

**Perceived Health Effects of Litter and Trash by Inner City Residents**

Undergraduate Honors Thesis

Presented in Fulfillment of the Requirements for the Degree  
Bachelor of Science with Distinction in the College  
of Nursing at The Ohio State University

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## Abstract

### Perceived Health Effects of Litter and Trash by Inner City Residents

Residents in inner city, low income neighborhoods identify their neighborhood as unattractive and stressful with violence and trash identified as impacting health. Purpose: This study identified inner city residents' perceptions of the impact of litter and trash in their neighborhood on health. In particular, the impact on health and residents most vulnerable to the impacts were explored, as were actions to eliminate or control litter and trash.

Methods: This qualitative descriptive study was guided by the Integrated Model of Environmental Health. The target population was residents  $\geq 18$  years, living in an inner city neighborhood. Participants were a convenience sample recruited via fliers and referrals. Data were collected by interviews (n=7), two focus groups (n=17 participants), and go alongs (n=3). Participants were primarily African American, female, and unemployed. Seventy-two percent of participants rented their homes and had been living in the neighborhood for less than five years. Residents received a \$50 gift certificate for participation.

Results: Litter and trash were described as a pervasive problem in the neighborhood. Respiratory complications, diseases from rodent infestation, injuries, and depression were often cited as health impacts from litter and trash. Older adults, children, and those with preexisting health conditions were viewed as most vulnerable. Residents perceived litter and trash as a stressful problem with no easy solution. Residents also identified risks, such as infection associated with cleaning up litter and trash including used needles and glass. Participants proposed neighborhood cleanups, competitions for the cleanest street, and education as ways to improve the litter and trash situation.

Conclusions: Residents of an inner city neighborhood perceived litter and trash as impacting health. Findings from this study can assist school nurses and public health officials with the education of residents regarding the health effects of litter and trash. Additionally, results can be shared with organizations that work within the neighborhood to assist with actions to decrease litter and trash.

## Introduction

A goal of Healthy People 2020 is to “promote health for all through a healthy environment” (United States Department of Health and Human Services [DHHS], Healthy People 2020, 2011). Healthy People 2020 (2011), describes the importance of a healthy environment in improving quality of life. The environment is considered everything around a person, including their home, neighborhood, and work place (DHHS, 2011). Consistent with this Healthy People goal is the principle of environmental justice. Environmental justice is defined as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (U.S. Environmental Protection Agency, 2012). As applied to neighborhoods, environmental justice maintains that residents of any neighborhood have the right to have a clean and safe living space, and access to resources to maintain a clean and safe living area.

Historically, regulations from the 1970’s on sanitation such as the Safe Drinking Water Act, the Clean Air Act, and National Environmental Policy Act helped to improve the environment in the United States (Greenberg, 2011). These legislative efforts have been instrumental in improving neighborhood sanitation efforts resulting in cleaner and safer neighborhoods. Nursing has historically advocated for environmental health. Florence Nightingale addressed the issue of environmental health in her *Notes on Nursing* (1860) by describing the importance of living in a clean environment and having fresh air. She discussed how filth and dirt are “sources of impurity” that can lead to sickness. Nightingale maintained that nurses have a responsibility to educate people on the importance of cleanliness. Expanding on Nightingale’s environmental advocacy, the American Nurses Association (ANA) recently

adopted principles of environmental health for nursing practice (ANA, 2007). One of these principles states that “nurses participate in assessing the quality of the environment in which they practice and live in” (pg 16). Nurses have the responsibility to monitor the safety and cleanliness of their environments. Another principle, which is consistent with environmental justice, is that nurses, patients, and communities have the right to know about “potentially harmful products, chemicals, pollutants, and hazards” in their environments (pg 16). This research is grounded in the environmental principles of Nightingale and the ANA in exploring residents’ perceptions of the health effects of litter and trash in their urban neighborhood and their suggestions related to improving the sanitation of their neighborhood. This study is part of a larger study that encouraged participation of the neighborhood community, external stakeholders, and partners in public and private efforts to promote revitalization and improvement of quality of life in the neighborhood; and to guide those efforts through specific recommendations of key areas for improvement. The purpose of the larger study was to identify the knowledge, attitudes, and beliefs of residents of the urban community regarding brownfields and litter in their community.

The specific purpose of this study is to identify urban residents’ perceptions of the impact of litter and trash in their neighborhood on health. The three research questions for this study are:

1. What particular health effects are perceived by residents to be related to litter and trash?
2. Who is perceived to be most impacted by litter and trash?
3. What can be done to improve the litter and trash in an urban neighborhood?

### **Literature Review**

Little research has examined urban residents' perceptions of the health effects of litter and trash, who is most impacted by litter and trash, and what can be done to improve the litter and trash situation in neighborhoods. Severance and Zinnah (2009) surveyed residents' (n=164) perceptions of an urban Michigan neighborhood. Trash, animals, and pollution were identified by eight percent of respondents as important health issues. In an open-ended question, respondents identified having a clean environment as the second most important element in a healthy neighborhood. The authors concluded that:

Professionals from higher income neighborhoods may not be aware that the excessive trash in a neighborhood is widespread and seen as a health problem. Unless staff [professionals] spend substantial time in the neighborhoods or listen to residents, the impact of trash in a neighborhood may not be considered in planning services" (p.22).

In a cross-sectional study that examined perceptions of the neighborhood and the social environments of residents (n=997) of a mid-sized Australian city an association was found between satisfaction with one's neighborhood and physical activity. The type of physical activity of the residents was influenced by the environment of the neighborhood. Higher satisfaction with one's neighborhood led to more physical activity, such as walking or biking (Stronegger, Titze, and Oja (2010)).

Forsyth and Davidson (2009) documented the presence of litter from alcohol containers (n=1406 pieces of trash) in eight neighborhoods in a Scottish town. The most disadvantaged neighborhood had 579 (41%) pieces of trash, whereas the least disadvantaged neighborhood had 137 (10%). The authors concluded that the presence of alcohol containers and trash can be an

indicator of neighborhood disadvantage. Kamphuis, et al. (2010) also analyzed neighborhood perceptions by residents (n=733) of 14 neighborhoods in an urban Netherland city. The overall aesthetic score for the neighborhoods was low. Graffiti and litter were identified as present in forty five percent of the neighborhoods. The authors found that residents of lower income neighborhoods were more likely to view their neighborhood as unattractive compared to those in higher income neighborhoods.

A survey of London residents (n=658) living in neighborhoods with high socio-economic status (SES) and of residents living in low SES neighborhoods was performed by Steptoe and Feldman (2001) to determine the relationship between neighborhood problems and health effects. The presence of litter was identified as one of the major neighborhood problems. An inverse association was found between neighborhood problems and self-rated health. A systematic review of 33 articles to identify the effects of neighborhoods on older adults was conducted by Yen, Michael, and Perdue (2009). Neighborhood problems, which included litter and trash, were identified as related to self-rated health issues and symptoms.

Latkin and Curry (2003) interviewed residents (n=818) living in high drug use areas of Baltimore, Maryland to examine the relationship between neighborhood perceptions and depression. Variables studied included presence of litter or trash on the street, vandalism, and crime. Sixty-nine percent of the respondents identified litter and trash as an issue in their neighborhood. The presence of litter and trash was related to vandalism, vacant housing, burglary, selling drugs, robberies, and depression. In another Baltimore study, Yonas, Campo, Burke, and Gielen (2007) interviewed 16 “prominent neighborhood individuals” (p.672) to determine how neighborhood factors influenced violence in adolescents. Vacant houses, litter and trash were identified by participants as contributing to violence. Trash was perceived as

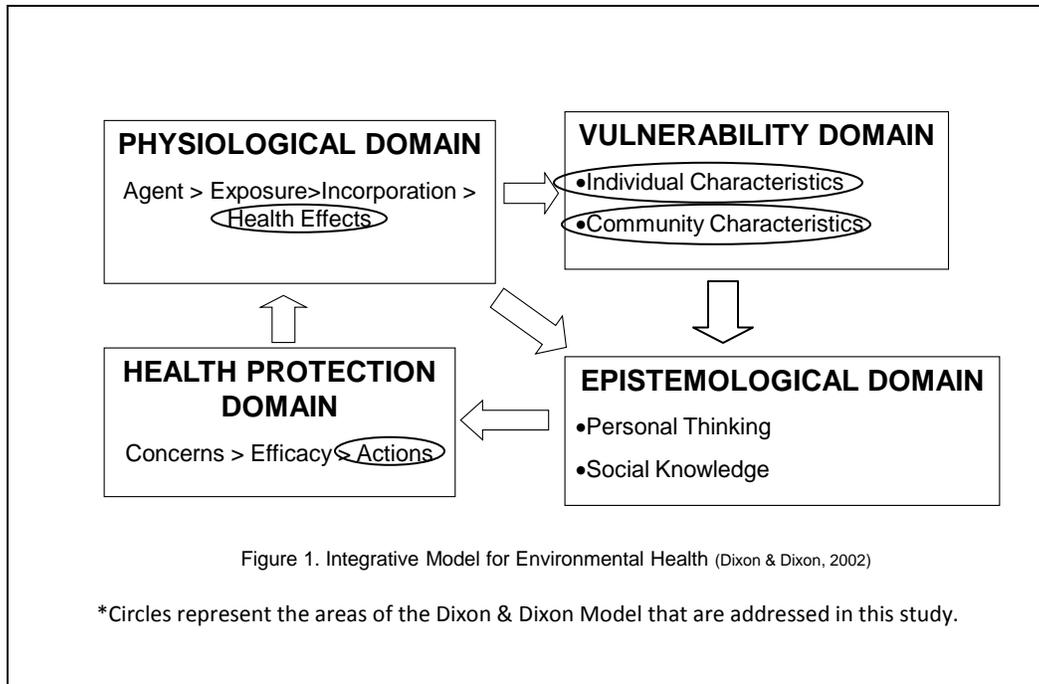
giving people places to “stash drugs and guns” (p.678). Trash and vacant houses were identified as having psychological effects and affecting self-perceptions and perceptions of their neighborhood.

The minimal available published literature indicates that residents perceive litter and trash as an issue within their neighborhoods and this is most evident in neighborhoods in which residents with lower SES reside (Research Question 2). The appearance of the neighborhood impacts aspects of resident’s lives including exercise, safety, physical and mental health (Research Question 1). No literature was found that examined resident’s suggestions to address litter and trash in their neighborhoods (Research Question 3).

### **Conceptual Model**

The Integrated Model of Environmental Health by Dixon and Dixon (2002) guided this study (Figure 1). This model describes the circular relationship between four different domains: Physiological, Vulnerability, Epistemological, and Health Protection. The Physiological Domain focuses on the cause of the problem in the environment. This includes the causal agent, amount of exposure to the agent, incorporation or how it affects the body physiologically, and health effects such as morbidity and mortality. The Vulnerability Domain focuses on who is most likely to be affected by the issue. Two areas of concern are the individual and community levels. Individual level characteristics include overall health and nutritional status, age, and gender related risk factors. The community level characteristics include socioeconomic status, occupation, and residency. The Epistemological Domain examines how much people know about the problem through personal thought and social knowledge. Personal thought is a person’s own understanding of the issue based on their experiences. Social knowledge is the community’s understanding of the issue based on common individual understandings and the

spread of knowledge by professionals. Lastly, the Health Protection Domain targets what the people do about the issue and is comprised of concern, efficacy, and action. Concern is the how much the issue is perceived to be a threat in the community. Efficacy is the belief that something can be done about the issue. Action is the steps that are made to change the issue in the environment.



## Methods

### Design

This was a qualitative, descriptive study in which data were collected by two focus groups, seven interviews, and three go-alongs. This study was approved by the Institutional Review Board of The Ohio State University. Focus groups are gatherings of people that take part in a discussion led by a member of the research team with the purpose of obtaining opinions on a specific topic (Krueger & Casey, 2009). The interviews are one-on-one questioning by a member of the research team with a predetermined set of questions. During a go-along, a member of the research team walks with the participant around the neighborhood and uses

observation and questions to obtain the participant's perception of litter and trash in the area (Carpiano, 2008).

### Setting

The setting for this study was a low SES, urban neighborhood in the Columbus area that is about one square mile and is located near a large university. The majority of the population is African American (51%), whereas about a quarter (24.5%) of Columbus population is African American. The average income in the study neighborhood is \$15,318, compared to Columbus's of \$41,370. A third of the population in the study is between 20-29 years old, while in Columbus the average age is 30.6 years. Fifty percent of the neighborhood population is below the poverty level, compared to the 20% of Columbus as a whole (See Table 1).

**Table 1. Comparison of Study Neighborhood to Columbus**

	Study Neighborhood	Columbus, Ohio
Median Age	20-29 <sup>a</sup>	30.6 <sup>c</sup>
Median Household Income	\$15,381 <sup>a</sup>	\$41,370 <sup>c</sup>
Race/Ethnicity	51% African American <sup>b</sup> 49% Caucasian	67.9% Caucasian <sup>c</sup> 24.5% African American
Vacant homes	16% housing <sup>b</sup>	7.33% <sup>d</sup>
Population	4,700 <sup>a</sup>	1,708,625 <sup>c</sup>
Foreclosures	104 <sup>a</sup>	1,383 <sup>e</sup>
% Below poverty level	50% <sup>a</sup>	20% <sup>c</sup>

Data Sources:

<sup>a</sup> Lai, I. L. (2010). GIS and Crime Mapping in Weinland Park.

<sup>b</sup> Forrest, T. M., & Goldstein, H. (2010). Weinland Park Evaluation Project.

<sup>c</sup> <http://www.city-data.com/city/Columbus-Ohio.html>

<sup>d</sup> <http://zipatlas.com/us/oh/city-comparison/percentage-vacant-housing-units.htm>

<sup>e</sup> <http://www.realtytrac.com/trendcenter/oh-trend.html>

## Participants

Participants were a convenience sample of residents currently living in the urban neighborhood who were over the age of 18. Recruitment occurred via flyers placed in public community buildings. Flyers contained information on the method, date, and time of data collection and a research phone number to call to participate. Residents interested in participating initially called the research phone number and were screened for eligibility and availability by a member of the research staff. Residents agreeing to participate received a reminder phone call or email the day before the focus group, interview, or go-along. Participants received an incentive \$50 gift card to a local grocery store.

## Instruments

A structured interview guide was used for the interviews, focus groups, and go-alongs. Questions were derived from the Integrated Model of Environmental Health (Dixon & Dixon, 2002) and addressed all four domains of the model. The questions analyzed in this study related to the Physiological, Vulnerability, and Health Protection domains. These questions addressed participant's perceptions of the type of people who are vulnerable to the health effects of litter and trash, the health effects that can result from litter and trash, and residents' suggestions for reducing or eliminating litter and trash. See Table 2 for the specific questions used for this study and Appendix A for the entire interview guide.

**Table 2. Interview questions analyzed in this study by domain.**

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Physiological Domain
<ul style="list-style-type: none"> <li>• How could litter affect someone's health?</li> </ul>
Vulnerability Domain
<ul style="list-style-type: none"> <li>• In thinking about litter– what type of person might be more at risk for health problems if</li> </ul>

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they were exposed to litter/trash?

- What do you think makes this community more at risk for health problems from litter?

#### Health Protection Domain

- What types of things are being done now in this neighborhood about litter?
  - What are things that people/families living in this neighborhood could do about litter?
  - What are things that the organizations, businesses, groups (e.g., city, Civic Association, churches) could do about litter in this neighborhood?
  - What would help neighborhood residents' deal with litter
  - What do you think can actually be done about litter in this neighborhood by you? other residents? civic association? By others?
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#### **Procedures**

*Focus Groups.* Focus groups (FG) discussions were moderated by an experienced moderator, and included a co-moderator and one or two note takers. FGs took place at a central location within the neighborhood. Upon arriving at the FG site, participants were greeted by the moderator, co-moderator or note-taker, and guided to FG area. Refreshments and a light snack were provided prior to and during the FG. The consent form was read aloud by the moderator and residents agreeing to participate completed the consent form and then the demographic form. Once informed consent was obtained, the moderator reviewed ground rules for discussion and achieved consensus regarding these ground rules; such as speaking one at a time, respecting other's opinions, and no side conversations. The moderator then led the discussion using the semi-structured interview guide. FGs were recorded using at least two digital recorders. At the end of each FG discussion, the co-moderator summarized the discussion and added any

additional comments of participants. Gift cards were dispersed following the conclusion of the discussion.

*Interviews.* Interviews were conducted one-on-one with participants at a time and location convenient for the participant. Using the same procedure as for the FG, participants completed the informed consent form and then the demographic form. The interviewer then asked the participant questions from the interview guide. Interviews were digitally recorded. At the conclusion, the interviewer summarized the responses by the participant and any additional comments were added; the gift card was then dispersed.

*Go-alongs.* Go-alongs were conducted by having a member of the research team talk with the participant while walking around the neighborhood at a time and date convenient for the participant. Participants first completed the informed consent form and then demographic form. The discussion was recorded on a tape recorder as the interviewer and the resident walked through the neighborhood. At the conclusion of the go-along, main topics were summarized and any additional comments of the participant were added. The gift card was then dispersed.

### **Data Management**

All FG discussions and interviews were professionally transcribed. All identifiers were removed during transcription. Transcriptions were reviewed by a member of the research team for accuracy. Finalized transcriptions were uploaded into NVivo for analysis. Data were abstracted from the transcripts by locating responses to interview questions identified in Table 2 and placed into a Word Document. Transcripts were re-read completely to assure no data were missed.

**Data Analysis**

*Coding Scheme.* A coding scheme based on the Dixon and Dixon (2002) domains and elements within each domain was developed during the larger study by the research team. Table 3 includes the elements and sub-elements of each domain that were coded in this study.

**Table 3. Elements and sub-elements by Domain**

Domain	Elements	Sub-Elements		
Physiological	Health Effects	Psychological		
		Injury		
		Respiratory		
		Unspecified Health Effects		
		Infection		
		Cardiac		
		Dermal		
		Latent Health Effects		
		Vulnerability	Individual	Age
				Gender
Health status				
Income				
Nutrition				
Community characteristics	Occupation			
	Race			
	Residence			
	Location			
	Density			

Domain	Elements	Sub-Elements	
Health Protection	Actions-Individual	Clean Ups	
		Incentives	
		Education	
	Actions-Community	Business	
		Children	
		Clean Ups	
		Education	
		Actions - Other	Incentives
			Competitions
	Receptacles		
	Government		
	Homeownership		
	Pride		
		Organization	
		Education (general)	

Coding was done by identifying key words or phrases for each domain. Data were coded individually by two members of the research team and then compared for reliability. Any differences were discussed until 100% agreement was reached. The total number of comments for each of the areas analyzed was tabulated and the percentage of comments per domain, element, and sub-element were calculated.

## Results

### Participants

Twenty-seven residents participated in the focus groups, interviews, or go-alongs. Participants were primarily African American (63%), female (67%), unemployed (63%), had at least a high school education (89%), and rented their home (72%). Participants ranged in age from 21-78 years with the majority (46%) between the ages of 31 and 59 years. Most (52%) lived in the community for less than five years.

### Health Effects

There were 45 comments by participants related to health effects of litter (Table 4). The majority of comments related to psychological effects, specifically to depression (20%). Four themes were developed that represent the participants' responses.

Psychological effects were identified in fourteen comments (31.1%). The never ending cycle of litter and trash was identified as causing feelings of hopelessness and depression. Residents also identified having a lack of control over the litter and trash situation as also causing depression. This theme is shown in this comment:

*would probably argue that a large presence of just litter all the time could impact someone's mental health by contributing to maybe a sense of depression or lack of feeling good about the area they live. If you already are having struggles personally with income, or health or difficulties with interpersonal relationships, if you live in a neighborhood that looks discarded and unloved and lots of litter, then I think that that'll just add to your depression.*

The second most common theme was respiratory effects. Specific illnesses such as allergies, asthma, colds, and other breathing issues were identified by residents. Cardiac issues were also identified by one comment. These are evident in this resident's response, *"People that already have health problems: asthma, maybe heart murmurs, breathing problems. Those people I would say would be more at risk."*

Injury and infections were identified as the third most common theme among responses. Residents identified that broken glass, animal bites, and needles can cause injury and/or infection portrayed in this comment, *"Cannot walk around in sandals due to broken glass pieces from beer."* Another comment illustrates this theme as well, *"go to pick the bag up, there could be a needle in there, and you get stuck by that needle."*

Lastly, there were eight comments that did not identify specific illnesses or effects of litter and trash, but did identify that litter and trash as having an overall impact on health. *"But trash does contribute to your health,"* is a quote portraying this idea.

**Table 4. Health effects coding breakdown by themes**

<b>Code</b>	<b># Comments (n=45)</b>	<b>Percent of Total Comments</b>
Psychological		
Depression	9	20%
Other	5	11.1%
Respiratory		
Allergies	2	4.4%
Asthma	4	8.9%
Colds	1	2.2%
Other	2	4.4%
Injury	8	17.8%
Unspecified Health Effects	8	17.8%
Infection	4	8.9%
Cardiac	1	2.2%
Dermal	1	2.2%

\*Comments used more than once for codes

## **Vulnerability**

There were 86 comments by participants related to vulnerability to litter (Table 5). The majority of comments related to individual characteristics, specifically to age (38.4%). Children were identified by 27% of the comments as most vulnerable to litter. Only 7% of the comments related to the vulnerability of the community at large. Sixteen themes were developed that characterized the responses.

Children were identified by residents as vulnerable because their immune systems are not completely developed, they are outside more and they are exposed more to litter and trash, and residents believed that children are more likely to put trash in their mouths. This comment by a resident demonstrates these themes.

*A kid I think will be more liable to get sick off litter cuz they be out here playing a lot. And kids put, like they play in leaves. So, if it's beer cans or anything— food, anything and kids, they don't really don't look when they're playing. They just touch stuff. And there out here playing with other kids and they're touching each other.*

Elderly were identified as vulnerable due to possibly having weakened immune systems and having more health issues.

The second most common theme related to health. People who have pre-existing health issues were identified as being more at risk, as well as those with a compromised immune system. This is demonstrated by this comment by a resident:

*I guess that has a compromised immune system that gets in contact with bacteria or anything like that, would be in trouble. And that obviously includes a lot of chronic health conditions that people in general in society have.*

Income was also identified as a factor that influences vulnerability. Residents identified having a lack of health insurance and resources as risk factors as evident by this resident's response, "*our lower income don't always have the health benefits that somebody that has.*"

Residents had differing opinions about occupation being a risk factor, there were four comments indicating occupation was a risk factor and three comments in which participants voiced that occupation had no impact on vulnerability. Neither males nor females, nor any particular race were identified as being more at risk for health effects of litter and trash. Certain residences were identified by residents as being more vulnerable than others within the neighborhood. This is illustrated by this comment: "*There are times where we won't even sit out on our front porch because the presence of the flies that come from that dumpster.*"

Residents identified certain community characteristics that indicated their neighborhood was vulnerable to litter and trash. One theme was that certain locations within the neighborhood are perceived as being more vulnerable for litter and trash. This is evident in this comment by a resident, "*At one time I lived on the west side, and later on I lived on the east side, and there is a big difference.*" One comment was made about the density of the area and how this leads to an overflow of trash in the dumpsters. This is demonstrated by this comment:

*Is rather dense. In other words, what do you call it, high occupancy of various homes. You have a lot of people living in single-family homes or half-doubles. And so you have a lot more people living than you have containers that can accommodate the waste from those homes.*

**Table 5. Vulnerability coding breakdown by themes**

<b>Code</b>	<b># Comments (n=86)</b>	<b>Percent of Total Comments</b>
Individual Age	80	93.0%

<b>Code</b>	<b># Comments (n=86)</b>	<b>Percent of Total Comments</b>
Young	23	26.7%
Elderly	9	10.4%
Age (no impact)	1	1.2%
Health Status	14	16.3%
Income	10	11.6%
Gender	5	5.8%
Residence	5	5.8%
Race	4	4.7%
Occupation	4	4.7%
Occupation (no impact)	3	3.5%
Nutrition	2	2.3%
Community Characteristics	6	7.0%
Location	5	5.8%
Density	1	1.2%

\*Comments used more than once for codes

### **Health Protection**

There were 136 comments by participants focusing on actions to address the litter and trash situation in the neighborhood (Table 6). The number of comments between individual actions and community actions was almost equal, with the majority (36.8%) focusing on neighborhood clean ups. Twenty-one themes were developed for the health protection domain.

Residents identified three areas for *individual actions*: clean ups, incentives, and education. Neighborhood clean ups were identified most commonly as the action individuals can take to improve the litter and trash in their neighborhoods. Individual strategies identified by participants included: picking up after yourself, keeping the area around your house clean, and going around the neighborhood to pick up litter and trash. These strategies are exemplified in this comment: *“Pick up after themselves. I collect trash too when I see it lying around especially around my house.”* Another strategy participants identified was giving away incentives to residents who went around the neighborhood and picking up litter and trash. A comment that illustrates this theme is,

*I think maybe have like rewards—I don't want to say rewards; people should do it anyway. But maybe like try to bribe people or motivate people to want to have a clean neighborhood or keep their yards clean, or even their neighbors' yard clean.*

Educating residents was also identified as a way to improve litter and trash within the neighborhood. These comments focused on residents educating and setting a good example for their children. This comment illustrates educating residents about the effects of litter and trash,

*I think educational; they need to know—this is what happens when you keep litter. It's not going to clean itself for one. And when you litter, someone else is going to do it—well, they're doing it, so I'm just going to go ahead and do it. Just education about littering.*

Residents identified six areas for *community actions*: clean up, education, children, businesses, incentive, and competitions. The majority of the comments were made about organizing community clean ups. Ideas ranged from having set days for clean ups, organizing clean ups by streets, and having large monthly clean ups. These themes are illustrated by this comment: “one person would take responsibility for their entire street, so they could educate their neighbors around proper dumpster usage, and they would also organize a litter clean up for their street.” Educating residents about resources available and potentially having a public service campaign to bring awareness to the issues were identified by residents. One participant had this idea, “Not just a sign, but also create a logo that includes a character—Mr. Clean, whoever.” Children were identified by participants as needing to be educated about the impact of litter and trash by their parents and in schools. This theme is shown by this participant's comment: “we need to educate. We need to go through the schools politically and start educating

*these kids from an early age, even if we do have to give them something to do it."* Having businesses take responsibility for the litter and trash around their locations was an idea brought up by participants and illustrated in this comment: *"business owners could also pick up the trash within a hundred foot radius of their business, would be huge."* Residents also identified having incentives, such as a picnic or discounted rent, for cleaning up the neighborhood as well as having street competitions are rewarding the cleanest street.

Receptacles were identified as another strategy to improve the litter and trash situation. Residents noted that increasing the number of trash cans available and placing them along streets where people commonly walk would help reduce the amount of litter. This is evident by this comment: *"There have to be receptacles. There have to be trash/litter bins at strategic intervals. That usually means corner to corner."*

Participants stated the city government had a major a role in improving the litter and trash. Signing a petition, changing laws about abandoned housing, and increasing the number of trash pickups were common suggestions. This comment illustrates this theme, *"They should make a law where you have 5 years to tear down this building; if not this building is going to be [torn] down."*

Increasing homeownership was identified as a way to decrease the amount of litter and trash. Residents suggested that if there were more homeowners, people would have more pride in the neighborhood and keep it cleaner. Residents also identified that home ownership would increase the amount of pride within the community and thus would also decrease the litter. This is portrayed by this comment: *"I think if there was a more sense of community, that people would take more pride in their area and deal with the litter."*

**Table 6. Health protection coding breakdown by themes**

<b>Code</b>	<b># Comments (n=136)</b>	<b>Percent of Total Comments</b>
<b>Individual</b>		
Clean Ups	28	20.6%
Incentive	6	4.4%
Education	5	3.7%
<b>Community</b>		
Clean Ups	22	16.2%
Education	9	6.6%
Children	9	6.6%
Business	5	3.7%
Incentive	4	2.9%
Competitions	2	1.5%
Receptacles	16	11.8%
Government	16	11.8%
Homeownership	4	2.9%
Pride	4	2.9%
Organization	3	2.2%
Education (general comments)	3	2.2%

\*Comments used more than once for codes

**Table 7. Data Themes**

<b>Category</b>	<b>Theme</b>
Health Effects	<ul style="list-style-type: none"> <li>• Never ending cycle of litter and trash can cause people to feel depressed.</li> <li>• Litter and trash can cause people to have feelings of hopelessness and the inability to do anything about the situation.</li> <li>• Exposure to litter and trash can impact respiratory and cardiac conditions.</li> <li>• Injuries and infections can result from broken glass, animal bites, and needles.</li> <li>• No specific health effects were identified, but litter and trash were identified as having an overall impact on a person’s health.</li> </ul>
Vulnerability	
Individual	<ul style="list-style-type: none"> <li>• Children’s immune systems not completely developed.</li> <li>• Children are outside playing more, they are exposed more to the litter and trash.</li> <li>• Children are more likely to pick up trash or put it in</li> </ul>

Category	Theme
	<p>their mouths.</p> <ul style="list-style-type: none"> <li>• Elderly have more health issues.</li> <li>• Elderly are more vulnerable because they may possibly have weakened immune systems.</li> <li>• People who already have pre-existing health issues such as asthma.</li> <li>• People with compromised immune systems.</li> <li>• Lack of health insurance.</li> <li>• Lack of resources available.</li> <li>• Working nights.</li> <li>• Job with more exposure.</li> <li>• There is no difference based on occupation.</li> <li>• Neither males nor females were identified as being more at risk.</li> <li>• No difference based on race.</li> <li>• Certain residences have more litter and trash.</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Certain locations in the neighborhood have more litter and trash.</li> <li>• The more people living in one house create more litter and trash due to overflow in the dumpsters.</li> </ul>
Health Protection	
Individual	<ul style="list-style-type: none"> <li>• Residents should pick up after themselves.</li> <li>• Residents should keep the area around their house free of litter and trash.</li> <li>• Residents should participate in neighborhood litter and trash pick ups.</li> <li>• Rewarding residents who pick up litter and trash in the neighborhood.</li> <li>• Parents educating their children about not littering and setting a good example.</li> <li>• Educating residents on the health effects of litter and trash</li> </ul>
Community	<ul style="list-style-type: none"> <li>• The community setting days for neighborhood clean ups.</li> <li>• Organizing clean ups by street or area</li> <li>• Having large monthly neighborhood clean ups.</li> <li>• Educating residents about resources available for litter and trash pick up, such as the phone number for bulk pick up.</li> <li>• Having an anti-littering public service campaign.</li> <li>• Businesses accepting responsibility for keeping the area around their location clean.</li> <li>• Educating children about litter and trash within the school system</li> </ul>

Category	Theme
Other themes	<ul style="list-style-type: none"> <li>• Holding a picnic for residents who assist with cleaning the neighborhood.</li> <li>• Discounting rent for maintaining a clean area around your residence.</li> <li>• Having street competitions and rewarding the cleanest one.</li> <li>• Increasing the number of receptacle and placing them in common areas</li> <li>• Signing a petition about increasing the number of trash cans throughout the neighborhood</li> <li>• Changing the laws to address abandoned housing in a more timely way</li> <li>• Increasing the number of trash picks up</li> <li>•</li> <li>• Increasing homeownership in the area to increase neighborhood pride and the trash</li> <li>• Increasing community pride would decrease the amount of litter and trash</li> </ul>

### Discussion

This study recruited residents from an inner city neighborhood to investigate their perceived health effects of litter and trash, to identify those most vulnerable to the impacts of litter and trash, and identify strategies residents determine can improve the litter and trash situation in their neighborhood. Participants identified psychological health effects and respiratory issues as the main health effects of exposure to litter and trash. Children, elderly, and those with pre-existing health conditions were perceived by residents to be most vulnerable to health effects of litter and trash. Neighborhood clean ups, education and increasing the number of trash receptacles were noted as strategies to improve the litter and trash situation in the neighborhood.

The findings from this study are consistent with the limited published literature in this area. Consistent with findings in this study, previous research has showed that residents of lower SES identify litter and trash as a problem within their neighborhood (Yen, Michael, and Perdue,

2009; Steptoe and Feldman, 2001). In this study, participants identified several psychological effects of litter and trash such as depression, which is similar to the findings in previous research (Yonas et al, 2007; Latkin & Curry, 2003)

Results from this study are relevant to nurses, specifically public health and school nurses. Public health and school nurses can use these findings to develop educational initiatives concerning the health impacts of litter and trash that are aimed at children and their families. Education can be targeted toward the perceived health effects that were identified by residents. At the conclusion of the study, a World Café was held to share the study findings with residents and provide an opportunity for residents to share their thought and opinions. In addition to the findings of this study, some of these participants proposed starting a business within the neighborhood to help improve the neighborhood's appearance and decrease the amount of litter and trash.

Limitations of the study included a small sample size. Consistent with qualitative methodology, only the thoughts and opinions of the participants were gathered and other views may have been missed. This study only used participants that were residents of one neighborhood and business owners' and experts' opinions were not considered in this study. Data were collected only in one neighborhood, therefore findings from this study cannot be generalized to other neighborhoods, but ideas such as education and awareness can be utilized in other future studies.

### **Conclusion**

The findings from this study are important in assisting with educating residents living in the neighborhood about the impact of litter and trash. Sharing study results, specifically the resident's thoughts on how to improve the litter and trash situation, with organizations that work

within the neighborhood is important to assist with decreasing the amount of litter and trash.

The method of discovering residents' thoughts on a topic first before attempting to implement interventions or education is important as it allows researchers to understand the residents' perspective and tailor interventions for each neighborhood specifically. Utilizing the Dixon and Dixon Model (2002) was easily applicable and would be appropriate for other future studies with a similar purpose.

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## Appendix A

### Introductory Questions

Environmental health has been defined as freedom from illness and injury related to exposures to toxic agents and other environmental conditions potentially detrimental to human health. So, some people think of environmental health as the health of the environment; some people think of environmental health as how the water, air, and soil effect human health.

We're going to be talking about environment health as it relates to soil quality. I'd like you to think about soil quality in the Weinland Park area where you live. Just to be sure we're all talking about the same area – here is a map of the Weinland Park area. Problems in soil quality can result from many different things.

1. In thinking about soil quality in general, not just in this neighborhood, can you name some of the reasons why there can be problems in the quality of soil/dirt?  
[Write list on whiteboard/paper so easily viewed by participants]  
[Probe for litter, trash, and brownfields]
2. In you were to grow vegetables in your yard, would you consider the things you grew to be safe to eat? What about vegetables grown in the common garden by the Godman Guild?

### Key questions

We're going to focus our discussion on specifically on litter and old building sites otherwise known as brownfields and their impact on soil quality. We're going to talk about how brownfields and litter can affect health, whose health may be affected by brownfields and litter, what people know about brownfields and litter and their potential impact on health, and finally what people in this neighborhood can do about old building sites/brownfields and litter.

We're going to start our discussion talking about litter:

[Epistemological Domain – Personal thought; Physiological Domain: Agent]

- In thinking about the litter in this neighborhood:
  - Would you consider litter to be a problem in this neighborhood and if so, why?
  - Where does the litter come from? [Probe: individual behavior, system issues such as trash bins]
  - What types of litter are in this neighborhood?
  - Where is most of the litter in this neighborhood [Probe: alleys, rental property, abandoned homes]
  - What happens to the litter?

[Physiological Domain – Health Effects]

- **How could litter affect someone's health? [Probe: physical and psychological health; adults, children]**

[Physiological Domain – Exposure, Incorporation]

- How could people who live in this neighborhood come in contact with or be exposed to litter? For example, could litter affect someone's health if they touch it? Smell it? Eat it?
  - How much contact would someone have to have for it to make them sick?

[Vulnerability Domain – Individual and community characteristics]

- **Some people have more bad health effects from different hazards and pollutants in the environmental than others. For example, children and the elderly are more at risk for breathing problems when there is an air quality alert from smog or other things.**
  - **In thinking about litter– what type of person might be more at risk for health problems if they were exposed to litter/trash? [Probe: age, gender, race, location of residence, occupation, health status, nutritional status, SES]**
  - Have you or anyone you know in this neighborhood, had their health affected by litter?
  - **What do you think makes this community more at risk for health problems from litter?**

[Epistemological Domain –Social knowledge]

- We've talked about the health effects of litter. Now I'd like to know why, where, and from whom do you get information about litter?
  - Have you ever looked for information about the health effects of litter? If so, why? And from where?
  - If you needed to look for information about the health effects of litter where would you look?
  - Who do you trust to give you good information about the health effects of litter? [Probes: Is the information focused on reporting a problem or preventing problems from occurring? Is the information written or spoken? Is the information coming from health professionals or someone else? Possible sources of information include friends, spouse, church, books, magazines, pamphlets, TV, Internet].
  - Have your attitudes towards litter in this neighborhood been affected by
    - TV or radio? civic association? Books? Gardening? Other?

[Health Protection Domain – Concerns, Efficacy, Actions]

- The final area that I'd like to talk about is what this neighborhood community can do about litter.
  - **What types of things are being done now in this neighborhood about litter?**
  - **What are things that people/families living in this neighborhood could do about litter? [Probes: pick up litter, recycle, neighborhood groups]**
  - **What are things that the organizations, businesses, groups (e.g., city, Civic Association, churches) could do about litter in this neighborhood? (Probe: recycling bins, trash receptacles, more accessible trash bins)**
  - **What would help neighborhood residents' deal with litter? [Probe: What types of services and information would be most useful?]**
  - **What do you think can actually be done about litter in this neighborhood by you? other residents? civic association? By others?**

We're now going to focus our discussion on old industrial sites (brownfields).

- Are you familiar with any old industrial sites in this neighborhood? If so, which ones and where are they?
- Are you familiar with the term ‘brownfields’? If so – what does it mean?

Because not everyone knows about brownfields, I’m going to give a definition of brownfields and some examples:

Brownfields are any land contaminated with hazardous chemicals that is being reused for real estate or development.

There are 3 brownfields in the this neighborhood area: the Columbus Coated factory site (runs along both sides of North Grant Avenue between East Fifth and East 11th avenues), the 3M site (located on east side of North Fourth Street between East Fifth Avenue and East Sixth), and a third site at Cleveland Ave and 5th. (Show pictures of the sites)

[Epistemological Domain – Personal thought; Physiological domain: Agent]

- Would you consider brownfields to be a problem in this neighborhood and if so, why?
- I’d like you now to tell me everything you know about the brownfields in this neighborhood – for example, what have you heard about the Columbus Coated site? The 3M site? Anything else you can tell us about the brownfields in this neighborhood?

[Physiological Domain – Health Effects]

- How could brownfield sites affect someone’s health? [Probe physical, psychological; adults; children; elderly]

[Physiological Domain – Exposure, Incorporation]

- How could people who live in this neighborhood come in contact with or be exposed to things from the brownfield sites that could effect their health? For example, could someone’s health be effected if they touched the soil in the brownfield sites? [Probe: dermal, inhaled, ingestion; Exposure duration ]
- How much contact or exposure would someone have to have for it to make them sick?

[Vulnerability Domain – Individual and community characteristics]

- Some people have more bad health effects from different hazards and pollutants in the environmental than others. For example, children and the elderly are more at risk for breathing problems when there is an air quality alert from smog or other things.
  - In thinking about the brownfield sites– what type of person might be more at risk for health problems if they were exposed to the brownfield sites? [Probe: age, gender, race, location of residence, occupation, health status, nutritional status, SES]
  - What do you think makes this community more at risk for health problems from brownfields?

[Epistemological Domain –Social knowledge]

- We've talked about the health effects of brownfields. Now I'd like to know why, where, and from whom do you get information about brownfields?
  - Have you ever looked for information about the health effects of brownfields? If so, why?
  - Where would you look for information about the health effects of brownfields?
  - Who do you trust to give you good information about the health effects of brownfields?

[Probes: Is the information focused on reporting a problem or preventing problems from occurring? Is the information written or spoken? Is the information coming from health professionals or someone else? Possible sources of information include friends, spouse, church, books, magazines, pamphlets, TV, Internet].

- Have your attitudes towards brownfields in this neighborhood been affected by
  - TV or radio? civic association? Books? Other

[Health Protection Domain – Concerns, Efficacy, Actions]

- The final area that I'd like to talk the this neighborhood community can do about brownfields.
  - What types of things are being done now in this neighborhood about brownfields?
  - What are things that people/families living in this neighborhood could do about brownfields?
  - What are things that other organizations, businesses, or groups (e.g., city, civic association, churches) could do about brownfields in this neighborhood?
  - What would **help** this neighborhood residents deal with brownfields? [Probe: What types of services and information would be most useful?]
  - What do you think can actually be done about brownfields in this neighborhood by you? other residents? civic association? By others?

Questions derived from Harnish, Butterfiled, & Hill, 2006)

### **Ending question**

Is there anything that we didn't talk about this <evening, morning> related to litter/trash in this neighborhood? To brownfields in this neighborhood?

*FG: [CO-MODERATOR(s) NAME(s)]* is/are going to read us a summary of the key points that she heard emerge from the discussion. I'd like to you listen to the summary, and tell me if anything was left out of the summary, or if you have anything that you'd like to clarify or add to the key points before we conclude our discussion.

*Co-moderator reads summary – asks if anything was left out, if anyone would like to clarify anything, or add any other key points.*

### **Closing**

I want to thank you for taking the time to be part of the group discussion.

Before we conclude, I want to remind you that our discussion is confidential nature of the discussion, so please do not share what was discussed here with anyone after you leave.

Again, we thank you all very much for being part of this discussion. We will now provide you with your gift certificate.