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# Health worker experiences with environmental pollution : health in urban targeted community : a study of pollution and clinicians' experiences and attitudes towards it in urban low-income communities and communities of color

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Environmental Pollution: Health in
Urban Targeted Communities

ABSTRACT

Research suggests that exposure to pollution can impact people's health, and that there are more chances for exposure in some urban low-income communities or communities of color. The purpose of the study is to explore whether social service oriented clinicians consider whether their clients are exposed to pollution, how large of a problem the believe pollution is for their clients, and what actions they and their clients have taken to protect against pollution. A second purpose is to assess whether clinicians view pollution as product of discrimination. A third purpose is to see if pollution is indeed higher in lower-income communities and communities of color than wealthier communities and white communities.

Fifty-six clinicians serving urban low-income communities or communities of color filled out a brief survey. The location of clinicians' agencies were linked with local demographic information and local pollution levels.

Most of the sample (41 people, 73.2%) believed their clients were exposed to pollution and half (30 people, 54.9%) believed pollution caused a health concern or made one worse. Most of the sample explained their clients' exposure as rooted class and about half explained it as rooted in race. Indeed, the most polluted areas were home to the lowest-income residents and had the highest proportion of people of color. High levels of pollution correlated with clinician report of clients' reproductive problems. Solutions and protections found by clinicians and clients are discussed.

HEALTH WORKER EXPERIENCES WITH ENVIRONMENTAL POLLUTION: HEALTH IN

URBAN TARGETED COMMUNITIES

A study of pollution and clinicians' experiences and attitudes
towards it in urban low-income communities and communities of
color

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## I. Introduction

The purpose of this study is to explore social workers' experiences with and attitudes about clients from low-income or racial minority neighborhoods whose health and wellbeing may adversely be impacted by pollution. Sociological, legal, and medical research has documented that some low-income, mostly non-white communities are more exposed to pollution generators and pollution than wealthier, white neighborhoods or would be expected by chance. They have also found that poor and minority communities develop or worsened physical and mental health problems because of their exposure (e.g., Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b; Peek, Cutchin, Freeman, Stowe & Goodwin, 2009; US Commission on Civil Rights, 2003).

My research aimsed to survey social service-oriented health professionals, who through their role at work, can make assessments of their clients' social, political, and environmental contexts (e.g., social workers, psychiatric nurses) as well as their health and wellbeing. These workers are placed in urban clinics that serve low-income communities or communities of color. I sampled social service-oriented health professionals because they were most likely to be aware of their patients' medical, mental, and social functioning, and were most likely to take into account their patients' contexts when making care decisions. One context they may take into account is pollution generators in the neighborhood. I chose clinics in urban neighborhoods because I am specifically examining urban pollution from sources such as factories, dense traffic areas, incinerators, landfills, and electricity generation plants. Although such generators can be found outside of cities, in urban areas they may be more concentrated, people may tend to live closer to them, and since the population is denser, generators may impact more people.

Other forms of contamination, such as chemicals intentionally added to food and indoor air pollution, are more difficult to link to external race and class issues than urban pollution generators, so I did not addressing them. Some rural areas have substantial environmental pollution, sometimes from non-industrial sources, such as pesticide use. I will not address this type of pollution because it is very localized. It would be difficult to determine if the clinician I was surveying was indeed working in a community that was exposed or not. I chose clinics that serve low-income or minority communities because scientific literature has shown that many of these communities are impacted by pollution, more so than white or wealthy communities or chance can account for (e.g., Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b; Peek, Cutchin, Freeman, Stowe & Goodwin, 2009; US Commission on Civil Rights, 2003).

The goal of the project was to explore whether social workers (or their social service-oriented health professional colleagues) working in areas at high risk for pollution exposure ever have patients for whom they believe pollution may have created a physical or mental health problem or made one worse. If they have, I will further explore how they explain pollution exposure, solutions or harm reduction actions they have suggested or patients have taken, and what resources could support them further. Perhaps they will think no further than city lay-out; others may wonder how racism has sculpted the neighborhood.

It is unclear if it is important for social workers to be knowledgeable about the presence of pollution in their agency's neighborhood and pollution's health effects. There has been little social work research done in this area. However, there are some indicators that awareness of pollution and its health consequences is important.

Ecological theory, a key social work theory, provides a rationale as to why social workers' awareness of pollution and its health consequences is important. I will discuss this further in

Chapter 2. Briefly, the theory holds that a clients' environment is important for wellbeing, mediated by how well clients fit into their external environment. The theory, in this context, is referring to a theoretical, rather than a physical, environment. A clinician's job is to help clients adapt to their theoretical environments through problem solving and by supporting coping skills, helping the client find a better suited environment, or working to change the environment (Brandell, 2011). There is a theoretical rationale for incorporating the physical environment into clinical social work if the physical environment contributes to problems for patients.

The health consequences of pollution are important for social workers to be aware of because they are potentially life threatening, may interfere with clients' functioning, and can be prevented or reduced. Chapter 2 will discuss these consequences further. Briefly, medical studies have associated air pollution of many different types with asthma, cancers, learning disabilities, stress, reproductive problems, heart disease, diabetes, lesions in the brain, and fatality (Calderón-Garcidueñas et al., 2008; Chen, Gokhale, Shofer & Kuschner, 2007; Kramer et al., 2010; Peek, Cutchin, Freeman, Stowe & Goodwin, 2009; Porta, Milani, Lazzarino, Perucci, & Forastiere, 2009; US Environmental Protection Agency, 2010b; Winder, 1993; World Health Organization, n.d.) Knowing about these health effects may be important for social workers. For example, lead poisoning can cause symptoms similar to ADHD among children (US Environmental Protection Agency, 2010b). Assessing for lead before prescribing medication for ADHD may prevent more serious consequences of lead poisoning, such as lowered IQ (US Environmental Protection Agency, 2010b).

Another reason why knowledge of pollution may be important for social workers is because it may be a social justice issue, and the National Association of Social Workers (NASW) supports social justice to end discrimination in its code of ethics (NASW, 1999). Pollution

may, in some cases, be a social issue because it disproportionately impacts low-income communities and communities of color (e.g., Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b; Peek, Cutchin, Freeman, Stowe & Goodwin, 2009; US Commission on Civil Rights, 2003). Chapter 2 will discuss this inequality further. Briefly, sociological studies have found that low-income or racial minority communities are more likely to be positioned near hazardous waste sites (Mohai & Saha, 2007), pollution-generating factories (US Commission on Civil Rights, 2003), and highways and other high automobile traffic areas (Houston, Wu, & Ong, 2004) than chance. Predictably, these low-income communities and communities of color are also more likely to have higher incidences of health problems (e.g., asthma, cancers) that has been linked to these contaminates (e.g., Morello-Frosch & Shenassa, 2006; Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b). Pollution becomes a social justice issue because people living in neighborhoods that are poor and mostly non-white are more exposed than chance would predict. This is what I will refer to as environmental discrimination.

Because pollution may be a social justice issue, the NASW has publically supported environmental standards, their enforcement, as well as their support for treatment and prevention for environmentally related health problems (Social Work Speaks, n.d, a.). The organization also advocates for racial justice by working towards structural equality around environmental discrimination issues (Social Work Speaks, n.d, b.). Combining these principles and priorities, knowledge of not just pollution, but the bigger picture socio-political issues around pollution's distribution in poor, minority, urban areas, falls well within the social work values framework.

There is a political justification for the social workers to be aware of environmental discrimination, or the social justice perspective of pollution distribution, as well. There are

many individuals, community groups, politicians, lawyers, and academics of many disciplines working to end environmental discrimination. Conversations about environmental discrimination span race and class lines, as well as professional and academic disciplines. Social workers are well situated to be a coordinator of these diverse parties (Kaufman, 1995). The National Institute of Health has named social workers as ideal candidates for translating science to practice, and practice to science (Brekke, Ell, & Palinkas, 2007). Because social work is a practice, an academic discipline, and sometimes a macro-practice, it is ideally placed to "bridge the gap" between all the parties working for environmental justice, or equal distribution of only necessary pollution across class and racial lines.

Despite all these indicators that it is important for social workers to be aware of environmental discrimination and its health consequences, no study has ever shown that they are aware, or that being aware is important for day-to-day clinical work. Leading peer-reviewed journals in the field have few if any articles discussing this practice and research area. Reasons why social workers have not addressed pollution specifically in low-income, racially diverse neighborhoods or environmental discrimination are unclear. Perhaps there is no theory comprehensive enough to drive research or practice. Social workers may not know how to enter into conversations about environmental discrimination due to gaps between lived experience and the existing research. Perhaps grass-roots, community organizations working against environmental discrimination do not use social workers as allies, or do not find social workers helpful. Although social workers are trained to look at their clients' larger contexts, such as the wider community, racism, and classism, they may be focusing on individual problems, such as psychiatric diagnoses and immediate concerns, such as finding shelter and food with clients. It could be, too, that pollution-related health problems are too infrequent, or too indirect a cause of

health problems, to register the issue as important for busy social work clinicians.  For example, fatalities due to pollution exposure are very rare and asthma has many causes beyond polluted air.  Similarly, clinicians may not attribute health issues to pollution and pollution to a social justice issue.

My study is important because it can clarify whether social workers or their colleagues in similar disciplines ever suspect a health problem is related to pollution, and if they believe pollution is related to racial or class discrimination. The study will also help determine how often they suspect this, and how big of a problem they think it is.  To my knowledge, this is the first study to examine awareness of and attitudes towards pollution and environmental discrimination in a real health setting and the first to sample social workers, case managers, and other social service-oriented health professionals.  To my knowledge, it will be the first to seek solutions other social workers can use in their day-to-day clinical work with people they suspect may be exposed to pollution.  My study theoretically conceptualizes environmental discrimination to better guide future research.  It also fills certain gaps in the existing medical literature by conceptualizing environmental discrimination as a racial issue, exploring how environmental discrimination manifests in an actual healthcare setting, and by examining health clinicians' attitudes towards it.  My hope is that this project locates points of entry for where social workers can become involved in environmental justice; promote safety among clients; work with communities, activists, researchers from other disciplines; and formulate new questions for future social work research.

Chapter 2 is a review of some of the health problems, as they may appear in a community clinic, that may result from, at least in part, exposure to pollution.  It reviews race and class based disparities in exposure to urban pollution generators, as well as health disparities between

races and classes that may result, in part, from differences in exposure to pollution. It also offers a theoretical frame for conceptualizing environmental discrimination using Werkmeister-Rozas & Miller's (2009) concept of institutional racism as a web, as well as ecological theory. Chapter 3 will detail the study's methods, which include an online survey emailed to service-oriented health professionals in urban clinics in low-income neighborhoods and communities of color around the US. Chapter 4 will review the results of the questionnaire, showing links between demographic characteristics and participants' awareness of and importance assigned to environmental discrimination. Finally, Chapter 5 will discuss the results and their implication for social work clinicians, macro-practice workers, and researchers.

## II. Literature Review

**Environmental Discrimination as Institutional Racism**

Conceptualizing environmental discrimination as a form of institutional racism helps build a framework for the concept, and helps illustrate the various ways environmental discrimination comes about. Using community-based studies, I will discuss the ways environmental discrimination arises as I apply the frame of Werkmeister-Rozas & Miller's (2009) concept of institutional racism as a web.

Werkmeister-Rozas & Miller (2009) write that institutional racism is a combination of formal and informal policies. We can see formal environmental policies, such as zoning laws that permit the top four polluters in Cleveland, Ohio, to all locate in or next to minority communities (US Commission on Civil Rights, 2003). We can also see informal policies, such as policy-makers' non-disclosure of decisions to pollute in certain areas. For example, the Environmental Protection Agency (EPA) and state officials in North Carolina disposed of unwanted contaminated soil on the side of a road in Warren County in 1978. The soil was contaminated with DDT, a pesticide that causes developmental problems in children and miscarriage, and was distributed in this community without the community's knowledge or consent (Bullard, 2000).

Werkmeister-Rozas & Miller's (2009) web image includes racism occurring on macro, mezzo, and micro levels. On the macro level, the federal Environmental Protection Agency's policies and enforcement decisions at times makes certain communities more vulnerable. For example, in the San Joaquin Valley in California, a county characterized by several poor cities, neither the county nor the EPA have made viable plans to meet the EPA's national air quality

standards (EarthJustice, 2010). Uneven enforcement of environmental standards on a national level may be one way environmental discrimination is manifested. On a mezzo level, some communities rely on a pollution generator for the wellbeing of the local economy. Robert Bullard, a sociologist at Clark Atlanta University and an environmental justice leader, details an example of this phenomenon. Shintech, a PVC producer, promised their proposed plastics plant in the predominantly African American town of Convent, Louisiana would create jobs. Convent community members were faced with a difficult choice between increased economic stability and health risks. On the micro level, individuals in communities may not be able to treat problems, such as asthma, that arise from environmental discrimination due to a lack of health insurance. Indeed, people of color are less likely than white people to have health insurance (Centers for Disease Control, 2009).

Werkmeister-Rozas & Miller (2009) also hold that institutional racism is part of a legacy with historical underpinnings. Environmental discrimination has been occurring throughout American history, with poor people and people of color traditionally having available only unclean, inadequate living conditions that foster health problems. For example, Abel (2007) shows the connection between environmental conditions that fostered high rates of tuberculosis infections in 19th century California among Mexican and Filipino communities that lived in those conditions.

The final part of Werkmeister-Rozas & Miller's (2009) web is the narrative of racism. The authors hold that public discourses, influenced by dominant power structures, deny the existence of institutional racism (Werkmeister-Rozas & Miller, 2009). Therefore it may be difficult for community members to fight against a nearby pollution-generating corporation not only because they often have fewer resources, but because they cannot prove there is a problem.

The US Supreme Court case *Alexander v. Sandoval* requires people bringing suits against pollution generators to prove that the generator's activities have a direct impact on the community. Proving this link may be costly and difficult if they need to hire a team of scientists.

The above examples show that environmental discrimination is both overtly permitted through policies, zoning, and lack of enforcement, as well as passively permitted through economic incentives, developing from existing disparities between races and classes. My project focuses on race and class disparities both actively and passively incurred through environmental degradation.

**Medical and Public Health Literature**

Scientists show pollution generators' impact on a community's health, link pollution exposure to race and class, and show race and class-based health disparities. However, very little research has tied all three linkages together. This section will discuss some sources and types of pollution, health effects as they may appear in a community health clinic, disparities between races and classes in these health outcomes, and disparities in exposure rates. However, I could find few studies that showed all of these health and exposure disparities in one dataset. Compounding health disparities among races and classes is that poor people and people of color are less likely than white people and people with higher income to access health resources (Jerrell & Sakarcan, 2009).

**Air pollution.** Electricity generation and automobiles are the two largest emitters of air pollution in the US, pollution that includes lead, carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen oxides, and volatile organic compounds (VOCs; Environmental Protection Agency, 2002) and particulate matter. Particulate matter is a mixture of components, such as

nitrogen oxides; metals; and dust (Environmental Protection Agency, 2010d). These pollutants can cause a number of health issues. Nitrogen oxides and sulfur dioxides have been linked to asthma and respiratory infections; and VOCs have been linked to lung cancer, heart disease, and respiratory disease (World Health Organization, n.d.). Carbon monoxide has been linked to heart and lung problems (Chen, Gokhale, Shofer & Kuschner, 2007). When nitrogen oxides and VOCs react in sunlight, they create ground-level ozone, which, when inhaled, can cause lung problems such as coughing, pain when inhaling, aggravation of asthma, and permanent lung damage with chronic exposure (Environmental Protection Agency, 2008). There is newer evidence using longitudinal data that suggests nitrogen oxides and particulate matter cause diabetes among highly exposed individuals, or those living nearest to heavily trafficked roadways (e.g., Kramer et al., 2010).

Exposure to lead can come from the air from automobiles, and also though industrial processes such as lead smelters, incinerators, and battery manufacturers. Lead can also come from soil, such as from old paint chips in homes; and water, when waste leaches into the ground; and food, when plants and animals that people eat have been exposed to lead. In 2005, the EPA recorded non-road equipment (e.g., generators, tractors, lawn mowers, aircraft, construction tools and other industrial equipment) as producing two tons of lead emissions in Suffolk Country, Massachusetts, and almost two and a half tons in Hartford County, Connecticut (Environmental Protection Agency, 2005). In children, blood levels of 10 micrograms or more per deciliter of blood are considered hazardous (Agency for Toxic Substances and Disease Registry, 2007). If a child's body contains four liters of blood, that means that only 0.0004 grams of lead in their blood would be cause for concern. Although lead emissions do not correlate perfectly with exposure to lead, and exposure to lead does not

correlate perfectly with blood lead levels, we can see that two tons of lead emissions might be cause for concern given how little lead is necessary to place children at medical risk.

Lead is taken into the body and deposited in bones, and depending on the levels taken in, may cause problems in the nervous, immune, reproductive, and developmental systems, as well as disruptions in the kidney and heart functions. Children are especially vulnerable to even low levels of exposure. In a health clinic setting, lead exposure may appear as high blood pressure and heart disease, and, among children, learning deficits, lowered IQ, and behavioral problems such as hyperactivity (US Environmental Protection Agency, 2010b). Narag, Pizarro, & Gibbs (2009) draw associations between lead exposure, socially disadvantaged neighborhoods, and criminal activity.

A community-based study sampled 55 children from middle class families living in Mexico City and a less polluted city nearby to examine the neurological effects of particulate matter. MRI scans showed about half of the children in Mexico City had indicators of lesions in the prefrontal cortices of their brains. The control group, 19 middle class children living in a less polluted city, had no such indicators. Children from Mexico City tended to perform lower on a cognitive test of IQ than children from the control city. The authors believe that pollutants may have inflamed brain cells, which in turn formed lesions (Calderón-Garcidueñas et al., 2008). Mexico City may be more polluted than any US city, so it is unclear if American children would have similar changes in their brain resulting from pollution. The study used a small sample, so the results may not be representative. Also, it is unclear if the lesions were due to particulate matter alone, or another factor, or a combination of factors.

Asthma is perhaps the most prominent and best-studied effect of poor air quality in low-income communities. Using US Census data and medical records of over 4,000 children, those

living in high traffic areas were 40-70% more likely to develop asthma than those who lived away from high traffic areas (Juhn, Qin, Urm, Katusic, & Vargas-Chanes, 2010). Although asthma occurs throughout the world, it has been found to be more prevalent in polluted areas and homes infested with roaches (Bryant-Stephens, 2009). According to the 1997 National Health Interview Survey, a Centers for Disease Control (CDC) national household survey, African American children were almost twice as likely as white children to have asthma in a sample of families that were less than half of the federal poverty level. This racial disparity lessened as income levels increased. Some medical researchers have suggested looking at racially-based health disparities from an ecological perspective, taking into account "social toxins" in the community, psychosocial stress, more pollution exposure, and allergens (such as cockroaches) and irritants (such as tobacco smoke), although no one has shown that these factors all contribute, or how much they contribute (Wright & Subramanian, 2007).

In a rare study that examined race-based health outcomes from air pollution exposure disparities, Morello-Frosch and colleagues (2002b) compiled EPA estimates of air pollution, 1990 US Census data, and cancer risk in over 300 urban areas in the US. For cancers associated with air pollution, risk was the highest in the urban areas most densely populated by people of color, even after statistically controlling for socioeconomic variables. However, this study has a number of limitations. The authors cannot account for exposure to contaminants through other means, such as food and indoor air pollution. Air pollution levels were estimates, so they may not have been accurate and may not have reflected levels that residents were exposed to in the past. The authors never specify which cancers they were measuring and whether these cancers ever have causes other than air pollution, such as genetic predisposition, lifestyle factors, or other environmental causes. Toxic release disclosures are not always accurate, so communities

may have been exposed to more pollution than the study could have recorded (Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b).

Despite its limitations, the medical literature suggests air pollution may be associated with asthma and other lung problems, various cancers, heart problems, and diabetes. There is some, albeit preliminary, evidence that air pollution, particularly from lead and particulate matter, may be associated with neurological changes. All of these conditions, however, have multiple causes; isolating air pollution as the single, or even largest cause, is difficult.

**Waste disposal.** Landfill sites are a cause of concern for some communities and medical scientists, particularly as possible emitters of carcinogens, but evidence is mixed. A review of studies that explored links between landfill sites and poor health outcomes suggests that landfills are associated with incidence of low birth weight, congenital malformations, cancer, and mortality. Residents living near landfills report fatigue, sleepiness, and headaches (Vrijheid, 2000). The author cautions that these findings are unreliable due to author bias and self report bias (i.e., people may be anxious living near a landfill and report psychosomatic symptoms). The reviewed studies did not include direct measures of exposure to contaminants or biomarkers of exposure (Vrijheid, 2000), nor did they assess what types of wastes were deposited in landfills or how they were deposited. Therefore other factors could be affecting health, in addition to or instead of nearby landfills. Other community-based studies (i.e., those that use health records and census data) provide some limited evidence that those living within 2 kilometers from a landfill have increased risk of congenital abnormalities (i.e., damage or defects to a developing fetus; 2% increase) and low birth weight (6% increase; Porta, Milani, Lazzarino, Perucci, & Forastiere, 2009). Variations across studies in which substances are

deposited in landfills may account for some of the variability in the communities' health outcomes.

Landfills' connection to cancer may be better supported by a case study approach. For example, the *New York Times* reports on the primarily African American town of Chester, Pennsylvania, which saw an increase in cancer rates after five landfills were zoned in the 1990s. Chester treated all of its county's waste, a county that, except for Chester, is mostly white. In 1995, the EPA found that the highest infant mortality rate and death rate from certain malignant tumors were both in Chester, as well high rates of kidney and lung diseases and blood-lead levels among children (Staples, 1996). However, it is difficult to prove the landfill, and not other factors, caused these poor health outcomes.

Incinerators are another form of solid waste management. These are furnaces that combust some types of wastes at extremely high temperatures as a means of disposal, leaving toxic ash as a byproduct. They may emit air pollutants such as VOCs, sulfur oxides, carbon monoxide, and, if they burn plastic containing polyvinyl chloride (PVC), dioxins, furans, and co-planar PCBs (World Health Organization, 2004). Dioxins, furans, and co-planar PBCs can contaminate water and build up in the plants and animals people consume. When humans consume the contaminated water, plants, and animals, these substances can disrupt immune, hormone and reproductive systems. Dioxins may cause cancer (World Health Organization, 2004), and there is some preliminary evidence connecting dioxin-like substances to Type II diabetes (Remillard & Bunce, 2002). However, studies in this area are limited, because many sample factory workers who are chronically exposed to high levels of dioxins, furans, and co-planar PCBs.

Researchers disagree about how much risk an incinerator poses to those living near it. Like variations in substances deposited in landfills leading to variations in health outcomes, differences in materials being incinerated have different implications for the type of air pollution emitted and health problems incurred. Most studies do not record the type of materials being incinerated, which may account for variations in community health outcomes. There is limited evidence that living within three kilometers of an incinerator increases the risk of cancer by 3.5%; specifically on-Hodgkin's lymphoma and soft tissue sarcoma (Porta, Milani, Lazzarino, Perucci, & Forastiere, 2009). Another study on the effects of only two air pollutants – sulfur dioxides and VOCs, has found that only 1 person in 4 million people would die from living within 5.5 kilometers from an incinerator (Roberts & Chen, 2006). In Massachusetts, there are incinerators located in the urban areas of Haverill, Saugus, North Andover, and Worcester, all owned by Wheelabrator or Covanta Energy.

In areas across the country, scientists have been documenting the closeness of landfills to vulnerable communities. A key text in the Environmental Justice literature (Bullard, Mohi, Saha, Wright, 2007), focuses on landfill and hazardous waste disposal siting. As a result, there is extensive scientific documentation that people of color, even more than poor people, are more likely to live near landfills and hazardous waste sites than white people or wealthier people across the country (Mohai & Saha, 2007). As a more local example, a National Institute of Health study found that in North Carolina, landfills were twice as likely to be positioned near communities that had at least 10% people of color, and were 1.4 times as likely to be located near communities where the average home was worth less than $100,000 (Norton, Wing, Lipscomb, Kaufman, Marshall, & Cravey, 2007). One longitudinal study in Southern California suggests the reason for the disparity is because wastes sites are intentionally sited in

communities of color, rather than because an economic incentive to move near a waste site where property values are lower attracted people of color to live there (Morello-Frosch, Pastor, Porras, Sadd, 2002b).

Literature on waste disposal links sites to cancers, diabetes, reproductive problems, and a weakened immune system. Most studies do not measure whether people are indeed exposed to contaminants from nearby waste disposal sites, so establishing a cause-and-effect relationship between waste sites and health is difficult. It is clear, however, that waste sites are disproportionately positioned near communities of color.

**Reproductive Health.** Medical research on the effects of environmental contaminants on reproductive health is limited. Epidemiological studies show a racial disparity in reproductive health, but it is unclear how much of this disparity is attributable to poor environmental conditions. Factors that lead to poor reproductive health other than pollution may include the mother's health and substance use (Centers for Disease Control, n.d.), stress, genetic predisposition, issues stemming from racism (Blackmore, Ferre, Rowley, Hogue, Gaiter & Atrash (1993), and poor prenatal care (Webb, 2004). There are several limitations for substantiating a link between contaminants and reproductive health. Each study participants' exposure must be measured, which can be difficult to do; controlling for other variables' deleterious effects is difficult when the size and nature of those effects are also unknown; large sample sizes must be used to minimize the effects of other variables; the effects of each contaminant must be known; and the interaction of each contaminant with other contaminants must also be known (Foster, 2003). Community-based studies and lab tests on animals can suggest the impacts of each contaminant or pollution source on a particular facet of reproductive

health. However, it becomes difficult to directly attribute the incidence of reproductive problems to a particular contaminant or pollution generator.

I will briefly review some of the data on reproductive health disparity that may or may not be related to exposure to environmental contaminants. Latinas' risk for cervical cancer is twice that of white women. The infant mortality ratio for African American babies to white babies was more than twice as high in 2001 (Centers for Disease Control and Prevention, 2004). Women of color, put together, are 1.6 times more likely to die from a cause related to pregnancy than white women. A review of studies from several government offices reports that African American women are diagnosed with uterine fibroids, which can cause infertility, two or three times more than white women. African American mothers are 66% more likely to give birth to a preterm baby, or a small fetus, than mothers of all other races combined. Small babies may be at increased risk for later health problems, such as diabetes, obesity, and hypertension. All three of these conditions occur at higher rates for African Americans compared to the rest of the US population (US Department of Health and Human Services, National Institute of Child Health and Human Development & National Institutes of Health, 2000). Preterm birth may also lead to intellectual disabilities (Centers for Disease Control, n.d.). Scientists and public health officials attribute these disparities to a number of sources, not just environmental pollution.

There is some literature that documents rapid population-level changes in reproductive health over the past few decades. There is evidence, for example, that testosterone levels in men have decreased by 1% per year over the past four or five decades (Travison, Araujo, O'Donnell, Kupelianm, & McKinlay, 2007). There is evidence girls are entering puberty earlier than they did three decades ago (Herman-Giddens, 2006). These rapid changes suggest the cause may be due to environmental or lifestyle factors (Woodruff, Carlson, Schwartz, & Giudice, 2008).

Lead is the best studied and most clearly linked environmental contaminant that impacts reproductive health. Lead is known to reduce male libido and cause infertility. Women exposed to high levels of lead may face infertility, miscarriage, premature delivery, hypertension while pregnant, and other complications (Winder, 1993). Babies exposed to lead in utero may have lower IQ, learning disabilities, and reduced growth (Agency for Toxic Substances and Disease Registry, 2007). However, these health effects occur after high exposure to lead, which may be uncommon.

Research on the health impacts of exposure to PCBs and dioxins are limited by their samples, most of which are factory workers or animals in laboratory experiments, both exposed to unusually high amounts of these chemicals (World Health Organization, 2004). In these studies, dioxin is linked to variations in menstrual function and other hormone disruptions (Mendola, Messer, & Rappazzo, 2008). PCBs are linked to reduced fertility, altered neurodevelopment, miscarriage, changes in pubertal development, decreased semen quality, endometriosis, and reduced birth weight (Agency for Toxic Substances and Disease Registry, 2000). A small pilot study measured the concentration of phthalates (a plasticizer similar to PCB) in mothers' urine during pregnancy. Then they measured their children's play (n=124) during preschool and found the boys of mothers with higher phthalate concentrations were less likely to engage in typical male play, such as play fighting (Swan, et al., 2009) Gender-related play has been used in other studies as a marker for hormone effects, although this marker may be problematic. Furthermore, the study sample may be too small to rule out chance to explain differences.

Like studies linking cancer to landfills, a community-based approach may yield new information about the reproductive effects of certain contaminants in settings that more closely

match common ways people are exposed.  In the 1980s, pregnant women who ate fish from Lake Michigan had breast milk that exceeded appropriate levels of PCBs by 25 times.  Mothers who ate the fish gave birth to smaller babies earlier.  The babies had smaller head circumferences, increased startle response, and poorer reflexes than non-exposed infants.  At seven months, they showed poorer visual memory than non-exposed children (Swain, 1988).  The researchers did not continue to follow-up after seven months.  A simple solution would be to not eat fish from PCB contaminated waters.  But one study conducted a decade ago in PCB contaminated waters surrounding New York City suggests that state warnings against eating fish from these waters are not enough.  Most (80%) of fishermen in that area did not know about the advisory and were continuing to eat the fish, and some (17.7%) regularly gave the fish to children to eat, and some (15.4%) had given the fish to pregnant women to eat (Crain, 2001).  Knowledge of the presence of harmful contaminants and the possible health risks are not enough to keep people, and their babies, safe.

Polluted environments can have profound effects on the health of mothers, fathers, and babies.  From cancers, infertility, complications while pregnant, to miscarriage, pre-term birth, and developmental problems among offspring, pollution's effects can last a lifetime.  However, it is difficult or sometimes impossible in a community setting to prove any given reproductive problem is a direct result of environmental contaminants.

**Mental Health and Wellbeing.**  The medical and public health literature seeks to link pollution exposure to health outcomes, and occasionally seeks to link exposure and health outcomes to race and class variables.  There is much less literature on the mental health impact and the day-to-day experience of living near a pollution generator.  However small, this body of literature suggests that not only the effects of exposure to pollutants are harmful, but that the

effects of discrimination and the accompanying sense of powerlessness among members of polluted communities are also harmful to health.

It is unclear whether people know if they are exposed to pollution and how much they attribute health problems to it. The presence of grassroots environmental justice groups across the country, in areas of heavy pollution (e.g., greater New Orleans) and lighter pollution (e.g., Boston), attests to community members' awareness of their exposure and concern over it. Each grassroots group generally focuses on issues specific to its most problematic communities, but also often has ties to larger environmental justice coalitions. Even if residents dislike polluters, polluters may mean, for some residents, financial security. Therefore, communities may be conflicted in their attitudes towards industry. Mohai and Bryant (1998), two researchers prominent for collecting and publishing data that usually supports environmental justice sentiments, find community members' concerns about the health effects of pollution increase proportionately to residents' proximity to generators. These researchers found that people around Detroit exposed to pollution, regardless of race, are more likely to consider the environmental conditions around them as serious and important than those less exposed. This study did not measure who among the participants worked for the companies that ran the generators and if that was correlated to a more permissive attitude towards to generators. Another study sampling 50 people from an area well known to be highly polluted, the New Orleans metropolitan area, found participants' average rating for the seriousness of environmental problems in the area was squarely between "not a serious problem" and "somewhat a serious problem." However, they also found the same participants were significantly more likely than controls living in a cleaner area to report experiencing many health problems associated with pollution, including breast cancer and miscarriage (Adeola,

2000). Awareness of and concern over environmental pollution may vary from community to community, and individual to individual.

Residents' reaction to their awareness of pollution is another line of inquiry in the literature. The presence of grassroots organizations across the country shows some react by organizing themselves, using political and legal means to advocate for clean communities. These grassroots organizations may be created to temper a feeling of powerlessness among residents. One community member, Loretta Murray from Brockton, Massachusetts, spoke against a plan to build a power plant in her low-income, high minority urban community in a town meeting: "How did they [an electric company] come into *our* town and tell us what they're going to do and bypass *our* city government?" (Stop the Power, 2010). This question highlights her feeling of powerlessness, her helplessness when government systems do not or cannot protect her, and her sense of violation at the company's intrusion.

Scientific literature supports the existence of these negative emotions for community members. Peek and colleagues (2009) found that of 2,000 people living near a Texas petrochemical plant, those living closest to the plant had the highest levels physiological stress (marked by interleukin-6 and viral reactivation), more self-reported concerns about their health, and were more likely to believe they were exposed to hazardous chemicals. (Peek, Cutchin, Freeman, Stowe & Goodwin, 2009). These associations are correlational; perceived exposure may have caused respondents' anxiety, leading to stressed immune systems as well as attributions of health problems to exposure. Indeed, another study found that cognitive variables mediated the relationship between pollution exposure and subjective health outcomes (Matthies, Hoger, & Guski, 2000). Even if a psycho-somatic explanation were true, however, it is indeed stressful – on the mind and body – to live near a pollution generator.

Another scientific study demonstrates that not just exposure to chemicals causes a stress reaction, but also the feeling of helplessness that is intrinsic in discriminatory dynamics. Vandermoere (2008) measured 109 people living in an area of Belgium contaminated by heavy metals and polyaromatic hydrocarbons, as well as a non-exposed control group. Those exposed to contaminants performed worse on measures of mental health than non-exposed controls. Counter-intuitively, perceived danger of contaminants did not influence mental health scores. Instead, Vandermoere found the variable that most influenced mental health scores were residents' sense of participation in decisions regarding their community's cleanliness. According to this study, then, Brockton resident Loretta Murray's mental health would decline more from her sense of powerlessness in decisions regarding the power plant's siting in her community than from her concern over the pollutants it would emit.

Aside from bigger picture issues like powerlessness and self-determination, living in a poor environment is logistically difficult. Residents of the New Orleans metro area run into many day-to-day problems because of high levels of pollution there. They are significantly more likely than controls living in less polluted Louisiana areas to report they cannot sell their house because of contamination, that friends from out of town are unwilling to visit them, noise from industry is bothersome, and vermin and other unpleasant markers of the community's degradation are present. Residents of the polluted versus less polluted areas are less likely to be proud of their homes, think of their living situation as permanent, and think of their neighborhood as a nice place to live (Adeola, 2000).

There is some evidence that poor people and people of color are more likely to feel powerless and have worse mental health outcomes than wealthier people and white people living in the same conditions. Downey & Van Willigen (2005) used data from over 2,000 respondents from

Illinois who took self report questionnaires measuring their sense of powerlessness and depression. These data were combined with TRI and US Census data to associate respondents' scores with whether they lived in an area with "visible industrial activity." Proximity to pollution generators does not solely predict powerlessness and depression; proximity aggravates existing race and class inequalities. Perhaps the cognitive structures that underlie community members' self reports of poor health outcomes were created long before a pollution generator moved in; instead, were created in response to lifelong experiences with racism and classism.

The literature that explores wellbeing in polluted areas suggests environmental discrimination is not just about the environment and health. Poor physical and mental health outcomes are a real consequence of racism and classism, and also serve as a proxy for how severe pollution is and how disempowered residents are, as well as a justification for ending environmental discrimination and promoting the rights of communities to self-determine.

Research has addressed the effects of racial discrimination on mental and physical health. Homeless youth of color who reported past racial discrimination were more likely to experience more emotional distress than those who have reported less discrimination (Milburn, Batterham & Ayala, 2010). Among 215 Mexican American adults, perceived discrimination was correlated with depression and poorer general health on self report measures (Flores et al., 2008). These studies provide correlational data, so it can only be suggested, but not proved, that racial discrimination causes psychiatric problems. We can see how negative cognitive structures would be set up so that environmental discrimination would be interpreted as yet another harmful effect of racism.

**Discussion of Medical and Public Health Literature**

This medical, public health, environmental, and legal literature on reproductive health, as well as the literature on waste disposal and air pollution has its limitations, some of which accompany their design and were addressed above. For example, many studies of a pollution generator do not measure biomarkers of exposure to the generator's contaminants. Therefore any health outcomes could be incidental or due to another source entirely.

There are gaps in what academics have chosen to address. Very little literature relays community members' subjective experiences with environmental discrimination or their responses. Medical model academics may leave out personal anecdotes, so much of the data is missing a basis in lived experience. Literature on the experience of environmental discrimination tends to focus on areas of the world that are egregiously polluted, such as New Orleans, limiting the generalizability of their findings from less polluted areas, such as Boston.

The literature also lacks studies that connect racially-based health disparities to environmental disparities. It is difficult to separate race from class. Racism accounts for why more people of color are more likely to be poor than white people, and it accounts for these communities facing more barriers to protecting themselves from pollution and finding alternative solutions to living near a pollution generator. But researchers have rarely shown the connection between race and pollution, focusing instead on the connection between poverty and pollution, if any demographic at all.

Both of these gaps – actual experiences and a race-based implication of exposure disparities – may be due to a lack of theory that could guide research in these areas. Perhaps an appropriate theory that could guide studies to these areas is found the field of social work – ecological theory.

**Ecological Theory**

The health concerns environmental discrimination creates fall well within the realm of medical study and medical clinical work, but social work research and practice may require a theory to guide involvement in this area. One theoretical concept that may help guide social workers' involvement in environmental discrimination is ecological theory. For clarity, I will refer to "physical environment" as the actual biological ecosystem around people and "theoretical environment" as the environment the theory refers to. According to the theory, the theoretical environment in which people live and interact is important for determining wellbeing. People, then, are not closed systems, but rather open and interacting with objects in the outer world, such as family, friends, schools, and cultures. Further, their internal objects, such as values, expectations, and coping skills, are important for how people will fit in their external environment. A good fit between person and theoretical environment is characterized by reciprocity and yields adaptedness, and a poor fit is characterized by inflexibility and yields stress. People can cope with stress through problem solving and regulating negative feelings (Brandell, 2011). Clinicians' role is to help clients adapt or find their best fit given their individual identities, including race and class identities, and the features of the environment, including other people and institutions that are racist and classist (Glitterman & Germain, 2008). Theorist Ann Weick (1981) called for the inclusion of the physical environment into this model, and emphasized the importance of mind-body connection for wellbeing, with a green physical environment being important for fostering this connection.

For this theory to guide clinical work and research in environmental discrimination, it may need to expand. The ecological framework acknowledges limitations of the environment but places the onus of adaptation on the individual, minimizing the reality of forces such as racism

and classism (Besthorn, 2002).  Many people have neither a choice of where they live nor much power to change their environments; the key concept of reciprocity in the ecological framework is missing in the environmental discrimination context.  There may  be more inflexibility between people and their physical environments than between people and their theoretical environments.  For example, the construction of an incinerator near one's home may be a situation an individual cannot adapt to, given financial constraints and lack of political representation. The ecological theory cannot account for inflexibility of this situation. The theory succeeds, however, in predicting the consequences of an inflexible, linear relationship between people and their physical environments.  It predicts dysfunction among individuals, disorganization of groups such as families and social networks, as well as a splintering and weakening of institutions (Glitterman & Germain, 2008).  This splintering and weakening may be observed in long legal battles between community members, local political leaders, and companies.

Ecological theorists have vaguely connected theoretical and physical environments, a seeming reflection of the social work field's faint engagement in physical environmentalism. Carel Germain, a key ecological theorist, wrote early on in her thinking:

The physical environment is still a largely unexplored territory in social work practice and tends to be regarded, when it is regarded at all, as a static setting in which human events and processes occur almost, if not entirely, independently of the qualities of their physical setting (Germain, 1981, p. 104, quoted in Besthorn, 2002).

The rise of ecofeminism has improved the framework's ability to account for the physical environment.  Ecofeminists draw parallels among domination and pollution of the natural world to other forms of oppression, such as the oppression of women.  Theorists believe the split between people and nature is arbitrary and fosters hierarchical, abusive behavior towards nature

(Besthorn, 2002). I would add that this man/nature split fosters abuses to not only the physical environment, but also to any communities or individuals impacted by abused physical environments. With polluted environments come a feeling of disconnection and fragmentation (Besthorn, 2002); I would expand this idea to more than just a feeling, but physical health problems that may interfere with role functioning as well.

Ecofeminism comes to the brink of being able to create a framework for environmental discrimination, but veers to another path, the same path earlier theorists have also taken. That is, Weick's (1981) idea that green space and connection to nature is important for wellbeing. In summarizing a similar ecofeminist belief, Besthorn writes, "it is this great soulfulness of nature which connects, deeply, unalterably nature with humanity" (Besthorn, 2002, p. 14). Although this may be true, Weick and Besthorn's line of thinking bypasses a critical prerequisite of having green space – having clean space.

But this shortcoming aside, both the theory and the literature invite some new questions into the environmental discrimination conversation. What are the ways people adapt and cope with their literal environments? How can the level of fit improve, on macro, mezzo, and micro levels? The mental health literature's limitations invite questions as well: How does race play into the framework? What are the mental health effects of environmental discrimination? These questions lend themselves to a qualitative interview or questionnaire to gain access to the meanings people assign to their physical and theoretical environments. The medical literature does much to show the health impacts of pollution, so accessing human experiences with these impacts is timely and important. How regular people – and their health care providers – view these impacts is important for moving to adaptations that are healthy and feasible. Pollution is just one of many possible causes of common health problems such as miscarriage and breast

cancer, so it is unclear whether health care providers and patients ever attribute the health problems to the environment.  The information will help social workers know how prominent of a problem pollution is to their low-income clients and clients of color and whether it is something they should assess.  Knowing about pollution generators in clients' neighborhoods may be important for diagnosing, treating, and preventing illness, as well as important for advocacy work and helping clients adapt.  However, the sense of urgency and importance with which clients and their health care providers are doing these things are yet unknown.  New information about how health care providers and their patients view their polluted urban environments may help to find ways to more coherently apply ecological theory to environmental discrimination.  My hope is that these meanings will lead to points that social workers can use to enter into the dialogue of environmental discrimination with both clients and academics.  If environmental discrimination is an important issue for social workers and their clients, social workers should have enough information to contribute meaningfully on micro and macro levels, with clients, researchers, agencies, medical colleagues, and their agency's communities.

### III. Methodology

The purpose of the study was to explore whether social service oriented clinicians consider whether their clients are exposed to pollution, how large of a problem they believe pollution is for their clients, and what solutions they and their clients have developed to protect against pollution. It was also to explore the attitudes clinicians have towards pollution in their clients' neighborhoods. Implicit in this goal was to see whether certain contextual factors, such as the clinicians' race or the level of poverty in their case loads are related to their attitudes. The purpose begs the question: what are the clinicians of people at risk of exposure to high amounts of pollution experiencing and thinking when it comes to pollution? One hypothesis is that in these polluted areas, and especially areas that are quite polluted, clinicians will be more aware of pollution and pollution related health problems. A second hypothesis is that in these targeted areas – low income communities and communities of color – clinicians may consider that the reason the area is polluted is because of a race or class discrimination. The study is not designed to assess whether clients' health and wellbeing are indeed impacted by pollution, but rather if their clinicians consider if they are, and if so, how the clinicians think about it.

To best explore these research questions, I chose a brief survey. The study quantitatively measures demographics of clinicians and their reports of their clients' demographics. It then quantitatively explores clinicians' experiences with client health problems, their beliefs about the health problems, about pollution exposure and impact, and their beliefs about the reasons clients are exposed to pollution. This design allows me to examine certain fixed variables (for example, a clinician who works mostly with poor, white children) and how they may relate with

certain attitudes (for example, the clinician attributes client pollution exposure to class discrimination rather than race discrimination).

**Sample**

Fifty-six participants were recruited.  I used a snowball sampling method, mostly using my natural networks to recruit participants. Snowball sampling is "used when the members of a special population are difficult to locate" (Rubin & Babbie, 2010, 149). I picked snowball sampling because I was locating very specific people – certain types of clinicians who work in certain contexts – and because I had a short time to locate them.  I also did not have a set place to recruit from, having no clear connection with any one agency that would allow me access to its clinicians.

Snowball sampling means that "each selected member of the target population is asked to provide the information needed to locate other members of that population they happen to know" (Rubin & Babbie, 2010, 149).  I sent emails to my classmates, coworkers, former coworkers, and friends in the field asking them to fill out the survey and pass it on.  They could pass on the URL for the study, the URL for the study's website (more information about the website to follow), or my contact information if they wanted a paper copy.  I supplemented my snowball sampling recruitment strategy by asking my non-clinician friends to allow me to use their networks.  For example, a friend who works as an environmental lobbyist posted my recruitment letter on a listserv she is part of.  As another example, a friend who is a lawyer for a social service agency sent my recruitment letter to his coworkers in clinical departments.  I attended a professional development conference for mental health practitioners and handed out business cards to other attendees with the web address of the survey.  Branching out of my natural networks, I posted the study on two social work forums.  I mailed paper copies of the

survey to community health clinics, complete with a self-addressed stamped return envelope.  I

created a website (www.EnvironmentalHealthStudy.com) with information about the study, its

purpose, how to participate, and resources to learn more about environmental discrimination.

The website was intended to help me recruit participants; it provided a simple URL to refer

people to verbally and on cards.  I hope to use it to disseminate my findings as well.  I began

recruiting January 23, 2011 and ended recruitment on March 15, 2011.

I did not deliberately recruit clinicians of color.  I often did not know the race of the

clinicians I was contacting or the clinicians my friends were contacting on my behalf.

However, since I was asking people to participate who worked mostly with people of color, I

hoped that the clinicians would reflect their clients' race.

For inclusion in the study, participants were social service health professionals such as

psychotherapists, case managers, social workers, psychiatric nurses, or home visitors who were

involved with clients in such a way that they could assess clients' health as well as larger social,

political, and environmental factors around their clients. They also worked in an agency in an

urban area that served people from a largely low-income community and/or one made up mostly

of people of color. (See screening questions in Appendix D).

Not included were clinicians who were not practicing with clients, who did not speak

English, and who did not serve in an urban area, or who did not serve many low-income clients

or clients of color.  The latter exclusion criteria were used to access clinicians who worked with

people at risk for pollution exposure and to environmental discrimination.

**Ethics and Safeguards**

Participating in the research meant filling out a survey that took about 15 minutes.  Their

potential risks were minimal.  Some may have felt the study implied they should be doing more

to assess for pollution's impact and find solutions.  Clinicians may have benefitted from thinking about the ways pollution might impact their clients and their practice.

The informed consent can be viewed in Appendix B.  The letter informs potential participants about why I conducted the study, the purpose of the study, inclusion criteria, potential risks and benefits, a discussion of anonymity (if the survey was filled out online) and confidentiality (if the survey was filled out on paper), and the voluntary nature of participation. Completed paper surveys were stored in a locked cabinet for the duration of the study.  Online surveys were stored in a password-protected, secure online database.  When entering data, I removed the paper surveys I needed at the time, and then returned them to the locked cabinet when I was finished.

The study was approved by Smith College School for Social Work's Human Subjects Review committee (see Appendix A).

After my study was completed, I disseminated the findings to the SCSSW community, on the website I created to help me recruit participants to the study, and to participants and others who expressed a wish to see my findings.  After the thesis requirements are completed, I will keep the completed paper surveys in their locked file cabinet, and the online surveys in their secure database, for three years according to Federal regulations.

**The Instrument**

The survey instrument (see Appendix C) consisted of 17 questions.  First, I asked participants their profession to verify that they were indeed social service oriented workers.  I asked how long the clinician has been in the agency and profession, the participants' racial and gender identifications, and the zip code of agency.  Beyond the participant's demographic data, I asked general demographic data about the clients they serve:  roughly the proportion of clients who

are white, adult, low income, immigrants, and the proportion who require a translator to communicate in English.

The survey asked participants to report roughly what percentage of patients have medical (e.g., asthma, diabetes, frequent nausea), reproductive (e.g., low birth weight babies, infertility, low libido), learning (e.g., ADHD, impaired visual-spatial skills, low IQ), and psychiatric (e.g., depression, anxiety, anger) problems that may or may not be related to poor environmental conditions. I allowed room for participants to write in other types of problems they saw. I asked whether these problems were a clinical focus or if they interfered with patients' role functioning, and what attributions participants made as to the causes of these health problems. Participants could attribute health problems to "genetic predisposition;" "poor home, school and/or social supports;" "chance, bad luck, or an accident;" "polluted or inadequate physical environment (e.g., air pollution);" "poor self care habits (e.g., poor diet, smoking);" "psychiatric symptom, stress, depression;" "N/A or not sure;" or "other." I asked if participants ever they suspect their patients are exposed to pollution from nearby generators, how much they know about pollution in the area, and if they think any of the health problems could have been caused or made worse by pollution. I left space for participants to make comments after some of these questions. Those who did not believe their clients are exposed to pollution and did not believe these health and wellbeing issues may be caused or worsened by pollution finished the survey at that point.

For those who answered positively to either or both of these questions (i.e., that clients are exposed and/or pollution impacts health), I asked what reasons they think would explain why clients are exposed to poor environmental conditions. Participants could check as many of nine attributions as they agreed with: "City lay-out leads to pollution in the client's neighborhood;"

"affordable housing is available only in less desirable, polluted areas;" "communities that are largely non-white tend to be polluted more often than mostly white communities;" "communities that are poor tend to be polluted more often than mostly wealthier communities;" "clients lack political representation and government protection from polluters;" "clients' communities have polluters because the polluters generate needed tax revenue and jobs for communities;" "clients do not care or are unaware that they live in a polluted area;" "environmental standards are not created or enforced in the clients' communities;" "clients do not take adequate action to keep their neighborhoods clean;" "not sure, or N/A;" "none of these reasons;" or "other (please specify)."

The next two questions were open-ended, and asked participants if they have ever seen clients protect themselves from poor environmental conditions, and if so, with what actions; and if the participants have ever made suggestions or acted on clients' behalf to encourage or bring about protection for them. The final question, also open-ended, asked what resources or information would better support the participants' work with clients who live in polluted neighborhoods.

As the surveys were submitted online and on paper, I entered the data into an Excel spreadsheet. I plugged the zip codes of the agencies participants provided me with into the US Census's online database, and added demographic information for each agency's zip code. I also matched each zip code with the county the agency was in, and looked up pollution information in the US Environmental Protection Agency's Toxic Release Inventory (TRI), also available online. So, entered into my data file was not only participant responses, but also demographic information in the participants' agencies' zip code and pounds of pollution and air pollution released in each agency's county in 2009. Pounds of pollution and Census

demographic data were designed to be a rough proxy for how polluted the area was and how at risk it was for environmental discrimination based on its poverty level and population of people of color.

**Data Analysis**

I used descriptive statistics to analyze the survey responses. I first described all survey responses together, then split my sample into two groups in several separate ways. By separating the sample into two groups, I could compare the survey responses of participants who worked in the most polluted counties to the rest of the sample, who worked with the highest proportion of people of color to the rest of the sample, and who worked with the highest proportion of low-income clients to the rest of the sample. I could also compare the participants who had been in the field the longest to the rest of the sample and clinicians of color to the rest of the sample. I also looked for correlations between pounds of pollution released and markers of race and income of clients and their communities.

**Discussion**

The study was designed to explore clinicians' attitudes and beliefs around their clients' environmental health, based on pollution levels, demographic variables of the community and the participants' caseload, and demographics of the participants. My own personal biases may have influenced the conclusions that can be drawn from the data in several different ways. First, my recruitment may have biased the data. Billing the project as an "Environmental Health Study" may have caused some participants to over-estimate their sense of pollution exposure and impact in order to contribute to the research. It also might have discouraged people who did not believe their clients were exposed or impacted by pollution from participating. People already interested in the environment may have been drawn to the study

more so than those who are not concerned with it. My natural networks tend to be made up of

liberal people who are aware of environmental impacts on health. Indeed, some of my

recruitment was through an environmental justice organization and an environmental justice

listserv, so it may have disproportionally sampled people concerned about their clients'

environmental health. Snowball sampling is not probability sampling – the participants were

not randomly selected and therefore may not represent all clinicians working in their contexts.

The design of the survey questions and the possible answers participants could select may

have biased any conclusions that could be drawn from the data. Rating the number of clients

who had a health problem or who had been impacted is a rough estimation – participants were

using a scale to concretely measure their loose approximation of their experience, so it may not

be accurate. I was also asking about their entire experience – have they *ever* had a client for

whom a health problem was caused or made worse by pollution. Participants may not

remember correctly. They may also have had a client for whom pollution was a problem when

the client lived elsewhere, or when the participant worked elsewhere. In that case, the

socioeconomic variables (e.g., the proportion of clients of color on the caseload) I tie to how

participants answered certain survey (e.g., whether clients have a health problem caused or

made worse by pollution) questions may be irrelevant or misleading.

The survey has not been tested for reliability or validity. People who filled out the survey

one way may indeed fill it out differently a second time. It may not accurately measure

participants' perceptions of the interaction between health and the environment. For example,

one aim of the study is to look at the relationship between contextual variables, such as the

clinicians' race, and clinician experiences and attitudes, such as their explanations for pollution.

However, I do not assess all contextual variables, such as the acuity of clients' problems, nor do

I assess all experiences and attitudes, such as clinicians' experience with pollution in their own neighborhoods. Therefore I might miss an important contextual variable that strongly relates to an experience or attitude.

Like my study, many other studies use TRI data, and more specifically, pounds of pollution, as a proxy for how polluted an area is (e.g., Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b). However, it is not a perfect measure for how polluted a community is and may not accurately measure the hazards of living there. Not all industries report all their releases to the EPA, and the EPA does not post all releases on the TRI. Not all air pollution comes from industries, much comes from automobile traffic, and this is not accounted for in TRI air pollution data. Not all types of air pollution are equally as hazardous to human health; there are differences between different chemicals in how, when, and on whom they have an impact. Not all counties are the same size. Some cover less land area and therefore there may be less opportunity for polluting industries to be included in its boundaries. The neighboring county, only miles from the agency, may be highly polluted, but this is not accounted for in the data. Wind patterns, elevation, and other geographic or atmospheric characteristics of the county may change how polluted the county is, weakening any correlation between pounds of pollution released and how much pollution is actually present. So although TRI data is used in academic literature as an indicator of pollution, it may be misleading.

The study was designed to access any experiences clinicians had with a hidden problem. I refer to the problem – environmental pollution – as hidden because it is not often defined for them or for their clients, it is hardly ever a focus of their clinical work, it is probably not an issue they were ever trained to notice or cope with, and for many it might not be a problem at all. The problem might also be hidden because urban pollution may be part of institutional

racism, and a narrative of clients' pollution exposure might be denied by public discourse (Werkmeister-Rozas & Miller, 2009). Therefore it was difficult to explore clinicians' experiences with attitudes towards pollution without suggesting that it existed.

I designed the survey to cast a wide net, capturing clinicians' experiences with their clients' health and their more private explanations for polluted communities. I hoped to see if there are any external variables – such as how polluted the area is, or how poor it is – that relate to clinicians' experiences and their private explanations. I also hoped to see if there are any internal variables – such as characteristics of clients and clinician – that also relate. I was curious as to whether clinicians see their clients' pollution exposure as a socio-politically charged phenomenon, or just bad luck. I was also curious to see if and how a bigger-picture, macro concept like pollution relates to day-to-day clinical work. Should it be, is it, or can it be, integrated into treatment, or at least be present in mind?

## IV. Findings

Fifty-six people passed the screening, agreed to the informed consent, and completed the survey. The response rate is impossible to calculate because of the snowball sampling methodology.

Key among the findings was that there was more air pollution in communities with the lowest income and the highest proportion of people of color than higher income communities and communities with fewer people of color. Forty-three participants either believed that their clients were exposed to pollution (41 people, or 73.2%) or that pollution had caused or worsened a health problem (30 people, or 54.9%). These findings support the first hypotheses that clinicians in areas at high risk for environmental pollution were largely aware of the pollution, and many felt that it impacted their clients' health. Of those 43 people, half (51.1% or 22 people) explained their clients' exposure as one rooted in race (i.e., communities that are largely non-white tend to be polluted more often than mostly white communities). A higher proportion (36 people, 83.7%) attributed it to class (i.e., "affordable housing is available only in less desirable, polluted areas"). This supports the second hypothesis – that clinicians in areas at risk for pollution attribute pollution to the race and class of community members.

**The Sample's Survey Answers**

**Demographic data**. Clinicians from all over all over the United States participated. In the northeast, workers in Massachusetts, New York, and Pennsylvania participated. The Southeast was represented by workers in Maryland, Washington DC, and Georgia. Workers out West

participated, including people in Texas, Arizona, and California.  Workers in Ohio, Michigan, and Indiana represented the Central US.

In the survey, I asked participants to list the zip code of their agency.  I corresponded each zip code to the name of the county the agency was located in.  I used the name of the county to look up Toxic Release Information (TRI) from the US Environmental Protection Agency.  I found that industries in the agencies' counties released an average of 1,016,992 pounds of toxins (range: 657 pounds to 7,840,553 pounds), ranging from very hazardous toxins by volume such as lead, to less hazardous toxins such as toulene.  Air pollution in the agencies' counties averaged 834,185 pounds in 2009, with a very large range from 656 pounds to 5,793,388 pounds.  I used air pollution as a proxy of how polluted an area was rather than the total pollution amounts, because air pollution may be more evenly distributed throughout communities than solid wastes, which may impact only a very localized area.

Most respondents (39, 69.6%) were social workers, but many other similar disciplines were represented as well.  Some identified as case managers (12, 21.4%), therapists (11, 19.6%), counselors (9, 16.1%), and home visitors (7, 12.5%).  One psychiatric nurse participated. A disease investigator, health educator, and a workforce development program manager also participated.  Many people selected more than one profession, often as both social worker and therapist.  The participants worked in their agencies an average of 4.3 years (median 2 years), and had been in the field for an average of 8.4 years (median 5 years).  Most (44, 78.6.0%) identified as white, and 14 people of color participated, 6 (10.7%) as Asian/Pacific Islander, 6 (10.7%) as African American/black, and two as Hispanic/Latino and one as Jewish.  Most (45, 80.4%) were female, 11 (19.6%) were male.  One male identified as "other" gender as well.

Participants described the demographics of their clients, including the proportion of their clients who were white (sample average was 31.4% of clients), immigrants (sample average was 22.9% of clients), required a translator to communicate in English (sample average was 13.9% of clients), adults (sample average was 61.8% of clients), and the proportion of clients who lived below the federal poverty line, received disability, or housing or food subsidies (sample average was 75.5% of clients). Cross-referencing the zip code of the agency with US Census data, 22.8% of community members near the agency lived below the federal poverty line (the national average in 2008 was 13.2%). The average median household income in the areas surrounding participants' agencies was $37,209 (the national average in 2008 was $52, 029); an average of 58.8% of surrounding communities identified as white (79.6% was the national percent of people identifying as white, including those who identify ethnically as Hispanic/Latino but racially as white, in 2009), and an average of 20.8% of community members surrounding participants' agencies identified as foreign born (11.1% was the national average in 2000). This shows that, on average, the survey sampled its target population – clinicians whose client population was largely made up of people with low incomes and people of color.

**Participants' beliefs about the environment and health**. Table 1 shows that almost all participants (53) reported that they worked with clients who had learning problems, such as ADHD, low IQ, or impaired visual skills, with most (41) reporting people with leaning problems comprised half or fewer of their clients. Fewer participants (27) reported they worked with clients with reproductive problems, such as miscarriage, birth defects, low libido, low birth weight, or infertility, with 25 saying only a few of their clients had such problems. Many participants (52) reported they worked with clients with persistent health problems, such as

asthma, headache, cancer, nausea, diabetes, heart problems, pain, and dizziness.  Almost all of

the sample (55) reported they worked with clients who had psychiatric problems such as

anxiety, anger, depression, and substance use.  About half the sample (28) reported all of their

clients had such problems.  Participants rated how often these problems – learning,

reproduction, health, and psychiatric – was addressed in their clinical work together or inhibited

clients' role functioning.  Participants' answers generally matched with their answers of how

frequently they saw these problems.

Participants reported what they felt were the sources of clients' learning, reproduction,

health, and psychiatric problems, picking from any combination of eight general sources.

Pollution was cited by 34 people (60.7%) as a source of any of these four general health

problems.  About one third of the sample (33.9%) thought pollution contributed to learning

problems, 26.8% thought it contributed to reproductive problems, 64.3% to medical health

problems, and 33.9% psychiatric problems.  The sample attributed all four categories of general

health problems to a genetic predisposition generally more than other causes.  The sample also

generally attributed learning problems to poor home, school or social supports (44 people, or

78.6% of the sample).  Much of the sample attributed reproductive problems to poor self-care

habits, such as smoking or poor diet (22 people, or 41.5% of the sample).  Participants generally

attributed medical health problems to poor self care and a polluted environment (both with 36

people, or 64.2% of the sample).  Participants generally attributed psychiatric problems to poor

home, school, or social supports (46 people, or 82.1% of the sample).  A few people listed lack

of access to health care as a source of health problems.

Most (41 people, or 73.2% of the sample) reported they believed their clients were exposed

to pollution; six did not, and 8 were unsure.  For the 41 who believed their clients were exposed,

13 believed some or about a half were exposed and 26 believed most or all were exposed. Nineteen participants reported they did not feel knowledgeable about pollution in their agencies' area; 29 felt somewhat knowledgeable, and only six felt very knowledgeable. About half the sample (30 people) believed they had clients who had a health or behavioral problem created or made worse by pollution; only 5 did not. Twenty were unsure. Out of the 30 who believed pollution may have created or worsened a health or behavioral problem, most (24) thought this was the case for half or fewer of their clients. This shows that many clinicians in urban, low income communities and communities of color suspect pollution caused or worsened health problems for some of their clients, and many are unsure if it has a health impact or not.

Those who reported that they felt they had clients who were exposed to pollution, and those who reported they believed pollution had caused or worsened a health or behavioral problem screened in to a final section of the survey (43 people). Participants were asked for reasons that their clients were exposed to pollution, checking as many from a list of 12 explanations as they pleased. The results are displayed in Table 2. Some explanations accessed a class-based rationale for pollution (i.e., "communities that are poor tend to be polluted more often than mostly wealthier communities " and "affordable housing is available only in less desirable, polluted areas"). Of the 43 people who answered this question, 32 (74.4%) and 36 (83.7%) respectively agreed with these explanations. Another possible explanation from which respondents could choose was a political rationale for uneven pollution exposure (i.e., "clients lack political representation and government protection from polluters"); 31 (72.1%) agreed with this explanation. Two explanations shifted the responsibility away from polluters to community members (i.e., "clients do not take adequate action to keep their neighborhoods clean" and "clients do not care or are unaware that they live in a polluted area.") Out of the 43

people who answered this question, 15 (34.9%) and 27 (62.8%) respectively agreed with these explanations. Another explanation allowed for the random set-up of cities (i.e., "city lay-out leads to pollution in the clients' neighborhood), and 23 (53.5%) agreed with it. Another suggested explanation was a race-based rationale (i.e., "communities that are largely non-white tend to be polluted more often than mostly white communities). Of the 43 people who answered this question, 22 (51.2%) agreed with this explanation. Half of the participants who believed that their clients were exposed to or impacted by pollution felt that it was, at least in part, because the clients were people of color. One explanation accessed a bigger-picture reasoning (i.e., "clients' communities have polluters because the polluters generate needed tax revenue and jobs for community members"); 14 (32.6%) agreed with this explanation. Most of the sample chose multiple explanations for pollution, showing that they understood pollution exposure in their agency's neighborhood to be a complex problem.

One quarter of the 43 people filling out this section of the survey reported they had seen clients take action to protect themselves from pollution. Ten people reported clients had used filtered or bottled water. One reported she had clients who had formed a coalition to speak about environmental injustices in the neighborhood, another had clients who attended a similar meeting. One mentioned clients took part in neighborhood clean-ups. Someone else reported clients relocated from Mexico to the US to avoid pollution. Twenty one percent of the clinicians filling out this section of the survey reported they had made suggestions to clients to help protect themselves from pollution. Two stated they asked clients to exercise in less polluted areas of the community. One discussed self-advocacy with clients, another suggested clients sue polluters, and someone else contacted the city to advocate for better city-cleaning measures. One suggested the client move to a cleaner neighborhood, and another suggested the

client have their home inspected for radon and other pollutants.  One person said they generally make suggestions of small actions clients can take but did not specify further.  Several took actions on behalf of clients.  One attended a meeting to learn more about local environmental hazards with the parents of her clients.  One contacted the local public health commission about his concerns.  Someone else started a garden in the community.  Twenty-one people felt that more resources would help them to work with their pollution-exposed clients.  Five wrote that general education about the issues would help, with two suggesting easily accessible information, such as pamphlets or a website, would be useful.  Two wanted to know the pollution risks of certain areas.  One suggested investment in clean energy, hoping this would also create new jobs.  One said that clients would not be able to benefit from resources because his clients' needs were more acute and pressing than poor environmental conditions.

Upon exiting the study, 13 people left comments.  Three expressed appreciation for the study, one of them noting these issues are often overlooked.  Three people suggested that the environment was not ever a focus of their work.  Two reported more acute problems took up their entire focus.  One reported her clients had many health concerns, mostly due to trauma and torture, and evaluating environmentally-based health concerns was less pressing.  One highlighted the need to integrate the environmentally-based health of their clients with other areas of their life, such as their sexual and spiritual health.  Another mentioned noise and light pollution as major sources of health and wellbeing concerns for clients.  Someone else mentioned the political vulnerability of their clients to environmental discrimination due to lacking documentation as citizens.

**Connections Among Survey Answers, TRI Data, and Census Data**

I first wanted to determine whether pollution levels were in fact related to markers of the

community's income and race. I correlated pollution levels to demographic variables, such as

incomes, and found little relationship. I observed that pollution levels ranged considerably,

making correlations difficult to assess. To eliminate the wide spread, I ranked ordered

pollution, with the area with the lowest level of pollution assigned a 1 and the area with the

highest level assigned 56. If there were two or more cases where pollution levels were identical,

they were assigned the mean of their ranks. The rank order of pollution levels correlated with

participants' report of reproductive problems among their clients ($r^2$=.58), and local Census

reports of median household income (the lower the income, the more polluted the area, $r^2$=-.33),

but not Census markers of race or clinician reports of the demographics of their caseloads.

Figure 1 is a scatterplot that shows the non-linear relationship between incomes and level of

pollution with the very highly polluted outliers (i.e., those above 1 million pounds) removed. It

clearly demonstrates that the relationship between Census income for the agency's zip code and

pollution levels for the agency's county is non-linear even after adjusting for outliers. As

incomes decreased, pollution increased sharply. A similar scatterplot (not shown) of proportion

of people of color and pollution level suggested that communities of color had more pollution,

but this trend largely disappeared once highly polluted outliers were removed.

Table 3 shows the sample split into three equal parts according to medians of Census median

household income, with the lowest median income at $24,022 (n=18) and the highest (n=19) at

$53,942 (which is slightly higher than the national median household income). At the lowest

income bracket, there is a higher proportion of people of color than there is at the highest

income bracket. However, there is a higher proportion of people of color on the caseloads of

participants who worked in the highest income bracket.  In wealthy, white communities, my

participants worked with more people of color than lower income communities.  Table 4

incomes are split the same way as Table 3 – into three equal parts, from lowest to highest.

Table 4 shows that in the lowest income bracket, 42% of the group's members worked in a very

polluted area (i.e., an area above the median level of air pollution for the entire sample).  In the

highest income group, only 28% of the group's members worked in an area above the entire

sample's median level of air pollution.  Table 5 shows a similar finding: participants working in

the lowest third of income areas were exposed to more than twice the amount of pollution on

average than the participants working in the wealthiest third of areas. This way of splitting the

data by income, as marked by Census data, shows that lower-income areas tended to have more

air pollution than higher income areas.  Similarly, sorting by Census measures of race, areas

with the top third highest proportion of people of color had twice the pollution as areas with the

lowest third lowest proportion of people of color (see Table 5).  These findings hold whether

sorting by average or median income or race measures.

   I examined the data in several ways to determine if the way participants answered certain

questions on the survey was related to various demographic facts about themselves, their

clients, or their neighborhoods.  By separating the sample into two groups, I could compare the

survey responses of participants who worked in the most polluted counties to the rest of the

sample, who worked with the highest proportion of people of color to the rest of the sample, and

who worked with the highest proportion of low-income clients to the rest of the sample. I could

also compare the participants who had been in the field the longest to the rest of the sample and

clinicians of color to the rest of the sample.

**"High pollution" participants**.  There was a wide range of pounds of air pollution released,

only a few locations were highly polluted, while most of the rest of the sample had less

variance.  I therefore compared participants whose agencies were located in areas with air

pollution one standard deviation above the mean pollution levels for the rest of the sample

(n=7), and compared these "high pollution" participants to the rest of the sample (n=49; see

Table 1).  The "high pollution" group included people in Detroit, Los Angeles, and Tucson,

among other cities.  Table 1 shows that this group averaged over 4 million pounds of air

pollution in 2009, and the rest of the sample averaged about 320,000 pounds.  Compared with

the rest of the sample, the "high pollution" group reported they worked with fewer white clients

(25.3% vs 32.3% for the rest of the sample) and more immigrants (43.6% vs. 19.9% for the rest

of the sample), but generally the same proportion of low-income clients. (US Census data

reveals the "high pollution group" worked in areas where the median household income was an

average of $6,000 less than the rest of the sample, and areas that had 12% more people of

color).  This shows that highly polluted areas were somewhat poorer and made up of somewhat

more people of color than the rest of the sample.

Table 1 shows that "high pollution" participants rated themselves an average of more

knowledgeable about pollution in the area than the rest of the sample.  Compared to the rest of

the sample, the "high pollution" group reported more reproductive problems among their clients

(71.4% vs 44.9% of the rest of the sample), and attributed learning problems among their clients

to pollution more than the rest of the sample (57.1% vs 30.6%).  The "high pollution" group

more readily acknowledged that their clients were exposed to pollution than the rest of the

sample (85.7% vs 71.4% respectively), but despite attributing learning, reproductive, medical

health, and psychiatric problems to pollution more than the rest of the sample, somewhat fewer

believed any of their clients had a health problem caused or made worse by pollution than the rest of the sample (42.9% vs 55.1%).

When making attributions for why clients were exposed to pollution, more of the "high pollution" participants attributed pollution to "clients lack political representation and government protection from polluters" than the rest of the sample (85.7% vs 51.0%). The "high pollution" group also put responsibility on clients to take action to keep their neighborhoods clean more than the rest of the sample (57.1% vs 22.4%). The "high pollution" group cited a race based explanation for their clients' pollution exposure ("communities that are largely non-white tend to be polluted more often than mostly white communities") less than the rest of the sample (14.3% vs 42.9%).

**Clients of color.** I performed a similar analysis, separating the data into two groups, one consisting of participants who reported 90% or more of their clients were of color (n=23), and the second group consisting of everyone else (n=33; see Table 1). I chose 90% or more people of color on a caseload because it represents participants who almost exclusively work with people of color. Participants' average proportion of white clients was 3.7% and 51.8% for the two groups. These "high people of color" participants hailed from the Bronx, Detroit, DC, and Athens Georgia among other locations.

Table 1 shows that the participants in the "high people of color" group also reported more immigrants than the rest of the sample (29.0% vs. 18.6%) fewer adults (44.5% vs 72.2%), and more low-income clients (86.0% vs 68.2%.) They reported more of their clients were exposed to pollution (82.6% vs 63.6%) and indeed, the mean air pollution in the "high people of color" group was about double that of the rest of the sample (1,048,615lbs vs 616,722lbs). Participants

in this "high people of color" group reported they believed learning problems were the result of a polluted environment more than the rest of the sample (43.5% vs. 27.3%).

Proportionately more participants in the "high people of color" group believed their clients were exposed to pollution (82.6% vs 63.6%), but there were no differences between the groups' belief that pollution had caused or worsened a health or behavioral problem.  The "high pollution group" also tended to acknowledge exposure to pollution, but denied that pollution caused or worsened a health problem.  Fewer members of the "high people of color" group attributed pollution exposure to economics ("clients' communities have polluters because the polluters generate needed tax revenue and jobs for communities") than members of the rest of the sample (17.4% vs 30.3% respectively) and chance ("city lay-out leads to pollution in the patient's neighborhood") more than the rest of the sample (30.4% vs 48.5%).  A race based explanation of pollution ("communities that are largely non-white tend to be polluted more often than mostly white communities") was endorsed by 7.4% *fewer* people in the "high people of color group," representing about the same difference between groups as a class based explanation ("communities that are poor tend to be polluted more often than mostly wealthier communities").  Clinicians who mostly worked with mainly people of color did not generally link pollution exposure to race any more than the rest of the sample, and they did not link it to class either.

Participants in the "high people of color" group reported their clients took action to protect themselves from pollution more than the rest of the sample (33.3% vs 18.8%), and that they themselves made more suggestions (37.5% vs 9.4%).

The lower the median household income for the agency's zip code, the higher the proportion of people of color.  Table 3 shows that the wealthiest areas, (i.e., the highest third of median

household income areas) had the fewest people of color according to the US Census. However, participants in these wealthier areas reported working with more people of color than participants working in lower income areas. For example, in the wealthiest third of areas (i.e., areas with a median household income of $52,942, almost $1,000 higher than the national median household income), the US Census reports a median of 20% residents who were people of color. Participants at agencies in those areas reported working with a median of 82% people of color. In the poorest third of areas (i.e., areas with a median household income of $23,437), the US Census reports 51% of the residents were people of color. Participants in these low-income areas reported they worked with 62% people of color, a number that matches the community's demographic. It seems that people of color in wealthy areas use the support of social workers and other similar clinicians more readily than white people.

**Low-income clients.** I performed a similar analysis, separating participants who reported 90% or more of their clients lived below the federal poverty line, received disability, or received a housing or food subsidy (n=19) from the rest of the sample (n=37; see Table 1). The "most low-income" had an average of 96.2% of clients who were low-income, whereas the rest of the sample had about 65.9%; the average median household income for the zip code of the agency was $32,220 for the "most low-income" group and $39,771 for the rest of the sample.

Participants in the "most low-income" group reported having on average more people of color (82.4%) than the rest of the sample (61.2%), with the US Census concurring (an average of 52.7% people of color in the zip codes of the "most low income" group vs. an average of 35.5% people of color in the zip codes of the rest of the sample). There was almost double the average pollution around the agencies of the participants in the "more low-income" group than

the rest of the sample (1,022,432lbs vs. 676,858lbs). These "most low income" participants hailed from the Boston area, various parts of California, and DC, among other locations.

More participants in the "most low-income" group than the rest of the sample attributed learning (42.1% vs 29.7%) and medical health problems to pollution (84.2% vs 54.1%).

Fifteen percent more participants in the "most low-income" group felt that their clients were exposed to pollution than the rest of the sample (84.2% vs 67.6%), and more believed pollution created or made a health problem worse (73.6% vs 43.2%). In the previous analysis that examined the "high people of color" group versus the rest of the sample, the "high people of color" group had about double the air pollution than the rest of the sample. The "most low income" group also had double the air pollution. However, the "most low income" group had more participants agree that pollution was a health problem for participants while the "high people of color" group did not. People working with low-income clients seemed quicker to name pollution as a problem for clients than people working with clients of color.

When explaining pollution, more participants in the "most low-income" group picked a class based explanation ("affordable housing is only available in less desirable, polluted neighborhoods") than the rest of the sample (79.0% vs 54.1%). Although the "most low income" group felt that their clients were more exposed to pollution and pollution impacted their health, they were about evenly matched with the rest of the sample in terms of finding solutions or protection from pollution and asking for resources.

**Veteran clinicians.** I was curious to see if long-time clinicians answered the survey differently than the rest of the sample. "Veteran" clinicians (n=17), or those who worked in their profession for 10 years or more, worked with about the same proportion of low-income clients, adult clients, clients of color, and clients who needed translators as the rest of the

sample (n=39). They also worked in neighborhoods that were similar to the rest of the sample in terms of median household income.

Veteran participants chalked up learning and reproductive problems to psychiatric/coping problems less than the rest of the sample. Slightly proportionately fewer veteran participants felt their clients were exposed to pollution than the rest of the sample. They made proportionately fewer explanations for clients' pollution exposure. Proportionately fewer felt that "clients' communities have polluters because the polluters generate needed tax revenue and jobs for communities" than the rest of the sample (23.5% vs 51.3%) and that "communities that are largely non-white tend to be polluted more often than mostly white communities;" (29.4% vs 43.6%).

**Clinicians of color.** I divided the sample once more into participants of color (n=11) and white participants (n=45). The samples worked with similar populations in terms of the proportion they reported were low-income, adults, and immigrants. Participants of color worked with somewhat more clients of color.

Participants of color attributed learning, reproductive, medical health, and psychiatric problems to poor self-care and psychiatric symptoms proportionately less than the rest of the sample. More reported that their clients had protected themselves against pollution than the rest of the sample (54.5% vs 17.9%), and more had made suggestions to clients about protection from pollution (45.5% vs 15.6%). About the same proportion for each group believed their clients were exposed to pollution, and about the same felt that they had clients for whom pollution had caused or made worse a health problem. Proportionately more participants of color held clients responsible for the cleanliness of their neighborhoods, agreeing with "clients do not care or are unaware that they live in a polluted area" and "clients do not take adequate

action to keep their neighborhoods clean" more than the rest of the sample (72.7% vs 42.2%, and 54.5% vs 20.0%, respectively). Somewhat more explained pollution exposure as a race issue than the rest of the sample (54.5% vs 35.6%).

Two goals of the study were to explore whether social service oriented clinicians consider whether their clients are exposed to pollution and how large of a problem they believe pollution is for their clients. Using some demographic variables of clinicians, the demographics of their clients, the demographics of their agency's neighborhood, and a rough proxy of pollution in the area, I hoped to show a relationship between these variables and clinician attitudes and beliefs. The sample generally agreed that clients were exposed to pollution. However, opinions were a little more mixed as to whether pollution caused or worsened a health problem, with half the sample agreeing it did for at least some of their clients. Interestingly, the participants who thought pollution was causing or worsening problems for clients were not necessarily working in the most polluted areas, the most low-income areas, or the areas with the most people of color. They were also not the most seasoned clinicians or the clinicians of color. They were spread out across many of these characteristics. Whether or not clinicians saw pollution as a problem for clients mostly came down to an individual, personal impression that was only somewhat influenced by the context. It shows that the meaning social workers and other similar professionals make of the impact of environmental factors on their clients is highly personal and individual.

The data also shows how the clinicians account for health problems that may or may not be caused or made worse by pollution, and what kinds of solutions and protections clinicians and clients have used against pollution, and could use moving forward. These thoughts and beliefs

varied by demographic characteristics of participants, their clients, and their pollution exposure. These variations will be discussed in the next chapter.

**Chapter 5. Discussion**

In this chapter, I will discuss some of the findings of the last chapter in terms of bigger picture trends and implications for clinical work, macro work, and future research directions. I will also discuss the strengths and limitations of the study.

**Current findings**

The findings that low-income areas and communities of color are more exposed to pollution than higher income areas and white communities were consistent with the current literature (e.g., Morello-Frosch, Pastorm, Porrasm, Sadd, 2002b; Peek, Cutchin, Freeman, Stowe & Goodwin, 2009; US Commission on Civil Rights, 2003). Like many other studies have found, however, separating race from income is difficult with this data: there is overlap between race and class. It seems that according to this data, income was slightly more robust an indicator of high pollution levels than race, which contradicts some of the environmental justice literature (e.g., US Commission on Civil Rights, 2003). This may be, however, because much of the environmental justice literature that indicates pollution as racial discrimination as opposed to class discrimination references landfill siting rather than air pollution levels (Mohai & Saha, 2007; Morello-Frosch, Pastor, Porrasm, & Sadd, 2002b; US Commission on Civil Rights, 2003). Perhaps if my study used landfills rather than air pollution as an indicator of pollution levels, race would have been more strongly tied to pollution levels than income. It may also be because there was a trend for participants in my sample to work with a higher proportion of people of color in wealthier areas than was reflected in census indicators of race in the area.

Therefore participants working *with* many people of color were not necessarily working *in* communities of color, rather in wealthier, less polluted neighborhoods.

The fairly strong correlation between pollution levels and clinicians' reports of reproductive problems ($r^2$=.58) was notable. It supports clinicians' impressions that pollution was indeed related to clients' health problems. This suggests that clinicians' impressions of pollution's impact were fairly accurate.

**Race**

Clinicians mostly working with clients of color and clinicians mostly working with low-income clients generally felt that their clients were more exposed to pollution than the rest of the sample. Indeed, both targeted groups were exposed to about double the amount of pollution, on average, suggesting clinicians' impression of pollution exposure were fairly accurate. However, only clinicians working with mostly low-income clients felt that pollution caused or worsened a health problem more than the rest of the sample; clinicians working mostly with people of color did not think so particularly more than the rest of the sample. It would be tempting to explain this inconsistency as one fueled by people of color's general apathy about their environments: perhaps a lack of concern by clients translated to fewer concerns by clinicians. However, clients of color and their clinicians, as well as clinicians of color, were all more focused on finding solutions and protections from pollution than the rest of the sample. This suggests that clients and clinicians of color were both concerned about their environments, and interested in increasing client safety, bursting the myth that people of color care less about their environments than white people.

Interestingly, a higher proportion of clinicians of color placed the responsibility of pollution on clients, endorsing "clients do not care or are unaware that they live in a polluted area" and

"clients do not take adequate action to keep their neighborhoods clean" more than the rest of the sample. They also explained pollution as a racial issue somewhat more than the rest of the sample. They cited a class explanation about as often as the rest of the sample.

Placing responsibility on clients for their own neighborhoods walks a line between blaming them for their neighborhoods' condition and giving them agency to change those conditions. Perhaps people of color were more comfortable than white people to take a position that, coming from white people, might be seen as blaming the victim. Perhaps it was people of colors' way of giving clients agency: Indeed, clinicians of color made more suggestions to clients for ways to protect themselves, showing that they believed in their clients' capacity to make changes. The agency they assign their clients might reflect a tradition of self-help in communities of color. White people may avoid assigning responsibility to clients for fear of blaming the victim, but they also risk not giving clients agency.

A related finding was that about the same proportion of participants working with mostly people of color explained pollution as a problem rooted in race as the rest of the sample. This may speak to the insidious nature of environmental discrimination – it is very unclear that it may be a racial issue – and difficult to access beliefs around this aspect of the problem. It might also be that people are uncomfortable defining a problem as a racial issue, especially when they are not of the race or the community the issue has a direct negative impact on. Defining pollution as a part of institutional racism may be too political a stance for many social workers. The idea of supporting environmental justice might seem like too much of a disclosure to clients, or an overstepping of boundaries. Defining a problem for someone, as anyone who has diagnosed a client from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) knows, can feel uncomfortably like a powerful imposition. Simultaneously, defining pollution

as discrimination may clarify the problem for some clients and reduce some of their shame about their environment, perhaps improving clients' ability to cope with their environments.

**Ecological theory**

Participants used the open-ended questions to note some of their concerns for the local environment. They worried about the effects of traffic and factories on clients, particularly on asthma rates. They worried about lead in the soil, and pesticide use. One put it very vividly: "my clients often live in hellish, filthy, emotionally, and literally toxic environments." Environmental pollution may be just one more contributor – along with urban poverty and racism – to a hazardous climate, all of which may cause or worsen a health problem.

Pollution may have been seen as just one of many risk factors for problems with clients' health and wellbeing. Medical research also finds this to be true, particularly when tying asthma rates to pollution in low-income urban areas. Other factors some researchers call "social toxins" may mediate the relationship (Wright & Subramanian, 2007). This may be why so many participants answered "I don't know" when asked if they had clients for whom pollution caused or worsened a health problem. Given that most people rated themselves not or somewhat knowledgeable, and given that they probably had very little training for information about pollution and its health impacts, participants just did not know if pollution was a problem or not. One respondent summarized many other clinicians' uncertainty with "I think so, but I don't have concrete evidence; it's not something my clients talk about or something I have thought to ask about." This vague suspicion may have lead 37% of the sample to answer "I don't know" when asked if pollution causes or worsens health problems for clients.

One point several participants made is that pollution is the least of their or their clients concerns. The existing literature warned me that this argument – that more acute and pressing

needs, such as food and housing, should be the focus of work with clients rather than the environment – may be invoked.  The study did not assess how acute the needs of participants' clients were, or the mission of clinicians' work with their clients.  If it had, I might be able to note that clinicians working with clients who had more acute needs or more specific needs were less likely to consider pollution as a contributor to problems.  Workers in highly stressful clinical situations might only assess for factors that can either immediately increase risk for health and safety (such as domestic violence or drug use) or factors that they can change or impact (such as housing instability or symptom relief).

Along these lines, one counselor who did not identify as a social worker wrote that environmental pollution "isn't a primary focus of my daily interactions with clients - and clinicians generally aren't trained to focus on environmental circumstances affecting health but rather modifiable health behaviors."  What clinicians focus on may depend on training and orientation.  A chapter in Nancy McWilliams's *Psychoanalytic Case Formulation* called "Assessing what cannot be changed" argues that assessing "harsh realities" of a patient's life conveys empathy (McWilliams, 1999, p.49).  It can remove shame, such as the shame of living in a polluted neighborhood.  She also notes that naming a harsh reality, such as pollution exposure, models ego strength, as the clinician can name pollution as a problem without "collapsing into a sense of futility in the face of what has been named" (McWilliams, 1999, p49).  She argues that taking note of what cannot be changed allows clinicians and clients to make appropriate, realistic modifications around the unchangeable (or in this case, difficult to change) problem (McWilliams, 1999).

Indeed, many participants suggested and many clients made such modifications.  For example, clinicians suggested that clients "move to a different neighborhood" and "change their

location for running groups." So although pollution levels are not necessarily feasibly modifiable for a client, they can feasibly modify their behaviors around pollution. Ecological theory guides clinicians to cope with theoretical and literal environments that fit clients poorly through problem solving and regulating negative feelings (Brandell, 2011), consistent with this participant's comment that modifiable behaviors are the focus of his work. Focusing only on modifiable behaviors might include behaviors related to increasing safety from pollution. However, a singular focus on "modifiable behaviors" outside of the social, political, and physical context may be best suited for certain agency contexts, certain clients, and certain clinical disciplines, but applied to all clinicians and clients, it could place workers at risk for missing an opportunity for understanding clients, helping them to change their relationship to a seemingly unchangeable problem, and finding realistic ways to make daily life more tolerable. Perhaps McWilliams can add to Ecological theory strategies of naming and empathizing with a poor fit between person and environment as another course a clinician can take to help clients.

Along the same lines, another participant invoked the "least of their problems argument" with his response to what resources would support clinical work with pollution-exposed clients. The participant wrote that more information about pollution would be helpful to his practice, but "getting my clients to comprehend the information from such resources? Good luck. If you're dying of AIDS, homeless, schizophrenic, have 12 kids, etc., other stuff takes priority." Indeed, only 14 participants had ever seen clients take actions to protect themselves against pollution. Even fewer clinicians had supported clients' actions. It may be appropriate to support only some clients in their actions to protect themselves against pollution based on the clients' concerns, capabilities, and what they are seeking support for. It may be a subject of

future research – investigating what agency and neighborhood contexts and client characteristics are most suitable for addressing environmental concerns.

**Solutions**

The solutions and protections clinicians and their clients found targeted not just day-to-day quality of life, but bigger picture improvements to communities. Ten reported their clients were drinking only bottled or filtered water, suggesting air pollution was not the only type of pollution clients worried about. Clients tended to find smaller solutions, such as drinking cleaner water, and clinicians tended to suggest bigger picture solutions, such as joining an environmental justice organization or moving to a cleaner area. It may be that clients are more likely to follow small, manageable, and reasonable actions that clinicians suggest rather than the bigger picture of pollution exposure or major life changes. The literature is quick to point to environmental justice organizations and movement leaders, but the on-the-ground reality is that many people will not connect to them. Rather, instead of joining in the politics of pollution or drastically changing their lives, they will stick to daily, small protections. Clinicians also suggested solutions that were double positives for clients, such as making pollution a part of a larger discussion of self-advocacy or encouraging clients to exercise in a healthier part of the city. In this way, discussions about pollution can easily tie in with other treatment concerns. For example, the way a client relates to something as difficult and intractable as pollution might be the way she relates to other similar problems. Developing self-advocacy skills when it comes to pollution may help the client advocate for herself in other areas of her life.

As for resources to support their clinical work, participants mostly asked for more information. They wanted to know what polluters there were in their area, what pollutants they were emitting, and potential health consequences of those pollutants, and the risk levels of

living there.  Others wanted to know what organizations and institutions, from non-profits to government services, could help them.  These are needs that macro social workers could fill.  Creating and distributing online or print materials with local hazards, possible health impacts, and nearby resources would benefit social workers and clients.  Perhaps a lecture series or training would help clinicians not only learn about pollution hazards in their areas, but how to integrate this knowledge into their clinical work.  Education and awareness, however, might not be enough.  The New York State Department of Health issued warnings to citizens against eating fish they caught in the PCB-contaminated waters around New York City.  Researchers found, however, that most fishermen ate the fish they caught anyway (Crain, 2001).  It may be up to macro workers and clinicians to find out what actually brings about behavioral change when it comes to environmental safety.

**Strengths and Limitations**

The study accesses the attitudes and beliefs clinicians hold about a topic they might not have ever examined before.  Although the snowball sampling method indicates the participants were not randomly selected, there were some strengths in the sample.  They came from twelve different states all over the US, suggesting that they represent the beliefs of people from many different parts of the country.  The sample indeed worked with low-income clients and clients of color, so it can possibly generalize to other clinicians working with these populations.  The sample is also subject to a wide range of pollution levels, so the results can apply to other clinicians working in a similarly wide range of environments.  Additionally, eleven percent of the sample were people of color, and 9 disciplines were represented.  The years of professional experienced ranged from intern to 33 years.  The sample worked with demographically similar clients, but themselves represented a wide array of people.

There were limitations to the generalziability of results based on the sample, however. The response rate was most likely low, given my large-scale outreach efforts, suggesting the sample is self-selected. People who have an interest in the environment might have been more likely to fill out the survey. The online survey host tells me that 55 people took one look at the first page (the screening questions) and left. Fifteen people filled it out in part. Any answers they provided were not included in the final analysis, mostly because they never inputted any data at all, rather just looked though the first page of the survey. Social workers are busy, and probably rarely have a solid block of 25 minutes to fill something out. Whatever the reason, many people saw the survey advertised, some even went to its website, but only some filled it out. The reasons people chose to fill it out – or not – are unclear, but they could have reduced the randomness of the sample.

The survey itself might not have accessed all the variables that connect clinical and community context with clinician attitudes and impressions. For example, the clinicians' own experience with pollution (e.g., whether they grew up in a polluted area or live in one now) may have impacted their attitudes towards client exposure more so than their clinical work.

Finally, TRI data is not a perfect marker of pollution levels for a city. It cannot account for all the exposures people will have to pollution throughout their lives. Pounds emitted may not be well correlated with the amount actually present in the city. The pounds emitted also does not take into account the hazards of the actual chemicals being emitted. For example, lead is more hazardous than toluene, but the difference is not accounted for in TRI data. My study and other studies that use TRI data use it as a rough proxy for pollution levels.

**Implications for Practice and Policy**

This exploration of clinicians' experiences and attitudes towards pollution raises many implications for social work clinical practice, macro practice, and future research.

Because pollution levels correlated with participant reports of reproductive problems, and because half of the sample felt that pollution caused or worsened a health problem for at least some of clients, it is safe to assume that pollution is a factor for many urban low-income clients and clients of color. However, it may not be a factor for all of them, it might not be the most pressing or acute of their problems, and it might seem futile to even discuss it. Despite these reservations, this study shows that it is important to assess anyway, because there are useful ways to use pollution in treatment, whether using it to teach self-advocacy and self-care, to empathize, or to encourage clients to take safety measures. It is also important because some clients were taking action to protect themselves from pollution, suggesting it is a salient issue to some.

Therefore, it is important to assess, and to do these assessments, clinicians need some information about what exactly to look for, which clients to look for it in, and which clients would benefit from conversations about pollution. Macro practice workers could collect and promote this information for both clinicians and their clients. They could also create trainings, lectures, and publications to prepare clinicians for this type of assessment.

For clinical workers, their training cannot possibly guide workers for every situation they may encounter. The findings underscore the importance of proactively seeking out information about what factors are important to be aware of in local agencies. Continuing education is an important social work value, and continued education about local health hazards is an important part of that value. Another implication for clinical work is how to make suggestions for ways

clients should protect themselves. Clients might be more likely to take small day-to-day actions to protect themselves from pollution, such as filtering drinking water, rather than bigger picture actions, such as joining an activist group, or life altering actions, such as moving. Making suggestions manageable seems like it may encourage clients to follow through. Finally, using pollution as an inroad to a larger conversation about other clinical themes may be useful to clinicians. Pollution ties in well with discussions of self-advocacy, self-care, health, oppression, discrimination, shame, and agency.

Another interesting area to examine clinically is the difference in how white clinicians and clinicians of color explained pollution. Proportionately more clinicians of color placed the responsibility of pollution on clients than did white clinicians. The reasons for this disparity are unclear. Perhaps assigning responsibility to clients is a way of blaming the victim. If this is the case, white clinicians shied away for reasons that can only be speculated about, and clinicians of color's willingness to do this may reflect a whole range of explanations from projecting their own internalized racism to giving clients agency to make change. If the latter is the case, white clinicians missed an opportunity. Similarly, clinicians of color more readily explained pollution exposure as a racial issue that white clinicians. It may be awkward to classify or define a complicated problem, especially if the problem might pertain to a race or a neighborhood that the clinician is not a member of. Examining the racial and class attitudes around pollution may lead to a rich discussion of implicit, difficult to access beliefs as well as difficult to conduct conversations with clients.

Clinicians are ideally placed to help bridge the gap between research and practice (Brekke, Ell, & Palinkas, 2007). The feedback for environmental justice researchers from clinicians is fairly clear. Research can further clarify for clinicians which clients in which agency and

neighborhood contexts would benefit most from conversations about pollution. Clinicians would also benefit from more local information about nearby polluters and health risks, as well as what small actions they can suggest to their clients as effective protections. Future research could further clarify the mental health effects of pollution exposure to see how it may interplays with existing clinical problems. To do this, future research might pull apart other "social toxins" (Wright & Subramanian, 2007) that may also be the result of discrimination, such as poverty and poor health. Talking directly to clients or community members would be the best way to access the meanings and importance people assign to the environment. Research based on direct contact with community members could help clinicians meet clients "where they are at" with the environment. Also, assessing whether clinicians' should define pollution as a political problem, and more specifically as institutional racism, for clients is still unclear. Is defining the problem for clients further undermining their ability to define it themselves, or does it clarify the problem and reduce blame and shame? In short, is it useful to clients for clinicians to bring into the room their views on the politics of pollution?

Comparing survey results from samples of four different types of communities (high income white communities, low income white communities, high income communities of color, and low income communities of color) would be interesting. Would pollution levels, clinician experiences and attitudes differ between groups and within groups? It would also be interesting to see what other contextual factors impact clinicians' beliefs about their clients' exposure to pollution. For example, if clinicians also lived in a polluted neighborhood, they may be more aware of the hazards of pollution to clients than clinicians who live in less polluted neighborhoods. It may also be that their political ideology impacts how they think of their clients' exposure to pollution. Some people do not believe environmental pollution is a world

concern – does that worldview impact their clinical work?  Social work is a sometimes tense mix of the personal and the professional.  More exploration into how personal beliefs impact professional work – and how this interaction helps or harms clients – is a fascinating direction to take this research.

It very well may be the case that, given other more acute needs of clients, clinicians assign low priority to assessments of their environmental health.  Therefore when asked, clinicians do not know if pollution causes or worsens health problems.  The goals of the study might be better met by a study design whereby clinicians regularly monitor clients' health problems and the possible etiologies of those problems. Alternatively, training clinicians on pollution and its potential health consequences, and then having them fill out the survey might access contextual factors on awareness and attitudes.

**Conclusions**

There was more pollution in low-income communities and communities of color.  About half the social workers surveyed thought pollution caused or made worse a health problem for at least some of their clients.  Many chalked pollution up to class and race discrimination.  But the clinicians' beliefs and attitudes were surprisingly divorced from their race, their level of experience, their clients' demographics, their agency's neighborhood demographics, and the amount of pollution their clients were exposed to.  These private beliefs and attitudes were highly individual and personal.  Perhaps this speaks to the nature of the work.  Research suggests that an important predictor of a positive treatment outcome is a strong relationship between client and clinician (e.g., Blatt, Zuroff, Hawley, & Auerbach, 2010).  Therefore the clinician's individuality and personhood – including their attitudes and beliefs -  are important to bring to their practice.  It is possible that clinicians' experiences of their clients do not

strongly influence their beliefs and attitudes towards pollution.  Instead, it might be that their

attitudes and beliefs about pollution influence their experience of their clients.

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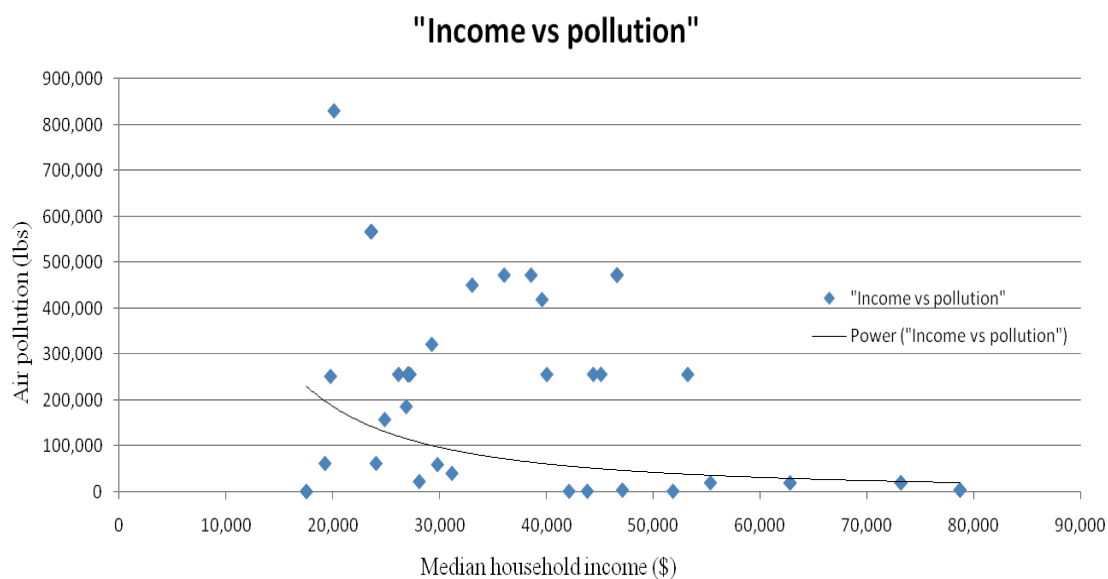
**Tables and Figures**

**Table 1.**

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**Table 2.**

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**Figure 1**

Pollution levels by income (n=47)*



"Income vs pollution"

**\*excludes** outliers (i.e., participants in agencies in areas with over 1 million pounds of air pollution released; n=9)

**Table 3**

Proportion of White People by Income (n=56)

|  | Median incomes of participants' agencies' zip | % of participants' agencies' zip who are white | % of participants' clients who are white |
|---|---|---|---|
| Average1 | $23,437 | 49% | 38% |
| Average2 | $32,497 | 55% | 32% |
| Average3 | $56,720 | 74% | 25% |
| | | | |
| Median 1 | $24,022 | 51% | 50% |
| Median 2 | $29,779 | 61% | 38% |
| Median 3 | $53,942 | 80% | 18% |

**Table 4**

<u>Air Pollution Levels by Income (n=56)</u>

| Median of median household incomes | Air pollution in participants' agencies' county | % of participants who's agency is in a county that is above median air pollution |
|---|---|---|
| Lowest income - $24,022 | 1,169,599lbs | 42% |
| Medium - $29,779 | 702,965lbs | 42% |
| Highest income - $53,942 | 493,959lbs | 28% |

**Table 5**

<u>Air Pollution Levels by Income and Race (n=56)</u>

| Income | Pollution level by median income of participants' agencies' zip (lbs) | Pollution level by % white people in participants' agencies' zip (lbs) |
|---|---|---|
| Average – lowest - $23,437 | 1,169,599 | 1,154,280 |
| Average – medium - $32,497 | 702,965 | 716,001 |
| Average – highest - $56,720 | 493,959 | 496,368 |
| | | |
| Median – lowest - $24,022 | 255,811 | 255,811 |
| Median – medium - $29,779 | 255,811 | 255,811 |
| Median – highest - $53,942 | 19,657 | 122,505 |
| | Lowest pollution level- highest pollution level (lbs) | Lowest pollution level- highest pollution level (lbs) |
| Average | 675,640 | 657,912 |
| Median | 236,154 | 133,306 |

# Appendix A: Human Subjects Review Board project approval letter

SMITH COLLEGE
School for
Social Work

Smith College
Northampton, Massachusetts 01063
T (413) 585-7950
F (413) 585-7994

January 20, 2011

Leslie Bosworth

Dear Leslie,

Your revised materials have been reviewed and you have done a fine job. There are just two small things on the Informed Consent. We ask that you please delete my name as if I am not available, Laurie Wyman (whose phone number it is) will make sure another Committee member will be available to them. Secondly, I don't find a place to check "I agree". Please add that. We are happy to give our final approval to this study and hope you are successful in your recruitment efforts.

*Please note the following requirements:*

**Consent Maintaining Data**: You must retain all data and other documents for at least three (3) years past completion of the research activity.

*In addition, these requirements may also be applicable:*

**Amendments**: If you wish to change any aspect of the study (such as design, procedures, consent forms or subject population), please submit these changes to the Committee.

**Renewal**: You are required to apply for renewal of approval every year for as long as the study is active.

**Completion**: You are required to notify the Chair of the Human Subjects Review Committee when your study is completed (data collection finished). This requirement is met by completion of the thesis project during the Third Summer.

Good luck with your project.

Sincerely,

Ann Hartman, D.S.W.
Chair, Human Subjects Review Committee

CC: Fred Newdom, Research Advisor

**Appendix B: Informed Consent**

Thank you for your interest in the Environmental Health Study.

I am conducting a research study on health care professionals' experiences, if any, of clients whose health or wellbeing may be impacted by poor environmental conditions as part of my Master's thesis for Smith College School for Social Work.

I am asking for your participation in a brief survey. If you can be described in these three ways, the study may be right for you: 1) If you are a social-service oriented health professional (e.g., social worker, counselor, psychologist, therapist, case worker, psychiatric nurse, or psychiatrist). 2) If you are involved with patients in such a way that you can assess their social, political, and environmental contexts. 3) And finally, if you work at community health agencies that serve people in low-income or racially diverse urban communities. If you match all three of these descriptors, I hope you will fill out a brief, online survey about your experiences, if any, with environmental impacts on health and wellbeing among your clients. The survey should take about 25 minutes or less. I encourage you to participate in the study even if you do not believe you have any experience with environmental impacts on health.

There are no risks to participation. Participating in the research will yield no direct benefits or compensation to you or your agency, but your input may impact the direction of future social work research and clinical work in this area. If you choose, I can send you a brief summary of findings whether or not you participated in the study.

Surveys completed online will be anonymous, and surveys completed on paper will be confidential. Neither online nor paper-based surveys will ask for your name, email address, agency, or any other personal information. For paper-based surveys, no identifying information, such as a return address on an envelope used to send me a completed survey, will be associated with the data. Any identifying information will not be included when the data is entered electronically. Please visit www.EnvironmentalHealthStudy.com if you would prefer to fill out the survey online. If you elect to have a brief summary of the findings sent to you, I will ask for your email or mailing address, but this information will not be associated with your survey and will be kept confidentially. In publications and presentations, any illustrative quotes or vignettes that are used will be carefully disguised. All electronic data will be protected by a password that limits access. Both electronic and paper-based data will be and kept in a secure location for three years as required by federal guidelines, and then destroyed. If I should need the materials beyond the three year period, I will continue to keep them in a secure location and will destroy them when no longer needed. The data will only be shared in electronic format

with my research advisor, a faculty member of Smith College School for Social Work, and a research analyst at the school.

Participation in the study is voluntary.  You may stop at any time while taking the survey and any information you have filled in will not be included.  If you use a paper-based survey, you can withdraw at any time during the data collection process, and materials pertaining to you will be immediately destroyed should you decide to withdraw.  However, once you submit the online survey, it is not possible to withdraw the data, as your response is anonymous and unable to be located.

If you have any concerns about your rights or about any aspect of the study, you can contact me or Smith College School for Social Work's Human Subject Review Chair.

My email: lesliebosworth@gmail.com

Phone: xxx-xxx-xxxx

Smith College School for Social Work Human Subjects Review Chair:413-585-7974

<If online:> **CLICKING ON THE "I AGREE" BOX INDICATES THAT YOU HAVE READ AND UNDERSTAND THE ABOVE INFORMATION AND THAT YOU HAVE HAD THE OPPORTUNITY TO ASK QUESTIONS ABOUT THE STUDY, YOUR PARTICIPATION, AND YOUR RIGHTS.  IT ALSO MEANS THAT YOU AGREE TO PARTICIPATE IN THE STUDY.**
<If on paper:> **YOUR SIGNITURE INDICATES THAT YOU HAVE READ AND UNDERSTAND THE ABOVE INFORMATION AND THAT YOU HAVE HAD THE OPPORTUNITY TO ASK QUESTIONS ABOUT THE STUDY, YOUR PARTICIPATION, AND YOUR RIGHTS.  IT ALSO MEANS THAT YOU AGREE TO PARTICIPATE IN THE STUDY.**

_____        _____

Signature                                                                    Date

You may print this page and keep it for your records.

Thank you for your participation,


Leslie Bosworth

**Appendix C: Survey instrument**

1.  Agency's zip code: _____

2. Length of time working in current agency: _____.

3.  Professional discipline (check all that apply):
_ Social worker
_ Case manager
_ Psychiatric Nurse
_ Psychiatrist
_ Therapist
_ Counselor
_ Psychologist
_ Home visitor
_ Other (please specify): _____

4. About how long have you worked in this (these) discipline(s): _____.

5.  Racial/ethnic identity (check all that apply)
_ African American/Black
_White/Non-Hispanic/Caucasian
_Hispanic/Latino
_Asian/Pacific Islander
_Native American
_Prefer not to answer
_Other (please specify): _____

6.  Gender Identity
_Male
_Female
_Other
_Prefer not to answer

7. Please provide the following general demographic information about the clients you see at your current agency. Please answer for those clients with whom you have worked directly.
*Required

About __% of my clients are white

About __% of my clients are immigrants

About __% of my clients are adults (18+)

About __% of my clients require a translator to communicate in English

About __% of my clients live below the federal poverty line, receive disability, or housing or food subsidies

8. Please rate about how often you encounter clients with the following health concerns:

| | None of clients | Some of clients | About half of clients | Most of clients | All of clients | Not sure/don't assess |
|---|---|---|---|---|---|---|
| Learning disability (e.g., ADHD, low IQ, impaired motor/visual/spatial skills) | | | | | | |
| Reproductive problems (e.g., miscarriage, birth defects, low birth weight, infertility, low libido) | | | | | | |
| Persistent health problems (e.g., asthma, headache, diabetes, cancer, heart problems, pain, dizziness, nausea) | | | | | | |
| Psychiatric/ Coping (e.g., anxiety, depression, anger, substance use) | | | | | | |
| Other concern, specify: | | | | | | |
| Other concern, specify: | | | | | | |
| Other concern, specify: | | | | | | |

9. For what percent of Clients have these concerns been addressed in your work together or have limited their role functioning (e.g., ability to work, do homework, play, or exercise)?

| | None of clients | Some of clients | About half of clients | Most of clients | All of clients | Not sure/don't assess |
|---|---|---|---|---|---|---|
| Learning disability (e.g., ADHD, low IQ, impaired motor/visual/spatial skills) | | | | | | |
| Reproductive problems (e.g., miscarriage, birth defects, low birth weight, infertility, low libido) | | | | | | |
| Persistent health problems (e.g., asthma, headache, diabetes, cancer, heart problems, pain, dizziness, nausea) | | | | | | |
| Psychiatric (e.g., anxiety, depression, anger, substance use) | | | | | | |
| Other concern, specify: | | | | | | |
| Other concern, specify: | | | | | | |
| Other concern, specify: | | | | | | |

10.  Please check what do you believe may be the source(s) of these health and behavioral concerns (check all that apply)

| | Genetic pre-disposition | Poor home, school, and/or social supports | Chance, bad luck, or an accident | Polluted or inadequate physical environment (e.g., air pollution) | Poor self care habits (e.g., poor diet, smoking) | Psychiatric symptom, stress, depression | N/A or not sure | Other |
|---|---|---|---|---|---|---|---|---|
| Learning disability | | | | | | | | |
| Reproductive problems | | | | | | | | |
| Persistent health problems | | | | | | | | |
| Psychiatric | | | | | | | | |
| Other concern, specify: | | | | | | | | |
| Other concern, specify: | | | | | | | | |
| Other concern, specify: | | | | | | | | |

11.  What is the extent of your knowledge of your clients' exposure to pollution, such as whether they live near factories, highways, electricity generation plants, landfills, and incinerators?
_N/A or not knowledgeable
_Somewhat knowledgeable
_Very Knowledgeable

12. Do you believe any of your clients are exposed to pollution in their neighborhoods from sources such as factories, highways, electricity generation plants, landfills, and incinerators?
_Yes
_No
_Not sure
_Thoughts/Comments:_____

12b. *If participant selects "yes" [survey host will automatically ask]:* About how many clients are exposed?

_ N/A, or none
_Some
_About half
_Most
_All or nearly all


13. Do you believe any of your clients have a health or behavioral problem created or made worse by environmental pollution?
_Yes
_No
_Not sure
_Thoughts/Comments:_____

13b. *If participant selects "yes" [survey host will automatically ask]:* About how many of your clients?

_N/A or none
_Some
_About half
_Most
_All or nearly all


[Those who answered "No or "not sure" to 11 and 13 will skip to the end. Everyone who answered in the affirmative for 11 or 13 should move on to the next section. The survey's online webhost will divert participants appropriately.]

Please answer the following questions with those clients who may be exposed to environmental pollution in mind:

14. What do you believe are possible reasons your clients are exposed to poor environmental conditions? (Check all that apply)
_City lay-out leads to pollution in the client's neighborhood.
_Affordable housing is available only in less desirable, polluted areas.
_Communities that are largely non-white tend to be polluted more often than mostly white communities.
_Communities that are poor tend to be polluted more often than mostly wealthier communities.
_Clients lack political representation and government protection from polluters.
_Clients' communities have polluters because the polluters generate needed tax revenue and jobs for communities.
_Clients do not care or are unaware that they live in a polluted area
_Environmental standards are not created or enforced in the clients' communities.
_Clients do not take adequate action to keep their neighborhoods clean.
_Not sure, or N/A
_None of these reasons
_Other (please specify):_____


15. Have you seen clients protect themselves from poor environmental conditions, from small strategies (e.g., filtering drinking water) to larger actions (e.g., attending town hall meetings regarding pollution generators)?
_Yes (specify what actions have they taken): _____
_No


16. Have you recommended actions clients could take to protect themselves from poor environmental conditions, from small actions (e.g., exercising in less polluted areas of their city) to larger actions (e.g., joining a local environmental activist group)?
_Yes (specify what recommendations): _____
_No


17. Are there resources or information that would better support you as you work with clients who live in polluted neighborhoods, from small resources (e.g., an overview of pollution-related health problems) to a bigger resource (e.g., funding for educational outreach projects)?
_Yes, specify: _____
_No

18. Before you exit the survey please write any comments, questions, or further information you would like me to know_____


Thank you for participating!

## Appendix D: Screening questions

Welcome! Thank you for your help in my research study! Before we get started, I have three quick questions to make sure this study is right for you.

1. Are you a social-service health professional, such as a psychotherapist, case manager, social worker, psychiatric nurse, home visitor, or psychiatrist?*
_Yes
_No

2. As part of your role at work, are you involved with patients in such a way that you can assess their health as well as larger social, political, and environmental factors around your patients?*
_Yes
_No

3. Do you work in a health setting in an urban area that serves people from a largely low-income and/or racial minority community?*
_Yes
_No

Thanks!

*Required questions