justice. Incorporating health measures in environmental justice research requires linkages between environmental justice researchers and health professionals in the government (e.g., State Department of Health), university (e.g., Schools of Public Health) and private sector (e.g., local hospitals).

Researchers studying environmental justice and asthma tend to conceive of the indoor and ambient environment as ontologically separate. Environmental justice studies focus almost entirely on ambient environments (Brown 1995; Szasz and Meuser 1997). The only exception is the case of children and lead where lead exposures from in-home paint are considered environmental justice issues by Kraft and Scheberle (1995) and indoor (e.g. in-home dust) and outdoor (e.g., soil) lead exposures are both used in the same study by Lambert and Lane (2004). Whereas asthma researchers have looked at both indoor and ambient exposures, they have not addressed the relationships between indoor and outdoor environments. Instead they have considered indoor (Bradman et al. 2005; Cheong et al. 2004; Chung et al. 2005; Kitch et al. 2000; Kodama and McGee 1986; Leaderer et al. 2002; Maier et al. 1997; O'Connor et al. 2004; Skorge et al. 2005) and ambient environments separately (Briggs et al. 2000; Bell, Samet, and Dominici 2004; Buzzelli and Jerrett 2004; Gilliland et al. 2000; Neidell 2004; Migilaretti and Cavallo 2004; McGowan et al. 2002; Peel et al. 2005; Scoggins 2004; Wilson, Wake et al. 2005; Sunyer et al. 1997).

This awkward separation of indoor and ambient environments stems from the ideology that humans are separate from nature and that ambient environments are not human-created, whereas indoor environments are. Especially in urban settings, both indoor and ambient environments have strong human imprints, with humans planting vegetation, polluting the air with motorized vehicles and building homes. In practice, indoor and ambient environments are co-constitutive. Roaches and mice move freely between homes and yards; air pollution flows in and out of homes; and dust from yards enters homes. In addition, there is a tendency to assume that the conditions of dwellings

are products of independent household decisions, rather than products of social processes inscribed with relations of power. I take the perspective in the analysis chapters that ‘environment’ includes indoor and ambient dimensions.

Asthma has become a visible and pressing issue in many low-income and minority neighborhoods. Environmental justice groups have mobilized around environmental factors in asthma responding to evidence that air quality and asthma are linked (Brown et al. 2003). In the case of asthma, there is agreement between activists and scholars that air quality does indeed play a role in asthma (Landrigan 2001; Zhu, Carlin, and Gelfand 2003; Wilson, Wake et al. 2005). Brown et al. (2003, 456) assert that “asthma has become perhaps the primary disease in which poor and minority people have pointed to social inequality and have engaged in widespread political action. The case of asthma demonstrates how environmental justice approaches place ethics and rights issues in the center of health policy.”

Using the environmental justice literature as my base, I treat exposure to asthma triggers (e.g., pollution, dust, mold) as environmental justice issues because exposure is mediated by racial/ethnic, social class and place-based inequalities. I also investigate the experiences of people dealing with environmental inequalities on a phenomenological level. I employ an expanded conception of environment that includes all spaces, such as those within the home, the city, and beyond to account for both indoor and outdoor environmental influences on asthma. I also apply the notion of white privilege to the formation of social and health inequalities, in addition to its original use of understanding environmental inequalities.

Critical social geography

Space and place are under-theorized in sociological research. Tickamyer (2000) asserts that the neglect of spatiality is a deficiency in the discipline. Before sociology became enamored with generalizability and statistical methods in the search for social laws mirroring those in physics, the discipline investigated topics that were inherently spatial such as core/periphery, urban/rural and developed/developing (Tickamyer 2000). With the development of GIS technologies and increased communication between disciplines, sociologists studying inequalities are again considering space; ‘spatial inequality’ is a small but emerging specialty area in sociology (Lobao and Saenz 2002).

In their quest for generalizability, sociologists have discovered robust patterns, such as those linking race and health (Kitch et al. 2000; Miller 2000; Boudreaux et al. 2003; Shields, Comstock, and Weiss 2004; Phelan and Link 2005; Smith et al. 2005; Ferris et al. 2006). Taking space into account by theorizing it as inseparable from society can help sociologists explain patterns uncovered. Following the Marxist tradition, geographer Neil Smith (1981, 190) critiques the dualistic tradition of conceptualizing society and space as separate:

The notion that space and society “interact” or that spatial patterns “reflect” social structure is not just crude and mechanical in its construction, but also prohibits further insights concerning geographical space; at root this...view of the relation between space and society remains tied to the absolute conception of space. Two things can only interact or reflect each other if they are defined in the first place as separate.

Considering space reinserts the environment into sociology. Not surprisingly, sociologists interested in space draw heavily from geography, particularly those studying environmental justice.

Instead of seeing space and society as separate, geographers see space and society as interdependent. Edward Soja (1980) proposes the sociospatial dialectic as a way to recognize the dependency of society and space on each other. The sociospatial dialectic is the idea that social inequalities produce, and are produced by, spatial inequalities. In their studies of society and space, geographers focus on the role of capitalism in creating space. Capitalist production is fundamental to the sociospatial dialectic as the relations of production are simultaneously social and spatial. In other words, “social relations of production are both space-forming and space-contingent” (Soja 1980, 211). Each round of capitalist development is coupled with a unique landscape in which some places are systematically privileged as sites of accumulation. The lines of sociospatial inequality are continually redrawn through capital’s dynamic of uneven development, which is endemic to capitalism (Brenner and Theodore 2002a, 355). “Uneven development is the basic geographical medium through which inter-capitalist competition and class struggle is played out” (Brenner and Theodore 2002a, 355).

Since the early 1970s, the global capitalist system has become increasingly neoliberal, meaning that institutional constraints on the market have loosened. Bourdieu (1998) characterizes neoliberalism as the “utopia of unlimited exploitation” because workers are exploited through low wages, privatization of public services, dismantling of welfare, assaults on organized labor and the reduction of corporate taxes (Brenner and Theodore 2002b). Like neoliberalism and capitalism, fear also plays a role in shaping the uneven development of the urban form. Mike Davis explains Los Angeles’ fortress-like architectural forms as “deliberate socio-spatial strategies” intended to insulate affluent society from the ‘undesirables’ (Davis 1992, 229). His notions can be cast more broadly,

as he explains, in the US, “we live in fortress cities, brutally divided between ‘fortified cells’ of affluent society and ‘places of terror’ where the police battle the criminalized poor” (Davis 1992, 224). Neoliberalization and fear reproduce, intensify, and crystallize uneven spatial development within cities.

Conclusion and overview of contents

My theoretical approach connecting vulnerability analysis, environmental justice and critical social geography in a study of health and environmental inequalities requires the use of multiple methods. The methods employed in this study include quantitative (Poisson regression and GIS) and qualitative (historical/archival, in-depth interviews). Quantitative methods provide a sweeping view that can be useful for documenting inequalities. Quantitative studies have power because of their generalizability and association with positivist ‘science.’ The value of quantitative studies in an emancipatory agenda (e.g., environmental justice or feminism) is that understanding social and spatial patterns in inequality is the first step toward working for equality (McLafferty 1995). For example, environmental justice activists use quantitative studies conducted by academics to bolster their struggles in the political arena.

In this study, I use quantitative methods to understand sociospatial patterns in inequality related to uncontrolled asthma in aggregate. However, quantitative analysis provides an incomplete picture and does not address experiences at the households level. For this, I turn to the microscale analysis and documenting the lived experiences with asthma. For example, one cannot understand ‘race’ by reporting a coefficient in regression model. Race is bound up with history, class, place, and gender, and experienced in social relations. To gain a more complete picture, I use in-depth

interviews with parents about their experiences coping with asthma in conjunction with quantitative analysis. I use both quantitative and qualitative methods to provide a general understanding of a pattern, and a nuanced look into the experiences of households. Quantitative and qualitative methods provide two optics for viewing and understanding childhood asthma.

Chapter 2 presents foundations for inquiry, including background information about Phoenix. In the third chapter, I introduce a zip code level analysis of the sociospatial patterns in uncontrolled asthma in metro Phoenix. Scaling down, in the fourth and fifth chapters I report qualitative findings pertaining to how the experiences of South Phoenix and Ahwatukee households differ in terms of health and environmental resources for controlling asthma. The sixth chapter offers a vulnerability framework that situates findings from the zip code and household level analysis in context, and presents theoretical and practical significance.

CHAPTER TWO

FOUNDATIONS OF INQUIRY

Introduction

This chapter provides background information critical to the chapters that follow. First, I review what a parent might learn about asthma from a healthcare provider or informational brochures. This information is important for understanding the parental quotes presented in Chapters 4 and 5. Next, I describe asthma in Phoenix, and illustrate local links between race/ethnicity, asthma and air pollution. The third aim of this chapter is to introduce the two case studies that are the foci of the qualitative component. Historical development and contemporary concerns are detailed for both areas. My understanding of the historical development of Phoenix came from archival research that included analysis of a variety of sources, such as historical journal and magazine articles, dissertations and theses, City of Phoenix Chamber of Commerce publications, and city and state government documents. I conclude the chapter by using sociodemographic information from the households participating in the in-depth interviews to introduce the people who live in each place and provide a more nuanced understanding of the differences between South Phoenix and Ahwatukee.

Asthma is a chronic inflammatory condition in the respiratory tract. During attacks, children experience bronchoconstriction, swelling of airway tissues, and excess mucus production that can plug the constricted air passageways. “Asthma has been called an invisible and unpredictable chronic illness that can frighten even adult patients as they helplessly struggle for air like a fish out of water. The phantom-like challenge to breathing, the symptoms that arise without appointment or predictability, and the

nondefinitive, multifaceted treatment all make for a disease that can be frightening and elusive— and all the while as impalpable as air itself” (Dell 2003, 50).

Because specific agents and actions trigger asthma, healthcare providers recommend that parents of children with asthma observe what triggers their child, and then avoid the triggers. Possible triggers include colds and infections, exercise, mold, tree or grass pollen, certain foods and additives, animals (especially dogs, cats, birds, and horses), wind, rain, cold air, dramatic fluctuations in weather, aspirin, aerosol sprays, odors, smoke, dust, air pollution, paint fumes, perfume, laughing, crying, holding breath and hyperventilating. Some triggers are inherently harder to control (Dell 2003; American Academy of Pediatrics 1999). Once the airways have reacted to a trigger, they are more sensitive to further triggers and the threshold for the asthmatic response is lower.

There are four types of asthma that are classified based on frequency of day and night symptoms before treatment (see Table 1). Households participating in the

Table 1. Clinical features of asthma before treatment

Classification	Days with Symptoms	Nights with Symptoms
Severe Persistent	Continual	Frequent
Moderate Persistent	Daily	5 or more per month
Mild Persistent	More than 2 per week	3-4 per month
Mild Intermittent	2 or less per week	2 or less per month

Source: American Academy of Pediatrics (1999)

qualitative interviews in this study have children with all four classifications of asthma.

Different control strategies are associated with each classification. For children with mild intermittent asthma, a ‘rescue’ medication is appropriate treatment. Rescue medications are used to treat acute symptoms during an attack. Albuterol, the most common type of rescue medication, comes in liquid forms appropriate for breathing

machines (also called nebulizers or SVN), and inhaled forms used in inhalers (see Figure 1). Breathing machines are often recommended for young children. The facemask and



Figure 1. Breathing machine and inhaler

Sources were <http://www.shades-of-night.com/weblog/images/nebulizer.jpg> and http://www.pcca.net/images/Medication_Images/ProventilMDI.jpg

hose apparatus deliver the medicine continuously and they do not require that the child have control over his/her inhalations. ‘Controller’ or preventive medications are recommended for children with persistent asthma. These medications reduce inflammation in the airways and are taken daily to prevent an attack. Advair and Flovent are commonly prescribed controller medication used by children whose households participated in this study. Many children with asthma also suffer from moderate to severe allergies, which exacerbate asthma symptoms. Children with asthma sometimes take allergy medications (e.g., Xyrectec) and nasal sprays (e.g., Flonase, Nasonex), depending on symptoms. Singulair is a medication prescribed to control both asthma and allergies. These six powerful asthma and allergy medications do not have generic counterparts and thus are very expensive. Uncontrolled asthma can be very dangerous,

and can result in death. Remodeling and scarring from uncontrolled asthma can also permanently damage children's lungs; this leads to increased risk of developing chronic obstructive pulmonary disorder.

Asthma trends in metropolitan Phoenix

Given its location in the warm dry desert, Phoenix has been a destination for persons seeking health since the late 1800s when local officials used the climate to actively recruit ill people to the nascent city (Grineski In Press-b). Into the 1960s and 1970s, asthma and allergy sufferers from the Midwest and Northeast moved to Phoenix to escape pollen-producing plants, pollution, and damp cold air. In Phoenix, as in other parts of the western US, environmental amenities initially attracting migrants were undermined by that very growth. The rapidly growing population quickly sullied the unpolluted, unpopulated, relatively disease-free environment of the late 19th Century (Grineski In Press-b). The Phoenix environment was polluted by pollen from nonnative vegetation planted by those who wanted to recreate a Midwestern or Northeastern landscape in the desert. In the last few years, metro Phoenix has led the nation in new home construction⁴ (Bernstein 2004). No other major US city depends as heavily on the housing industry for its economic well-being⁵ (Burrough and Creno 2004). Besides adding to traffic woes, the scale of construction has disturbed the desert crust and created serious air quality problems in metro Phoenix. Metro Phoenix was an Environmental Protection Agency (EPA) non-attainment area for carbon monoxide from 1990 to 2003 and has been a non-attainment area for particulate matter greater than ten microns in diameter (PM10) and ozone since 1990 and 1991 respectively (Arizona Department of

Environmental Quality 2004). Both of those pollutants are tied to respiratory disease (Zhu, Carlin, and Gelfand 2003; EPA 2000; McConnell et al. 2003).

There are clear temporal and spatial patterns in childhood asthma hospitalizations. A seasonal pattern is readily apparent in asthma hospitalizations. Hospitalization counts rise in the winter months, and fall during the summer months (Figure 2). In fact, twice as

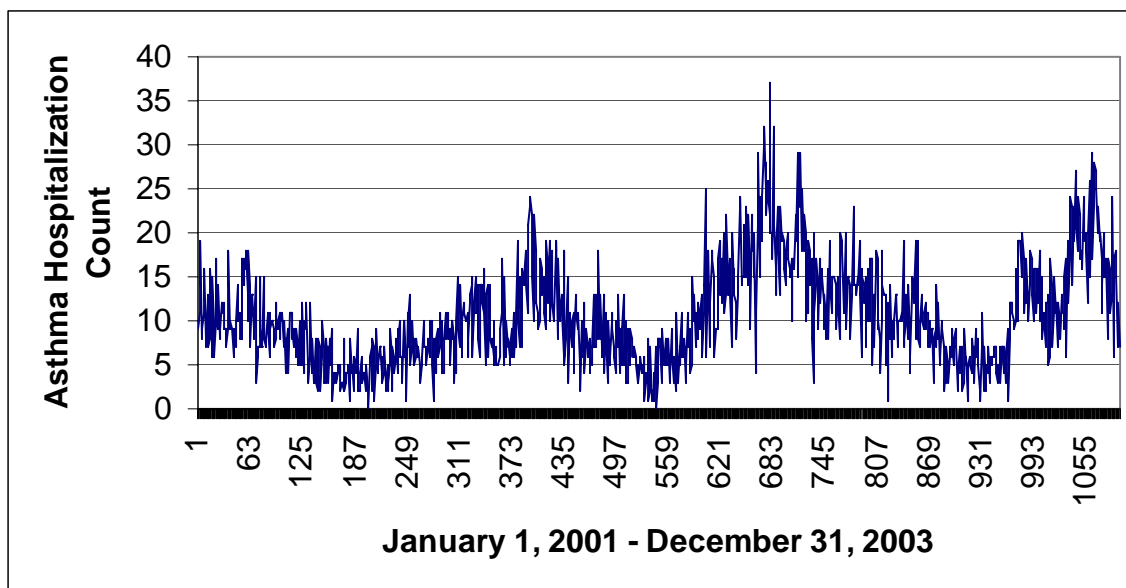


Figure 2. Daily asthma hospitalizations for all ages
Source of the data was Arizona Department of Health Services

many children are hospitalized for asthma in the winter months than in the summer months. Stagnant air, a thirty-three percent increase in traffic volumes, colder air and the cold and flu season combine to make it more difficult to control asthma in the winter.

Figure 3 illustrates the asthma hospitalization rate of children (per 100,000) by zip code in 1999. The color-coding scheme is based on quartiles of rates. Only the ninety-nine zip codes with more than 1,000 children are shown in this map; twenty-three zip codes are excluded in all dissertation-related analysis because their populations are too small to make a stable hospitalization rate.

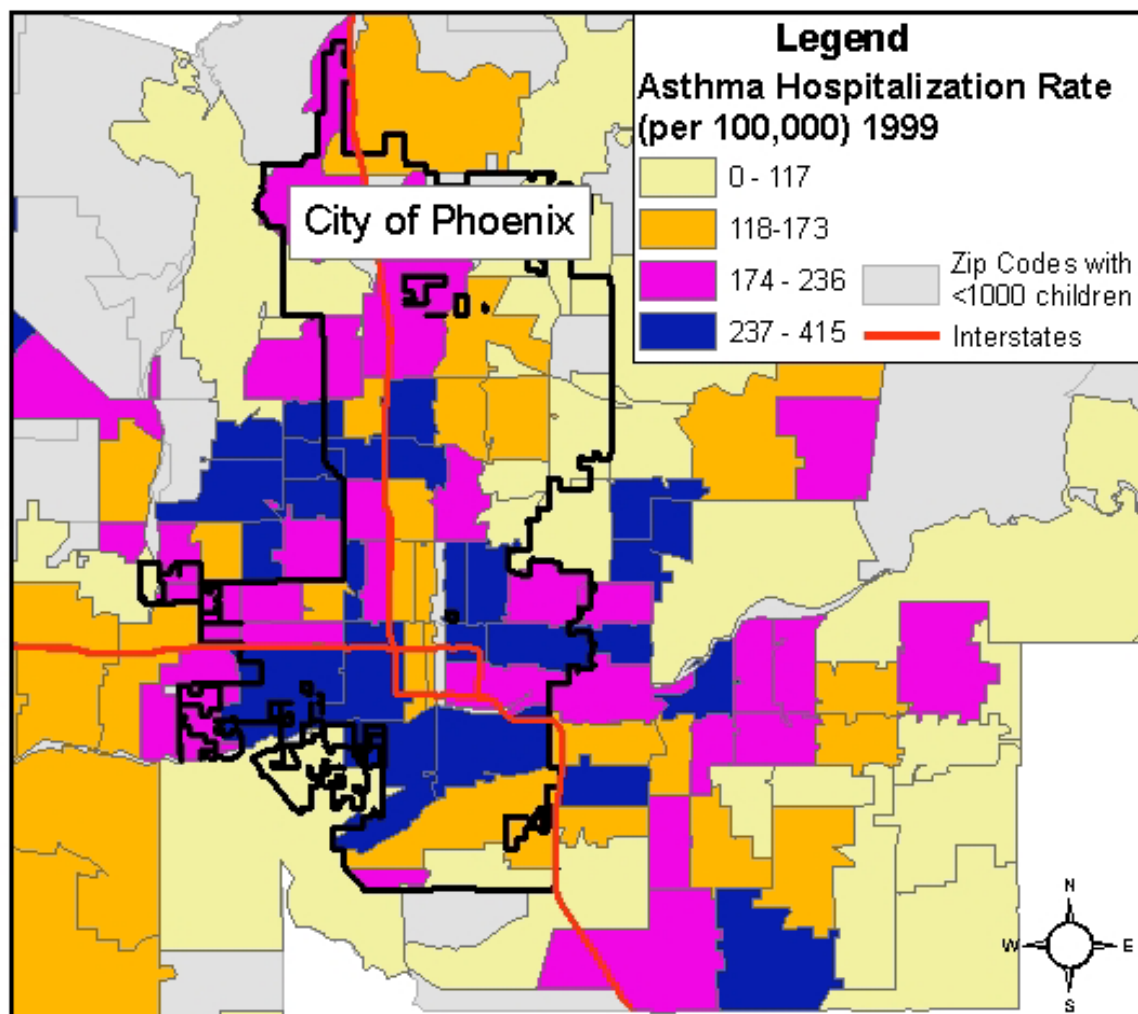


Figure 3. Children's asthma hospitalizations in metro Phoenix by zip code in 1999
 Source of the data was Arizona Department of Health Services

While visual inspection of the map reveals a clustered pattern in hospitalizations, I use spatial statistics to test whether it is statistically significant. Tests for spatial autocorrelation consider proximity of locations and the similarity of the characteristics at these locations. I use two tests: Moran's I, which measures how similar areal units are across the study area and the General G test, which indicates if values tend to cluster in high or low groupings. See Technical Appendix A, for complete methodological details. I find, from the Moran's I statistic (score = 0.05, $t = 5.0$, $p < 0.01$), that asthma hospitalizations are significantly clustered in metro Phoenix and, from the General G

statistic, that they tend to cluster in high, not low, groupings (score = 0, $t=5.6$, $p<0.01$). The high clusters are located in the central areas of the metro area and along the freeways.

Racial/ethnic and age-based patterns in asthma are also present. Of all people utilizing healthcare in Maricopa County, nine percent of African Americans are seeking it (i.e., went to the doctor or hospital) for asthma, as compared to five percent of non-Latino whites and four percent of Latinos (Rimsza, Bartels, and Bannister 2006). Children also utilize care for asthma at a greater rate than adults, with just over six percent of children ages birth to fourteen seeking care for asthma as compared to four and a half percent for people ages fifteen and older, indicating that children have higher rates of asthma than adults (Rimsza, Bartels, and Bannister 2006).

To investigate racial/ethnic differentials in asthma hospitalization rates and the impact of traffic pollution on asthma hospitalization rates, my colleagues and I conducted a time-series analysis for the years 2001-2003 in Maricopa County. We find that children ages birth to fourteen are disproportionately hospitalized for asthma on a daily basis as compared to all persons (0.58 per 100,000 per day as compared to 0.31); these relationships are strongly statistically significant (Grineski, Atkinson-Palombo, and Balling Jr. In Revision)⁶. African American children are hospitalized at a significantly greater rate (1.8 per 100,000 per day) than Latino (1.0) and non-Latino white (.51) children, with Latino children being hospitalized at a significantly greater rate than non-Latino white children. This racial/ethnic pattern holds for all ages as well (Grineski, Atkinson-Palombo, and Balling Jr. In Revision)⁷.

Using seasonally adjusted data in multiple regression models, we find that when traffic pollution levels (i.e., nitrous dioxide) are greater than expected, there is a significantly greater than expected rate of hospitalizations due to asthma three days later (Grineski, Atkinson-Palombo, and Balling Jr. In Revision). African American children are the most sensitive to increases in traffic pollution, followed by Latino children and then non-Latino white children, as is evidenced by a larger increase in hospitalization rates when pollution levels are above average. The same relationship is found for daily decreases in temperature (Grineski, Atkinson-Palombo, and Balling Jr. In Revision). There is a high degree of correspondence between group-specific rates of uncontrolled asthma and sensitivity to air pollution. Children, specifically minority children, have higher rates of uncontrolled asthma, and increases in traffic pollution correspond with more substantial impacts on asthma hospitalization rates.

Grineski, Atkinson-Palombo and Balling Jr. (In Revision) demonstrates that while all Phoenixians are affected by increases in traffic pollution, they are not affected in the same way. Children may be influenced to a greater degree by air pollution because they spend more time outside and, relative to body size, have higher metabolic demands for oxygen (Landrigan 2001). In Phoenix, we may have found that racial/ethnic minority children are more sensitive to pollution because they live in areas with higher concentrations of traffic-related pollution. There is a history of racial/ethnic minority populations in the central city, where the freeways intersect and pollution levels are higher. It could also be that minority children's airways are more reactive to pollution because their asthma is more tenuously controlled. Because of poverty and

discrimination, racial/ethnic minority children receive preventative healthcare and medications at a lower rate (Lara, Allen, and Lange 1999; Ortega et al. 2002).

This dissertation builds off previous asthma research conducted in Phoenix. By employing spatial analysis, I discern if racial/ethnic minority children live in more polluted areas. By conducting in-depth interviews with African American, Latino and Anglo parents, I uncover challenges faced by racial/ethnic minority children.

Comparative case studies

Because of my interest in sociospatial inequalities and responding to the call by Hyden (1997) for comparative qualitative health research, I use a comparative case study methodology for this dissertation. Phoenix is a suitable laboratory to examine inequalities in asthma control because in addition to having high rates of asthma and racial/ethnic variability in rates, the city has a segregated urban geography.

Race/ethnicity are also closely linked to poverty. In metro Phoenix, one-fifth of African Americans and one-quarter of Latinos live below the poverty line as compared to one-twentieth of whites (Bureau of the US Census 2000). Here, I compare the historically poor and minority central city, South Phoenix, to a newer, upper-middle class enclave, Ahwatukee, with a more in-depth examination into the central city case. The well-documented increase in prevalence rates of asthma in inner cities and the exposure of residents to a host of socio-environmental constraints warrants the focus on that case.

These two areas were chosen for several reasons. South Phoenix is the historically poor and minority district. It has been the site of several environmental justice contestations and is represented by the media as trope for undesirable (Grineski 2003; Bolin, Grineski, and Collins 2005; Sicotte 2003). The landscape is patterned with

industry, warehouses, and neighborhoods. The predominantly Anglo upper class Ahwatukee represents its polar opposite. Its built environment sparkles with newly constructed homes, schools and retail shops. Desert-landscaped and green parks finger between subdivisions, some of which are oriented around lakes. Lakes are absent from the South Phoenix residential landscape, and the open space is mostly agricultural remnants (Figure 4). ‘Green’ dominates the landscape in Ahwatukee related to grassy lawns, lush desert vegetation and golf courses, while ‘brown’ is the overriding tone in South Phoenix due to dusty yards, industry and vacant lots. This is evident in aerial photos of typical neighborhoods in the two areas (Figure 5).

These two areas are geographically proximate, but socially and aesthetically disparate. The differences between the two case study areas reflect growing income inequality in the state. Arizona has the fastest growing disparity between rich and poor and the fourth largest income gap in the US (Paterik 2006). By studying two areas within in the same city that differ greatly in terms of the socio-environment, I can understand the role of uneven geographic development in shaping local experiences, and be privy to a wide range of asthma experiences. Children under the age of fourteen are the focus on this research because they have higher rates of asthma and are more dependent on caretakers for basic needs than are older children.

The *South Phoenix Study Area* extends from Thomas Road to neighborhoods bordering South Mountain City Park on the south (see Figure 6). The east and west boundaries are roughly Thirty-fifth Avenue and Fortieth Street. Its boundaries are coterminous with Roosevelt Elementary District and Phoenix Elementary School District. South Phoenix is a heterogeneous area (see Figure 7) containing downtown

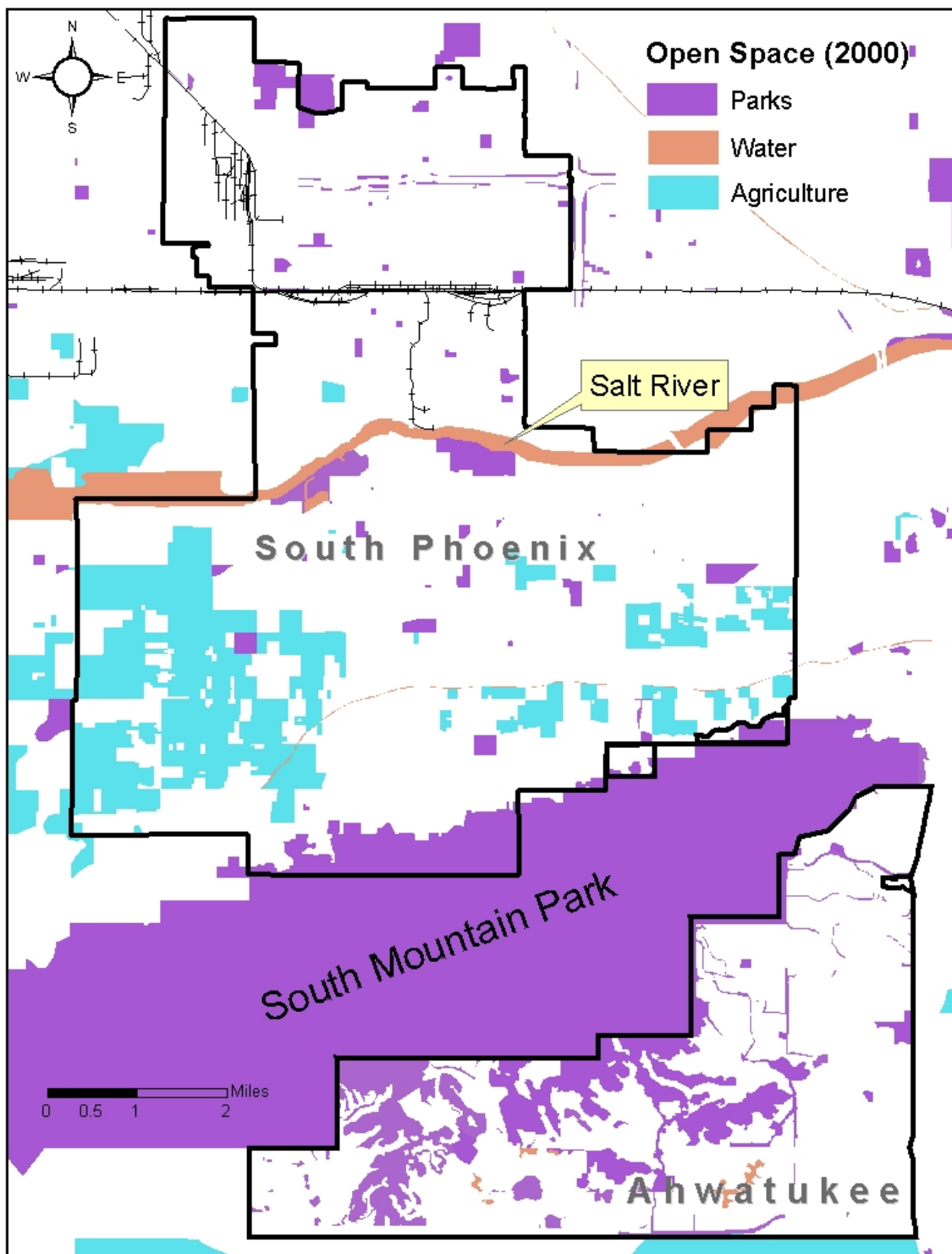


Figure 4. Open space in South Phoenix and Ahwatukee

Note: Salt River does not typically contain water and flows only during intense rains.

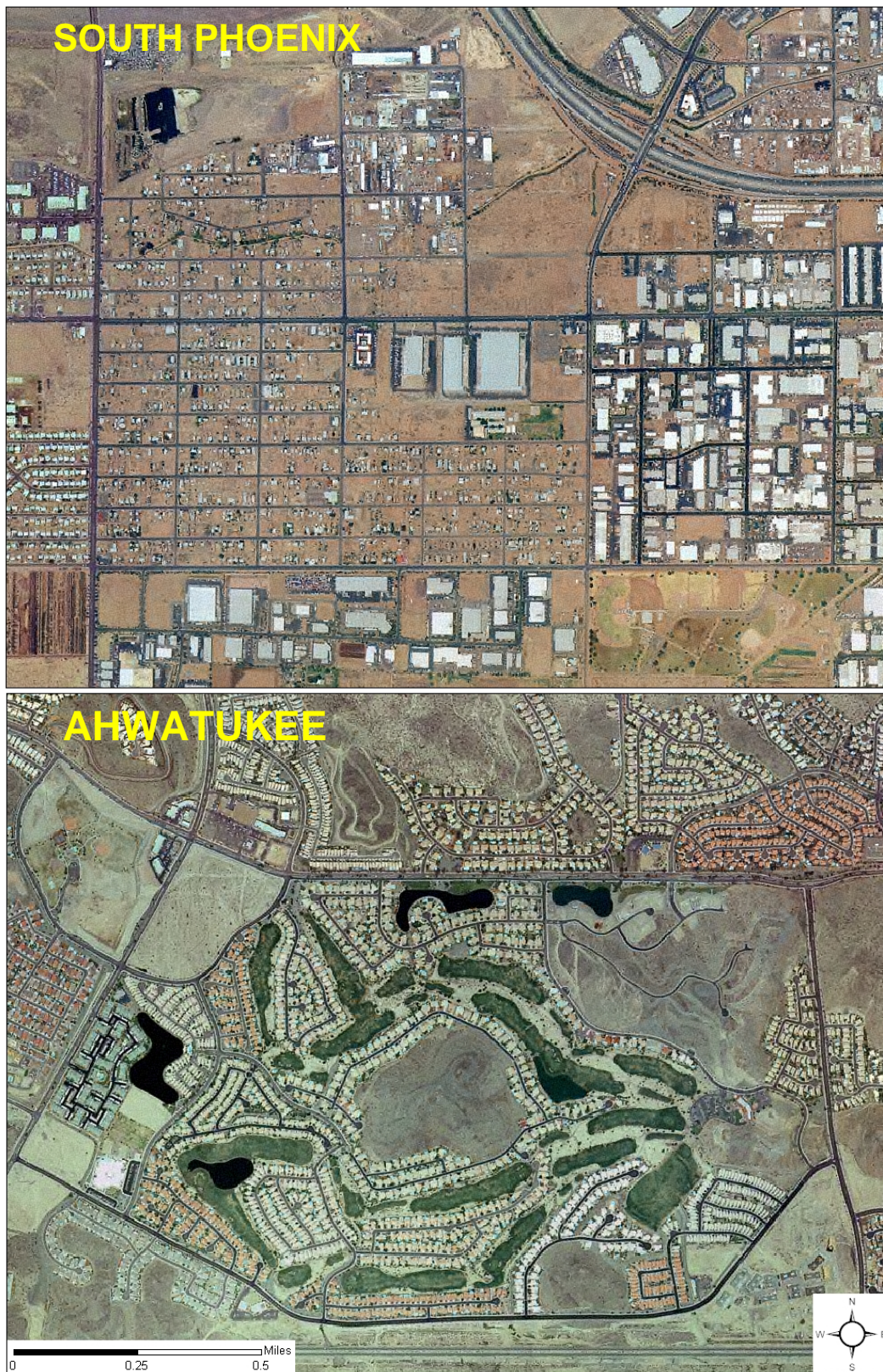


Figure 5. Aerial photographs of typical neighborhoods in South Phoenix and Ahwatukee

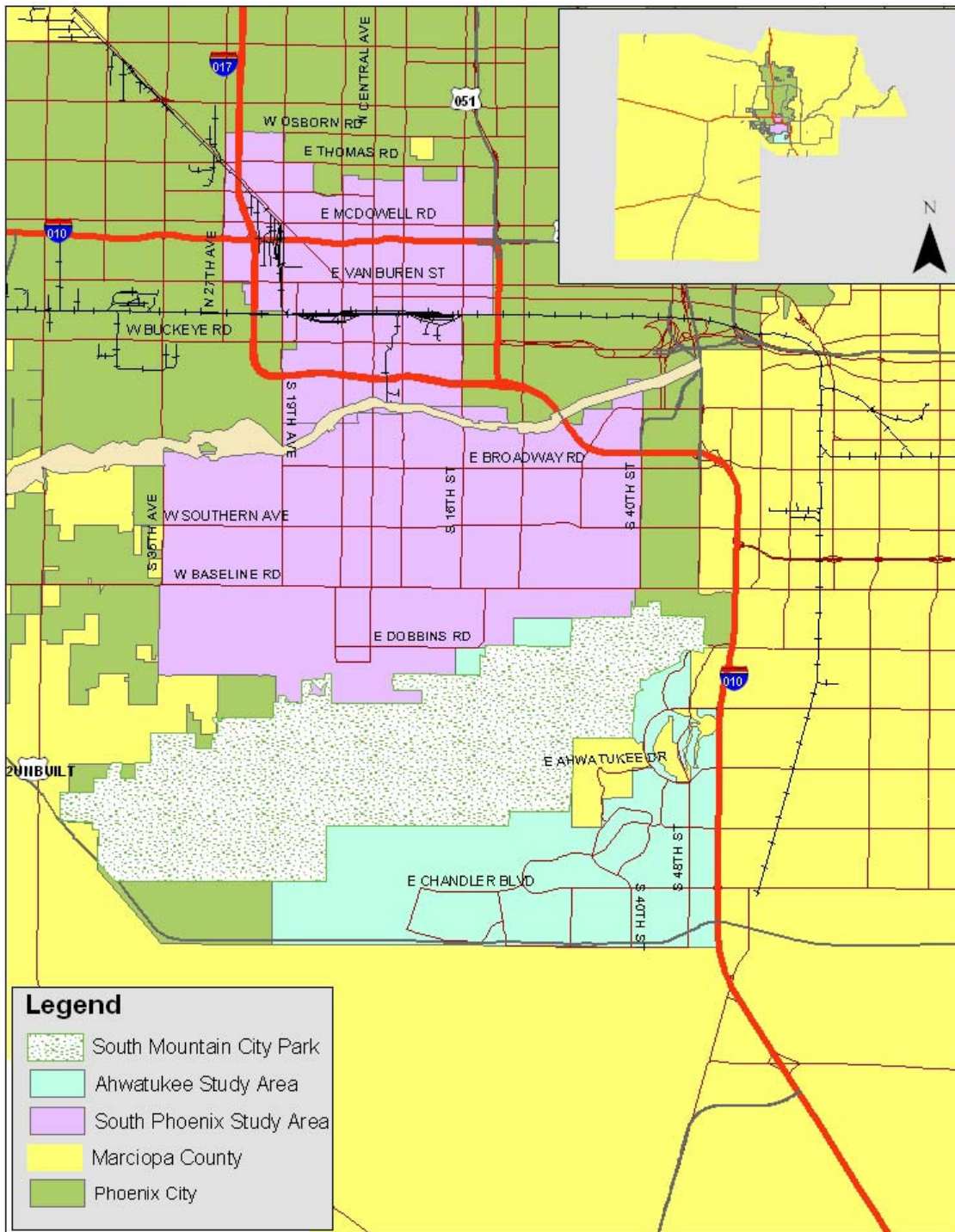


Figure 6. South Phoenix and Ahwatukee study areas



Figure 7. South Phoenix residential landscape: (A.) Downtown Phoenix neighborhood; (B.) Industrial/residential neighborhood; (C.) Rural neighborhood; (D.) Small multi-family housing complex; (E.) Gated development near South Mountain Park.

neighborhoods and the neighborhoods south of the Salt River. The downtown neighborhoods are the oldest in the city; few are gentrifying and most remain deteriorated. South of the Salt River, the homes are generally ranch style and were built after 1960. Many have guest cottages behind the main homes that are now occupied by low-income renters. New and expensive subdivisions are now being located in areas closest to South Mountain Park. Small apartment complexes are scattered throughout the zone. The *Ahwatukee Study Area* runs from the southern edge of South Mountain City Park to the Frye/Pecos Roads to the south (see Figure 6). Nineteenth Avenue and Interstate 10 define the eastern and western edges of the study area. The Kyrene Elementary School District serves the area. This area is homogenous and largely comprised of single-family two-story white stucco homes. In terms of sociodemographic characteristics, the areas differ greatly (Table 2).

South Phoenix has eight times as many Latino residents, eleven times as many residents living in poverty, and twenty-five times as many residents living in crowded conditions. While almost one-third of South Phoenicians were born in Mexico, only one-hundredth of Ahwatukee residents were born there. In Ahwatukee, ninety seven percent of adults have graduated from high school, whereas only fifty two percent have high school diplomas in South Phoenix. In Ahwatukee, household incomes are three times what they are in South Phoenix and the homes are twenty-eight years newer on average (Bureau of the US Census 2000).

Table 2. Socio-demographics in Ahwatukee and South Phoenix

	Ahwatukee	South Phoenix
Population	77,881	273,177
% Population Under 15	23%	29%
% Black	4%	11%
% Latino	8%	64%
% White (Not Hispanic)	81%	22%
% Households in Poverty	3%	31%
Median Household Income (1999\$)	\$82,683	\$28,649
Median Year Home Built	1993	1965
% Households Own Home	80%	54%
Median Number Rooms in Home	6	4
% Households in Same House 5 Years Ago	33%	51%
% Crowded (over 1 person/room)	1%	26%
% Households Without Vehicle	2%	17%
% Born in Mexico	1%	28%
% Single Parent Households	10%	21%
% Adults Not Graduated High School	3%	49%
2004 Hospitalizations (per 100,000)	131	803
2004 Emergency Room Visits (per 100,000)	282	1620
NO2 Modeled Average (ppm)	0.00	0.04
HDI TRI Industrial Air Emissions (lbs)	4	191,652

Note: Ahwatukee zip codes are 85044, 85045 and 85048 and South Phoenix zip codes are 85003, 85004, 85006, 85007, 85008, 85009, 85034; 85040 and 85041.

Sources of the data were the 2000 Census, Arizona Department of Health Services, and Environmental Protection Agency.

In 2004, children in South Phoenix were hospitalized, and went to the emergency room at a rate six times that of the children in Ahwatukee. The historical trajectories of both places illuminate reasons behind their vastly different profiles.

South Phoenix

South Phoenix is a social landscape produced and sustained by uneven geographic development favoring locally unwanted land uses (e.g., warehouses, landfills, industry, and solid waste disposal), poverty, dilapidated housing, and hazardous and polluted environments. The term ‘South Phoenix’ denotes race, ethnicity and social class more

than it does geographical coordinates as the boundaries continually shift in local discourse, adjusting to the Latinization of previously Anglo neighborhoods. Early in the twentieth century, South Phoenix was the area south of the downtown and north of the Salt River (Figure 8).

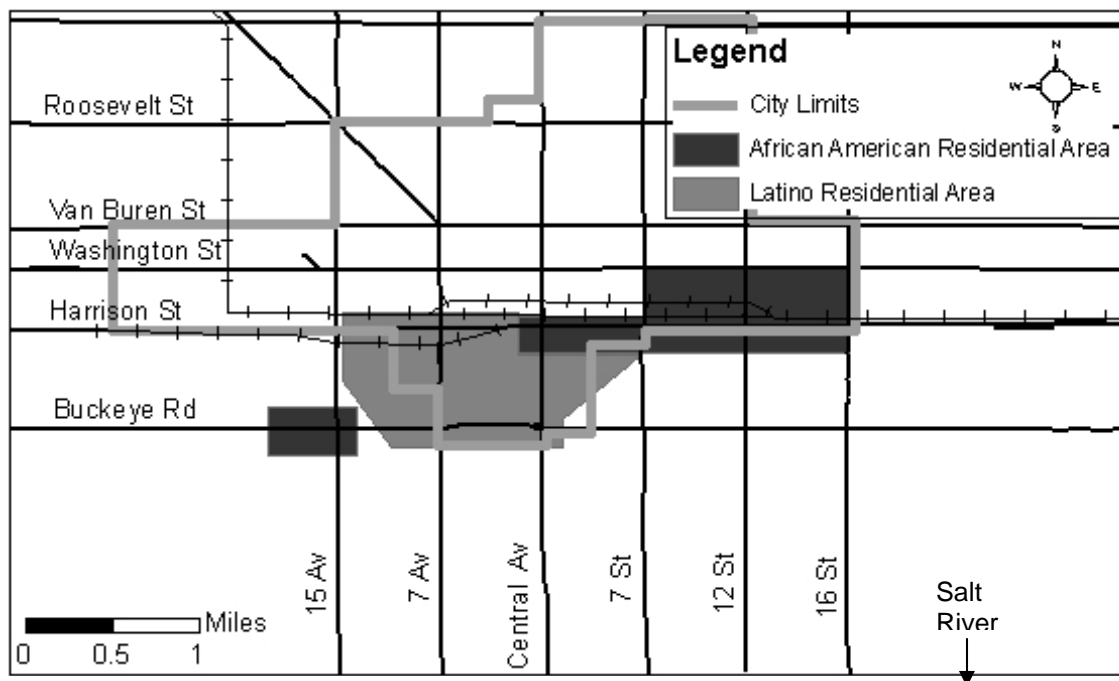


Figure 8. Minority neighborhoods in Phoenix, 1911.
Source of the data was Roberts (1973)

During and after WWII, the South Phoenix expanded to fill the zone south of the Salt River and north of South Mountain Park. Today, neighborhoods and industrial land uses west of the downtown are sometimes included as ‘South Phoenix,’ although they are not included in this study. Early patterns of institutionalized segregation are reflected in the urban configuration today. While thirty-one percent of South Phoenicians are Latino, only nine-percent of residents in the rest of metro Phoenix are Latinos. Nearly all of metro Phoenix’s African American population also resides in South Phoenix: nine percent of residents are African American compared with the three percent of residents

who are African American in the rest of Phoenix (Bureau of the US Census 2000). The synonymy of South Phoenix with race and ethnicity is visible in Figure 9.

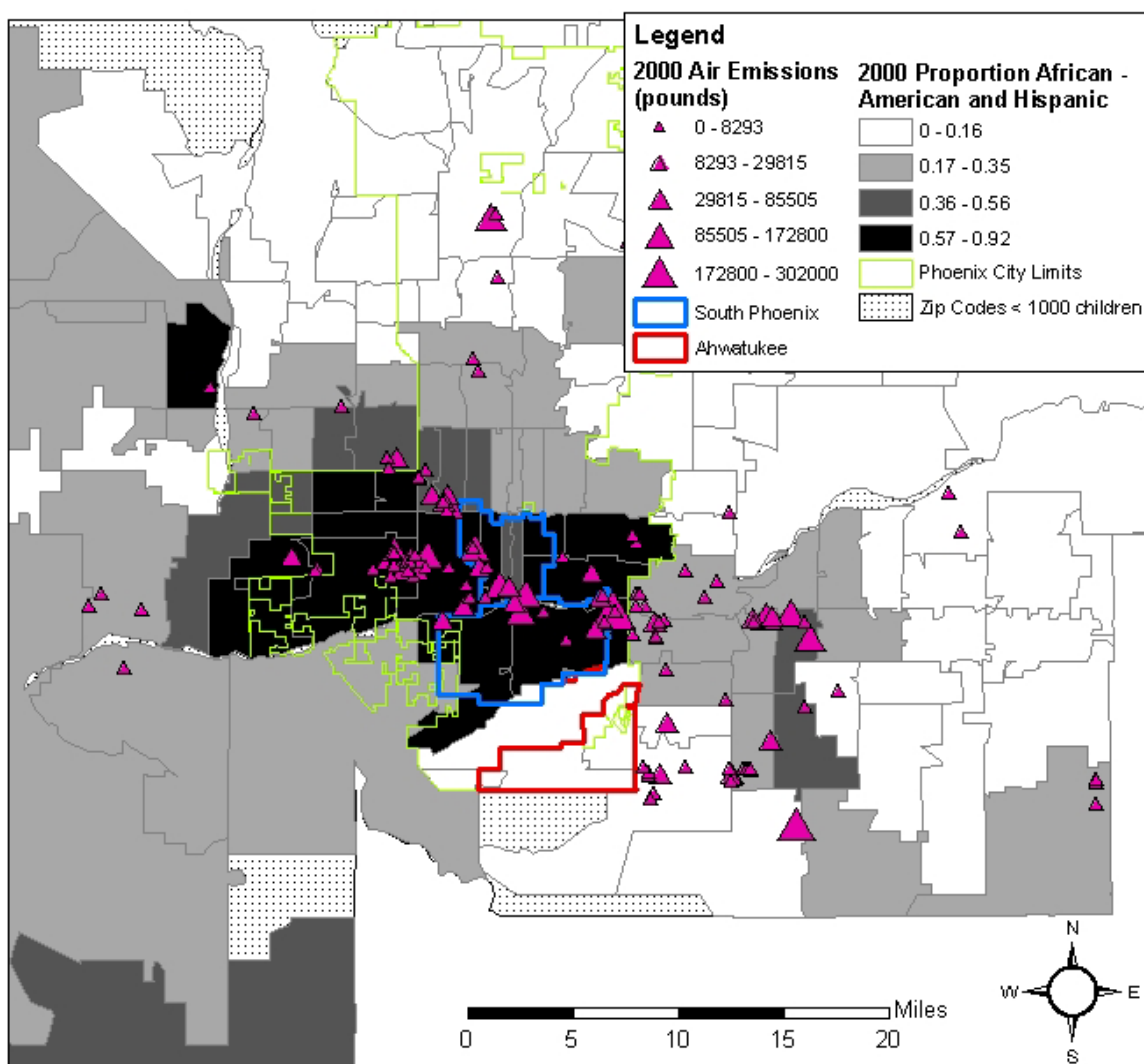


Figure 9. Industrial facilities and minority populations, 2000

During the first two decades of urban development in Phoenix, the city followed the traditional concentric ring model, with neighborhoods radiating out from the downtown. But in the 1890s, two large floods had started the city on its North-South segregated trajectory, as Anglos fled north of the downtown to higher ground, abandoning the southern district to those in poverty. The absence of a sewer system, combined with growth to the north, created a crisis of waste water from the north running

in open ditches through South Phoenix and into the intermittently flowing Salt River (Bolin, Grineski, and Collins 2005). Industrial land uses also clustered in the southern zone. The coming of the transcontinental railroad through the same corridor in the late 1920s further cemented early patterns and fashioned land use in the district toward industry, stockyards and waste (Myrick 1980).

Beginning in 1935, South Phoenix began hosting the municipal airport, which is now the nation's fifth busiest. Phoenix's industrial development boomed during WWII when its inland geography made it 'safe' for war industry. Then, urban renewal of the 1960s coupled with leapfrog development on the urban fringe resulted in freeways being placed through the South Phoenix area. This connected new developments to each other and to employment downtown at the expense of local residents: the historically African-American neighborhood of Eastlake was cleaved in two. By 2000, nearly all industrial facilities in Phoenix were located in areas with higher percentages of racial/ethnic minorities, with a large proportion of them in South Phoenix (Figure 9).

Early patterns of racial and ethnic segregation in the southern district were institutionalized during the Great Depression when the Home Owners Loan Corporation (HOLC) locked in the urban configuration for Phoenix by withholding relief funds from minority neighborhoods, thus establishing precedent for institutionalized housing discrimination (Brunk 1996, 67). These sociospatial practices hindered future economic growth in the minority district: "with funds in one hand and a box of colored pencils in the other, the HOLC defined Phoenix's growth pattern over the next fifteen years" (Brunk 1996, 67). Housing segregation was not the only type of discrimination faced by

minorities in Phoenix as a “system of segregation, as inflexible as any in the South, was a dirty little secret of life in Phoenix for many years” (McCoy 2000, 217).

Discrimination led to poor housing quality in the district. African-Americans and Latinos could only obtain short- term (~five year) mortgages so households spent the mortgage money to buy the land and then built their own structures piecemeal, leading to poorly constructed dwellings in South Phoenix (Figure 10) (McCoy 2000). In 1939,



Figure 10. Poor housing conditions in South Phoenix, 1951.

Source of the pictures was Arizona Historical Society- Central Arizona Division

roughly ninety-three percent of homes in the ‘slum district’ could be classified as substandard. For example, on one block, only two houses had running water, only one had an inside toilet, and one outside toilet was used by twenty-four families. Only seven homes had electric lights (Horton 1941).

After several years of intense effort, South Phoenix advocates finally won three racially segregated housing projects (one each for Anglos, African Americans and Latinos) in 1940 with a total of 500 units. These projects were built with Federal Housing Administration (FHA) monies; the city never levied taxes to pay for low-income housing projects. These projects did little to meet the low-income housing shortage in Phoenix. Post- WWII, the City reframed its housing department to focus on housing

workers employed in the growing industrial sector and largely ignored public housing for decades (Zachary 2001). In 1946, the director of the country health unit reported: “Steinbeck-esque Joad families living in dilapidated housing.” He found “row after row and even dirtier alleys. Small kids played in a squalor that a hog raiser wouldn’t tolerate in his pens. As many as twenty families crowded into cracker box wooden shacks on a fifty foot lot” (as quoted in Zachary 2001, 203).

In 1947, the federal government (i.e., FHA) put pressure on Phoenix to build low cost housing by threatening to build it for Phoenix if local builders and real estate developers did not. Strong and well organized opposition to public housing came from the Phoenix Chamber of Commerce, which successfully lobbied against it (Zachary 2001). The Chamber was part of a coalition trying to establish Arizona as a nascent conservative power base in Washington by creating itself in contrast to the liberal north (Zachary 2001). In the 1950s, the city’s Urban League declared that ninety five percent of Phoenix’s African Americans lived in the ‘worst’ areas of the city (McCoy 2000). Because apartment complexes were completely segregated well into the 1950s, even middle-class African American households lacked housing options.

The housing crisis caught the attention of President John F. Kennedy in the 1960s and he encouraged Phoenix to use available federal urban renewal funds to expand public housing. But, Phoenix was not eligible for the money because the city government had done away with a requirement for the funds: a city housing code. Instead of adopting a code and building housing, the City of Phoenix chose to do without and South Phoenicians still bear the costs of this decision today (McCoy 2000).

During the first half of the twentieth century, South Phoenix was synonymous with disease. High rates of small pox, syphilis, tuberculosis, and record levels of infant mortality plagued South Phoenix into the 1960s (Luckingham 1989; Kotlanger 1983; McLoughlin 1954). Despite high rates of disease, South Phoenix has been historically underserved by healthcare facilities (Miracle on 7th Avenue - A history of Phoenix Memorial Hospital 1981). The shortage intensified during WWII. In 1941, military personnel and civilian workers flooded the city. In the 1930s, the city had 365 hospital beds for their city of 50,000; in 1941, they still had the same number of beds for 140,000 people (Miracle on 7th Avenue - A history of Phoenix Memorial Hospital 1981). This shortage of care resulted in a dynamic by which the highest bidders got care and "the Mexicans, the Negroes, and the poor whites died" (McLoughlin 1954, 101).

When the first hospital in South Phoenix (i.e., Phoenix Memorial at Seventh Avenue and Buckeye Road) opened in 1944, it was thanks to repeated attempts by a South Phoenix clergyman. This hospital met a large need for healthcare, especially among the African American population, who faced outright denial of admission at local hospitals (Kotlanger 1983). In 1979, the first emergency center south of the Salt River opened to serve the 70,000 mostly racial/ethnic minority households living in the southern portion of South Phoenix who had been without adequate emergency services for decades (Miracle on 7th Avenue - A history of Phoenix Memorial Hospital 1981). Still today, the portion of South Phoenix located south of the Salt River is federally designated as underserved in terms of primary care (Department of Health and Human Services 2000). South Phoenix remained underdeveloped during the postwar boom and then has been further disenfranchised with the onset of neoliberal policies post 1970.

In 2000, South Phoenix had the highest recorded concentration of asthma episodes in the state of Arizona. In response, the Phoenix Children's Hospital started the Breathmobile, a mobile asthma clinic that travels to twenty elementary schools in South Phoenix and provides free asthma care (Phoenix Children's Hospital 2005). It has reduced school absences and hospital visits among families served (J. Harris, Program Director, personal communication, 9/17/2004). Surprisingly, the Breathmobile receives no government funding. Healthcare professionals are paid by Phoenix Children's Hospital and its approximately \$50,000 a year operating budget is currently supported ninety percent by Wal-Mart and ten percent by a grant from Aetna insurance company (J. Harris, Program Direction, personal communication, 10/20/2004). Twenty-five percent of Breathmobile parents speak English (R. Rodriguez, Eligibility Coordinator, personal communication, 10/20/2004) and the Breathmobile's respiratory therapist sponsors approximately half the children on the Glaxo Smith Kline's 'Bridge to Access' program. This program provides free medications to households who lack health insurance and meet the income requirements (GlaxoSmithKline 2006). It is the only program of its type that does not require the patient to have legal status in the US (Sherry, Respiratory Therapist, personal communication, 10/20/2004).

In addition to asthma, South Phoenix is plagued by other health and social concerns. It has been termed a "pocket of need" by the Maricopa County Maternal Health and Child Needs Assessment because of adverse maternal and child health outcomes. For example, in 1999, South Phoenix logged twelve percent of the births in metro Phoenix and nineteen percent of the infant deaths (i.e., 10.65 infant deaths per 1000 live births) (Maricopa County 2001). Some residents are concerned about the

industrial presences in their neighborhoods and fear for their children's health (Grineski In Press-a). A South Phoenix neighborhood recently protested the temporary closing of their neighborhood elementary school because students failed to make academic progress. The school has anchored the neighborhood since 1947; and as a longtime South Phoenician said: "This school is the only thing in this neighborhood that keeps these kids doing what they're supposed to be doing. Without it, you might as well turn this entire area into a large penitentiary"(Bland 2005).

The gentrifying area at the far south end of South Phoenix is being re-imagined as a desirable place. New retail developments stand in place of citrus orchards and aging minority neighborhoods are torn down and gated subdivisions with half-million dollar homes rise in their place. Even with redevelopment in its southern most extent, South Phoenix's reputation is slow to change. The area is represented in the media as an unsafe zone and described as "crime-ridden, run down and dangerous" (Arizona Republic 1999).

Current Residents

To investigate how households experience asthma in South Phoenix, I conducted in-depth interviews with parents with the intent of identifying local particularities related to the range of characteristics identified by vulnerability framework: social class, gender, age, race/ethnicity, language/literacy, and migration/residency. A discussion of the methods and materials used is presented in Technical Appendix B.

In South Phoenix, I interviewed forty-one households of low social class. Their median income category is between \$10,000 and \$15,000. Because of their poverty, one-quarter of the interviewed households do not own a car. Household size ranges from two to twelve persons, and homes tend to have one or two bedrooms. In terms of health

insurance, seven households have children who are uninsured, seven households have job-based insurance for the children and the other twenty-seven are on AHCCCS (Arizona Health Care Cost Containment System), Arizona's Medicaid program or Kids Care, the State Children's Health Insurance Program (SCHIP). The federal government created SCHIP in 1997 to cover low-income children who did not qualify for Medicaid. Whereas households on AHCCCS do not pay a monthly fee or co-pays (co-payments) for medications and doctors visits, Kids Care households have slightly higher incomes and pay a monthly fee based on a sliding income scale; medications and co-pays are still free (State of Arizona 2005). AHCCCS and Kids Care are both managed care plans that contract with the same providers.

Regarding housing tenure, thirteen households own their homes; nine live in public housing; and the other nineteen rent. A handful of the owning Latino households are participating in 'rent to own' programs offered by their landlords. These programs have the potential to be predatory in that households are responsible for investing their own resources in maintaining the property and are without the benefits of a mortgage. One Latino household interviewed has been renting to own their home for fifteen years. The majority of renters live in cottages behind main houses, older single-family homes or small complexes of two to four units. These rentals are generally poorly maintained. Only two households rent from large multi-unit apartment complexes and they have the benefits of community amenities (e.g., swimming pools), on-site maintenance and management, and better quality living spaces, but pay higher monthly rents.

Of the interviewed South Phoenix households, eleven households are African American, three are Anglo, and twenty-seven are Latinos. All but one of the Latino

households is of Mexican descent. In three of the African American households, elderly women are adoptive parents to young children with asthma.

In terms of gender, women are disproportionately represented in the South Phoenix sample, as a woman participated from every household and only two men (a father and stepfather) were involved in the interviews. The high degree of participation by women reflects the pattern whereby women are the primary caretakers of the children with asthma. Thirty-seven percent (n=15) of South Phoenix households have only one parent in the home. For African American households (n=11), the percentage of single-parent households is higher at sixty-four percent (n=7), and for Latino households (n=27), the percentage is lower at twenty-six percent (n=7). In the two-parent households where the woman is a homemaker, the man usually works in the service sector, such as construction, auto shops or day labor⁸. Childcare and house cleaning are common occupations for participating women. In South Phoenix it is not uncommon for households with two to four children with asthma.

The importance of English literacy has intensified in recent years with increased efforts to marginalize immigrants (e.g., Phoenix's passage of Proposition 200 in 2004). Since 2000, Arizona has had the most restrictive English-only education law in the country, which states that textbooks, materials, bulletin boards, and teaching must be in English only (Kossan 2006). Fourteen of the twenty-seven Latino parents (52%) interviewed speak only Spanish. Seven (26%) speak both Spanish and English proficiently. Two parents (7%) are taking classes to learn English and four (15%) are illiterate in Spanish and unable to speak English. Eight (30%) of the Latino households contain undocumented immigrants. Residency is an individual, not households-level

characteristic, and it cannot be assumed that all people in the same household have the same rights. Of these eight households, all parents interviewed are undocumented parents but two have children who are US-born and the other six have undocumented children. These eight households are the most economically marginal, with median incomes under \$10,000 and an average household size of 6.3 people. Tables 3 and 4 summarize this review by listing characteristics and the ‘name’ of participating South Phoenix parents.

Ahwatukee

In contrast to South Phoenix, Ahwatukee is representative of newer upper-class developments in metropolitan Phoenix, although it is geographically separated from the rest of the metropolitan area by South Mountain City Park. With inward looking gated communities and restrictive Home Owners Associations, Ahwatukee is what Mike Davis (1992) would call a ‘fortified cell’ of affluent society, designed to insulate residents from ‘undesirables.’ A local real estate agent shared her description:

Ahwatukee is actually part of Phoenix Arizona, but because of Ahwatukee's distinct and strong identity, it is sometimes perceived as a separate town. Mountain views and the Arizona sunshine create a fabulous backdrop for recreational activities. The communities in Ahwatukee offer peaceful neighborhoods in the midst of beautiful desert scenery... Master planned communities are abundant, supplying amenities, which include parks, golf courses, community centers, and landscaped walking paths. (Lee 2005).

Ahwatukee occupies land that was once ‘Ahwatukee Ranch,’ spanning the southern foothills of South Mountain Park. Ahwatukee is a Crow word meaning “magic place of my dreams.” When the ranch owner died in 1960, a portion of the land went to South Mountain City Park and the rest to developers (A History of Ahwatukee 2003). Presley Development Company built the first housing development, called

Table 3. Characteristics of South Phoenix households

Parent	Child Age	Child			Parent		Parent Language	Child Insurance
		Asthma Control~	Dwelling	Tenure	Nativity (Years in US)	Child Nativity		
Malene	7	Well	Apartment	Rent	US	US	English	Job
Ronda	5	Well	House	Own	US	US	Both	AHCCCS
Maureen	9	Well	House	Own	US	US	Both	Job
Concha	4	Well	Apartment	Rent	MEX (2)	MEX	Spanish	None
Inez	10	Well	Apartment	Rent (PH)	US	US	English	AHCCCS
Susie	8	Well	House	Own	US	US	English	Kids Care
Gwendolyn	11	Somewhat	Apartment	Rent (PH)	US	US	English	AHCCCS
Rebecca	11	Well	House	Rent	US	US	English	Job
Marielena	12	Completely	Apartment	Rent (PH)	MEX (10)	MEX	Spanish	AHCCCS
Betheny	8	Well	House	Rent	US	US	English	AHCCCS
Ana	4	Somewhat	House	Rent	US	US	English	Job
Shauna	7	Well	Apartment	Rent	US	US	English	Kids Care
Marilu	5	Somewhat	House	Rent (PH)	US	US	English	AHCCCS
Dominga	8	Well	House	Rent	MEX (5)	MEX	Spanish	None
Gelisa	5	Poorly	House	Rent	US	US	English	AHCCCS
LeRinda	7	Completely	Apartment	Rent	US	US	English	Job
Miranda	8	Well	Apartment	Rent	MEX (31)	US	Both	AHCCCS
Alejandra	11	Well	Apartment	Rent (PH)	MEX (16)	US	Both	AHCCCS
Lilia	8	Well	Apartment	Rent	US	US	English	AHCCCS
Juana	8	Well	Apartment	Rent	Hond. (10)	US	Spanish	AHCCCS
Deanna	8	Completely	House	Own	US	US	English	Job
AnaClaudia	12	Well	House	Rent	MEX (10)	MEX	Spanish	None
Dora	7	Somewhat	House	Rent (PH)	US	US	English	AHCCCS
Elodia	11	Completely	Apartment	Rent	MEX (14)	US	Spanish	AHCCCS
Constance	9	Well	Apartment	Rent (PH)	US	US	Both	AHCCCS
Paulina	8	Somewhat	Apartment	Rent (PH)	US	US	English	AHCCCS
McKenzie	7	Well	House	Own	US	US	English	AHCCCS
Odalys	9	Missing	House	Own	MEX (25)	US	Spanish	AHCCCS
Margaret	12	Well	House	Own	US	US	Both	Kids Care
Abigail	11	Well	House	Rent	US	US	English	AHCCCS
Maria	7	Somewhat	House	Rent	MEX (8)	US	Spanish	AHCCCS
Cecilia	12	Somewhat	Mobile	Own	US	US	English	None
Mireia	6	Well	House	Rent	MEX (8)	US	Spanish	AHCCCS
Silvia	5	Well	House	Own	US	US	English	Job
Monica	9	Well	House	Own	MEX (4)	MEX	Spanish	None
Sonia	8	Well	House	Rent	MEX (6)	MEX	Spanish	None
Rosalinda	8	Well	House	Rent	MEX (9)	MEX	Spanish	None
Jacque	7	Well	House	Own	US	US	English	AHCCCS
Jamilla	9	Well	House	Own	US	US	English	AHCCCS
Crescencia	8	Somewhat	House	Own	MEX (22)	US	Both	Kids Care
April	10	Well	House	Rent (PH)	US	US	English	AHCCCS

Notes: (PH) means household has public housing assistance in the form of conventional public housing (projects) or vouchers. If parent had more than one child with asthma, the child age provided refers to the child that was the focus on the interview.

~ Parents reported asthma control on a four-point scale: Completely Controlled, Well Controlled, Somewhat Controlled, and Poorly Controlled

Table 4. Characteristics of South Phoenix households, continued

Parent	Transport- ation	Household Income (\$)	Parent Education	Parent Race	# Parents	Employment
Malene	Car	20-39,999	HS Grad	Af.-Am.	1	State -AHCCCS
Ronda	Bus	15-19,999	HS Grad	Latino	2	Airport
Maureen	Car	20-39,999	2-Year Deg.	Latino	2	Homemaker
Concha	Bus/Get Ride	Under 10,000	HS Grad	Latino	2	Don't Know
Inez	Car	Under 10,000	2-Year Deg.	Latino	2	Homemaker
Susie	Car	20-39,999	HS Grad	Anglo	2	School Volunteer
Gwendolyn	Bus/Walk	10-14,999	HS Grad	Af.-Am.	1	Data Entry
Marielena	Car	Under 10,000	Elem.	Latino	1	Homemaker
Rebecca	Car	40-59,999	Part Coll.	Af.-Am.	2	Child Care
Betheny	Car	Under 10,000	Some HS	Af.-Am.	2	Homemaker
Ana	Car	20-39,999	2-Year Deg.	Latino	2	Child Care
Shauna	Car	15-19,999	Part Coll.	Af.-Am.	1	Home Health
Marilu	Car	10-14,999	Part Coll.	Latino	1	Waitress
Dominga	Car	Under 10,000	Elem.	Latino	2	Homemaker
Gelisa	Car	Under 10,000	Part Coll.	Af.-Am.	1	Homemaker
LeRinda	Car	20-39,999	Part Coll.	Af.-Am.	2	State - ADHS
Miranda	Car	20-39,999	HS Grad	Latino	1	State - AHCCCS
Alejandra	Bus/Walk	Under 10,000	HS Grad	Latino	1	Homemaker
Lilia	Car	Under 10,000	Part Coll.	Latino	1	Teacher's assistant
Juana	Car	10-14,999	Elem.	Latino	2	Homemaker
Deanna	Car	80-99,999	Part Coll.	Anglo	2	Business
AnaClaudia	Car	10-14,999	Elem.	Latino	2	Does not work now
Dora	Car	15-19,999	2-Year Deg.	Latino	1	State - Prison
Elodia	Bus/Walk	Under 10,000	Elem.	Latino	2	Homemaker
Constance	Car	15-19,999	HS Grad	Latino	1	Homemaker
Paulina	Bus	Under 10,000	Part Coll.	Af.-Am.	1	Home Health
McKenzie	Car	Under 10,000	Part Coll.	Anglo	1	Home Health
Odalys	Bus	15-19,999	HS Grad	Latino	2	Homemaker
Margaret	Car	20-39,999	HS Grad	Latino	2	Homemaker
Abigail	Car	Under 10,000	HS Grad	Latino	2	Homemaker
Maria	Car	10-14,999	HS Grad	Latino	2	Homemaker
Cecilia	Car	20-39,999	Part Coll.	Latino	2	Home Health
Mireia	Car	Under 10,000	HS Grad	Latino	2	Homemaker
Silvia	Car	60-79,999	Part Coll.	Latino	2	Secretary
Monica	Car	15-19,999	Part Coll.	Latino	2	Cleaning
Sonia	Ride	Under 10,000	HS Grad	Latino	2	Cleaning
Rosalinda	Car	10-14,999	Part Coll.	Latino	2	Homemaker
Jacque	Car	Under 10,000	Some HS	Af.-Am.	1	School Volunteer
Jamilla	Car	10-14,999	Some HS	Af.-Am.	2	Homemaker
Crescencia	Bus	20-39,999	Part Coll.	Latino	2	Child Care
April	Get Ride	Under 10,000	HS Grad	Af.-Am.	1	Homemaker

“Fort Ahwatukee” in 1971. Presley Development’s long term plan included 8,400 homes occupied by 23,000 people. The company’s vision is more than fulfilled (A History of Ahwatukee 2003): 30,000 people inhabited the area in 1990 and close to 80,000 lived in

the greater Ahwatukee area in 2000 (Murphy 2000). The City of Phoenix promotes the area as series of master-planned communities, with desert landscaping, golf courses and lakes (City of Phoenix 2003b) (Figure 11). Real estate values doubled between 2004 and 2005, making the area even more desirable (Lee 2005).



Figure 11. Ahwatukee residential landscape

In a pattern typical of Sunbelt cities, a fragmented geography of internally oriented communities has resulted from the replacement of citywide planning by elected officials with planning by corporate developers. The area suffers, like other areas in city, from the problems of rapid piecemeal growth without an integrated development plan (Murphy 2000). For example in 1985, funds were allocated for a proposed freeway that would connect Ahwatukee to west Phoenix although the city ran out of money before it

was built. Since then, 255 homes have been built in the proposed freeway zone and four public elementary schools are now located adjacent to the zone (Murphy 2003). In 2004, voters approved a transportation initiative that allocated money to build the freeway. The privileging of private developers' interests at the expense of holistic city planning created the current crisis whereby new homes are now located in the path of the proposed freeway.

Despite the lack of centralized planning, residents identify many positive attributes. As one resident states, "what makes Ahwatukee special is that it is a cul-de-sac" (quoted in Murphy 2003, n.p.). The area contains an abundance of retail, restaurant, and recreational amenities. The school district serving the area, Kyrene, is one of the top school districts in the state of Arizona. Kyrene students record some of the highest standardized test scores in the state and one-hundred percent of the schools are meeting state standards (Kyrene School District 2002; Kyrene Schools One of Top Districts in State 2003). Parents can also choose from a slate of private and religious schools depending on their preferences.

Current Residents

As I did in South Phoenix, I conducted in-depth interviews with Ahwatukee parents to investigate their experiences with asthma with the intent of identifying local particularities related to the range of characteristics identified by vulnerability framework: social class, gender, age, race/ethnicity, language/literacy, and migration/residency (see Technical Appendix B). The twelve households interviewed in Ahwatukee are of upper social class. Their median household income category is between \$100,000 and \$149,999 per year, and household size ranges from two to five,

with four being the median. Parents interviewed are employed in business, teaching, or nursing, or are homemakers. All participating parents use a car as their primary source of transportation. All but one of the households has job-based insurance for their children. One parent has job-based insurance for herself, but put her daughter on a private plan that is less expensive. Eleven of the households own their multi-bedroom homes. Only one household rents and they are new to the Phoenix area. All parents are white, and thus members of the dominant racial/ethnic group in Phoenix. One of the children is bi-racial, but her mother is white.

Women are also disproportionately represented in Ahwatukee, as all twelve parents interviewed are women and no men participated in the interviews. As in South Phoenix, women are primary caretakers of children's asthma, even when they work outside the home. Eleven households (92%) have two-parents. Of the twelve women, three (25%) are stay-at-home parents, four (33%) work part time, and three (25%) work full time. All women are caring for a biological child with asthma; the elderly adoptive parent household type is not present. In terms of language/literacy and migration/residency, all parents speak English and have college degrees, some are working on advanced degrees. They routinely conduct research on asthma using the Internet and books; three stay-at-home parents are self-proclaimed asthma experts. Eleven parents are born in the US and one parent is a legal resident from Canada. Tables 5 and 6 present a tabulation of study participants.

Table 5. Characteristics of Ahwatukee households

Parent	Child Age	Child Asthma Control~	Dwelling	Tenure	Parent Nativity (Years in US)	Child Nativity	Parent Language	Child Insurance
Kristy	5	Well	House	Own	US	US	English	Job
Kathleen	8	Somewhat	House	Own	US	US	English	Job
Pamela	5	Poorly	House	Own	US	US	English	Private
Kimberly	7	Well	House	Own	US	US	English	Job
Stacy	4	Completely	House	Own	US	US	English	Job
Megan	12	Completely	House	Rent	US	US	English	Job
Michelle	9	Poorly	House	Own	US	US	English	Job
Faith	6	Well	House	Own	US	US	English	Job
Jordy	8	Somewhat	House	Own	US	US	English	Job
Greta	10	Well	House	Own	CAN (9)	CAN	English	Job
Karen	8	Completely	House	Own	US	US	English	Job
Debbie	12	Well	House	Own	US	US	English	Job

~ Parents reported asthma control on a four-point scale: Completely Controlled, Well Controlled, Somewhat Controlled, and Poorly Controlled

Table 6. Characteristics of Ahwatukee households, continued

Parent	Transportation	Household Income (\$)	Parent Education	Parent Race	# Parents	Employment
Kristy	Car	100-149,999	Coll. Deg.+	Anglo	2	Administration
Kathleen	Car	100-149,999	Coll. Deg.+	Anglo	2	Homemaker
Pamela	Car	40-59,999	Coll. Deg.+	Anglo	1	Teacher
Kimberly	Car	80-99,999	Coll. Deg.+	Anglo	2	Homemaker
Stacy	Car	60-79,999	Coll. Deg.+	Anglo	2	Teacher
Megan	Car	80-99,999	Coll. Deg.+	Anglo	2	Nursing
Michelle	Car	over 150,000	Coll. Deg.+	Anglo	2	Communications
Faith	Car	over 150,000	Coll. Deg.+	Anglo	2	Nursing
Jordy	Car	100-149,999	Coll. Deg.+	Anglo	2	Investment
Greta	Car	100-149,999	Coll. Deg.+	Anglo	2	Child Care
Karen	Car	over 150,000	Coll. Deg.+	Anglo	2	Homemaker
Debbie	Car	over 150,000	Coll. Deg.+	Anglo	2	Teacher

Conclusion

Connections between Ahwatukee and South Phoenix are subtle and reflect spatialized stratification. Three of the twelve households live in Ahwatukee because of

its proximity to South Phoenix as the husbands work as managers in its industrial facilities (e.g., circuit board manufacturer and Honeywell). Households use the freeways that skirt South Phoenix to travel to their jobs in downtown Phoenix. Commuting to downtown from the suburbs is a typical pattern in Phoenix. In fact, only fifteen percent of employees in large downtown businesses live downtown (Burns and Gober 1998). One Ahwatukee household employs a cleaning woman from South Phoenix, whose son ironically has asthma. Visits through the neighborhood reveal landscapers of Latin descent working in the well-manicured yards. One can imagine that landscapers, maids, and nannies in Ahwatukee come from South Phoenix where the highest percentages of low-income minority residents dwell; research has demonstrated the spatial mismatch between inner city dwellers and their places of employment (Burns and Gober 1998).

The physical presence of the large mountain park separates the two areas: South Phoenix is not visible from Ahwatukee and vice versa. But social, economic, and environmental relationships bind the places. When reviewing the demographics of the interview participants, the co-location of race/ethnicity and social class in place becomes readily apparent. Before investigating the peculiarities of South Phoenix and Ahwatukee households in place in Chapters 4 and 5, I present an investigation into metro-Phoenix wide-patterns of racial/ethnic, social class and environmental inequalities in uncontrolled asthma in Chapter 3. This quantitative analysis allows me to place household experiences in South Phoenix and Ahwatukee within a broader framework of more generalizable results.

CHAPTER 3

SOCIOSPATIAL PATTERNS IN UNCONTROLLED ASTHMA

Introduction

In this chapter, I answer the research question, “Do sociospatial inequalities explain patterns in uncontrolled childhood asthma?” To do so, I introduce multivariate models using sociodemographic and environmental variables to predict asthma hospitalizations at the zip code level. In his classic study, Mayer (1983) explains how spatial analysis can increase our understanding about disease by suggesting possible causal factors. Relationships between disease and place can imply characteristics about the people living there (e.g., reasons why they might be more susceptible), or the place (e.g., there is increased exposure to a hazard) (Jerrett et al. 2003, 1784).

Data

From the health inequalities, vulnerability and environmental justice literature, I identify race/ethnicity, social class and environment as dimensions of inequality related to asthma. Here, I operationalize these dimensions for use in the regression models. I use four sources of data: Arizona Department of Health Services asthma hospitalizations, a multi-criteria pollutant model, Toxic Release Inventory (TRI), and US Bureau of the Census. Because the US Census was last published in 2000 and the only available multi-criteria pollutant model is from 1999, I choose to combine data from 1999 and 2000 in this analysis. I pair these two data sets with asthma hospitalization from 1999 and TRI data from 2000.

Asthma hospitalization data

I obtained the 1999 asthma hospitalization data from the Arizona Department of Health Services. As the name implies, hospitalization data do not include visits to the emergency room or to a primary care provider for asthma and do not indicate asthma prevalence rates in the general population. Instead, hospitalization data can be used as a proxy for uncontrolled asthma. In most cases, it is possible to successfully control asthma with medications and regular healthcare; most patients are never hospitalized (American Academy of Pediatrics 1999). Counts of asthma hospitalizations⁹ (ICD-codes 493) are initially collected by hospitals and then reported to, and collated by, the state. Age and zip code of residence at the time of the hospitalization are recorded for each patient in the dataset. I created a variable representing the number of children aged zero to fourteen years hospitalized in each zip code in 1999. The data is visually represented in Figure 3.

Criteria pollutant data

The Environmental Protection Agency (EPA) sets legal limits for six common air pollutants called the criteria pollutants: ozone, nitrogen oxides (including nitrous dioxide), sulfur dioxide, carbon monoxide, particulate matter and lead. In this analysis, I focus on three criteria pollutants: nitrous oxides, ozone and carbon monoxide. Nitrous oxides (NO_x) are a group of reactive gases that includes nitrous dioxide (NO_2). NO_x is an important precursor to ground level ozone and is implicated in respiratory and cardiovascular health. While most NO_x is colorless, NO_2 is part of the brown haze visible over large cities like Phoenix (Figure 12). Ozone (O_3) forms in the presence of NO_x , volatile organic carbons and sunlight and records it's highest levels in the



Figure 12. Phoenix's brown cloud

summertime. Ozone can irritate lungs and airways much like sunburn even at low levels. Carbon monoxide (CO) results from the incomplete combustion of fuel and in cities, almost all CO can be attributed to motor vehicle exhaust. CO is associated with illnesses of the cardiovascular system, central nervous system, and respiratory tract (EPA 2005a).

I use modeled pollution surfaces for nitrous oxide¹⁰, nitrous dioxide, carbon monoxide and ozone, which I obtained from the environmental engineering department at Arizona State University. Engineers manipulate EPA National Emissions Inventory (NEI) estimates in a spatiotemporal model that accounts for population and housing density, roads, water sources, land use, meteorological factors and chemical interactions between pollutants (see Technical Appendix D for more detailed information). In this analysis, I use data for the four pollutants from 4 PM on 27 August 1999. I manipulated the data into a raster (grid) file using ARC GIS 9.0 and assigned each grid square a

pollution value in parts per million. I then used zonal statistics to calculate the average pixel value for each zip code for each of the four pollutants. The four pollutants are highly correlated so I created a factor combining the four surfaces in SPSS (alpha = .9634), which I term the Multi- Pollutant Factor and use in the regression analysis. Figure 13 depicts the four individual gridded surfaces, and the resultant multi-pollution factor.

Toxic Release Inventory data

To account for industrial sources of air pollution, I use data from the EPA's Toxic Release Inventory (TRI). In 2000, there were 127 sites in metro Phoenix that reported emissions to the TRI and collectively, they emitted approximately 1,800,000 pounds of chemicals (Figure 9). To investigate the effects of point-source industrial air emissions on uncontrolled asthma, I created an air emissions score for each zip code using GIS as per Bolin et al. (2002). To do this, I drew a one-mile buffer around each TRI facility in Arc GIS 9.0. I intersected the TRI buffers and zip code boundaries and calculated the area of each portion of the intersected circles. I divided this proportional area score by the area of the buffer and multiplied this by the air emissions value for the original buffer. I then summed the emissions of all portions of TRI buffers falling within each zip code to create a HDI score for each of the ninety nine zip codes in this analysis (Beyer 2004). Fifty zip codes in metro Phoenix have a HDI score of zero and forty-nine zip codes have non-zero scores. For the non-zero zip codes, the maximum HDI score is 460,353 pounds, the mean is 26,506 pounds, and the standard deviation is 70,163 pounds¹¹.

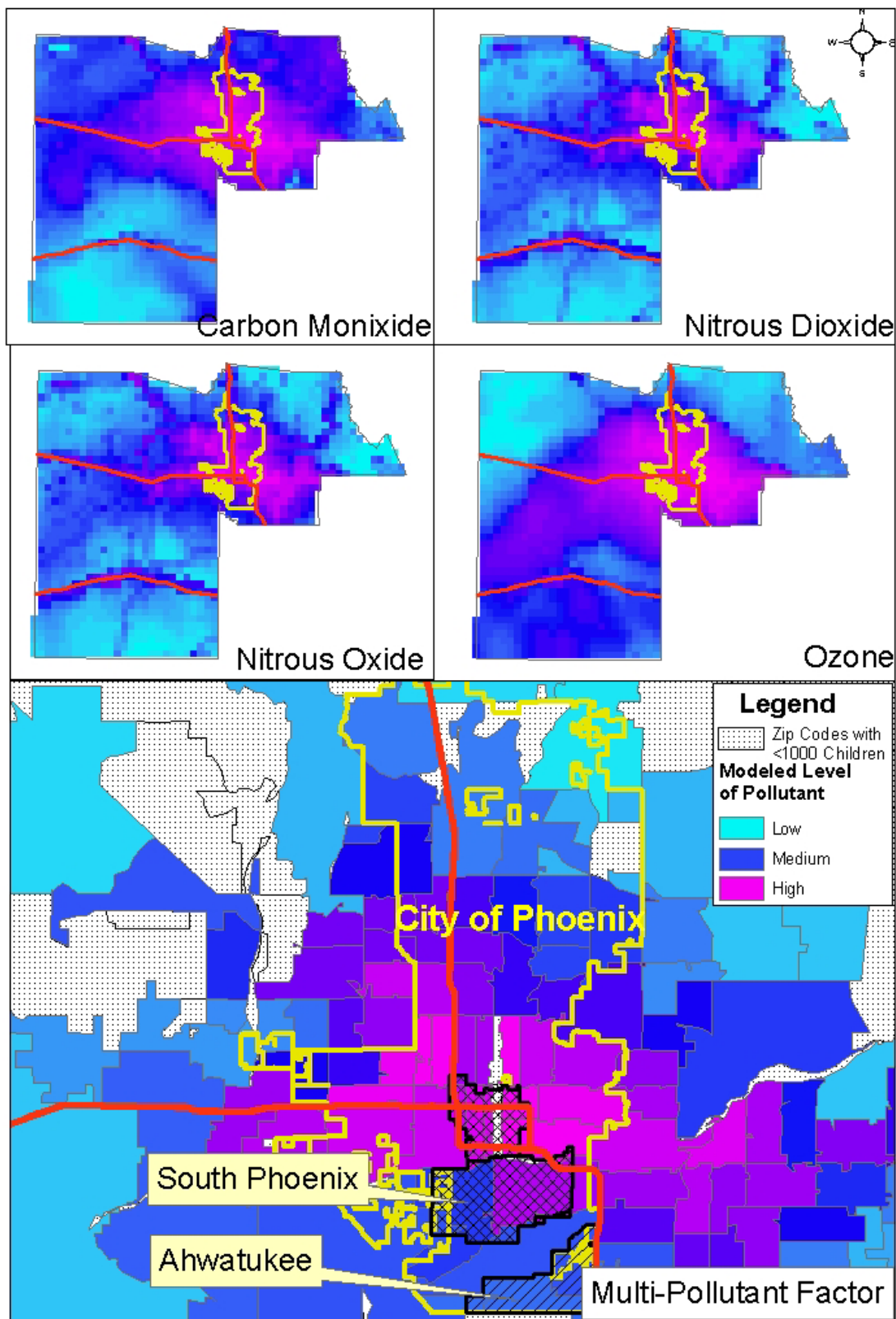


Figure 13. Individual modeled pollution surfaces and the composite surface

US Bureau of the Census data

Using census data, I created four factors that represent social class, race/ethnicity, and environment. To select variables for my factors, I considered which variables would most closely map to accessing resources important for asthma control. First, I created a Social Class Factor by combining median household income, median value of owner occupied homes and median sale price of homes in the zip code (Alpha: 0.82). This variable combines both individual and neighborhood-level social class. I hypothesize that areas with lower social class will have higher rates of uncontrolled asthma. Second, I developed a Latino Immigrant Factor by joining proportion Latino, proportion foreign-born, proportion living in crowded conditions (over one person/room), and proportion speaking Spanish only (Alpha: 0.913). I hypothesize that areas with more Latino immigrants will have higher rates of uncontrolled asthma although there is conflicting evidence related to Latino asthma rates as compared to non-Latino white asthma rates. Third, I created a Race Factor using proportion African-American. I hypothesize that areas with higher proportions of African-Americans will have higher rates of uncontrolled asthma. Fourth, I developed an Indoor Hazards Factor to represent in-home aspects of hazardousness of place by combining proportion of households that rent and median age of housing stock (Alpha: 0.85). These two variables were chosen because households that rent are constrained in making asthma-related changes and older homes tend to contain more asthma triggers, like mold and roaches. I hypothesize that areas with higher levels of indoor hazards will have higher rates of uncontrolled asthma.

Descriptive statistics are provided in Table 7.

Table 7. Descriptive statistics for census variables and factors in analysis

Census Factors & Variables	N	Min.	Max.	Mean	Std. Dev
Social Class Factor	99	-1.48	5.84	0.00	1.00
Median value of owner occ homes	99	53,400	646,100	134,528	74,225
Median sale price of homes	99	0	550,000	137,301	72,722
Median household income	99	21,168	117,487	49,033	18,228
Ethnicity/Barrio Factor	99	-0.91	3.61	0.01	0.97
Proportion Latino	99	0.01	0.42	0.11	0.09
Proportion foreign born	99	0.03	0.45	0.13	0.09
Proportion crowded	99	0.00	0.36	0.09	0.09
Proportion Spanish	99	0.00	0.32	0.05	0.07
Indoor Hazards Factor	99	-1.51	2.64	0.00	1.00
Proportion renters	99	0.03	0.70	0.30	0.17
Median year home built	99	1948	1999	1982	11
Race Factor	99	0.000	0.218	0.034	0.030
Proportion African American	99	0.000	0.218	0.034	0.030

Figure 14 shows the spatial patterning of these factors and allows for a visual comparison between Ahwatukee and South Phoenix. South Phoenix is in the lowest quartile for Social Class, the two higher quartiles for Indoor Hazards, and in the highest quartiles for Latino Immigrant and Race. Ahwatukee is in the highest Social Class quartile, the lower quartiles for Indoor Hazards, the lowest Latino Immigrant quartile, and the middle highest quartile for Race¹². These comparisons between quartiles provide yet another example of how disparate the areas are in terms of the socioenvironment.

Methods and Results

Given that the dependent variable is a count of hospitalizations per zip code, I ran Poisson regression models in SAS 9. Poisson regression is appropriate for count data as it assumes that values are non-negative integers (Gardener, Mulvey, and Shaw 1995). An ‘offset’ term is used to model rates when outcomes are dependent on area or population (Goetz n.d.). The offset is the natural log of, in this case, the population of

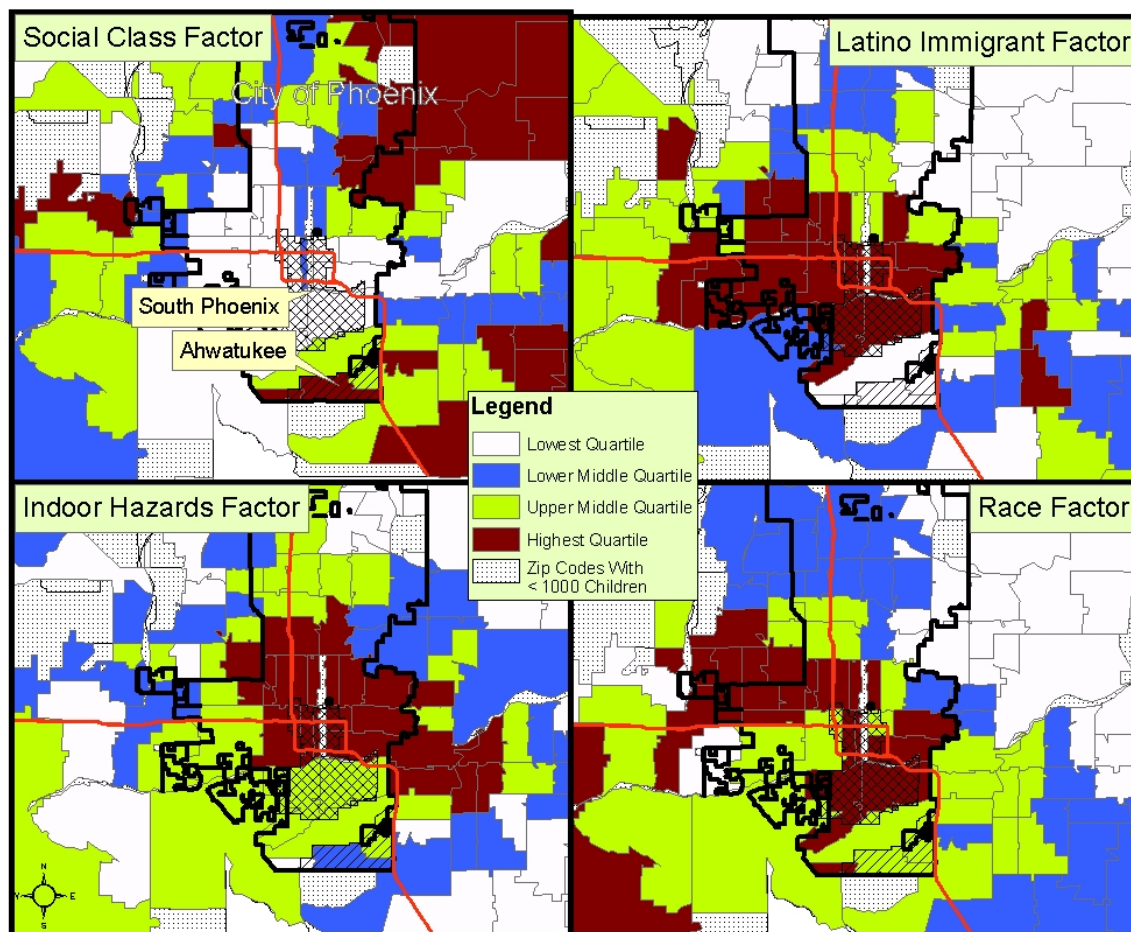


Figure 14. Spatial distribution of four census factors, 2000

children fourteen and under. There are ninety-nine zip codes in Maricopa County with more than 1000 children, which are used in this analysis. Correlations between variables in this analysis are shown in Table 8.

I ran three nested models. First, I considered only the census factors representing racial/ethnic and social class dimensions of inequality as predictors of uncontrolled asthma (Model 1). Next I included the indoor hazards variable (Model 2), before combining racial/ethnic, social class, and indoor hazard dimensions of inequality with the two measures of outdoor environment (Model 3). Model fit statistics are presented in Table 9 and the parameter estimates in Table 10.

Table 8. Correlations between variables and factors used in analysis

		Social Class	Indoor Hazards	Pollution Factor	HDI Air Total	Latino Imm.	Race	Asthma Hosp.
Social Class	Corr.	1	-0.51	-0.44	-0.23	-0.55	-0.33	-0.34
	Sig.	.	0.000	0.000	0.024	0.000	0.001	0.001
Indoor Hazards	Corr.	-0.51	1	0.79	0.24	0.65	0.43	0.39
	Sig.	0.000	.	0.000	0.017	0.000	0.000	0.000
Pollution Factor	Corr.	-0.44	0.79	1	0.31	0.69	0.44	0.49
	Sig.	0.000	0.000	.	0.002	0.000	0.000	0.000
HDI Air Total	Corr.	-0.23	0.24	0.31	1	0.44	0.53	0.40
	Sig.	0.024	0.017	0.002	.	0.000	0.000	0.000
Latino Imm.	Corr.	-0.55	0.65	0.69	0.44	1	0.56	0.39
	Sig.	0.000	0.000	0.000	0.000	.	0.000	0.000
Race	Corr.	-0.33	0.43	0.44	0.53	0.56	1	0.39
	Sig.	0.001	0.000	0.000	0.000	0.000	.	0.000
Asthma Hosp.	Corr.	-0.34	0.39	0.49	0.40	0.39	0.39	1
	Sig.	0.001	0.000	0.000	0.000	0.000	0.000	.

Table 9. Predicting asthma hospitalizations: model fit

Model	Description	Deviance/ DF	Chi Square/ DF
1	Only Social	1.76	1.64
2	Adding Indoor	1.69	1.56
3	Adding Outdoor	1.53	1.39

Table 10. Predicting asthma hospitalizations: analysis of parameter estimates

Model	Intercept	Social Class	Latino Imm.	Race	Indoor Hazard	Pollution Factor	TRI Total Air
1	BETA	-6.343	-0.150	0.037	0.098		
	Sig.	0.000	0.005	0.308	0.000		
2	BETA	-6.349	-0.092	-0.016	0.104	0.128	
	Sig.	0.000	0.088	0.684	0.000	0.003	
3	BETA	-6.357	-0.098	-0.085	0.065	0.046	0.161
	Sig.	0.000	0.071	0.053	0.022	0.365	0.001

In terms of model fit, the model combining racial/ethnic, social class, and environment (Model 3) is the best fitting model (i.e., Deviance /DF and Chi Square /DF are closest to 1). The models that include the environmental predictors (Models 2 and 3) fit better than the model that includes only the sociodemographic predictors (Model 1) meaning that combining multiple dimensions of inequality provides a closer estimate of the variance in uncontrolled asthma. These model fit statistics underscore the importance of considering social and environmental factors when studying asthma.

Looking only at sociodemographic factors (Model 1), areas with lower Social Class and higher proportion of African Americans have significantly higher rates of uncontrolled asthma, controlling for Latino Immigrant, which is not significant. In Model 2, the Indoor Hazards factor is a significant positive predictor of asthma hospitalizations and its addition causes Social Class to become less significant. This means that Indoor Hazards account for some, but not all, of the effect of Social Class on uncontrolled asthma.

In Model 3, Indoor Hazards became insignificant with the addition of the Multi-Pollution factor and TRI Total Air Emissions. Both outdoor environmental hazard variables account for all of the effect of indoor hazards and also have their own independent, and significant, effects. This finding indicates that areas with high levels of TRI Total Air Emissions and the Multi-Pollution factor also have high levels of indoor hazards, and that TRI Total Air Emissions and the Multi-Pollution factor are more important predictors of asthma hospitalization than is Indoor Hazards. This suggests that while indoor asthma interventions are important, pollution reduction strategies may be more important.

The Latino Immigrant Factor is significant ($p = 0.053$) in the negative direction, meaning that areas with more Spanish-speaking Latino immigrants have lower rates of asthma hospitalization controlling for the other factors. Explanations for this finding include the possibility that Latino immigrants are not relying on, or using, the hospital for asthma care and/or that they have lower rates, or less severe cases, of asthma. To understand the importance of race, class and environment, I turn in the next chapter to qualitative interviews with parents managing asthma in Phoenix. This quantitative analysis does not reflect preventative healthcare measures, which may reduce uncontrolled asthma (i.e., asthma hospitalizations). In Chapters 4 and 5, I argue that the environment and healthcare are the two essential resources for successful asthma control and this quantitative analysis does not address the importance of healthcare. It does demonstrate that environmental quality is an important predictor of uncontrolled asthma.

This analysis illustrates that sociospatial inequalities do explain patterns in uncontrolled childhood asthma. Adding the outdoor environment to the social/indoor factors in Model 3 weakens the effect of social class and explains away the effect of indoor hazards because areas with hazardous indoor environments also have hazardous outdoor environments. This indoor/outdoor finding represents an environmental double jeopardy for residents, which is reflected in higher rates of asthma hospitalizations. The Multi-Pollutant factor emerges as the most important predictor (largest Beta) of asthma hospitalizations.

Models 1-3 do not specifically determine if zip codes with greater proportions of racial/ethnic minorities or persons with low social class have higher levels of outdoor hazards. To find out, I ran two separate models predicting the Pollution Factor and TRI

Total Air Emissions using the four census factors (Social Class, Latino Immigrant, Indoor Hazards and Race). For TRI Total Air Emissions (Model 4), the Latino Immigrant Factor and Race Factor are significant positive predictors controlling for Social Class and Indoor Hazards and the R Square for that model is twenty-nine percent (See Tables 11 and 12).

Table 11. Predicting pollution: model fit

Model Fit				
Model	Dependent Var.	F	Sig.	Adj. R Sq.
4	TRI Air Total	11.1	0.000	0.292
5	Pollution Factor	51.0	0.000	0.671

Table 12. Predicting pollution: analysis of parameter estimates

Model		Indoor Hazards	Latino Imm.	Race	Social Class
4	BETA	-0.129	0.297	0.424	0.015
	Sig.	0.268	0.023	0.000	0.890
5	BETA	0.603	0.318	0.019	0.050
	Sig.	0.000	0.000	0.785	0.491

Model 4 indicates that areas with higher percentages of African Americans and Latino immigrants have higher volumes of industrial emissions, controlling for Social Class and Indoor Hazards. The increased exposure to industrial pollutants may be reflected in zip-code level asthma hospitalization rates for African Americans as percent African American is a significant predictor of asthma hospitalizations in Models 1, 2 and 3. This explanation does not hold for zip codes with higher levels of Latino Immigrants, as Latino Immigrant is an insignificant, or an almost significantly negative, predictor of asthma hospitalization rates. Whether reflected in asthma hospitalization rates or not, Model 4 demonstrates an environmental injustice whereby Latino Immigrants and African Americans tend to live in zip codes with higher levels of industrial air emissions independent of social class (see also Bolin et al. 2000).

When predicting the Multi-Pollutant factor, I find that the Indoor Hazards and Latino Immigrant are significant and positive, controlling for African American and Social Class, which are not significant; the R Square for the model is sixty-seven percent (Model 5). This means that areas with higher levels of Indoor Hazards and Latino Immigrants have higher levels of criteria pollutants in metro Phoenix independent of social class and percent African American (See Tables 11 and 12). This finding supports my double jeopardy assertion and the relationship between Indoor Hazard and the Multi-Pollution factor.

Latino Immigrant factor is significant in both of the models predicting TRI Total Air Emissions and the Multi-pollution factor, meaning that Latino immigrants have limited access to less hazardous environments. But this exposure is not reflected in the model predicting asthma hospitalization rates. Nonetheless, the exposure of Latino immigrants emerges as independent of social class, reflecting the concentration of Latinos in South Phoenix, and more recently west Phoenix, where levels of hazards are higher.

Conclusion

This analysis supports urban-level solutions to uncontrolled asthma in the form of pollution reduction strategies. The importance of environmental context in asthma hospitalization rates means that asthma is more than just an individual problem and that the solutions reside at multiple scales. This analysis has three main limitations. First, I am limited by relying on asthma hospitalization data. The data do not allow me to make claims about asthma prevalence or asthma severity. Second, I am restricted to conducting my spatial analysis at the zip code level because that is the only spatial scale

at which the asthma data are available. Because researchers socially impose scale, conducting the analysis at multiple scales would be preferable (Pulido 2000). However, because of confidentiality, hospitalization data at finer geographical scales is not publicly available. Third, it is impossible to infer individual actions from data at the zip code scale, which limits the interpretations I can offer for the statistical analysis presented above. The analysis indicates that inequalities exist, but from these models I am not able to determine why they exist, or how they developed.

In the next two chapters I employ qualitative analysis, specifically in-depth interviews with parents of children with asthma, to address these limitations. First, I am able to interview parents whose children had all four severities of asthma, and who have varying degrees of control over the asthma. Second, analysis occurs at the household scale, which does not represent any degree of aggregation. Third, because individual actions and attitudes are the focus of the analysis, I am able to discern more about the process behind the formation of sociospatial inequalities.

CHAPTER 4

EXPERIENCING INEQUALITIES: HEALTHCARE

Introduction

How do parents have differential control of children's asthma? The stories of Gwendolyn and Faith presented at the beginning of Chapter 1 illustrate two examples of how experiences differ between central city and suburban households. Faith's household is Anglo-American and upper income, living in a four bedroom home tucked up next to a mountain preserve in Ahwatukee. She is married and has a college education. Gwendolyn's is a low-income African-American household living in a public housing apartment near a freeway in downtown Phoenix. She is single parent with a high school education who uses the bus for transportation. Whereas Gwendolyn's household struggles with accessing primary healthcare and follow up visits after hospitalizations, Faith's has an asthma management team for her son, including herself (a registered nurse), her spouse, a primary care doctor, and an asthma specialist. These two households differ greatly in resources available for dealing with asthma and are differentially able to protect their child from uncontrolled asthma.

In this chapter, and in Chapter 5, I use the in-depth interviews to investigate how the characteristics of vulnerability introduced earlier (social class, gender, age, race/ethnicity, language/literacy, and migration/ residency) relate to vulnerability to uncontrolled asthma in Phoenix. Bundles of characteristics determine the access and control households have over resources. From analysis of interview data, healthcare and the environment emerge as the most salient resources for asthma management. Healthcare resources include primary healthcare, medications, and asthma specialists and

are the focus of this chapter. Environmental resources include the indoor and ambient environments and are addressed in the next chapter. The control that households have over resources is a salient dimension of access. For example, bundles like Anglo/upper class/college educated/American impart access and control over resources. These characteristics refine the coarser dimensions of inequality (race/ethnicity, social class and environment) that were initially culled from the literature and operationalized in the quantitative models.

Assemblages of social characteristics influence methods of social protection and self-protection employed by households (Wisner et al. 2004). Self-protection involves the measures that households take to reduce their child's risk of an asthma attack, including where they live and what their home is like. For asthma, self-protection steps include removing carpet, giving the child preventative asthma medication, or moving away from a freeway. Social protections, on the other hand, occur at a level above the household and include non-monetary social relations (e.g., assistance from family), or provisions from the government or institutions (e.g., health insurance). In this chapter, I consider how parents differentially access and mobilize healthcare resources in South Phoenix and Ahwatukee.

Getting by: Healthcare in South Phoenix

"AHCCCS is good to help."

Health insurance, primary and specialist care and medications are important healthcare resources for households coping with asthma in both South Phoenix and Ahwatukee. In South Phoenix, the majority of participating households (n=27) rely on state health insurance: AHCCCS or Kids Care. AHCCCS and Kids Care cover

medications, doctor visits and hospital care at little or no cost for qualifying households with asthma. Admittance into the programs is restricted based on income and legal residency in the US (State of Arizona 2005). All participating parents express general levels of satisfaction with the service and appreciation for what they receive from it.

April is an aging and disabled African-American grandparent/adoptive parent to her son's three children with asthma. She reckons, "Medications cost a lot of money. But AHCCCS is really good to help, and wonderful with the children, and with me too." For Shauna, whose daughter uses Kids Care, the ten dollars fee she pays per month is "nothing compared to her [my daughter's] medications."

AHCCCS and Kids Care offer a medical taxi service that assists people by taking them to and from doctor's appointments with twenty-four hour notice. Five households interviewed rely on this important social protection measure. April states: "AHCCCS is very wonderful. I like that I can get transportation when I need it. I use it all the time for the kids. You got to wait two or three hours for them to come back and get you. [laughs] You go and you have to sit there and wait to see the doctor and then you have to wait a couple of hours for the cab to come back and get you. But I am still glad to have the transportation to go when nobody is around to take me."

However, the taxi does not serve households with urgent care needs. Lilia is a single Latina parent of an eight-year-old son with asthma and two other children. She works full-time as a teacher's aid and does not own a car. She explains:

I like that they [AHCCCS] provide transportation to doctor's appointments. I don't like that like there's times where one of the kids will be sick and I have to take him in, but we can't get an AHCCCS taxi because we have to call twenty-four hours in advance. So at 8:00 we get an appointment for 2:30. Then you call the AHCCCS at 8:30 and they still won't give it to you. So then I have to take the bus - I take two busses. It probably takes, maybe about an hour to get there.

Lining up AHCCCS taxis and taking buses is more complicated than driving one's own vehicle. Parents can spend hours waiting for the bus or taxi and, for working parents like Lilia, this means losing a portion of an already small income.

While AHCCCS and Kids Care provide social protection, there are limits to state healthcare provisions. While AHCCCS and Kids Care provide medications for free, some households have difficulty obtaining approval from AHCCCS for expensive brand name medications (e.g., Zyrtec for allergies) and diagnostic tests. For example, Susie has four children with asthma and allergies, and she says: "That's one bad thing about AHCCCS. They're not really wanting to find out what they're allergic to. We tried to get them allergy testing, but they [AHCCCS] don't want to pay for it and it's expensive. I mean, I could probably pay for one but I can't pay for four and so that's hard. And they don't want to pay for allergy medication, like Zyrtec or something like that. They're like, 'No, we don't feel they need it.' Whether they do or not, I mean, so..." Marilu is a single Mexican-American parent whose five-year-old son uses AHCCCS. Her son's plan will not cover his preventative asthma medications and this perplexes her: "I want preventative care for him: do they want to keep paying the emergency costs?" Because AHCCCS will not cover preventative treatment, Marilu's son does not receive it. Marilu has been temporarily laid off from her job at the airport due to construction and is behind on her bills; she is unable to purchase the medications without help from her insurance. She is in the process of switching her son to another AHCCCS plan in hope that it will cover his medications. Parents express frustration when AHCCCS/Kids Care will not cover treatment that might improve their child's condition.

“She takes Advair sometimes.”

For some children, asthma medications cause unpleasant side effects. Albuterol is a fast acting ‘rescue’ medication that has been prescribed to all South Phoenix children whose households participated in this study. Possible side effects include elevated heart rate and high blood pressure (Monroe et al. 2003). Miranda, a single parent to four children, one with asthma, explains:

Finally the doctor said Octavio has asthma, because he would put him on a breathing treatment [of albuterol] and he did fine. And then once he diagnosed him with it, he said, “You know what? We're going to send him home with a machine and he needs to have it.” I didn't really like giving it because the heartbeat. It would go really fast and it scared me. Octavio was a baby with a heartbeat that you can see through his chest. It was beating away. It made him hyper. It wasn't really noticeable when he was a baby. But after a while, he was uncontrollable. So I tried to wean him off it.

Six of the South Phoenix parents mention that their child suffers side effects from albuterol; several parents report that the side effects make them less likely to give the child the medication.

Many parents fear the long-term effects of medications, and wish their children did not need to take them. However, nearly all South Phoenix households report trying to follow the healthcare provider’s plan of treatment when financially and logistically possible. LeRinda’s seven-year-old daughter May has chronic asthma and has been under the care of a pulmonologist since she was an infant. LeRinda struggles with giving her daughter medications. She says:

And, my upbringing, we did not take medication. My mother didn't give us any kind of medicine. I mean nothing. I have to deal with the fact that May is on so many medications. When we go see Dr. Woodward every three months, we say, “Could you take her off something?” No, he won't take her off anything. He says, “LeRinda, this is something she's going to need until she is maybe approaching late teens.” I trust that he's making good decisions. I constantly ask him, “So is the medication breaking down or not functioning with anything in her

body?" And he said "No." He said right about now, it's too early to detect if it's destroying her liver or her kidneys or anything. But other than that, he says, just keep doing what we are doing - have her drink tons of water.

LeRinda expresses reservations about May's medications repeatedly throughout her interview. She has both personal and economic reasons for wanting to take May off her medications, but counters them with unwavering trust in May's doctor. He has been treating May for six years, and LeRinda is confident in his ability to give appropriate care.

In contrast, Silvia feels that her daughter's pulmonologist did not give appropriate care. Silvia thinks that inhaled steroids were negatively affecting her youngest daughter, a kindergartener named Cierra. When Silvia noticed that Cierra was not growing taller nor was she gaining weight, she decided to wean Cierra off the medications prescribed by the pulmonologist. Silvia recalls:

But I bathe her. I'm like, it's like when you wet a dog and all their fur just sticks to them, so I'd be like, Oh My God, you know. That's what got me to say you know what, these medications are killing her. I don't know if they're helping her or making it worse. I started taking them away little by little and really, really trying to... in other words I was being very greedy about giving her medication, and it wasn't the cost. I would take food out of my own mouth just to make sure she had her medications.

In Cierra's case, Silvia felt the medications were causing harm and that they were not effective in helping Cierra breathe. Now, Silvia treats Cierra as needed with albuterol and keeps a current steroid prescription in the house just in case, but has not yet used it. Many of Cierra's problems stemmed from a collapsed lung as an infant, which has healed over time. Silvia reports that her pediatrician is in full support of her actions. In Silvia's case, her observations of her daughter's health caused her to take control of Cierra's treatment and take her daughter off the prescriptions.

For many South Phoenix parents, getting preventative medications, allergy testing and specialist care for their children occurs over a process of several years. Shalona is an African-American seven year old who has suffered from asthma since infancy. Her great aunt Jacquie adopted her because her mother struggled with a drug addiction and was unable to care for her. For several years, frequent asthma episodes, missed school, sleepless nights and hospital stays, plagued Shalona; her asthma was not under control. Shalona is on AHCCCS and uses the County Clinic as her primary care facility where she has not been placed under the care of one particular physician, but sees a variety of physicians. She continued to suffer until a paramedic advised Jacquie in the ambulance that was taking Shalona to the hospital. Jacquie states:

They didn't want to tell me about the Advair because it costs money. They didn't tell me about the Singular either. I found out about that from another parent that was at the clinic. And the way I found out about the Advair was that paramedic. She said she had asthma and was on Advair and she told me that I should ask for it. And once I asked for it, they gave it to me. But they didn't say a thing about giving it to her before... They never said nothing about it after all those times she had been in that hospital, you think they would have, but they didn't. They wouldn't, I had to ask for it, that woman [paramedic] told me to ask for it.

Since taking Advair and Singulair regularly, Jacquie reports that Shalona's asthma is more controlled, and she rarely visits the emergency room. Of the eleven African American households participating in this study (all of whom have AHCCCS or private insurance), only three (27%) have specialist care for asthma from a pulmonologist. Of the Latino children on AHCCCS or private insurance (n=20), seven (35%) see a pulmonologist. Contrastingly, ten (83%) of the Anglo Ahwatukee households (all on private insurance) use specialists. This qualitative comparison does not include controls for severity of asthma, but given Jacquie's experience, it is possible that African American and Latino households are not getting the specialist care (including

preventative medications) they need for their children. National-level studies demonstrate that African-American and Latino children with asthma are more likely not to be treated in accordance with national guidelines (Ortega et al. 2002). While the neglect of Shalona by the healthcare system is likely not intentional, it is these subtle forms of discrimination and racism that stem from systems of white privilege and shape the lives of persons of color.

A less common occurrence is when South Phoenix parents have access to preventative medications prescribed by physicians and covered by AHCCCS/Kids Care, but do not give them to the child. For example, seventy-seven year old April has asthma, as do her three children. They all see the same physician who prescribed Advair, albuterol inhalers, and liquid albuterol for the breathing machine for all four of them. However, April prefers to use albuterol, especially for her oldest daughter Jailah. She explains:

This [holds up Advair still in a sealed package] is something that Jailah uses sometimes around the house, but she don't like this because it is the powdered kind. It tastes funny and gets in your throat so if she don't want this, I say, "OK, I will give you a breathing treatment then." Lot of times I get up in the night around two or three o'clock and give one, about the time I have to take mine. She takes Advair sometimes. But it is mostly the breathing machine and the albuterol inhaler. The doctor wanted to try this [Advair] out and see if it would work. But I prefer the machine and the inhaler. It is not this powder on the tongue.

April and Jailah do not like the taste of Advair and April does not think it is important to use Advair as a preventative medication. April is comfortable using albuterol and has adapted to a life in which she regularly rises in the middle of the night to give breathing treatments. Her personal experiences with albuterol have taught her that it is a good medication; she says: "I notice a big difference with albuterol. My grandson just turned twenty-one and he has asthma bad, and he is on this too." In April's case, she is not

purposely neglecting the health of her children as she routinely takes them to the doctor and reports prioritizing their health, but her own understandings of medication contradict with understandings of the medical system.

When households have access to asthma medications, parents' decisions to self-protect using the medications are contingent on their trust in medical system and their own beliefs and observations. Beyond that, there are social influences on self-protective behavior, such as education levels, use of the Internet to gather information (which influence beliefs about medications and knowledge about which medications are available), and healthcare provider's decisions about delivery of medications to certain groups.

“She doesn't have insurance, that is why she goes to the clinic at the school.”

Undocumented immigrants and the working poor are the groups commonly without health insurance in the US. Their lack of insurance can be tied to neoliberal policies that have steadily loosened the institutional controls on the market since the 1980s. Loosening of institutional controls has meant that provisions protecting workers in the postwar era are no longer in place (Brenner and Theodore 2002b). Workers are hyper-exploited as they receive low wages and few benefits, such as health insurance. The very low wages have brought increasing numbers of undocumented immigrants to Phoenix from Mexico. These undocumented workers are not paid a living wage nor provided with health insurance (Prentice, Pebley, and Sastry 2005; Valenzuela Jr. et al. 2006). Low- and middle-class working Americans also suffer the consequences of the 'freeing' of the market, as they are losing their health insurance at an alarming rate. The total number of uninsured Americans rose from forty million in 2000 to forty five million

in 2003 and over two and a half million fewer children had job-based health insurance in 2003 than in 2000. Over one-third of uninsured Americans are Latino. By 2003, only fifty six percent of employees had job-based health insurance (Gutwig 2004).

Cecelia's Mexican-American household contains five of the more than forty five million uninsured Americans in the US today (Gutwig 2004; Kamman 2005). Cecilia and her husband own an aging singlewide trailer and together they made between \$25,000 and \$30,000 last year, which was enough to disqualify their three children from Kids Care. Cecilia's son Sam and her husband are both on multiple medications and twelve year old Sam has been hospitalized six times for asthma. Cecilia says:

I had insurance. I used to have Kids Care. I make a little too much because I have to work, so they have dropped me off Kids Care. I'm without insurance right now and paying everything cash until the middle of October. My husband has changed jobs, and he has to wait fifty days for our insurance. Now he works as a supervisor for Bob's Meat Company. That means more money. That means a steadier income. Before he was a supervisor at the Arizona Biltmore Resort & Spa. It's a five-star resort. The thing about that is, you're depending on an income of tips. And every time Sam gets sick, I am paying cash for whatever I needed for Sam. I have to pick up the Singulair tomorrow. That's \$200. I've got to pay for one prescription for thirty days. And he has other prescriptions. Thank God he has extra of some of the other ones. I'm not picking up anything I don't have to pick up. But his inhaler was a necessity. I had to pick that up, because he didn't have any extras. He uses that so much that I didn't have any relief inhalers [albuterol] in the house. He needs one for school and one for the home. Healthcare's really costing me an arm and a leg right now for the next two months until I can afford insurance.

In total, they will have gone without insurance for about five months this time. Cecilia hopes Sam will remain healthy until the new insurance begins. Even then, she worries because the plan looks expensive and the coverage not extensive. Cecilia explains what it is like to go to a doctor's office without insurance:

I'm not trying to be mean, but some doctors will not take you if you don't have the cash. When I go to my doctor at Arcadia Family Clinic, I have to leave my bankcard in the front before they'll take Sam back. What they do is, a lady came

in and she said she didn't have the cash to pay for her appointment that day. They told her, "Well, I'm sorry. You have to reschedule." She's like, "Excuse me." They're like, "You don't have your bank card?" She's like, "No. I have no cash either." They go, "You'll have to reschedule your appointment." I could not believe that. I approached them. I said, "What's going on? Are you saying that if I don't have my money today that I have to reschedule the appointment?" They're like, "Yeah."

Not treating someone because he/she cannot pay raises questions of ethics at a variety of levels. Some assert that not providing healthcare to someone because she cannot pay is a violation of human rights (Farmer 2003). It also challenges ethics of the medical profession. Despite being ethically questionable, denying people healthcare because they cannot pay happens repeatedly in the US, as is evidenced by Cecilia's quote. The United States, the richest country in the world, is the only developed country that does not provide healthcare to all of its citizens. The lack of a healthcare system creates instability for households like Cecilia's household which live on the edge and, as Cecilia puts it, "without a financial cushion."

Recent research estimates that approximately thirteen percent of Phoenicians are uninsured, and that the problem is especially great compared to other cities because of the increase in the undocumented immigrant population (Hurley, Pham, and Claxton 2005). Anaclaudia and her household are uninsured undocumented immigrants who came to Phoenix from Mexico ten years ago. Anaclaudia's daughter Aracely had her first asthma attack at school, and the Breathmobile and the school nurse have been treating Aracely's asthma ever since. Because she was born in Mexico and in the US illegally, Aracely does not qualify for AHCCCS, and Anaclaudia explains, "That is why she goes to the doctor at the school. The school nurse checks her and then when she gets worse, the nurse has her see the doctor from the hospital [Phoenix Memorial] who comes to the school" (in

Spanish). The Breathmobile and school-based health clinics allow households like Anaclaudia's to access basic health services. Language barriers mediate the efficacy of relationships between school nurses and parents. The school nurse at Aracely's school does not speak Spanish and Anaclaudia does not speak English, but they communicate at a basic level and at age twelve, Aracely helps translate for her mother.

Accessing healthcare from the school nurse represents the most basic level of social protection for uncontrolled asthma. The nurse cannot prescribe medications, but she/he can administer medications, and advise parents. All public elementary schools in the two South Phoenix school districts have credentialed nurses in the schools. Mary Chick, school nurse at Lassen Elementary in South Phoenix, reports: "We have two air filtration machines that we put in the classrooms with the most serious asthmatics and I give medications to those who have them. There is only so much that the school can do." (M. Chick, personal communication, 11/7/2004).

My findings show that instead of relying on the emergency room and hospital for treatment, undocumented immigrants in South Phoenix use them as a last resort and rely on the social protections offered by schools, including the Breathmobile. Of the eight households with undocumented parents¹³, none have hospitalized a child, only two have taken children to the emergency room, and five have children who see the Breathmobile. The healthcare utilization behaviors of these eight households are mediated by social, cultural, and economic factors such as lack of money, transportation difficulties, beliefs about doctors, and fears of deportation. Monica, who immigrated to the US four years ago, has two children with asthma who are uninsured. She works as a cleaning person and shares her home with ten others. She reports that she does not take her children to

the hospital because it is too expensive. While schools provide some level of social protections for children without health insurance, they are not equipped to treat children during emergencies, such as providing a cast when a child breaks a bone¹⁴. The fact that undocumented immigrant children are forced to rely on the social protections provided by their elementary schools reflects the inequitable nature of the healthcare system in the US whereby social class and residency status determine access, instead of the need for care. School-based programs are important stopgaps in an unraveling safety net for undocumented children with asthma.

In states across the US, lawmakers are proposing broad healthcare reform amidst their constituencies' growing frustrations with elevated health insurance costs, reductions in coverage and a lack of reform at the federal level. Twelve states are discussing proposals that would create state health systems that cover all residents (Crawford 2006b). In Illinois, all children will be covered beginning in July of 2006 (Dorning 2005). In Arizona, a bill has been introduced to cover all residents who have lived in the state for more than a year (Crawford 2006b). In recent years, responsibility for healthcare, along with other social services, has been rescaled from a federal to a state level responsibility (Trudeau and Cope 2003). The decentralization of healthcare reform has led to increasing inequality between states and unequal protection for children.

In the current absence of government-run programs for those without health insurance, non-governmental groups, like the Phoenix Children's Hospital Breathmobile, attempts to fill the gaps. The Breathmobile is one of the only institutional sources of need-based healthcare available to South Phoenix children no matter their health insurance status. It is emblematic of new forms of non-governmental, locally based

social services that have emerged and become increasingly important with the retrenchment of state protections. Gough (2002) explains enterprises like the Breathmobile as products of ‘socialization,’ or cooperation of actors through networks other than the market. She reasons that while social protections are weaker and constantly challenged by neoliberalization, they will not cease to exist because socialization efforts are in response to demands of capital; workers need resources to continue working (Gough 2002). In this way, services like the Breathmobile, while critical for those without health insurance, serve as ‘band-aids.’ This provision of minimal need-based services may obstruct more positive forms of transformation and reinforce the status quo.

The Breathmobile represents the primary social protection against uncontrolled asthma for nine households, six of which are immigrants. All children in these households were prescribed preventative medications and receive frequent asthma care from the Breathmobile. The Breathmobile assists households with self-protection by teaching parents and children about asthma, its triggers, and in-home modifications. Parents using the Breathmobile are appreciative of the services provided. Dominga is an undocumented immigrant and her children use the Breathmobile; she recalls:

The three girls were born in Mexico, but Danielle was always very sick. In Mexico, she was sick all the time from when she was a baby. [is quiet and a few tears roll down cheeks] She was in bed all the time. When we got to Phoenix, we brought her to St. Vincent de Paul [charity clinic] and they diagnosed her with asthma. They also gave us some syrup for the cough. The school then sent us to the Breathmobile. The Breathmobile provides us the medicine, which is really nice, because it is hard for their dad to find work. We don’t have very much money. Danielle would not have any medicines without the Breathmobile. At St. Vincent’s they just gave her a little bottle of cough syrup when we went there. If they get really sick I can take them to the emergency room, but other than that there is no where to go, only the Breathmobile (in Spanish).

Dominga's daughters utilize the Breathmobile's participation in medication assistance programs available to the poor. The Breathmobile obtains Singulair, Flovent and Advair for children whose households meet the income requirements. Sherry, the respiratory therapist for the Breathmobile, runs their drug assistance programs and she reveals the situation: "It is getting harder for non-citizens. A few years ago, I could use lots of programs, but now it is only Glaxo that allows non-citizens the free meds; this is great for albuterol and Advair but our main problem is for the nasal sprays. Glaxo's seem to cause more nosebleeds, but there is no other free option. I have them use over the counter drugs instead, like Claritin or Ocean Spray but it is not the same" (personal communication, 9/24/2005).

Migration/residency plays a key role in the availability of social protections. The free medication programs allow undocumented immigrant patients of the Breathmobile to obtain medications, but they do not allow healthcare providers and parents the freedom to choose from a variety of medications. Because many children would not have medications without the Breathmobile, it is a key resource in the social safety net for children with asthma. But the Breathmobile relies entirely on grants and charitable programs to operate and is thus a less secure source of protection than having access to healthcare and medications elsewhere. While it performs an important service, it is a stopgap, not a systemic solution to immigrant healthcare needs. The Breathmobile is designed to treat children's asthma. They do not treat adults with asthma or other health conditions. Judy Harris, Director of the Breathmobile, explains to me that, "We try to squeeze kids in who are sick -especially from the undocumented families. The parents will call and say that the kid is having asthma and can they come in. So they come in,

and the kid has an ear infection, which we are ill equipped to treat and the only other option in the ER [emergency room] and the family does not want to go there. Last year, I finally used some of the budget to keep some antibiotics on hand, so that at least we can give out those” (personal communication, 10/20/2004). In its role as a primary healthcare provider for undocumented immigrant children, the Breathmobile offers limited services in contrast to primary healthcare children can receive with AHCCCS and private insurance.

“Do I have to apply or what?”

Some households have difficulty accessing social protections for which they are entitled. Fear, a lack of knowledge, parental illiteracy and limited English proficiency are four sources of difficulty, and when households overcome these limitations and access services, it is usually because someone at the child’s school assists them. The school plays an essential role in linking parents and services because of the trust parents have in the school. Schools occupy a daily presence in the lives of low-income households: children eat meals there, and parents and children receive healthcare, access newspapers and the Internet, and learn English at the schools.

Immigrants in Phoenix live in a culture of fear. Recent policy changes, specifically Proposition 200 in Phoenix, have aggressively targeted undocumented immigrants receiving social services. Bolin and Stanford (1998, 119) when studying Latinos in California described similar anti-immigrant policies as “intentionally disadvantaging an already vulnerable low income population” (Bolin and Stanford 1998, 119). This culture of fear is intensified when a child of undocumented immigrants has a chronic illness (e.g., asthma). While all parents have anxieties about their child’s illness,

the distress is compounded when parents possess limited financial and cultural resources and have restricted access to the fruits of the healthcare system. Policies targeting immigrants have had the ‘unintended’ consequence of making even legal immigrants fearful of the government. Children born in the US to parents in the country illegally suffer in this milieu as parents do not access social services children are legally entitled to for fear of being deported or being denied citizenship at a later date. The Breathmobile’s respiratory therapist shares this typical story:

...Her kids were born here and her husband had some papers to be here legally, but she was here illegally and was really worried about getting deported. We have been treating the children for three years and finally have them on Kids Care. They should be on Kids Care because they are citizens. But there are rumors going around the community that you can get deported when you go to sign them up, or if you try to apply for citizenship at a later date and they see you using government services they will be less likely to grant you citizenship. After three years, the mom finally trusted us and signed her kid up for Kids Care (Sherry, personal communication, 10/20/2004).

While one can imagine this mother is concerned about her children’s health (e.g., she seeks care from the Breathmobile), her fears of deportation, separation from her family, and future inability to apply for legal status override her fears about being able to access healthcare for her children. She also comes from Mexico, where people are less likely to seek healthcare from physicians, and instead rely on family, friends and alternative therapies (Mikhail 1994). Her story illustrates how fear can play into the cycle of poverty for immigrants. If one of her children experienced a serious health crisis before he/she was on Kids Care, she would not have had the money or health insurance to pay for a hospitalization or surgery and would have slipped even father into poverty because of her fear.

Even among immigrant households where everyone has legal status in the US, a culture of entitlement is absent. Distrust and fear are the overriding emotions and they result in unequal protections for children. Many parents try to be inconspicuous and go without assistance. For Crescencia, fear of interaction with immigration authorities combined with her limited access to information about available services, lack of energy to seek out extra information, and desire to be self-sufficient. It meant that her household did not access health services they were entitled to receive for many years.

Crescencia's daughter was born in California and her household moved to Phoenix ten years ago after losing everything in the Northridge earthquake in California. Both Crescencia and her husband work, but neither of their jobs offer health insurance. The household was generally healthy until six years ago when their youngest daughter Rachel ended up in the emergency room because she could not breathe. Crescencia explains (in Spanish and English):

I have Kids Care. We pay \$100 a month and it is for the family. We have been on it for three years. Before that, we paid cash for the doctor. But then when Rachel was getting sick so much, we could not afford it and it got very expensive. It was \$100 just for the visit and that did not count the medicine. It was hard because sometimes we did not have the money. And when she started getting sick, we didn't have AHCCCS. We didn't have nothing and she got worse and worse. And they wanted us to pay cash and we would go there and pay for it, and pay for the medicines - all the things - we had to pay for them. At that time, we heard at the school about AHCCCS and they told me we could sign up. The school helped me fill out the papers.

Parental illiteracy and limited English proficiency are two other important reasons behind why some children are not able to fully take advantage of AHCCCS, and other social services, like public housing. Parents who do not speak or read the dominant language – in this case English – lack the abilities to deploy cultural capital to competently navigate the social service realm. Bourdieu explains cultural capital as “the

degree of mastery one has of the cultural practices which a given society recognizes as legitimate” (Callinicos 1999, 289). In a survey of over 1000 families in Boston, children's insurance coverage, citizenship, and family income link closely with parental English proficiency (Flores, Abreu, and Tomany-Korman 2005). Limited English proficiency among parents is tied to errors with their children's medications (Wilson, Chen et al. 2005; Leyva, Sharif, and Ozuah 2005), and contributes to health disparities by hampering effective health communication (Jacobs et al. 2005). Simply translating educational materials from Spanish to English does not solve the problems, as part of the problem is cultural (Bolin and Stanford 1998).

Four monolingual Spanish-speaking parents who participated in interviews are unable to read and write in Spanish. They have been in the US for between ten and twenty-five years and their children are on AHCCCS. Odalys, for example, has received a flyer about the taxi service, but is unable to fully comprehend it: “I have heard that there is a program with Kids Care that if you call and if you don't have a ride they can give you one. I received something in the mail that said that you can call for a ride, but I am not really sure how it works and what to do. Do I have to apply or what? I don't understand how it works” (in Spanish).

Illiteracy also reduces the control that Elodia enacts over her son's health insurance. Elodia immigrated to the US fourteen years ago from Mexico having not completed elementary school. She lives in a one-room building that was previously used to screen-print t-shirts. Her eleven-year-old US-born son Elbanco has an AHCCCS plan that sends him to the Maricopa County Clinic. Elodia explains:

At Maricopa, he does not have a doctor. It is always a different doctor there. Every time I go there - and this is not for emergencies just for appointments - it is an all day wait. Even if he is really sick, I am there all day. I am waiting there for hours until they take him into the examining room and then once we get there, it is another wait for the nurse and then another wait to see the doctor. I like the doctors and their service once I see them, but the wait is so long.

Given her dissatisfaction with the wait times at the County Clinic, I ask her if she plans to switch Elbanco to a different AHCCCS plan that allows him to go to a private clinic where he could see the same doctor and she replies: “There is a paper with many, many plans on it, but I haven’t switched plans because what if I pick one and it is very far away? I don’t have a vehicle or the money to get there.” Elodia’s illiteracy combines with her lack of transportation to create a situation whereby she is unable to take full advantage of the social protections offered by AHCCCS.

Illiteracy also inhibits her from controlling Elbanco’s medications. I ask her which medications Elbanco takes and she replies, “I don’t know the names, but he used to take one every day in the mornings and the nights and the other when needed.” He had not been taking the medication for four months because of some confusion at the clinic during his last visit. I offer the names of several common medications and Elodia pauses and answers: “Albuterol and Flovent, but I don’t know which one is which.” When the medications come from the pharmacy, it will be difficult for Elodia to determine which one is albuterol, to be taken as needed, and which one is Flovent, to be taken twice daily, as she cannot read their names. Juana, a Honduran immigrant who cannot read or write, is also limited in her understanding of the medications. I ask her, “Does Carlos take medications?” She responds, “Does he ever! He takes albuterol and... Let me go get them, they are hard to remember. Here, he takes albuterol and [hands me the bottle].” I remark, “Oh, Singulair.” And Juana replies, “What is that for? The doctors just said to

take it every morning and every night.” Juana’s lack of understanding of why her son takes medication could stem from her illiteracy, cultural differences between patient and provider, or the comprehension problems that occur between English-speaking doctors and the Spanish-speaking parents.

The Director of Health for the City of Phoenix Head Start reports serious problems with communication between English-speaking healthcare providers and Spanish-speaking parents in Head Start. She feels this negatively impacts children’s health and, while Federal law required translation, she has her staff work with AHCCCS to switch children to clinics with Spanish-speaking staff (C. Wilhmer, City of Phoenix Head Start, 2/1/2006). Title VI of the Civil Rights Act of 1964 prohibits discrimination based on national origin, which includes language. Therefore any hospital that receives federal funding (which is nearly every one due to Medicare and Medicaid) is subject to this law and must provide translation to people with limited English proficiency, of which there are now between eleven and twenty one million nationwide. In Arizona, more than one million of the five million residents speak Spanish at home, and half of this one million speak limited English (Náñez 2006). However despite the scale of the problem, this Act is not enforced by the federal government nor followed consistently in practice.

In a study of seventy hospitals across the country, twelve of which are in metro Phoenix, researchers find that when Spanish-speakers call the admissions or emergency desk, a Spanish speaker is not available forty-four percent of the time. When Spanish-speakers visit the hospitals, a Spanish-speaker is available only forty percent of the time (American Institute for Social Justice 2004). The lack of translation at hospitals and clinics is symptomatic of the dominant system of white privilege that has devalued the

health of non-English speaking children, and results in children receiving less than adequate and inequitable healthcare.

Households cope with the lack of translation in a variety of ways. For example, Maria and her husband are monolingual Spanish speakers and when they rushed their son Timothy, who was on AHCCCS, to the emergency room for asthma, seven-year-old Timothy translated between the doctors and his parents as no translator could be found. When Maria tells me about this instance, she speaks with a matter-of-fact tone stating: “since Timothy knows English, he can translate (in Spanish).” Maria did not present the lack of translators as problematic or appear to feel she was entitled to an interpreter in spite of the anxiety she may have felt at not being able to fully understand what was wrong with her son. From Maria’s perspective, Timothy’s ability to translate is an improvement on her past experiences of being unable to communicate with non-Spanish speakers. In other words, as Timothy grows up, he becomes a form of cultural capital for his mother: he can interact with the dominant Anglo culture in a way she cannot. As a child growing up in the US and being educated in the public school system, Timothy is, in the words of Bourdieu (1989), being “inculcated,” through the “investment of time,” into the dominant culture.

In addition to struggling with a lack of interpretation, Rosalinda is concerned about the long wait times in the emergency room. She describes her experiences in the emergency room¹⁵: “They are very slow. I believe that people who have very severe problems should be treated first and they did not treat him until the father went up and told them, ‘Hey, my kid can’t breathe,’ and then that is when they finally took him in. We had waited about one and half hours, which is an eternity when your child can’t

breathe” (in Spanish). I ask, “ Did they speak Spanish in the emergency room?” and Rosalinda responds, “No they didn’t speak Spanish. They had to find somebody.” And then I ask, “So when your husband went to complain that you had been waiting so long, did the interpreter have to translate the complaint? Would there be someone just there at the front desk to translate?” and Rosalinda says, “No. [laughs] They totally did not understand him but he knew some words in English and it was enough to get them to realize that my son was having problems breathing.” In the case of Rosalinda and her spouse, uncertainty that the emergency room staff would understand them created greater anxiety and exacerbated a situation that was already quite difficult. In South Phoenix, several healthcare centers exist to serve low-income children and have Spanish-speaking providers, like Mountain Park Health Center and the Breathmobile. But as the American Institute for Social Justice (2004) study demonstrates, translation in healthcare settings is a serious problem nationwide, and in metro Phoenix as well.

“Who is going to take us to the emergency room?”

Gender inequality contributes to a lack of resources for women in South Phoenix, especially those who grew up in the Mexican culture, where the gendered divisions are the sharpest. Amongst the interviewed parents who speak only Spanish, ten of the twelve are homemakers and the two parents that are employed outside the home work nights as cleaning women and are the primary care takers of their children during the days. Eleven of the twelve Spanish-speaking households have two parents in the home and a recent widow heads the twelfth household. These households have the lowest income (median: less than \$10,000) and lowest levels of education (approximately half with elementary educations) of interviewed households, but do not have two parents in the labor market.

In these very poor households, personal transportation is an important resource. While eight of the twelve households owns a car, all twelve women interviewed report that their primary source of transportation is not the car but an alternative, like walking, the bus, or a friend or family member's car (not the husband's). For the eight households with cars, the husbands and adult sons took the cars to work, leaving the women in the home. This spatial restriction to the home makes it difficult for the woman to deal with the child's asthma during emergencies that occur during the day.

For these eight households, transportation is a key resource in which access is determined by gender and employment. Odalys and her youngest son Joe (who has asthma) live with her husband, adult sons, their wives and children and she remarks:

Not driving makes it difficult. It is hard to depend on my sons because they all work. Last year, they would call him from the school and tell me to come pick him up because he was sick. I would have to tell them "I can't. I don't have a car," and it was far enough that I couldn't usually walk. So a couple of times the school nurse brought him home. Other times I have taken the bus to pick him up from school when he is sick, but it is really hard because I have to depend on my sons and they work. I tried taking the taxi before but it is very expensive and so I have always taken the bus since then. But it is difficult when Joe is sick. I have to get on the bus with him and he is already sick and so it is not good (in Spanish).

Anaclaudia, whose husband takes their car to work, faces similar challenges when trying to pick up her daughter from school when she is having an asthma attack. She recalls, "That time when she got sick at school, I wanted to bring her home on the bus, but they wouldn't let me, so I had to find someone to bring us home. A friend down the street finally came and got me that time when she was so sick." In the case of chronic illness, this 'traditional' arrangement whereby women are relegated to the home and men go to work is constraining as the women are unable to leave the home to take the child to the doctor, or pick her/him up from school when she/he is sick.

When couples separate, the system of gender inequality severely disadvantages poor women and their children. For example, Elodia's relationship with her husband is conflictual and marked by periodic separation. She explains: "I worry a lot, especially when my son is sick. One time, during the night, he got sick and this was during a time when my husband was not living with us and I was worried, 'Who is going to take us to the emergency room?' but at that time, I had very good neighbors who took me to the hospital." Not having her own source of transportation contributes to the fear and anxiety Elodia experiences. Elodia is the undocumented immigrant parent who cannot read or write in Spanish or speak English. She does some housecleaning while her son is at school, but does not earn much. For vulnerable households like Elodia's, asthma-related needs concatenate with preexisting needs, intensifying their disadvantages.

In addition to conditioning access to personal transportation, gender almost exclusively determines which parent is the caretaker. Inez has four children, one of whom is named Felix and has asthma. Inez identifies herself as an employee but has been a stay-at-home parent for two years. She says: "I am a home mom right now. And, really, I am a security officer. I worked at the airport. With Felix here and there, the Dad, he tells me, I think it is more better if you stay home cuz you can get more done with the kids and everything, and I said, 'OK.' To me, it is no problem." Inez and her husband fight about Felix's health and Inez is frustrated because her husband does not take an active role in Felix's care. Inez says: "The Dad worries so much. He wonders why Felix is getting sick more than he was before. He gets on me: 'What is going on? Why is he like this or that?' And I say, 'Why don't you spent time talking to the

doctors?’ We both fight and we argue about it. He takes us to the doctor, but he won’t go back in the examining room.”

Very few women in South Phoenix and Ahwatukee report that asthma management is a joint endeavor with their partners (n=3). Among South Phoenix women, especially the Spanish-speaking ones, poverty and the lack transportation combine with being the sole providers of asthma care and result in a heavy burden. Crescencia’s story illustrates how gender, transportation and the burden of asthma care intersect. Crescencia is a native Spanish speaker who is learning English and so she switches back and forth between languages during the interview. Crescencia’s husband does not believe that his daughter has asthma and does not take any responsibility for her asthma care. While we talk in her living room, her husband returns home and Crescencia explains to him in Spanish that we are the people here to talk about asthma. Her husband spats in Spanish, “Rachel doesn’t have asthma.” Crescencia responds, as we can tell she has done many times before, by holding up a Ziploc baggie full of drugs and stating, “Then what are all these medications for?” He responds in low, aggressive Spanish, and then walks into another room and slams the door. Crescencia begins in a quiet voice and we lean in to hear: “Anytime there is a problem, he don’t see that problem. I go over there [school] and they say there is a problem. I take her in [clinic]. I always take her. He never takes her. At least I need a ride. I don’t want to walk over there. I don’t drive, but he drives. He has that truck.” I ask her, “When Rachel needs to go to the emergency room or urgent care, does he drive you?” and she explains:

No. Most of them time when my daughter was sick, the oldest daughter drove us. But she moved two months ago when she got married. Now when I need to take her, I ask him. If he don’t want to do it, I just call the taxi. I can’t wait. I will take a taxi. I don’t drive. I always take the bus. Yesterday, when the nurse called

and said Rachel needs the flu shot, I take the bus. That is it. I don't ask. Sometimes, if Rachel needs to go, I ask and he says "No." So, I take the bus to the clinic. When I go to Jesse Owens [urgent care], it is near to here. I just ask my neighbors, "Can you bring me there?" When she has to go to the hospital, we go to Maricopa [County Hospital], we need to call the ambulance.

The marriage of Crescencia's adult daughter has intensified the burden of Rachel's asthma by compounding the transportation difficulties. For Crescencia, and others with marginal livelihoods, a familial change, such as an adult child's marriage, can result in a situational vulnerability that has serious impacts on the poor household's abilities to self-protect.

Crescencia is the sole caretaker of Rachel and she tells us that she is too busy to take Rachel to the doctor: "If everything is OK, we are supposed to go every three months. But if she is doing OK, I don't take her to the doctor. I really don't have time. Because when I go, they write the prescriptions for one full year, so I don't take her to the doctor." Rachel does not receive preventative asthma care, in part, because her care, and household labor, is not shared between both of her parents. Crescencia describes her daily routine:

Ok, I get up at 4:00. I make lunch for my husband. I go back to bed for just one hour more. I get up and get Rachel ready for school at 6:00. I am always pushing her, "Come on, come on, let's go." We run to the kitchen and have cereal and then she goes to school and I go to my work. I walk her to school and take the bus to work. At 12:00, I get done with my work. I spend one hour on the bus and by the time I get back, I have forty-five minutes to like relax. Then I go pick her up and we walk. I come back. I fix the food. I wait for the husband. I give the food. I clean up the kitchen and run to my school. I am back here at 8:00 at night. Then the little time I have in the night is to do my homework, clean up the kitchen, help her with the homework. I have classes Monday through Friday and some Saturdays. I know I don't have a lot of time with her, and so I do the best I can. I need to do what I need to do. In the morning, the first thing I do is be sure she takes the medicine. And at night, I give the medicine to her. After I give her the last dose I feel like [breathes a sigh of relief], we made it through another day. That is checked off the list.

Crescencia's husband takes his truck to work outside the home but Crescencia also works outside the home. She goes to community college using the bus while maintaining full responsibility for the home and child. Using the bus means that significant portions of her busy day are spent waiting for transportation and that taking Rachel to the doctor is complicated. This ethnographic vignette illustrates the compounding vulnerabilities for children in households like Crescencia's.

Patterns of urban development in Phoenix compound the gender and poverty-based transportation disadvantages faced by women. Phoenix is a rapidly growing sprawling city that lacks centralized planning. The interests of white privilege have been advanced as public funds flow with suburban growth on the periphery of the city (Wichert 1996). Dis-investment in the Phoenix bus system, used largely by low-income residents, is symptomatic of this system of white privilege, but is not unique to Phoenix. For example, a lawyer for the Bus Rider Union in Los Angeles characterized the city's Metropolitan Transit Authority as operating "Third World buses for Third World people" (Davis 1995). Phoenix has been termed one of the most automobile-dependent cities in the world (see Tayal, Anantuni, and Burns 2001). Moreover, a review of bus schedules reveals that on the vast majority of bus lines, service runs only from 5 AM to 10 PM and no busses run between 12 AM and 4 AM. Only one-third of the 4000 bus shelters in the city provide shade from Phoenix's intense sun for patrons (The Business Journal Phoenix 2004). This inadequate bus system reflects system of privilege that disenfranchises poor people in Phoenix.

“Everything is expensive with this insurance.”

Despite the shrinking numbers of employers offering health insurance, some lower-middle class households have insurance plans from their jobs, like seven of the South Phoenix parents in this study. These seven households have median incomes of between \$20,000 and \$39,999 and a median household size of four. For these lower-income households, the cost of the healthcare is a financial burden and in some instances, their child’s health is negatively affected because of it. In 2004, health insurance premiums reached an annual average of \$9,950 for family coverage while a full-time worker earning the federal minimum wage of \$5.15 an hour earned only \$10,700 a year (Gutwig 2004). Ana’s experiences provide an example of the difficulties faced by low-income households with job-based insurance and a child with a chronic illness. Ana’s son with asthma, Lino, has just started kindergarten. Her husband works nights at a hospital and she teaches full time with Head Start. They have three children and pay rent to live with Ana’s in-laws. Ana says:

We have health insurance through my husband. Everything is expensive: the hospital - like the ER visit would be like \$100 and that includes any kinds of treatment they have to give to him. But if they prescribe him something then that’s extra - like steroids for a few days. I have to go and pick that up and pay. I think the doctor visit went up, is it \$25 now. It used to be \$15. The specialist is the same price as the pediatrician. I was surprised about that and really happy about that. We were seeing the pulmonologist pretty regular until they got him under control ...He used to be on Kids Care and I loved it, I got so spoiled with the Kids Care because they cover everything, and then someone goes to work and - I mean we started with this insurance I guess it's been about a year, two years. Now we pay, Oh My Gosh, what is it? Let's say at least eighty some dollars a month just for his medications. That's not even counting his doctor's visits. And then if I don't, if something's tight, we're like, well let's just give him his Advair once a day to try to make it last longer, but then he's struggling and it's a no win situation. Because like if he misses a dose [of Advair], he's irritated. And he can have trouble breathing. Or, it's is like, well, OK we get paid at the end of the week, we need to wait to get this renewed or refilled or something like, then he's irritated.

Ana and her husband are both employed but Lino's healthcare expenses are difficult for the household to manage. While the household has access to healthcare, the cost is prohibitive and Lino does not always get the medication he requires because of cost. This example illustrates how social class influences social and self-protection methods available to household, separate from parental agency or knowledge.

In addition to directly influencing children's health with medications that are too expensive for parents to buy, rising healthcare costs can have secondary effects on health. For LeRinda, the increasing costs of health insurance are forcing her to find a less expensive apartment. She pays \$140 a month for her daughter May's medications with the insurance she receives as an employee with Arizona Department of Health Services. She has used up her paid sick leave caring for her daughter and that, on top of the increases in monthly insurance premiums and medication costs, means she is struggling to pay rent. She lives in a brand new downtown Phoenix apartment complex with a pool and workout facility that she uses to help May manage her asthma. She tells me that while roaches are bad for asthma, she does not have a problem with roaches at that apartment: "There are none here. Not one." The apartment was on the upper limit of what she could afford before her healthcare costs increased, but she loves living there. She explains: "I really wasn't expecting to move. I wasn't expecting to leave, but because of the insurance going up, I have no choice. Absolutely. I want to find a less expensive place here [downtown Phoenix], I really want to because she doesn't want to leave Shaw [Elementary]. I really like Shaw, and I really don't want her to have to keep going from school to school." Given the South Phoenix housing stock, it will likely be difficult for LeRinda to find an affordable apartment that is of the same quality as her

current dwelling. LeRinda is not alone in struggling with increased healthcare costs. The average premium paid by workers in the US increased nearly ten percent between 2004 and 2005, and has increased sixty-three percent since 2000. Premium increases are outpacing price increases and economic growth, making healthcare increasingly less affordable (Gabel et al. 2005).

Summary

Access and control over healthcare resources exist on a continuum among my South Phoenix respondents. Those without insurance have the least access and control over healthcare and rely heavily on the school. This group is comprised almost entirely of monolingual Spanish-speaking households who are at a cultural disadvantage, although the ‘assimilation’ of children through mastery of English is used as cultural capital by parents. As a non-governmental source of social protection, the Breathmobile partially compensates for the lack of healthcare by providing asthma-specific care to children without insurance. Those with job-based or AHCCCS/Kids Care health insurance have comparable access to general healthcare, as an insurance plan guarantees some form of coverage, but differ in the control they have over their healthcare. Those with AHCCCS/Kids Care receive medications and tests that are *approved* by the service free of charge (or for a small monthly fee), but are sometimes denied approval for expensive asthma medications and allergy tests. Being denied approval limits parents’ abilities to follow the course of treatment initially recommended by their doctors. Those with job-based insurance report that asthma medications are approved by their health plans but the high price of co-pays limits their abilities to take advantage of them.

These findings may be generalizable to metro Phoenix, as a recent study finds that persons on public insurance have lower rates of emergency room visits for asthma than do those on private insurance. The authors think that this finding reflects the success that AHCCCS has in providing high quality service for asthma patients (Rimsza, Bartels, and Bannister 2006). In addition to suggesting that AHCCCS provides a good service, my findings indicate that some households on private insurance are not able to afford to take advantage of the services offered by their plans.

Restricted access and control over health resources contributes to the vulnerability of children to uncontrolled asthma, and health insurance status, income, and culture are key players in determining vulnerability. Children without health insurance are very vulnerable to uncontrolled asthma. When their households access school health services, like the Breathmobile or school-based clinics, their vulnerability is reduced. Children living in low-income households with private insurance are vulnerable because, while they technically have access to high quality healthcare, their parents are unable to afford the co-pays for medications and doctor's visits. Many children with governmental insurance (i.e., AHCCCS/Kids Care) are well provided for and secure in accessing healthcare. Others are more vulnerable because their preventative asthma medications are not approved for coverage by their AHCCCS/Kids Care plans. Language is a key cultural dimension in vulnerability. In the US, speaking English represents a key cultural advantage in utilizing the healthcare system. Miscommunications and limited communication between parents and doctors are common because of language and cultural differences and add to the anxiety of parents. Even more than speaking a different language than doctors, parents who are unfamiliar with the US medical system

may not know how to ‘play the game’ of negotiating bureaucracies, and navigating a hierarchical healthcare system.

Demanding the best: Healthcare in Ahwatukee

“The insurance has been great about everything”

In Ahwatukee, as in South Phoenix, health insurance, primary care, medications and specialist care are important health resources for households dealing with asthma. A culture of entitlement is part of the ‘class habitus’ of the Ahwatukee parents. ‘Class habitus’ is embodied capital (Bourdieu 2000, 376), and the “internalized form of class condition and of the conditionings it entails” (Bourdieu 1992, 101). In this case, properties of parent’s embodied class habitus include the expectation of access to any and all resources to help their children, the expectation of being treated a specific way in social relationships, and a fear losing control of asthma. Twelve Ahwatukee households interviewed have access to health insurance through their jobs. One parent chooses not to use the insurance from her job for her daughter and purchases a private plan that is less expensive. Finding jobs accompanied by health insurance is not difficult for Ahwatukee households. All participating women have a college degree, Master’s degree or are working toward a Doctoral degree. Eleven women are married and their partner also has advanced education.

Rising healthcare costs have had a minor impact on Ahwatukee households and those interviewed are generally satisfied with their health insurance. The neoliberal shift has meant that while the majority of the population is subject to the power of market forces, the strong maintain social protections (Brenner and Theodore 2002a). This has been the case for Ahwatukee households as cost does not inhibit them from accessing

convenient healthcare, nor does it impede the control they hold over their healthcare allowing them to benefit fully from technological advances in medicine. Many parents speak about the costs of healthcare in relative, not absolute, terms. Because they have disposable income, what is 'expensive' is determined, not by an upper limit of what they can pay, but in relation to a generalized knowledge about what others pay. For example, Greta (parent to a ten-year-old son with asthma) says: "Our co-pays are \$35 which I hear is not much, compared to most."

Ahwatukee households have access to state-of-the-art social protections through their health insurance plans. They have many choices in their healthcare and are culturally prepared to maximize their options. Households have choices in terms of where they go to obtain care, and what type of insurance plan they have. Kathleen, a stay-at-home parent of two children ages eight and ten with asthma explains: "I go to the urgent care that is just down the street, and they take my insurance. The insurance has been great about everything. They've never denied us any claims on emergency room visits or anything." Faith, parent to a six-year-old son with asthma, remarks: "We had over thirty plans to choose from." Jordy's household chose their insurance plan from the suite offered by her company because it gives them a high degree of control over their healthcare. In addition to having choices and opportunities to control healthcare, Faith and Jordy have the cultural capital necessary choose which plan is best for their children's chronic illness. In Ahwatukee, parents have the education levels needed to understand what different types of healthcare plans offer, such as managed care, fee-for-service, health maintenance organizations (HMO), point-of-service (POS) and preferred provider organization (PPO) plans; they grew up using the US medical system and

understand how it works; and lastly, they expect and desire to make choices about their healthcare – they are uncomfortable with others making choices for them. Jordy’s only son, eight-year-old Cole, has severe asthma and allergies like her spouse. Jordy says:

With United Healthcare, I don't need referrals and those kind of things, which is great. It's point of access. I can go to those doctors [specialists] without preauthorization. There have been very few doctors that I wanted to see that are not on the plan. My company has very good insurance; I work with Charles Schwab. They pay eighty-five percent of the premium, so it's--I have very, very good insurance and very, very cheap insurance compared to most. So if insurance costs \$7,000 a year for family coverage, my company pays eighty-five percent of that cost. And I pay fifteen percent: it comes out of my paycheck. Even our medicine co-pays are cheap. But I still spend a couple hundred dollars a month. But next to other people that I've talked to, it's next to nothing. For us, the out-of-pocket family maximum for a year per individual is \$1,500. And I may hit that part for Cole this year.

This quote illustrates how Ahwatukee households like Jordy’s have access to a breadth of health resources and how those with higher incomes are typically privileged in minimizing their costs. Insurance plans, high incomes, extensive knowledge of ‘working’ the healthcare system, and the fact that all households interviewed have at least one vehicle per parent facilitate the use of healthcare services.

When Ahwatukee households encounter problems with their social protections (e.g., health plan), they compensate effectively by enacting self-protections to limit the impact of problems on children’s health. For example, Greta is a Canadian citizen living in Phoenix because her husband was recruited to work for Honeywell. She is dissatisfied with the restrictions in her CIGNA plan, which require her to use only CIGNA facilities so she sometimes takes her son to the nearby urgent care center, choosing to pay cash for the visit, instead of driving to the CIGNA clinic. She states: “With CIGNA, they're very strict. We have to go to a CIGNA clinic and we have to get our medication from a CIGNA pharmacy. Why should we always have to go all the way in Chandler? It takes

me twenty minutes just to get there. We have so many clinics here and we are going to try to get one here [in Ahwatukee].” As an upper class person, Greta takes access to healthcare for granted and wants it to be convenient. Because Honeywell offers its employees other options for healthcare plans, Greta is working to improve the convenience by switching to a plan that is less restrictive. While Greta is a migrant, her high social class and legal residency mean that her son is much less vulnerable than the children of migrants in South Phoenix.

Ahwatukee parents feel entitled to the best possible healthcare for their children; they do not want to experience any limitations. Seven parents explicitly stated that they wanted ‘the best’ healthcare for their child. Parents demand ‘the best’ and their incomes allow them to take additional actions beyond what is provided by their health insurance plan, which is illustrated by the following quote from Michelle: “I just felt like he [pediatrician] wasn’t giving Harrison the attention he deserved. So when I was pregnant with my second son, I talked to my OB-GYN, who is very good, and I said, ‘Who would you recommend?’ And her recommendation worked for me. Our new pediatrician has been great. She’s referred us to the best. And I always tell her, ‘I want the best, don’t give me any insurance restriction stuff, we’ll work through that later.’ So she’s been good.” Michelle defines the pediatrician as ‘great’ because she gives Harrison the best possible treatment, regardless of coverage or cost. For these parents, entitlement is part of their class culture and it influences how they self-protect: they demand the best, and drive to control all impacts of asthma on their children’s lives.

When 'the best' isn't enough

The impacts of asthma are not always controllable, even with financial resources, high levels of education, and 'unlimited' resources. Despite two Ahwatukee households' best attempts to provide their children with the finest healthcare, their children suffered from stunted growth. Both children were under the care of pediatricians and asthma specialists, and subsequently saw endocrinologists for growth problems before parents and doctors understood that the growth problems were tied to the inhaled steroids. Here, I highlight the case of Michelle's household to demonstrate how households negotiate the contradictions inherent in using a medication that both helps and harms a child, and how they confront challenges to their attempts to control asthma.

Michelle is married, works full time and is the primary asthma caretaker of her nine-year-old son Harrison. Harrison has had asthma since he was eighteen months old, but a hospitalization at age four caused Michelle to take the asthma more seriously. She recalls what happened during and after the hospitalization:

I had again said, "I want the best" and so at that time, we got serious and had to start buying all the gadgets - the spacer, and learning how to work the Flovent [inhaled steroid]. We started taking 440 milligrams a day, and they also started him on the chewable Singulair, five milligrams at night - and so he did great! The next three years, no problems, and I really thought his asthma was under control. I made an appointment back to Dr. Wong's office to see if we can't get him off some of these meds, because he's doing so well. I don't want to keep him on meds if I don't have to. I don't want to keep him on meds - for his body. He was so tiny - a real skinny kid. And I just, it's just not necessary if he is getting older, maybe he is outgrowing it?

When Harrison was seven, Michelle noticed that his growth rate had slowed. She brought him to his pediatrician who was equally worried and sent him to an endocrinologist:

They took like seven vials of blood from him and sent all of it off to be tested for every possible thing. It can be really scary stuff, because we're worried about pituitary tumors. I just was freaking about that, and then all along, my husband and I were always wondering about the steroids. We heard all this nasty stuff about steroids. The doctor said that inhaled steroids were okay, and so of course, I went out on the Internet. When you're a parent, and your kid is not growing, you think, what else could it be? You put all this stuff in about the asthma, and the Flovent, and it said - one of those articles that we pulled up from the United Kingdom said - if you take over 400 milligrams of an inhaled steroid, they've seen growth retardation. He was hitting 440 at the time and so at that point in time - because he was doing so well - we thought, we're going to pull him off Flovent.

Harrison has been off Flovent for seven months and Michelle reports that he had grown an inch. But in the two months before I met with Michelle, Harrison had several serious asthma attacks that required trips to urgent care for liquid steroids.

Michelle's corporate job requires that she travel out of town regularly, but even when she is away, she makes the decisions regarding Harrison's asthma treatment. She says: "It [Harrison's asthma] is something that I've taken on, yeah. I was out of town and my husband called. I'm like, 'Hun, you've got to get him to the hospital!' Harrison was laying on the couch, having labored breathing, and I'm like, 'Go, go, go.' So he went to urgent care, and again, he was back on the oral steroids - three teaspoons for five days. Actually, he had to get an injection too. That is how bad he was." Michelle wants to put Harrison back on the Flovent as she reports that a son who can breathe is more important than a tall son, but her husband resists. She says: "It's like, even with the Flovent, going back on it, my husband's resistant on that. I said, 'He has already had these five oral things, which is equivalent to two years of doses of Flovent in only six months!' So we're better off to go back on the Flovent. I'd rather having it inhaled than injections or the oral stuff. And my husband is not sure about that. He's just so anti-steroid now, because of the growth. He's really anti-medicine. He's like, 'It's unnatural.'" Even

though Michelle is the primary manager of Harrison's asthma, Michelle and her spouse discussed possible treatment options and at this level, asthma management was a two-parent endeavor. This is something that occurred less frequently among my South Phoenix respondents.

Michelle and her husband struggled with a medication that was supposed to help their son, but had also stunted his growth. When challenged, they sought out information by reading medical articles downloaded from the Internet. They already had a personal computer with Internet connection in the home, which made accessing the information convenient. Because they each hold one job (as compared to two or three) they have time in the evenings to devote to research. They also sought assistance from the medical system, by visiting the pediatrician, an endocrinologist and the pulmonologist, and before deciding to take Harrison off the medication. Within their 'class habitus,' being assertive, seeking out information, and visiting physicians were the only possible options; this is how they solve problems. They did not, for example, call in a folk healer or minister, continue giving the medication because the pulmonologist initially said to do so, or delay action for reasons such as being too tired or unable to easily access transportation.

In addition to growth delays from inhaled steroids, children in Ahwatukee, like those in South Phoenix, also suffer side effects associated with the most common rescue medication, albuterol. All children in this study are on, or had been on, albuterol at one time. Kathleen explains the situation for her son:

That's another issue with Gavin. We have a hard time getting him to focus on something to begin with. He's a very energetic child, and the albuterol makes them so hyper. I don't know if you've ever experienced having to try one, Oh my god, it's like this [shakes hands]. It just really makes you jittery. It's kind of a

catch-22 because if you use the albuterol, it makes them hyper and you're trying to keep them calm so they'll stop coughing, and yet then it makes them more excitable so they're running around more and it's making them cough more.

Other parents report that albuterol makes it difficult for their child to sleep and concentrate in school. Unlike South Phoenix parents, some Ahwatukee parents have an alternative to albuterol: Xopenex. Xopenex (*levalbuterol*) is an albuterol-derivative with fewer side effects (Berger, Ames, and Harrison 2004). Faith explains the difference with Xopenex:

When Phillip was on albuterol, I would have to give it at night and he would be wired. He would eventually go to sleep but, you know, as they stand they will just jump. It increases the heart rate so much. And actually I am glad that we switched to Xopenex because with albuterol sometimes I hesitated to give it to him because of the side affects. When Dr. Wong suggested Xopenex, I was like all over it. He said, "It doesn't always work for every child," but I wanted to try it and it works great with Phillip. We are never going back to albuterol.

Xopenex is a name-brand medication that is very expensive and doctors caution parents that their insurance company might not cover the medication, although the insurance companies cover the medication for all households who were prescribed it in this study.

While the side effects from albuterol are not long lasting or life threatening, parents in Ahwatukee have access to an alternative. Faith's son has a mild case of asthma. He is not allergic to dust, does not use medication at school and had not woken up at night or been short of breath in the month preceding my interview with his mother. Yet because of her socioeconomic status, Faith is in the position to demand 'the best' for her son, which to her, is Xopenex.

Being able to receive Xopenex, even if insurance does not cover it, is an advantage for those in Ahwatukee. They are able to self-protect at a level above the provisions offered through their social protection (i.e., insurance plan). Kimberly is stay-

at-home parent of two children with asthma, both on Xopenex. Her insurance company covers Xopenex, but insurance coverage is not conditional to her children getting the medication:

Quite frankly, when it comes to Xopenex, I think I'd just shell out and use it when I need it. But it's also money, basically money. Other people can't afford a drug like Xopenex. If you don't have great health insurance, and even the co-pay on that used to be \$80, with good insurance. Insurance companies did not want you to take Xopenex because it is expensive and albuterol is cheaper. However, they have done a study that showed the hospitalization rates are way down with that drug. But albuterol is cheaper. I pay for it because my kids don't feel good [on albuterol], they can't go to sleep at night. But you take someone who is from the other side of the mountain [South Phoenix], who doesn't have good health insurance, that drug is extremely expensive. But those kids are up all night. You're tired and you're wired on albuterol at the same time. But my kids can do Xopenex on a SVN in the middle of the night and go to sleep five minutes later. And I will say that Xopenex changed my life because you're so exhausted and you are wired. But on the other side of the mountain, it's cost. It is just expensive.

Kimberley clearly articulates her household's social-spatial position in relation to those "from the other side of the mountain" [South Phoenix] and the advantages this imparts for her children. In Ahwatukee, vulnerability is mediated by medications like Xopenex, which halt the cycle of sleepless nights and missed school and workdays for parents and children. As Kimberley alludes, research has shown that while Xopenex is a more expensive medication than albuterol, treating children with Xopenex is less expensive in the long run as it reduces hospitalizations (Schreck and Babin 2005; Quinn 2004). Here, class privilege means that Ahwatukee parents are better able to protect their children from uncontrolled asthma by accessing medications, like Xopenex.

"I'm not intimidated."

All interviewed households in Ahwatukee have one particular primary care doctor for their children, which is not case in South Phoenix. The importance of seeing the same physician (i.e., continuity of care) has been affirmed by researchers who find that

continuity reduces children's emergency room visits and hospitalizations (Christakis et al. 2001). Additionally, continuity contributes to trust and mutual understandings between parents and doctors. The notion of the necessity of a 'family doctor' is an aspect of upper class habitus. Ahwatukee parents typically grew up with a family doctor taking care of them, and definitely desire that for their children. It contrasts sharply with the experiences of some low-income households in South Phoenix, who do not see the same doctors over long periods of time because of frequent moves, gaps in insurance coverage, and government health plans that do not assign them to one physician. Generally, Ahwatukee children are able to visit 'their doctor' when they go to the clinic, except for last minute appointments. Only Stacy is unhappy with her son not being able to see 'his doctor' regularly. She explains that the problem is that her son's pediatric practice has high staff turnover meaning her son has been switched several times. Accessing urgent care at the clinic is not difficult for Ahwatukee households. Kathleen, for example, reports: "I can usually get him in within a couple of hours." In Ahwatukee, households are not hindered by unequal social protections; they are advantaged by them. Systems of social protections cater to them and are designed to serve them. They are not hindered by the cost of healthcare, like South Phoenix households are.

Social relationships between parents and physicians in Ahwatukee are characterized, according to parents, as relatively equal. Sharing social status with physicians removes cultural and class barriers in seeking care for chronically ill children. Because parents and physicians have similar levels of education and social class, the social distance between them is collapsed. This has the effect of engendering more effective communication and mutual understandings. Parents are not intimidated by

medical professionals and take an active role in negotiating treatment for asthma. Faith, a registered nurse, tells me: “No, I am not intimidated at all, after all my years in the ICU [Intensive Care Unit], I worked with doctors every day.” She is educated as a nurse and is a credentialed member of the medical community. Parents who are satisfied with their child’s pediatrician report that the doctor defer to them or the specialist when making decisions about asthma treatment, thus reaffirming the parent’s power and status as equal to the physician. Jordy reports: “I have a fabulous pediatrician, a really, really good pediatrician. So I would never change him because he’ll defer the treatment of asthma. He’ll tell me sometimes: “What do you think?” Or, he will defer the treatment of it to Dr. Wong [the specialist].” Megan, a registered nurse, characterizes a good doctor as one that “doesn’t give me any flack and just pretty much lets me do what I want to do.” Pamela is a teacher who suffers the same severe asthma and allergies as her daughter. She prefers her daughter’s previous pediatrician because that doctor did not question her suggestions for treatment. Kimberly is a stay-at-home parent who is an engineer by training. She explains: “I’m an analytical, so I know. I know more about asthma in kids than the nurses at the allergist’s office. And he’ll [allergist] tell you that too.” Ahwatukee parents actively manipulate the healthcare system by employing cultural capital to better protect their children. The similar social position shared by parents and physicians, related to high levels of education, generous insurance plans and high incomes, allows Ahwatukee parents to exercise significant control over their child’s healthcare.

Ahwatukee parents’ feel very comfortable evaluating doctors. They are not deferential to the social status of physicians and are enabled by their similar social statuses to be critical of their children’s doctors. For example, parents are unhappy with

doctors who do not test and treat the child's allergies, do not put the child on liquid steroids after attacks, do not give the child preventative inhaled steroids, like Advair, and treat the child, as Michelle says, like they were "one in the mill." Greta, from Canada, explains: "You know what, I don't know what it is with some of these doctors here. I don't know if it is because they're immune or they just, they don't care. I don't know what it is. With ours, it was like, 'Oh, did you want Advair? Okay, we can switch you.' You know, it was like no big thing." Parents usually take expedient action on complaints. When parents want a specialist or a different medication, the insurance almost always covers it. Their micromanagement of their child's treatment is aided by their high levels of education and income and access to tools like the Internet.

Specialist care is a routine part of asthma treatment in Ahwatukee, even for relatively mild cases, which is not the case in South Phoenix. Ten of the twelve households use pulmonologists or allergists to treat their child's asthma. Children typically come under the care of a specialist soon after they are diagnosed. After a few instances of coughing that sent Phillip to the emergency room, Faith took her son to an asthma and allergy specialist. She clarifies: "Then my pediatrician referred me to Dr. - actually I told him who I wanted to go to, Dr. Wong. I already knew who is the best as far as pediatrics go." Michelle expresses similar sentiment by also requesting Dr. Wong because he is 'the best.' Kristy's five-year-old daughter Ursula had asthma symptoms since she was a year and a half and was diagnosed as a preschooler. Her pediatrician sent her to Phoenix Children's Hospital to see a specialist, instead of diagnosing her himself. Kristy explains:

They sent us to Phoenix Children's Hospital to their pulmonary department, and we actually just out of luck saw the director - he was the one that did her questionnaire and diagnosed her with mild intermittent asthma and said this is what it means. They spent a lot of time with us. They are really good, oh my God, I mean learned more in those two visits. Those two visits were worth everything --- because that is all they do. They give you a whole package of stuff and they had a book in there for her like the A,B,C's of Asthma. I felt very secure after I left there. I felt, okay, this is okay. We are going to handle it and I just had the knowledge that if I needed it, the resources were all there.

Private insurance plans are designed to serve households like those in Ahwatukee. Even though Kristy did not explicitly demand 'the best,' her pediatrician provided it for her by sending her to Phoenix Children's Hospital and her insurance paid for the visit.

As a form of self-protection, some parents have specific ideas about how their child should be treated and actively seek out specialists who share their philosophy.

Jordy's son previously saw Dr. Wong, one of 'the best' according to other Ahwatukee parents, but she switched him to Dr. Shimimoto because Dr. Wong "just threw drugs."

Jordy says:

I don't like any of the pulmonary groups here. There's only like four hundred pediatric pulmonologists in the country. Wong was good, but actually I found a better one. His name is Dr. Shimimoto. He worked as part of Wong's group for a year. Then he went out on his own because he's very much a micromanager. He's so knowledgeable and so amazing. My pediatrician's group is East Valley Children's Center, and my pediatrician is Dr. Kern. He's fabulous. Dr. Shimimoto went around and talked to the different pediatricians. Cole had a very bad asthma attack in May, and Dr. Kern said, "I've got a fabulous doctor you need to go see. Now I know you see Wong, but..." So I decided that I wanted to -. I've done a lot of environmental controls in my house. I wanted to explore also that side in addition to the pulmonary side - like how to change the environment and how to make it best for him.

Jordy's abilities to control her son's asthma far exceed the opportunities created by her high income and insurance plan alone. She possesses an ensemble of dispositions, which reflect her cultural capital and class privilege and enable her to take control of her son's asthma. This ensemble includes her motivation to conduct research about her son's

disease; her ability to communicate as an equal with her son's doctors; her spouse's full support of her actions; her social assertiveness about her treatment ideas; and her complete engagement with her son's asthma problem; and her optimism in seeing asthma as a problem she could solve.

Ahwatukee households still have problems with their healthcare, but they do not harm the child's health and are remedied quickly. For instance, Michelle's income and assertiveness enabled her to solve a problem with specialist care. She thought her cats might have been causing her young son Harrison's breathing problems but the primary care doctor said he could not test Harrison for allergies because he was too young. Instead of removing the cats from the home or asking her pediatrician to refer her to an allergist, Michelle took the following actions:

I don't really feel like we got the help we needed from primary care. I actually looked through the yellow pages, and I'm like, there has got to be someone. I called the Arizona Allergy Institute and I told them, "My doctor says I can't get allergy testing until they're four or five years of age." I said, "This can't be, because my kid is suffering," and they said, "Oh no, you can test them when they're young infants. We have ways to test the little ones for milk allergies and all the other things," I'm like, "Oh My God!" So they really helped out. That's when we found out. I just contacted them. I did. I paid out of pocket. I didn't even care. My insurance didn't cover them, it was desperation at that point because we were just so frustrated. We didn't know what the heck was going on, and then we got rid of our cats, and got the air filters, and changed everything in the house.

Michelle had the social skills and knowledge needed to be an assertive problem solver in this situation. She was not passive or accepting of what the doctor had told her; she shared a similar social status and challenging what she was told was an automatic response. For Michelle, an allergy test was essential and because of her income, she was able to work outside of her insurance network to get what she thought was needed. The test also confirmed her suspicions that the cats were to blame for her son's symptoms.

“Pa[ying] out of pocket” was possible for Michelle because healthcare expenses comprise a relatively small fraction of her income (as compared to South Phoenix households). In Ahwatukee, asthma care is characterized by heavy parent involvement, assertiveness, and the use of specialists. Children experience the multiplicative effects of social and self-protections as parents and providers work together to provide the child with ‘the best’ care.

“She’s in no way a nurse!”

In Ahwatukee, most children whose parents participated in the study do not have a credentialed nurse in the school (n=10). Only the two children that go to St. John Bosco Catholic School are under the daily care of the credentialed nurse. For these two children, the nurse plays an important role in their asthma treatment. For example, the nurse suggested to Greta that her son was having exacerbations too frequently and needed stronger medication. Greta then took him to the doctor and asked that he be put on Advair. In contrast, a private school, a charter school and the public school district serving Ahwatukee do not have credentialed nurses in the schools. At the private and charter school, the secretary handles health issues.

At the public schools, individual elementary schools employ a health assistant on each campus, and four registered nurses float between the elementary schools. Health assistants have basic qualifications: they take a three-credit course through the community college called Health Assisting which includes first aid and cardiopulmonary resuscitation (CPR) or they can be a certified Emergency Medical Technician. (G. Donahue, Kyrene School District, personal communication, 5/31/2005). Nurse Donahue, supervisor of school health, tells me that she is worried about the staffing in the

district but that those in power are not expanding health services. She says: “I think anytime that you have kids that have chronic conditions that can quickly progress from symptoms to needing 9-1-1 called. You need to look at and determine if you have adequate staffing. We have over 1,000 asthmatics in the district this year. Every year, I share this information with the Cabinet (i.e., superintendent, assistant superintendent and all directors) and my reason for doing that is to let them know the severity of the kids out there and wanting them to consider: is staffing adequate for safety?” (G. Donahue, Kyrene School District, personal communication, 5/31/2005).

The source of the budget cuts that have resulted in the loss of school nurses is the increasing operation costs (e.g., electricity, health insurance for staff) and declining revenues from a decrease in enrollment (Kyrene School District 2006). Ginger Donahue explains that the source of declining enrollment is parents moving to Ahwatukee fifteen years ago to raise families and then not selling their homes to young families but continuing to live in Ahwatukee (personal communication, 5/31/2005). Because of the lack of nurses in the schools, children in Ahwatukee are vulnerable to school-related asthma problems. Parents report a range of feelings regarding the health assistants. Kathleen is angry with the health assistant at her child’s public school because she does not take her children’s asthma seriously. She says: “I mean I just know she’s a health assistant, but she’s in no way a nurse. I mean it’s awful but I’ve lost a lot of confidence in our health assistant over the last three years.” However, the health assistant in Kimberly’s children’s school is described as “fabulous.”

Three Ahwatukee households do not keep asthma medications for their children at school. Stacy and Faith, who have four- and six-year old sons respectively, both told the

health assistant and secretary at their child's schools to call them if the child had a problem. Debbie's twelve-year-old son has had asthma since infancy, but it has gotten progressively more seasonal through time. He kept a breathing machine at school when he was younger but he recently moved to middle school. Debbie says: "Just in the last month, the doctor said, 'I want him to have an inhaler at school, just in case.' But the insurance would not cover it, so I just said, 'Call me if you need it and I will bring it over.' And I am home two and a half days a week and he hasn't had any problems. The doctor wrote the prescription for two inhalers, but the insurance would not cover both of them." Debbie's frustration with her insurance company not covering both inhalers means that her son does not have one at school. It was unclear why Debbie did not pay cash for a second inhaler¹⁶, given the consequences of her son not having one at school. In these three cases, the households have the resources to self-protect by supplying the school with medications, but choose not to. These children are at risk for a serious asthma exacerbation at school because asthma can cause airways to constrict rapidly and in a serious attack, it would be difficult for parents to get to school with medication in time.

Summary

In Ahwatukee, households enjoy access to healthcare, and exercise a high degree of control over it. Every household has access to primary care, specialist care and medications when needed. Access combines with cultural capital to advantage households to a greater extent than households in South Phoenix. The high degree of control, facilitated by economics and culture, enables parents to self-protect by selecting specific doctors, advising treatment, and agitating for 'the best' medications. This also

means that some parents choose not to keep medications at school. These children are vulnerable to experiencing serious asthma attacks without rescue medication. In Ahwatukee, asthma management is typically the responsibility of the parent. Doctors do not directly communicate with schools, which do not always have nurses or health assistants.

Monetary resources, combined with cultural capital (e.g., access to information via Internet, high levels of education, and a sense of entitlement), drive parents to push for what they think is best for their child. Because of this demand for ‘the best,’ accepting that the child has a chronic illness is difficult. For example, Faith describes how she felt when her son was first diagnosed with asthma: “I was like shocked. I go “How could this be?” I was actually in denial. I did not want to believe that my son had asthma. And I was actually very scared, instantly scared. And I didn’t want my son to go through a life long problem like that.” Faith’s son Phillip has a mild case of asthma. According to Faith’s report, he does not wake up at night from asthma, is not limited in his daily activities, and is rarely short of breath. But, she is very eager to start six-year-old Philip on an inhaled steroid, even though doctors recommend against usage among children younger than eight. She says: “Because he still has coughing, so sporadically we will have to do a breathing treatment. Naturally, I have been questioning Dr. Wong when we can start on the Advair.” Because parents have a sense of entitlement and an expectation that their children’s lives should proceed successfully and happily, it is hard for them to accept a chronic illness.

Healthcare in Ahwatukee and South Phoenix

Analysis of healthcare experiences in South Phoenix and Ahwatukee demonstrate that economic and cultural resources influence self-protection behaviors. However, self-protection behaviors are carried out in a social context that is unequal, and shaped by the ‘upstream’ dimensions of neoliberalism and white privilege. Ahwatukee and South Phoenix households differ in the ways they deploy economic and cultural capital to access and control health resources. Ahwatukee caretakers select a primary care doctor and children receive treatment that doctors and parents request, which insurance companies approve. They are more likely to see a specialist: eighty percent of households use specialists as compared to twenty-five percent in South Phoenix. In general, children who see specialists in South Phoenix suffer from unmanaged asthma for a period of time before coming under the care of a specialist, whereas in Ahwatukee, children see them right away. Monolingual Spanish speaking households in South Phoenix have the most difficulties accessing specialist care with only two of the fourteen seeing specialists. Access to specialists is closely tied to immigration, language, and health insurance status.

In South Phoenix and Ahwatukee, gender inequality persists in households with mothers taking care of the child’s asthma in all fifty-three households; it does not matter if the mother works outside of the home, or not. In Ahwatukee, gender inequality does not impact the transportation of the child to the doctor, or home from school, as women have their own automobiles. None of the households in South Phoenix have been prescribed Xopenex - the alternative to albuterol used by some Ahwatukee parents - despite the fact that six parents report that their children suffer side effects from albuterol.

When I ask a nurse practitioner with the Breathmobile about Xoponex, she says, “The problem is that there is not generic form of Xoponex and most insurance companies won’t cover it because of the high cost. We have free samples of Xoponex on board if a child is hypersensitive, but for most children, albuterol works well” (G. Wilson, Breathmobile, personal communication, 9/24/2005). While children in both areas will experience the similar side effects from albuterol, the acceptance of the side effects varies. In Ahwatukee, parents are socially positioned to learn about an alternative medication, request it, and pay for it and this is not the case in South Phoenix, where albuterol “work[ed] well.”

In both areas, parents report that children respond negatively to inhaled steroids. Comparing the stories of Silvia in South Phoenix and Michelle in Ahwatukee reveals how parents dealt with challenges differently. While it is a case of equal power, with both parents taking control and stopping the medication, the two households do not share equal cultural resources. Silvia noticed her daughter’s small size, thought it was from the medications, and weaned Cierra off the medications over a period of time. She felt that as Cierra’s primary caretaker, she knew the medications were harming her, and was going to stop it. In Ahwatukee, Michelle’s initial impulse was to take her son to specialists, conduct research on the Internet, and consult her husband before deciding to take Harrison off the medications. While Silvia relied only on her personal experiences when deciding to take Cierra off the medications, Michelle combined her experiences with external resources and information before coming to the same conclusion.

In South Phoenix, parents, health professionals, the government, non-governmental organizations, and the schools control asthma. Households on AHCCCS

receive only medications and diagnostic tests that are approved by the State. Non-governmental organizations like the Breathmobile provide care, but their funding is dependent on grants and their medication assistance on pharmaceutical companies' charity. Especially for undocumented immigrant children, parents have little control over asthma care and rely on free services provided through the school. The school nurse or Breathmobile commonly informs parents that their child has asthma, and then helps them access treatment. The social nature of the safety net (e.g., Breathmobile, school clinics, AHCCCS) in South Phoenix means that the protections can change with the political system. For example, the government can cut programs for the poor and stop funding school-based healthcare centers. This leaves households living on the edge, in constant fear of having their entitlements revoked.

In Ahwatukee, parents and physicians have the primary responsibility for asthma care but the relationship is one in which parents exert a fair degree of control over treatment. Public schools, and some private schools, do not always station credentialed school nurses in schools. Children are vulnerable to asthma problems only when parents do not prioritize asthma or exercise their control in the best interests of the child, as there is less of a community-level safety net in Ahwatukee. Children in South Phoenix are persistently vulnerable to the risk of uncontrolled asthma because of a long history of structural disadvantage, whereas Ahwatukee children attending schools without school nurses of asthma medications are situationally vulnerable, meaning that they are at risk, despite being part of a normally secure group.

What this comparison between healthcare in Ahwatukee and South Phoenix reveals is the role of cultural capital as a mediating influence on access and control over

resources. The mention of culture is not to devalue a political economic explanation for inequality, but to strengthen it. As Mitchell (1995, 107) states, “Culture is a means for representing relations of power.” It is not dualistically related to social and economic realms, but embedded in them (Mitchell 1995) and is yet another vehicle through which dominant groups reassert their power in the process of subverting the less powerful. “Cultural distinctions help reproduce and express inequalities in economical capital” (LiPuma 1993, 29). While all households possess cultural capital, Ahwatukee parents’ holds more sway when dealing with the medical system. Ahwatukee parents tend to be more assertive, socially and culturally similar to their doctors, and educated; they operate within a culture of entitlement. In South Phoenix, parents are often appreciative, lacking high levels of education, and visiting healthcare providers with whom they are not culturally similar. Immigrant parents live within a culture of fear whereby they must watch their children suffer amidst one of the most technologically advanced healthcare system in the world.

The power of cultural capital is revealed when comparing how parents make decisions about changing health plans, solve problems with healthcare, and deal with physicians. When deciding to switch health plans, Ahwatukee parents make educated and informed decisions about which plan is best for dependents with chronic illness. Conversely, South Phoenix parents with AHCCCS or Kids Care also have many choices for plans, but they almost always relinquish their option to choose and accept the plan randomly assigned to them. When facing problems with healthcare, Ahwatukee parents rely on social networks (e.g., to advise them on choosing ‘the best’ doctor), the Internet and the advice of specialists, whereas South Phoenix parents rely on themselves and their

observations. A key difference between the two areas is that in Ahwatukee, parents used economic and cultural resources to *isolate* and *solve* problems, whereas in South Phoenix, parents' economic and cultural resources allow them to *cope* with problems.

CHAPTER 5

EXPERIENCING INEQUALITIES: ENVIRONMENT

Sequestered in hazardous zones: Environment in South Phoenix

“There was a big ol’ black cloud sitting over here.”

As with healthcare resources, access to, and control over, environmental conditions are salient for asthma control. Environmental assets include homes where it is possible to control indoor asthma triggers (e.g., those without carpet, mold and pests) located in neighborhoods where it is possible to reduce ambient exposures (e.g., dust, traffic pollution). The home and ambient environment are tightly correlated in Phoenix, where substandard homes are located in more polluted areas and vice versa. This pattern has developed over a century of white privilege in Phoenix.

Development trajectories in Phoenix favoring Anglo interests created zone of environmental degradation in South Phoenix inhabited primarily by racial/ethnic minority and low-income households (Bolin, Grineski, and Collins 2005). Within this zone, in-depth interviews reveal that immigrant households tend to live in the poorest quality environments. This follows a national trend in the US whereby counties with higher percentages of immigrants and non-English speaking households have greater numbers of large quantity hazardous waste generators and proposed Superfund sites (Hunter 2000). South Phoenix is where households find the least expensive monthly rents, less expensive homes for sale (Figure 15) and the City’s five public housing projects, called ‘conventional public housing complexes’ by the City (Figure 16). Restricted housing options result in low-income households being sequestered in hazardous zones and effectively prohibited from accessing less hazardous environments. Simultaneously, the

housing stock in South Phoenix is aging and deteriorating, especially in the northernmost reaches of the zone. Because they live in deteriorating homes in hazardous areas, South Phoenix households have limited control over their indoor and ambient exposures and suffer from an environmental double jeopardy. This environmental double

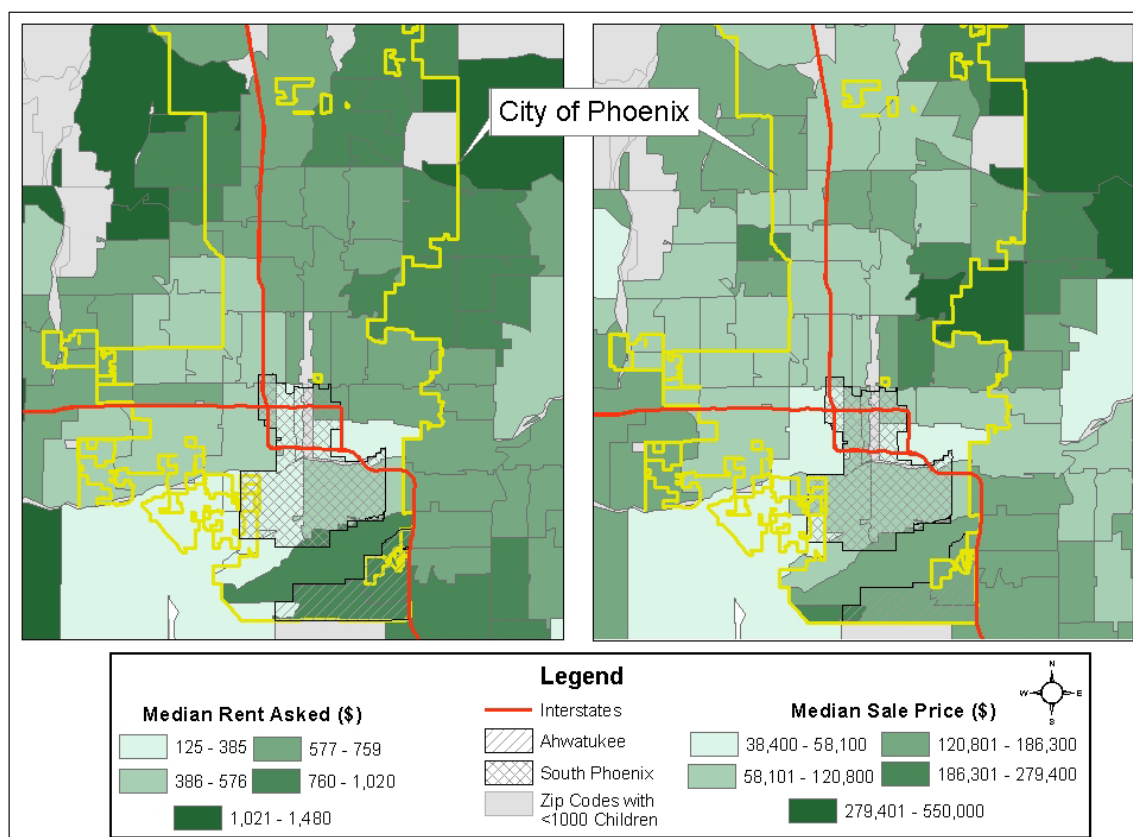


Figure 15. Median rent asked and median home sale price, 2000

jeopardy is reflected in parental experiences with asthma and the added difficulties parents face in self-protecting. Maria, for example, reports that her son's asthma is triggered by "the mold in the bathroom, the carpet, and the dust outside."

Patterns of development placing hazards in South Phoenix mean that its households live proximate to land uses not permitted in Anglo Phoenix (Figure 16, Figure 17). South Phoenix households experience a variety of hazards, including waste sites,

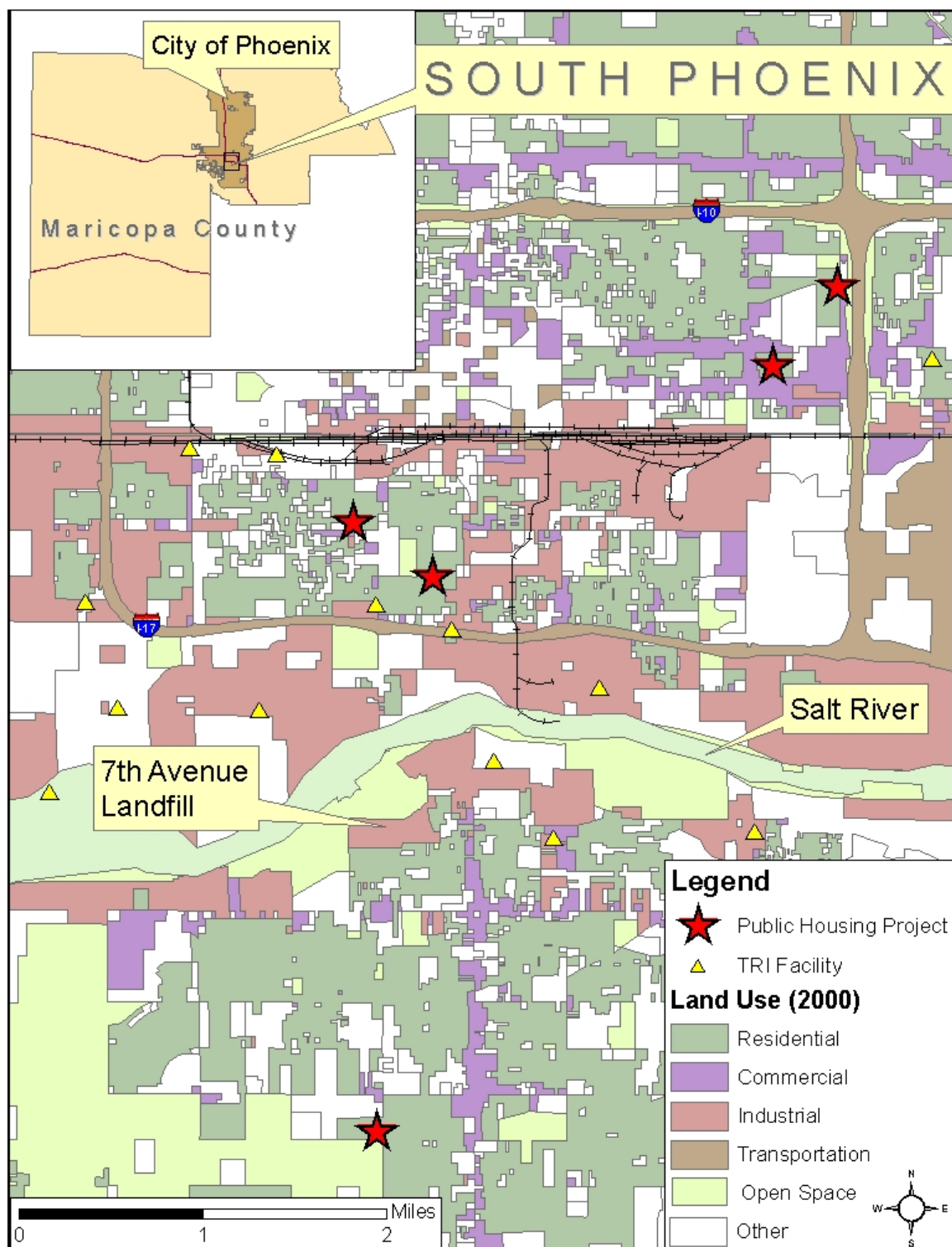


Figure 16. Map of public housing and land use in Phoenix
Notes: 'Open space' includes agriculture and parks.



Figure 17. Lack of buffering between land uses in South Phoenix

Source of the photograph was http://www.west.asu.edu/PhxMetroWeb/SouthPhx2003/COURSE_IMAGES/Cassandra_2-28-03/source/feb28airliquidcannistersbe.htm

industrial facilities, and diesel trucks, on a daily basis. For example, Margaret, whose son and spouse have asthma, says: “We noticed recently during the night - like about 1:00 AM. We can smell something burning and it comes in through the evaporative cooler and my husband gets sick from it. And, you know, it’s from the - there’s like a landfill not too far.” The landfill that Margaret referred to is located three-quarters of a mile

from her home. Jamilla explains that for her three children with asthma: “the pollution triggers it - like these fumes from these busses and big trucks, these factories burning stuff.” Jamilla lives near a busy intersection in a neighborhood surrounded by warehouses, and semi-trucks regularly travel through her neighborhood. Jamilla’s sister describes what it was like to drive to Jamilla’s house. She says: “I got trucks on the front side of me, trucks in back, trucks on the side.”

Heavy freeway traffic, industrial pollution and dust create a pall that envelops South Phoenixians, some of whom can be seen waiting on busy streets for city busses. Paulina lives in a public housing complex in an industrial area of South Phoenix one-half mile from Interstate 17. She recalls: “Sometimes, I can see the pollution in the air - from the cars, the black smoke – just setting everybody off. This summer, there was a big ol’ black cloud sitting over here.” LeRinda currently owns a car but she explains: “Back then, we were taking the bus, so that was also something that I felt was contributing to her asthma - because we were waiting outside near the street, people at the bus stop smoking cigarettes. She would have to cover her mouth. We had a scarf.” Anaclaudia reports: “It is very dusty here. I think the dust has a lot to do with my daughter’s asthma. It is dusty in the evenings as the dust blows over from near Baseline [Road]” (in Spanish). These quotes illustrate how environmental hazards are part of daily life in South Phoenix and it is within this hazardous landscape that parents must manage asthma.

Environmental degradation combines with social stresses in South Phoenix. When I ask Dominga, an undocumented immigrant, if there are things she dislikes about where she lives, she explains: “I don’t like the dust around the house. I have to water the

ground to keep the dust down. There are also a lot of bad people around the neighborhood and they steal the clothes when I hang them out to dry. I don't feel very safe here (in Spanish)." Dominga's household of five did not gross \$10,000 last year and rents a home with a tarpaper roof one-sixth of a mile from Interstate 10. Dominga is limited in the efficacy of self-protection measures she is able to take because of her social and physical environment. Dominga's case highlights two additional examples of fear and anxiety in South Phoenix parents' lives: fear of crime, and fear that outdoor environmental conditions will make children sicker. Because she can do little to protect her children from crime and hazards due to where they live, her fears are well founded and represent the internalization of power differentials that residentially restrict her to South Phoenix.

"This house is not good for asthma."

Simultaneously, households have difficulties controlling indoor hazards. For households living in South Phoenix's aging housing stock, managing pests, like mice, rats and cockroaches, which are associated with the development and exacerbation of asthma, is difficult (Salam et al. 2004; Lanphear et al. 2001). In August, when the average high temperature in Phoenix is 105° F, I visit Margaret at her home. Her household does not have air conditioning or evaporative cooling and we sit between two box fans in the living room of the sparsely furnished home. Her outside walls and front door are marred by holes. Margaret is forthright in speaking about cockroaches as she says: "I also know mice trigger asthma. And cockroaches, those are also triggers. I try to get rid of them but especially in South Phoenix, it's hard to get rid of those too. Because there is times when we do get them, and we get rid of them for awhile and

they're back. That's one of the problems that I would have with my son, Luke, where they would trigger his asthma." I ask her if she uses pesticides and she responds: "No, because the fumes are too much for Luke. So eventually we would have to exterminate and keep him out in order to get rid of them. That's what we usually have to do. We have to leave for the whole day, so we usually go to the mall." Margaret owns her small deteriorating home and struggles to keep it pest-free.

Rental homes tend to be in poorer condition than owner-occupied homes and the pest problems more extreme. The poor housing quality experienced by renters is an acute environmental injustice in metro Phoenix, where the percent of households who rent in each zip code is correlated significantly with the percentage of households lacking kitchens and bathrooms (Bureau of the US Census 2000) Among my South Phoenix study participants, the median income category of the twenty-eight renters is between \$10,000 and \$14,999 whereas the median income category of the thirteen owners is between \$20,000 and \$39,000. A concrete manifestation of these statistics can be seen in the experiences of one of my respondents. Gelisa is an African-American parent of six who earns less than \$10,000 a year and rents an old home. In addition to having asthma, she suffers from back problems and speaks to me while reclining in her bed about her rodent infestation:

As soon as my lease is up, I am doing the move thing. I cannot stay here. Because me and rats don't get along. There is, you all might say mice, but the rats that is in the house, we don't get along. You down there, I am staying up here [in the bed]. And that doesn't help because, me, I am allergic to cockroaches, to cats, dogs, I have an allergy test that I took, and I am pretty much allergic to a lot of stuff which is why I kind of want my son to take the test.

Gelisa has not been able to obtain an allergy test for her asthmatic son, five-year-old Andre, and she worries that the mice/rats and roaches affect his asthma. She sees moving

as the best protection against her rodent problems because her landlord refuses to help with mitigation.

Gelisa's home is typical of the deteriorating rental stock throughout the study area. Visiting homes was an important way in which I gained information about living conditions. In South Phoenix, I found households living with a tar paper roof or holes in roof; rodent and insect infestations; feral cats living under home; no heat or air conditioning; gaps under door, no door or door off hinges; boarded up windows or broken windows; and wood slat floor. South Phoenix rental homes and apartments have been neglected for many decades.

Immigrant/Spanish-speaking households are more likely to occupy homes with serious flaws, although Mexican-American and African-American households living in abject poverty also reside in poor quality housing. Anaclaudia, an undocumented immigrant, lives in a rental home three blocks east of Interstate 17 near the State Capitol on a heavily trafficked street. The home is brick with paint peeling on the window frames. There is a makeshift entryway constructed out of wood in the back and a very small yard with a part wood/part screen fence. The screens in most of the windows are ripped and hanging away from the window frames. Anaclaudia has only an evaporative cooler and must keep windows open while using it. The house has an attic with an open vent where pigeons enter, along with rain and dust. There are also some vents and openings in the foundation below floor-level. The roof is missing shingles and looks as if it might leak. Anaclaudia explains: "When it rains, the walls get wet, there is a lot of humidity in the house, and mold. I have to work to get rid of the mold and it comes back after each rain. I turn on the heater to dry out the walls when they get wet and the heater

helps” (in Spanish). When asked if she plans to stay at her current residence, despite the problems, she replies: “For the time being, right now, we do not have any other options, we have to stay here until we can somehow find a way to move” (in Spanish).

Households like Anaclaudia’s are very aware of the indoor hazards they face, but do not feel like they have the money to move or rent a better quality dwelling.

Mold problems like Anaclaudia’s are surprisingly common in South Phoenix, where at least eleven of the interviewed households report serious mold problems. In-home molds are linked to the development of asthma (Chung et al. 2005; Skorge et al. 2005; Stark et al. 2005; Jaakkola, Hwang, and Jaakkola 2005) and tend to be associated with cockroaches, indoor cats and in-home dampness (O’Connor et al. 2004).

Respondents identified evaporative coolers and roof leaks as sources of their in-home mold. Mold is a problem more often facing renting households, as only two¹⁷ of the eleven with mold problems own their homes. In the rental cases, tenants complain to landlords about mold but nothing is done.

In several instances, the tenant was admonished for being incompetent at cleaning mold. For example, Dora had mold problems in her rental home. She explains what happened when she complained to her landlord: “He said, ‘Watch the way you are cleaning’ and I said, ‘It is not the way I am cleaning. It is in the walls.’ I was like: ‘You come and clean it.’ I scrub it with bleach and peroxide - anything and everything that they say to use - and it is not coming up. It is just that the house is so old and so yucky that it couldn’t be fixed.” In this way, the landlord blames Dora for the problem, instead of taking responsibility for the deteriorating conditions of his home.

Predatory landlords taking advantage of marginal households with little cultural or economic power (e.g., undocumented immigrant households) is a common occurrence in South Phoenix and it influences parents' abilities control children's asthma. Maria, a Spanish-speaking parent of a son with asthma, lives in a two-room 'cottage' behind her landlord's home. Antonia and I duck under her low hung roof through the propped open door to enter the home. Maria does not have air conditioning or an evaporative cooler and tries to manage the stifling August heat with one fan. Maria has repeatedly complained to her landlord about the old carpeting, which gets wet when it rains, and the mold in the bathroom. She learned from the Breathmobile that carpet and mold are asthma triggers. The landlord repeatedly refuses to fix the leaks or take out the carpet. Maria takes English classes at the elementary school and her teacher gave her the phone number for the City of Phoenix Housing Department so she could lodge a complaint. However, her husband is afraid that the landlord will evict the family if they complain and he does not want to lose this home. It is better than their previous dwelling, which had wood walls and was located near a nightclub where shootings had occurred. She asks if I will look at the mold, and then write a letter to the landlord indicating that the mold is a danger to her son's health. Maria leads me to the door of her family's bathroom. There is large splotch of black mold approximately two feet in diameter in a corner where the ceiling meets the walls; the center of the splotch is buckling about a foot from the horizontal plane made by the ceiling. From the ceiling, the stain extends down the crease that marks the corner of the wall above the tub and fingers out onto both walls. This is the family's only tub and shower. Her husband's fear of being evicted for

complaining about conditions is well founded; another undocumented immigrant household participating in the study was evicted for that reason.

Some South Phoenix households, like Maria's, feel powerless to report landlord abuses to local officials for fear of losing their rental home, or being deported. Poor households and those lacking legal immigration status in the US tend to suffer landlord abuse. These households are not positioned to demand better housing or cleaner environments, and doing so is risky, as the case of Mireia illustrates. Mireia lives in a three-room duplex a half-mile from the Seventh Avenue landfill; her home has a flat roof and outside walls are covered in peeling fuchsia paint. Mireia has been living in the US for eight years without legal documentation and her daughter Melissa was born in Phoenix. A large cement patch is visible on the living room ceiling and the floor is cracked poured cement. Mireia explains that the ceiling collapsed and when the landlord refused to fix it, they did it themselves. Melissa was recently diagnosed with asthma and Mireia has become fearful of the impact of the "the house and the walls" on Melissa's asthma. Mireia says, "This house is not good for asthma. There are animals, like mice and roaches here, and mold and the kitchen is bad. The landlord wants us out of the home because we have been complaining. He does not want to help" (in Spanish). We ask her if it is because she has not paid her rent, and she says she always pays her rent. She explains that they have one month to leave and do not know where they are going to go. For Mireia's household, Melissa's asthma is one stressor among many that the household is dealing with simultaneously. When I ask a representative from the City of Phoenix Housing Department about what happened to Mireia, she explains: "That is illegal. But what happens in South Phoenix is that families usually don't get a copy of

the lease, so they don't know the rules or what they gave as a deposit. The leases will be in English and the landlord will keep the copy.” (Bernice, City of Phoenix, personal communication, 9/24/2005). They do not know how to ‘play the game’ of renting a home in the US and their landlords do not abide by the ‘rules of the game,’ further disadvantaging renters.

Section 33-1324 of the Residential Landlord and Tenant Act in the State of Arizona states that “landlords must comply with the requirements of applicable building codes materially affecting health and safety; make all repairs and do whatever is necessary to put and keep the premises in a fit and habitable condition; and maintain in good and safe working order and condition all electrical, plumbing, sanitary, heating, ventilating, air-conditioning and other facilities and appliances” (Brewer 2004, 8-9). Perennial mold is covered by this section and is therefore illegal. When landlords do not “maintain fit premises,” the Act specifies that tenants can legally withhold a portion of their rent to pay for repairs, call a building inspector, or give written notice of the problems and leave within five days with no consequences (Brewer 2004).

To parents in Ahwatukee, these three courses of action would be logical and possible. They could quickly deploy the cultural (e.g., education, assertiveness, sense of entitlement, knowledge of procedures), social (e.g., access to lawyers, and other professional advice) and economic (e.g., pay for a lawyer and afford to miss work) capital needed to address the problem. Of course, with such assemblages of capital, it is unlikely that they would face these issues to begin with. South Phoenix tenants are likely to have rental home problems and are, in general, unable to enter the legal field and consequently remain entrapped in unfit homes. They simply do not have the needed

resources. One can imagine questions that would arise as low-income parents considered these three options: Did they have the money to pay for the repairs at the time in which they were needed? What if the repairs were more than the monthly rent? What if the building inspector found out about their illegal status and reported them to the authorities? What if they called the building inspector and he/she did not speak Spanish? Where would they go if they left their current residence? Who would take care of the children after school when they moved away from the trusted neighbor? How would they pay to move their things, for security deposits, and utility startup costs? These questions reveal the ways in which even poor legal immigrants and US citizens can be effectively entrapped in abusive and exploitative rental situations.

Elodia's household has suffered grievous abuses from two landlords and is chronically vulnerable to uncontrolled asthma. Elodia is an undocumented immigrant; her son's asthma plays into her housing decisions but is one among many considerations. She explains the following from her one-room rental unit:

After we moved out of my sister's place [she was physically abusive], we had to find a place in a hurry and we found one near Garfield [Elementary School]. But that place was in very bad condition for my son and his asthma. There were cockroaches everywhere, and ticks biting the children's ears. There were no windows so we had no way of getting air and we lived there during the summertime so it was miserable. It was so hot and the floor was just wooden boards. And it was uneven and I almost fell tripping on the floor, so it was not a good place. We were only there a week. They charged \$450, so it was a lot. I was passing by this place and there was a sign out front and I stopped and asked him about it and it was for the big house, not this place. But they were asking \$600 a month and we don't have the money. So then he said we could rent this place. The owner was using this to print t-shirts, but he said that we could move in here. So we moved in here, even though it was only one room, because otherwise we would have been living outside, on the streets. We were desperate at that time. I knew we should not be without a roof over our heads, because of Elbanco's asthma, you know, I know he needs a place to live. He asks me for his own room, and I have to tell him that we can't, we just don't have the money to live anywhere else. The owner is not a good person, and neither is his wife. I

complained to them that there was water under the refrigerator and a leak in the sink and they said, “Well, if you don’t really like it here, then leave.” They are finding little things to try and make us leave, but we can’t leave, if we had money then we could leave. When we moved in here, it was the fifth of the month and if you move in on the fifth, then you pay for rent on the fifth, and they are always asking us to pay on the first, and we don’t have the money on the first, and we are not supposed to pay on the first. The refrigerator broke and all our food went to waste. I asked if we could have a bag of ice since the refrigerator went bad and we were losing all our food and they said, “What, now you want donations?” They are not that nice. They finally gave us a new refrigerator but until then we tried to save the food by storing it in a friend’s fridge (in Spanish).

Elodia’s husband works as a day laborer and his income is not steady. She experiences high levels of stress related to her living situation and is visibly shaken during the interview. Her son’s chronic illness adds to an already tenuous situation. The financial and housing instability of her household makes it difficult to prioritize asthma and her son Elbanco has been without his asthma medications for the last four months. She epitomizes someone living on the margins and, by any measure, is extremely vulnerable. She has very few resources to employ and is at the mercy of her landlord who has showed her little kindness. Elodia is trapped in a cycle of poverty, vulnerability, and anxiety with the consequence of finding it difficult to deal with Elbanco’s asthma.

Subsidized Inequalities

For qualifying households, moving into public housing is a form of social protection against uncontrolled asthma and a way to improve housing conditions. This is the case for Paulina, an African-American parent living in the conventional public housing projects. She describes her previous apartment:

The apartment that I was in was not exactly in good condition. And the landlord was a slumlord. He didn’t come fix nothing. There was no shower, you know, and the door was off the hinges and stuff could come in. Me and my son had spider bites all over us. My feet and legs were swollen and him, he was bad [his breathing] from that. There were so many things wrong with that place: old carpet, mold. I wanted to move out of there when I first moved in so when they

called me about this place, I was like, “OK, let’s go!” I was there for a year and a half. The landlord was a slumlord, all he wanted was his rent money. I was paying \$380 over there and he couldn’t fix nothing. If I would call him up, he’d say, “I be other there” and then he don’t show up. It would be a whole day that I had took off from my job so he could come fix whatever I called about and he don’t come.

Moving from her previous apartment into the public housing projects is an advantage for Paulina in dealing with her son’s asthma. Her public housing apartment has tile floors, a washer/dryer, a functional bathroom and kitchen, and better maintenance service. In this study, nine households use housing assistance: four use Section 8 housing vouchers and five live in housing projects.

In Phoenix, as in all major US urban areas, there is a shortage of public housing. The dearth of public housing can be read as a product of the capitalist order’s success in reproducing a system of advantage. The shortage can be traced to 1937 when the US real-estate capital successfully lobbied against the first public housing legislation (Hackworth 2003). Since then, real-estate interests have continued their successful lobbying. Their success is manifested in the disparity between the quantities of public housing stock in the US compared to other industrialized countries. While being in part a casualty of real estate’s power, the lack of public housing is also the cultural product of class-motivated discrimination, concealed by ideologies of individualism, freedom and independence, and the American myth that everyone has equal chances to work and succeed. The US’s lack of public housing might appear as happenstance, yet it was historically orchestrated by the dominant class to reproduce social order whereby they held power. Only 1.2 million, or roughly one percent of the approximately 112.3 million housing units in the US are publicly owned, compared to eight percent in Japan, twenty-five percent in Great Britain and forty-five percent in the Netherlands (Hackworth 2003).

Within the US, the situation in Phoenix is dire. Phoenix is the fifth largest city in the US, yet it ranks fifty-ninth in federal funding for public housing and the city's housing department relies almost exclusively on federal funding (Alonzo-Dunsmoor 2005). Building public housing has not been part of the growth strategy in Phoenix at any point in its history, which instead has favored single-family subdivisions and the middle class Anglo families they attract. In Phoenix, 4,600 households use some type of public housing, including those 1,776 households living in the conventional public housing (City of Phoenix 2005). These households represent a fraction of those in need in Phoenix as over 74,000 households live in poverty (Bureau of the US Census 2000). In 2005, there were 44,000 households waiting for an opening in a conventional public housing apartment or a Section 8 voucher which provides subsidized rent (Alonzo-Dunsmoor 2005).

In Phoenix, public housing complexes were built during 1940s, expanded several times during the 1950s and 1960s, and are now deteriorating. Federal urban renewal monies are currently funding the rebuilding of the historically African American Matthew Henson public housing project as part of HOPE VI, a federal program to renovate the poorest quality public housing in the US¹⁸ (Howell, Harris, and Popkin 2005). The program was labeled "HOPE" as a discursive strategy to distort its promise as a service for those most in need. However, the program is geared, not toward assisting the nation's poorest, but toward engendering hopelessness among those waiting for public housing while furthering the interests of dominant groups. The program provides subsidies to cities for including market rate and nonpublic housing units in the projects and encourages linkages with the private sector (Hackworth 2003). The federal

government has been successful in using HOPE VI to dismantle public housing: as of 2001, HOPE VI had resulted in the demolition of close to 70,000 public housing units in the US, and sixty eight percent of the replacement units will be for residents earning higher incomes (Hackworth 2003).

Actions at the HOPE VI project in Phoenix are consistent with this national-level agenda. The renovations at Matthew Henson will consist of a phased demolition of 358 old units and construction of new units over a five-year period for a gain of 240 units with on- and off-site development containing public housing, affordable, and market rate rental units (Housing and Urban Development 2001). While some of the homes in the new Henson Village are earmarked for the city's poorest, the 372 new public housing units are a small improvement over the 358 there previously. This small gain does little to alleviate the 44,000 households on the waiting list. Decisions at Henson Village must be understood in the context of neoliberalization and are part of a broader system of rescaling regulations in the US.

Other households involved in public housing use Section 8 vouchers. Households with Section 8 vouchers pay rent based on thirty percent of their income with the government paying the rest (City of Phoenix 2005). Households that I interviewed in this study on Section 8 are satisfied with the program; several others are on waiting lists for the Section 8 vouchers. The Section 8 housing program was developed in 1974 and shifted housing assistance to an individual-level. Theoretically, Section 8 should reduce concentrations of poverty by subsidizing households' rental payments enabling them to rent from private landlords approved by the program located across the city (Guhathakurta and Mushkatel 2002; Grigsby and Bourassa 2004). The Section 8

program has been an attempt to conceal the politics of discrimination by giving the illusion that participating tenants can live anywhere. However, because landlords must agree to participate in the Section 8 program, the vouchers are not redeemable in every (or even most) private-rental units and research has shown that the program has done little to reduce concentrations of poverty in inner cities (Hackworth 2003).

The city's conventional housing projects are located in the central city, near industry and pressed up against freeways (Figure 16). This pattern of governmentally subsidized environmental inequities is found in at least eight other US cities (i.e., Albuquerque, Charleston, Des Moines, Jersey City, Mobile, Stockton, Tacoma and Toledo). Cutter et al. (2001) find that households living in public housing in these cities have greater risk potential from hazardous facilities based on proximity and reported releases, as compared to the non-governmentally housed. In Phoenix, as elsewhere, residents of the housing projects have little control over their ambient environmental exposures as the City relegates them to hazardous environments.

I spent an afternoon with Inez in her housing project apartment in an industrial neighborhood near Interstate 17. The air quality in her neighborhood was the worst I experienced while conducting interviews: the visibility was poor and I felt my lungs tighten as I exited the car. Inez's ten-year-old son Felix has chronic asthma and special needs. Inez feels that Felix's brain did not get enough oxygen over the course of his first three years when he suffered repeated respiratory distress and was never diagnosed or treated for asthma by doctors at the County clinic. She blames this negligence for his slow cognitive and motor skills. He has been hospitalized for asthma an average of six times a year over the course of his ten years. She says:

Felix would love to see a day that he could go without his medicine. But, it is hard for him and he is used to going to the hospital. He knows the routine. He knows what the doctors are going to do. If they are going to give an IV, he knows which arm to give them. He hates getting sick, and he hates if he has to stay in the hospital. He says, "I know I have to stay Mom, go home and get some sleep and I will see you tomorrow." He is a trouper, you know, it breaks my heart. And he tells me, "You know Mom, I'll never get better." He says, "Mom, is this going to stay with me for a long time?" And I says, "I hope not." But no one has never told me nothing about, what his odds are - what his odds of survival are, and if he is ever going to get better, get stronger, or is it going to get worser when he gets older, or what? And that is the hard thing, this whole heartbreak. You know, my husband tells me, he says, "Don't get so close to him," and I says, like, "Well, I try not to." I try to treat him like a normal kid and I try not to think the worst, but when you see this little kid with tubes in his nose or mouth. First you see him smiling and jumping and the next thing you know, Boom, he is laying down, trying to get air so he can live, you know, it is just really heart breaking.

Some parents, like Inez, are very fearful of asthma. Inez is afraid of her son dying and her communications with the healthcare system do not assuage her fears. She repeatedly stresses during the interview that she wants to know Felix's prognosis. Fear of her son's death is an important facet of her experiences with his asthma. Her fears are reflected in her attempts to "not get to close to him." Her daughter also suffers from aggressive outbursts, which are treated with medication. Inez explains, "Sometimes I wonder if she bursts out like that to get attention because a lot of the attention goes to Felix because I am always constantly worrying about him and taking him to the doctors and I try not to treat anybody any less or any more." Inez's children's experiences illustrate the violent causes and consequences of her fears. Within the home, Inez is anxious about Felix's well being, and outside the home, the household is sequestered in a hazardous area. Their status as public housing recipients mean they have little control over their environment and Felix has little opportunity to access a less-polluted environment. Felix is doubly trapped within unsafe emotional and ambient environments.

In addition to being located in industrial areas near freeways, the conventional public housing projects are deteriorating after sixty years of use. Constance lives in a first floor apartment in a two-story complex with her four asthmatic children, her oldest Jerome has a serious case. She illustrates one aspect of living in the dilapidating projects and its impact on her children's asthma: "We have a lot of leaks from upstairs. So when it leaks, wherever it leaks, it leaves mildew and I am right away having to go and get that cleaned up and the Housing says that there is really nothing they can do because the apartments are so old."

While Constance is dissatisfied with some aspects of living in the housing projects, including the leaks and that fact that "it is not safe here for the kids," she currently feels as if she is without other options:

I lost my job because Jerome was always sick and daycare wouldn't let him in. I was working at IHOP, Target and K-Mart. So I just said, OK, I am going to have to be home for a while until I can get him under control, which really took a lot out of my budget. Now, my boyfriend, he pays our bills and is providing for us...

My boyfriend's work is more seasonal and so right now [September], they barely work. He installs carpet and tile. It is kind of like construction, they have a period where it slows down. We are going into winter and I know Jerome will be getting sick so we have to put money away, just for that. He works less in the winter and I am not working so it hurts when one of the kids gets sick. AHCCCS only covers the prescriptions. If it is something like Robutussin or Tylenol, they don't cover that. I asked the Breathmobile, "What am I supposed to do if I can't afford cough syrup for him when he is sick?" Now, I can just call my boyfriend, and even though Jerome is not his, he will give me the money. But I worry about what if he is not in the picture, it is scary. I want to get a night job, but if I worked graveyard, how would my boyfriend deal with him if he got sick? He doesn't really know what to do. Not only with Jerome, but with all the other kids. He is barely getting to notice when Jerome gets sick.

As an unemployed single parent with four children, all of who had asthma, Constance is reliant on the government and her boyfriend for economic support. Her boyfriend is the biological father of her two youngest children. Gender inequality is present in relations

between partners, as it is Constance's duty to care for the children alone. Because she is financially dependent on her boyfriend and unable to work, Constance has limited control over her resources. She worries about her ability to protect her son from uncontrolled asthma in the event that her boyfriend leaves her. Jerome's asthma contributes to her inability to be employed and move out of public housing into a less hazardous neighborhood. Her fears of losing her partner's economic support and of Jerome having an asthma attack when he is under the care of her boyfriend play into the cycle of poverty and dependence for Constance. The consequences of her living situation and fears keep her reliant on public housing as her only housing option.

Another negative aspect of conventional public housing projects for children with asthma is that all of the City's 1,776 public housing units are equipped with evaporative coolers, instead of air conditioning. There is a general sense among nearly all parents with evaporative coolers and South Phoenix healthcare providers, like the Breathmobile, that evaporative coolers are not desirable for people with asthma. This is because improperly maintained coolers can become moldy and trigger asthma. Kodama and McGee (1986) find that homes with air conditioning are less likely develop mold. Eleven South Phoenix parents voice their concerns about evaporative coolers triggering their child's asthma. Air conditioning is also desirable because, as research in Tucson (AZ) demonstrated, asthma inhalers are less effective when used at temperatures above the recommended temperature (i.e., 15-25 C or 59 –77 F) (Hoye, Mogallan, and Myrdal 2005). During the late summer in Phoenix, monsoon season brings humid weather, making evaporative coolers ineffective. This means that public housing households are not able to keep their medicines below 25 C¹⁹ from July until mid-October.

Alejandra lives in the public housing projects and is slated to move into the new Hensen Village (Hope VI) apartments after they are built. She describes the situation: “We are going to move to another apartment because the evaporative cooler here is making my daughter sick. We have been here for three years but there is not another apartment here that we can move to. I got a letter from the doctor [Breathmobile] that says that she is always sick here in this apartment and that the cooler was not good for her asthma so I took that to the City and I think that helped us get approved to be transferred over to the new apartments [Hensen Village]” (in Spanish). The Hensen Village apartments will be the first public housing units in the City to have air conditioning.

While offering households some protection from predatory landlords, public housing projects reduce the control households have over environmental exposures. Conventional housing projects trap Phoenix households in industrial and polluted neighborhoods; they are not, for example, located in Ahwatukee. They reduce households’ ability to control exposures to ambient pollution. In the housing projects, households face the double jeopardy of indoor hazards, like evaporative coolers, co-locating with industrial land uses and poor air quality.

“I’m on Section 8, so I reported it.”

The situation is better for households with Section 8 vouchers as they are not forced to live in the conventional projects without air conditioning and can demand that their rental unit be kept up to code. If landlords of homes occupied by Section 8 tenants neglect properties or try to raise the rent, Section 8 households can, and do, use the program to demand adequate housing. Both Dora and April use Section 8 vouchers to rent homes outside of the housing projects. Their Section 8 status enhances their ability

to remedy landlord neglect and dishonestly in ways that are not possible for those renting from private landlords.

Dora, a Mexican-American single parent of two children with asthma, compares the differences between her previous home and her current home, both rented with

Section 8 vouchers:

At that house [where we used to live], there was a lot of mold in the house. And over here, there is not. They both have carpet. But at the old place, we had a leak in the hallway and the hallway floor was like soaked, and I kept telling my landlord it was soaked and he came in with a vacuum cleaner and said that cleared it all up and I said, "No, you have to rip the carpet up because there will be mold under it." So I decided to move because of that and because the landlord fell through the roof when he was trying to fix the leak. And he was taking forever to fix stuff around there and the mold and stuff. I am on Section 8, so I called and reported it. And they said, "Go ahead and find another house." So I did and I moved out and I don't know what happened with him. I had problems with that house.

April is the seventy-seven year old African American grandmother who adopted her son's three children. She explains how she used Section 8 to keep her landlord from taking advantage of her:

She [landlord] is trying to go up on my rent because she had to fix the furnace. She wrote me a letter and said, "By the first of November, I want \$1150." The rent was \$1050. She said, "You are such a good tenant, I hope you remain to be my tenant, but I am going to go up in rent on November 1st." So I called her and I called Section 8. Because you can't do that - she signed those papers for a year! Section 8 said, "Don't worry about it Miss McConnell, we will move you on to another place." And so I don't know if we will be able to stay here, we might. Then the landlord said, "Well, I didn't think you had to notify them. I thought maybe we could just work that out between me and you." I said, "No, if I work that out between me and you, and Section 8 finds out, they will say, 'Hey if you can do that much, you can pay your own rent.'" No. No. No. That undercover thing - that is not good. When you go undercover, you lose everything you got.

For April and Dora, their Section 8 status allows them to demand fair treatment from their landlords. In the case of Section 8 vouchers, the social protections provided by the program empower households to self-protect by standing up to landlord abuses. It could

help tenants develop a sense of self-efficacy that could translate into empowerment in other realms, such as dealing with schools or doctors. Protections provided by public housing and Section 8 are not offered to households in the US illegally, or to the 44,000 households on the waiting list.

“I’ll never ever live in a place that’s carpeted again.”

The majority of households interviewed in South Phoenix are not using public housing assistance, and they tend to move frequently - sometimes because of asthma. In addition to moving, they manage their children’s environmental exposures by using HEPA air filtration machines and removing carpet. Moving is one way that households attempt to access less hazardous indoor and ambient environments and protect their children from hazardous environments. Monica explains, “We used to live by the landfill, so it is a better life here. It’s cleaner and more rural” (in Spanish). Betheny moved specifically because of her daughter’s asthma:

Over there [Baseline Road], there is a lot of construction and dust. We were living in an area where they were building all over, so over here [downtown] I mean there is not as much dust. She doesn’t complain about all the dust, so I think over here is better. We moved because of her asthma. Because I was always getting up in the middle of the night and she was always being at the doctor’s office and the school was calling me to pick her up. She was riding the school bus to school and she had to walk by this crud [construction site] and so I thought that maybe moving to a different part of town would help and it has helped a little: she is not complaining as much and waking up at night.

Moving is a self-protection measure used by households to reduce their children’s environmental exposures. Parents tend to report that the new home and neighborhood are superior to the previous one. Usually, they move from one area in South Phoenix to another, trying to access better conditions within a zone of hazardous environments.

Using HEPA air filtration machines is another way for households to manage exposures but they are too expensive for many South Phoenix households - only Gelisa has an air filtration machine in her son's bedroom. Inez describes her quest for an air filtration machine:

Like right now, I am investing into an Air Purifier that goes in the home, like an air filter, whatever, the thing. I am investing in one of those, and they are going to give it to me hopefully by next month and to put it in his room to help with the dust and winds and stuff that comes down. Right now, we put in for one at K-Mart. We are getting one there because the doctors are always telling me to get one of those machines for him, to put on in the winter, or in the springtime to help with the dust and pollen. So I am buying, investing in to one of those, and it is kind of one of those things, it has to come out of your pocket.

I ask,” And those machines are expensive aren't they?” Inez replies, “Like, thirty dollars [laughs embarrassed].” I continue, “And you have to get filters too?” She says, “Yeah, twenty seven dollars [laughs again].” As Inez points out, health insurance does not cover air filtration machines. Research has demonstrated that HEPA in-home air filtration machines reduce fungal levels by thirty five percent and particulate levels by thirty eight percent (Cheong et al. 2004). While they aid households in managing in-home exposures, HEPA filters are cost prohibitive for very poor households.

Removing carpet from the homes of children with asthma is an important in-home modification, as carpet harbors dust and allergens (American Academy of Pediatrics 1999). Rental households face difficulties removing carpet because they are not supposed to modify the homes. Legally, a landlord cannot forbid a household from modifying the residence if a member of the household has a disability. Alma Garcia, from the Southwest Fair Housing Council explains the law to me: “Asthma qualifies as a disability, so if you need to rip out the carpet, you can, although you may be asked to replace it and pay for the changes, so it is not always so great for low-income folks, but

legally, the landlord cannot just say no.” (A. Garcia, Southwest Fair Housing Council, personal communication, 9/24/2005).

Households that plan to stay in their rental unit indefinitely are more likely to invest their own money in asthma-related modifications. Anaclaudia explains a typical occurrence in South Phoenix: “We had to take out the carpet and put in flooring. We took the carpet out about a year ago and we really noticed a difference. The carpet held a lot of dirt from all the people stepping on it. My husband and I paid for the flooring and we did the work ourselves. We asked the owner if she would do it. I told the owner that Aracely had asthma, but she still would not change it” (in Spanish). Other households, like Marilu’s, try to find rental units that are without carpet to begin with: “The only rugs we have are like the throw rugs. I’m glad because I learned from--when he was first born-- we lived in an apartment that had carpeting. I know that was bad for him. When I moved, I looked for a place without carpet. I’ll never, ever live in a place that’s carpeted again.” Removing carpet, using air filters and moving to another home in another neighborhood are ways that South Phoenix households self-protect to manage environmental exposures.

Summary

Environmental injustices occur at two scales in metro Phoenix. First, the poor are effectively forced to live in South Phoenix because it is the zone with the lowest rents and lower home sale prices (Figure 15). At the same time it is an area where ambient pollution levels are the highest (Figure 9, Figure 13). Then, within South Phoenix, the poorest of residents (typically undocumented immigrants) become entrapped in hazardous microenvironments within the zone. The poorest parents in my study tend to

live substandard rental homes near freeways in the dustiest of neighborhoods, which contribute to the vulnerability of their children with asthma. The situation is compounded by landlord neglect and abuse, and parent's reluctance/inability to demand fair and legal treatment by landlords. Children who live in rental homes are more vulnerable to uncontrolled asthma because the homes are in poorer condition and it is difficult for parents to make asthma modifications, like removing carpet. Conventional public housing residents are forced to live in more hazardous neighborhoods and in apartments with evaporative coolers, yet are protected from the most grievous of landlord abuses. Section 8 households are well positioned to demand that their rental units be kept up to code but the need for Section 8 far outpaces the supply. The overarching hazardous environment influences all children's vulnerability to uncontrolled asthma in South Phoenix and proximate factors, like roof leaks and landfills, compound vulnerability at a local level.

Advantaged in the suburbs: Environment in Ahwatukee

No hazards here

Ahwatukee households have better access to safer environments than those in South Phoenix. Their incomes increase the choices they have about where to live (see Figure 15) and they consciously choose to reside in Ahwatukee, instead of Scottsdale, for example. Interviewed parents report choosing Ahwatukee because of the good public and private schools, the exclusive master-planned design, the proximity to green spaces, golf courses and South Mountain Park, and the retail services. Contrary to South Phoenix, residential and open space land uses dominate the landscape; there is little industrial zoning and no TRI facilities within the borders of Ahwatukee (see Figure 18).

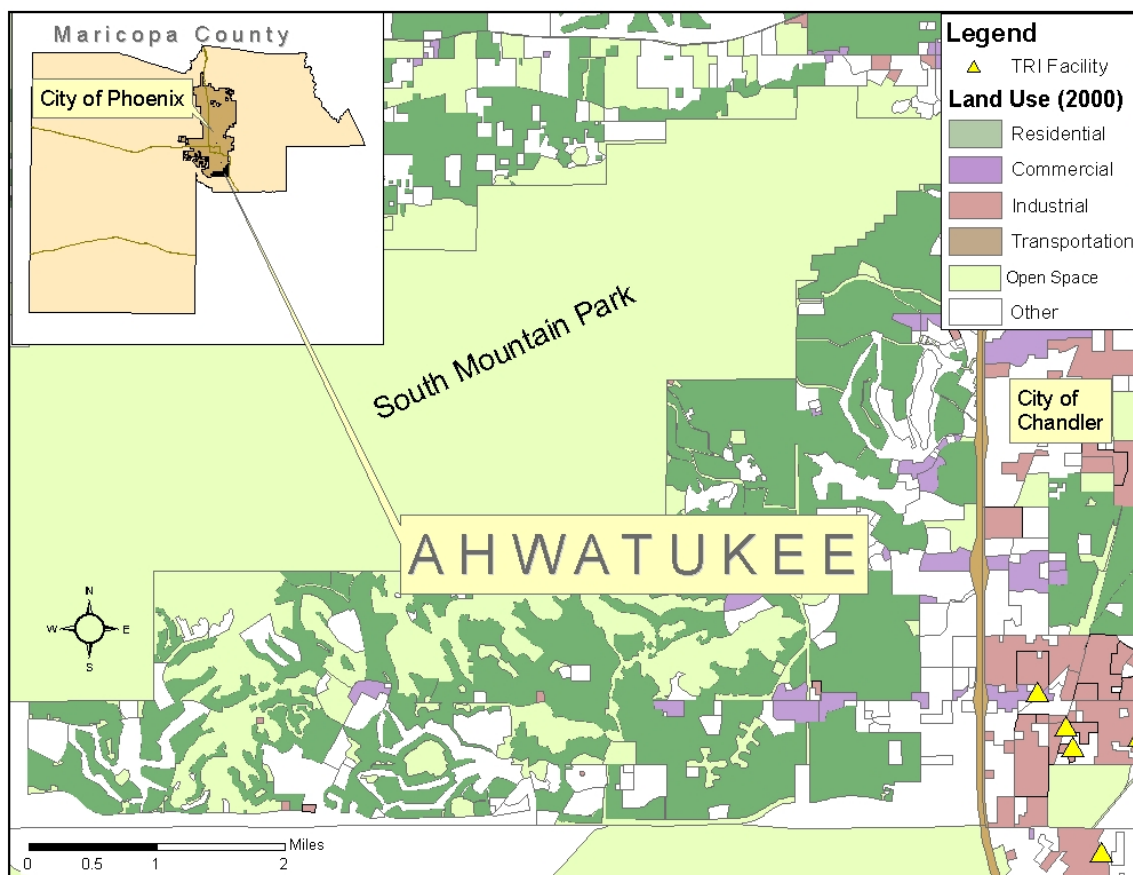


Figure 18. Land use in Ahwatukee

Residents experience the polar opposite of the environmental double jeopardy felt in South Phoenix: they live in high quality homes in less hazardous neighborhoods.

Ahwatukee housing stock is relatively homogenous. I visited the homes of six of the twelve participants from Ahwatukee and certain characteristics are present in all six homes. They tend to have small households of two to five people and large homes with three to five bedrooms. Homes are two-storied with stucco siding, red-tiled roofs, and attached multi-car garage, and are located along curvy cul-de-sac streets. Cacti and rocks are present in the front yards. The interiors are spacious and open, with high ceilings and ceramic tile, or a mix of ceramic tile and light colored carpet. Bedrooms are located upstairs while the living spaces occupy the downstairs. Sliding glass doors open into

backyards surrounded by block fences with grassy play areas and swimming pools. All twelve households live in homes with air conditioning and most use HEPA filters to clean the air. While problems with cockroaches and mold are ubiquitous in South Phoenix, no one in Ahwatukee reports problems with them; walls, doors, and roofs are airtight.

Landscaping of rocks and grass also reduces visible dust in the neighborhoods.

“I noticed a dramatic difference.”

Because the Ahwatukee parents are upper-income homeowners, they are able self-protect by modifying their homes to control indoor exposures. Only one of the twelve Ahwatukee parents rents her home and she is new to the Phoenix area. Participating households took a series of home modification steps, including disposing of stuffed animals, encasing pillows, purchasing air filters and removing carpet. These protections were almost automatic responses to an asthma diagnosis and reflect their upper class habitus. Kathleen is a stay-at-home parent who is president of her children’s Parent-Teacher Association. Her husband has a Master’s degree in Business and works in chip manufacturing in South Phoenix. They moved to Phoenix from Colorado because, as she explains: “There’s not a lot of industry in Colorado and here, there’s so much of it. We thought, oh he’ll have a lots better chance in finding a position out here.” Once arriving in Phoenix, they purchased a home lot in Ahwatukee and built the home in which they currently live. Both of their children, Gavin aged ten and Geoff age eight, have lived there since birth and started having respiratory problems before their first birthdays. Kathleen is the primary manager of the asthma and she makes decisions regarding their care. When she is away from home, her husband calls her cell phone and

asks if he should give the children breathing treatments. She has made a series of in-home changes because of her children's asthma:

We don't have any more carpeting in our house at all. We used to have it throughout the house, and now there's no carpet in our house whatsoever because that triggers him. There is wood up in all the kids' bedrooms - trying to help eliminate it that way. Every time he'd get on the floor and play, no matter how many times you vacuumed the house, it didn't matter. So he'd get on the floor and play and be coughing, sneezing. We have to wash his bedding a couple times a week just to get rid of all the dust. He never slept with - he can't bring stuffed animals into his bed. He has never had stuffed animals or big fluffy pillows. Like we have these special hypoallergenic pillows and the cases for them and mattress covers. And the mattress covers that both the boys have on their beds and pillows. We don't have pets. I dust his room a couple days a week trying to keep the dust down. We go through bottles of the germ gel and, you know, he'd walk in the door, okay we've got to sanitize. At school and at home and every time we go to a store, you know. You get in the car, afterward wash your hands with it. But it's hard to control, you can only do so much.

Kathleen's tenor when speaking these words is very self-assured and matter-of-fact: making these modifications is not something she ever questioned or debated. Controlling asthma is a constant task she carries out and something that is part of her daily life.

For some households, modifying the home is a central part of living with asthma and reflects the key role asthma plays in their lives. Several parents employ a 'more is better' approach, reflecting their class habitus and privilege. Jordy's eight-year-old son Cole has been sick with allergies and asthma since he was two years old. Cole's illness plays heavily into Jordy's life and marriage. She describes:

He was very, very ill for eighteen months. Colds turned into bronchitis right away. He had ear infection after ear infection. The pulmonologists said to me, "Your child is not a candidate for a daycare. You need to stay home with him." And I only worked part-time but I was able to work and be a mother. But I ended up quitting my job and staying home eighteen months. I called that the dark ages. Cole's illness can be very stressful on a marriage. It put a lot of stress, and sometimes I think that we've probably never had a second child because of that. I mean before he had asthma, he had--and I'm told that this is actually quite

common. He had every weird thing under the sun. We've been at every--at the Emergency Room or urgent care on every major and minor holiday, when we've been on vacation.

In addition to influencing her family size, marriage and employment, Cole's asthma is distinctly visible in her home environment. Jordy took many measures to control Cole's exposures in the home. She describes them:

I have been in this house for four years and I've tiled the entire house. Before we moved in, we tiled his room. You have to tile because everything else has glue: hardwood floors, carpeting. Carpet is regulated by the government, but the padding is not. So you can have products in padding that you would never want your child to breathe. Almost two years ago, we took out a home equity line [second mortgage], because I said I want to make our house as asthma-friendly as possible. We tiled the entire house. I mean we did about \$15,000 worth of modifications to our house, which is kind of sad because we're upper middle class and you can't do it if you are not. Asthma has a huge financial implication on people. You miss tons of work, you do things that--you spend three times as much money on doctors and drugs. We're lucky that we can afford to do that. So we tiled the house. I changed to all natural products, no chemicals, no nothing. We have a pool so we put in a salt system so we don't have any chlorine. No drapes, no nothing. We have all wood blinds or shutters. Everything is encased: his pillows, bed. No stuffed animals. Actually, I got him one stuffed animal this past summer. It's this little monkey. I never realized how important stuffed animals are to a kid. I always thought they're just dust gatherers. We have HEPA air filters in the bedrooms, in our bedroom and his. And then we use the HEPA--the special air filter on the main system. It's recommended by the American Lung Association for asthma and COPD and stuff.

I ask, "Did you notice a difference with Cole after you made these changes?" and she says, "Yes, dramatic difference." Jordy recognizes that her income allowed her to take self-protection measures to reduce her son's exposures through home modifications.

Jordy, perhaps more than anyone else participating in this study, knows how to 'play the game' of asthma management; she actively seeks out medical treatment from a specific philosophy, reads medical literature extensively, 'works' her insurance coverage, and carries out countless home modifications.

Like Jordy, other parents use air filtration machines, which research has shown reduces particulates and mold spores (Cheong et al. 2004). Michelle has two filtration units in her home: “I have one for his bedroom and I have one in our family room -the tall Sharper Image ones with that ultraviolet light. I spent a fortune on these things and they’re the ones that don’t have actual filters. You just wipe it clean and the ultraviolet light is supposed to kill so many viruses and bacteria, so it does that and filters the air, but we have that running nonstop.” When the doctor recommended that Faith put a filter in Phillip’s room, she did, in addition to placing three other machines around the house. This simple act reflects her class culture: if one is good then four is better. Stacy and her son both have allergies and asthma. She employs a bimonthly cleaning service to help her control asthma triggers. I ask her, “Do you notice a difference with that?” and she replies, “I do. Yes. Absolutely.” As these stories illustrate, parents apply the same ‘command and control’ approach used to make decisions about their children’s healthcare to home modification efforts.

“I would’ve liked to have had just more carpet put in.”

While most households are proactive with home modifications, some households with financial means and knowledge choose not to self-protect with home modifications. Greta’s household has lived in their home for nine years. Greta’s husband, an allergy and asthma sufferer like her son, wants to remove all carpeting in the home. However Greta prefers carpet and feels that she can maintain the dust through a cleaning regimen. Over the years, they have taken the carpet out of some rooms in the home; when I visited, white carpet still covered floors in the dining room and upstairs rooms. She explains:

Yes, it was all carpeted initially. And now we've put in wooden floors here [living room] and now wood is going on the staircase and in the bedrooms. So we will only have the dining room left with carpeting. But when he was little and I knew carpeting wasn't good, I'd shampoo my rugs every two months. They were always clean. I had to because of his breathing. We weren't ready to take them up because they were so new - the house was new. Even my husband notices his breathing is better after doing that [putting in wood in living room], and that's why he's so dead set on wood-I would've liked to have had just more carpet put in, but we're going to go with wood because it's easier to keep clean. Even though I did a pretty good job maintaining the dust with the carpet. They play- see, my husband noticed this. They play hockey on the floor in my room, which is carpeted. They have indoor hockey nets and sticks. And they constantly hit the sticks on the carpet, every time. After he finishes playing an hour or so, he'll come and use his inhaler. It's because of the dust in the carpet.

Greta subscribes to the upper middle class cultural aesthetic of white carpet, which overrides her concerns with dust causing asthma attacks, even though she has experiential evidence that dust in the carpet causes her son's exacerbations. Her preference for carpet and her belief that she can keep it clean contribute to her household's decision not to remove carpet, even though it is an asthma trigger for their son and they have the financial resources to make the change. Having high incomes means that households have access to the resources needed to make home modifications; it not does necessarily mean that households will act to control their children's exposures.

"You control asthma or it controls you, you have a choice."

Upper-middle class Phoenix homes are rarely without a private swimming pool; it is almost a necessity of their class culture. When I ignorantly ask Kimberly if her gated community has a swimming pool, she responds, "It doesn't have a *public* pool" because, of course, everyone has a backyard pool. The ubiquitous backyard swimming pools in Ahwatukee are visible in the aerial photo in Figure 5. It is not surprising then that Ahwatukee households participating in the interviews tend to have swimming pools in their back yards. The class preference for swimming pools has the unintended

consequence of being a self-protection measure for children with asthma because swimming has been shown to be an effective non-pharmacological treatment for asthma. Swimming is less likely than other physical activities to trigger asthma exacerbations and has been shown to decrease asthma symptoms (Rosimini 2003). Michelle and Faith have swimming pools in their backyards and use swimming as part of their children's asthma treatment. Michelle explains, "We know from a sports perspective that one of the best things for kids with asthma is swimming, and they have to hold their breath. He loves the water, he can hold his breath a long time under water, so we've done some of that." In addition to playing in his backyard pool, Faith's son swims competitively; she relates to me how this came to be: "And he was in soccer and all the running was a trigger. So actually we changed strategies and we have him on the swim team. He has been in swimming lessons since he was three and this summer was the first one he could get on the swim team. And there is no problem with asthma. He got first place in almost all of his races. I think swimming actually in all honesty has been the thing that has really turned him around. It has so increased his lung capacity." Having access to a swimming pool is an asthma control advantage for Ahwatukee households.

As an asthma control strategy, Ahwatukee households also try to manage ambient exposures to air pollution. Ten out of the twelve Ahwatukee households report that air pollution is a trigger for their child's asthma. In Ahwatukee, parents speak of pollution in a general sense, sometimes mentioning a specific pollutant, like ozone. Kathleen tells me, "I know *our* air quality is really bad. I notice he's a lot worse on days when *we* have high pollution warnings." Kimberly, a stay-at-home parent previously employed as an engineer, remarks: "If the *ozone* is really high - for my daughter particularly - it's a huge

trigger.” Jordy states: “Particulate matter is very much so a trigger for Cole. Ozone a little bit, but particulates are a hundred times worse. I get e-mails from the County on that and I pass through downtown all the time on the way to work. It's kind of hard not to see.” These general understandings of pollution reflect the fact that these households do not have noxious industrial facilities in their backyards and experience secondary air pollutants, like ozone.

Ahwatukee parents report several methods they use for controlling exposure to air pollution, although many feel there is little they can do to remediate air pollution. Kimberly manages ozone levels for her daughter by keeping her inside and running her air filtration system. Pamela, a teacher whose daughter has severe asthma and allergies, reports: “There really isn’t a lot you can do [on a high pollution day] except not go anywhere. We all have to run our air conditioners. We couldn’t go out in the backyard or we wouldn’t go swimming that day.”

Allergy testing is a tool used by parents to help them control both indoor and ambient exposures because it identifies the child’s allergic triggers, which the parent can then actively manage. Pamela knows that the grass in their yard is not a problem for her daughter: “We have grass, but she is not allergic to it. She has had allergy and blood work done.” In Faith’s case, an allergy test enables her not to modify her home: “And I specifically asked Dr. Wong: ‘Should we change our house as far as getting rid of the carpet?’ and he goes, ‘Really, it is not going to make that much of a difference as long it is kept clean’ and Phillip was allergic to dust a little bit, but nothing bad.” Because Faith’s son is under the care of an allergist who has conducted an allergy test, she agrees with the doctor that removing the carpet is unnecessary, even though she is willing to

accommodate. This information about allergic triggers enables parents to be more strategic in their self-protection measures and take only 'necessary' measures. While they have the resources - both cultural and economic - to make home modifications, the ready access to allergy testing (in part due to high quality health insurance) means that Ahwatukee parents can identify which modifications are unnecessary. However, parents of children who have not taken allergy tests do not know, for example, if the child is allergic to dust. Because they do not know, and most children are allergic to dust, South Phoenix healthcare providers, like the Breathmobile, recommend that parents remove carpet. This represents a serious challenge, and stressor, for households who rent and/or have low-incomes. The predictable advantage experienced by Ahwatukee households in the case of home modifications and allergy tests illustrates the positive feedback mechanism associated with advantage. Simply put, Ahwatukee households are cushioned within a class-based cycle of advantage.

Summary

Parents voice their concerns about the lack of control they have over their children's asthma. Kimberly says:

With my kids, there's nothing I could have done other than have different genetics and on my husband's side, same thing. And I think over the past thirty years, they say, "Oh yes, our air is cleaner now." Well, maybe, but what kind of changes have happened in our genetic structure as a result of that adaptation? It's more complicated than "Oh, our air is cleaner today." Well, maybe it is not, and number two, we're talking about decades for this to build up. It's happening more subtly than you think and once it's done, it's done. So this, "Oh, it doesn't matter, you shouldn't complain, our air is as clean as it has ever been," that doesn't mean there's not long-term damage, and the air is not clean!

Kimberly blames factors outside of her control - genetics and decades of air pollution - for her children's asthma. She also feels that it is her responsibility to control her

children's environment, which will minimize the impact of asthma on their lives. She explains: "Control your environment. That is really the bottom line. What you can control, you control, and you can control your environment. When my daughter was first starting to have problems with asthma, the second night the HEPA filter was in her room, she did better... The research shows that if you hit hard and fast when they're young, your odds are much better later for them not having permanent lung damage. And to me, that's my responsibility. Plus I can't live with asthma uncontrolled. You control asthma or it controls you, you have a choice." Kimberly, and other Ahwatukee households, can successfully control their environment to the degree that it is possible by changing their homes, running air purifiers and living in areas that are less hazardous to begin with. Their income and education levels, combined with newer housing and less hazardous environments, make this possible and reduce the vulnerability of their children to uncontrolled asthma.

Environment in South Phoenix and Ahwatukee

Because of their incomes, Ahwatukee households have many more housing options than do low-income households. Low-income households in Phoenix find the majority of affordable housing in South Phoenix and the housing is generally poor quality. The ambient environment in which South Phoenix and Ahwatukee households live is strikingly different. Despite the fact that pollution levels (as measured in this study) are higher in South Phoenix, fifty-eight percent (n=7) of Ahwatukee households think the environment is to blame for their child's asthma while only twenty-seven percent (n=11) of South Phoenix households think so. In Ahwatukee, ambient air pollution is one of the only things that households feel is outside of their control, and

therefore to blame. In South Phoenix, households struggle to control many facets of their lives, and pollution is another aspect that is outside of their control.

For South Phoenix households who have access to social protections, they are both helped and hindered by them. Public housing vouchers mean that households have recourse against grievous landlord abuses, but residents living in the conventional housing projects are sequestered in hazardous environments with evaporative coolers. Undocumented immigrant parents are limited in their abilities to self-protect against uncontrolled asthma in the home. Their undocumented immigration status mean that they have very low incomes and are fearful of drawing attention to themselves. Thus, they are unlikely to use formal channels (e.g., city's Landlord/Tenant Office) to complain about unsafe conditions, like mold, which is common in their rental homes. Nearly all South Phoenix parents report actively attempting to control their ambient environments, by watering the dirt, covering their children's mouths with scarves, and keeping children inside on high pollution days. They actively take self-protection measures, but are living within a pall of hazardous conditions.

Ahwatukee households are better able to self-protect because they have access to more resources (e.g., owned home, HEPA machine, Internet for research) and live in less hazardous environments. They use HEPA air filtration machines and remove carpet from all or part of their homes at a higher rate than South Phoenix households. It is easier for households in Ahwatukee to obtain allergy testing for their children than it is for those in South Phoenix, which gives Ahwatukee parents information useful in managing triggers. It is not that Ahwatukee households have more knowledge about these modifications; South Phoenix households frequently mention that they would like to purchase filters and

remove carpet, but are unable to make the changes. Because they have higher incomes and own their homes, it is much easier for Ahwatukee households to make changes. In South Phoenix, homeowners make modifications slowly, as in the case of Crescencia, who tiled one room in her house each year.

This chapter illustrates how the home, like urban zones exposed to industrial emissions or traffic pollution, is an embodiment of environmental inequality. My visits to study participants' domiciles revealed the many ways in which the hazardous 'outdoor' environment – a product of social inequality and uneven geographic development – penetrates the homes of the very poor. Rain flows into homes through leaks and create molds; broken windows and poorly sealed doors allow dust from the yard to enter the home; ants, spiders, mice, rats, and roaches have found their niche inside homes; and evaporative coolers pull outside air into the homes. Research has demonstrated the many ways in which poor housing (e.g., roaches, mold, and dust) harms health (Crain et al. 2002; Lambert and Lane 2004; Bradman et al. 2005; Stark et al. 2005; Jaakkola, Hwang, and Jaakkola 2005) and substandard housing is clearly a problem of the poor. Households in Ahwatukee do not report having any of the problems listed above and use air filtration machines to remove outdoor air from their indoor environments.

Poor housing quality is an environmental injustice issue akin to TRI facilities in minority neighborhoods, because the relations of power, which locate hazardous facilities in minority neighborhoods, are also at work in the production of indoor environments. In spite of popular and academic discourses that treat home conditions as a personal responsibility, the home is not a place where conditions can be understood as the product of autonomous individual decision-making. The case of public housing in Phoenix

exemplifies how decisions by those in power over the last seventy years have shaped the home lives of the city's poor and served to reproduce conditions of inequality. The current stock of public housing is in disrepair. There are very few units available given the number of people living in poverty; and while residents wait for an opening, they are forced to reside in substandard homes, which represent the only affordable options. At the expense of those with little power, political decisions regarding public housing in Phoenix – influenced by neoliberal policy from Washington – have not served those in need and have done little to challenge the hegemony of real estate interests in Phoenix.

As in the case of public housing, the status of rental housing in Phoenix reflects power relations. In rental homes, tenants can inherit serious problems from previous tenants and apathetic landlords. Past power differentials are seen in the conditions of rental homes built before 1960 when the city did not have a housing code and allowed landlords to prohibit inspections on their properties (McCoy 2000). Conditions have been allowed to deteriorate in homes rented to undocumented immigrants because it is financially advantageous to landlords, and the renters are powerless to contest the conditions. Even when tenants, such as Maria, are knowledgeable about state protections and about the fact that the conditions in which they live are not legally permitted, they are still afraid to assert their rights. At another level, South Phoenix residents do not have easy access to a well-developed retail sector, which in turn influences their abilities to maintain homes. As Crescencia, a homeowner without her own source of transportation explains, “We also don't have stores here that they have in other places, like Home Depot, or Lowe's, places that sell things we need to fix up the houses.”

The home as product of power relations is not unique to the barrios of South Phoenix. In Ahwatukee too, power relations are inscribed in the landscape. Community-level organizations, like Home Owners Association's, determine the restricted pallet of colors houses can be painted, if non-resident landlords can own homes in the neighborhood, and what type of, and how many, vehicles can be parked in front of the house. The walls surrounding the subdivisions clearly reflect the power to demarcate 'insiders' from 'outsiders.' Because the home is not a private, autonomous, independent space divorced from the broader ambient and political environment and because conditions vary with race, class and place, it is an important axis of environmental inequality.

Conclusion

Households in South Phoenix are chronically vulnerable, on a day-to-day, year-to-year and historic basis, whereas households in Ahwatukee are generally secure. In South Phoenix, asthma-related needs concatenate with preexisting needs, intensifying disadvantages. The area was bypassed during the postwar boom and residents have paid the price for urban growth in Phoenix without directly benefiting for it. Characteristics associated with abilities to protect against uncontrolled asthma cluster based on location in South Phoenix or in Ahwatukee. Asthma control advantages accumulate in Ahwatukee while disadvantages do so in South Phoenix. Children in Ahwatukee have access to less hazardous environments and better access to healthcare. A few specific aspects run counter to this trend: the Breathmobile provides high quality care to uninsured children in South Phoenix and children in Ahwatukee lack credentialed school nurses in their schools. Compounding disadvantages are especially risky for asthma

because once lungs and airways are sensitized and reactive, they are more easily sensitized again. My research suggests that a hazardous environment, when combined with a lack of healthcare, is worse for asthma than either one is alone.

Fear and anxiety are facets of dealing with asthma. Parents tend to express some degree of nervousness about their child's condition, yet convey optimism about their child's future. For the lower class households, being afraid is imbricated in deepening the cycle of poverty. Fear of retribution is a cause of parental inaction in cases of landlord abuse, paralysis in making decisions, and an inability to work. It is important to recognize that in general, parental fears are not irrational or unfounded, but products of living on the margins of an individualistic and increasingly neoliberal society. Fears experienced by parents participating in this study include fears of deportation, children's illness, crime, impacts of hazardous environments, being homeless, not making ends meet, and child's death. Like the parents in South Phoenix, parents in Ahwatukee are anxious about their child's illness and worry about the impacts of pollution on their children's health. They do not, however, share the other fears. Undocumented immigrants tend to suffer the most fear and anxiety. For this group, their situation is tenuous to begin with, and the added challenge of a chronically ill child heightens fear, anxiety, and economic hardship. In the next chapter, I will discuss the linkages between my quantitative and qualitative analyses and report theoretical, methodological and practical implications of the study.

CHAPTER 6

CONCLUSION

Reviewing and Explaining Findings

Applying a vulnerability approach to a multi-method study of uncontrolled asthma allows for the synthesis of historical, quantitative and in-depth interview findings. Vulnerability researchers use pressure and release (PAR) models as conceptual tools for understanding how ‘bundles’ of social and environmental factors result in vulnerability for some and security for others in specific political economic milieus. PAR models include historical conditions and economic factors that influence the importance of certain social characteristics to vulnerability and security (Bolin and Stanford 1998).

Figure 19 is a variant of a PAR model illustrating how social processes at multiple scales mediate vulnerability to uncontrolled asthma. At the far left of the model are the structural factors implicated in vulnerability that I identify for my subject: neoliberalism and white privilege. I focus on white privilege because of the importance of racism, including environmental racism, in shaping urban development nationwide (Pulido 2000). Because of the close linkages between race and class in the US, ‘white privilege’ also includes class privilege. It has also been central to the growth trajectory in Phoenix, with minority South Phoenix bearing the burden of growth, while others benefit (Bolin, Grineski, and Collins 2005). In Phoenix, white privilege is reflected in urban settlement patterns, residential and job segregation, social exclusion of minorities, industrialization, and the emplacement of urban infrastructure, including highways and railways

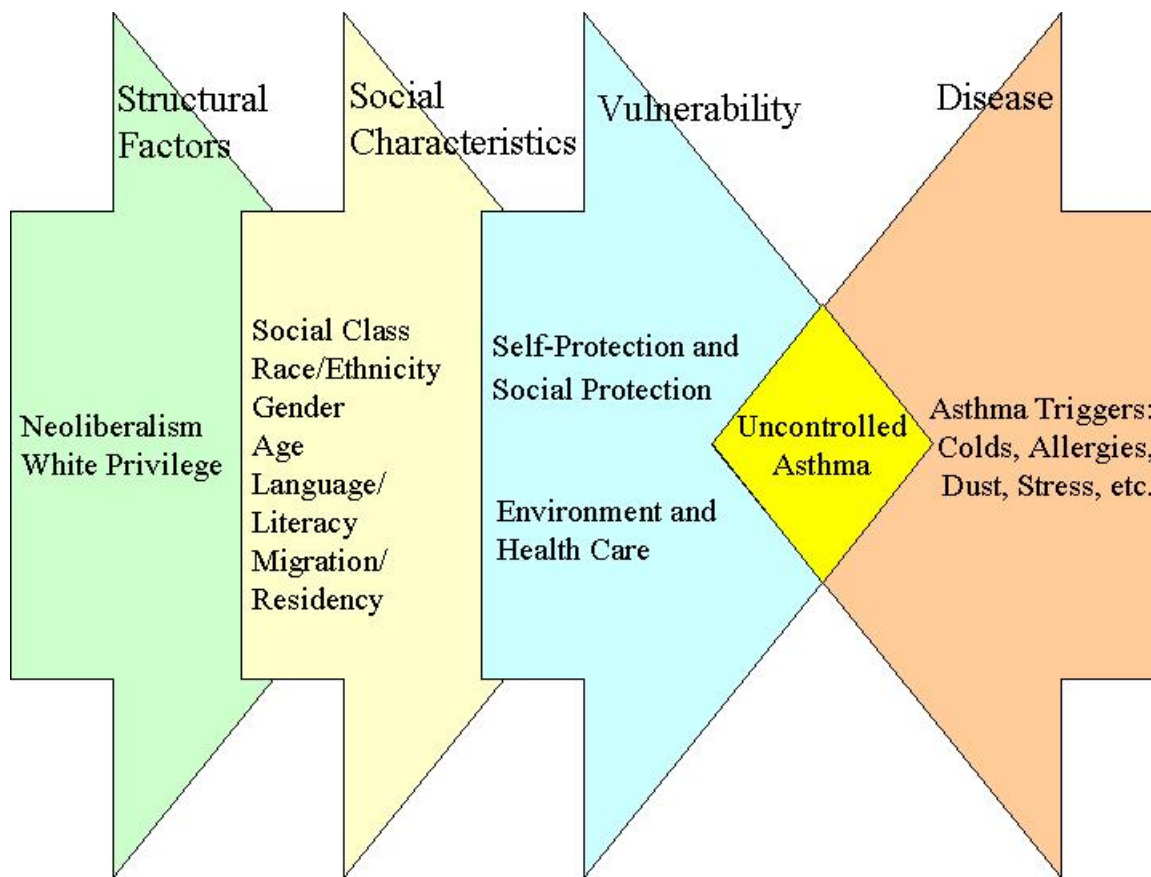


Figure 19. PAR model for uncontrolled asthma

(Horton 1941; Roberts 1973; Miracle on 7th Avenue - A history of Phoenix Memorial Hospital 1981; Kotlanger 1983; Luckingham 1989; Brunk 1996; Burns and Gober 1998; McCoy 2000; Zachary 2001; Bolin, Grineski, and Collins 2005; Grineski In Press-b).

The other structural factor in Figure 19 is neoliberalism, which amplifies risk for poor households. The loosening of constraints on the market through the enactment of neoliberal policies at a national level has dominated the political economic landscape since the 1970s. Neoliberalism has exacerbated preexisting conditions in Phoenix instead of mitigating problems resulting from a century of white privilege. Neoliberalism has been shown to be an important factor in increasing health inequalities worldwide (Coburn

2004; Farmer 2003). White privilege and neoliberalism provide the structural scaffolding within which Phoenix households operate.

Crises in the welfare system and the declining profitability of mass-production in the 1970s meant that states began to enact neoliberal policies to dismantle institutional constraints on the market (Brenner and Theodore 2002a; Staeheli and Brown 2003). Neoliberalization (i.e., neoliberalism as a process) has facilitated cuts in social programs; disciplinary, not cooperative, relations between workers and management; more competition for jobs; restructuring of state services to private enterprises; and possessive individualism (e.g., proliferation of gated communities) (Peck and Tickell 2002). The ideology of personal responsibility underlies neoliberalization and resonates well with American ideals of hard work and individualism (Trudeau and Cope 2003). “This ideology also rationalizes unevenness of fortunes produced by the shift toward flexible accumulation of capital and its political handmaiden: the devolution of federal support programs” (Trudeau and Cope 2003, 795). This can be clearly seen in the chronic underinvestment in public housing in Phoenix.

With the passage of the Personal Responsibility and Work Opportunity Reconciliation Act and the Illegal Immigrant Reform and Immigrant Responsibility Act in 1996, the US government firmly policed the social service border, making legal citizenship the hallmark of the welfare state, instead of family need or length of residence. Since then, research has demonstrated the negative impacts on immigrants, both legal and illegal, who are largely people of color (Morgen and Maskovsky 2003). Welfare reform in 1996 is also responsible for the vast decrease in the number of families using benefits: in 1995, 4.8 million households were assisted and that number dropped to

2.6 million by 1996 (Moller 2002). In addition to reducing social protections for immigrants and others, cuts in the welfare system have been coupled with fewer social protections offered by employers, like health insurance, and the weakening of environmental regulations (Peck and Tickell 2002).

Neoliberalization furthers Anglo privilege because embedded within a neoliberal ideology of personal responsibility is idea that the ‘playing field is level.’ For example, a level playing field would mean that rental and labor markets are ‘free’ and ‘open’ to anyone who can afford the rent or meet the qualifications for employment (Trudeau and Cope 2003). This ideal neglects “the reality of social regulation and de facto exclusion [that] come[s] through both the structural effects of metropolitan processes, and the contingent social, economic, and political practices that perpetuate race, gender, and class differentiation” (Trudeau and Cope 2003, 779) and rationalize inequality.

White privilege, which includes class privilege, has continued to thrive with the onset of neoliberalization. As benefits have been reduced for those in need, upper class Anglo people are better positioned to access the limited services. In an analysis of the US, Moller (2002) finds welfare benefits are lower in states with larger proportions of Black single mothers and higher in states with larger proportions of white single mothers controlling for state resources. States reproduce white privilege by designing racialized social programs that advantage Anglo households (Moller 2002).

In Phoenix, neoliberalism and white privilege are reflected in the landscape and personal experiences. Interest driven growth has been central to Phoenix’s identity and political economy since the city’s inception in the late 1800s when city boosters capitalized on the healthseeking movement using migrants with tuberculosis to build a

city (Grineski In Press-b). Since then, the ‘growth at all costs’ mantra has been omnipresent and the interests of Anglo Phoenix have been promoted while the old urban core of South Phoenix bears the environmental costs. Neoliberalization has intensified the impacts of white privilege on South Phoenix. Since the 1970s, neoliberalization is behind the disinvestments in public housing, decreasing numbers of employees whose jobs provide health insurance, anti-immigration sentiment and policy, lack of social services, including health services in the southern part of South Phoenix, and pollution levels (from environmental deregulation).

In Figure 19, the specific social characteristics influencing vulnerability (i.e., social class, gender, age, race/ethnicity, language/literacy and migration/residency) are located to the right of the structural factors. These characteristics are important because of the systems of power currently in place; theoretically, different characteristics would be important in different political-economic contexts. These characteristics are important because they influence vulnerability, which is located to their right in the model (Figure 19). The vulnerability arrow in the model refers to the social and self-protection measures available to households, and the access that they have to less hazardous environments and healthcare. My research has demonstrated why each of these social characteristics is important for vulnerability.

Social class is a general indicator of vulnerability. It is a significant predictor of uncontrolled asthma in the quantitative investigation, and analysis of in-depth interviews reveals that upper class households have a greater potential to self-protect. Higher social class households tend to own homes and are able to afford HEPA filters, home modifications (e.g., removing carpet), and healthcare or medications not covered by

insurance. They are also advantaged as they can deploy their cultural capital and class privilege in ways that are rewarded by the dominant system and advantage their children (e.g., equal status with doctors aids communication and they know how to ‘play the game’ of the healthcare system). Their health insurance policies are more likely to cover expensive tests and they have more choices in terms of neighborhood and house type, enabling them to live in less hazardous locations. They are less reliant on social protections because they have the ability to provide for themselves, and are therefore less impacted by neoliberalization. Among lower social class households, income determines whether households qualify for social protections like AHCCCS (Arizona Health Care Cost Containment System) and public housing, and whether households make enough money to utilize their private insurance plan if they have one. Low social class severely restricts housing options of the poor in Phoenix and sequesters them in hazardous areas where housing costs are lower.

Race/ethnicity is closely connected to social class, but is important separately because of racism, discrimination and cultural differences (Bolin and Stanford 1998). Qualitative analysis reveals clear cultural differences between Anglos and minority groups in the ways in which they solve problems and interact with the healthcare system. In Phoenix, racial/ethnic minorities have reduced access to less hazardous environments compared to Anglos as I find that areas with higher percentage of racial/ethnic minorities have higher levels of criteria pollution and industrial air emissions in Phoenix, controlling for social class. I also find that proportion African-American is a significant predictor of higher rates of uncontrolled asthma in Phoenix (controlling for a host of factors). Latino households face chronic vulnerability due to assemblages of characteristics like low

social class, monolingual Spanish speaking, illiterate, and undocumented migrant, which influence the quality of the environments in which they live and their access to healthcare. They lack cultural capital necessary to work the system. For Latinos, it is not just the lack of cultural capital, but the fact that their cultural characteristics serve as a district disadvantage in the current milieu, due to pervasive anti-Mexican-immigrant sentiment. In sum, African American and Latino households experience unequal social protections and are less able to self-protect.

Gender represents an aspect of social existence that structures opportunities and in the case of asthma in Phoenix, plays an important role in self-protection. Gender links closely with social class and race/ethnicity. There are a higher proportion of single parents among the poor households (in South Phoenix), specifically among African Americans, and all the single parents are women. In South Phoenix, I find that missed work due to the child's chronic illness is a significant financial burden on single parents, as compared to two-parent households, which make purchasing medications or moving to a better quality home more difficult. Gender inequality within two-parent households means that women are responsible for asthma care, whether they are employed outside the home or not. Women not employed outside the home are reliant on a partner for financial support, which causes them to worry about the child's welfare if the partner were to leave. Because gender conditions access to transportation among low-income Latino households, women struggle with transporting children home from school and to healthcare centers when they are ill.

In this study, age is closely tied to race with the three elderly adoptive parents being African American. These three parents have adopted a total of eight children

between them because of the children's biological parents' drug use. Being of old age is a complicating factor to controlling children's asthma because the parents are dealing with young children during their retirement years, and are frequently rising in the middle of the night to treat children's asthma. Additionally, the elderly parents are managing their own chronic health conditions, on top of the children's, and have reduced mobility in transporting the children home from school when sick, and to healthcare centers.

Language/literacy presents barriers to households trying to self-protect and access social protections. In my research, speaking only Spanish is tied to low social class and Mexican nativity. Spanish-speaking households have the lowest incomes, live in the poorest quality housing, and are more frequently taken advantage of by landlords. It is more difficult for them to access social protections from the healthcare system because providers at clinics, hospitals and schools do not always speak Spanish, complicating communication between parents and providers. Children living with parents who are illiterate are especially vulnerable to uncontrolled asthma because of medication errors and the challenges parents face trying to access social services, like AHCCCS or public housing. They struggle to 'play the games' of accessing social services (e.g., signing up for public housing) and strategically manipulating their health insurance plans (e.g., switching plans when dissatisfied).

Migration/residency is perhaps the single characteristic with the biggest impact on vulnerability to uncontrolled asthma. It conditions access to a host of social protections, ranging from public housing to health insurance and limits self-protection measures taken by undocumented households because of fears of deportation, low-incomes and language barriers. Migration/residency status is closely connected to social class, race/ethnicity

and language/literacy. Undocumented households lack health insurance at the highest rate, and are especially at risk for landlord abuses and poor living conditions. While their eligibility for social programs has been drastically reduced in the neoliberal age, undocumented households sometimes access private protections, like the Breathmobile and its free medication programs.

The diamond in Figure 19 between Vulnerability and Disease represents the incidence of uncontrolled asthma, which occurs at the nexus of structural causes, social characteristics, vulnerability, and characteristics of the disease. Disease is located on the far right side of the model and it represents the biological characteristics of asthma, such as the triggers of children's asthma. There are feedback loops between Disease (on the right side of model) and social factors (on the left side of model), which are not depicted, including, for example, how exposure to cockroaches results in accumulating sensitivity for children.

To illustrate which bundles of characteristics create more vulnerable and more secure households, I developed a simple system for scoring households represented in Table 13. Gender is not included because it did not vary between primary respondents (i.e., they are all women). The ten configurations of vulnerability are present among households participating in interviews. This table illustrates how households with specific bundles of characteristics are more vulnerable than others. For example, 'migration/residency' has different influences on white upper class, and non-white lower class households. For children in white upper class households, being foreign-born does little to impact vulnerability (score of 1), whereas for children in non-white (i.e., African

Table 13. Vulnerability rubric

Social Class	Race/Ethnicity*	Age	Language	Literacy	Migrant	Residency	Vul. Score	N
1=Low	1=Non-white	1=Elderly	1=Spanish	1=No	1=Yes	1=No		
High	White	Not Elderly	English	Yes	No	Yes	0	11
High	White	Not Elderly	English	Yes	Yes	Yes	1	1
Low	White	Not Elderly	English	Yes	No	Yes	2	3
Low	Non-white	Not Elderly	English	Yes	No	Yes	3	19
Low	Non-white	Elderly	English	Yes	No	Yes	3	3
Low	Non-white	Not Elderly	Spanish	Yes	Yes	Yes	4	7
Low	Non-white	Not Elderly	Spanish	Yes	Yes	No	5	5
Low	Non-white	Not Elderly	Spanish	No	Yes	Yes	5	1
Low	Non-white	Not Elderly	Spanish	No	Yes	No	6	3

NOTE: "N" refers to the number of interviewed households in each category.

* Non-white refers to African American and Latino households

American or Latino), lower class households, being foreign-born is another factor that contributes to vulnerability (scores of 4 to 6). Children in racial/ethnic minority households with low social class and a parent who is an illiterate illegal immigrant are more vulnerable to uncontrolled asthma, whereas children in upper class, white, English-speaking, literate and native-born households are less vulnerable (Table 13).

The vulnerability of the groups in the rubric is a contingent product of historical geographic processes. Group characteristics relate to the capacity of households to self-protect and access social protection (of which cultural capital is a key dimension). The endemic system of inequitable social protections in the US (due in part to white privilege and neoliberalism) is a salient component of children's vulnerability. The US healthcare system is well developed and technologically rich, but inequitable. Unequal access to the fruits of the healthcare system serves to exacerbate the differences in vulnerability between groups (Farmer 2003). Which groups are able to fully benefit from the US healthcare system is determined by power and privilege, not need.

The environment is also structured through social processes, as neoliberalism and white privilege have created heterogenous urban environments that influence the capacities of households to self-protect against uncontrolled asthma. Certain groups are better able to self-protect by accessing less hazardous environments and successfully modifying their environment to reduce vulnerability; however, the context in which they self-protect is determined by a history of inequitable social actions.

Theoretical and Methodological Implications

With this study, I offer a hybrid environmental justice framework that can be applied to other instances of environmental injustice. This framework combines a quantitative spatial approach with a qualitative phenomenological approach and conceives of the environment broadly. The quantitative approach was a zip code level analysis that offered several additional directions for environmental justice research. First, I collaborated with an environmental engineer and used a modeled composite pollution surface instead of the more commonly employed interpolated surfaces (e.g., Jerrett et al. 2001). Second, by predicting asthma hospitalizations, I was able to investigate a health measure instead of imputing risk. Third, I considered indoor hazards and housing as others forms of environmental injustices, which is less common in environmental justice research (except in the case of lead).

The qualitative approach offers new directions. Qualitative environmental justice research is usually historical, addressing the development of inequalities (e.g., Boone 2002), or related to the study of social movements for environmental justice (e.g., Kebede 2005). Through its comparative case study/in-depth interview methodology, this project offers a method for understanding how individuals view themselves within systems of

inequality. South Phoenix resident Maria, for example, states that: “Society doesn’t have a good view about the area I live at [South Phoenix]. Up north, there are more nice houses and people take care of them. Here, there are a lot of homes that are not as nice, but they are cheaper. The schools are better up there than here. The security is better up North. But the rents are low here (In Spanish).” Maria has a clear understanding of her position within the sociospatial system of stratification in Phoenix, and a broader understanding of her experiences can help ameliorate inequalities. In-depth interviews also offer specificity and elucidation to important environmental justice concepts, like race and class. From the Phoenix case, I illustrate the embodiment of race and class by sharing stories like Gwendolyn’s and Faith’s featured in Chapter 1.

By using the well developed tools of vulnerability analysis (e.g., Wisner et al. 2004), I place people’s experiences in political and economic context to elucidate how broad scale factors influence local people. The vulnerability frame illuminates how households cope (e.g., through social and self-protections) with environmental and social injustices. It represents one technique for looking ‘upstream’ for causes of health disparities. By using Bourdieu’s notion of cultural capital within the well-developed framework vulnerability analysis, I am able to investigate, more specifically, how culture influences parents’ abilities to use resources.

The combining of quantitative and phenomenological approaches is useful to garnering a more complete picture of a research problem, and the approach I offer here can be improved in future research. First, obtaining more spatially specific data at a finer resolution would improve the explanatory power of the statistical models. When predicting asthma hospitalization, data on percent of people with health insurance should

be included as insurance status is related to seeking healthcare. Aggregating health data and pollution models at a smaller geographical resolution, like census tract level, instead of zip code level would allow for a more precise investigation into the relationships between people, environments and asthma. My study could also be improved by measuring in-home conditions, instead of approximating them with census data. Sending out a 'home conditions checklist' to a representative sample of households within the study area would be one possibility. In the future, I would attempt to collect or obtain individual level asthma data with the address of each individual so that I could employ a multi-level statistical model to consider the role of individual-level and neighborhood-level predictors.

Second, my research underscores the importance of building linkages with experts across disciplines whose interests link with environmental justice, such as nurses, medical doctors, lawyers, and environmental engineers working within and outside the academy. Further articulation with experts in other fields would improve the quality of data used by environmental justice researchers, and increase the explanatory power of environmental justice research. For example, healthcare providers with the Maricopa County Asthma Coalition plan to screen all Head Start children for asthma in the fall of 2006 and collaboration with this non-academic unit could result in use of this spatially specific prevalence data set for an environmental justice study that would be of useful for the Coalition and researchers.

Third, future attempts to conduct comparative studies using in-depth interview methodology could be improved by equally sampling the same numbers of people within each comparison groups to make for a more valid comparison. A longitudinal study

design whereby the researcher returns several times to a subset of the participating households would give a more reliable set of experiences than the ‘snapshot’ approach used here. Fourth, studies investigating asthma, environment and healthcare should be conducted in other places to determine if the patterns uncovered in Phoenix are robust.

Practical and policy Implications

My results suggest targeted interventions in metro Phoenix that provide equal protection for children from different social groups. In terms of healthcare, the elementary school emerges as an important agent in controlling asthma. Most elementary schools in Ahwatukee are without a credentialed school nurse, and as this study suggests, being without a nurse increases children’s risk of a serious asthma exacerbation at school. In low-income schools, like those in South Phoenix, schools play an important role in helping parents negotiate the social service realm, but this relationship is complicated when parents and nurses do not speak the same language. Offering Spanish-language courses for English-speaking school nurses and continuing to fund English-language programs for parents at the schools are two steps toward reducing communication barriers.

This study also supports continued and increased funding for school-based programs that provide healthcare to low-income (and immigrant) children, such as school-based clinics and the Breathmobile. Governmental funding could help the Breathmobile expand its service to other low-income children in need, such as those in Maryvale (West Phoenix) and Mesa. The Breathmobile is a low risk investment as it has already reduced hospital use, emergency room visits, and missed school days for participating children (Phoenix Children's Hospital 2005). Running programs through

the schools provides households with multiple services in one location, which is convenient for parents without transportation, and capitalizes on the trust that parents have in the schools making programs more likely to be utilized (Bruner 1992).

Continued funding for AHCCCS and Kids Care is essential as parents rely heavily on the services to help with asthma control. As Rimsza, Bartels and Bannister (2006) illustrate, the preventative services offered by AHCCCS/Kids Care are likely reducing patients visits to the emergency room for asthma. Despite its success, Kids Care faces continual assaults from the Arizona legislature as representatives debate the continuation of the program each year. For example, head of the Senate Appropriations Committee State Senator Bob Burns (R-Peoria) states that paying for health coverage is "a personal responsibility," and if the state assists, "we are creating incentives that drive people away from helping themselves" (Dickey et al. 2006). Expanding the AHCCCS taxi service to include urgent care visits would be an important improvement to the program, as parents without transportation struggle with taking their children to the doctor on short notice.

My quantitative findings demonstrate that air pollution affects all Phoenicians, especially racial/ethnic minority children. This is support for pollution reduction efforts through the enforcement of existing laws and the expansion of programs, like commuter busses. Quantitative and qualitative investigations expose the difficulties that low-income households face in obtaining high quality affordable housing. Expansion of public housing programs to provide adequate housing is essential to reducing the vulnerability of children with asthma, as many children with asthma struggle in substandard housing with mold and pests. Part of this effort could include allowing renters access to City of Phoenix Department of Neighborhood Services grants to fix up

deteriorating houses or pay for installation of new heating and cooling systems, currently only available for low-income homeowners (City of Phoenix 2003a). Better enforcement of rules that prohibit landlords for renting substandard properties and that require them to remediate unsafe conditions (like mold) must be paired with the protection of Spanish-speaking and undocumented immigrant households who voice their concerns and stand up against the abuses.

The situation in Phoenix with children's asthma, healthcare and the environment is symptomatic of historical legacies of white privilege and neoliberalization at a grander scale. The experiences of households in Phoenix articulate with national policies related to healthcare, education, environment and immigration. For example, across the US, the healthcare system is inequitable and not meeting the needs of many. A promising initiative is state-level efforts to provide healthcare to children. Following the lead of Illinois, which recently passed a bill to cover the health of all children, Arizona is flirting with developing a healthcare system that better serves its people. Phil Lopes, a Arizona democrat in the House of Representatives proposed a bill that would create a single-payer system that pools funds from Medicare, Medicaid and employers to provide insurance coverage to all Arizona residents regardless of health status, employment, age or income level. Lopes justifies this bill with the evidence that half of all healthcare costs in Arizona are already financed by the public sector, through coverage for public employees, members of the military, Medicare and AHCCCS (Crawford 2006a). While children are not directly responsible for creating current crises with healthcare, the environment and immigration, they unfairly bear the costs, and re-framing the current crises in terms of

intergenerational equity and social justice for children makes resolving the crises even more urgent.

ENDNOTES

¹ While research studies demonstrate that African American children consistently suffer from higher rates of asthma than white children, some studies find that Latino children have higher rates of asthma than non-Latino whites whereas others find lower rates for Latinos (Ortega and Calderon 2000; Akinbami, Rhodes, and Lara 2005; Smith et al. 2005; Rimsza, Bartels, and Bannister 2006; Boudreaux et al. 2003).

² Facilities are asked to report their releases if they have ten or more full-time employees and manufacture/processes over 25,000 pounds of the approximately 600 designated chemicals, or use more than 10,000 pounds of any designated chemical or category (EPA 2005b).

³ While the EPA regulates criteria pollutants like ozone, TRI emissions do not have attainment criteria.

⁴ Maricopa County (Metro Phoenix) added over 136,000 new homes between 2000 and 2003, which was the largest number of all counties in the US (Bernstein 2004).

⁵ Within metropolitan Phoenix's \$140 billion economy, the far-reaching housing industry accounted for \$45 billion in 2003 while manufacturing represented \$35 billion and tourism, \$9 billion (Burrough and Creno 2004).

⁶ To control the probability of committing a type I error when conducting multiple comparisons with paired-data, I used the Bonferroni correction and divided the test-wise significance (i.e., 0.05) by the number of tests (i.e., 7) (Benjamini and Hochberg 1995). This controls for the multiple comparisons and preserves an alpha level of 0.05. In this case, the Bonferroni approach, using $0.05/7 = 0.0071$, supports the rejection of the null hypothesis that rates are the same (Benjamini and Hochberg 1995).

⁷ These findings corroborate previous research showing that racial/ethnic minority children have higher rates of asthma hospitalizations (e.g., Ortega and Calderon 2000), but the Latino finding is in contrast with Rimsza et al. (2006) who also studied asthma in Phoenix. In our data set, the same child can be included in the daily count of hospitalizations multiple times (e.g., hospitalized on 1/4/02 and 5/4/03). This is important for the second part of the analysis, looking at hospitalizations and pollution levels, because we wanted to know how many children were in the hospital on a given day. It was not important if the same child was hospitalized multiple times, whereas Rimsza et al.'s (2006) aim was to determine the prevalence rate of asthma in Maricopa County and thus counted each child only once. These differences may be why our Latino finding differed from Rimsza et al.'s.

⁸ Persons holding jobs like these are subject to abuses. In a recent study of 2,660 day laborers across the United States, researchers found that abuse was the most definitive characteristic of the market. In the two months leading up to the survey, forty four percent of day laborers were denied food, water and breaks; twenty eight percent were insulted or threatened by the employer; and an employer abandoned twenty seven percent at the worksite. Injuries were also common, and over half of the laborers did not receive medical care for injuries sustained on the job (Valenzuela, et al. 2006).

⁹ "Hospitalization" means that the person spent at least one night in the hospital.

¹⁰ Since NO_x is largely emitted in the form of NO rather than NO_2 , the pollution model speciates NO_x into 90% NO and 10% NO_2 and creates a surface for each (Y.J. Choi, Fluid Dynamics Lab, Arizona State University, personal communication, July 19, 2005).

¹¹ As a point of clarification, I used total volume of air releases and did not weight the industrial air emissions by toxicity. Toxicologists do not definitively know which chemicals cause asthma and in what quantities, although they do argue that industrial toxins play a role in asthma (Delfino et al. 2003; Leikauf et al. 1995). In this analysis, I followed the logic that the increased levels of particulates in the air from industrial air emissions could trigger asthma, aside from any toxicological impact on children's lungs.

¹² In terms of race, the actual percentage African American in the two areas is four percent in Ahwatukee versus nine percent in South Phoenix.

¹³ These eight households had a total of twelve children with asthma and four children had AHCCCS.

¹⁴ For example, Dominga's daughter Amiee did not receive care for a broken wrist suffered at elementary school because of her status as a low-income undocumented immigrant child. She now has a crooked hand. Dominga explains: "They [St. Joe's Hospital] did not give Aimee good service with her wrist. They did not give her a cast, only a splint and so her hand did not really heal properly, it is a little bit crooked. They only gave her the splint and 5 days after that she went to another place on 42nd Street and they gave her the cast, but it was too late because the bone already started to re-attach. They asked why we had waited so long to bring her in and I told them why: I didn't want to wait five days, but they [hospital] gave her the splint but they didn't say anything else, just that they couldn't help her and she needed to find help somewhere else. The emergency room gave me a list of phone numbers to call for help. I called them but only some of them spoke Spanish and every single person that I spoke to would not help. Then I told the school nurse, "It happened at school. Can you help me?" And no one would help when I called but when the nurse called, someone agreed to help, that is when we went to 42 Street and got a cast. I had to pay \$500 cash for the cast, it was very expensive. They said the only way it could be fixed was to use a hammer and break it again.

¹⁵ In addition to poorly serving Spanish-speakers, Arizona is ranked forty-second out of the fifty states for emergency room care. They rank forty third for number of emergency departments per one million people, forty fifth in number of registered nurses per 1,000 people, forty seventh in number of hospital-staffed beds per 1,000 people, forty ninth in annual per capita expenditures on hospital care, forty sixth for annual state Medicaid expenditures per population under sixty five. These shortages perpetuate emergency room crowding. One bright note was that the state ranked ninth in contributions to the State Children's Health Insurance Program (CHIP) per one hundred children younger than age eighteen (Taylor and Hughes 2006).

¹⁶ The average retail price for an albuterol inhaler is \$19.99 but they are available via an internet pharmacy for \$10.99 (*Drugstore.com* 2006).

¹⁷ Malene had since sold the home because of her daughter's asthma and moved in to an apartment. Margaret was renting-to-own her home with mold problems.

¹⁸ The health status of HOPE VI residents is decidedly worse than that of others in assisted housing and other poor people, despite their similarity in terms of economic deprivation. The difference in the level of asthma prevalence, a condition that has been tied to various measures of housing quality, is especially pronounced. This paper indicates that one major benefit of improving housing quality may be improved health status (Howell, Harris, and Popkin 2005)

¹⁹ This problem is also extreme for low-income households (not on public housing) who lack cooling apparatuses, or have only evaporative coolers.

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TECHNICAL APPENDIX A

SPATIAL STATISTICS

First, Moran's I measures the degree to which neighboring areal units are similar with respect to an attribute (Ping et al. 2004). Moran's I measures the degree to which neighboring areal units are similar with respect to an attribute. Moran's I is defined as:

$$I = \frac{n \sum_{i=1}^n \sum_{j=1}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^n \sum_{j=1}^n w_{ij} \sum_{i=1}^n (x_i - \bar{x})^2}$$

where n equals the number of observations; w_{ij} is the weight between locations i and j ; x_i and x_j are the values at locations i and j ; and \bar{x} is the average over all locations of the variable (Ping et al. 2004, p. 221). Moran's I ranges from negative one to one, with negative values indicating a dispersed pattern, values close to zero, a random pattern and positive values, a clustered pattern (Lee and Wong 2001). While Moran's I describes SA globally, it does not identify whether a clustered pattern is "hot" (high) or "cold" (low). For this I use the General G-statistic (Lee and Wong 2001). General G is represented by $G(d)$ when j does not equal i and is specified below.

$$G(d) = \frac{\sum \sum w_{ij}(d) x_i x_j}{\sum \sum x_i x_j}$$

The weight [$w_{ij}(d)$] can be specified in different ways but is calculated using inverse distance in this analysis. The numerator includes only those $x_i x_j$ pairs that are within d , whereas the denominator includes all $x_i x_j$ pairs (Lee and Wong, 2001, p. 165). The numerator thus indicates the magnitude of the statistic and will be large if the neighboring values are large and small if the neighboring values are small. G is characterized by the distance at which units can be regarded as neighbors. The distance is specified by the researcher based on what makes sense for a given study area. In this case, I use thirty-

five km because zip codes are the unit of analysis. Census tracts, for example, would require a smaller distance band, ten km for example. For the General G-statistic, scores close to zero are clustered, scores over one are dispersed and scores near one are random(Lee and Wong 2001). A significant positive z-score indicates that there is general spatial clustering of high values within a specified distance in the study area, while a significant negative score means that low values are clustered within that distance in the study area. Spatial Analyst in Arc GIS 9 was used to calculate both global measures of SA using the tools: “Spatial Autocorrelation Moran’s I” and “High/Low Clustering Getis-Ord General G.”

TECHNICAL APPENDIX B
IN-DEPTH INTERVIEW METHODOLOGY

Parents were recruited to participate in interviews through three school districts (i.e., Kyrene, Roosevelt, Phoenix Elementary) and two private schools (Summit School of Ahwatukee and St. John Bosco). Interview materials are provided in Technical Appendix C. After gaining approval from superintendents and directors, I passed out recruitment materials to school nurses and health assistants. At Summit School, flyers were mailed to the parent of each child with asthma instead of being passed out at school as Summit School does not have a school nurse or health assistant. Nurses or health assistants then gave the materials out to parents of children with asthma at their school. Materials consisted of a flyer and stamped postcard. The flyer contained information about the study, and asked that parents send the postcard in if they were interested. It also explained that households would receive a twenty-five dollar incentive to thank them for participating. This was made possible by a grant from St. Luke's Foundation in Phoenix. Recruitment materials were available in English and Spanish. Interviews were conducted in both Spanish and English, using the assistance of a bilingual undergraduate Arizona State University student and Phoenix native, Antonia DeAlejandro, hired through the St. Luke's grant. We attended the interviews together and Antonia translated between the parent and I.

Twelve of the interviewed households were recruited in Ahwatukee and forty-one were recruited in South Phoenix. The difference in recruitment between the two areas can be traced to two factors. First, the monetary incentive was not as important to the upper middle-class households. Second, the Kyrene District controlled the research process to a great extent and forbade me to contact the health assistants through e-mail, telephone, and personal visits. The district sent out my recruitment materials and cover

letter to the health assistants. In Roosevelt and Phoenix Elementary, I was able to attend meetings with the nurses and explain the study. I then followed up with phone calls, emails and visits to their offices. This gave me a better sense of the experience of being a school nurse in those districts and encouraged participation by the nurses. My understanding of the Kyrene health assistant experience is limited to what parents and the district head nurse told me. Because I only received four postcards from the Kyrene District, I added two private schools and asked parents to recruit other parents (snowball sampling). Three parents were snowballed and five were recruited through the private schools, which brought me to twelve parents.

Interviews lasted sixty minutes on average, and ranged from forty to 120 minutes in length. Thirty-three of the fifty-three interviews were conducted in the respondent's home. Schools, libraries and restaurants were other common interview locations. The interview schedule was piloted among parents of low-income children involved in the Asthma Athletics swimming program (January 11- February 3, 2005) at the downtown Phoenix YMCA. It was revised as necessary post-pilot.

With caretaker permission, I audiotaped the interviews. All interviews were audiotaped except for one. In that case, notes were taken during and after the interview. The Ubiquis transcription company transcribed half of the interviews and I transcribed the other half. After receiving a transcribed interview from Ubiquis, I listened to the audiotape of the interview and read along with the transcript to fill in sections marked "inaudible" and correct any mistakes. Transcribing the Spanish interviews was a two-step process. First, I transcribed the English portions of the interviews conducted in Spanish. Then, Antonia listened to the tapes and filled in gaps in her original on-the-fly

translation. Using a professional company to translate and transcribe the Spanish interviews was cost prohibitive, even with the St. Luke's grant. I then coded all interview transcripts using NUDIST N*Vivo software. The recruitment flyer, recruitment post card, consent form, interview schedule and demographic questionnaire are also provided in Appendix C. Pseudonyms are used for all participating parents to protect their privacy.

My use of in-depth interviews with parents extends from a qualitative tradition in medical sociology that explores experiences of chronic illness through narratives (Conrad 1987; Charmaz 1991; Bury 1997). Narrative allows for examination of an illness experience apart from definitions and conceptions used in biomedicine (Bell 2000). Hyden (1997) concluded that comparative studies of racial/ethnic groups and social contexts were needed, but absent from the literature. Narratives are usually collected through in-depth interviews; rheumatoid arthritis, cancer, and multiple sclerosis are common chronic conditions studied (Hwang, Kim, and Jun 2003; Sullivan, Weinert, and Cudney 2003; Driedger, Crooks, and Bennett 2004; Im, Ok Lee, and Sook Park 2004). One of the best examples of qualitative health research looking at parental experiences managing children's chronic illness using a grounded approach is Shirley Hill's in-depth examination into the experiences of thirty-two African-American mothers of children with sickle-cell anemia (Hill 1994). Relying on interview data, she explores mothers' experiences caring for children with sickle-cell anemia, including diagnosis, treatment and broader familial contexts. A premise of narrative health research is that diseases are complex ongoing experiences that influence people differently depending on race/ethnicity, class, gender and place. Though possessing myriad conceptualizations in

the literature, narrative in this project is broadly defined to encompass “just about everything” concerning people’s lives (Bell 2000, 189).

TECHNICAL APPENDIX C

INTERVIEW MATERIALS

Recruitment Flyer

Share Your Story About ASTHMA!



Does your child have asthma? If so, I would like to invite you to talk about your experiences with asthma and concerns that you have about asthma. My name is Sara Grineski and I am a doctoral candidate in Sociology at Arizona State University working under the direction of Dr. Bob Bolin. I am studying experiences of families with asthma. How does asthma affect your child and your family? What challenges do you face in trying to deal with your child's asthma? What seems to help your child?

Who: Parents and Caretakers of Children (Age 15 and Under) with Asthma

What: Be interviewed by me about your experiences with asthma.

Where: At a place that works for you (your home, the school, a coffee shop, a library)

When: At a date that works for you (weekends, weekdays, evenings, mornings, afternoons)

How long: The interviews will last about an hour.

Why participate?

1. The project allows families a chance to share their stories about asthma.
2. The project will find out about asthma-related challenges facing families and strategies that families use to cope with asthma, and share them with other parents, health care providers and policymakers.
3. There is a \$25 cash incentive for families who participate.

Thank-you!

Sara Grineski

Arizona State University

If you are interested in participating, please contact Sara directly at Sara.Grineski@asu.edu, 480 557 9543, or SEND IN THE POSTCARD.

****IMPORTANT INFORMATION****

All information shared during the interviews will be kept **confidential** and private.

Names and other identifying information **will be removed when the project is shared** with others. You may withdraw from the study at any time without penalty.

Recruitment Postcard

<p><input type="checkbox"/> Yes, I have a child with asthma and I am interested in learning more about the ASU Asthma Study.</p> <p>Please contact me...</p> <p>Name: _____</p> <p>Phone: _____</p> <p>A good time to call is: _____</p> <p>_____</p> <p>_____</p>	<p>STAMP</p> <p>Sara Grineski Arizona State University Department of Sociology PO Box 874802 Tempe, AZ 85287-4802</p>
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Consent Form

Dear Caretaker of a Child with Asthma:

I am a doctoral candidate in the Department of Sociology at Arizona State University under the direction of Dr. Bob Bolin, Professor. We request your participation in a research project looking at caretaker's experiences managing a child's asthma. We are interested in your story about what it is like to deal with your child's asthma – challenges that you face, ways that you cope, how it influences you and your family, and your experiences at health care centers. I am requesting your participation, which will involve filling out a short questionnaire and then participating in a one-on-one interview with me about your experiences managing your child's asthma. I prefer to audiotape the interviews so that I can more accurately remember what you said. The tapes will be kept confidential and only I will have access to them. At the conclusion of the study, the tapes will be destroyed. If you would like to participate in the research but not have your interview taped, please let me know.

Your participation is voluntary. You can choose not to participate or to withdraw from the study at any time. You will receive a monetary incentive at the completion of your interview of \$25. If you withdraw from the interview without completing it, you will be partially compensated with \$10. The results of the research study may be published or presented, but your name and identifying characteristics will not be used. The project will find out what challenges are facing families with asthma and what programs/services are working well. If you have any questions concerning the research study, please call Dr. Bolin or me at (480) 965-3546 (work).

Sincerely,
Sara Grineski

By signing below you are giving consent to participate in the above study and have your interview audiotaped.

Signature Printed Name Date

By signing below you are giving consent to participate in the above study and NOT have your interview audiotaped.

Signature Printed Name Date

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through Karol Householder, at (480) 965-6788.

Interview Schedule

Date of Interview: ___/___/_____

Child's name: _____

Child's age: _____

Parent name: _____

ID: _____

About Your Child's Asthma

How did it all begin with your child's asthma?

When did it start?

Why do you think it started when it did?

How would you describe your child's breathing problems?

What do you think has caused your child's breathing problems?

What does your child's sickness do to him/her? How does it work?

How severe is it?

Does any one else in your family have asthma?

What triggers your child's asthma?

Have you made any in-home modifications because of your child's asthma?

Are you are owner or renter of the home you live in?

Asthma History

How have things (asthma symptoms, living arrangements, triggers, health care coverage, etc.) changed since before your child was diagnosed to now? (Give an "asthma timeline")

Why did certain changes influence your child's asthma?

Describe your child's most serious asthma attack. What happened?

Residential Setting

Why did you choose to live in the area of the city (South Phoenix or Ahwatukee) where you live?

What are the drawbacks and benefits of living there?

Why did you choose to live the (apartment, trailer, house) where you live?
What are the drawbacks and benefits to living there?

How long have you lived at your current address? Where did you live before? Was your child's asthma different or the same between places? If so, why?

Dealing With Your Child's Asthma

What do you fear most about your child's sickness?

What are the biggest problems that your child's sickness has caused for him/her? And for you?

Is your child's asthma something that you usually deal with, something your spouse usually deals with, or something that you both deal with together?

Are there things that are challenging or frustrating about being a parent of a child with asthma, things that have happened only once or many times? If so, what?

How does your child's asthma affect other members of your household?

Are there things that are challenging about dealing with asthma?

Probes: Transportation?

Health Care difficulties? (Appointments, insurance claims)

Medication? (co-pays, refills, affordability)

Home conditions? (pets, carpet, mold)

Outdoor environmental conditions? (proximity to freeway)

Social difficulties (Sleepovers, inactivity)

Flexibility of work schedules (paid sick leave, ability to miss days)

Single parent (more responsibility)

We have talked a lot about challenges and constraints.... What sorts of resources are advantageous? What helps you manage the asthma? (meds, herbs, programs)

How would you rate the management of your child's asthma on a scale of 1-5, 1 = poor, 5 = excellent? Why do you give this rating?

Is your child involved in the management of his or her own asthma? If so, how?

Health Care

Does your child have health insurance? If yes, it is through your job?

Where does your child receive health care? (school nurse, clinic, hospital, etc.)

Where is it located? Is getting there easy for you?

How often do you go there? Why?

Are you happy with the care you receive there?

How satisfied are you with the treatment your child is receiving?

Are there things that you would change about the way that your health insurance plan works?

Are there things that you would change about your child's treatment, doctor or clinic?

Asthma Knowledge

Has a health care provider taught you about asthma and management?

What do you do when your child begins to cough or wheeze?

Other

If air pollution was a trigger for your child's asthma, how do you try to deal with it?

Is there anything else that we haven't covered that you want to share with me about your experiences with asthma?

Demographic Questionnaire

ID: _____

Initial Survey Questions:

Please fill out the following questions. Filling out this form is completely voluntary and you can stop at anytime without penalty. Thank you for agreeing to participate. I value your responses and thank-you for your time!

1. What is your home address?

2. What type of dwelling best describes the home?

House	<input type="checkbox"/>	
Apartment	<input type="checkbox"/>	
Mobile home	<input type="checkbox"/>	
Duplex	<input type="checkbox"/>	
Other	<input type="checkbox"/>	Please describe: _____

3. How many persons live in your household? _____

4. How many are children (under age 18): _____

5. Which school does your child attend?

6. What was your country of birth?

US	<input type="checkbox"/>	
Mexico	<input type="checkbox"/>	
Other	<input type="checkbox"/>	Please list: _____

If not the US, how long have you lived in the US?

7. What was your child's country of birth?

US

Mexico

Other Please list: _____

8. What languages do you speak? (Check all that apply)

English

Spanish

Other Please list: _____

9. Do you have health insurance?

Yes 

No

If yes, what type of insurance is it?
(Example: AHCCCS or private insurance)

10. Is there one particular place, such as a clinic or doctor's office that your child usually goes for health care when they are having problems with their breathing?

Yes 

No

If yes, what kind of place is it? (Example: doctor's office or emergency room)

11. How many times during the last 12 months did they go there for asthma? _____

12. Do you own a car?

Yes

No

If no, what is your usual source of transportation?
(Example: bus, walk, bike, friend's car)

13. Check the box next to the amount that is closest to the annual income of your household.

Under \$10,000	<input type="checkbox"/>
\$10,000- 14,999	<input type="checkbox"/>
\$15,000- 19,999	<input type="checkbox"/>
\$20,000- 39,999	<input type="checkbox"/>
\$40,000- \$59,999	<input type="checkbox"/>
\$60,000-\$79,000	<input type="checkbox"/>
\$80,000-\$99,999	<input type="checkbox"/>
\$100,000-\$149,999	<input type="checkbox"/>
\$150,000 or higher	<input type="checkbox"/>

14. What is the highest level of education you have achieved?

Elementary School	<input type="checkbox"/>
Some High School	<input type="checkbox"/>
High School Degree	<input type="checkbox"/>
Part of College	<input type="checkbox"/>
Associates Degree (2-year or specialized training)	<input type="checkbox"/>
More than Associates Degree	<input type="checkbox"/>
College Graduate	<input type="checkbox"/>
More than Bachelor's Degree (Master's, Medical, Law, PhD)	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

15. Would you describe yourself as... (Check all that apply)

Hispanic, Latino/a
or Mexican-American

White or Anglo

Black or African-American

Asian or Pacific Islander

Native American/
American Indian

Other

Please list: _____

Would you like to receive a summary of the results of this research project on children with asthma in Phoenix? If yes, please provide your mailing address below:

Thank you.

TECHNICAL APPENDIX D

POLLUTION MODELS

Yu-Jin Choi, a postdoctoral research assistant in the Fluid Dynamics Lab at Arizona State University, generated the pollution surfaces used in this dissertation. She used a series of pollution modeling steps, culminating in the running of the CMAQ (Community Multiscale Air Quality) model. First, EPA National Emissions Inventory (NEI) estimates for CO, NO_x and VOCs are gathered. Second, tons of pollution per year at the county level, as per NEI, is imputed into the SMOKE (Sparse Matrix Operator Kernel Emissions) model. SMOKE is an emissions processing system designed to create gridded, speciated, hourly emissions for input into a variety of air quality models (Center for Environmental Modeling for Policy Development 2005). It processes area, mobile, and point source and biogenic emissions (Lee, Grossman-Clarke, and Fernando 2002). In this case, emissions were allocated to a four-kilometer grid. SMOKE uses spatial and temporal profiles to convert the tons/year into hourly totals for each grid cell (Yu-Jin Choi, personal communication, July 21, 2005). I use the allocation for 27 August 1999 in this analysis. To inform the allocation, population and housing density, roads, water sources, and land use are used in the model. The SMOKE model also speciates NO_x into NO₂ and NO for eventual input into the CMAQ model. Since NO_x is largely emitted in the form of NO rather than NO₂, the SMOKE model speciates NO_x into 90% NO and 10% NO₂. (Yu-Jin Choi, personal communication, July 19, 2005). Third, MM5 Model is also used to create input for the CMAQ model that includes the meteorology (temp, wind speed) factors. Fourth, SMOKE and MM5 are both inputs into the CMAQ model. CMAQ models are used to develop emission control strategies. They consider interactions of multiple pollutants, which is important as pollutants chemically interact in the atmosphere. This emissions models technology developed in the 1970s, catalyzed by

new US air quality regulations. The CMAQ integrates meteorological variables, outputs from emissions models and then performs chemical transport modeling for multiple pollutants at multiple scales (EPA 1999). These models were used in designing the 2002 ozone non-attainment boundary for Maricopa County. I received the data as four text files, imported each file into ARC GIS 9.0 as a raster (grid) file with four square kilometer cells, each with a pollution value in parts per million. I then used zonal statistics in ArcGIS 9.0 to calculate the average pixel value for each zip code in Maricopa County. I then combined the four surfaces into a multi-pollution factor in SPSS because they were highly correlated. This factor is used in the regression models predicting asthma hospitalizations. This model is superior to the more traditional method of interpolating pollution surfaces in studies of air pollution and health (e.g., Jerrett et al. 2001). A data limitation of the CMAQ model used is that it models pollution during the summer of 1999. During the summer of 1999 (June - September), only 20% of all hospitalizations for children took place (277 of the 1409 total).