

INVISIBLE SCOURGE: WHAT BED BUGS AND PROPOXUR CAN TEACH US ABOUT  
HEALTH AND THE URBAN ENVIRONMENT

by

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## THESIS ABSTRACT

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Title: Invisible Scourge: What Bed Bugs and Propoxur Can Teach Us About Health and the Urban Environment

Bed bugs were once considered eliminated from the United States, so recent resurgence of this pest has been cause for concern. Presence of these troublesome insects has resulted in the proposal of controversial policies. For example, the state of Ohio petitioned the EPA for a FIFRA Section 18 emergency exemption to use the insecticide propoxur, a neurotoxin, to treat bed bug infestations in the state. In this thesis, I analyzed public comments for the exemption, task force reports, and media to examine how health and the urban indoor environment are framed in this decision-making process. Though bed bugs carry stigma, those who have them are not overtly blamed for the pest. However, an inability to eliminate them effectively is situated as a lack of personal responsibility. A political ecology of health analysis and healthism are used to understand how narratives of health and personal responsibility justify use of this pesticide.

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# CHAPTER I

## INTRODUCTION

The recent resurgence of bed bugs (*Cimex lectularius*) in the United States has resulted in unprecedented levels of panic from both the public and government officials. For example, *The New York Times* referred to bed bugs as our “nation's most recent plague” (Hager, Fitzsimmons, & Warren, 2010). In some ways, this damning title seems extreme, considering that this pest has never been shown to directly transmit disease (J. Goddard & deShazo, 2009; Romano, 2004). Ironically, a potentially greater health risk resulting from the reemergence of bed bugs in our national awareness is the growing arsenal of chemical insecticides used to combat the bugs. A Centers for Disease Control and Prevention report found that between 2003 and 2010, there were 111 acute illnesses and one fatality in seven states related to insecticide use to control bed bugs. (CDC, 2011) Despite public health evidence showing that bed bugs are less dangerous than the chemicals used to exterminate them, these insects can in some cases cause grave physical and psychological distress. In response to public demand for a solution, entomologists and chemical companies are searching to find the insecticide that will be the panacea for overcoming our national bed bug concern.<sup>1</sup>

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<sup>1</sup> This thesis is about how health and identity are discussed as Ohio decides whether to use propoxur to treat the state's recent increase in bed bug complaints. Due to the nature of the material in this thesis, I feel especially conscious about using loaded language to describe homes that contain bed bugs. I tried my best to avoid words like, “infestation”. However, at certain points I ran out of synonyms and value-free ways to describe bed bugs in the indoor environment. By its nature, our language is coded to talk about insects in a negative light: homes are infested, plagues of locusts descend upon crops, diseases such as malaria and West Nile virus are linked to insect bites. While writing this thesis, I abandoned my quest to use value-free language to talk about bed bugs, because it was requiring me to use imprecise language to describe this occurrence. I find it interesting that the simplest way to talk about bed bugs perpetuates the stigma of these animals. Perhaps this is also the reason why some

One such pesticide is propoxur, a compound banned for indoor use due to its neurotoxic properties in young children. On October 21, 2009, the Ohio Department of Agriculture (ODA) made an appeal to the United States Environmental Protection Agency (EPA) for a Section 18 exemption to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): to reapprove propoxur for indoor use, in order to overcome<sup>2</sup> pesticide-resistant bed bug strains. Ohio, and especially its major metropolitan areas, is considered one of the states with the most severe rate of bed bug cases. This has drawn particular attention to the state from national media outlets, such as TIME magazine. (Burleigh, 2010)

The push to have an effective pesticide against bed bugs reiterates a paradox that is fairly unique to pesticides: do public health and aesthetic benefits of chemical control outweigh potential toxicity to humans and wildlife? However, this is not merely a conflict over health risks versus benefits; the history of public health in the United States has demonstrated that certain identity groups have often been scapegoated for public health crises, such as cholera and yellow fever (Shah, 2001; Taylor, 2009) and that factors such as race play huge determinants in whether someone will shoulder a disproportionate number of environmental ills and health risks (Bullard, 1994). Additionally, pests such as bed bugs carry a deep stigma, and despite media assurance that these insects can affect anyone, it is possible that those who are involved in public discourse about bed bug control (whether they support

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who comment on how best to eliminate bed bugs from Ohio's indoor environments also use this loaded language; it's the way we know how to talk about bugs.

<sup>2</sup> In a similar vein to my first footnote: I initially tried to write about pesticides without using the war metaphors that are so often used to describe pest management: combat, eradicate, exterminate. However, I once again discovered that it is difficult to write about pesticides without using such language, since it is the most common vocabulary to talk about these chemicals.



or oppose chemical pesticide use) have their own narratives about who is to blame for the resurgence of this pest or most likely to be victimized by the epidemic. These notions of how perceptions of health are related to environment and how indoor environmental quality (including class-based assumptions about the urban environment) contribute to the ways that we interact with the environment lead me to wonder: how is health of those affected by bed bugs discussed in the struggle for the state of Ohio to control the reemergence of this pest? I plan to address this question through a political ecology of health analysis of public comments, local and national media, and task force reports.

### *Literature review*

#### Political ecology of health

Political ecology is an interdisciplinary field which seeks to understand how environmental decision-making by groups and individuals is “embedded in larger social, political, and economic processes at multiple scales” (Robbins & Sharp, 2003, p. 427). Though this is a field primarily focused on wilderness, open space, and outdoors, there have been numerous calls to develop a political ecology of indoor spaces and urban areas (D. Biehler & Simon, 2011; D. D. Biehler, 2009). This view helps to bring political ecology in closer conversation with the environmental justice movement, which expands the traditional definition of environment to include *where we live, work, and play* and seeks to expose and overturn the biases in environmental decision-making that have resulted in the overwhelming toxic burdens placed on poor communities of color (Bullard, 1994).

Political ecology of health is one area where we can see a developing scholarship on indoor and domestic realms. According to Janice Harper, “a political ecology of health framework allows us to explore how people’s perceptions of their environmental health risks shape the ways in which they interact with their environments (whether indoors or outdoors), use resources, and degrade their environments (whether through poor indoor cleanliness or, as business leaders, through industrial toxic releases)”(Harper, 2004) This framework would also recognize the structural inequalities, social practices, and relationship to the environment that act as determinants of health inside and outside of the home.

Though much political ecology of health work, and political ecology research in general, is focused on the environmental and health concerns of nations in the global south, several scholars have worked on environmental issues at various scales in the United States. For example, in his study of U.S. suburban lawns, Paul Robbins found that those homeowners with the most knowledge of the health risks of lawn chemicals were curiously also most likely to use them in maintaining a pristine lawn.(Robbins, 2007) Scholars have also documented how history, geography, and poverty may intersect in nuanced ways to produce negative health consequences as a result of air quality (Harper, 2004) or exposure to lead in the home (Hanchette, 2008).

The case of bed bugs and the desire find a chemical such as propoxur to combat them serves as an excellent case study for how “citizen perceptions of how various health problems are connected to the environment not only shape how they respond to illness but also influence how they interact with their environment”

(Harper, 2004). Sources such as public comments provide a fairly polarizing venue for demarcating how citizens want to interact with their indoor environments: by using propoxur to control bed bugs or not. By evaluating language about the relationship between bed bugs, health, and environment in these Section 18 exemption comments, I hope to uncover underlying assumptions that dictate how individuals, property managers, and pest control specialists interact with indoor environments and perceive health risks, be they from bed bugs or pesticides such as propoxur.

Many political ecologists, such as Robbins, situate their arguments around the role of capitalism in perceptions of and interactions with the urban and rural environment. There is likely much to be said about the role of capitalism in promoting solutions to bed bug infestation, chemical and otherwise, effective and ineffective, to the American public. However, this concept extends beyond the bounds of this particular analysis. Instead, I will argue in Chapter II that the physical and emotional strain caused by the resurgence of bed bugs has created its own demand for market-based interventions. Though there may push within industry to create new markets or promote particular products, the demand for *any* solution to a bed bug infestation potentially has the ability to drive even controversial interventions, such as a Section 18 exemption for propoxur.

### Identity, health and environment

Popular language around bed bugs has frequently used language of epidemic, or plague (as in the *New York Times* story). However, this language of epidemics is not value-free. As Julie Guthman and others have noted, speaking of a health

concern (be it cholera, AIDS, obesity, etc) as an epidemic implies certain judgments related to the morality, cleanliness, and hygiene of those afflicted by said illness(Guthman, 2011). Historically, major health epidemics (both in the United States and globally) have been blamed on those who can be labeled ‘other’, due to race, class, sexuality or immigration status. Rather than citing health problems as the result of insufficient sanitation infrastructure or public health measures to prevent the spread or exacerbation of disease; personal responsibility is cited as the cause of illness. One might also assume that beliefs about causes of disease would dictate beliefs about the best way to combat this disease, via: public sanitation, quarantine, drugs, or cultural practices.

In his study of AIDS and tuberculosis in modern Haiti, the physician Paul Farmer asks us to explore these diseases, remembering that, “creation and maintenance of such disparities, which are biological in their expression but are largely socially determined” (Farmer, 2001). Farmer insists that to better understand and prevent these emerging infectious diseases, we must examine what he refers to as the “differential political economy of risk” (Farmer, 2001), which take into account the role of social processes and structural violence in health which would, for example, make poor, marginalized women especially at risk for negative health outcomes in both Haiti and the United States.

United States history abounds with assumptions that members of certain identity groups, or their personal hygiene practices are the cause of disease. It is impossible to provide an exhaustive review here of the ways that various identity groups have been scapegoated for health concerns or labeled as having inferior

hygiene practices. However, it is my hope that a brief overview of a wide variety of examples of this occurring will help readers accept that discussions of public health concerns (including bed bugs) do contain both explicit and implicit discussions of identity, and that assumptions about disease and identity may manifest themselves in interventions to treat and prevent disease. In the case of bed bugs, assumptions about identity may dictate whether individuals and agencies advocate for the use of pesticides or some other intervention to eliminate, prevent, or treat this pest.

In the early 20<sup>th</sup> century, fear of dirt and uncleanliness was used as a justification for segregating black communities from white ones, even storing textbooks used by black students separately from those of white students.(Glenn, 2002) In New York City in the mid-19<sup>th</sup> century, cholera was blamed on the questionable moral behavior of the black and Irish residents of the city's slums, which, of course encouraged residents with means to avoid these areas, or even flee the city itself.(Taylor, 2009) Quarantine and segregation in the Jim Crow era were also cited as measures to prevent tuberculosis, ignoring overcrowding and lack of access to health care that may have exacerbated the severity of this disease in the African American community.(S. Roberts, 2009)

African American citizens were not alone in being characterized as vectors of illness. In the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, immigrants living in San Francisco's Chinatown were blamed for smallpox and tuberculosis outbreaks in the city, with much attention paid to their supposedly inferior morals and hygiene, rather than the crowded tenements where they lived and worked. (Shah, 2001) This sentiment toward immigrant populations was echoed in Los Angeles during the late 19<sup>th</sup> and

early 20<sup>th</sup> centuries, when even public health officials characterized the city's Chinese, Japanese, and Mexican immigrant communities as sources of disease. In this case, it is argued that "disease itself was defined as much by sociocultural beliefs in the inherent uncleanness of immigrants and nonwhites as by biological explanations" (Molina, 2006). These examples suggest that even a supposedly objective science such as public health is subject to ignoring how factors such as malnutrition and poverty may contribute to disease, in favor of stereotyped ideas of disease and cleanliness.

By evaluating public and government descriptions of the causes and consequences of bed bug infestations, I hope to examine if and how assumptions about the identity of those with bed bugs is linked to prejudiced assumptions about health and cleanliness. Early assertions linking bed bugs to international travel or increase in immigration hinted at identity-based judgments of the source of this pest. However, as I will explore briefly in Chapter II and the analysis of public comments, media reports and belief that anyone can get bed bugs counters any explicit identity-based judgments about who is to blame for these insects. As I will detail later, though there may be some ways that identity is evoked (through class, education, age or physical ability) there are few explicit claims about identity made in my data set. As I will describe in Chapters III and IV, identity is mentioned only tangentially to discussions of correct versus unsafe ways to eliminate bed bugs in one's home. However, there is likely room for other researchers to unpack explicit and implicit assumptions about health and identity in the urban environment, and in the case of bed bugs in particular.

## Healthism and non-vector disease?

In considering the case of bed bugs and indoor pesticide use, it is important to keep in mind that we see examples of morally-based judgments around health, even when (or perhaps especially when) the disease in question is not caused by a specific disease vector such a virus, bacterium, or parasite. For example, in Julie Guthman's *Weighing In: obesity, food justice, and the limits of capitalism* (Guthman, 2011), she discusses the concept of "healthism" and thereby "lifestylism" in relationship to the framing of obesity in the United States as a health epidemic. Healthism is a term first used by Robert Crawford, in which health is situated at the level of the individual (Crawford, 1980). The term healthism was later used pejoratively by the physician Petr Skrabanek to describe "coercive medicine". Conversely, the belief that personal health is a marker of good citizenship, thereby marks the unhealthy as unworthy of a place in the body politic. As a consequence of healthism, those who are healthy are thereby free to make pronouncements as to how the unhealthy should behave. (Skrabanek, 1994) Ideas of healthism and lifestylism apply far beyond conventional ideas of vector-caused disease, and may include factors such as diet, exercise, and hygiene. For example, in Guthman's discussion of obesity in the United States, she emphasizes the diet and behavioral proscriptions imposed on those who are overweight by healthcare providers and the general public. (Guthman, 2011) Because healthism focuses so fiercely on personal responsibility, it may ignore the power of environmental or social determinants of health, such as: air and housing quality, poverty, access to medical care, and chemical exposure.

In the case of some environmentally-induced illnesses, conclusions about the causes of disease may result in associating blame to those affected by a disease-causing agent, because they did not do enough to prevent or cure disease. Since private-domain functions such as cleaning and childcare are often considered the responsibility of women, women may be considered responsible for the health of their children and cleanliness of their homes (Kurtz, 2007). For example, mothers of children at risk for high blood lead levels, due to living in proximity to a lead smelter, may be given complex, time-consuming cleaning regimes to protect their children from the intellectual disabilities that can result from high lead exposure. These public health interventions place focus on individual behaviors, rather than changing environmental regulations that allow polluting industries to emit lead. This focus on personal responsibility can lead to stigma associated with those parents who cannot decrease their child's blood lead level through hygiene practices alone. (Bryson, McPhillips, & Robinson, 2005) Interventions to diminish the symptoms of asthma also frequently focus on domestic labor: encouraging caregivers to make sure their child's indoor environment is free of mold, dust, and roaches may seem like an achievable goal to pediatricians or public health professionals who interact with the families of asthmatic children. However, this assumption ignores how factors such as housing quality and outdoor air pollution may contribute to the disease. (Harper, 2004) Thus, these beliefs rooted in healthism may result in public health interventions that deal with the proximate causes of illness, such as dust or lead in a child's bedroom, but do not consider the



ultimate cause of the disease or the need for greater regulation to reduce these environmental triggers of their disease.

In a similar vein, the United States' post-World War era of better living through chemistry and ubiquitous pesticide use (Carson, 1962) has brought with it an expectation that lawns, croplands, and living rooms should be free of pests and disease, and those who do not comply with these aesthetic expectations may be stigmatized for their condition, or subject to outside interventions to help them meet these lifestyle expectations.

I expect to find that bed bugs have elicited some degree of moral judgments that diseases such as cholera and smallpox brought about in the past, or prompt moral and hygienic interventions such as we presently see with obesity, asthma, lead poisoning, and other diseases with complex, environmental and social causes. Though bed bugs have not been linked to severe disease, I think that the stigma of this insect and the expectation that insects can and should be eliminated from the indoor (and in many cases outdoor) environment makes those who have bed bugs vulnerable to moral, identity-based judgments and perhaps, prescriptions on how to live and deal with this pest.

### *Methods*

To gain a better understanding of how beliefs about health, risk, and identity shape how Ohioans respond to bed bugs in their environment, I will use qualitative methods to analyze public comments, media, and institutional reports related to bed bugs. I plan to code all of my data to identify themes that arise in discussion of

health, environment, and to a lesser degree identity as they relate to bed bugs.

Below are details of how these data sets were collected and chosen for the purpose of this research project.

#### A. ODA Section 18 exemption application and public comments

From late 2009 to early 2010, the Ohio Department of Agriculture's application for a Section 18 emergency exemption to approve propoxur for use indoors to combat bed bugs was available for public comment on [www.regulations.gov](http://www.regulations.gov). Over 100 comments were collected during this time, from private citizens, housing agencies, pest control professionals, nonprofit organizations, and scientists. These comments are an excellent addition to my data for two reasons. First, they represent a wide range of expertise on the subject, from concerned individuals to so-called experts on pesticides, bed bugs, or housing. Secondly, this data represents the opinions of those in favor of using propoxur for indoor use, as well as those who are opposed to approving this chemical for use on bed bugs. These comments will allow me to observe how those for and against using propoxur for this purpose may represent health, the indoor environment, and identity in their comments.<sup>3</sup>

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<sup>3</sup> Though the best analysis of this public comment data would have given equal time to consider each side in the debate to grant a Section 18 exemption for propoxur, there were drastically fewer comments from those against using this pesticide than there were in favor of its approval. Most of these comments against propoxur's use were from large national or regional nonprofits, dedicating to reducing pesticide use or preserving natural resources. These organizations provided arguments that were cited with scientific articles, and that touched on both biological and legal reasons to not grant this exemption. It was much more difficult to find themes in the rhetoric of these comments, beyond their shared technical assertions. I will provide a much more abbreviated evaluation of comments against the use of propoxur than in favor. However, I will include comments from this 'side' of the debate throughout my analysis as appropriate, such as when dangerous use of illegal chemicals is discussed.

## B. Institutional reports

Since bed bugs have become an object of major public health concern in our country, several citywide, statewide, and nationwide committees, taskforces, and working groups have been convened to come up with solutions to the this problem. Reports from these groups show how bed bugs are framed by those deemed 'experts' by the state, and demonstrate solutions that are likely to be considered or implemented as public policies. These committees may consist of experts such as: public health officials, exterminators, academics, housing administrators, agriculture experts, and representatives of local, state, and national environmental protection agencies. Though the individuals who make up these panels have a wide range of expertise, I assume that the information contained in their reports represents a general consensus of what should be done to control bed bugs. The two public reports that I plan on reviewing are: the 2011 *Ohio Bed bug Workgroup: final report and recommendations to the governor and Ohio general assembly* and reports and summary reports from the 2009 *National Bed Bug Summit*, sponsored by the Environmental Protection Agency. The purpose of analyzing these documents is to explore how ideas about bed bugs and the best way to deal with them are represented by experts and those who have the most impact on what future policies might be considered.

## C. National and local media

To supplement the text from public comments and task force reports, I selected pieces of local and national media from 2007-2011 that discuss bed bugs in the United States, specifically in Ohio, and interventions to try to halt their spread.

Through this data, I hope to see how media might shape the way that individuals perceive the relationship between health, bed bugs, and the environment. I also wonder how this media might create or perpetuate stereotypes about how bed bugs are acquired and successfully or unsuccessfully eliminated.

In the subsequent chapters, I will explore how beliefs about health and the indoor environment affect perceptions about how to deal with Ohio's bed bug problem. In Chapter II, I provide a brief overview of bed bug ecology and indoor pesticide ecology, and attempt to identify how perceptions of insects as signs of disease and the psychological strife caused by bed bugs might make them seem more threatening than difficult-to-perceive causes of disease, such as chemical pollution. In Chapter III, I will provide a survey of discussion of health and identity of at-risk groups in my data. In Chapter IV, I will focus on how public comments and task force reports situate bed bugs as an individual problem, and use the concept of healthism to explore how personal responsibility is framed in this public policy debate. Finally, in Chapter V, I will tie this issue briefly to broader concerns of environmental justice, including a dearth of affordable, safe, and effective options to control this pest. Finally, I shall discuss some of the barriers to effectively evaluating opposing sides of environmental decision-making, due to the issue of problem closure.

## CHAPTER II

### ECOLOGY OF BED BUGS AND INDOOR PESTICIDE USE

Why have bed bugs captured the imagination of the media and public health community in the United States to such an extent? How might commonly held beliefs about what factors contribute to disease affect how bed bugs are controlled? In this chapter, I hope to address these questions, and provide a brief overview of the ecology of bed bugs and urban pesticides. I will explore the idea that bed bugs may be more easily rationalized as causes of disease than pesticides, due to uncertainties in studying and determining the relationship between chemical exposure and disease, as well as stigma of insects as disease-causing organisms. I will begin with a brief overview of basic bed bug ecology and factors that may have contributed to their resurgence in North America, justification for the heightened concern around this pest, an overview of urban pesticide use, and the mechanics of propoxur in particular.

#### *Bed bug ecology*

The common bed bug (*Cimex lectularius*) is a small (6-7mm), nocturnal insect that is an obligate blood feeder. Unlike some other insect species that consume blood, both male and female bed bugs feed on blood, which means that these animals must feed on humans, other mammals, or birds every few days in order to molt, and reproduce (Service, 2004). Bed bugs are very skilled at hiding in furniture, bedding, or other crevices where they may be undetectable. Unlike ticks, bed bugs do not stay attached to their host, and instead seek hiding places during the day (Service,

2004). This cryptic behavior may also contribute to the ease with which they can move, as egg or insect, from place to place as stowaways on clothes, furniture, or luggage. Bed bugs are wingless, which means that much of their dispersal is due to human movement of and contact with their daytime hiding spots(Service, 2004). Bed bugs can also go without food for many weeks, which contributes to the ease with which they spread, since this insect can hide in a crevice for some time until a new potential host comes into contact with them. (Bonnefoy, Kampen, Sweeney, & World Health Organization. Regional Office for, 2008)

Due to the fact that bed bugs must bite their hosts to thrive and reproduce, they can be quite annoying to those affected by this pest. Bed bugs bites are most often undetectable, but may also appear as small, red, itchy bumps. These itchy bites may contribute to physical and psychological discomfort, even leading to a condition called sensitivity syndrome, which is characterized by insomnia and agitation. Bed bugs may also increase the risk of diseases such as anemia and asthma, due to repeated blood loss from bites and airborne allergens such as insect waste, respectively. Fortunately for those who are fed on by these insects, though bed bugs have been shown to contain more than 25 human pathogens, there is no evidence that can transmit bacteria or viruses from one host to another. (Bonnefoy, et al., 2008) However, the physical and psychological discomfort caused by this pest should not be understated. Though bed bugs cannot transmit pathogens, they have been shown to cause at times severe psychological discomfort. It has in fact, been suggested that those who have had bed bugs in their home may even demonstrate symptoms similar to that of Post Traumatic Stress Disorder (PTSD) (J. d. S. R.

Goddard, 2012). Clearly this insect represents a quality-of-life and mental health threat to those who are affected by this pest. The psychological component of bed bugs, and the stigma associated with them, is likely one of the major impetuses for effective market-based solutions for this problem, such as granting the State of Ohio a FIFRA Section 18 exemption for the use of propoxur . Additionally, this physical discomfort and psychological distress caused by bed bugs could explain some of the risks that individuals take to get rid of the pests: ranging from the use of a potentially toxic pesticide in the home to applying potentially risky home remedies for the pest. The latter will be discussed in greater detail in Chapters III and IV.

Bed bugs are indiscriminate pests, and have been shown to affect the homes of people from a wide range of classes. This sentiment is echoed in media, which reminds the public that all social groups are at risk for bed bugs. For example, a Reuter's piece interviewed an entomologist, who said, "Five-star hotels are just as susceptible as little cheap ones. People bring them in with their stuff." ("Bedbugs Not Just Confined to Beds: Infestation Spreading to Subways, Theaters and Hotels," 2009) This fact may explain why so few explicit identity-based claims were seen in my data set; though these pests are incredibly stigmatized, public and personal narratives about this pest emphasize the fact that anyone can get them, including five-star hotels. However, some public health officials believe that factors associated with low socio-economic status may also increase one's risk for bed bug infestation. For example, low-income individuals may be more likely to use secondhand furniture or clothing that could carry bed bugs, or live in multifamily housing. These buildings may be in need of basic repair, due to government

disinvestment in subsidized housing, leaving them more permeable to bed bugs and other insects. (D. D. Biehler, 2009)

Why is it that bed bugs are just now reemerging in the United States, and what factors may have contributed to their increase in recent years? Many believed that bed bugs were completely eradicated during the post-World War II era. This is likely due to the ubiquitous use of broad-spectrum insecticides, such as the organochlorine pesticide DDT, in indoor and outdoor environments.

The use of chemicals to combat insects in fields, forests, and homes resulted in the supposed eradication of this pest in the United States, prior to recent increases. For example, in 1997, there were only two bed bug infestations reported nationwide. (Bonney, et al., 2008) However, some experts contend that, this ubiquitous use of pesticides may have also contributed to the resurgence of bed bugs in the past few years, since these broad-spectrum insecticides also kill spiders and other natural predators of bed bugs. Additionally, some public health officials believe that regulatory changes in what pesticides may be used, such as via the Toxic Substances Control Act of 1976 and the Food Quality Protection Act of 1996, may have provided bed bugs an opportunity to reemerge without the threat of exposure to the most lethal organochlorine chemicals (Williams, et al., 2008). This belief, that government regulation of chemicals may result in an increase in bed bugs and other pests, is one of the neoliberal arguments for the reapproval of propoxur that we will see later in documents such as public comments in favor of issuing an emergency exemption.



### *Indoor pesticide ecology*

In many minds, pesticide use is associated with agriculture, forestry, or other rural uses. However, there is evidence that urban pesticide use may be a very legitimate health concern. Though more pesticides are used in agricultural areas, in urban areas, they are applied at a higher concentration. For example, one Canadian study showed that pesticides in urban areas were applied at up to 3.65 times the density of rural application: 2.92 kg/ha in a city versus 0.8kg/ha in rural areas (Pim, 2002). This may be due to the increased density of homes, lawns, and gardens in urban areas, or to a diminished tolerance for weeds and pests in the urban environment. Nationwide, 80-90% of households use some form of pesticides (Morello-Frosch & Lopez, 2006). Much of this urban pesticide use occurs indoors, which may be responsible for more than 80% of all pesticide exposures (Berkowitz, et al., 2003). Pesticide application may be especially frequent in high density public housing, where routine applications may occur as frequently as once per week in apartments with a pest complaint (Williams, et al., 2008) and even as a preventative measure to prevent the spread of pests from one unit to another (D. D. Biehler, 2009). Exposure to pesticides in indoor, urban environments may also include residues of pesticides that have been banned for some time and illegal or otherwise inappropriate pesticides that residents use in an attempt to control infestations without the help of a pest management professional. (Weber, 2008)

Acute pesticide poisoning is only one, and perhaps the most rare, negative health consequence associated with pesticide exposure. Pesticides have also been associated with chronic conditions such as: cancer, birth defects, reproductive

dysfunction, and immune disease (Dinham, 2003), as well as neurological disorders (T. Colborn, 2006; Griffith, Tajik, & Wing, 2007). The United States Environmental Protection Agency acknowledges that “by their very nature, most pesticides create some risk of harm” (Griffith, et al., 2007). Asthma has been linked to the exposure to pesticides used to control insects, such as the German cockroach (D. D. Biehler, 2009). Children in particular may be more at risk for deleterious pesticide exposure. For example, the American Academy of Pediatrics released a policy statement in December of 2012, which warned of children’s unique sensitivity to pesticide exposures and risk for developmental disability or childhood cancer. (J. R. a. C. J. K. Roberts, 2012)

#### *Barriers to determining the risks of individual pesticides*

By nature it is difficult to study the relationship between pesticides and particular illnesses and determining what risks are associated with pesticides. I will discuss several of these barriers, such as: sublethal effects, time lag between exposure and disease, consequences of multiple chemical exposures, and environmental persistence. I believe that these nuanced, difficult to observe facets of chemical ecology may contribute to the underestimation of health risks attributed to pesticides. These factors, combined with the more proximate quality-of-life threats imposed by bed bugs may make individuals or institutions more likely to favor pesticide use in order to combat insects in the home.

### Sublethal effects

Though organizations such as the Center for Disease Control may track the frequency of acute pesticide poisoning (CDC, 2011), it is more difficult for these widespread health organizations to track the occurrence of chronic illness or moderate pesticide exposure. In some cases, pesticide exposure can resemble the flu, with symptoms such as nausea, vomiting, coughing, and sneezing. (Jacobs & Dinham, 2003) This similarity to other common illnesses may be one reason why pesticide exposure may go undetected or underreported. Pesticide-related illness may also go unreported, like many illnesses, due to external factors such as lack of health insurance or immigration status. Many pesticides may also work by disrupting the endocrine system, thus displaying the inverted-'U' dose-response curve that is characteristic of endocrine disrupting chemicals. For these compounds, very small doses may have greater health effects than larger doses, especially if exposure to these compounds occurs during fragile developmental stages. (Theo Colborn, Dumanoski, Peterson Myers, & Key, 1997) These developmental stages occur in fetuses, infants, and children—who consume more food, water, and air by weight than adults do and thus may have greater environmental exposure to toxins. This may make babies and children especially vulnerable to the effects of residual pesticides and other chemicals. (Goldman, 1998; Steingraber, 1997)

### Time lag

Chemical-related diseases may also be underestimated due to the lag that can exist between the time of exposure and the onset of disease. For example, the

consequences of giving pregnant women the drug DES was not seen until many years later when their teenage and young adult daughters developed reproductive cancers at an alarming rate compared to the general population. (Theo Colborn, et al., 1997) It may be even more difficult for individuals and epidemiologists to make the connection between exposure and disease with pesticides, than pharmaceuticals, since individuals who may be exposed to pesticides where they live, learn, work, and play and may be unaware of the pest management practices that are implemented in all of these locations. Application of pesticides is so commonplace that they have for decades taken on what Rachel Carson dubbed the “harmless aspect of the familiar”(Carson, 1962); they elicit no particular concern or interest from those who may be exposed. Most people move from place to place throughout their life, and are unlikely to consider and very unlikely to trace exposures that may have occurred decades before they were faced with a diagnosis. (Steingraber, 1997)

### Multiple exposures

In addition to this time lag that can be observed between the time of exposure and onset of disease, it may be difficult to connect pesticide exposure to disease due to the many compounds that an individual may be exposed to, in endless combinations over the course of their life. There are currently tens or even hundreds of thousands of chemical active ingredients in use in the United States, only a tiny fraction of which have been tested for safety. (Steingraber, 1997) Even fewer of these compounds have been tested for synergistic health effects with other common chemicals, though chemical combinations may have protective or

deleterious effects.(Theo Colborn, et al., 1997) These countless chemicals may also move freely in wind and water and settle on unintended surfaces or environments, hence the term 'pesticide drift'. (J. Harrison, 2008; J. L. Harrison, 2006)

#### Persistence & chemical stability

One study of dust wipes from 500 homes throughout the United States found pesticide residues in a high percentage of homes. For example, the insecticide cis-permethrin was detected in 89% of wipes. Some of the substances detected have been banned for use in the United States, such as chlordane (found in 74% of wipes) and DDT (found in 41% of homes as DDT and 33% of homes as the metabolite DDE). (Stout, 2008) These findings may be due to the long half-lives of these products, or perhaps in small part, to unregistered use of these compounds. For example, DDT was banned for use in the United States in 1972 yet remains the most common pesticide found in wild fish in this country. (Steingraber, 1997)

These cognitive, scientific, and legal barriers to proving a relationship between chemical exposure and disease may contribute to bed bugs' perception as a greater public health threat than pesticide exposure. Bed bugs represent a visible contamination of the indoor environment, and can cause itching and anxiety. Insects, such as cockroaches, ticks, fleas and mosquitoes, have long been associated with disease and unseemliness. Despite the presence of a few of the same cognitive barriers as pesticides (persistence is a fact of their biology and it may be difficult to 'prove' the source of bed bugs), bed bugs represent a tangible representation of a potential disease vector (or at least a source of discomfort), and thus may be

perceived by some to be a greater threat to environmental health than their chemical counterparts.

### *Propoxur ecology*

Rather than speaking in generalities about pesticide ecology and barriers to accurately evaluating the risk of urban pesticides, let's revisit propoxur, the compound that the Ohio Department of Agriculture petitioned to reapprove for indoor use. Propoxur is a crystalline carbamate insecticide. Individuals who use this chemical are cautioned to avoid contact with this compound, as symptoms of exposure might include: blurred vision, abdominal cramps, headache, and muscle twitching, among others. (NIOSH, 2006) In April of 2007, the EPA announced that manufacturers of propoxur-based insecticides had requested that this product no longer be approved for indoor or crack and crevice use, due to potential exposure of children. The EPA also lists propoxur as a *probable human carcinogen* (EPA, 2009).

Besides the health concerns related to acute or one-time exposure to propoxur, public health studies have also shown that propoxur is an incredibly persistent insecticide. This means that it is both a more effective pesticide, since it can kill insects for some time after application, and a greater risk to the health of those who live, work, and play in indoor areas where propoxur may linger. (Julien, et al., 2007; Whyatt, et al., 2002)

Despite this evidence that propoxur may be undesirable for indoor use, it has also proven to be a highly effective pesticide to use against even insecticide-resistant strains of bed bugs. Most famously, Dr. Michael Potter at the University of

Kentucky demonstrated in an unpublished study that propoxur was very effective in killing all stages of bed bugs. This study is frequently cited as evidence in favor of propoxur's use, though it is unclear how those using this study have accessed the unpublished data. For example, in Governor Strickland's April 19, 2010 letter, requesting that the EPA grant Ohio's section 18 exemption, he writes, "according to a study by Dr. Michael Potter from the University of Kentucky, control rates with currently registered products range from 6.7 percent to 43 percent for a 24-hour period. Propoxur, during this same period, achieved 100 percent control". [OBBW 2011, Appendix C]

Despite propoxur's effectiveness as a residual pesticide, it has also been related to a number of serious chronic health concerns, such as cognitive impairment and immune suppression. (Yadav, et al., 2010) This pesticide has also been shown to cause reproductive system changes in male rats (Ngoula, et al., 2007) and increase physiological symptoms of stress, including liver damage (Liang, Wang, Long, & Wu, 2012). As we will see in the next chapter, these health concerns are cited as a major reason to not grant Ohio a Section 18 exemption to use propoxur in indoor environments.

## CHAPTER III

### CHARACTERIZATIONS OF HEALTH AND IDENTITY

This chapter will serve as a survey of themes in the text that I evaluated, especially public comment data. Because there was such a range of opinions present in this public comment data, this chapter will focus primarily on how each side of this debate identified those who were at-risk as a result of this policy, and how propoxur exposure or bed bug infestation were represented as a health concern.

#### *Characterizations of health & identity by those opposed to use of propoxur*

For the most part, those opposed to allowing an emergency exemption for propoxur to eliminate bed bugs expressed concern with the potential health effects that this pesticide may have on children's health. One anonymous commenter wrote "Is the EPA willing to risk the health of children by bringing this chemical back into the arena. It will be used in childrens homes exposing them directly to propoxur." [Docket #0083]<sup>4</sup> In their comments, the nonprofit organization Beyond Pesticides highlighted the vulnerabilities of children to indoor pesticide exposure, "indoor residential pesticide applications increase the exposure and health risks of residents, especially infants...Children are particularly at risk from this pesticide because their neurological and metabolic systems are still developing." [Docket

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<sup>4</sup> All public comments used here will be cited with the last four digits of their docket number. All comments are from the United States Federal Register, pertaining to Docket # EPA-HQ-OPP-2009-0856: the Ohio Department of Agriculture's request to the EPA for a Section 18 exemption for propoxur. Comments were open to the public from January 6, 2010 to January 21, 2010. I accessed public comments through [www.regulations.gov](http://www.regulations.gov). In most cases, spelling is in context, except for a few cases where I edited the text for clarity. Generally, I do not name the individuals who submitted each comment, though in some cases I give their profession or organization that they represent.



#0025] One business owner wrote “Please vote no, we have enough toxic chemicals in this world lets do our part and keep the away from our children” [Docket #0045].

Many of these comments that evoked concerns about children’s health also mention very specific health concerns that are possibly linked to propoxur exposure. For example, Beyond Pesticide’s comment stated the wide variety of health effects that could be linked to propoxur exposure:

*Symptoms of propoxur poisoning include nausea, vomiting, abdominal cramps, sweating, diarrhea, excessive salivation, weakness, imbalance, blurring of vision, breathing difficulty, increased blood pressure or ‘hypertension’ and incontinence. Death may result from respiratory system failure associated with propoxur exposure. [Docket #0025]*

Similarly, the statement from the environmental nonprofit Natural Resources Defense Council echoed these health concerns:

*In extreme poisoning cases, this chemical can harm or kill humans. More commonly, at lower levels of exposure, propoxur causes a variety of poisoning symptoms, many of which can mimic common illnesses; these include nausea, vomiting, diarrhea, wheezing, sweating and tearing eyes. More severe poisoning can cause muscle twitching, drooling, seizures, respiratory paralysis and death. Some recent research indicates that exposure to this type of pesticide can impair children’s neurological development, resulting in pervasive disorders that may include delays in motor development and attention deficit/hyperactivity disorder. [Docket #0069]*

Other comments focused on the potential health risks of chemicals in general, and advocated for greater chemical regulation:

*We can no longer afford to expose our population to the results of chemicals that can now be defined as dangerous by creation of breast cancer, autism, parkinsons disease and many other forms of sickness. Take a page from the book the Europeans regulate themselves from. Chemical insect control formulations are off limits. Their health issues reflect the positive. PLEASE, do not promote more synthetic chemicals. [Docket # 0096]*

Though there were many (about five times) fewer public comments against the emergency exemption for propoxur, those against using this compound for

indoor bed bug control were extremely focused on the potential health effects of this pesticide, especially to infants and children. These comments focused more heavily on scientific and legal arguments for not using propoxur for this purpose, and less on emotional and economic appeals, as seen in the comments of those in favor of propoxur's use.

#### *Characterizations of health and identity by those in favor of the use of propoxur*

Unlike those opposed to this policy, those in favor of an emergency exemption for propoxur had more varied explanations as to the health risks that bed bugs and pesticides pose, and who might be at risk. Somewhat surprisingly, many public comments in favor of propoxur's use cited a fear of the negative consequences of residents or property owners 'taking matters into their own hands' with disastrous consequences.

#### Characterization of bed bugs as a health concern

Many public comments from those in favor of propoxur's approval characterize these insects as a health concern, compare bed bugs to other disease-causing organisms, and use language that elicits the need to eliminate bed bugs in order to protect public health. For example, one individual wrote:

*I work with elderly persons, who many times are vision-impaired and live in homes where they're attacked nightly without knowledge of a problem. I take exception to anyone who suggests this is merely "a public health nuisance." This is a crisis. If there was a resurgence of scabies, I'm positive no one would be calling this a simple "nuisance." The general public should be outraged that we have the tools to put a stop to this, but our "all or nothing" mentality has painted us into a corner. [Docket #0037]*

Others who expressed a similar concern that bed bugs were or could become a health concern also used the urgency of their public health concerns to advocate for the approval of propoxur to combat bed bugs. One commenter wrote: “This problem, which was completely eliminated in our country years ago because we had pesticides to take care of them, may grow to an epidemic affected all our lives without immediate action” [Docket #0017]. Another noted:

*From a public health standpoint (and I am a Registered Public Health Sanitarian) even though these pests have CURRENTLY not been shown to transmit disease, they may be implicated in the future as a vector. They certainly are a health concern by the severe itching, loss of sleep, worry, and stress imposed by these infestations. [Docket #0086]*

The above examples of the stress caused by bed bugs, combined with fear of this insect’s ability to transmit disease or cause discomfort may contribute to the stigma that surrounds these insects. An August 2010 New York Times piece on bed bug stigma featured several examples of citizen’s expressing concern over the health stigma attached to bed bugs in New York City:

- “They don’t want to hug you anymore; they don’t want you coming over...You’re like a leper”
- “I haven’t been over to her place in a year, I don’t want the cooties”
- “It’s really like H1N1. Everybody is concerned about it, wondering if they’ll be next.”

While the NYT author of this piece, and most of the interviewees, emphasized the deep, health-related stigma associated with bed bugs, with phrases such as “victims of the nation’s most recent plague are finding that an invisible scourge awaits them in the form of bed bug stigma”, others interviewed for this piece saw bed bugs as a random (though incredibly threatening) occurrence, saying “It’s like terrorism. Just cross your fingers and keep going”.

## Reasons for increase

Though the reemergence of bed bugs has been blamed on a number of factors which may have lead to a spread of this insect: international travel, immigration, and pesticide resistance; many public comments that discussed the reason for bed bugs' increase cited federal pesticide policies for limiting the arsenal of chemicals that could be used to fight indoor insect infestations. Several effective pesticides from the market, or limiting their ability to be used indoors . As one individual wrote:

*Small children in cribs almost look abused because of the many bites on their bodies, and who can't say that this is an unacceptable and abusive situation which can be directly linked to the elimination of effective products though the Food Quality Protection Act. So then, who is responsible for the misery of those children? [Docket #0065]*

Another commenter wrote, "This problem, which was completely eliminated in our country years ago because we had pesticides to take care of them, may grow to an epidemic affected all our lives without immediate action" [Docket #0058].

The Ohio Bed Bug Workgroup, convened by the Ohio Department of Health, also identified pesticide policies and changes in pesticide use as a reason for the increase of bed bugs in Ohio. For example, the increase in popularity of insecticide bait traps was cited as a reason for an increase in bed bug infestations, since these insects are not affected by bait traps in the same manner as cockroaches and ants. The Ohio Bed Bug Workgroup also agreed with those who commented in favor of propoxur: that pesticide policies had restricted the tools available to pest management professionals. Listed under one of the 'Root Causes' headings of the workgroups 2011 report to the governor, the OBBW stated:

*Laws regulating pesticide use became more restrictive in the 1990s and, as a result, many residual insecticides are no longer available for use in residential settings. Unfortunately, many insects, bed bugs in particular, demonstrate resistance to currently available pesticides. In most instances, repeated treatments are often required to control an infestation, leading to significantly increased costs and higher cumulative pesticide exposure for residents. [OBBW 2011, p. 10]*

The media's framing of this issue may also be contributing to perception that federal policies limiting the use of certain pesticides are responsible for the contemporary bed bug problem. For example, one New York Times article stated that "Bed bugs, once nearly eradicated, have spread across New York City, in part because of the decline in the use of DDT" (Hager, et al., 2010).

### Role of government

These above examples which cite the banning of DDT and the FQPA as reasons for the increase in US bed bug infestations also raise questions as to how each side of the argument to use or not use propoxur views the role of government in remedying this bed bug problem. Clearly, several individuals in favor of using propoxur believe that government regulation of pesticides has worsened bed bug infestations. Additionally, the lack of social service and low-income housing resources is cited by several individuals as a reason to grant the emergency exemption for propoxur. For example, in their public comments, the Central Ohio Bed Bug Task Force noted:

*Ohio currently has serious financial difficulties, and most of our social service agencies and schools have seen their funding reduced, and they are unable to assist families by paying for bed bug eradication, or to provide help to frail and elderly individuals prepare for treatment [Docket #0070]*

### Who is at risk?

Those against using propoxur to treat bed bugs very clearly articulate that children's health is most at risk, should this chemical be used ubiquitously for crack and crevice treatment of bed bugs. Somewhat surprisingly, those in favor of this Section 18 exemption cite other vulnerable groups: seniors and those with disabilities, as being most at risk of problems brought on by bed bug infestations. The needs of seniors was a very common concern in these public comments, with several senior housing, social service agencies, and even state government representatives highlighting the needs of seniors as the most pressing concern in this policy debate. For example, one state senator in favor of using propoxur to kill bed bugs wrote "I have visited seniors afflicted with bed bugs and it is extremely unsettling. The bugs have infested homes, day cares, senior living facilities, hotels, dorms, and hospitals" [Docket # 0108]. Several other commentators wrote about the benefits of using propoxur to seniors' quality of life: "The ability to have a 1 application 100% kill would significantly increase the likelihood of permanently removing bed bugs from heavily infested buildings, including those which house vulnerable senior citizens and disabled individuals." [Docket #0006] Another wrote, "as a property manager for subsidized elderly housing I find it imperative to use this chemical to control the bed bug outbreak. The repercussions of neglecting this will be great, not only in health and safety issues" [Docket #0013].

Many of these concerns about seniors' vulnerability to bed bug infestations also stem from the belief that these individuals are not physically able to help

eliminate the pests, as well as how bed bugs may exacerbate other health or economic concerns for this group:

*As the Area Agency on Aging serving over 5,000 older adults and their caregivers in Central Ohio, we support the use of propoxur for the treatment of bed bugs. Our low income clients cannot afford the high treatment cost or time of the complicated process of preparation and treatment... Many older adults have major health issues and are allergic to these bits even finding these bug in their open wounds. Providers of home health services are reluctant to give the older adults the personal care services they require because of infestations. [Docket #0022]*

In many instances, the inability of seniors and those with disabilities to comply with preparation for pesticide treatments is cited as a reason why bed bugs are a growing concern, and justification for propoxur to be approved to treat these insects. One representative from the Franklin County Board of Health listed, in his list of justifications for using propoxur, "Compliance: Preparation for treatment is an extensive process. May (Whyatt, et al.) people are unable to do all of the work required for proper treatment, or they fail to do what is required of them after treatment" [Docket# 0074]. A manager of low-income senior housing wrote:

*I manage a 218 unit HUD subsidized elderly housing apartment complex in Columbus, Ohio. We have had bed bugs in one apartment &, of course, don't want them to spread. A number of our residents, because of frailty, disability & lack of income, will be unable to correctly handle the prep work involved in bed bug extermination. I'd like you to consider what the treatment process involves & how it affects residents & apartment owners. The resident mentioned above is confined to a wheelchair & was unable to complete or afford the work necessary to prepare for extermination [Docket #0075]*

The number of possessions that some senior citizens have was also given as a reason why they may be unable to comply with the cleaning prescriptions of a pest management professional:

*It is especially difficult with the elderly because of the amount of "things" that they have accumulated over the years. The sheer amount of prep work that*

*must be done prior to extermination is overwhelming to most of our residents, and the cost to our property to properly prep the units and exterminate on multiple occasions is going to cause severe issues with our operating accounts, thereby forcing us to request rent increases. [Docket #0021]*

One issue left unaddressed in these public comments is the idea that in many households seniors, infants, and adults all live under the same roof. Therefore, though each side may have concerns about the health of children, or the financial and physical burdens put on senior citizens, these groups cannot be distinctly separated and may share indoor environments.

#### Cost of treatment

The cost of effective treatment for bed bugs was cited as one of the major reasons to approve propoxur for indoor use. As a representative from the Franklin County Board of Health noted, “current treatment technology requires multiple treatments at a significant cost to our residents. On average, eradication costs between \$800-1500. For many of our lower-income residents, this cost is far greater than they can afford”. [Docket #0074] This cost burden was cited as not only a barrier to residents, but also to landlords, management companies, and government agencies that oversee rental units and subsidized housing. Several commenters noted that the number of treatments required was a major barrier to successful and affordable treatment of bed bugs, for both property owners and tenants. “Because of the resistance to pesticides, multiple applications are needed which pose a serious burden to both residents and in the case of rental units, landlords who face repeated costly treatments”. [Docket #0006] Another property manager noted that the expense of multiple treatments may impact rent prices of



affordable housing projects, stating, “affordable apartment communities often have very limited budgets due to restricted rent. The sustainability of some projects could be impacted when treatment costs escalate rapidly as a result of having to apply relatively ineffective treatments, multiple times”. [Docket #0048]

Decision-makers in government and public health also recognize the economic burden that bed bugs can impose, especially on low-income families. The Ohio Bed Bug Workgroup stated, in one of their policy recommendations to Governor Ted Strickland, “while bed bugs are not a problem solely associated with poverty, the cost of control is out of reach for persons of low or no income. Left untreated, infestations become severe and serve as a source for new infestations”. [2011, p. 16]

Obviously, the claims that propoxur could eliminate 100% of bed bugs in one treatment looks especially appealing to those paying \$1000 or more to treat homes multiple times with ineffective pesticides. Several pest control professionals also commented that though there are less-toxic methods available to control bed bugs, these methods are more costly, and thus inaccessible to low-income residents or affordable housing projects. As the National Pest Management Association stated in their comments, “while PMPs do utilize other non-chemical control methods such as heat to effectively manage bed bugs, these types of approaches can be cost-prohibitive and unaffordable for lower income households”. [Docket #0056] This comment highlights the supposed luxury and privilege of treating insect infestations with less toxic methods. In the eyes of those in favor of granting propoxur a Section

18 exemption, this chemical seems to solve the problem of cost of treatment and the potential health risks of multiple treatments with pesticides.

Fear of residents' "taking matters into their own hands"

One of the most surprising themes in public comments was a fear of residents and landlords afflicted with bed bugs "taking matters into their own hands", and using unsafe or home-remedy pest control solutions. Perhaps this should not be surprising, since the death that has resulted from treating a home with bed bugs was the result of unsafe use of pesticides and other chemicals in an attempt to affordably exterminate the pests. Many who provided comments in favor of propoxur's use were worried about what compounds individuals might use on their own to fight bed bugs. As a representative from the Franklin County Board of Health wrote:

*Many are resorting to other (un)safe methods of treatment, including procuring farm, lawn care, and garden chemicals, to rid their home of the pests. Others have used untested herbal and chemical substances that may present a significant health hazard to them. [Docket #0074]*

Some noted that the use of risky or unregulated products to control bed bugs was due to the prohibitive cost of professional pest control:

*If the cost of control is beyond the reach of those affected, they will either turn to their own control devices or learn to live with the pest. Control efforts employed by the non-professional often-times places all residents within the property at-risk of pesticide poisoning. [Docket #0077]*

Many pest management professionals commented on the extreme actions that citizens may take in order to eliminate bed bugs from their home. Some pest management professionals commented on residents' willingness to break the law to rid their homes of bed bugs, such as one individual who wrote, "trust me, as one

who regularly receives calls from residents whose homes are infested with bed bugs and who are desperate to eliminate the problem there is no length to which they won't go-legal or illegal" [Docket #0018]. Other pest control professionals worried about layperson use of pesticides with unsubstantiated claims or dubious health effects and the consequences of unregulated products with 'snake oil' claims:

*Based on my constant conversation with folks dealing with severe bed bug infestations, I fear that many are exposing themselves and their families to a lot of products that have not been tested for human expose in their homes, and worse yet that these products are not effective and they are being applied over and over again. [Docket #0016]*

\* \* \* \* \*

*If more reliable, cost-effective chemicals are not soon made available to professionals, fraudulent and ineffective products will likely enter the market with unsubstantiated claims. These products, with unknown contents and efficacy, will be used indoors in close human contact and on a widespread basis. [Docket #0104]*

Many comments, including a mass comment campaign, also highlighted the risk of unscrupulous or unlicensed pesticide applicators using dangerous or inappropriate techniques to treat indoor infestations. In particular, these comments highlighted costly toxic cleanup that was the result of pesticide misuse in low income housing. Several Ohio fires and explosions related to pesticide use were also highlighted as reasons to approve propoxur to treat bed bugs. According to the comment from the National Pest Management Association:

*Two Cincinnati area incidents resulted in fires that displaced residents while misuse in Harrisburg caused an explosion that injured five tenants and displaced several others...EPA should not forget that just a few years ago unlicensed applicators in several states (including Ohio, Michigan, Louisiana, Tennessee, Mississippi, Illinois, and Arkansas) treated lower-income multi-family housing with methyl parathion to manage cockroaches and ants. The subsequent cleanup cost almost \$75 million. The ever-growing bed bug outbreak combined with lack of multiple available pesticide products is another methyl parathion episode waiting to happen. [Docket #0056]*

Another pest management professional described the consequences of toxic pesticide application in multi-family housing.

*I fear that if a more affordable, reliable product such as propoxur is not approved to treat bed bugs you will see a repeat of an episode that occurred in the early 1990s when an unlicensed operator in the Cleveland area treated homes in low-income areas for cockroaches and ants with an agricultural pesticide. The subsequent cleanup displaced more than 850 people, required the decontamination of more than 200 residences and cost the U.S. government \$22 million to clean up - one of the costliest environmental disasters of the 1990s. [Docket #0018]*

The Ohio Bed Bug Workgroup also identified the use of dangerous and ineffective chemicals as a side-effect of bed bugs reemergence in Ohio. In their identification of 'Critical Issues and Needs Identified by the Workgroup', the OBBW mentions, "there are also news reports of people, desperate for relief, causing house and apartment fires by spraying isopropyl alcohol in an attempt to control bed bugs". (2011, p. 10) In an appendix to the OBBW report, a letter from Governor Ted Strickland to then-EPA administrator Lisa Jackson, Strickland highlights the risks of unregulated pesticides being used:

*On June 4, 2010, the Ohio Department of Agriculture was notified of a situation in Cincinnati involving a potential misuse of a pesticide in an occupied rental property. Upon investigation, it was discovered that the property owner had hired an unlicensed pesticide applicator to treat the property for bed bugs. The applicator sprayed the interior of the duplex to the point of saturation with a product called Malathion. The tenants, including one small child, were treated for chemical exposure at a local hospital. [2011 Appendix E]*

These examples demonstrate the stark, expensive, and toxic reality of the risks of pesticide misuse. These contaminations represent the physical health consequences of a lack of affordable pest management options.

This concern about residents and property managers 'taking matters into their own hands' raises interesting questions about pesticide regulation. Those in favor of using propoxur to exterminate bed bugs might argue that too much government regulation (such as the Food Quality Protection Act or the banning of DDT in the 1970s) lead to a lack of affordable pest management options for those who cannot afford multiple treatments from a pest management professional. However, those against propoxur's use argue, as we'll see later, that allowing propoxur will only lead to another chemical being misused by the public and unlicensed professionals.

## CHAPTER IV

### BED BUGS, PROPOXUR AND HEALTHISM

Somewhat surprisingly, few public comments, news articles and government documents blame those with bed bugs for bringing the insects into their home. Sure, the stigma associated with these animals is widely expressed, as well as an urgency to once again ‘eliminate’ these pests from the United States. Those commenting on the use of propoxur to kill Ohio’s bed bugs emphasized the stigma and economic cost of these insects, and warned of the dangers of unsafe methods to eliminate them (either through using propoxur or other unregulated materials). Very few comments were made that specifically blamed residents who had bed bugs for their state. Though one commenter did claim: “Bed bugs are brought into residences by the people living there. Landlords should not be responsible for treatment” [Docket #0068]. However, this opinion was very rarely voiced, which is somewhat surprising if one considers the many explicit ways in which specific groups have been blamed in the past for illness and sanitation concerns. In fact, some commenters specifically reject any stereotypes that may exist about who has bed bugs:

*Bed bugs are most frequently found in dwellings with a high rate of occupant turnover, such as hotels, motels, hostels, dormitories, shelters, apartment complexes, tenements, and prisons. E. Such infestations usually are not a reflection of poor hygiene or bad housekeeping. [Docket #0062]*

Newspaper articles about bed bugs also highlighted how everyday bed bug infestations could be; for example, one article about bed bug prevention in a psychiatric hospital noted from one interviewee, “it’s not rich or poor or dirty or

clean- everybody is going to run into these one way or another” (Crane, 2010). However, several specific themes in these comments situate health and bed bug control at the level of the individual in more subtle ways. When a low-income housing manager blames senior or disabled residents for being unable to physically prepare their unit for pesticide treatment, this pest problem is being attributed to these individuals’ physical inability to assist with treatment. As one commenter noted, “residents have trouble complying with the needed prep work making it difficult to eliminate the pest” [Docket #0007]. Participants in the EPA’s National Bed Bug Summit also highlighted the attitude that residents are not compliant with landlords in managing infestations. One comment highlighted in the published comments stated, “residents are a problem and are sometimes unwilling to cooperate or engage in behaviors to manage pests”. [p. 7] A property manager elaborated further:

*It is impossible to treat an apartment if the resident is unwilling to do their part. Any resident that has bed bugs must wash in hot water and hot dry all their clothing and bag it up to avoid re-infestation. The majority of the time the bed bugs are located in the resident's furniture and clothing yet as a property owner I am being forced to treat their possessions as well as the apartment. If chemical such as Propoxur are not permitted then bed bugs will soon be everywhere, on public transportation such as the bus or train, in movie theater seats or in local shopping centers. [Docket # 0023]*

Individuals are not only held responsible for their inability to prepare their homes to be treated by pest management professionals, but also for the potential risks of using unsafe or unregulated pesticides. Though less-toxic methods of eliminating bed bugs are available, one commenter noted:

*However, the people most vulnerable to bed bug infestations cannot afford professional Integrated Pest Management services and typically lack the knowledge, sanitation and motivation to cooperate if they could! Consequently,*

*people infested with bed bugs will use whatever they can get their hands on (legal or illegal) to help alleviate the problem. Desperate people will do desperate things. [Docket #0101]*

The above comment is one of the more damning descriptions of those affected with bed bugs. This sentiment is echoed by other commenters:

*Those individuals who can not afford pest control services or who are less educated about controlling bed bugs will take whatever means necessary to do what they have to do to protect themselves and their family. Many of these necessary means involve the use of chemicals in such high quantities that they are creating worse pesticide concerns in their own homes. [Docket #0054]*

Even those commenting against the Section 18 exemption of propoxur expressed concern about citizens' ability to safely eliminate bed bug infestation:

*(I)n reality, labels are only closely followed by the best practitioners. In low-income communities (where it is argued that propoxur would be most useful) there is less likelihood that it will be used carefully in a targeted manner...There are serious and very real concerns about illegal/dangerous pesticide uses due to the extreme mental anguish caused by BB. Also of concern is "self-medication" by residents, building managers, school districts-inappropriate chemical tools used in excess to no effect. [Docket #0106]*

Another commenter against the use of propoxur indoors feared that, if approved, propoxur would become another dangerous chemical to be misused:

*It will ruin the market and provide a dangerous alternative for the homeowner, apartment dweller, landlord. They are already using products that are putting them and their kids at risk, We (Whyatt, et al.) walk into numerous homes with DE dusted all over the(Whyatt, et al.) place. I remember one that had the DE dust in the air because he used a fan to circulate the DE with his year old baby in a crib. [Docket #0067]*

Though, for the most part, those with bed bugs are not explicitly blamed for the infestation, these kind of comments highlight how residents may be held responsible for their own bed bug problem, or negative health outcomes that result from pesticide misuse. The fact that Docket # 0106 above highlights that those in low income communities are least likely to properly use an approved insecticide



demonstrates an assumption that low-income communities would be less likely to eliminate bed bugs in a healthy or safe way. However, the commenter does not explicitly state whether this is due to lack of financial resources (to hire a professional pesticide applicator) or some other barrier to healthy behavior, such as education. The Ohio Bed Bug Workgroup also highlighted the need to educate the public on safe use of pesticides, stating, “it is also important to educate people about the importance of following label instructions when applying household pest control products”. [2011, p. 10] However, this task force also acknowledged the lack of infrastructure for public education on this matter.

Many newspaper and magazine articles about bed bugs described dangerous pesticide use, including illegal pesticides from around the world. One *New York Times* article highlighted black market pesticides, such as Tres Pasitos, that are commonly used by some immigrant communities:

*Though several professional exterminators said they had never encountered the product, they said it was just the latest in a stream of goods that for years had flowed from overseas factories into the supply closets of households and businesses (Semple, 2011)*

These news pieces may create some level of awareness to not use dangerous or unregulated pesticides, to those who have access to print media. However, in many ways these articles also sensationalize pesticide misuse, and those who get sick as a result. Several national news stories highlighted the story of a North Carolina woman who died after applying pesticides to her home, bedding, and body. These stories also mention other incidences of illness related to improper pesticide use. (Melnick, 2011; Neuman, 2011)

Though the above statements do not represent the same level of moral judgment that is seen in historical documents describing the victims of smallpox or HIV, these comments demonstrate that those on either side of the propoxur debate not only recognize the stigma associated with those afflicted by bed bugs, but also may share common assumptions about those most vulnerable to bed bugs (or perhaps least able to afford effective treatment). By stating that residents are unable to properly prepare their home for pesticide treatment, or highlighting the negative health consequences of pesticide misuse, this public health concern is being situated at the level of the individual: residents may not be able to help ‘catching’ bed bugs, but they are certainly responsible for making sure the pest is removed from their home safely and effectively.

These judgments of those who use unsafe pesticides or who are unable to physically comply with treatments represent implicit class-based assumptions about health. As several of the comments discussed in the previous chapter stated, effective treatment for bed bugs can cost well over \$1000 for one house or apartment, and may require regular cleaning and visits from a pest control professional. If an individual has limited mobility, such as a senior citizen or someone with a disability, there may be a need for added labor costs to prepare a home for pesticide treatment. Those in favor of reapproving propoxur for indoor use advocate for this pesticide as an inexpensive, more effective alternative. However, this pesticide would still require professional application, and could thus still be financially out of reach of many households. The same could be said of non-toxic alternative treatments, such as using heat or cold to eliminate bed bugs.

In her discussion of the political ecology of pest management in urban housing, Dawn Biehler highlights the history of subsidized housing and pest management. She argues that lack of maintenance of public housing, has resulted in these home becoming more hospitable to insects such as bed bugs and cockroaches. Lack of finances to repair affordable housing projects means that there are more crack and crevices between units for insects to crawl and hide. Biehler argues that “physical and social permeability of all domestic spaces should lead us to question the notion of “private” responsibility for environmental health problems there” (D. D. Biehler, 2009).

Many environmental justice scholars may also question the notion of private responsibility for environmental health concerns. Though many health problems with environmental causes or triggers have been blamed on individuals, diseases such as asthma and lead poisoning have long social histories related to poor housing quality, and manufacturing facilities located in poor communities of color. (Hanchette, 2008; Harper, 2004; Sze, 2007) The same could be said of the current concern over bed bugs and dangerous pesticide misuse; those who can afford professional extermination or less toxic methods or removal have access to that privilege, while those who cannot afford safe pest management practices are held responsible for any negative health effects that result from pesticide misuse. In the end, those who are least able to afford effective bed bug treatments are also likely to experience other environmental and health inequalities.

## CHAPTER V

### CONCLUSION

Ultimately, the state of Ohio was denied their request for a Section 18 emergency exemption to use propoxur, due to health concerns about children exposed to this pesticide. However, bed bugs continue to represent a very real public nuisance that communities across the continent are struggling to control. The ease at which these pests spread, the physical and psychological discomfort that they cause, and the expense of their removal continues to be a barrier to effective treatment of this pest. Though numerous educational interventions have been proposed (such as an informational telephone hotline), at this point there are very limited government financial resources devoted to public outreach or prevention. [OBBWG 2011]

#### *The issue of problem closure & construction of 'environment'*

Based on the divergent ideas of how bed bugs or propoxur may pose health risks, it is clear that each side of the debate over the use of this controversial pesticide has a different frame of what constitutes an environmental health problem. This may be considered an issue of problem closure or “the pre-definition of the purpose of inquiry” (Forsyth, 2003). In the case of whether or not to use propoxur to reduce bed bug infestations in Ohio, each side has defined the environmental problem differently, and thus the health concerns they raise and interventions proposed are very different. Those in favor of using propoxur have framed the problem as: what pesticide can eliminate bed bugs in the fewest

applications, thereby reducing expense? Those opposed to the reapproval of propoxur for indoor use construct the problem as: how might propoxur negatively affect the health of those who use the indoor environment where it is applied? These incongruous frames of problem closure are common in public policy and environmental decision-making, and in many ways, make it difficult to compare each side of the argument.

In this case of environmental decision and policy-making, problem closure also seems closely tied to how each side defines environment, and construction of what makes a healthy or unhealthy indoor environment. Obviously both sides are aware of the potential risks of harmful pesticides in the indoor environment: many in favor of using propoxur cite occurrences of pesticide contamination when banned substances or unscrupulous pesticide applicators have caused costly, dangerous contamination of indoor environments, while those against using propoxur are concerned about the potential health effects of propoxur, in particular, but pesticides, in general. However, these sides diverge when it comes to determining if bed bugs or the indoor use of propoxur presents a bigger threat to indoor environmental health.

In many ways, this issue is framed as a scientific conflict: effectiveness of propoxur against bed bugs versus potential health effects of using this pesticide. However, as is the case in many environmental conflicts, each side is using their own framing of scientific expertise to promote their own objective. Therefore, the information presented to decision-makers is not a neutral interpretation of data, but rather the result of the social and political forces that shaped it. (Ozawa, 1996) This

public policy debate is not about scientific data, so much as it is about the economic and health impacts of bed bug infestation and treatment.

*Regulation, risk, and vulnerable populations*

Much of the push to approve propoxur or other pesticides for use against bed bugs is due to this concern that residents will ‘take matters into their own hands’, resulting in dangerous pest management practices that may put themselves, their children, or their neighbors at risk. Despite this fear being frequently evoked in a push for effective bed bug interventions, those with this concern never discuss how approving propoxur will stop these unsafe practices, besides apparently allowing for fewer required pesticide applications by licensed pest control professionals. Unfortunately, these dangerous circumstances created by misuse of chemicals in an effort to control bed bugs is more likely due to complete lack of financial resources for professional pest treatment, as well as unclear legislation about whether landlords or tenants are responsible for bed bug eradication. For an effective public policy to control bed bugs in the state of Ohio, it may be necessary for local health departments, social service agencies and other organizations to work together to eliminate bed bugs safely in those households that could otherwise not afford safe and effective treatments.

## APPENDIX

### DATA SOURCES

#### *Public comments*

Public comments for and against the Ohio Department of Agriculture's request for the EPA to grant the state a Section 18 emergency exemption to use propoxur to fight bed bugs were accessed through [www.regulations.gov](http://www.regulations.gov). Each of the more than 100 comments related to this policy were found under Docket # EPA-HQ-OPP-2009-0856, and can be accessed online at:

<http://www.regulations.gov/#!docketDetail;D=EPA-HQ-OPP-2009-0856>.

#### *Task force reports*

"EPA's National Bed Bug Summit: Participant Recommendations", April 15, 2009. Accessed through EPA's Pesticides: Science and Policy website; <http://www.epa.gov/pesticides/ppdc/bedbug-summit/partic-recom.pdf>

Ohio Department of Health: Zoonotic Disease Program, "Ohio Bed Bug Work Group, 2011: Final Report and Recommendations to the Governor and Ohio General Assembly", January 5, 2011. Accessed via the Ohio Department of Health website: <http://www.odh.ohio.gov/~media/ODH/ASSETS/Files/web%20team/features/2011ohiobedbugworkgroupreport.ashx>

#### *Print media*

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