# Rental Housing and Health Equity in Portland, Oregon: A Health Impact Assessment of the City's Rental Housing Inspections Program

**Project Partners**

Oregon Public Health Institute, Multnomah County Health Department, Community Alliance of Tenants, Metro Multifamily Housing Association, Rental Housing Association of Greater Portland, City of Portland Bureau of Development Services, City of Portland Housing Bureau

**Funder**

The Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. The opinions expressed are those of the author(s) and do not necessarily reflect the views of the Health Impact Project, Robert Wood Johnson Foundation or The Pew Charitable Trusts.

ophi
oregon public health institute

**Prepared by:**
Steve White, Oregon Public Health Institute
Moriah McSharry McGrath, Multnomah County Health Department

**For more information about this report contact:**
Steve White, steve@orphi.org, (503) 227-5502

**Acknowledgements:**
This project relied on the time and expertise of numerous groups and individuals. Moriah McSherry McGrath from the Multnomah County Health Department contributed to data gathering and assessment at all phases and helped write the existing conditions component of the report, and Ed Marihart from the Bureau of Development Services helped field multiple data requests and clarifying questions about the inspections process. Elisa Harrigan and her staff at Community Alliance of Tenants also conducted tenant surveys. OPHI staff Beth Sanders coordinated meetings, dissemination and evaluation efforts, and Liz Paterson developed the project's evaluation component.

In addition, all members of the project's Steering Committee provided substantial input and expertise at all phases. SC members included:

- **Deborah Imse**, Executive Director , Metro Multifamily Housing Association
- **Elisa Harrigan**, Executive Director , Community Alliance of Tenants
- **Kari Lyons-Eubanks**, Policy Analyst , Multnomah County Health Department
- **Lila Wickham**, Environmental Health Director, Multnomah County Health Department
- **Moriah McSharry McGrath**, Research Analyst, Multnomah County Health Department
- **Phil Owen**, Executive Director, Rental Housing Association of Greater Portland
- **Elizabeth Carpenter**, Rental Housing Association of Greater Portland
- **Andrea Matthiessen**, Program Manager, Portland Housing Bureau
- **Ed Marihart**, Senior Management Analyst, Portland Bureau of Development Services
- **Steve White**, Project Manager, Oregon Public Health Institute
- **Noelle Dobson**, Associate Director, Oregon Public Health Institute

Special thanks are also due to the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, for funding this project, and to Health Impact Project staff, particularly Saqi Maleque Cho, for

providing advice and guidance throughout. The opinions expressed are those of the author(s) and do not necessarily reflect the views of the Health Impact Project, Robert Wood Johnson Foundation or The Pew Charitable Trusts.

# Table of Contents

# Executive Summary

This health impact assessment (HIA) of the City of Portland's rental housing inspection program compared the program's two current inspections models, the standard inspection model and the pilot enhanced model in East Portland, finding that both improve the health of rental housing residents but that the enhanced model has greater potential to contribute to improved health and health equity. These findings suggest important opportunities within Portland Bureau of Development Service's (BDS) inspections program to advance health and equity goals outlined in the Portland Plan.* This document describes the assessment process, its findings, and three key recommendations that the city funds:

1. **A strategic expansion of the enhanced inspections model;**
2. **Tenant and property owner/manager education through the housing inspection program; and**
3. **A more robust system of tracking inspections.**

## WHAT IS AN HIA?

HIAs are a relatively new policy and planning tool for providing decision-makers with information about how their proposed plans and policies will likely impact the health of the communities they serve and for offering recommendations about how to maximize the health benefits and minimize negative health impacts of their decisions. HIA practice has its roots in the increasingly well-understood fact that many of the strongest predictors of health and well-being are social and environmental conditions which are shaped by decisions in multiple sectors that often do not include considerations of health impacts in their decision-making processes. Accordingly, HIAs are meant to inform decision makers in multiple sectors as they make choices that affect the social and physical environments of the communities in which they work and serve. HIA also strives to assess the relative distribution of these benefits and burdens throughout the population, so that recommendations can help decision-makers assure equitable impacts of their plans and policies. HIA is a flexible tool but follows systematic procedures to assure its scientific integrity. More information about HIA is available on the Health Impact Project website at: www.healthimpactproject.org/hia.

* The Portland Plan is a 25 year strategic plan for the city that was adopted by City Council in April, 2012. The Plan and supporting documents are available on-line at: http://www.portland-online.com/portlandplan/ .

## WHY WAS THE HIA CONDUCTED?

Research has documented many connections between housing quality and health. The ability of rental housing, in particular, to support good health has become an increasingly important public health issue in Portland as the City's renter population continues to grow in size and diversity. The quality of rental housing also raises health equity issues because vulnerable groups such as low-income individuals and ethnoracial* minorities are significantly over-represented in the tenant population. Since these groups are at higher risk of multiple adverse health outcomes for a variety of reasons, it is important to maintain healthy rental housing to help minimize their health risks.

Depending on how they are designed and implemented, rental housing inspections programs can help support good health by working with tenants and property owners to ensure that rental housing is well-maintained and complies with Portland's property maintenance codes. This HIA was undertaken to inform current and future discussions about funding for the rental housing inspections program by providing City Councilors, BDS staff, and other local housing and health stakeholders with information about the relative health and health equity impacts of the two different housing inspection models currently employed in the City of Portland: the standard inspections model and an "enhanced" model, a more resource-intensive inspections model that has been implemented in areas of East Portland since 2010.

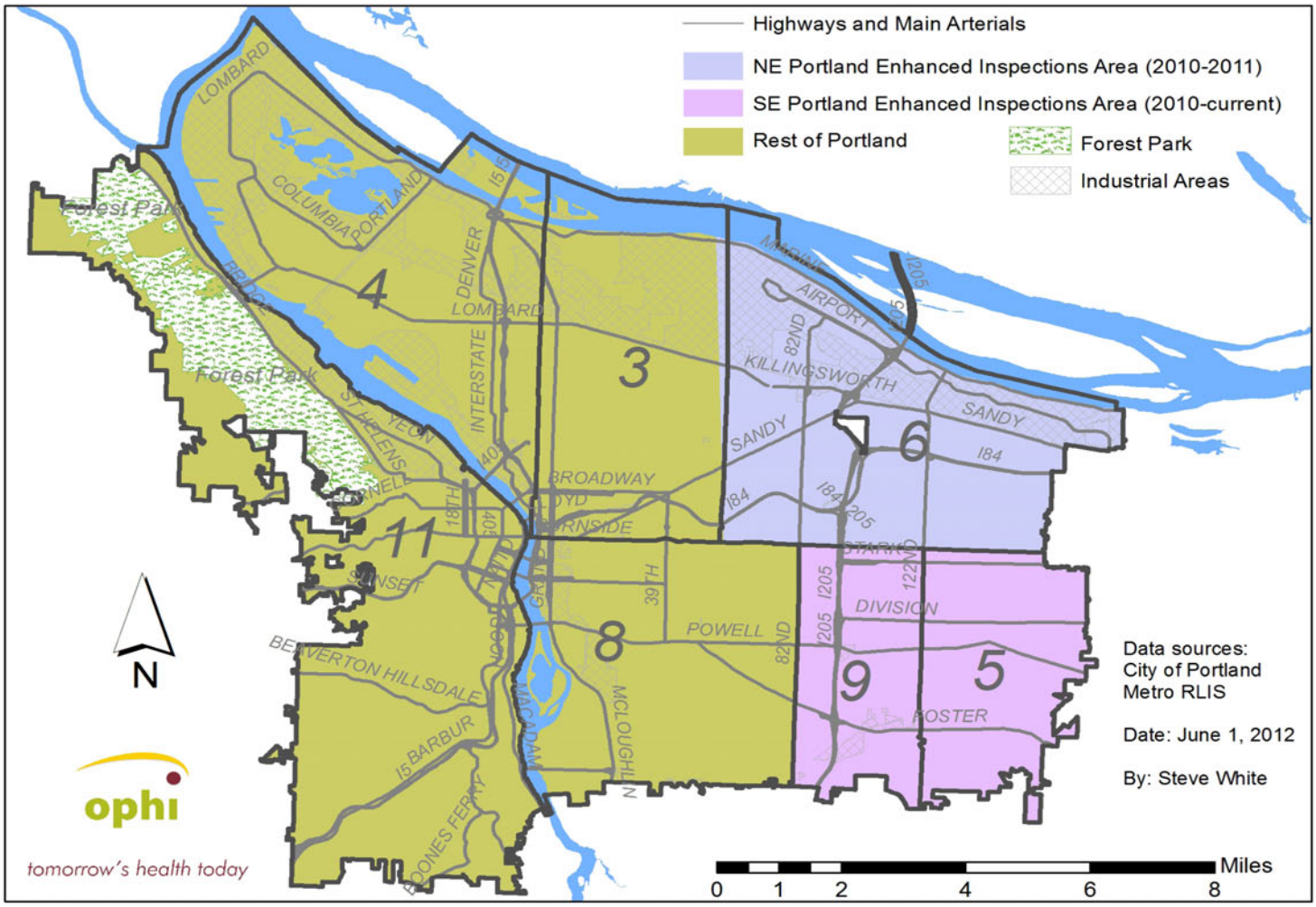
The standard model that the city has used for many years in all parts of Portland is a complaint-driven process in which inspections of housing units are triggered by complaints from tenants, neighbors, or other members of the public. Enhanced inspections were recommended in 2008 by the Quality Rental Housing Workgroup (QRHW)† in an attempt to improve the ability of the City's rental housing inspections program to address health related housing conditions, particularly for vulnerable groups such as low-income and ethnoracial households. Use of the enhanced model began in January 2010 in two areas: Outer Southeast Portland (south of Burnside St. and east of 82nd Ave.) and Outer Northeast Portland (north of Burnside St. and east of 57th Ave.). In the enhanced model, inspections are still initiated by complaints, but inspections that find a certain threshold of violations

* For the purposes of this project, we defined ethnoracial minorities as people who are of any non-white race and people who are Hispanic (of any racial background, including white). We relied on Census Bureau data to group people into white and ethnoracial minority categories.

† The Quality Rental Housing Workgroup was comprised of a large number of landlord, tenant, housing, and health stakeholders. It was tasked with increasing the effectiveness of the Bureau of Development Services' inspections program by working with both landlords and tenants to improve the quality of the city's rental housing stock and its ability to support the health of Portland's renters. The QRHG Final Recommendations report is available online at: http://www.portlandonline.com/shared/cfm/image.cfm?id=221397 [accessed6/1/12].

in the rental unit or on the exterior of the property can then trigger inspection of additional rental units in the property owner's portfolio. In October 2011, a shortage of inspectors led BDS to discontinue the program in Outer Northeast in order to meet the higher demand for enhanced inspections in Outer Southeast.

**Map ES1: Enhanced inspections districts**



Although health issues were one of the primary motivators for the formation and direction of the QRHW and its recommendations, the Neighborhood Inspections Team Stakeholder Advisory Committee (NITSAC)—a group that was formed to implement the QRHW recommendations—has not had the opportunity to assess the health impacts of the enhanced model relative to the standard model and determine whether it was fulfilling its purpose. As a result, decision-makers have not been able to evaluate these impacts as they direct resources for maintaining, eliminating or strategically expanding the geographic coverage of the enhanced model. This HIA seeks to provide this health-based information as City Councilors, city staff, and other stakeholders work together to enact budgeting and other policy decisions that best enable the housing inspections program to protect public health.

## WHO CONDUCTED THE HIA?

The project was led by Oregon Public Health Institute, a 501 c(3) non-profit organization that works with partners in many sectors to advance policies, plans, and practices that address the root causes of many of our state's most pressing health concerns. The Steering Committee for this HIA included representatives from Metro Multifamily Housing Association, Rental Housing Association of Greater Portland, Portland Bureau of Development Services, Community Alliance of Tenants, Multnomah County Health Department, and the Portland Housing Bureau. The Steering Committee directed the scope and methods of the project and worked together to develop recommendations based on the findings. The project received funding from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. The Health Impact Project is a national initiative designed to promote the use of HIA as a decision-making tool for policymakers. The opinions expressed are those of the author(s) and do not necessarily reflect the views of the Health Impact Project, Robert Wood Johnson Foundation or The Pew Charitable Trusts.

## WHAT DID THE HIA FIND?

This HIA found that:

1. there are strong connections between housing, health and equity
2. the current inspections program faces challenges in meeting community needs, and
3. the enhanced inspections model holds promise for better achieving health and health equity in Portland.

These conclusions are based on a review and analysis of scholarly literature, local

research, community health data, and BDS's inspections program tracking data. Each of these findings is presented in more detail below.

*1. There are many connections between housing, health, and equity.*

a. **Substandard housing contributes to poor health.** Existing academic research and local case studies have identified numerous health problems that are directly influenced by those housing conditions addressed in Portland's Property Maintenance Code (Title 29). Key issues of concern are asthma and lead poisoning (particularly among children); physical injuries from falls, burns, and electrocution; communicable diseases resulting from poor sanitation and pests; illness resulting from lack of heat and hot water; and stress from dealing with all of these problems.

b. **Groups at higher risk of various health problems—particularly communities of color and low-income households—are more likely to live in substandard housing.** Existing research and local data demonstrate that this is true both locally and nationally. Not surprisingly, low-cost rental housing tends to be lower quality and is less likely to be code-compliant. Substandard housing places socioeconomically disadvantaged populations in double jeopardy because they are already at higher risk of health problems and are also more likely to live in lower-cost housing.

c. **Housing inspections and the subsequent improvements to housing conditions reduce the occurrence and severity of multiple health problems.** Since most items in Portland's Property Maintenance Code are health-related, ensuring that properties meet these requirements will improve the ability of housing to support health.

d. **Tenant behaviors contribute to the health impacts of housing.** Independent of building characteristics and management practices, tenant behaviors can limit or degrade the ability of housing to support health. Examples of these behaviors include: introducing health hazards such as tobacco smoke, toxic cleaning chemicals, and pesticides; damaging the property; failing to use appliances such as ventilation systems properly; and neglecting to report maintenance issues in a timely manner. Because they are often the result of a lack of information or understanding regarding best practices, educational activities may help to change these behaviors.

e. **Healthy housing interventions are most effective when they address both housing conditions and tenant/landlord behaviors.** Research and best practices for housing-related health interventions demonstrate that education of landlords and tenants in combination with housing inspections is more effective than either service provided alone.

***2. Portland's current inspections program is constrained in its ability to support healthy housing and health equity.***

a. **Portland's standard inspections model imposes barriers to healthy housing for vulnerable households.** As documented in a 2006 report by the Community Alliance of Tenants and highlighted by the QRHW Final Report, cost-burdened renters often refrain from making complaints to the city because they fear that their landlord will raise their rents, intimidate, or evict them. Language can also be a barrier for households where English-language proficiency is limited.

b. **Both of the city's inspections models currently lack an educational component for landlords and tenants.** Educational materials and strategies for using them have been developed but due to the lack of funding for translation, distribution, and printing, BDS has not utilized them.

c. **The current tracking system used by BDS data collection makes it difficult to systematically assess which housing problems (and, subsequently, health determinants) are being addressed through inspections.** The current inspections database lumps 244 different pre-defined violation types into three broad, overlapping categories. This makes it impossible to track violations related to specific health outcomes, such as asthma or lead poisoning. This information would not only be useful for helping understand and quantify the health impacts of the inspections program, but would also help BDS and its public health partners develop educational materials and implement intervention programs. In addition, more detailed data would also help BDS determine which areas of the city would best benefit from the enhanced model and the additional staffing resources it requires.

***3. The enhanced inspections model improves housing conditions and health equity.***

a. **The enhanced model improves health equity in Portland.** Because rental households are more likely to be headed by ethnoracial

minorities and people with low incomes who are at increased baseline risk of many of the health problems that are caused or exacerbated by housing problem, and because, among renters, people of color and low-income people are more likely to live in a unit with housing problems, the program provides the greater benefit to people more likely to suffer housing-related health problems.

b. **The enhanced model reduces barriers to reporting.** The enhanced model results in improvements for residents who aren't willing or able to file a complaint because it leads to inspections of units for which a complaint hasn't been made, but which are more likely to be substandard because they are in a building managed by an owner whose properties have housing problems. This contributes to health equity by creating a system that increases access to services for vulnerable social groups who otherwise experience barriers to using them.

c. **The enhanced model is more effective than the standard model in improving health-related housing conditions.** Analysis of BDS's rental inspections tracking data demonstrates that complaints made under the enhanced model resulted in 75% more improvements than a complaint made under the standard model. Some of the difference is due to the fact that units in the enhanced inspections areas typically had more violations per unit than the units in the standard districts. However, much is also due to the number of additional units inspected as a result of the enhanced model. While the standard model led to improvements in 1,391 units, the enhanced model led to improvements in 1,844 units despite having slightly fewer initial complaints.

d. **Strategically expanding the enhanced model will increase the number of housing units that are inspected and improved.** Strategically expanding the enhanced model to the three other BDS districts with the highest rates of cost-burdened households would more than double the number of renter households covered. There are currently about 16,000 rental units in the enhanced model pilot area. Adding districts 3, 4, and 6 would increase the number of rental units covered to over 37,000. While BDS data suggest that these districts have lower rates of substandard housing than the enhanced model pilot area, enhanced inspections would still likely generate at least an 8% increase in the number of units inspected, and at least a 10% increase in the numbers of violations found and cured in the

new areas. Importantly, enhanced inspections would not impose any additional burden on property-owners because the program is "self-limiting": properties where few or no violations are found during initial inspections undergo no additional inspections. The enhanced model helps tenants in buildings where owners cannot or will not make necessary improvements, but does not change the inspections system procedures or impacts for buildings that are appropriately maintained.

## RECOMMENDATIONS

Based on the findings described above, this HIA recommends that Portland City Council support and increase the Mayor's 2012-2013 budget to allocate funds that enable the Portland Bureau of Development Services to:

1. **Strategically expand the enhanced model to other parts of Portland with the highest rates of cost burdened households.** The enhanced model has proven to be more effective than the standard model in eliminating health-related sub-standard housing conditions. Since residents of sub-standard housing are more likely to be low-income or ethnoracial minorities, and are thus at higher risk for multiple health problems, improving their housing conditions will minimize a major driver of health inequity in Portland. Strategically expanding the enhanced model to three other BDS inspections districts with the highest rates of cost-burdened households would more than double the number of renter households covered. Implementing this recommendation will help maintain quality housing for renters at a time when increasing numbers of households are priced out of the homeownership market. It will also help the city advance the health and equity goals in the *Portland Plan*.

2. **Implement the tenant/landlord education strategies developed by the Quality Rental Housing Workgroup.** Housing-related health interventions are most effective when they address both housing conditions and tenant/landlord behaviors. Tenants need to better understand how they can reduce the presence of mold, pests, allergens, irritants, and safety hazards. Landlords need to better understand the value of timely repairs and basic services, including their potential to reduce health risks. Adding an educational component to the BDS inspections program such as the one developed by the QRHW, would greatly enhance its ability to improve the health of Portland renters, particularly those residents who are more likely to live in sub-standard housing.

3. **Implement the BDS Information Technology Advancement Project (ITAP) which is currently in the RFP response phase and is scheduled to be completed and implemented in 2015-2016.** This HIA and previous attempts to assess the health impacts of the rental housing program reveal the limits of the current data tracking system to answer key questions. As the QRHW report noted, inspectors and their public health partners need to be able to readily identify the locations of inspections along with the type of violations, time to remediation, and types of education and enforcement actions that were conducted for both renter- and owner-occupied housing. This information is necessary to document health and housing problems and develop cost-effective solutions for addressing them, but is currently not captured in the BDS tracking system. The ITAP Project would allow inspectors, public health professionals, and the general public the ability to track and view violations by individual unit and provide details about types of violations cited and the attendant outcomes of the inspections process. City Council has already committed to this and BDS has this included in its budget for this year and the next several years to address this issue.

To help stakeholders and decision makers consider possible changes to the finding level for the rental housing inspections program, Table ES1 summarizes the health and health equity impacts of either expanding the enhanced inspections model to three additional inspections districts, or eliminating the enhanced model entirely. In addition, since this report also makes additional recommendations to improve the ability of the rental housing inspections program to protect the health of renters and advance health equity, Table ES1 also summarizes the impacts that would be produced by the adoption of these recommendations.

**Table ES1: Summary of health and health equity impacts of the expansion and elimination scenarios relative to the status quo**

| Scenario | Direction of Impact | Magnitude of Impact (i.e., how many) | Severity of Impact (i.e., how good or bad) | Equity Impacts | Strength of Causal Evidence |
|---|---|---|---|---|---|
| Expansion | + | moderate | moderate | + | *** |
| Elimination | - | moderate | moderate | - | *** |
| Recommendations (Expansion + Education + Improved Tracking) | + | major | major | ++ | *** |

Explanations:

- Direction of Impact refers to whether the alternative will positively impact health determinants (+), negatively impact health determinants (-), or have no impact on health determinants (~).
- Magnitude of Impact reflects a qualitative judgment of the size of the population of the anticipated change in health determinant effect: minor, moderate, major.
- Severity of Impact reflects the nature of the effect on health determinants and its permanence: minor, moderate, major.
- Equity Impact reflects a qualitative judgment of the magnitude of the anticipated change in health inequities related to housing conditions: (--)=moderate increase in health inequities related to housing(-)= minor increase in health inequities related to housing; (~)=no change; (+)=minor improvement in health equity related to housing; (++)=moderate improvement in health equity related to housing
- Strength of Causal Evidence refers to the strength of the research/evidence showing causal relationship between the alternatives and the health determinants: * = plausible but insufficient evidence; ** = likely but more evidence needed; *** = high degree of confidence in causal relationship. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.

# 1 Introduction

Healthy housing is essential for maintaining individual and community health. Healthy housing helps residents to maintain physical health by reducing exposure to environmental hazards and by decreasing the risk of unintentional injuries. Healthy housing can also promote mental health by reducing sources of stress, anxiety, and depression. In contrast, inadequate housing contributes to acute and chronic health problems, particularly for people such as ethnoracial minorities, people with low incomes, children, and seniors that are at higher risk of housing-related health problems.

The presence of rodents and insects contributes to the spread of infectious diseases, as do inadequate food storage, lack of heating, and exposure to accumulated waste and raw sewage. Chronic diseases such as asthma and other respiratory illnesses, cancer, and brain and nerve damage result from exposure to toxic substances such as mold and other allergens, lead, asbestos, and radon. Injuries and the attendant temporary and permanent physical disabilities can result from falls, burns, and electrocution caused by faulty building and equipment conditions. Temporary health conditions such as headaches, fever, nausea, and vomiting can result from exposure to toxic agents such as carbon monoxide, pesticides, and off-gases from substandard or degraded building materials.[1-9]

In most jurisdictions, including Portland, Oregon, local housing codes establish minimum standards and a baseline for healthy housing conditions. A key strategy in maintaining healthy housing is the use of inspections programs that help ensure that housing codes are met.

The Oregon Public Health Institute and its partners recently received funding to conduct a health impact assessment (HIA) of the city of Portland's rental housing inspections program in order to help determine, and improve, its effectiveness at maintaining healthy housing in Portland. HIAs are a policy and planning tool for providing decision-makers in non-health related sectors with information and recommendations regarding the health and health equity impacts of their decisions. The overall goal of HIA is to ensure that health considerations are taken into account when decisions are made in order to maximize positive health impacts and minimize negative health impacts.

The specific purpose of this HIA is to assess the relative health and health equity impacts of the two different rental housing inspection models that the city currently employs by determining their relative effectiveness in improving health-related housing conditions in Portland's rental housing stock. The standard inspections model that the city has used for many years is a complaint-driven

process in which complaints by tenants, neighbors, or other members of the public lead to inspections of their units. In 2010, the city also began to pilot an "enhanced" inspections model that is also complaint-based, but also triggers inspections of additional units in the property owner's portfolio. This enhanced model was initially proposed by the Quality Rental Housing Workgroup (QRHW), a workgroup convened by the Portland City Council in 2007-08 and comprised of a large number of landlord, tenant, housing, and health stakeholders. The enhanced model was designed to address some of the shortcomings of the city's standard inspections model with the goal of improving the quality of the city's rental housing stock for both property owners and tenants, particularly low-income and ethnoracial minority renters who are less likely to file a complaint but more likely to live in substandard housing.

Although health issues were one of the primary motivators for the formation and direction of the QRHW and its recommendations, the Neighborhood Inspections Team Stakeholder Advisory Committee (NITSAC)—a group that was formed to implement the QRHW recommendations—has not had the opportunity to assess the health impacts of the enhanced model relative to the standard model and determine whether it was fulfilling its purpose. As a result, decision-makers have not been able to evaluate these impacts as they direct resources for maintaining, eliminating or strategically expanding the geographic coverage of the enhanced model. This HIA seeks to provide this health-based information as City Councilors, city staff, and other stakeholders work together to enact budgeting and other policy decisions that best enable the housing inspections program to protect public health.

## Report overview

This report begins with a brief description of the HIA process, followed by a summary of the scoping process that the project's Steering Committee followed to identify key health issues to be assessed, determine which scenarios to consider, and develop research questions to answer. After the scoping summary is the assessment section that describes the health-related housing conditions of Portland's rental housing stock and the housing-related health conditions of Portland renters, and then predicts the potential health impacts of changes in the funding level for the rental housing inspections program on health-related housing conditions in Portland. Finally, based on this assessment, this report offers recommendations developed by the Steering Committee for how the inspections program can be changed to better improve the health and health equity of Portland's renter population.

# 2 Overview of the Health Impact Assessment Process

Health impact assessment (HIA) is an emerging public health practice that provides "a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations for monitoring and managing those effects."[10] The HIA process involves following the six steps described in Table 2 below.

HIA is based on the increasingly well-understood fact that many of the strongest predictors of health and well-being are social and environmental conditions which are shaped by decisions in multiple sectors that often do not include considerations of health impacts in their decision-making processes. Accordingly, HIAs are meant to inform decision makers as they make choices that affect the communities in which they work and serve. HIA practice is relatively new in the United States, but has been effectively developed and employed in many countries to produce public policy and planning projects that more effectively promote health and health equity and thereby improve quality of life and reduce health inequities and healthcare costs.

**Table 2: Steps of a health impact assessment**

| Step | Purpose |
|---|---|
| Screening | Determines whether a proposal is likely to have health effects and whether the HIA will provide information useful to the stakeholders and decision-makers. |
| Scoping | Establishes the scope of health impacts that will be included in the HIA, the populations affected, the HIA team, sources of data, methods to be used, and alternatives to be considered. |
| Assessment | Involves a two-step process that first describes the baseline health status of the affected population and then assesses potential impacts. |
| Recommendations | Suggested changes or strategies based on findings and best practices that could be implemented to improve health or otherwise manage the health effects, if any, that are identified. |
| Reporting | Documents and presents the findings and recommendations to stakeholders and decision-makers. |
| Monitoring and Evaluation | Monitoring can include monitoring of the adoption and implementation of HIA recommendations or monitoring of changes in health or health determinants. Evaluation can address the process, impact, or outcomes of an HIA. |

## 2.1 Key concepts and terms often used in HIA

- **Health: "**A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."[11]
- **Health Impact**: Any change in the health status of an individual, population, or sub-population, or any change in the physical, natural, or social environment that has a bearing on public health.
- **Health Outcome**: The changed health status of an individual, population, or sub-population related to health determinants. Health outcomes can be positive or negative.
- **Health Determinants**: Any factor known to impact the health of an individual, population, or sub-population. Health determinants include:
    - Features of ***the social and economic environment*** such as income and education;
    - Features of ***the natural and built environment*** such as air quality, housing and pedestrian infrastructure;
    - A person's ***individual characteristics and behaviors*** such as genetics and smoking.
- **Health Equity**: Health equity refers to disparities between population groups in the presence of disease, health outcomes, or access to care that result from a variety of changeable social factors such as income inequality, educational quality, natural and built environmental conditions, individual health behavior choices, and access to health care. Health equity is improved as these disparities are eliminated or minimized. Health inequity is exacerbated as these disparities grow.
- **Stakeholders**: Individuals or organizations who are affected by the policy, plan, or project under consideration; have an interest in the health impacts of the policy, project, or plan under consideration; and/or have direct or indirect influence on the decision-making and implementation process of the policy, project or plan under consideration.

# 3 HIA Scope

The purpose of scoping is to identify which health impacts will be assessed in the HIA, which populations will be affected and assessed in the HIA, which data sources and methods will be used, which alternatives will be considered, and who will conduct the HIA. This sections provides a summary of the scoping decisions made by the project's Steering Committee.

## 3.1 Key health impacts related to housing inspections

Initially, the following housing-related health determinants were considered by the Steering Committee.

- Access to health-supportive resources (heat, housing, health care, jobs, education, social services, social networks, etc.)
- Overcrowding
- Exposure to airborne pollutants (mold, animal dander, gasses)
- Stress
- Exposure to physical hazards
- Exposure to toxic materials (lead, pesticide residue)
- Pests (bites from rodents/bugs, vector-borne diseases)
- Lack of functioning utilities
- Sanitation
- Loss of affordable housing units
- Neighborhood blight

After discussion, the Steering Committee decided to remove access to health-supportive resources, neighborhood blight, and overcrowding from consideration, primarily because they seemed to be relatively indirect effects, and would be hard to assess given the project's short timeframe. In addition, the Steering Committee discussed, but decided to not pursue, examining the potential health effects that might result from the possible loss of affordable housing units, either as a result of landlords raising rents in response to changes in the inspections program, or as a result of more sub-standard units being inspected and removed from the market sooner than otherwise would be the case. The Steering Committee decided not to pursue this pathway because it did not feel that there would be sufficient existing evidence for helping determine whether landlords would raise rents or whether more units would be shuttered because of enhanced rental inspections, and

because the project's short timeline would not allow for such information to be gathered.

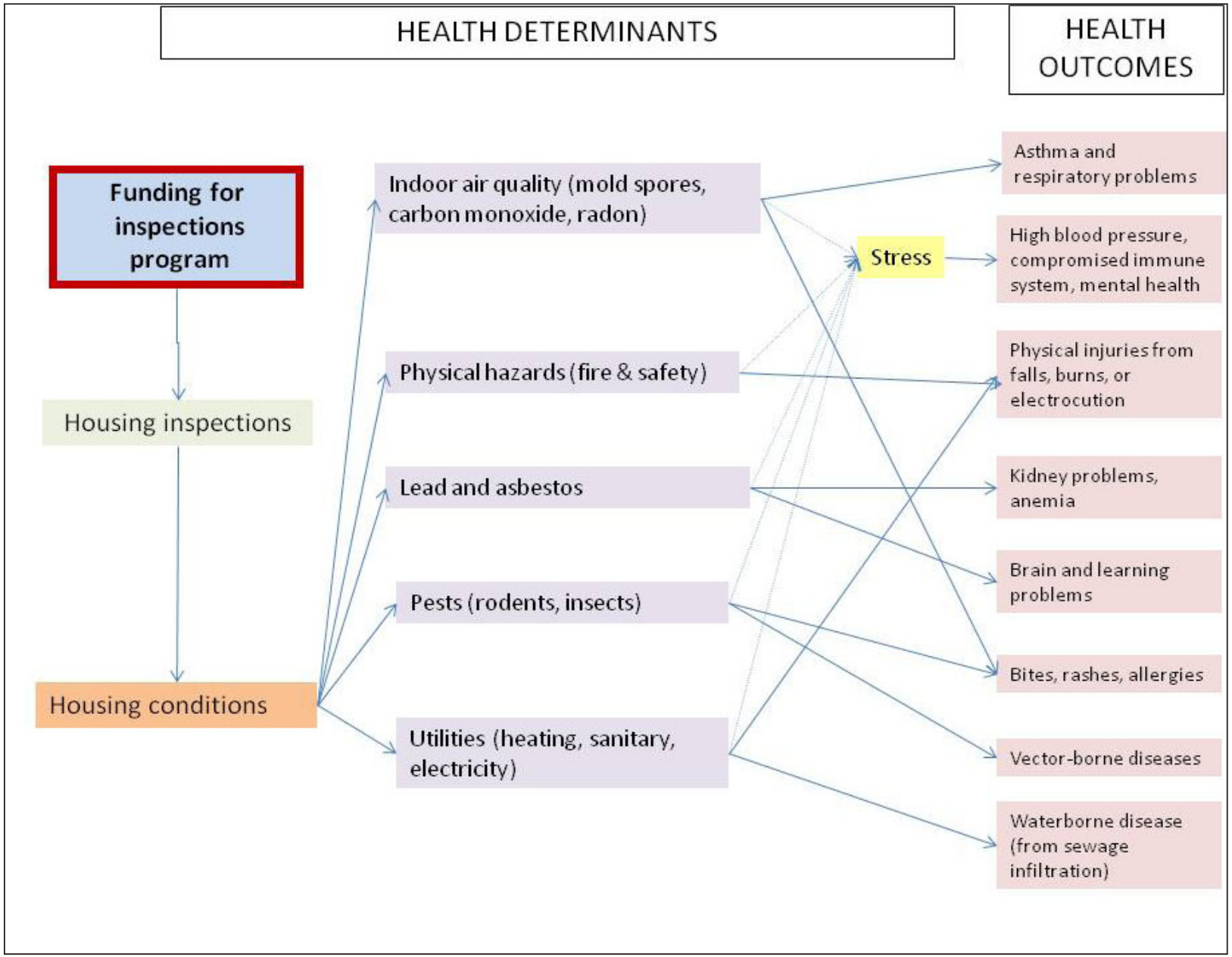
The final set of health determinants that the Steering Committee selected to be assessed in this HIA, along with their related health outcomes, are displayed in Figure 1. This "pathway diagram" shows the relationship between a policy decision, health determinants, and health outcomes. In addition, the Steering Committee also decided that the HIA briefly examine the relative contributions of owner and tenant behavior on health and housing conditions in order to assess the need for education with inspections and to ensure that property owners aren't being blamed for issues out of their control.

## 3.2 Impacted populations

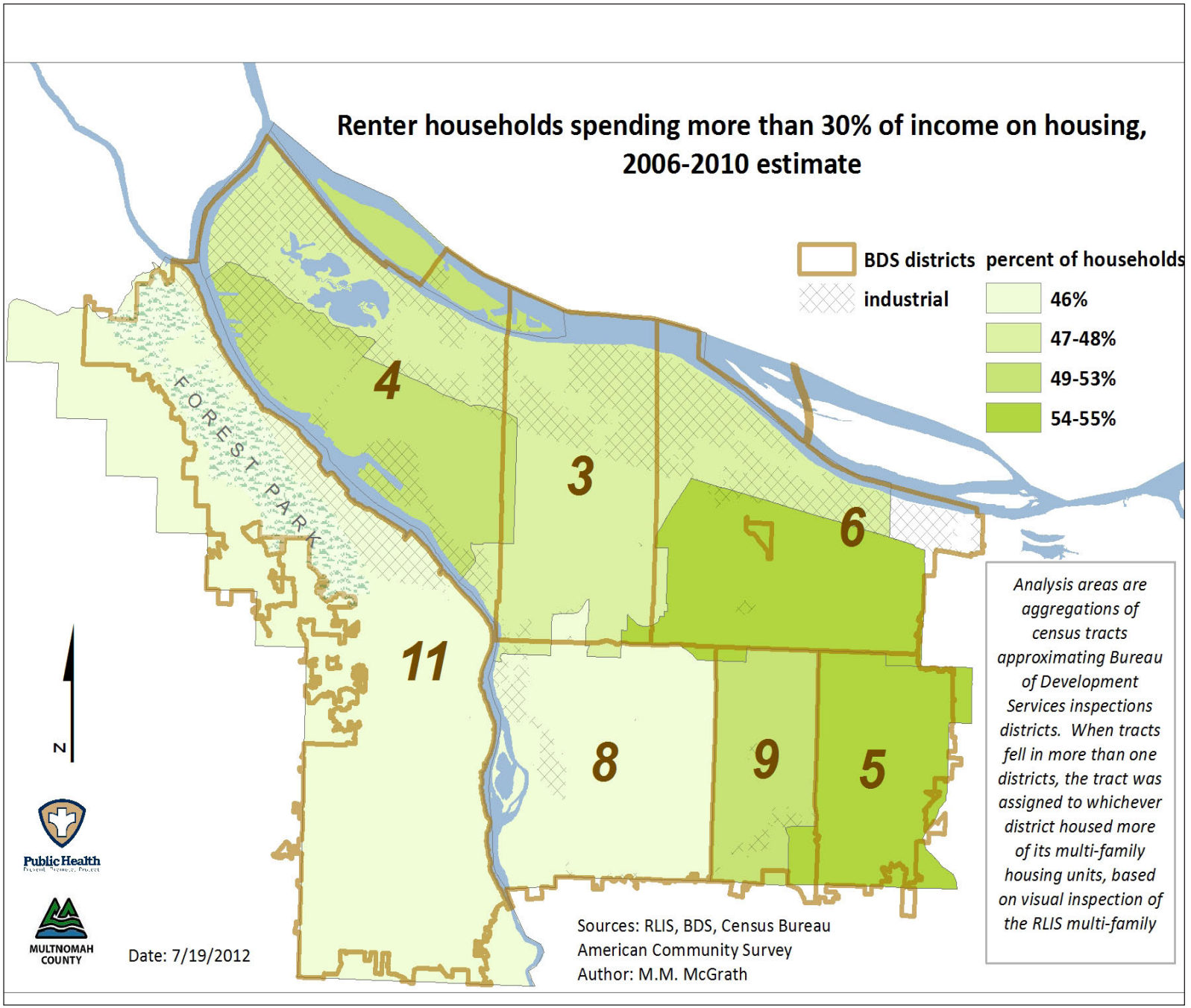
The enhanced inspections model was initially designed to address barriers to use of the standard model by low-income and ethnoracial minority households, such as fear of retaliation, language barriers, and lack of education/awareness of rights regarding housing conditions, etc. While it is likely that these households would be most affected by expansion or elimination of the enhanced model, the Steering Committee decided to consider impacts on all renters in its assessment in order to 1) determine whether, and to what extent, other renters might be impacted by changes in the City's inspections program, and 2) highlight possible equity issues regarding who might benefit most by the proposed changes in the City's inspections program.

The Steering Committee also briefly considered whether impacts on landlords should be assessed since they would definitely be impacted in some way by changes in the inspections program. However, since these impacts would not likely include significant health impacts, the Steering Committee decided not to include them as an impacted population for the purposes of the HIA.

**Figure 3: Portland rental housing inspections program HIA pathway diagram**



## Map 1: Cost-burdened renter households, by inspections district



## 3.3 Scenarios for analysis

To help inform city budgeting decisions, the Steering Committee decided to consider and compare the relative health impacts of three different possible scenarios related to changes in the funding level for the inspections program, based on their relative abilities to produce improvements in health-related housing conditions:

1. **Status quo:** The enhanced model continues to be applied in Districts 5 and 9, while the rest of the city (Districts 3, 4, 6, 8, 11) is served by the standard inspections model (See Map 3 for District boundaries).
2. **Enhanced model is discontinued:** The enhanced model is discontinued, and the entire city is served by the standard inspections model.
3. **Enhanced model is strategically expanded:** The enhanced model is continued in Districts 5 and 9 and expanded to Districts 3, 4, and 6 based on their relatively high proportions of cost-burdened households (See Map 1). While the Steering Committee initially considered assessing the impact of expanding the enhanced model citywide, it eventually determined that a strategic expansion to three additional districts would be more realistic and thus assessment of this scenario would more effectively help City Council and BDS staffs determine where to direct additional resources should they be made available for the inspections program. The Steering Committee chose to select additional districts based on proportions of cost burdened households because local reports and anecdotal information indicate that such households are both more likely to live in substandard housing and less likely to initiate complaints, and would thus benefit most from the enhanced model.

## 3.4 HIA project goals

The Steering Committee conducted the HIA for the following purposes:

1. To provide the Portland City Council and BDS directors with information about the relative health and health equity impacts of the city's standard and enhanced rental housing inspections models, so that they might more effectively consider health and health equity outcomes when funding the city's housing inspections program.
2. To provide other interested stakeholders with information about the relative health and health equity impacts of the city's standard and enhanced rental housing inspections models, in order to inform their engagement and advocacy on housing inspections issues, including efforts to institute and update the recommendations developed by the Quality Rental Housing Workgroup (QRHW) and the Neighborhood Inspections Stakeholder Advisory

Committee (NITSAC).

3. To increase understanding among project stakeholders about the connections between housing inspections, housing stock, health, and health equity.
4. To build capacity among Steering Committee members and other stakeholders to participate in HIAs and utilize them in their work.

## 3.5 Analytic methods

As noted in Table 2 above, assessment is essentially a two-step process that first describes the baseline health status of the affected population and then assesses potential impacts. To accomplish these two tasks, the Steering Committee selected the following methods for these phases of the assessment.

- Baseline assessment
  - › Relationships between housing inspections, housing conditions, and health
    - Review of scholarly and grey literature
  - › Housing status
    - Descriptive statistical analysis of local and regional data on rental housing conditions
  - › Health status
    - Descriptive statistical analysis of local and regional data on health behaviors and hospitalizations
- Impact assessment
  - › Comparative case study using descriptive statistical analysis of BDS inspection records
  - › Online and in-person surveys of tenants whose units or neighbors' units have been inspected under both models, and landlords who have had their properties inspected
- Estimation of relative health impacts of the three different scenarios through extrapolation of results of the comparative case study

The Steering Committee developed the following set of research questions for the assessment:

1. How many additional inspections and related property improvements result from the enhanced inspections program as compared to the standard model?
2. How many more inspections and related property improvements would be performed if the enhanced inspections program were strategically expanded to other parts of the city, based on risk of relatively high amounts of

substandard housing?

3. What are the magnitude, likelihood, and direction of health impacts of expanding the enhanced inspections program?
4. Will there be differential health impacts of expansion based on income and ethnoracial differences?
5. How do the city's two inspections models currently address tenant behaviors that exacerbate or mitigate the health impacts of substandard housing?

Analysis followed the assessment guidelines developed by the North American HIA Practice Standards Working Group.[12]

# 4 Assessment: Baseline Health and Housing Conditions

The purpose of assessment stage of HIA is to characterize the likely impacts of a decision on health and health equity in the affected community. As noted in the introduction, the decision that this HIA seeks to help inform is a funding decision for the City of Portland's rental housing inspections program. The level of funding for the program will determine whether, and to what extent, the city will be able to continue the enhanced inspections model that is currently being used in outer southeast Portland. To predict health impacts of this decision, this HIA assessed baseline conditions of health determinants and health outcomes that would likely be differently impacted by three potential future scenarios: status quo, discontinuation, and expansion. For each of these scenarios, this HIA also considered equity impacts, that is, the extent to which the health of certain groups is more likely to be affected than others'.

This chapter describes the first step of assessment, documenting baseline conditions of the key health determinants and health outcomes identifying during the scoping phase. The second step, predicting how the decision under consideration will affect these determinants and how social groups will be differently impacted, is discussed in chapter. [5]

## 4.1 Local housing stock

The National Center for Healthy Housing's State of Healthy Housing report provides a picture of how Portland's housing stock compares to other cities, based on the findings of the 2002 American Housing Survey conducted by the Census Bureau.[13] In several ways, the local housing stock compares favorably to other cities surveyed. However, there are also significant challenges to assuring that Portlanders are living in homes that can support their health. Out of 44 cities assessed by the National Center for Healthy Housing, Portland ranked 17th for healthy housing, with 45.2% percent of households reporting one or more problems with their housing unit. Problems that were more common in Portland than in the nation as a whole include:

- water leaks from outside (13% of homes)
- broken heating equipment (4% of homes)
- rooms without working electrical outlets (3% of homes),
- window problems (8% of homes), and
- foundation problems (5% of homes).

## 4.2 Rental housing stock

In 2002, 42% of Portland households rented their home, the 11th highest rate among the 44 cities surveyed.[13] By the 2010 Census, the figure reached 46%, or 115,044 households.[14] In the 2002 American Housing Survey, 42% of rental households in the Portland Metropolitan Statistical Area reported one or more problems with their housing units, with 2% reporting severe physical problems. Applying these rates to Portland today suggests that there are approximately 48,300 renter households with housing problems, 2,300 with severe problems. Portland renters are more likely than homeowners to experience almost every type of housing problem. Table 4.2 below provides detailed rates for each problem. The most prevalent interior problems are water leaks and cracks and holes in walls, and the most prevalent exterior problems are found with roofing and windows.

**Table 4.2: Prevalence of housing problems by housing tenure, Portland, Oregon Metropolitan Statistical Area, 2002[13]**

| | Housing unit type | |
|---|---|---|
| | Renter-occupied | Owner-occupied |
| ***Overall housing quality*** | | |
| Any identified problem | 42% | 37% |
| Moderate physical problems | 5% | 2% |
| Severe physical problems | 2% | 1% |
| ***Interior problems*** | | |
| Water leaks from inside | 11% | 9% |
| Water leaks from outside | 7% | 10% |
| Open cracks or holes in walls | 6% | 4% |
| Flush toilet breakdown | 5% | 2% |
| Water supply stoppage | 5% | 3% |
| Signs of mice | 5% | 6% |
| Lacking kitchen facilities | 3% | 1% |
| Broken plaster/peeling paint | 3% | 2% |
| Heating equip breakdown | 3% | 2% |
| Rooms without working electrical outlet | 2% | 1% |
| Room heater without flue | 2% | 3% |
| Sewage disposal breakdown | 2% | 1% |
| Lacking complete plumbing | 1% | 1% |
| ***Interior problems cont.*** | | |
| Holes in floors | 1% | 0% |
| Signs of rats | 1% | 1% |
| Exposed wiring in unit | 1% | 1% |
| ***Exterior problems*** | | |
| Roofing problems | 6% | 5% |
| Window problems | 6% | 5% |
| Siding problems | 5% | 4% |
| Foundation problems | 3% | 3% |

Renters are much more likely to live in homes that lack complete facilities. Though Multnomah County has more homeowners than renters, rental households with inadequate plumbing outnumber owner-occupied households by almost five times. For inadequate kitchen facilities, renters outnumber homeowners eight and a half times (Table 4.2.1).

**Table 4.2.1: Incomplete facilities by housing tenure, Multnomah County, 2006-2010 estimates[15, 16]**

| | Number of households (%) | | |
|---|---|---|---|
| | Renter-occupied | Owner-occupied | Magnitude of Difference (Renter/ Owner) |
| Incomplete plumbing | 2,250 (2%) | 507 (0%) | 4.4 |
| Incomplete kitchen | 3,803 (3%) | 446 (0%) | 8.5 |

## 4.3 Local inspections data

It is difficult to obtain recent, local data about the conditions of housing units in Portland. While the American Housing Survey systematically collects data, it has not been conducted in ten years. The City's Bureau of Development Services tracks the findings of its inspections, but there are two limitations to this dataset: the complaint-driven nature of the inspections program and antiquated technology. First, because the City only inspects units about which there has been a complaint, there is no systematic assessment of all housing units. Second, for the units that have been inspected, relatively little specific information is recorded about the findings of the inspection and the resolution of the problems. When a violation is recorded for tracking purposes, it is categorized in one of three broad categories. While these categories are nominally useful for understanding the types of violations that inspectors are finding, they do not allow subsequent analysis of what specific housing standards were violated. In addition, while the closing of a case implies that the violation has been remedied, or "cured", there is no documentation of how violations are cured, making it difficult to assess the extent to which health-related problems are being addressed.

However, data from the neighboring city of Gresham may provide some insight into the likely conditions of Portland's rental housing stock. Gresham instituted mandatory inspections of rental units in 2007, which has created a local dataset about the prevalence of varying housing problems. In 2009, Gresham inspected 1,633 units, almost a third of their rental households. They found 4,297 violations, an average of 2.6 per household.[17] Table 4. below shows the prevalence of the ten most common violations in Gresham and projects how many units would

be affected if the problems were present at the same rate in Portland. These ten problems accounted for over 60% of violations found by Gresham inspectors.

**Table 4.3: Inspections findings from Gresham extrapolated to Portland**

| | percent of Gresham violations (2009) | Portland projection (2010)* |
|---|---|---|
| Unmaintained surfaces | 16% | 18,447 |
| Smoke detector (Improper number) | 10% | 11,941 |
| Door inoperable or in disrepair | 6% | 7,363 |
| Mold | 6% | 6,533 |
| Hot water heater discharge pipe | 6% | 6,452 |
| Inoperable appliances | 4% | 4,632 |
| Hot water heater <120 degrees | 4% | 4,525 |
| Exposed wiring | 4% | 4,525 |
| Inoperable smoke detector | 4% | 4,337 |
| Electrical-cover plate | 3% | 2,945 |

* Projections are based on 115,044 renter-occupied households in the city of Portland in 2010 (U.S. Census Bureau, 2011d)

It is likely that Gresham and Portland share somewhat similar patterns of housing problems, given the fact that they are in the same climate and metropolitan area. However, it should also be noted that Gresham's housing stock is more similar to the housing stock in outer southeast and outer northeast Portland in terms of the age and quality of the rental units. An indicator of this similarity is provided by the average rental rates in these areas displayed in Table 4.3.1.

| Table 4.3.1 Average rent per square foot, Multnomah County market areas, 2011* | |
|---|---|
| Gresham/Troutdale/Wood Village/Fairview | $0.81 |
| Outer Northeast Portland | $0.83 |
| Outer Southeast Portland | $0.87 |
| North Portland | $0.93 |
| Southwest Portland | $0.96 |
| Inner and Central Northeast Portland | $1.06 |
| Inner and Central Southeast Portland | $1.07 |
| Northwest Portland | $1.28 |
| Downtown Portland | $1.51 |
| * Metro Multifamily Housing Association Apartment Report, Spring 2011 | |

As will be discussed in greater detail in Chapter 5, the rental housing stock in East Portland is generally lower in quality than in other parts of Portland, as reflected by the number of complaints rental housing inspectors receive and the number of violations found by inspectors. Thus, the projections for Portland contained in Table 4.3 should be considered to be at the higher end of a reasonable range of estimates for the numbers of violations that likely exist in Portland.

## 4.4 Renter Demographics

Renter- and owner-occupied households in Portland are very different from each other demographically (Table 4.4). Half of people living in rental homes pay at least 30% of their income for housing, which is considered the ceiling for affordability. Renters are 2.5 times more likely than home owners to experience this cost burden. Median income for rental households is less than half of that for owner-occupied households. Rental households are more likely to be headed by a person of color but less likely to have children; however, the proportion of households with young children is similar across renter- and owner-occupied housing.

| Table 4.4: Household demographic characteristics by housing tenure, Portland, Oregon | | |
|---|---|---|
| | Housing unit type | |
| | Renter-occupied | Owner-occupied |
| With children under 18 years old (2010)[14] | 46% | 54% |
| With children under 6 years old (2010)[14] | 7% | 8% |
| Median household income (2006-2010 estimate in 2010 inflation adjusted $US)[19] | $31,548 | $65,167 |
| Housing costs greater than 30% of income (2006-2010 estimate) [20] | 50% | 20% |
| Hispanic householder (2010) [21] | 8% | 4% |
| ***Householder race (of any Hispanic origin – 2010)*** [21] | | |
| White alone | 77% | 86% |
| Black or African American alone | 8% | 3% |
| American Indian and AlaskaNative alone | 1% | 1% |
| Asian alone | 5% | 6% |
| Native Hawaiian and other Pacific Islander alone | 1% | 0% |
| Some other race alone | 4% | 1% |
| Two or more races | 4% | 2% |

In addition to being more likely to be renters, people with low incomes and members of minority ethnic or racial groups are much more likely to live in housing that does not meet basic habitability standards.[1, 8, 22, 23] According to a 2011 report by the US Centers for Disease Control and Prevention, in 2009, non-Hispanic blacks had the highest odds of householders living in inadequate housing, followed by Hispanics, American Indians/Alaskan Natives, and Asians/ Pacific Islanders when compared with non-Hispanic whites. Also, householders earning an annual salary of ≤$24,999 were almost five times more likely to live in inadequate housing than those earning ≥$75,000.[22]

## 4.5 Portland's rental inspection districts

For the purposes of housing inspections, the City of Portland is divided up into seven geographic districts (see Map 2 below). For this HIA, estimates from the 2006-2010 American Community Survey were used to estimate the characteristics of each district's residents. Each census tract in Portland was assigned to one of these seven districts (when tracts crossed tract boundaries, they were assigned to a district based on where the majority of its multi-family housing fell). The characteristics of these districts are presented in Table 4.5. In every district, renter households are more likely to be burdened by housing costs and earn less than $50,000 a year. In addtion, in all districts, with the exception for District 3, households led by people of color are more likely to rend than own, with the greatest likelihood being in District 11, which has an almost 2 to 1 margin between minority renter vs. minority owner households. In District 3, there is no difference between the percent of renter vs. owner households that are led by a person of color. There is wide variation between districts in the proportion of households with children. For each of the household characteristics, the three districts where the rate is highest among renters are indicated with bold text.

## Map 2: Portland housing inspections district

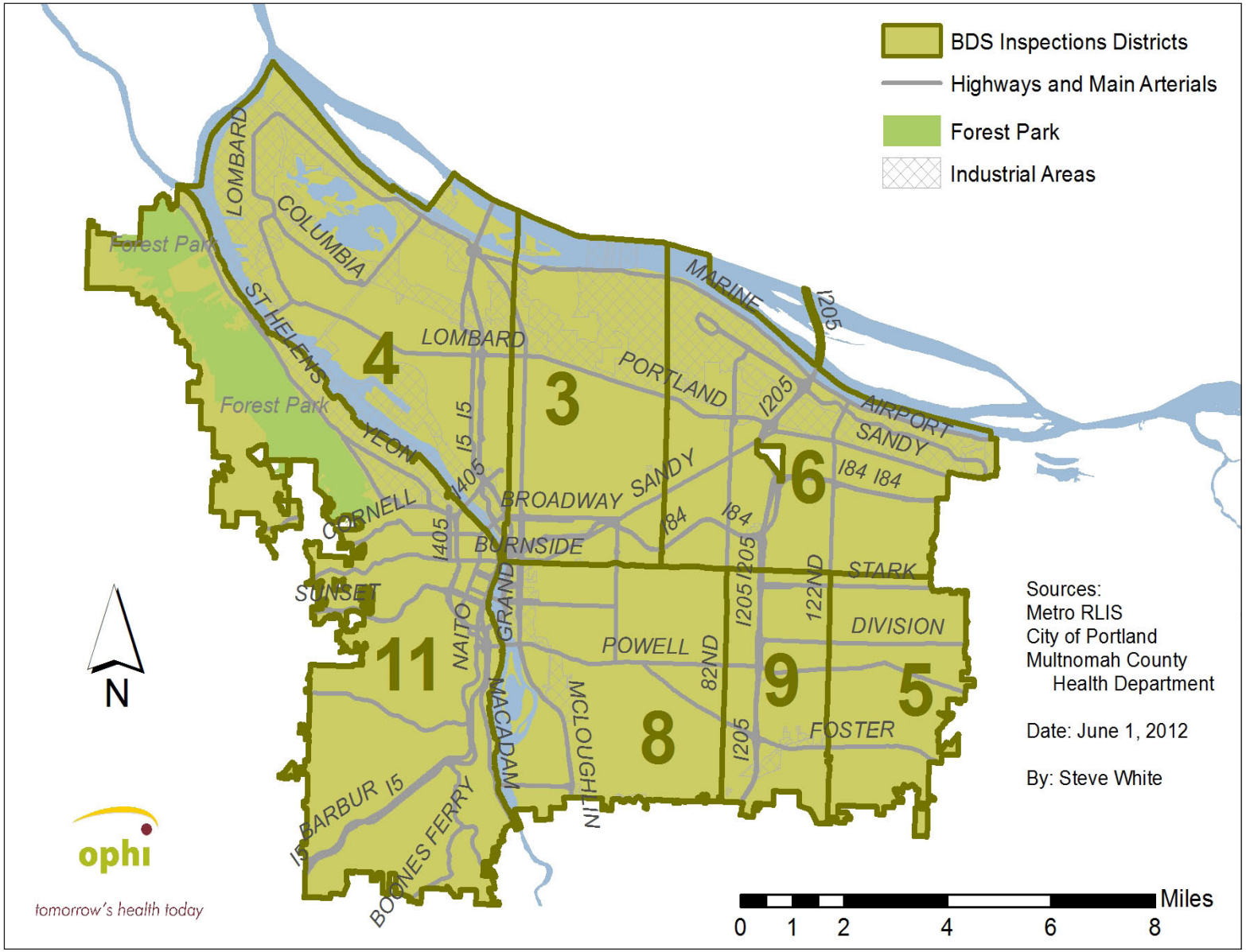


**Table 4.5: Estimated housing units and household characteristics by inspections district, City of Portland**

| | | | | Household characteristics | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Housing units | | | | housing cost-burdened | | < $50,00 income | | headed by person of color[1] | | with children under 18 | |
| district | total | owner-occupied | renter-occupied | owner | renter | owner | renter | owner | renter | owner | renter |
| **3** | 36,289 | 22,739 (63%) | 13,550 (37%) | 34% | 48% | 26% | 71% | 50% | 50% | 31% | 17% |
| **4** | 27,408 | 16,545 (60%) | 10,863 (40%) | 40% | **53%** | 39% | **79%** | 46% | 54% | 26% | 29% |
| **5** | 19,732 | 11,934 (60%) | 7,798 (40%) | 43% | **59%** | 40% | **78%** | 41% | **59%** | 35% | **48%** |
| **6** | 32,091 | 18,793 (59%) | 13,298 (41%) | 38% | **60%** | 38% | **80%** | 39% | **61%** | 25% | **32%** |
| **8** | 55,477 | 29,304 (53%) | **26,173 (47%)** | 36% | 47% | 34% | 72% | 44% | 56% | 28% | 16% |
| **9** | 17,222 | 8,930 (52%) | **8,292 (48%)** | 45% | 51% | 48% | 75% | 45% | 56% | 33% | **37%** |
| **11** | 59,520 | 29,714 (50%) | **29,806 (50%)** | 33% | 47% | 20% | 70% | 35% | **65%** | 26% | 8% |

## 4.6 Housing-related health conditions

While research has demonstrated connections between health and housing, it is difficult to get local level data that illustrate the connections in particular individuals. First, outcome data for many housing-related health conditions are available only at the city, county, state, or national level. Second, there are few data systematically collected that track people's health based on the type of housing in which they live. In this section, we review the prevalence of various housing-related health issues with as much specificity as is permitted by the data that are available. Because renters are more likely to be people of color and earn less money than homeowners, we provide information about differences between racial and income groups for health outcomes whenever possible.

### 4.6.1 Indoor air quality

Many aspects of a home can affect indoor air quality, which contributes to respiratory diseases, especially asthma, as a result of airways being irritated by mold, dust, fragrances, cleaners, and animal dander. Nationally, the proportion of asthma cases attributable to in-home allergens is estimated to be at least 21%.[3] Residents can be exposed to poisonous gases, such as carbon monoxide produced by substandard heating systems, appliances, and ventilation.

#### 4.6.1.1 Asthma

From 2006-2009, the age-adjusted asthma rate in the Multnomah County was 9.2%, slightly lower than the 9.7% rate statewide.[24] In 2007, there were 569 adult asthma hospitalizations, or 8.1 for every 10,000 residents, well above the state rate of 6.225. In Oregon in 2006-2008, 25.4% of adults reported missing one or more days of work in the last three months due to asthma. People whose households earned lower incomes were more likely to miss work: the rate was 33.6% for people whose households earned less than $35,000; 26.8% for people who earned $35,000-50,000; and 18% for people whose households earned more than $50,000.[24].

Asthma is a major health problem for children in Multnomah County. An estimated 5.6% of Oregon children had asthma is 2008, with 9.7% having experienced it at some point.[26] The consequences of asthma were severe for children on Medicaid in Multnomah County in 2004-5, of which there were about 3,800; about 1,400 of these children were under the age of five. A report by the Oregon Health Authority found 24% of children on Medicaid with asthma had gone to the emergency room for an asthma problem, and 4% of children on Medicaid with asthma had stayed overnight at the hospital for an asthma problem. The rates were even higher in the 0-4 age group: 29.9% had visited the emergency room and 6.2% had stayed overnight. For children aged 5-17 on Medicaid, the combined asthma control score was 1.5, making Multnomah one of the worst counties in Oregon for asthma control.[27]

#### 4.6.1.2 Carbon monoxide poisoning

While there are limited data on the extent of carbon monoxide poisoning, the Oregon Health Authority reports 18 hospital stays caused by carbon monoxide poisoning in 2007, for an age-adjusted rate of .5 per 100,000 population.[25] Research conducted in neighboring Washington State found that, "The black and Hispanic white populations of Washington State had higher relative risks for severe, acute, unintentional CO poisoning than the non-Hispanic white

population," and hypothesized that people of color are less likely to receive treatment for carbon monoxide poisoning. The authors also emphasized the importance of socioeconomic context to risk for poisoning (i.e., different groups have different housing environments and behaviors), though the dataset they used did not provide enough information to empirically prove the connections.[28]

### 4.6.2 Stress

People experience stress for a wide variety of reasons. It is very difficult to measure the level of stress a person experiences due to housing conditions, but some information is available about stress and mental health issues in the population as a whole.

In Multnomah County, in 2004-2006, 11% of adults reported a major depressive episode in the past year and 13% reported serious psychological distress in the past year. Both figures are higher than the state's rates, which were 9% and 12% respectively.[29] Less than two-thirds of the population (62%, age-adjusted) reported no poor mental health in the past 30 days, a statistically significant difference from the Oregon rate of 66%.[30]

High blood pressure can be another marker of stress. From 2006-2009, 23% of Multnomah County residents had high blood pressure, slightly below the state rate of 26% .[30]

### 4.6.3 Physical hazards

Nationally, residential injuries lead to thousands of deaths and millions of emergency department visits each year. In 2003, one-third of all deaths stemming from injuries resulted from injuries in the home, with children and seniors accounting for most of these deaths. Adults over the age of 75 have the highest death rate due to unintentional home injury, and account for a third of the total unintentional injury deaths across all age groups. It is not known how many home-based injuries are the results of poor housing conditions. The primary injury-causing physical hazards related to substandard housing conditions are generated by faulty flooring, stairs, and lack of safety infrastructure such as hand rails and window guards that can lead to falls, and faulty electrical systems that can lead to electrocution and fires.[3]

### 4.6.3.1 Falls

Falls are the leading cause of nonfatal injuries for infants, children, youth, and seniors, and account for 45% of all injuries nationwide in the home that require medical attention.[3] Data on falls among Oregonians indicates a similar age distribution. While data for the state of Oregon does not specify where falls occurred, it is likely that they account for a similar proportion of residential injuries in Oregon.[31] Nationally, the most commonly reported causes of home-based falls are falls on steps or stairs, slipping, stumbling, or tripping on same-level flooring, and falls from or out of a building. Structural hazards associated with falls include lack of handrails on stairs, slippery, uneven, or damaged flooring and steps, inadequate lighting, the presence of tripping hazards such as electrical or telephone cords in walkways, and a lack of safety devices such as grab bars in bathrooms, safety gates, and window guards. Individual behaviors and factors such as poor physical ability and not maintaining uncluttered floors and walkways are also primary causes of falls.[3]

### 4.6.3.2 Electrical fires

In 2009, about 45,000 home electrical fires that involved some type of electrical failure or malfunction were reported in the U. S. These fires resulted in 472 deaths, 1,500 injuries, and $1.6 billion in property damage.[32] Four of the primary causes of such fires are age-deteriorated wiring and related electrical components, damaged components of the electrical system due to proper or improper use, outdated products that are not as effective as newer products in preventing fires, and use of products in ways other than their intended use.[32] Similar data was not available at a state or local level.

Most fire-related injuries and deaths result from inhalation of smoke or toxic gases produced by the fire, rather than burns. As with falls, national data suggests that youth and seniors are at highest risk for fire-related injuries and deaths. Other groups with increased risk for fire-related injuries and deaths include African-Americans, American Indians, low-income households, and people living in manufactured homes and substandard housing.[3]

Other structural issues related to electrical fire injuries and deaths are the presence of functional, properly located smoke alarms and emergency exits.

## 4.6.4 Lead poisoning

Lead poisoning is especially dangerous in children, whose sensitive nervous systems are rapidly developing. As one of the older cities in the region, Portland's

housing stock contains many buildings that were constructed or renovated with lead-based paint – one of the major causes of childhood lead poisoning. Of Multnomah County children under age three who had their blood lead level tested in 2006, .7% had blood lead levels elevated above 10 µg/dL. This is more than twice the statewide rate of .3%.[25]

There are ethnic and racial disparities in blood lead levels. In Oregon from 2005-2010 the median blood lead levels of tested children aged 0-5 were: 1.1 µg/dL in American Indian/Alaska Native children, 1.8 for mixed race children, 2.0 for Blacks, 2.1 for Whites and Asians/Pacific Islanders, 2.74 for Hispanics, and 1.73 for children of other races.[33]

### 4.6.5 Pests/sanitation

Pests and the unsanitary conditions that often attract them contribute to a variety of health outcomes, the primary of which is asthma (discussed above) resulting from exposure to allergens generated by cockroaches, mice, and rats.[3] Unsanitary conditions can also contribute to the transmission of communicable diseases such as tuberculosis, and bacteria-caused illnesses due to exposure to unsafe drinking water, raw sewage, or other improperly stored waste.[1-3] There is currently no data available on rates of these health outcomes as they relate to housing conditions.

### 4.6.6 Lack of functioning utilities

Utilities such as heating, water, and plumbing systems help tenants maintain a variety of healthy housing conditions. Regarding heating, properly heated homes lower risks of hypothermia and other illnesses. Properly heated homes also reduce the risk of injuries resulting from the use of improper or less safe heating sources such as open fires and space heaters. Up to 25% of families that lose their primary source of heating use space heaters or ovens and stoves, risking contact burns, carbon monoxide exposure, and especially deadly house fires.[34]

Issues related to water and plumbing include lack of hot water and improper waste disposal, both of which contribute to unsanitary conditions. Improperly adjusted or malfunctioning water heaters can also lead to scalding.[3] There is currently no data available on rates of these health outcomes as they relate to housing conditions.

# 5 Assessment: How Portland's Inspections Program Impacts Heath and Health Equity

This section discusses our assessment of the relative health impacts of the expansion, maintenance, or elimination of the enhanced inspections program. We compared three potential scenarios:

1. **Status quo:** The enhanced model continues to be applied Districts 5 and 9, while the rest of the city (Districts 3, 4, 6, 8, 11) is served by the standard inspections model (See Map 3 for District boundaries).
2. **Enhanced model is discontinued:** The enhanced model is discontinued, and the entire city is served by the standard inspections model.
3. **Enhanced model is strategically expanded:** The enhanced model is continued in Districts 5 and 9 and expanded to Districts 3, 4, and 6 based on their relatively high proportions of cost-burdened households (See Map 3 in the Scoping chapter).

This assessment is based primarily on an assessment of BDS tracking data for its inspections program between July 1, 2010 when records for the enhanced program began to be recorded and October 31, 2011 when the boundaries for the enhanced program area were modified.* This dataset includes records of every inspection performed by the city, including the types of violations that were found by the inspector and addressed by the landlord. The analysis also integrates information from local and national reports about which populations might be most impacted—positively or negatively—by changes to the inspections program.

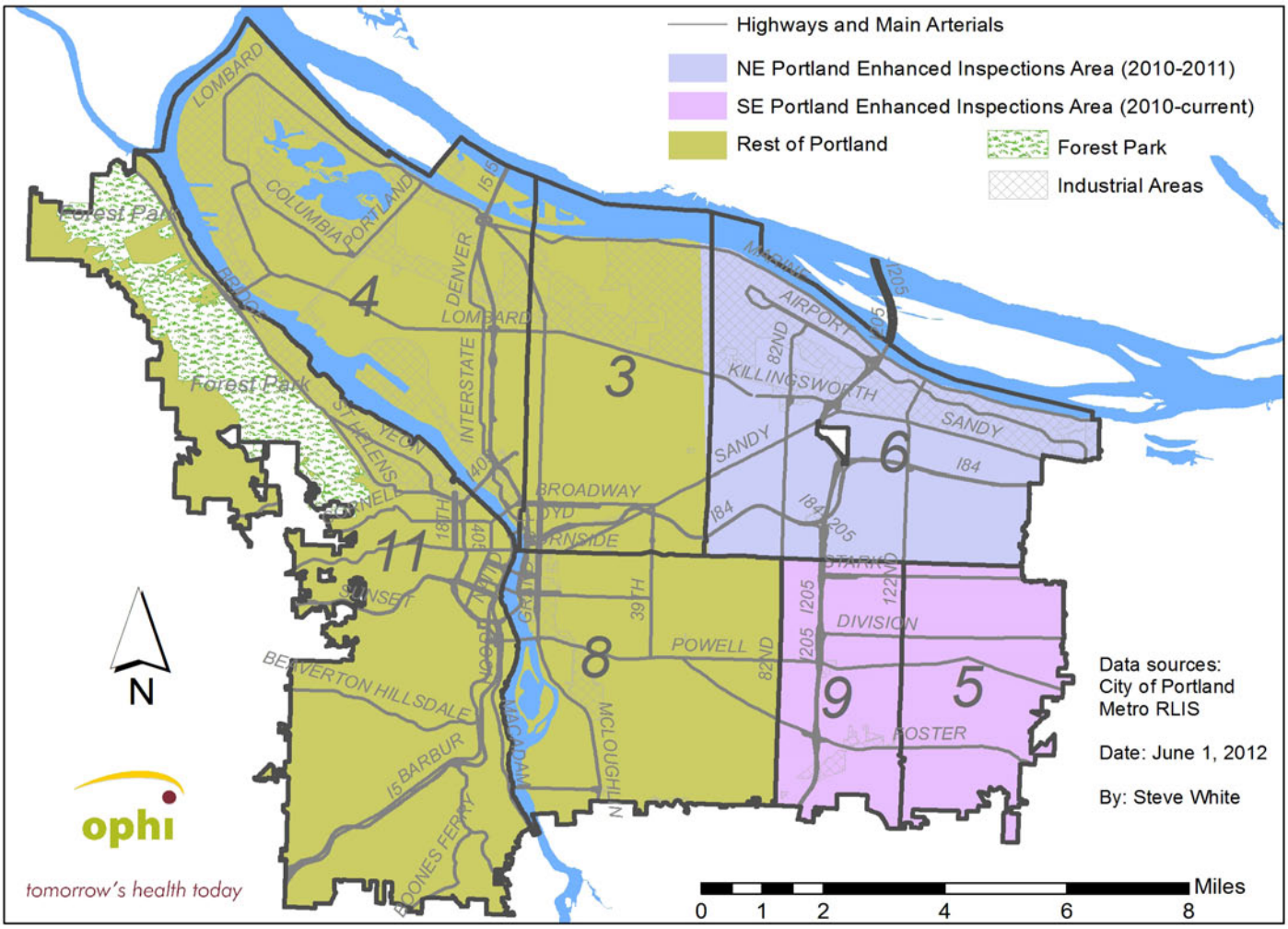
Before predicting the health and health equity impacts of potential changes in funding for the inspections program, this section begins with a detailed description of the City's inspections program and its role in ensuring healthy rental housing, including consideration of other factors influencing the ability of housing to impact health.

## 5.1 Portland's rental housing inspections program and health

Housing inspections help ensure healthy housing by identifying housing conditions that do not meet building codes, which are based health and safety concerns. In Portland, housing quality standards are outlined in the City's

* Surveys of both tenants and landlords were also conducted, but only a small number of surveys were completed and did not yield any useful results.

**Map 3: Enhanced inspections districts**




Property Maintenance Code (Title 29)* the purpose of which is "to protect the health, safety and This code establishes standards for habitability by requiring such features as waterproofing and weather protection, hot and cold running water, safe drinking water, smoke detectors, safety from fire, and adequate plumbing, heating and electrical equipment. There are also standards requiring a building's walls, floors, ceilings, stairways, and railings be in good repair and free of garbage, rodents or pests.

* The State of Oregon's Revised Statutes (ORS) Chapter 90 Residential Landlord and Tenant Act also contains building and maintenance standards that are applicable to Portland rental units. However, while there are mechanisms for enforcing them, the state lacks an inspections program such as the one that the City of Portland has for enforcing its codes. In addition, the Portland building code is generally more detailed and has higher standards, so it is typically the reference point for identifying issues in housing stock within the city boundaries.

While all rental units in Portland—including subsidized units (e.g., those where rent is supplemented with a Section 8 voucher) that may be subject to other inspections processes—are required to comply with the Property Maintenance Code, enforcement of the Code only occurs when a complaint has been made about a particular unit or property. Although complaints are made primarily by affected tenants, they can be made by anyone such as neighbors or social services organizations and public safety professionals who notice possible violations while performing their duties.

As previously noted, Portland's Neighborhood Inspections Program currently employs two inspections models: standard and enhanced. The enhanced model was initially piloted in all neighborhoods of East Portland, but is currently restricted to Outer Southeast Portland—the southern half of the initial pilot area (See Map 3). The standard model is applied in all other parts of the city. With both models, inspections are initiated by complaints, but in the enhanced model, the initial complaint can lead to the inspection of additional units within the owner's portfolio if the initial inspection identifies violations that exceed a threshold of the number and type of violations.

When an initial complaint has been made, a housing inspector from the Neighborhood Inspections Program then calls to arrange a time to come out to inspect the unit for code violations, typically within 1-2 weeks, depending on the inspectors' workloads. The inspector then inspects the unit, looking primarily for conditions related to the issue(s) identified in the complaint, but also for other obvious code violations, both within the unit and around the property. If any code violations are found, the inspector will detail them in a Notice of Violation that is then sent to the owner and tenant. The Notice directs the owner to remedy the violations within 30-60 days, and then call the inspector for a re-inspection to affirm that the identified violations have been "cured." The notice also describes fines that will be levied on the owner if the violations are not cured in due time.

With the standard model, a case is closed when all violations have been cured. With the enhanced model, however, the inspector inspects additional units either on site or at another of the owners' properties if the threshold of violations was exceeded in stage 1. These "Stage 2" inspections are initiated if non-tenant caused violations are found in two or more of the following categories during the initial complaint-based inspection:

- Health/Sanitation – 2 violations
- Fire/Life/Safety – 1 violation
- Improper egress – 2 violations
- Electrical – 2 violations

- Lack of utilities – 1 violation
- General maintenance – 5 or more violations

Stage 2 inspections include 50% of the other units on the property to be inspected, up to a maximum of 20 units, except for 2-4 unit complexes, in which all remaining rental units in the property are inspected and, for duplexes, one additional unit owned by the same landlord, if applicable. For single-family homes that meet the Stage 2 threshold, inspectors perform exterior inspections of two additional units owned by the same owner, if applicable.

Depending on the findings of the Stage 2 inspection, another round of inspections can occur. Stage 3 inspections are initiated if the inspector finds that 50% or more of the units inspected in Stage 2 meet the trigger criteria listed above. Stage 3 involves inspection of all remaining units at the property.

If 50% or more of the units inspected in Stage 3 find two or more of the trigger categories meet the threshold number of violations, Stage 4 inspections are then performed. Stage 4 inspections consist of an exterior inspection at one additional property owned by that landlord and is selected at random. If the exterior condition meets specific criteria mentioned previously, then one interior inspection will follow, and Stage 2, 3, and 4 inspections will also then follow if applicable.

Inspectors use the same check list of possible code violations to assess for both the standard and enhanced inspections processes. This checklist contains 244 items related to the physical condition of the housing unit and property (see Appendix A), most of which directly or indirectly impact the risk of adverse health outcomes. As noted above, health outcomes related to housing conditions are often influenced not just by the housing conditions themselves, but also by tenant and landlord behaviors. Although it is possible that Portland's inspectors could suggest behavior changes during the performance of their inspections or refer tenants and landlords to educational materials or programs, they are under no requirement to do so, and are currently not provided with information or training to help tenants and landlords change their behaviors. Furthermore, tight and unstable funding has left inspectors with a backlog of cases, decreasing the amount of time they have to spend working with owners and tenants.

## 5.2 Tenant behavior and healthy housing

Existing research and intervention practices demonstrate that tenant behavior, as well as structural conditions maintained by the landlord, can also contribute to substandard housing conditions and related health outcomes.[8, 36] Improper ventilation practices can lead to mold and mildew growth, accumulation of waste

can attract pests and microbes, improper use of utilities can result in injuries and exposure to air pollutants such as carbon monoxide and smoke, and placement of furniture and other objects can block emergency exits. The health risks associated with unhealthy housing conditions are often exacerbated by tenant behaviors that contribute to the problem. The likelihood of an asthma attack, for example, is increased when exposure to mold or pest allergens is combined with exposure to improperly used household cleaning chemicals or tobacco use.

The potential for both tenant behavior and housing conditions to contribute to adverse health outcomes is made most apparent by the relative success of health improvement interventions that target both sources, as opposed to interventions that focus just on behavior or just on housing conditions, particularly for air quality issues.[3, 7, 37] In Portland, for example, the Multnomah County Health Department (MCHD) initiated a multifaceted childhood asthma reduction program in 2006. Teams of community nurses, community health workers, and environmental health specialists visited the households to provide education about asthma, medication management, and asthma triggers. While in the home, the team conducted inspections of the home to identify and remove environmental asthma triggers. This program has produced significant reductions in asthma-related emergency department visits and hospitalizations for the participating families.[23, 38] Many other jurisdictions have implemented similar programs addressing both behaviors and housing conditions related to asthma which have led to similar results.[39]

Unfortunately, Portland's current rental housing inspections program does not contain an educational component that would address tenant behaviors related to housing related health issues. Other local organizations occasionally receive resources to develop and implement educational programs related to housing and health—notably MCHDs childhood asthma program and the Josiah Hill Clinic's lead poisoning prevention program—and the Community Alliance of Tenants offers education and resource referrals for its members. However, these programs are limited in their reach and are not directly coordinated with inspections. Nevertheless, while the effectiveness of multifaceted programs demonstrate that Portland's inspections program would be more effective at improving health related housing conditions, it also indicates the necessity of inspections and subsequent physical improvements to rental housing stock for improving health related housing conditions.

## 5.3 Renters most affected by inspections: Equity impacts

Although Portland inspectors currently do not gather demographic data about the households whose units they inspect, local and national data indicate that people with low incomes and members of minority ethnic or racial groups are much more likely to live in housing that does not meet basic habitability standards.[1, 8, 22, 23] According to a 2011 report by the US Centers for Disease Control and Prevention, in 2009, non-Hispanic blacks had the highest odds of householders living in inadequate housing, followed by Hispanics, American Indians/Alaskan Natives, and Asians/Pacific Islanders when compared with non-Hispanic whites. Also, householders earning an annual salary of ≤$24,999 were almost five times more likely to live in inadequate housing than those earning ≥$75,000.[22]

In addition to being more likely to live in unhealthy housing, people with low incomes and members of minority ethnic or racial groups are also more likely to experience poor health because of a wide variety of other factors such as relative lack of access to health care, lack of education, increased likelihood of living and working in polluted and unhealthy environments, and lack of resources available for acquiring essential goods and services.[40-42] As a result, the perpetuation of unhealthy, substandard housing serves to exacerbate existing health inequities, while improving substandard housing would help improve health equity.

Local research suggests that the two inspections models differ in their ability to improve housing conditions for low income and ethnoracial minority households. According to a 2005 report produced by the Community Alliance of Tenants*, many low income and minority renters refrain from requesting inspections from the city primarily because of fear of retaliation by their landlords in the form of eviction, raised rents, or intimidation, but also because of language barriers and lack of knowledge about the inspections program and process.[43] As previously noted, the enhanced model was conceived to address these barriers by providing a process that can lead to units being inspected without a complaint when another tenant has made a complaint that revealed a certain threshold of violations. As will be discussed in greater detail below, the enhanced inspections model has indeed led to more units being inspected as a result of an initial complaint. While there is no demographic data for the renters whose units are receiving these additional inspections, the fact that low income and minority households are more likely to live in substandard units means that it is likely that they are also more likely to be the ones benefiting from the additional inspections produced by the enhanced

* This report was based on interviews with sixty-two Portland tenants who self-selected as having personally experienced problems with substandard housing by either calling CAT' Renters' Rights Hotline or by getting involved in CAT's Safe Housing Project. CAT staff also interviewed seven lawyers with expertise in Oregon's Landlord Tenant law and experience with Multnomah County's housing court.

model. In short, while low income and minority renters are both more likely to benefit from the inspections program than other renters, they are even more likely to benefit from the enhanced inspections model than the standard inspections model.

## 5.4 Inspection program health impacts

Due in part to data limitations, but also to the fact that there are multiple factors beyond to housing conditions that contribute to housing-related health problems discussed in the previous section, it is beyond the scope of this current project to attempt to quantify the relative impacts of the two inspections models on the rates of incidence of these health outcomes. But the data do allow us to assess the relative impacts of the two models on identifying and improving substandard housing in Portland. Since the relationships between substandard housing and these health issues have been well-documented in local and national research, we can expect that bringing rental housing up to code will help lower rates of these key health outcomes, particularly for vulnerable populations that are more likely to live in substandard housing. Based on this conclusion, we can then consider future scenarios concerning the impacts on health-related housing conditions resulting from expansion or contraction of the enhanced inspections model.

### 5.4.1 Assessment methods

We assessed the relative impacts of the two inspections models on health-related housing conditions by analyzing BDS's Neighborhood Inspections Program records of inspections performed between July 1, 2010 (when data for the enhanced inspections were first recorded), and October 31st, 2011 (when the boundaries of the enhanced program changed to no longer include Northeast Portland). While the data do not allow us to compare the specific types of violations that were found by the two programs during this time, it does allow us to compare the number of violations per case, as well as the number of units that were inspected per case. A case is opened when an initial complaint is made and closed when all of the identified violations from the initial inspection and subsequent inspections have been cured. These comparisons indicate the relative ability of the two models to improve health-related housing conditions.

In addition, while the categories of violations that are used for tracking purposes are too broad to help determine which specific types of violations and related health determinants are being addressed through the two inspections programs, they do provide us with the ability to broadly consider which determinants might be more or less impacted by the expansion or contraction of the enhanced

inspections model. As noted above, inspectors use a uniform checklist with 244 possible specific violations when they visit a site. While the specific violations are listed in the Notices of Violation that are sent to the landlords and tenants after the inspection, they are lumped into three different categories for the purposes of tracking.* BDS data tracks the number of each type of violation for each of the city's seven inspection districts, as well as the date of the inspection. Table 5.4 below lists the three categories and the health outcomes that are generally primarily and secondarily related to the bulk of the specific housing conditions.

---

* The tracking data for the enhanced program also has three sub-categories for the fire/life/safety category: electrical,lack of utilities, and improper egress. However, since tracking data for the standard inspecitoins does not use these sub-categories, the data for thes sub-categories is lumped together in this analysis as fire/life/safety issues in order to make it possible to compare data from the two programs.

| Table 5.4: BDS inspections data tracking categories and related health determinants | | |
|---|---|---|
| Violation Category | Health Determinant Most Directly Addressed | Additional Health Determinants Addressed |
| **Fire/Life/Safety**<br><br>Most of these types of violations address conditions related to physical injury hazards such as exposed and faulty wiring that may lead to electrocution or fires; damaged floors or stairways that can cause falls; faulty or blocked entrances or exits that could prevent escape in case of a fire; lack of fire detectors; and faulty plumbing or appliances that could lead to build up of noxious or flammable gases. | Physical<br><br>Hazards<br><br>Lack of Utilities | Exposure to Air Toxics (primarily sewer and noxious gases)<br><br>Stress |
| **Health/Sanitation**<br><br>Most of these types of violations address conditions related to conditions that might foster the presence of health harming biologic substances such as mold, bacteria, and viruses, as well as other toxic substances such as lead and asbestos. Violations include the presence of mold, as well as lack of proper ventilation infrastructure (fans and working windows) and faulty plumbing that lead to moisture build-up and mold growth; presence of raw sewage; accumulated garbage and other conditions that might foster pest infestations; and chipped paint, indicating a potential lead hazard. | Exposure to Lead<br><br>Exposure to Air toxics (primarily mold)<br><br>Lack of Utilities<br><br>Stress<br><br>Pests/Sanitation | Physical Hazards |
| **General Maintenance**<br><br>These violations cover a broad range of issues and are generally considered to be more directly related to cosmetic issues and the piecemeal deterioration of the structure than to the health of the occupants. Violations include damaged moldings and non-functioning plumbing and lighting fixtures; clogged gutters, and dry rot in wooden support structures. | | Physical Hazards<br><br>Exposure to Lead<br><br>Exposure to air toxics<br><br>Lack of Utilities<br><br>Stress<br><br>Pests/Sanitation |

## 5.4.2 Findings

The inspections data is summarized below in Tables 5.4.1-4, with data being broken down by inspection district. Table 5.4.1 provides the total numbers of cases, violations, and units inspected for each district, as well as the average numbers of violations per case and units inspected per case. As discussed above, a case is opened when a valid complaint is made, and is closed when all of the violations found as a result of the initial complaint have been "cured" (brought up to code). All of the cases examined here have been closed, meaning that all of the violations have been cured, and that a violation also indicates an improvement.

Table 5.4.2 provides the differences in rates of violations per case, units inspected per case, and violations per unit. As these numbers indicate, a complaint made in the enhanced model pilot area produced 75% more (3.50 vs. 2.00) improvements per case and 70% more improvements overall, even though there were slightly fewer cases in the enhanced districts than in the standard districts. Part of this is due to the fact that units in the enhanced inspections areas typically had more violations per unit (2.40) than the units in the standard districts (1.87). However, much of this difference is also due to the ability of the enhanced complaint process to lead to the inspection and improvement of additional units that would not have been inspected under the standard model. While the standard model led to improvements in 1,391 units (1.07 units per case), the enhanced model led to improvements in 1,844 units (1.46 units per case). The ability of the enhanced model to significantly increase the number of additional units and related improvements demonstrates that it is more effective in improving housing-related health determinants than the standard model.

**Table 5.4.1: Rates of violations and units inspected per case, standard and enhanced districts, 7/1/10—10/31/11**

| District | Inspections Cases | Total Violations | Violations per Case | Units Inspected | Units Inspected per Case | Violations per Unit |
|---|---|---|---|---|---|---|
| ***Standard*** | | | | | | |
| **3** | 248 | 612 | 2.47 | 248 | 1.00 | 2.47 |
| **4** | 77 | 108 | 1.40 | 80 | 1.04 | 1.35 |
| **8** | 544 | 1,127 | 2.07 | 625 | 1.15 | 1.80 |
| **11** | 435 | 760 | 1.75 | 438 | 1.01 | 1.74 |
| **sub-total** | **1,304** | **2,607** | **2.00** | **1,391** | **1.07** | **1.87** |
| ***Enhanced*** | | | | | | |
| **5** | 543 | 2,705 | 4.98 | 916 | 1.69 | 2.95 |
| **6** | 597 | 1,443 | 2.42 | 789 | 1.32 | 1.83 |
| **9** | 123 | 278 | 2.26 | 139 | 1.13 | 2.00 |
| **sub-total** | **1,263** | **4,426** | **3.50** | **1,844** | **1.46** | **2.40** |
| **Total** | **2,567** | **7,033** | **2.74** | **3,235** | **1.26** | **2.17** |

**Table 5.4.2: Differences between enhanced and standard model rates of violations and units inspected per case, 7/1/10--10/31/11**

| | Violations per Case | Units Inspected per Case | Violations per Unit |
|---|---|---|---|
| Standard | 2.00 | 1.07 | 1.87 |
| Enhanced | 3.50 | 1.46 | 2.40 |
| **Difference** | **+1.5 (75%)** | **0.39 (36%)** | **+0.53 (28%)** |

Table 5.4.3 details the types of complaints generated in the different inspections districts. As noted above, the three categories of complaints that BDS currently uses for tracking purposes—fire/life/safety, health/sanitation, general maintenance—each contain numerous specific violations, the specific details of which are not tracked. As this table indicates, most of the violations in both the enhanced and standard inspections districts are general maintenance violations. In the standard and enhanced inspections districts, 53% and 63% of the violations fell in this category, respectively. In both areas, the next most common violations were fire/life/safety, 29% and 20% respectively, followed by health/sanitation at 18% and 17%, respectively.

**Table 5.4.3: Number and percent of violations by type, standard and enhanced districts, 7/1/10--10/31/11**

| District | Total Violations | Fire/Life/Safety | | Health/Sanitation | | General Maintenance | |
|---|---|---|---|---|---|---|---|
| ***Standard*** | | | | | | | |
| **3** | **612** | 220 | 36% | 101 | 17% | 291 | 48% |
| **4** | **108** | 22 | 20% | 17 | 16% | 69 | 64% |
| **8** | **1,127** | 288 | 26% | 207 | 18% | 632 | 56% |
| **11** | **760** | 226 | 30% | 151 | 20% | 383 | 50% |
| **sub-total** | **2,607** | **756** | **29%** | **476** | **18%** | **1,375** | **53%** |
| ***Enhanced*** | | | | | | | |
| **5** | **2,705** | 491 | 18% | 478 | 18% | 1,736 | 64% |
| **6** | **1,443** | 290 | 20% | 246 | 17% | 907 | 63% |
| **9** | **278** | 98 | 35% | 37 | 13% | 143 | 51% |
| **sub-total** | **4,426** | **879** | **20%** | **761** | **17%** | **2,786** | **63%** |
| **Total** | **7,033** | **1,635** | **23%** | **1,237** | **18%** | **4,161** | **59%** |

While it is possible that the differences in the percentages of different types of violations found between the standard and enhanced inspections area are related to differences in the inspections models, it is more likely due to differences in rental housing stock between the different inspections districts. According to city inspectors, the types of violations they find often vary based on the age of the building since different building practices and materials were used at different times. Because different parts of the city were developed at different times, it is likely that the variations between the percentages of types of violations have

more to do with the nature and condition of the building stock in the different inspections districts than with the procedural differences between the two inspections models. If there was a feature of the enhanced model that led to different proportions of the three violations categories being found, it would likely show up in the data for the Stage 2-4 inspections since this is where the enhanced inspections process differs from the standard process. As the numbers from a sample of enhanced inspections data contained in Table 5.4.4 indicates, there is some variation between the percentages of types of violations found in Stage 1 and in Stages 2-4, particularly for health/sanitation. However, while slightly higher proportions of general maintenance violations found in Stages 2-4 might have made a small contribution to the higher proportion of general maintenance violations found in the enhanced inspections districts compared to the standard inspections districts, the same logic would lead us to expect a higher proportion of fire/life/safety violations in the enhanced districts than in the standard districts, but this is not the case and indicates that the types of violations uncovered in the Stage 2-4 phases of the enhanced inspections are not substantially different from those identified in the enhanced Stage 1 and standard inspections.

**Table 5.4.4: Violation class by stage for selected* inspections, enhanced program,7/1/10--10/31/11**

| | Inspections Cases | Total Violations | Fire/Life/ Safety | | Health/ Sanitation | | General Maintenance | |
|---|---|---|---|---|---|---|---|---|
| Stage 1 | 279 | 2,246 | 510 | 23% | 458 | 20% | 1,287 | 57% |
| Stages 2--4 | 22 | 389 | 104 | 27% | 38 | 10% | 242 | 62% |
| Stage 2 | 19 | 373 | 93 | 25% | 36 | 10% | 239 | 64% |
| Stage 3 | 3 | 16 | 11 | 69% | 2 | 13% | 3 | 19% |
| Stage 4 | 0 | 0 | 0 | 0% | 0 | 0% | 0 | 0% |

* BDS currently has recorded enhanced inspections data broken down by stage for about one fifth of the total enhanced inspections cases. This sample includes all data available for enhanced cases initiated between 7/1/10—10/31/11.

## 5.5 Projecting Future Impacts

As previously noted, the primary purpose of this analysis is to assess potential health impacts that would result from changes to funding Portland's housing inspections program. To help inform budget decisions, the HIA Steering Committee decided to consider and compare the relative health impacts of three different possible scenarios on the basis of their relative effects on health-related

housing conditions: status quo: expansion of the enhanced model, and elimination of the enhanced model (these scenarios are described in greater detail in Chapter 3: Scoping).

Comparison of the relative impacts of the three scenarios on health-related housing conditions is based on estimates of the annual number of found and cured violations and number of units inspected that would result from enacting the different scenarios. These estimates are summarized below in Table 5.5.1. They were derived from the analysis of the BDS tracking data discussed above, adjusting the number of annual cases to reflect the fact that the initial analysis was for a 16 month time period, and adjusting up or down the rates of violations per case and units per case for districts being reclassified as enhanced, depending on the scenario (a more detailed description of how these adjustments were made can be found in Appendix C.)

**Table 5.5.1 Scenario comparisons by estimated violations per year and units per year**

| | Estimated Cases (complaints) per Year | Estimated Violations per Year | Estimated Units Inspected per Year |
|---|---|---|---|
| **Status quo** | *1,925* | 4,928 | 2,308 |
| **Expansion** | *1,925* | 5,421 | 2,492 |
| *Difference from Status Quo* | | *493 (10%)* | *184 (8%)* |
| **Elimination** | *1,925* | 3,643 | 1,821 |
| *Difference from Status Quo* | | *-1,286 (-26%)* | *-487 (-21%)* |

As Table 5.5.1 indicates, maintaining the inspections program as is, with the enhanced model being applied only in districts 5 and 9, would result in an estimated 2,308 units inspected per year, and 4,928 violations found and cured per year. If the enhanced model were expanded to districts 3, 4, and 6, then we would expect to see an 8% increase in the numbers of rental households receiving inspections and a 10% increase in the number of violations found and cured per year. If the enhanced model were eliminated from the inspections program, then we would expect to see a 21% decrease in the number of units inspected and improved and a 26% decrease in the number of violations found and cured.

# 6 Summary of findings

This HIA found that:

1. there are strong connections between housing, health, and health equity
2. the current inspections program faces challenges in meeting community needs, and
3. the enhanced inspections model holds promise for better achieving health and health equity in Portland.

These conclusions are based on a review and analysis of scholarly literature, local research, community health data, and the Bureau of Development Service's inspections program tracking data. Each of these findings is presented in more detail below.

***1. There are many connections between housing, health, and equity.***

**a. Substandard housing contributes to poor health**. Existing academic research and local case studies have identified numerous health problems that are directly influenced by those housing conditions addressed in Portland's Property Maintenance Code (Title 29). Key issues of concern are asthma and lead poisoning (particularly among children); physical injuries from falls, burns, and electrocution; communicable diseases resulting from poor sanitation and pests; illness resulting from lack of heat and hot water; and stress from dealing with all of these problems.

**b. Groups at higher risk of various health problems—particularly communities of color and low-income households—are more likely to live in substandard housing.** Existing research and local data demonstrate that this is true both locally and nationally. Not surprisingly, low-cost rental housing tends to be lower quality and is less likely to be code-compliant. Substandard housing places socioeconomically disadvantaged populations in double jeopardy because they are already at higher risk of health problems and are also more likely to live in lower-cost housing.

**c. Housing inspections and the subsequent improvements to housing conditions reduce the occurrence and severity of multiple health problems.** Since most items in Portland's Property Maintenance Code are health-related, ensuring that properties meet

these requirements will improve the ability of housing to support health.

d. **Tenant behaviors contribute to the health impacts of housing.** Independent of building characteristics and management practices, tenant behaviors can limit or degrade the ability of housing to support health. Examples of these behaviors include: introducing health hazards such as tobacco smoke, toxic cleaning chemicals, and pesticides; damaging the property; failing to use appliances such as ventilation systems properly; and neglecting to report maintenance issues in a timely manner. Because they are often the result of a lack of information or understanding regarding best practices, educational activities may help change these behaviors.

e. **Healthy housing interventions are most effective when they address both housing conditions and tenant/landlord behaviors.** Research and best practices for housing-related health interventions demonstrate that education of landlords and tenants in combination with housing inspections is more effective than either service provided alone.

*2. Portland's current inspections program is constrained in its ability to support healthy housing and health equity.*

a. **Portland's standard model imposes barriers to healthy housing for low-income households**. As documented in a 2006 report by the Community Alliance of Tenants and highlighted by the QRHW Final Report, cost-burdened renters often refrain from making complaints to the city because they fear that their landlord will raise their rents, intimidate, or evict them. Language can also be a barrier for households where English-language proficiency is limited.

b. **The city's inspections program currently lacks an educational component for either for landlords or tenants**. Educational materials and strategies for using them have been developed but due to the lack of funding for translation, distribution, and printing, BDS has not utilized them.

c. **The current tracking system used by BDS data collection makes it difficult to systematically assess which housing problems (and, therefore, health determinants) are being addressed through inspections.** The current inspections checklist lumps 244 different violation types that are entered into a database in three broad,

overlapping categories. This makes it impossible to track violations related to specific health outcomes, such as asthma or lead poisoning. This information would not only be useful for helping understand and quantify the health impacts of the inspections program, but would also help BDS and its public health partners develop educational materials and implement intervention programs. In addition, more detailed data would also help BDS determine which areas of the city would best benefit from the enhanced model and the additional staffing resources it requires.

3. ***The enhanced inspections model improves housing conditions and health equity.***

   a. **The enhanced model improves health equity in Portland.** Because rental households are more likely to be headed by people of color and low-income people, and because among renters people of color and low-income people are more likely to live in a unit with housing problems, the program provides the greater benefit to people more likely to suffer housing-related health problems. This contribution is compounded by the fact that people of color are at increased baseline risk of many of the health problems that are caused or exacerbated by housing problems.

   b. **The enhanced model reduces barriers to reporting.** The enhanced model can lead to improvements for residents who aren't willing or able to file a complaint because it leads to inspections of units for which a complaint hasn't been made, but which are more likely to be substandard because they are in a building managed by an owner whose properties have housing problems. This contributes to health equity by creating a system that increases access to services for vulnerable social groups who otherwise experience barriers to using them.

   c. **The enhanced model is more effective than the standard model in improving health-related housing conditions.** Analysis of BDS's rental inspections tracking data demonstrates that a complaint made under the enhanced model produced 75% more improvements than a complaint made under the standard model. Part of this is due to the fact that units in the enhanced inspections areas typically had more violations per unit than the units in the standard districts. However, much of this difference is also due to the ability of the enhanced complaint process to lead to the inspection and improvement of additional units that would not have been inspected under the

standard model. While the standard model led to improvements in 1,391 units, the enhanced model led to improvements in 1,844 units despite having slightly fewer initial complaints.

d. **Strategically expanding the enhanced model will increase the number of homes that are inspected and improved**. Strategically expanding the enhanced model to the three other BDS districts with the highest rates of cost-burdened households would more than double the number of renter households covered. There are currently about 16,000 rental units in the enhanced model pilot area. Adding districts 3, 4, and 6 would increase the number of rental units covered to over 37,000. While BDS data suggest that these districts have lower rates of substandard housing than the enhanced model pilot area, enhanced inspections would still likely generate at least an 8% increase in the number of units inspected, and at least a 10% increase in the numbers of violations found and cured in the new areas. Enhanced inspections would not impose any additional burden on property-owners because the program is "self-limiting": properties where no violations found during inspections undergo no additional inspections. The enhanced model helps tenants in buildings where owners cannot or will not make necessary improvements but does not change the inspections system procedures or impacts for buildings that are appropriately maintained.

# 7 Recommendations

Based on the findings described above, we recommend that Portland City Council support and increase the Mayor's 2012-2013 budget to allocate funds that enable the Bureau of Development Services to:

1. **Strategically expand the enhanced model to other parts of Portland with higher rates of cost burdened households.** The enhanced model has proven to be more effective than the standard model in eliminating health-related sub-standard housing conditions. Since residents of sub-standard housing are more likely to be low-income or members of communities of color and thus at higher risk for multiple adverse health outcomes, improving their housing stock will minimize a major driver of health inequity in Portland. Strategically expanding the enhanced model to three other BDS inspections districts with the highest rates of cost-burdened households would more than double the number of renter households covered. Implementing this recommendation will help maintain quality housing for renters at a time when increasing numbers of households are priced out of the homeownership market. It will also help the city achieve the health and equity goals in the *Portland Plan*.
2. **Implement the tenant/landlord education strategies developed by the Quality Rental Housing Workgroup.** Housing-related health interventions are most effective when they address both housing conditions and tenant/landlord behaviors. Tenants need a better understanding of how their behaviors can reduce the presence of mold, pests, allergens, irritants, and safety hazards. Landlords need to have a better understanding of the value and necessity of timely repairs and basic services that can reduce health risks. Adding an educational component to the BDS inspections program would greatly enhance their ability to improve the health of Portland renters, particularly those residents who are more likely to live in sub-standard housing.
3. **Implement the BDS Information Technology Advancement Project (ITAP) which is currently in the RFP response phase and is scheduled to be completed and implemented in 2 ½-3 years.** This analysis, and previous attempts to assess the health impacts of the rental housing program, reveals the limits of the current data tracking system to answer key questions. As the QRHW report noted, inspectors and their public health partners need to be able to readily identify the locations of inspections along with type of violations, time to remediation, enforcement, and fines for both renter- and owner-occupied housing. This information is necessary to document health

and housing problems and develop cost-effective solutions for addressing them, but is currently not captured in BDSs tracking system. The ITAP Project would allow inspectors and public health professionals the ability to track and view violations by individual unit and provide details about types of violations cited and the attendant outcomes of the inspections process. City Council has already committed to this and BDS has this included in its budget for this year and the next several years to address this issue.

# 8 Summary of Potential Impacts

As stated at the outset, this HIA was undertaken to inform current and future discussion about funding for the rental housing inspections program by providing City Councilors, BDS staff, and other local housing and health stakeholders with information about the probable health and health equity impacts that would result from changes in the funding level for Portland's rental housing inspections program. Table 8 summarizes the health and health equity impacts of the Expansion and Elimination scenarios relative to the Status Quo scenario that were analyzed above. In addition, since this report also makes additional recommendations to improve the ability of the rental housing inspections program to protect the health of renters and advance health equity, Table 8 also summarizes the impacts that would be produced by the adoption of these recommendations.

**Table 8: Summary of health and health equity impacts of the expansion and elimination scenarios relative to the status quo**

| Scenario | Direction of Impact | Magnitude of Impact (i.e., how many) | Severity of Impact (i.e., how good or bad) | Equity Impacts | Strength of Causal Evidence |
|---|---|---|---|---|---|
| Expansion | + | **moderate** | **moderate** | **+** | *** |
| Elimination | - | **moderate** | **moderate** | **-** | *** |
| Recommendations *(Expansion + Education + Improved Tracking)* | + | **major** | **major** | **++** | *** |

**Explanations:**

· Direction of Impact refers to whether the alternative will positively impact health determinants (+), negatively impact health determinants (-), or have no impact on health determinants (~).

· Magnitude of Impact reflects a qualitative judgment of the size of the population of the anticipated change in health determinant effect: minor, moderate, major.

· Severity of Impact reflects the nature of the effect on health determinants and its permanence: minor, moderate, major.

·Equity Impact reflects a qualitative judgment of the magnitude of the anticipated change in health inequities related to housing conditions: (--)=moderate increase in health inequities related to housing(-)= minor increase in health inequities related to housing; (~)=no change; (+)=minor improvement in health equity related to housing; (++)=moderate improvement in health equity related to housing

· Strength of Causal Evidence refers to the strength of the research/evidence showing causal relationship between the alternatives and the health determinants: * = plausible but insufficient evidence; ** = likely but more evidence needed; *** = high degree of confidence in causal relationship. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.

# Appendix A: Bureau of Development Services Violation Checklist, by Violation Type

| *Fire/Life/Safety Violations* | |
|---|---|
| **Foundation** | Portions of the crawl space have been excavated without benefit of permits and inspections. This condition may substantially impair the foundation's ability to carry imposed loads. 29.20.050, 29.50.010, 29.50.020 |
| **Accessory Structure** | Swimming pool is not totally enclosed by a structure, enclosed by a substantial fence at least four (4) feet in height and/or equipped with a self closing and latching gate except where bordered by a wall of an adjacent structure at least four (4) feet in height. 29.30.280 |
| **Address** | Property address cannot be seen from the street. 29.30.010 |
| **Address** | Property has no visible address. 29.30.010 |
| **Chimney** | Chimney is obstructed. 29.30.040 |
| **Commercial Apts** | Common _____ is obstructed. 29.30.230(d) |
| **Commercial Apts** | Common passageways lack required visible directional exit signs, which indicate the way to exit doors and fire escapes. 29.30.230(d) |
| **Door, exterior** | _____ _____ door(s) cannot be opened from the inside without the use of special knowledge or effort. 29.30.100(a) |
| **Door, exterior** | _____ on _____ entry door(s) potentially impedes emergency escape. 29.30.230(b) |
| **Door, interior** | _____ on _____ door potentially impedes emergency escape. 29.30.230(b) |
| **Door, interior** | Exit door in common corridor or passageway cannot be opened from the inside with one hand in a single motion. 29.30.100(b) |
| **Door, interior** | Required door closer to stair enclosure is _____. 29.30.100(c) |
| **Electrical** | Dwelling unit has damaged wiring. 29.30.190 |
| **Electrical** | Dwelling unit lacks _____. 29.30.190 |
| **Electrical** | Electrical outlet(s) in _____ _____. 29.30.190 |
| **Electrical** | Electrical service panel has open circuit breaker spaces. 29.30.190 |
| **Electrical** | Fuse box is overfused. 29.30.190 |
| **Electrical** | Light fixture(s) in _____ are _____. 29.30.190 |
| **Electrical** | There are unapproved splices in the wiring. 29.30.190 |
| **Electrical** | Unapproved and/or excessive use of extension cords, creating possible fire hazards. 29.30.190 |

| *Fire/Life/Safety Violations* | |
|---|---|
| **Electrical** | Unapproved electrical wiring and/or fixtures installed without obtaining required permits and inspections (including but not limited to: _____). 29.30.190, 29.05.040, 29.50.010, 29.50.020 |
| **Floor** | An accumulation of personal belongings stored on the floor limits emergency egress and creates a potential fire hazard. 29.30.140(b) |
| **Foundation** | Structural members are _____, substantially impairing their ability to carry imposed loads. 29.30.050(b) |
| **Handrail** | _____ lacks required _____ high safety guardrail with intermediate rails spaced so that no object larger than a four-inch sphere may pass through. 29.30.080(c) |
| **Handrail** | _____ steps lack a required approved safety handrail not less than 30" nor greater than 38" high, that is continuous the full length of the stairs with ends that turn into the wall or butt into a post. 29.30.080(b,c) |
| **Handrail** | Handrails at the _____ steps _____. 29.30.080(b,c) |
| **Handrail** | Open side(s) of _____ stairs lacks required 34" high safety guardrail with intermediate rails spaced so that no object larger than a five-inch sphere may pass through. 29.30.080(c) |
| **Handrail** | The handrail at the _____ steps is unsecured, and incapable of supporting the loads to which they are subjected. 29.20.080 |
| **Mechanical** | A fuel burning appliance lacks the required clearance to combustibles. 29.30.180 |
| **Mechanical** | An unapproved woodstove was installed without benefit of permits or inspections. 29.30.180(a,1), 29.50.010, 29.50.020 |
| **Mechanical** | Clothes dryer duct is damaged and/or obstructed. 29.30.180(a,2), 29.30.120 |
| **Mechanical** | Dwelling lacks required approved heating facilities capable of maintaining a room temperature of 68 degrees Fahrenheit at a point 3 feet above the floor in all habitable rooms. 29.30.180(b) |
| **Mechanical** | Dwelling unit lacks required gas service. 29.30.180(a) |
| **Mechanical** | Heater vent connector is damaged. 29.30.180(a) |
| **Mechanical** | Open flame heater(s) in use, creating a fire hazard. 29.30.180(b) |
| **Mechanical** | Portable heater(s) in use are creating a fire hazard. 29.30.180(a,b) |
| **Mechanical** | Portions of asbestos wrapping on heating ducts are loose and friable. 29.30.180(a), 29.30.260(d) |
| **Occupancy** | The _____ is being occupied as unapproved habitable space. This area does not meet minimum requirements for habitable space, including but not limited to: _____. 29.30.200(a,b), 29.30.090(b), 29.30.110(a) |

| *Fire/Life/Safety Violations* | |
|---|---|
| **Plumbing** | Dwelling unit lacks proper connection to a public or approved private ____ system. 29.30.170(a) |
| **Plumbing** | Dwelling unit lacks required water service. 29.30.170(a) |
| **Plumbing** | Gas fired water heater is improperly vented. 29.30.180(a,1), 29.30.170(c) |
| **Plumbing** | Open drain pipe allows entrance of sewer gases into the dwelling. 29.30.170(c) |
| **Plumbing** | Unapproved s-trap is installed on ____ drain. 29.30.170(c,d) |
| **Plumbing** | Water heater lacks a code-approved temperature/pressure relief valve drain tube. 29.30.170(b,c,d), 29.30.180(a) |
| **Plumbing** | Water heater lacks a code-approved temperature/pressure relief valve. 29.30.170(b,c,d), 29.30.180(a) |
| **Porch** | ____ porch is missing. 29.30.070 |
| **Porch** | ____ porch lacks minimum ____ high guardrail with intermediate rails spaced so that no object larger than a four inch sphere may pass through. 29.30.080(c) |
| **Porch** | Porch supports are deteriorated and/or deflected indicating structural failure. 29.30.070 |
| **Porch** | Portions of porch decking and/or stairs are deteriorated, damaged, and/or missing. 29.30.070 |
| **Porch** | Portions of structural members supporting ____ are deteriorated and/or deflected, indicating structural failure and affecting load bearing capacity. Please bring this letter along with detailed plans of any structural work to be performed to the City of Portland Development Services Center at 1900 SW 4th Avenue, First Floor, to obtain required permits. 29.30.050(b) |
| **Sleeping Room** | ____ is being used as a sleeping room. 29.30.210(a,b) |
| **Smoke Detector** | Sleeping areas lack required protection by operable smoke detectors and/or alarms. 29.30.240 |
| **Stairs** | ____ stairs are missing. 29.30.070 |
| **Stairs** | ____ steps riser height varies more than the allowable 3/8", between the tallest and shortest riser, portions exceed allowable height of 8". 29.30.070 |
| **Stairs** | Common stairway and basement access stair rails are incomplete, of insufficient size and/or lack returns. 29.30.080(b,c) |
| **Stairs** | Stairs are unsafe and fail to meet minimum tread width of 9" and/or exceed the maximum riser height of 8". 29.30.070 |

| *Fire/Life/Safety Violations* | |
|---|---|
| **Stairs** | Stairs are unsafe to use, with deteriorated, damaged and/or missing ____. 29.30.070 |
| **Windows** | ____ window(s) are boarded, preventing emergency exit, ventilation, and light. 29.30.090(a,b,c,f) |
| **Windows** | ____ window(s) cannot be opened and/or lacks hardware capable of holding it open. 29.30.090(f) |
| **Windows** | Accessible ____ window(s) lack hardware capable of maintaining the window(s) in an open position to provide emergency escape and ventilation. 29.30.090(f) |
| **Windows** | Basement egress window lacks a window well the full width of the window with a maximum depth of 44 inches below grade and a 3 foot clearance measured perpendicular to the outside wall. 29.30.230(a) |
| **Windows** | Bedroom emergency exit is barred. 29.30.230(a,b) |
| **Windows** | Bedroom window(s) are sealed shut, preventing emergency exit and ventilation. 29.30.090(f) |
| **Windows** | Egress window(s) in sleeping area(s) exceed maximum sill height of 44 inches above the floor. 29.30.090(d) |
| **Windows** | Egress window(s) in sleeping area(s) lack required minimum net clear opening of 20 inches wide by 22 inches high, and if constructed after July 1, 1974, must be at least five (5) square feet in area. 29.30.090(e) |
| **Windows** | Required emergency exit is blocked. 29.30.230(a,b) |
| **Windows** | Sleeping area(s) lack required approved emergency egress. 29.30.230(a,b) |
| **Accessory Structure** | Portions of exterior walkway are ____, creating a trip hazard. 29.30.020 |

| *Health and Sanitation Violations* | |
|---|---|
| **Floor** | Portions of ____ floor coverings are damaged, deteriorated and/or missing, resulting in a possible moisture penetration of the subflooring and the inability to maintain the floor in a clean and sanitary condition. 29.30.110(a,b) |
| **Floor** | Portions of ____ floor coverings are damaged. 29.30.110(a,b) |
| **Floor** | Portions of ____ floor coverings are stained and dirty. 29.30.110(a), 29.30.140(b) |
| **Floor** | Portions of ____ floor lack nonabsorbent floor covering. 29.30.110(b) |
| **Floor** | Portions of ____ subflooring are deteriorated and spongy, indicating structural failure. 29.30.110(a) |

| *Health and Sanitation Violations* | |
|---|---|
| **Floor** | Portions of _____ subflooring are deteriorated. 29.30.110(a) |
| **Floor** | Portions of carpet in the _____ are _____ creating conditions that pose a health and/or safety hazard to the occupants. Therefore, removal and/or replacement is required. 29.30.140(b), 29.30.270(b) |
| **Floor** | Portions of carpet in the _____ are _____ to such a degree as to pose a health hazard to the occupants. Therefore, replacement is required. 29.30.140(b), 29.30.270(b) |
| **Floor** | Portions of the connection between the bathtub and floor covering are not adequately sealed, allowing possible moisture penetration to the subflooring. 29.30.110(a,b), 29.30.120 |
| **Hazard** | The Bureau of Development Services Neighborhood Inspections must receive confirmation from the State of Oregon that a Certificate of Fitness has been issued verifying the clean-up of the property before a Housing Inspector can enter the property to perform inspections, and/or close this Housing case and allow occupancy. Please contact Brett Sherry at 971-673-0442 at the State for proper cleanup procedures of your property. |
| **Hazard** | The Multnomah County Health Department has determined that there is a lead hazard at this property. Please retain an Oregon-certified lead risk assessment contractor to assess the lead hazards for this unit and provide a plan to abate or remediate the hazards. The Multnomah County Health Department will review and approve the plan to abate or remediate the hazards determined by the risk assessment. When the abatement and/or remedies are complete, retain a different contractor certified by the State of Oregon to do a lead clearance test. Multnomah County Health department will review the results to determine if the lead hazard has been remedied. |
| **Hazard** | The State of Oregon Health Division has identified this property as an illegal drug laboratory site where hazardous chemicals were found and seized, rendering the property unsafe for occupancy. 29.30.260(b) |
| **Mechanical** | Clothes dryer duct is damaged and leaking dryer exhaust to the interior. 29.30.180(a,2), 29.30.120 |
| **Mechanical** | The exhaust duct for the clothes dryer fails to vent to the exterior. 29.30.180(a,2), 29.30.120 |
| **Pest** | Dwelling unit shows evidence of _____ infestation, resulting in a health hazard to the occupants. After extermination, proper precautions shall be taken to prevent reinfestation. 29.30.130 |
| **Plumbing** | Dwelling lacks required hot water facilities capable of heating to at least 120 degrees Fahrenheit. 29.30.170(b) |
| **Plumbing** | _____ drain is plugged. 29.30.170(c) |
| **Plumbing** | Bathtub faucet is below flood rim of fixture. 29.30.170(c,d) |
| **Plumbing** | Dwelling unit lacks required bathtub or shower facilities. 29.30.150(c) |

| *Health and Sanitation Violations* | |
|---|---|
| **Plumbing** | Graywater from the ____ does not discharge to an approved drainage system. 29.30.170(a,c,d) |
| **Plumbing** | The ____ sewer rain drain standpipe lacks cap. The sewer standpipe should be sealed with a wing-nut test plug or a rubber cap. 29.30.170(c) |
| **Plumbing** | The ____ sewer rain drain standpipe lacks cap. The sewer standpipe should be sealed with a wing-nut test plug or a rubber cap. 29.30.170(c) |
| **Plumbing** | Waste water from this site is discharging onto adjacent property. 29.30.170(c,1,4) |
| **Plumbing** | Water is leaking from base of toilet. 29.30.170(c) |
| **Sanitation** | Dwelling units lack weekly garbage service subscribed to and paid for by the property owner. The owner of any single or multi-family dwelling unit who rents or leases a unit for human habitation shall provide at least one (1) 20 gallon receptacle for each dwelling unit, or a large combined-type with capacity sufficient to prevent overflow of garbage between days of collection. Receptacles shall have tight-fitting lids and collection shall be by a licensed hauler at least once a week. The licensed hauler for your area is XXXX. 29.30.140(c) |
| **Sanitation** | Trash and debris has accumulated on the interior of the dwelling unit creating ____. 29.30.140(b) |
| **Sanitation** | Trash and debris have accumulated on exterior property areas. Any time limit on a City of Portland Nuisance Posting on this property takes precedence over the time limits on this Housing Code case. 29.30.140(a) |
| **Sanitation** | Trash and debris have accumulated on exterior property areas. 29.30.140(a) |
| **Sanitation** | Trash receptacle ____. 29.30.140(c) |
| **Walls** | Excessive mold growth in the ____ indicates lack of ventilation and/or moisture control. 29.30.120 |
| **Walls** | Excessive mold growth on the ____ ____ indicates lack of ventilation and/or moisture control. 29.30.120 |
| **Walls** | Portions of the ____ coverings ____ have excessive amounts of mold and/or mildew, indicating excessive dampness. 29.20.120 |
| **Walls** | Portions of the ceiling coverings are water damaged, indicating possible weather entry. 29.30.030, 29.30.110(a) |
| **Windows** | Bathroom lacks required ventilation window or approved ventilation system. 29.30.090(c) |

| *General Maintenance* | |
|---|---|
| **Accessory Structure** | Portions of the _____ are _____, posing a hazard to pedestrians and/or occupants. 29.30.020 |
| **Accessory Structure** | Portions of the _____ are in disrepair with _____. 29.30.020 |
| **Accessory Structure** | Portions of the fence are broken and/or falling. 29.30.020 |
| **Accessory Structure** | Portions of the retaining wall are cracked and/or deflected, indicating structural failure. 29.30.020 |
| **Address** | Address numbers posted do not match the address listed on the Multnomah County Assessment and Taxation Records for the property. 29.30.010 |
| **Address** | All dwellings shall have address numbers posted in a conspicuous place so they may be read from the street or public way. 29.30.010 |
| **Address** | Units lack individual and/or consistent numbering or lettering. 29.30.010 |
| **Bathroom** | Dwelling unit lacks a bathtub or shower in a room that allows privacy. 29.30.150(c) |
| **Bathroom** | Dwelling unit lacks a lavatory basin separate from the kitchen sink. 29.30.150(d), 29.30.160(a) |
| **Bathroom** | Dwelling unit lacks a toilet in a room separate from the habitable rooms and that allows privacy. 29.30.150(d) |
| **Ceiling Height** | Basement being used for habitable space in one- or two-family dwelling unit lacks a minimum flat ceiling height of at least 6 feet 8 inches and fails to meet the exceptions on height requirements for allowable ceiling projections, (such as pipes, ducts, beams, or similar encroachments). 29.30.200(a) |
| **Ceiling Height** | Basement being used for habitable space in one- or two-family dwelling unit violates the allowable exceptions for ceiling encroachments. Ceilings are in violation if (1) the ceiling projections under 6 feet 8 inches cover more than 10 percent of the floor space and/or (2) ceiling projections under 6 feet 8 inches are more than 2 feet from the perimeter wall. 29.30.200(a) |
| **Ceiling Height** | Ceiling height covering more than 10 percent of the floor area of basement habitable rooms is too low. Code allows 10 percent or less of the total ceiling area be at least 6 feet 2 inches high. 29.30.200(a) |
| **Ceiling Height** | Habitable room in the attic, where the ceiling is sloped, lacks a minimum ceiling height of at least 6 feet 8 inches over at least 50 percent of the overall room area. 29.30.200(b) |

| *General Maintenance* | |
|---|---|
| **Ceiling Height** | Portions of a basement being used for habitable space in one- or two-family dwelling unit has the minimum 6 feet 8 inches ceiling height but violates the exceptions allowed in the code. Violations to the ceiling exception are (1) projections under 6 feet 8 inches over more than 10 percent of the floor space and/or (2) ceiling projection under 6 feet 8inches that are more than 2 feet from the perimeter wall. 29.30.200(b) |
| **Ceiling Height** | Habitable room in one- or two-family dwelling unit lacks a minimum ceiling height of at least 7 feet 6 inches. 29.30.200 |
| **Chimney** | Chimney is not reasonably plumb. 29.30.040 |
| **Chimney** | Chimney smoke pipe connection holes are covered with unapproved material. The material must be either concrete and/or masonry. 29.30.180(a), 29.30.040 |
| **Chimney** | Portions of chimney above the roofline have deteriorated mortar joints and/or missing bricks. 29.30.040 |
| **Chimney** | Portions of the chimney have _____. 29.30.040 |
| **Commercial Apts** | Apartment building lacks one _____ for every twelve residents or fraction thereof. 29.30.150(c) |
| **Commercial Apts** | Apartment building lacks one _____ on each floor. 29.30.150(c) |
| **Commercial Apts** | Common _____ lacks adequate lighting of at least 1 foot candle at principal points and ½ foot candle at other points, measured at not more than 4 feet above the floor. 29.30.190(c) |
| **Commercial Apts** | Metal fire escape lacks corrosion-resistant paint. 29.30.230 |
| **Derelict** | Property is a derelict building as defined by Code, because it is vacant and _____. 29.10.020, 29.40.010 |
| **Door, exterior** | _____ entry door(s) lack required locks 29.30.100(c) |
| **Door, exterior** | Exterior door lacks the required minimum 3' X 3' landing. 29.30.100(d) |
| **Door, exterior** | Portions of _____ exterior door _____ are damaged, deteriorated and/or missing. 29.30.100(d) |
| **Door, exterior** | Portions of _____ exterior door(s) are _____. 29.30.100(d) |
| **Door, exterior** | Portions of _____ screen/storm door(s) are damaged and/or deteriorated. 29.30.100(d) |
| **Door, exterior** | Portions of the _____ exterior door _____, allowing weather entry. 29.30.100(d) |
| **Door, exterior** | The slider door has deteriorated or missing rollers, dirt-encrusted roller track, and/or damaged or missing locking hardware. 29.30.100(a,c,d) |

| *General Maintenance* | |
|---|---|
| **Door, interior** | _____ door does not fit within its frame. 29.30.100(e) |
| **Door, interior** | _____ door does not provide privacy. 29.30.150(c) |
| **Door, interior** | _____ door lacks required privacy lock. 29.30.150(c) |
| **Door, interior** | Interior door is broken, deteriorated, and/or missing. 29.30.100(e) |
| **Door, interior** | Portions of the _____ door _____ are damaged, deteriorated and/or missing. 29.30.100(e) |
| **Electrical** | _____ lacks an operable light fixture. 29.30.190(b) |
| **Electrical** | _____ lacks at least one supplied and operable light fixture and one operable outlet. 29.30.190(b) |
| **Electrical** | _____ lacks at least two operable outlets or one outlet and a light fixture. 29.30.190(a) |
| **Electrical** | Access to electrical circuit panel is blocked by an accumulation of personal belongings. Required clearance in front of panel is 30" wide and 36" deep. 29.30.190, 29.30.110 |
| **Electrical** | Baseboard heater in _____ is _____. 29.30.180(a), 29.30.190 |
| **Electrical** | Electrical outlet(s) in _____ _____. 29.30.190 |
| **Electrical** | Electrical outlets and/or switches lack cover plates. 29.30.190 |
| **Electrical** | Electrical service panelboard lacks required access and/or clearances. 29.30.190 |
| **Electrical** | Electrical switch(es) in _____ _____. 29.30.190 |
| **Electrical** | Electrical wiring running beneath joists is subject to mechanical damage. 29.30.190 |
| **Electrical** | Exposed electrical wiring not in conduit is subject to mechanical damage. 29.30.190 |
| **Electrical** | Junction boxes in the _____ lack cover plates, exposing wires. 29.30.190 |
| **Electrical** | Kitchen lacks required service connections for refrigeration and/or cooking appliances. 29.30.160(b) |
| **Electrical** | Light fixture(s) in _____ are _____. 29.30.190 |
| **Exterior** | Portions of brick and mortar joints are deteriorated, cracked, and/or missing. 29.30.060(d) |
| **Exterior** | Portions of exterior metal surfaces are rusted or corroded. 29.30.060(c) |
| **Exterior** | Portions of exterior paint are peeled to bare wood. 29.30.060(b) |
| **Exterior** | Portions of the _____ veneer are deteriorated, cracked and/or missing. 29.30.060(d) |

| *General Maintenance* | |
|---|---|
| **Exterior** | Portions of the ____ veneer are not adequately tied back to its supporting structure. 29.30.060(d) |
| **Exterior** | Portions of the exterior siding are deteriorated, damaged and/or missing. 29.30.060(a) |
| **Exterior** | Portions of trim paint are peeled to bare wood. 29.30.060(b) |
| **Exterior** | Portions of untreated wood lack required 6" clearance to earth. 29.30.060(b) |
| **Exterior** | Trees/shrubs growing onto the dwelling may contribute to the deterioration of the structure. 29.30.060(a) |
| **Fireplace** | Fireplace firebox mortar joints are deteriorated. 29.30.180(a), 29.30.270(b) |
| **Fireplace** | Fireplace firebrick is damaged or missing. 29.30.180(a), 29.30.270(b) |
| **Floor** | Portions of carpet in the ____ are ____ posing a trip hazard to the occupants. 29.30.140(b), 29.30.270(b) |
| **Foundation** | Foundation under porch area is open to interior. 29.30.060(a), 29.30.130 |
| **Foundation** | Foundation vents are blocked, restricting ventilation in the crawl space. 29.30.120 |
| **Foundation** | Health Sanitation Violation: Foundation is open to rodent entry. 29.30.060(a), 29.30.130 |
| **Foundation** | Portions of basement walls are spalling (chipped and flaked). 29.30.050(a), 29.30.060(d) |
| **Foundation** | Portions of concrete foundation are cracked and deflected, indicating structural failure. 29.30.050(a), 29.30.060(d) |
| **Foundation** | Portions of concrete foundation are cracked and/or spalling (chipped and flaked). 29.30.050(a), 29.30.060(d) |
| **Foundation** | Portions of foundation are in disrepair. 29.30.050(a,b) |
| **Foundation** | Portions of required foundation vents lack approved screening. Required vents shall be covered with corrosion-resistant wire mesh, with the least dimension being ____. 29.30.060(a), 29.30.130 |
| **Foundation** | Portions of wood supports in contact with earth are decayed and deteriorated, resulting in structural deficiency. 29.30.050(b), 29.30.060(b) |
| **Handrail** | The ____ handrail is less than 1 ½ inches from the wall. 29.30.080 |
| **Handrail** | The handgrip portion of the ___ handrail is less than 1 ¼ inches or more than 2 5/8 inches in cross section. 29.30.080 |
| **Mechanical** | ____ is incapable of performing the function for which it is designed. 29.30.180 |

| *General Maintenance* | |
|---|---|
| **Mechanical** | The end of the clothes dryer duct lacks a required damper. 29.30.180(a,1) |
| **Mechanical** | The exhaust duct for the clothes dryer is improperly connected with the use of screws. Joints must be connected so as to be smooth on the interior. 29.30.180(a,1,2) |
| **Mechanical** | Thermostat control knob is missing. 29.30.180(a) |
| **Occupancy** | An occupied ____ has been identified at this property. A _____ is not approved for occupancy within the City of Portland unless it is located in an approved trailer park or campground with approved electrical and plumbing connections. Please discontinue the occupancy, and call the above Housing Inspector for an inspection to verify compliance. 29.50.050 |
| **Occupancy** | An unapproved dwelling unit has been created without obtaining required permits and inspections. 29.50.010, 29.50.020 |
| **Occupancy** | Dwelling unit is overcrowded. 29.30.220 |
| **Occupancy** | Lacks required ceiling height. 29.20.200 |
| **Occupancy** | The ____ has unapproved ____ service connections. 29.20.170, 29.20.190 |
| **Occupancy** | The ____ has unapproved electrical and/or plumbing hook ups. 29.30.170, 29.30.190 |
| **Occupancy** | The further occupancy of the basement area must be discontinued immediately. Failure to comply will result in referring this matter to the City of Portland Code Hearings Officer. |
| **Occupancy** | This dwelling is vacant and open to entry by unauthorized persons. Dwelling unit must be secured and/or boarded. 29.20.010(b) |
| **Permit** | ____ ____ without obtaining required permits and inspections. 29.05.040, 29.50.010, 29.50.020 |
| **Permit** | ____ work done without obtaining required permits and inspections. Violations include but are not limited to: ____. The building inspector may require additional corrections. 29.05.040, 29.50.010, 29.50.020 |
| **Plumbing** | ____ faucet leaks. 29.30.170(c) |
| **Plumbing** | ____ is cracked or damaged. 29.30.170(c) |
| **Plumbing** | ____ is inoperable. 29.30.170(c) |
| **Plumbing** | ____ lacks ____ water supply. 29.30.170(b) |
| **Plumbing** | ____ waste or drain lines leak. 29.30.170(c) |
| **Plumbing** | Bathtub drain plug hardware is inoperable and/or portions are missing. 29.30.170(c) |
| **Plumbing** | Kitchen sink seal at the ____ is not adequate to prevent moisture penetration. 29.30.110 |

| *General Maintenance* | |
|---|---|
| **Plumbing** | Lavatory basin is loose at the wall. 29.30.170(c) |
| **Plumbing** | Plumbing lines and/or fixtures have been installed without obtaining permits and inspections. 29.50.010, 29.50.020 |
| **Plumbing** | Plumbing vent line on _____ side of dwelling does not extend the required 6" above the roof line. 29.30.170(c) |
| **Plumbing** | Portions of _____ faucet assembly are missing or damaged. 29.30.170(c) |
| **Plumbing** | Portions of the _____ finish are damaged, so that it cannot be maintained in a clean and sanitary condition. 29.30.170(c) |
| **Plumbing** | The dishwasher drain hose is not secured to the underside of the counter before dropping down into the tailpiece. 29.30.170 |
| **Plumbing** | Toilet flushing mechanism does not work properly. 29.30.170(c) |
| **Plumbing** | Toilet is not adequately secured to the floor. 29.30.170(c) |
| **Plumbing** | Toilet tank leaks. 29.30.170(c) |
| **Plumbing** | Unapproved material is in use on the _____ waste or drain line. 29.30.170(c,d) |
| **Plumbing** | Water heater lacks seismic strapping. 29.30.170(c,d) |
| **Porch** | Portions of porch skirting are damaged or missing. 29.30.060(a), 29.30.070 |
| **Roof** | Gutters and downspouts are not connected to an approved disposal system and/or not channeling rainwater in an approved manner to an approved point of disposal. 29.30.030 |
| **Roof** | Gutters and downspouts are not connected to an approved disposal system and/or not channeling rainwater in an approved manner to an approved point of disposal. 29.30.030 |
| **Roof** | Portions of gutters and/or downspouts are clogged with an accumulation of debris, preventing proper drainage. 29.30.030 |
| **Roof** | Portions of gutters and/or downspouts are clogged with vegetation. 29.30.030 |
| **Roof** | Portions of gutters and/or downspouts are damaged, deteriorated, and/or missing. 29.30.030 |
| **Roof** | Portions of roof are deflected, indicating structural deficiencies. 29.30.030, 29.30.050(b) |
| **Roof** | Portions of roof covering are deteriorated, damaged and/or missing, resulting in possible weather entry. 29.30.030 |
| **Roof** | Portions of roof flashings are damaged, deteriorated and/or missing. 29.30.030 |
| **Roof** | Portions of roof sheathing and/or rafter tails are deteriorated, damaged, and/or missing. 29.30.060(a), 29.30.030 |

| *General Maintenance* | |
|---|---|
| **Roof** | Portions of roof structure are deflected and deteriorated, indicating structural failure. 29.30.030, 29.30.050(b) |
| **Roof** | Portions of soffits and/or fascia are deteriorated, damaged, and/or missing. 29.30.060(a) |
| **Roof** | Roofing is damaged, worn and/or leaking. 29.30.030 |
| **Roof** | Tree limbs and/or branches on the roof may contribute to the deterioration of the structure. 29.30.060(a), 29.30.030 |
| **Sleeping Room** | Bedroom is overcrowded. 29.30.210(d) |
| **Sleeping Room** | Sleeping room lacks a minimum floor area of 70 square feet. 29.30.210(d) |
| **Stairs** | The doorstep riser to landing exceeds maximum allowable 8". 29.30.070 |
| **Waiver** | NOTE: This property currently has a(n) ____ waiver in place to temporarily suspend code enforcement fees. This waiver will expire on (date). |
| **Walls** | Bathtub surround is not adequately sealed at tub and wall. 29.30.110(a) |
| **Walls** | Bathtub/shower area lacks required nonabsorbent wall covering to a height of 72" above the floor. 29.30.110(a) |
| **Walls** | Portions of ____ cabinets/cupboards are damaged and/or missing. 29.30.270(a,b), 29.30.110(a) |
| **Walls** | Portions of ____ counter top are cracked or damaged. 29.30.270(a,b) |
| **Walls** | Portions of ____ coverings are ____. 29.30.110(a) |
| **Walls** | Portions of ____ coverings have ____. 29.30.110(a) |
| **Walls** | Portions of the bathtub/shower surround are deteriorated. 29.30.110(a) |
| **Walls** | Portions of the molding are missing. 29.30.110(a) |
| **Walls** | Shower door does not operate properly. 29.30.170(c) |
| **Walls** | Wall covering around ____ pipe penetration is damaged or missing. 29.30.110(a) |
| **Windows** | ____ lacks minimum total glazing of 6.8% of the room's floor area (5% for habitable basement rooms). 29.30.090(a) |
| **Windows** | ____ lacks total openable window area of at least 1/40$^{th}$ of the area of the room, or an approved ventilation device. 29.30.090(a) |
| **Windows** | ____ window panes are broken and/or missing. 29.30.090(h) |
| **Windows** | ____ window(s) are damaged, broken, and/or missing. 29.30.090(h) |
| **Windows** | ____ window(s) are in disrepair with ____. 29.30.090(b,f,h) |

| *General Maintenance* | |
|---|---|
| **Windows** | _____ window(s) are poorly fitted and deteriorated, allowing weather entry. 29.30.090(h) |
| **Windows** | _____ window(s) lack required locking hardware. The locking hardware must be openable from the inside without the use of a key or any special knowledge or effort. 29.30.090(g) |
| **Windows** | Bathroom window does not open easily for required ventilation. 29.30.090(c,f) |

# Appendix B: Scenario Projection Methodology

All scenario projections are based on the analysis of the BDS tracking data in the assessment section, particularly the numbers and calculations contained in Table 5.4.1 (reprinted below).

**Table 5.4.1: Rates of Violations and Units Inspected per Case, Standard and Enhanced Districts, 7/1/10--10/31/11**

| District | Inspections Cases | Total Violations | Violations per Case | Units Inspected | Units Inspected per Case | Violations per Unit |
|---|---|---|---|---|---|---|
| *Standard* | | | | | | |
| **3** | 248 | 612 | 2.47 | 248 | 1.00 | 2.47 |
| **4** | 77 | 108 | 1.40 | 80 | 1.04 | 1.35 |
| **8** | 544 | 1,127 | 2.07 | 625 | 1.15 | 1.80 |
| **11** | 435 | 760 | 1.75 | 438 | 1.01 | 1.74 |
| **sub-total** | 1,304 | 2,607 | 2.00 | 1,391 | 1.07 | 1.87 |
| *Enhanced* | | | | | | |
| **5** | 543 | 2,705 | 4.98 | 916 | 1.69 | 2.95 |
| **6** | 597 | 1,443 | 2.42 | 789 | 1.32 | 1.83 |
| **9** | 123 | 278 | 2.26 | 139 | 1.13 | 2.00 |
| **sub-total** | 1,263 | 4,426 | 3.50 | 1,844 | 1.46 | 2.40 |
| **Total** | 2,567 | 7,033 | 2.74 | 3,235 | 1.26 | 2.17 |
| **Difference between Enhanced and Standard** | -41(3%) | +1,819 (70%) | +1.5 (75%) | +453 (33%) | 0.39 (36%) | +0.53 (28%) |

## Status quo

For the purposes of scenario comparison, the estimated number of inspections cases per year in all three scenarios assumes that the number of cases per year will remain the same in each of the inspections districts. Since the number of inspections presented in Table 5.4.1 was for a 16 month period, they were adjusted for the one year scenario period by multiplying by .75 (12/16), totaling 1,925 estimated inspections cases per year for the entire city.

Total violations for the status quo scenario were calculated by multiplying the adjusted number of inspections cases by the rate of violations per case for each district that was calculated in Table 5.6.1, after adjusting the rate of violations per case for district 6 to reflect the fact that it is no longer an enhanced inspections district as it was between 7/1/10 and 10/31/11. The rate of violations per case for district 6 was adjusted based on the percentage difference between the average rates for the standard and enhanced districts. As Table 5.4.1 indicates, the average rate of violations per case for standard districts was 2.00, which is 43% lower than the 3.50 average rate for the enhanced districts. However, instead of just lowering the rate for district 6 by 43%, the district 6 rate in Table B.1. (1.81) is only a 32% decrease to reflect the Steering Committee's directive to keep estimates conservative. The total estimated number of violations was then calculated by multiplying the rates for each district by the number of cases per district, and then summing up the district totals. The rate of units inspected per case for district 6 were similarly adjusted, using a more conservative 20% decrease as opposed to the 27% decrease suggested by the percentage difference between the 1.46 average rate for the enhanced districts and the 1.07 rate for the standard districts. The total numbers of units inspected were then calculated by multiplying the rate of units inspected for each district by the number of cases for each district.

| Table B1: Status quo Units Inspected per Case, Standard and Enhanced Districts, Projected Per Annum | | | | | |
|---|---|---|---|---|---|
| District | Inspections Cases | Total Violations | Violations per Case | Units Inspected | Units Inspected per Case |
| ***Standard*** | | | | | |
| **3** | 186 | 459 | 2.47 | 186 | 1.00 |
| **4** | 58 | 81 | 1.40 | 60 | 1.04 |
| **6** | 448 | 736 | 1.64 | 473 | 1.06 |
| **8** | 408 | 845 | 2.07 | 469 | 1.15 |
| **11** | 326 | 570 | 1.75 | 329 | 1.01 |
| ***Enhanced*** | | | | | |
| **5** | 407 | 2,029 | 4.98 | 687 | 1.69 |
| **9** | 92 | 209 | 2.26 | 104 | 1.13 |
| **Total** | **1,925** | **4,928** | | **2,308** | |

## Expansion of enhanced inspections

The expanded enhanced inspections model scenario assumes that the enhanced model will be applied to districts 3, 4, and 6 in addition to the current enhanced districts, 5 and 9. In order to estimate the increases in total violations and units inspected in these three additional districts that would likely result from the application of enhanced inspections, the rates of violations per case and units inspected per case were adjusted conservatively upwards based on the percentage differences between the average rates for the standard and enhanced inspections areas contained in Table 5.6.1, with the exception of the rates for district 6 which were taken directly from Table 5.6.1 since these were calculated when this district was an enhanced district. Thus, while the average rate of violations per case in the enhanced areas (3.50) was 75% higher than the average rate for the standard districts (2.00), the rates of violations per case for districts 3 and 4 were increased by 56%, which is 75% of 75%. Similarly, while the average rate of units inspected per case in the enhanced areas (1.46) was 36% higher than the average rate for the standard districts (1.07), the rates of units inspected per case was increased by 27%, which is 75% of 36%.

| Table B.2: Expansion Scenario: Violations and Units Inspected Per Case, Standard and Enhanced Districts, Projected Per Annum | | | | | |
|---|---|---|---|---|---|
| District | Inspections Cases | Total Violations | Violations per Case | Units Inspected | Units Inspected per Case |
| ***Standard*** | | | | | |
| **8** | 408 | 845 | 2.07 | 469 | 1.15 |
| **11** | 326 | 570 | 1.75 | 329 | 1.01 |
| ***Enhanced*** | | | | | |
| **3** | 186 | 571 | 3.07 | 236 | 1.27 |
| **4** | 58 | 116 | 2.00 | 76 | 1.31 |
| **5** | 407 | 2,029 | 4.98 | 687 | 1.69 |
| **6** | 448 | 1,082 | 2.42 | 592 | 1.32 |
| **9** | 92 | 209 | 2.26 | 104 | 1.13 |
| **Total** | **1,925** | **5,421** | | **2,492** | |

## Elimination of enhanced inspections

In order to estimate the decreased numbers of violations found and cured and units inspected, the rate of violations per case and units inspected per case for districts 5, 6, and 9 were adjusted using the same approach used for adjusting the district 6 numbers for the status quo scenario. The rates of violations per case for these three districts were adjusted based on the percentage difference between the average rates for the standard and enhanced districts. As Table 5.6.1 indicates, the average rate of violations per case for standard districts was 2.00, which is 43% lower than the 3.50 average rate for the enhanced districts. However, instead of just lowering the rates for districts 5, 6, and 9 by 43%, the rates for these districts in Table B.3 (1.81) is only a 32% decrease (75% of 43%) to reflect the Steering Committee's directive to keep estimates conservative. The total estimated number of violations was then calculated by multiplying the rates for each district by the number of cases per district, and then summing up the district totals. The rate of units inspected per case for the three districts were similarly adjusted, using a more conservative 20% decrease as opposed to the 27% decrease suggested by the percentage difference between the 1.46 average rate for the enhanced

districts and the 1.07 rate for the standard districts. As with the more conservative decrease for the rates of violations per unit, thus estimated 20% decrease is 75% of the 27% decrease observed in the original analysis. The total numbers of units inspected were then calculated by multiplying the rate of units inspected for each district by the number of cases for each district.

**Table B3: Elimination Scenario: Units Inspected Per Case, Standard and Enhanced Districts, Projected Per Annum**

| District | Inspections Cases | Total Violations | Violations per Case | Units Inspected | Units Inspected per Case |
|---|---|---|---|---|---|
| ***Standard*** | | | | | |
| **3** | 186 | 459 | 2.47 | 186 | 1.00 |
| **4** | 58 | 81 | 1.40 | 60 | 1.04 |
| **5** | 407 | 1,380 | 3.39 | 550 | 1.35 |
| **6** | 448 | 736 | 1.64 | 473 | 1.06 |
| **8** | 408 | 845 | 2.07 | 469 | 1.15 |
| **9** | 92 | 142 | 1.54 | 83 | 0.90 |
| **Total** | **1,599** | **3,643** | | **1,821** | |

# References


1. Krieger J, Higgins DL. Housing and health: time again for public health action. *Am J Public Health* 2002;92(5):758-68.

2. Krieger J, Jacobs DE, Ashley PJ, et al. Housing interventions and control of asthma-related indoor biologic agents: a review of the evidence. J Public Health Manag Pract 2010;16(5 Suppl):S11-20.

3. Jacobs DE, Brown MJ, Baeder A, et al. A systematic review of housing interventions and health: Introduction, methods, and summary findings. Journal of Public Health Management and Practice 2010;16(5):S5-S10 10.1097/PHH.0b013e3181e31d09.

4. DiGuiseppi C, Jacobs DE, Phelan KJ, Mickalide AD, Ormandy D. Housing interventions and control of injury-related structural deficiencies: a review of the evidence. J Public Health Manag Pract 2010;16(5 Suppl):S34-43.

5. Lindberg RA, Shenassa ED, Acevedo-Garcia D, Popkin SJ, Villaveces A, Morley RL. Housing interventions at the neighborhood level and health: a review of the evidence. J Public Health Manag Pract 2010;16(5 Suppl):S44-52.

6. Sandel M, Baeder A, Bradman A, et al. Housing interventions and control of health-related chemical agents: a review of the evidence. J Public Health Manag Pract 2010;16(5 Suppl):S24-33.

7. Saegert SC, Klitzman S, Freudenberg N, Cooperman-Mroczek J, Nassar S. Healthy housing: a structured review of published evaluations of US interventions to improve health by modifying housing in the United States, 1990-2001. Am J Public Health 2003;93(9):1471-7.

8. Office of the Surgeon General. The Surgeon General's Call to Action To Promote Healthy Homes. Rockford, MD; 2009.

9. Jacobs DE, Kelly T, Sobolewski J. Linking public health, housing, and indoor environmental policy: successes and challenges at local and federal agencies in the United States. Environ Health Perspect 2007;115(6):976-82.

10. National Research Council. Improving Health in the United States: The Role of Health Impact Assessment: The National Academies Press; 2011.

11. World Health Organization. WHO Definition of Health. Available at: http://www.who.int/about/definition/en/print.html Accessed May 15, 2012.

12. North American HIA Practice Standards Working Group. Minimum elements and Practice Standards for Health Impact Assessment, version 2. 2010.

13. National Center for Healthy Housing. State of healthy housing location summary: Portland, OR. Available at: http://www.nchh.org/Policy/State-of-Healthy-Housing/Location-Summary/tabid/346/msa/32/Default.aspx#Portland_Table. Accessed May 15 2012.

14. U. S. Census Bureau. 2010 Census Summary File 2: Table HCT12: Tenure by presence and age of people under 18 years by household type (excluding householders, spouses, and unmarried partners). Available at: factfinder2.census.gov. Accessed May 15, 2012.

15. U. S. Census Bureau. 2006-2010 American Community Survey: Table B25053: Tenure by kitchen facilities. Available at: factfinder2.census.gov. Accessed May 15, 2012.

16. U. S. Census Bureau. 2006-2010 American Community Survey: Table B25049: Tenure by plumbing facilities. Available at: factfinder2.census.gov. Accessed May 15, 2012.

17. Schmidt E, Chiles K, Godsby D. Rental Housing Inspection Division Program Orientation. In. Gresham, Ore.; 2010.

18. Oregon Metro Data Resource Center. Metro Multifamily Housing Inventory. Available at: http://rlisdiscovery.oregonmetro.gov/?action=viewDetail&layerID=2364. Accessed May 15, 2012.

19. U. S. Census Bureau. 2006-2010 American Community Survey: Table B25119: Median household income the past 12 months (in 2010 inflation-adjusted dollars) by tenure. Available at: factfinder2.census.gov. Accessed May 15, 2012.

20. U. S. Census Bureau. 2006-2010 American Community Survey: Table B25106: Tenure by housing costs as a percentage of household income in the past 12 months. Available at: factfinder2.census.gov. Accessed May 15, 2012.

21. U. S. Census Bureau. 2010 Census Summary File 1: Table H14: Tenure by race of householder. Available at: factfinder2.census.gov. Accessed May 15, 2012.

22. Raymond J, Wheeler W, Brown MJ. Inadequate and unhealthy housing, 2007 and 2009. Morbidity and Mortality Weekly Report 2011;60(supplement 1).

23. Multnomah County Health Department. Health Impacts of Housing in Multnomah County. In. Portland, OR; 2009.

24. Garland R. Burden of asthma in Oregon: 2010. In. Portland, Ore.: Oregon Health Authority; 2010.

25. Oregon Health Authority. Oregon Environmental Public Health Tracking data portal. Available at: https://epht.oregon.gov//index.aspx. Accessed May 15, 2012.

26. National Center for Environmental Health: Asthma in Oregon. Available at: http://www.cdc.gov/asthma/stateprofiles/Asthma_in_OR.pdf. Accessed June 1, 2012.

27. Oregon Department of Human Services. Geographic Disparities in Pediatric Asthma Control Among Oregon Children on Medicaid. In. Salem, OR; 2008.

28. Ralston JD, Hampson NB. Incidence of severe unintentional carbon monoxide poisoning differs across racial/ethnic categories. Public health reports (Washington, D.C.: 1974) 2000;115(1):46-51.

29. Oregon Health Authority. Oregon's Epidemoligical Data on Alcohol, Drugs, Mental Health and Gambling. 2012.

30. Oregon Health Authority. Oregon Behavioral Risk Factor Surveillance System. Available at: http://public.health.oregon.gov/BIRTHDEATHCERTIFICATES/SURVEYS/ADULTBEHAVIORRISK/COUNTY/INDEX/Pages/index.aspx. Accessed May 15 2012.

31. Oregon Health Authority. Oregon Injury Prevention Plan. In. Salem, OR; 2010.

32. John R Hall J. Home Electrical Fires. National Fire Protection Association, Fire Analysis and Research Division; 2012.

33. Northwest Portland Area Indian Health Board. Blood Lead Levels Among Oregon American Indian and Alaska Native Children. Portland, OR: Northwest Tribal Epidemology Center; 2012.

34. Smith LA, Flacks J, Harrison E. A Child Health Impact Assessment of Energy Costs and the Low Income Home Energy Assistance Program. Boston, MA: Child Health Impact Assessment Working Group; 2007.

35. City of Portland Auditor's Office. City of Portland Title 29 Property Maintenance Regulations. Available at: http://www.portlandonline.com/auditor/index.cfm?c=28193. Accessed May 15 2012.

36. Spivey A. On closer inspection: Learning to look at the whole home environment. Environ Health Perspect 2005;113(5).

37. Krieger JK, Takaro TK, Allen C, et al. The Seattle-King County healthy homes project: implementation of a comprehensive approach to improving indoor environmental quality for low-income children with asthma. Environ Health Perspect 2002;110 Suppl 2:311-22.

38. Office for Oregon Health Policy and Research. Comparison of Home-based Environmental Interventions to Reduce Asthma Morbidity. Salem, OR: Office for Oregon Health Policy and Research; 2010.

39. Crocker D, Kinyota S, Dumitru G, et al. Effectieness of home-based, multi-trigger, multicomponent interventions with an environmental focus for reducing asthma morbidity: a Community Guide systematic review. American Journal of Preventative Medicine 2011;41(2S1):S5-32.

40. Multnomah County Health Equity Initiative 2009 Report. In. Portland, OR: Multnomah County Health Department; 2009.

41. Frieden TR. Forward--CDC Health Disparities and Inequalities Report - United States, 2011. MMWR Surveill Summ 2011;60 Suppl:1-2.

42. Jacobs DE. Environmental health disparities in housing. American Journal of Public Health 2011:S115-S122.

43. Community Alliance of Tenants. Substandard Housing Research Project: Portland's Tenants Speak Out About the Condition of Their Housing. Portland, OR; 2005.