

Multnomah County Health Department

Health Impacts of Housing in Multnomah County

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Public Health
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1. Introduction

Over the past few decades there has been a resurgence in the attention given to the public health impacts of substandard housing conditions. A large body of scientific evidence leaves little doubt about the connection between deteriorated housing conditions and health concerns such as asthma, heart disease, and unintentional injuries. It is also commonly recognized that unhealthy living conditions are most likely to be occupied by low income people with limited options for affordable housing. Consequently, the focus of housing-related interventions is usually residential rental units available to individuals and families below the median income.

Multnomah County is experiencing the same shortage of quality, affordable housing for low-income residents that almost all other U.S. metropolitan areas face. Tightly controlled urban growth in the City of Portland, soaring housing prices in the last decade, and a growing population have contributed to the current low-income housing crisis. It is difficult to quantify the proportion of low-income housing units in substandard condition due to inadequate data collection systems in Multnomah County. However multiple local studies have identified substandard housing as a significant problem. The plight of low-income county residents has become the focus of several housing-related government and non-profit agencies. However, the health effects associated with low-income housing are not always given due consideration in the struggle to expand affordable housing opportunities.

To address the public health concerns linked with low-income housing, Multnomah County Health Department convened a summit in 2007 for agencies and non-profits involved with housing issues. The solutions proposed at the summit included an overhaul of the City of Portland housing code and inspections system, tapping market forces to create incentives to build healthy, affordable housing, educating landlords and tenants about rights and obligations, forging coalitions in the community, raising awareness among community organizations and developers, and the extension of housing-related regulations to parts of the county that are outside the City of Portland. While health problems associated with poor housing conditions are equally problematic in owner-occupied and rental housing, the reason this report focuses on rental housing is two-fold. First, county residents are increasingly likely to turn to rental housing because they cannot afford to buy a house and because of increasing restrictions in the mortgage industry. Second, when a landlord receives rent for a residential unit the landlord is agreeing to provide the tenant a habitable residence. It is appropriate to scrutinize the rental industry to ensure that these businesses are not deriving an income at the expense of the public's health.

Currently, there is no source of complete data on the conditions of low-income residential housing in Multnomah County along with the health status of the occupants. However, census data on the exterior condition of houses in Portland (see appendix B) along with anecdotal evidence from non-profit and local government agencies provide enough information to reveal a growing problem in the area of housing and

health. This report will provide an overview of nationwide data on some of the most significant health consequences associated with substandard housing as well as a summary of effective system-wide strategies used to strengthen the housing system in cities throughout the U.S. The report will also describe local efforts to address the scarcity of quality, affordable residential rental units in the county and make recommendations for future action.

2. Affordable housing in Multnomah County

According to the U.S. Department of Housing and Urban Development (HUD, Community Planning & Development, 2008) housing is considered affordable if a household spends no more than 30% of its annual income on it (HUD, Community Planning & Development, 2008). HUD estimates that around 12 million renter and homeowner households nationwide pay more than 50 percent of their annual incomes for housing, and a family with one full-time worker earning the minimum wage cannot afford the local fair-market rent for a two-bedroom apartment anywhere in the United States. (HUD, Community Planning & Development, 2008)

In 2008 the fair market rent for a 2 bedroom apartment in Multnomah County was approximately \$800 per month (HUD, HUD USER data, 2008). HUD determines the average rental price at the 40th percentile in a given area and uses this amount as the fair market rent; 60% of rental units have higher rents than the fair market rent value. In order to pay \$800 per month in rent and still use only 30% or less of its annual income, a household of four persons would need to earn approximately \$32,000 yearly. In Oregon, the minimum wage in 2008 was \$7.95 (U.S. Department of Labor, 2008) or approximately \$16,540 a year for a 40-hour a week job. In a family of four with two adults it would require both adults working full time for minimum wage to earn enough to afford a 2 bedroom apartment.

The U.S. Bureau of Labor Statistics examines the spending habits of Americans every year. In 2004-05 (the most recent data available) the Consumer Expenditure Survey collected data for the Portland-Vancouver-Beaverton metropolitan statistical area and determined that the average household income before taxes was \$56,000 for a family of 2 or 3 persons (U.S. Bureau of Labor Statistics, 2008). At the same time the average amount spent on housing (both rented and owned dwellings) was over \$16,000 which is approximately 29% of average annual income (U.S. Bureau of Labor Statistics, 2008). These amounts are averages for the metropolitan statistical area indicating that there are many households that pay more than 29% on housing that, by HUD standards, is unaffordable. Additional data from the American Community Survey shows that in 2006 almost half of all renters (approximately 49%) in Multnomah County paid 30% or more of their income for rent (American Community Survey, 2007).

Residential real estate costs in and around Multnomah County have risen steeply over the past decade. In spite of the overall drop in prices in the past two years home prices are still relatively high and potential

home buyers are now finding it difficult to obtain mortgages. The challenges of purchasing an affordable house force families to turn to the rental market. However, residential rentals also pose problems for county residents.

As rents have increased, the number of available rental units has decreased making it difficult for low income persons to find affordable housing in this county (PDC Affordable Housing Fact Sheet, 2007). Studies by Metro and the City Club of Portland estimate that Portland alone will need almost 20,000 new units through 2017 for households earning less than 50% of median family income (approximately \$34,000 for a family of four). Under these circumstances low income families may have little choice but to live in poor quality housing and, in situations of extreme financial hardship, face the threat of homelessness.

3. Effects of unaffordable housing on health and health-related factors

The links between housing conditions and health have been established convincingly by numerous scientific articles in the past three decades or more. Often, individual housing conditions and the associated health effects were examined discretely e.g. lead poisoning in children (Krieger J. and Higgins D., 2002). A more holistic examination of the full array of housing-related exposures and associated health problems is a relatively recent approach. In response to the overwhelming body of evidence in the field of housing and health, the Centers for Disease Control and Prevention as well as the World Health Organization have created programs and guidelines to address the problem comprehensively.

To provide context for the discussion of housing policy later in this report the current section summarizes our understanding of the links between substandard housing and health problems. A more thorough examination of this field can be found in articles cited in the reference section of this document.

Food insecurity

Scarcity of affordable housing can put families at risk of poor health as they spend a greater proportion of their income on housing. When housing costs rise without similar increases in household incomes families are forced to sacrifice other necessities that are critical to good health. Studies have shown that families spending 30% or less of their total expenditure on housing paid more for food relative to those spending 50% or more housing (Lubell et al. 2007 citing Lipman, 2005). Lack of housing-related subsidies has been linked to poor health outcomes in children such as iron deficiency (Lubell et al. 2007 citing Meyers et al. 1993), and malnutrition-related physical underdevelopment (such as low weight-for-age) (Lubell et al. 2007 citing Frank et al. 2006).

Lack of access to health care

For the same reasons that households spend less on food when they are forced to spend more on housing they are also more likely to curtail health care utilization (Lubell et al. 2007 citing Lipman 2005). Families with housing expenses that were 30% or less of their total budget spent more than twice the amount on health care compared with families with housing expenses that consumed 50% or more of their income. In a study examining families receiving welfare, access to housing subsidies increased the likelihood that a person would see a doctor compared with persons who received no housing subsidy (Lubell et al. 2007 citing Lee 2003).

Stress and related health concerns

The most direct link between unaffordable housing and poor mental health is demonstrated in studies of homeless populations. Studies have shown that homeless children are more likely to experience health problems and developmental delays compared with children in poor families that have housing. Similarly, homeless adults have poorer mental health outcomes compared with adults with a similar income and stable housing. More recently there have been studies that show that persons who were forced to move frequently due to eviction or foreclosures had higher levels of stress. One study found that even among those who had a home people who have difficulty paying basic expenses were more likely to develop hypertension over a 10 year period (Lubell et al. 2007 citing Matthews et al. 2002).

As noted by Lubell et al. (2007) in their review of the literature on affordable housing on health, the benefits of stable housing may be outweighed by the negative health outcomes caused by living in poor quality housing or neighborhood conditions.

Heat Insecurity

Heat maintained below 68 degrees Fahrenheit can support mold growth. As the average percentage of monthly income spent on rent has increased to more than 50%, less income is available for heat. In Program Year 2006, Oregon Low Income Energy Assistance Program (LIEAP) provided \$15,946,465 in total client assistance statewide, serving 57,874 households with approximately \$276 per household. Approximately 70% of these households live at or below the federal poverty mark (about \$775 per month for an individual). The number of households with income levels that would qualify for assistance is increasing, as are heating and oil prices. More than 9,000 households statewide are on a waiting list for assistance, and many of these households are currently disconnected from utility service or have received a shutoff notice.

An additional health problem associated with low indoor temperatures is hypothermia. Turning down the temperature in the home is not a health risk for most people and just means a slightly colder home. However, for the elderly, it could have significant health implications such as hypothermia. According to a web site for senior citizens (New Tech Media, 2006), it only takes a small drop in a home's temperature to affect the health of an elderly adult. As the body ages, it produces less heat and it becomes more difficult to regulate the body's temperature. Even a relatively mild indoor temperature of 60 degrees Fahrenheit can put elderly adults at risk for hypothermia.

In Multnomah County, the LIEAP program provided heat assistance to 7,899 families (comprised of almost 17,300 individuals) during the 2007 program year. Of these, 7,442 households (94% of households receiving heat assistance) were at or below the federal poverty level including some households with no earnings at all. During the 2008 program year 8,608 households received heat assistance of which 8,386 households (97%) were at or below federal poverty level. Multnomah County does not have any wait lists for energy assistance.

The need for assistance outstrips demand reported by Multnomah County Weatherization, PGE HEAT Assistance.

Physical health consequences

Low income families are more likely to reside in poor quality housing due to a shortage of quality low-cost housing and proximity to public transportation and other amenities. A significant body of research both nationally and internationally link poor quality housing to a variety of health problems ranging from respiratory illnesses to unintentional injuries. A comprehensive overview of the connection between inadequate housing quality and health as well as references to published research on various aspects of this connection is presented in an article by Krieger and Higgins published in 2002 (see reference section). This section provides a brief outline of what is known about the link between housing characteristics and health.

Childhood lead poisoning

Children aged 6 years or less who are exposed to high levels of lead are at risk of significant health problems including anemia, nerve and kidney damage, and seizures. Lead exposure can interfere irreversibly with brain development resulting in poor linguistic and motor skills along with behavioral problems.

The most common source of lead exposure is through lead-based paints in homes. Although there has been a nationwide ban on lead-based paint since 1978 there are many older homes with the original paint

that continues to pose a threat to young children. Examples of ways in which children come into contact with lead-based paint include ingesting peeling paint, exposure to lead dust created by opening and closing windows and doors coated with lead-based paint and remodeling in homes with this type of paint.

One study estimates that nationwide approximately 400,000 children aged 5 years and younger have unsafe blood lead levels when compared with the standard set by the Centers for Disease Control and Prevention (Meyer et al., 2003). Further, the percentage of homes with lead-based paint was higher in units occupied by families earning less than \$30,000 annually (35% of housing units) compared with middle and upper income housing units (19% of housing units).

In Multnomah County between 2003 and 2007 there were 103 children 6 years old or younger with confirmed elevated blood lead levels (Oregon Human Service Department, Public Health Division, 2008). Approximately 10% of children between 0 and 6 years of age are tested annually for elevated blood lead levels in this county. Clearly, the number of cases of childhood lead poisoning represents a significant undercount of the extent of the problem. However, data on the age of the housing stock in Portland and the presence of a significant number of confirmed cases of elevated blood levels in children is an indication that the threat of lead poisoning is still present in many Multnomah County homes.

The most recent American Housing Survey data for the Portland metropolitan statistical area was collected in 2002. According to this survey about 63% of all occupied homes in the area were built prior to 1980 which increases the likelihood of lead-based paint in the homes.

Asthma and other respiratory illness

Mold, dust mites, rodents, or cockroaches are allergens that are associated with asthma and may be found in poor quality homes. One study showed that most asthma is associated with exposure to these allergens and only 20% of asthma cases in these settings are non-allergic (Lubell et al. 2007 citing Breyse et al. 2004). Adding to the existing asthma triggers are the household chemicals that residents resort to in many instances in order to control the pest and mold problems. These chemicals can exacerbate health problems in residents suffering from asthma or other respiratory illness.

Multnomah County Health Department received a \$1M, 3 year demonstration grant from Housing and Urban Development to design a home based intervention to improve asthma control in low-income children. The demonstration grant was completed in 2008 and was successful in improving asthma control by identifying and eliminating asthma triggers and educating and empowering families. The success is evidenced by a statistically significant reduction in emergency department use and resultant hospitalizations.

Homes that are poorly maintained and prone to excessive moisture are likely to harbor mold, dust mites and pests. The climate in the Pacific-Northwest may contribute to the problem of moisture and water damage in homes in Multnomah County. In 2006 a study found that the highest prevalence of cockroach allergen was found in older homes and low-income households (earning less than \$20,000 a year) as well as high-rise apartments and urban areas (Lubell et al. 2007 citing Cohn et al.)

The 2002 American Housing Survey found that almost 7% of occupied houses in the Portland metropolitan area had evidence of rodent (rats or mice) infestation in the 3 months prior to the survey. Information on cockroach infestation is not available.

Unintentional injury

Fires and burns are among the leading causes of injury-related deaths in homes according to the Centers for Disease Control and Prevention (CDC 2006). A study in Dallas showed that the highest rates of fire-related injury occurred in low-income houses. The study also found that low-income housing was significantly less likely to be equipped with functioning smoke alarms (Lubell et al. 2007 citing Istre et al, 2001). Overcrowding and improperly insulated radiators are also reasons for higher fire-related injuries and deaths.

Injuries from falls are also a concern in low-income housing. Windows and stairs without appropriate safeguards and inadequate lighting contribute to this type of injury.

Other physical health concerns

In addition to the concerns detailed in the preceding paragraphs the article by Krieger and Higgins (2002) presents evidence connecting substandard housing with infectious diseases caused by unsafe drinking water, lack of hot water for washing, ineffective waste disposal and overcrowding which facilitates the transmission of diseases like tuberculosis. The authors also discuss the connection between damp, moldy houses chronic respiratory illnesses (other than asthma), indoor sources of air toxins and chronic headaches and nausea, indoor temperature (living in cold housing) and cardiovascular disease, and radon exposure and lung cancer.

Neighborhood Effect

The environment around residential units can also have an impact on the health of residents. In some neighborhoods, easy availability of low cost, high calorie food and lack of opportunities to engage in physical activity contribute to obesity among the residents. Obesity in turn increases the risk of developing heart disease, stroke, type 2 diabetes, high blood pressure, arthritis-related disabilities, sleep disorders, and depression.

Other potential concerns associated with the site of residential units include proximity to roads with high volumes of traffic such as freeways. Motor vehicles expel particulate matter, carbon monoxide, sulfur dioxide, benzene and an array of other chemicals that have been linked to respiratory diseases and other health concerns. The potential risks to human health as a result of exposure to air pollution in the Portland area have been presented by Oregon Department of Environmental Quality in the Portland Air Toxics Assessment (OR DEQ, 2006). Indoor noise levels in houses located close to busy streets or railway tracks can reach harmful levels disrupting sleep, increasing stress and contributing to poor concentration among children. Another significant concern near busy roads is the increased probability of collisions involving motor vehicles and pedestrians.

4. Evidence of housing conditions and health impacts of housing in Multnomah County

As mentioned earlier, there is a large gap in our understanding of local housing conditions for low-income persons and the health problems associated with substandard housing. The lack of current data is partly due to the fact that the U.S. Census Bureau has not administered the American Housing Survey in the Portland area since 2002 and has no plans currently to survey the Portland area again as a result of budgetary constraints. In the past, this survey provided a rich source of information on interior and exterior housing conditions and demographics of the residents for both rental and owner-occupied housing. However, the survey did not simultaneously collect health-related information that might have shed light on the prevalence of certain diseases with known links to housing conditions.

Another potential source of information is the Portland Bureau of Development Services, Neighborhood Inspections Program, a complaint-driven rental housing inspection program of the City of Portland. Housing inspectors complete forms during these inspections to document the conditions of the housing units. These data are not routinely entered into an electronic database and thus are not available for analysis. Further, the housing inspection reports can only provide a limited picture because the program will inspect housing in response to calls from tenants of rental properties regarding substandard housing in the City of Portland. Tenants may also be reluctant to report a problem to the housing inspection program for fear of retaliatory eviction under Oregon's no cause eviction law. Additional details of this law are provided later in this report. The data are not representative of the state of the broader array of Portland's residential rental units.

In 2005 Multnomah County Health Department's Environmental Health Program worked with the Neighborhood Inspections Program to undertake a special project to sort data and analyze 223 reports that documented inspections of around 300 units in multi-family dwellings (Multnomah County Health Department, Environmental Health, 2005). These inspections took place over a 12 month period in 2003-04. The analysis used a key word search to examine the number and types of housing code violations

discovered during the inspection process. There were 1,781 code violations documented for the 300 units examined. A summary of the findings from this analysis is presented in Table 1.

Table 1. Summary of housing code violations in 300 residential units inspected in 2003-04

Type of violation	Number of units
Severe water leakage with existing mold/mildew or potential for mold/mildew	121
Exterior bare wood and evidence of peeling paint (potential lead issues)	17
Insect or rodent infestation	71
Trash/debris/unsanitary conditions	52

In terms of the number of violations found (as opposed to the number of units inspected) 619 (approximately 35%) of the 1,781 violations involved a potential indoor air quality concerns that had the potential to affect the residents' health adversely.

At present, there is no source of information on the physical condition of owner-occupied houses in Multnomah County.

5. Challenges to improving substandard housing in Multnomah County

Capacity to provide education to landlords and tenants

The range of effects of housing quality on health is not commonly understood and public health education on these issues is necessary to inform landlords and tenants of the potential health risks associated with substandard housing. Currently, there is no system of coordinated educational messages aimed at landlords and tenants in Multnomah County. There is a need for educational tools that provide landlords with information about the connection between housing and health and about the ways in which landlords can prevent health problems that are of particular concern in this area. Appropriate educational material for tenants is also lacking. Tenants in Multnomah County come from diverse backgrounds and may need information to be presented in ways that accommodate specific cultural, linguistic and literacy needs. Finally, we need a system of consistent messages on housing and health that all housing-related agencies in Multnomah County can use to educate the public.

Cost of repairs

Repairing and maintaining homes at standards that promote the health and well-being of the occupants will, naturally, involve some expense. In the case of owner-occupied homes, the cost is borne by the

home owner. Those who live in rental housing depend on the landlord to repair and maintain the housing unit. By extension, in situations where the condition of the rental unit can cause or aggravate health problems the occupant's health depends on the landlord's willingness to make repairs promptly. One example is mold and mildew infestation in the rental housing. According to the American Housing Survey of 2002 more than 7% of rental units in the Portland metropolitan statistical area had water leaking into the house from the exterior during the previous 12 months and over 11% had interior leaks (e.g. from leaking pipes). Given the damp Pacific Northwest climate, mold and mildew growth are a predictable consequence of water leakage. However, fixing the leakage problem along with mold remediation is expensive and the cost is likely to be a significant deterrent to repair and effective maintenance by the landlord. The significant cost of mold remediation is an example of the importance of timely, low-cost repairs and preventive strategies by the land lord to avoid adverse health and economic consequences.

Affordable rental housing in Multnomah County is more likely to be in poor condition and consequently may contribute to health problems of the occupants. This is particularly true of housing that is affordable to county residents who are at or below the poverty level. According to the 2002 American Housing Survey, rental units, especially those occupied by households whose incomes are below poverty level, were more likely to have problems with the home including leakage, signs of rodent infestation, lack of potable water, non-functioning toilets, inadequate kitchen facilities, and heating problems.

Inadequate housing codes and enforcement

For tenants living in substandard housing in Multnomah County there are relatively few options available for improving their living conditions. The paucity of quality, affordable, centrally-located housing combined with state laws that are either vague or inadequate in protecting tenant rights result in tenants being forced to tolerate unhealthy housing conditions in parts of the county where city laws do not provide tenant safeguards beyond those afforded by state law. In Portland, the Quality Rental Housing Workgroup has successfully promoted changes to the existing housing code to bolster the protection these laws afford tenants. One example is the recommendation to provide standards and education for effective remediation of housing units that are infested with pests or have sanitation violations.

However, even with the adoption of more stringent housing codes, if there are inadequate resources dedicated to code enforcement it is uncertain whether strengthened codes will be enough to assure healthy housing.

Landlord's obligations and tenant's legal remedies under current housing code in Portland

Chapter 90 of the Oregon Revised Statutes and Title 29 of the Portland Property Maintenance Code contain provisions that, among other things, outline the landlord's responsibilities and the tenant's legal alternatives when these obligations are not fulfilled. Appendix A provides the text of the relevant sections

of Oregon and Portland laws. Both set of laws establish standards for habitability of rental housing requiring 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 that walls, floors, ceilings, stairways and railings be in good repair and that the rental unit be free of garbage, rodents or pests. However, in many instances the legal requirements of habitable housing are stated broadly which makes it a challenge to enforce.

A tenant living in a substandard rental unit can request an inspection of the premises as a first step towards rectifying the problems if notifying the landlord in writing does not result in resolution of the problem. However, the cities of Portland and Gresham are the only parts of Multnomah County that have a housing inspection program that can assess rental units for compliance with state and city standards. As mentioned previously, inspections in Portland occur in response to complaints from tenants rather than being a system of routine, mandatory inspection of all housing units. When tenants fear for the stability of their housing it is likely that there is significant under-reporting of substandard housing conditions and violations of housing codes. In Gresham the newly established rental housing inspection program includes both mandatory inspections of a representative sample of rental units as well as complaint-driven inspections. Smaller cities in Multnomah County such as Wood Village are also examining the possibility of introducing housing codes within their jurisdictions also.

If tenants are unable to request a housing inspection (because the housing unit is located outside Gresham and Portland) or if they choose not to do so, they can still attempt to rectify poor housing conditions through legal channels. When rental units are uninhabitable the law provides tenants several options to remedy the situation including ending the rental agreement, suing the landlord to perform the necessary repairs, or getting the repairs done themselves and deducting the cost of the repairs (up to a certain amount) from the rent. However, in reality the laws and the legal system that were intended to protect tenants themselves pose significant deterrents to tenants who consider legal action. Some of these challenges are discussed below.

While the law provides that tenants may deduct the cost they incurred themselves in repairing their rental unit (up to \$300) they are also required to provide notice of this to their landlord one week prior to undertaking repairs themselves. The tenant must document the need for the repair and the cost of labor and materials required to make the repairs. One potential problem with this system is that tenants need to know when to provide notice and in what form before undertaking repairs. Another problem is that under Oregon law the landlord may terminate the rental agreement for failure to pay rent if the tenant deducts the cost of repairs from the rent owed. While the tenant can raise habitability as a defense to non-payment of rent the complexities of the law usually require legal representation in court in order for the defense to be successful.

No cause termination of rental agreements

Oregon law prohibits landlords from retaliating against tenants by evicting, raising rent, or through other means. At the same time a landlord has the right to terminate a rental agreement with a tenant for no cause if the landlord provides notice 30 days in advance of the last day of the tenancy. Proving retaliation when a landlord uses the 30-day no cause termination provision is very difficult in practice (Community Alliance of Tenants, 2005). If a tenant ignores the 30-day notice the landlord has the right to evict the tenant. However, evictions become part of a tenant's record and may become a barrier to finding rental units in the future. The tenant is then left with little choice but to comply with the no-cause termination notice and find other housing.

Tenant accountability for habitability

Until recently, the inspection and code enforcement process in Portland focuses on the landlord as the entity who is responsible for maintaining a rental unit in habitable condition. This was true despite the fact that Oregon's Landlord-Tenant law assigns responsibilities related to the upkeep of the housing unit to both landlord and tenant. Without clear standards outlining the obligations of the tenants with regard to the habitability of the housing units they occupy landlords were left with few tools to require the tenants to do their part in complying with city housing codes. Since the adoption of the Quality Rental Housing Workgroup recommendations by the City of Portland the responsibilities of tenants in Portland are more explicitly stated. However, parts of the county that do not have similar codes that clarify tenant responsibilities remain in the same position as the City of Portland before the adoption of the recommendations to strengthen city housing code.

6. Public health efforts to improve housing-related health in Multnomah County: the Healthy Homes Initiative

Multnomah County Health Department, Environmental Health Services program received a grant from the Centers for Disease Control and Prevention to implement the Healthy Homes Initiative. In Multnomah County the program's goal is to reduce asthma symptoms among children 1 to 6 years old by identifying asthma triggers in their homes and through education of caregivers. Over a 24 month period beginning in 2006 the program staff reached 141 children in 115 households. Teams of public health staff including community nurses, community health workers and environmental health specialists visited the households to provide education about asthma, medication management and asthma triggers as well as to conduct inspections of the home to identify and remove environmental asthma triggers.

As a result of the Healthy Homes Initiative interventions there was a net improvement in asthma-related knowledge among the children's parents and caregivers. The initial home environmental inspections

revealed a number of asthma triggers and in subsequent inspections of the homes showed a decrease in these triggers. Further, there was a decline in the number of children experiencing asthma symptoms after the public health teams provided their services.

While the program as implemented in Multnomah County is limited in scope, it has been effective in reducing housing-related illness among children who participated in the program. It will be important to provide similar services to more residents in the county as well as to address multiple deficiencies in housing simultaneously such as lead exposure, pest management, and injury prevention. We also need policies drawing on the expertise of a variety of programs and organizations in the public and private sectors to build system-wide solutions that establish and attain healthy housing standards. The following section describes promising housing policies that have been implemented in other parts of the country.

7. Improving health through system wide housing policy solutions – effective strategies nationwide

In 2004 the Enterprise Foundation issued a report discussing nationwide efforts to create affordable healthy homes (Proscio, 2004). The cross-cutting theme among these various efforts is that they all work to bring public health and housing policies in closer alignment with each other. Nineteenth century concerns about poor quality housing and sanitation brought the two fields together initially, but in the past several decades public health guidelines for healthy housing have been at odds with housing industry concerns about “first costs” – the immediate cost of incorporating healthy home features in residential construction. In some cases public health recommendations for healthy home construction impose a significant financial burden on the housing industry while resulting in only a small gain in health protection. In other situations, the conflicting interests result from public health's long range view of the costs inherent in constructing with less healthy materials or designs and the housing industries short-term view of cost as being limited to the materials and labor involved in a given construction project.

In recent years, public health and the housing industry have begun to work together to develop programs and policies to build healthier homes. This movement is not widespread. The author of the Enterprise Foundation report describes policies and efforts that have shown promise in alleviating the problems associated with substandard housing.

Market-based solutions

Housing developers may be reluctant to use materials and methods necessary to meet the standards of a healthy home because of the “first costs” or the initial expenses that are associated. The additional expenses would have to be recovered through higher rent or sale prices for the buildings. In order to use market forces to their advantage, proponents of healthy housing had to create a financial incentive for

developers to voluntarily construct healthy housing. One strategy is to create a health-related “stamp of approval” from an authority that is well-recognized by consumers who might be more likely to seek out and pay a premium for houses endorsed. The competitive advantage that a health-related certification creates might become an incentive for developers to engage in healthy building practices.

The most visible example of a health-based certification program is the Energy Star label given by the Environmental Protection Agency (EPA) to products meeting certain energy-saving criteria. The label is recognized by consumers as a sign of an environmentally-conscious product, and in many instances, this is a significant criterion in their selection of products such as home appliances. The increased recognition and demand for products that have earned the Energy Star label has created market incentives for manufacturers to meet the more stringent EPA criteria voluntarily.

The EPA recently expanded the Energy Star program by creating an optional set of criteria promoting indoor air quality. Builders are not required to meet the Indoor Air Quality (IAQ) Package standards in order to earn the Energy Star label, however, doing so would give them added recognition. The IAQ criteria require builders to use techniques to limit moisture, radon and pests, install efficient heating and cooling systems, to install safe ventilation systems for combustion equipment, and to use nontoxic building materials. The EPA expects this addition to the Energy Star program to be as successful as the original program through the same forces of consumer demand. Other certification programs such as the Leadership in Energy and Environmental Design for Homes (LEED for homes) fulfill a similar function as the EPA program.

The programs were introduced recently and at this time it is unclear whether market forces have encouraged builders to adopt Energy Star IAQ or LEED standards in building homes. It is likely that national home builders will be the first to adopt these practices and these companies are not likely to construct affordable homes. However, it is expected that these healthy home building practices will eventually spread to the construction of affordable housing once there is broader acceptance and demand for these health promoting features.

Build multi-disciplinary coalitions to strengthen housing standards

Financial incentives for building healthier affordable homes can be created through government agencies operating at the local level. Major funders of public housing such as HUD, state housing finance agencies, and local housing authorities incorporate standards for healthy, affordable housing in awarding public housing construction contracts. Proscio (2004) cites the Asthma Regional Council (ARC) in Boston as an example of this strategy. Government agencies at the local, state and federal levels as well as community organizations representing health, housing and the environment came together with the common goal of preventing and controlling asthma. In addition to coordinating their efforts in asthma

control and prevention this group published clear guidelines for contractors, architects and residents outlining healthy housing construction and renovation methods that alleviate asthma and other respiratory illnesses among residents. The healthy home principles and methods became a requirement of government contracts. ARC members worked to raise awareness of the healthy housing guidelines among sister agencies that were not involved in the coalition. Within 2 years of publishing their guidelines 14,000 units in New England meet most or all of the criteria set out in those documents.

Mobilizing community-based organizations

Another effective policy strategy described by Proscio (2004) is to work with existing community-based organizations and coalitions to raise awareness and encourage action towards healthy, affordable housing. Community-based organizations are uniquely positioned to understand the health concerns of members of the community they represent. Even if the original purpose of the organization is not related directly to health and housing these entities enjoy a position of trust within their communities and are committed to improving conditions in these communities. These characteristics may make it possible to engage community-based groups to improve affordable low-income housing stock.

Examples of successful efforts through community-based organizations come from cities including Baltimore, Cleveland, and Los Angeles. In Baltimore, a grassroots organization sought to alleviate childhood asthma caused by residential exposure to cockroach, mold, and rodents. The organization sought to convert empty lots and abandoned buildings in a Baltimore neighborhood into a large development of healthy, affordable housing. Their efforts included door-to-door canvassing to assess the prevalence of childhood asthma and to encourage parents to join the push for a new housing development.

In Cleveland a community organization was successful in introducing elements of health-related inspections into the pre-existing system of inspections for energy efficiency at little extra cost. As inspectors were already in houses to inspect for weatherization they were able to also look for housing conditions that increased the risk for asthma and lead poisoning. The weatherization program was expanded to address health concerns because of the efforts of the community-based organization.

A final example comes from Los Angeles where members of a low-income community were recruited and trained to become community health advocates. The community advocates conducted home inspections of many of the rental homes and documented conditions that were detrimental to health. They also interviewed the residents to document health problems and provided education on healthy housing. In situations where housing conditions violated local housing code, the community advocates helped residents negotiate the system to demand remediation from their landlords or from government agencies responsible for code enforcement. In addition to improving living conditions on a case-by-case basis, this program also resulted in a database documenting environmental and health conditions of the residents.

Together with their advocacy, the data collected were effective in changing policy through the passage of statewide laws that gave local authorities the authority to enforce certain housing laws.

Pursue Stronger Regulations and Better Enforcement

Standards for housing and health have been established at different levels of government as well as through different government programs. It is rare that any one of these sources of regulation adequately address all substandard housing conditions that have the potential to affect health. The National Center for Healthy Housing notes that the major sources of health-related housing regulations for conditions in existing homes are housing/property maintenance codes (federal, state and local codes), health and sanitation codes (state and local), Landlord-Tenant law (state and local), product standards for health and safety of consumer products (federal government and national associations), and hazard management laws (federal, state and local) that address specific housing-related hazards such as lead paint or asbestos. New construction is covered under separate codes at state and local levels. However, not all housing falls within the purview of this body of law. For example the U.S. Department of Housing and Urban Development (HUD) legal requirements apply only to housing subsidized through federal assistance or to housing covered by mortgage insurance.

In some situations government agencies with jurisdiction over the same community may not be aware of each other's activities or responsibilities with regard to regulation of housing. Proscio (2004) describes in his report the situation in Los Angeles where the housing, building and health departments were all reluctant to enforce existing lead-safety laws because they mistakenly believed that they did not have the authority to do so and that another agency had enforcement authority.

One solution suggested by Proscio and participants of the Multnomah County Healthy Homes Summit is to bring together the various government agencies responsible for housing and health in the county to reach a common understanding of healthy housing standards and to assess the adequacy of the existing body of law on housing in protecting the health of residents. Subsequent steps might involve adopting model housing regulation and coordinating enforcement activities. Proscio also recommends the inclusion of developers in strengthening this system so that the result is sound, practical healthy-housing policy.

8. Housing policy in Multnomah County

Market forces

There are limited financial incentives to encourage housing developers to build affordable housing in Multnomah County. In Portland, the primary financial incentive is in the form of property tax abatements in exchange for reserving a proportion of new or remodeled multi-unit residential buildings for low-income

households. However, these tax abatement programs were created to increase the availability of affordable housing and usually do not specify methods and materials for constructing homes that promote the health of the occupants. Some of these tax abatement programs result in healthy interior conditions in housing units to the extent specified by the city housing code because the developer improving existing property must show that existing code violations have been addressed.

City-sponsored financial incentives to spur the development of quality, affordable housing do not exist in parts of Multnomah County outside the City of Portland and there are no equivalent programs at the county level. It is possible that one of the unintended consequences of Portland's tax abatement structure is that developers are less likely to construct affordable housing outside the city limits without the attractive incentive program in other parts of the county. City-level census estimates for 2006 are available for Portland and Gresham only. According to these estimates Portland had a median family income of almost \$58,000 while Gresham had a much lower median family income of about \$51,600. Areas like Gresham may be experiencing the hardships of significantly lower family incomes coupled with fewer opportunities to find quality, affordable housing. Although Portland is significantly more populous than Gresham the effects of a shortage of affordable housing in Gresham have an impact on almost 14% of the county's population (Portland Development Commission 2007 estimate).

Multnomah County developers can also benefit from other nationally available incentives with indirect financial benefits. These incentives include the sought after Energy Star and Leadership in Energy and Environmental Design (LEED) rating and certifications. The Energy Star home rating allows the builder to seek favorable financing options and both certifications make houses more appealing to consumers. Although these two programs are designed to encourage energy efficient housing development a secondary consequence is that housing units meeting these standards are likely to be healthy living environments.

Convening a coalition of experts

In May 2007 Multnomah County Health Department convened a Healthy Homes summit inviting experts in the field of health and housing to review information on the connection between housing conditions and health. During the summit, the Health Department facilitated discussions among participants to identify and prioritize housing-related concerns and the most appropriate approaches to resolving these problems.

In July 2007 the City of Portland created the Quality Rental Housing workgroup to review the condition of rental housing in Portland and to evaluate the city's efforts to enforce the housing maintenance code. The health of tenants occupying substandard housing units was a prime motivator for convening this work group.

In both situations, county and city governments spearheaded efforts to bring greater visibility and response to the issue of unhealthy residential rental housing. Collectively, the participants in these expert coalitions have produced draft recommendations for improving clarity and raising standards through modifications of Portland's housing code.

Similarly, in January 2008 an advisory group comprised of housing and health experts as well as representatives from tenant and landlord associations met to improve rental housing conditions in Gresham. The advisory group worked with city government officials to work out the practical details involved in implementing the first mandatory rental housing inspection law in Oregon which was passed in December 2007.

Stronger regulation and enforcement

According to the American Community Survey of 2006 an estimated 42% of occupied housing units in Multnomah County were occupied by renters. Strong housing codes that specifically address health and safety concerns along with consistent enforcement of the regulations are necessary to ensure the well-being of occupants of rental units.

The City of Portland has adopted housing codes that address housing conditions that are likely to have the greatest impact on the health of residents such as moisture inside the home that may lead to mold, pest management, lead and safety. However, the language of the regulations is not sufficiently specific with regard to the interior and exterior housing conditions that constitute code violations. An additional problem is that Portland's housing inspection program is complaint-driven so that very few of the rental units in the city are actually inspected for code compliance.

To strengthen Portland's housing code the city's Bureau of Housing and Community Development has set up a Quality Rental Housing Workgroup that released draft recommendations in 2008 regarding improvements to the housing code as well as enforcement procedures. The Workgroup is comprised of representatives of county and city governments, non-profit organizations providing low-income housing in Portland, tenant associations, property management associations and community-based organizations. The group recommended the inclusion of specific requirements in the city's code to identify and correct indoor housing problems in rental units such as lead, moisture, pests and other health issues. The group also recommended clearly outlining tenant and landlord responsibilities so that the landlord was not held solely responsible for maintaining healthy conditions in housing units. To strengthen enforcement the workgroup supported increased funding to the housing inspection program partly derived from fees imposed on landlords. In addition, the workgroup recommended expanding the current complaint-driven system by offering rental unit inspections when referrals are made by the police department, fire department, or social service agencies. The group also proposed that the inspection program should give

priority to rental properties with exterior conditions that violate housing code, have a documented history of code violations, are associated with higher crime levels, or have unpaid property taxes.

The City of Gresham, the second most populous city in Multnomah County, has adopted the International Property Maintenance Code which includes provisions requiring landlords to address interior dampness, garbage, infestation by insects or rodents, and safety issues. In December 2007, Gresham established the Rental Housing Inspection Program through which the city will conduct annual inspections of residential rental units selected in random order. These routine inspections will occur along with a complaint-driven inspection system. Landlords of rental units that are in violation of city housing codes are required to repair the units and undergo a second inspection to assure compliance.

In both Portland and Gresham the proposed or adopted changes in housing codes are intended to bring sharper focus to the health concerns associated with substandard housing conditions and to require remediation of these unhealthy living conditions. The changes in housing codes have the potential to assure housing stock that meets minimum health-focused standards. Critics of the more stringent housing codes argue that by placing the financial burden of repairs on landlords the housing authorities might inadvertently contribute to a greater shortage in affordable housing because the property owners are expected to pass the costs on to tenants.

Mobilizing community-based organizations

Multnomah County has a number of non-profit programs and grassroots organizations that have worked in various ways to improve the condition of low-income rental housing. The Community Alliance of Tenants (CAT) is an example of such efforts in the area. CAT is a statewide tenant-rights coalition. Through various programs CAT seeks to empower tenants to organize and collectively improve the conditions of their housing through education about tenant rights, training for tenants in identifying hazards within the home, and referrals to legal and technical assistance. CAT also advocates for affordable housing, improvement of substandard housing conditions, and for stronger eviction protections for tenants. A sister organization operating in the Portland metropolitan area is Affordable Housing Now! (AHN). This group has raised funds and drawn political support for the preservation of affordable housing locally. Groups like CAT and AHN that operate within Multnomah County improve the availability of affordable housing and work to ensure that these units meet basic habitability standards and promote policies related to housing and health as part of their work on substandard housing issues. However, with other affordable housing-related groups it is unclear how much emphasis they place specifically on addressing the adverse health consequences of substandard housing.

In 2003 Multnomah County Health Department worked with low-income residents of communities of color in north and north-east Portland to prioritize health concerns related to their housing including indoor air

quality, lead-poisoning, mold, and garbage. The community group, known as the PACE-EH (Protocol for Assessing Community Excellence in Environmental Health) Coalition, used evidence of substandard housing conditions in their neighborhoods to convince local government and non-profit agencies in the Portland area to include green building principles in future development and building rehabilitation projects.

The Josiah Hill III Clinic's healthy homes program aims to protect children from environmental hazards and to promote community action in support of healthy homes. The organization focuses on lead exposure prevention and asthma prevention in the home. This clinic grew out of the community's expressed need and works to provide home health assessments and leverage resources for families to improve housing conditions.

9. Recommendations for long term action

Establish housing-related data collection systems

Much of our understanding of the connection between health and housing in Multnomah County comes from national studies, anecdotal evidence from local programs or residents, and a small number of records of housing inspections conducted in Portland. In 2002 the American Housing Survey conducted a local survey in Portland and provided a rich source of quantitative information about the state of local housing, both owner-occupied and renter-occupied units. However, the survey's limitation was that it did not provide information on the whole county. Unfortunately, at present the U.S. Census Bureau has no plans to repeat this survey. Without a source of routinely collected information on housing conditions and health status of the occupants it is almost impossible to estimate the magnitude of these problems in Multnomah County.

At least two potential solutions can address the lack of current information on housing. The first option is to fund and administer a modified version of the American Housing Survey to a representative sample in Multnomah County. The survey could include questions on interior and exterior housing conditions of public health concern and also gather information on the health status of the occupants. Repeating the survey periodically would provide information on trends in housing and related health and safety issues in Multnomah County.

A second option that can be instituted concurrently with a periodic survey is to collect the findings of housing inspections on standardized forms that can be entered into electronic data bases for analysis. Currently, the documentation of housing inspection findings takes the form of a narrative written by the inspector to record findings. This method contains obvious limitations for purposes of data analysis.

Even with an electronic database, under the current inspection system the City of Portland will only have data for residential rental units that are brought to the attention of the inspection program by tenant complaints. However, in Gresham, the mandatory annual inspection is likely to yield a more representative picture of the state of housing in that city. Areas outside of Gresham and Portland without housing codes will not be captured through this method.

Incorporate health-focused action in existing housing-related efforts

The growing problem of affordable housing in Multnomah County and increasing concerns over the quality of rental housing have given rise to numerous efforts by non-profit organizations, grassroots activists, and local government agencies. However, the potential health effects of substandard housing do not usually receive the attention they deserve.

While many communities around the country struggle to mobilize community-based organizations in the area of health and housing, Multnomah County has the advantage of an existing network of groups that are already familiar with and active in dealing with local housing issues. The challenge for public health proponents is to make housing-related health a prominent subject for discussions and actions related to low-income rental housing. The Los Angeles effort to train tenants of low-income housing to identify unhealthy conditions in the home and to advocate for improvements is an example of a health-focused strategy that built on the interests of community members. In a system where housing inspections are not mandatory and there is a shortage of resources to carry out the inspections tenants trained to detect housing defects and associated health impacts would be helpful allies.

Much of the efforts around quality affordable housing occur in the city of Portland. While the large majority of the county's population resides in Portland over 20% of county residents live outside the city limits and do not enjoy the full benefits of the efforts to increase access to quality, affordable housing. Ensuring the uniform efforts throughout the county will be an important step in improving housing-related health for all occupants of low-income rental units.

Ensure Healthy Housing is a Community Priority

The profound effect of inadequate housing on human health is not commonly understood and is often overlooked. Efforts to raise awareness about these issues must continue in order for healthy homes to become a priority for our county. These efforts are necessary to secure funding for programs and policies that promote safe and high quality housing for our residents, for enforcement of existing laws and, for educating the public about these public health issues.

References

Breyse, Patrick, Nick Farr, Warren Galke, Bruce Lanphear, Rebecca Morley, and Linda Bergofsky. 2004. The Relationship Between Housing and Health: Children at Risk. *Environmental Health Perspectives* 112(15): 1583-1588.

Centers for Disease Control and Prevention. 2006. Fire Deaths and Injuries: Fact Sheet. World Wide Web page <http://www.cdc.gov/ncipc/factsheets/fire.htm> accessed on 10/16/2008.

City of Gresham. 2008. Rental Housing Inspection Program Tenant Information. World Wide Web page <http://greshamoregon.gov/> accessed on 10/16/2008.

Cohn, Richard D., Samuel J. Arbes Jr., Renee Jaramillo, Laura H. Reid, and Darryl C. Zeldin. 2006. National Prevalence and Exposure Risk for Cockroach Allergen in U.S. Households. *Environmental Health Perspectives* 114(4): 522-526.

Community Alliance of Tenants. 2005. *Substandard Housing Research Project: Portland's Tenants Speak Out About the Condition of their Housing*. Portland, Oregon: Community Alliance of Tenants.

Frank, Deborah A., Nicole B. Neault, Anne Skalicky, John T. Cook, Jacqueline D. Wilson, Suzette Levenson, Alan F. Meyers, Timothy Heeren, Diana B. Cutts, Patrick H. Casey, Maureen M. Black, and Carol Berkowitz. 2006. Heat or Eat: The Low Income Home Energy Assistance Program and Nutritional and Health Risks Among Children Less Than 3 Years of Age. *Pediatrics* 118(5): 1293-1302.

Greiling, Andrea. 2005. *Office of Neighborhood Involvement, Neighborhood Inspections Program Database Development*. Portland, Oregon: Multnomah County Health Department, Environmental Health.

Krieger, James and Donna L. Higgins. 2002. Housing and Health: Time Again for Public Health Action. *American Journal of Public Health* 92(5): 758-768.

Istre, Gregory R., Mary A. McCoy, Linda Osborn, Jeffrey J. Barnard, and Allen Bolton. 2001. Deaths and Injuries from House Fires. *New England Journal of Medicine* 344(25): 1911-1916.

Krieger, James and Donna L. Higgins. 2002. Housing and Health: Time Again for Public Health Action. *American Journal of Public Health* 92(5): 758-768.

Lee, Wang, Eric Beecroft, Jill Khadduri and Rhiannon Patterson. 2003. Impacts of Welfare Reform on Recipients of Housing Assistance: Evidence from Indiana and Delaware. Prepared for the U.S. Department of Housing and Urban Development by Abt Associates.

Lipman, Barbara J. 2005. *Something's Gotta Give: Working Families and the Cost of Housing*. Washington, DC: Center for Housing Policy.

Lubell J, Crain R, Cohen R, 2007, *Framing the issues – the positive impact of affordable housing on health*. Center for Housing Policy. World Wide Web page

http://www.nhc.org/pdf/chp_int_litrvw_hsglth0707.pdf. Accessed on 08/07/08.

Matthews, Karen A., Catarina I. Kiefe, Cora E. Lewis, Kiang Liu, Stephen Sidney, and Carla Meyer, Pamela A., Timothy Pivetz, Timothy A. Dignam, David M. Homa, Jaime Schoonover, and Debra Brody. 2003. Surveillance for Elevated Blood Levels Among Children—United States, 1997-2001. *Morbidity and Mortality Weekly Report* 52(SS10): 1-21.

Meyers, Alan, Dana Rubin, Maria Napoleone, and Kevin Nichols. 1993. Public Housing Subsidies May Improve Poor Children's Nutrition. *American Journal of Public Health* 83(1): 115.

New Tech Media. 2006. Hypothermia a Risk for Elderly with Temperature Just 60 Degrees. World Wide Web page <http://seniorjournal.com/NEWS/Alerts/6-01-03-HypothermiaARisk.htm>. Accessed on 01/27/2009.

Oregon Human Services Department, Public Health Division, Lead Poisoning Prevention Program, e-mail communication on 10/16/2008.

Portland Development Commission. 2007. Affordable Housing Fact sheet. World Wide Web page http://www.pdc.us/pdf/housing_services/tif-setaside/affordable-hsg-2007_faqs.pdf accessed on 10/16/2008.

Proscio, Tony. 2004. *Healthy Housing, Healthy Families: Toward a National Agenda for Affordable Healthy Homes*. The Enterprise Foundation. National Center for Healthy Housing.

U.S. Bureau of Labor Statistics, Consumer Expenditure Survey. Metropolitan Statistical Area Tables. World Wide Web page <http://www.bls.gov/cex/2004/msas/west.pdf> accessed on 10/16/2008.

U.S. Census Bureau, American Housing Survey. 2003. American Housing Survey for the Portland Metropolitan Area: 2002. World Wide Web page <http://www.census.gov/prod/2003pubs/h170-02-34.pdf> accessed on 10/16/2008.

U.S. Department of Labor, Employment Standards Administration, Wage and Hour Division. Minimum Wage Laws in the States, July 2008. World Wide Web page <http://www.dol.gov/esa/minwage/america.htm#Oregon> accessed on 10/16/2008.

U.S. Housing and Urban Development, Community Planning & Development. Affordable Housing. World Wide Web page <http://www.hud.gov/offices/cpd/affordablehousing/> accessed on 10/16/2008.

U.S. Housing and Urban Development, HUD USER Data Sets on Fair Market Rent, World Wide Web page <http://www.huduser.org/datasets/fmr.html> accessed on 10/16/2008.

US Census Bureau. American Community Survey. 2007. Multnomah County, Oregon Selected Social Characteristics in the United States: 2006. World Wide Web page http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=05000US41051&-context=adp&-ds_name=ACS_2006_EST_G00_&-tree_id=306&-lang=en&-caller=geoselect&-format= accessed on 10/16/2008.

Yunis. 2002. Socioeconomic Trajectories and Incident Hypertension in a Biracial Cohort of Young Adults. *Hypertension* 39: 772-776.

Appendix A. Excerpts from Oregon Landlord Tenant Law (ORS Chapter 90)

Landlord responsibilities

90.320 Landlord to maintain premises in habitable condition; agreement with tenant to maintain premises.

(1) A landlord shall at all times during the tenancy maintain the dwelling unit in a habitable condition. For purposes of this section, a dwelling unit shall be considered uninhabitable if it substantially lacks:

- (a) Effective waterproofing and weather protection of roof and exterior walls, including windows and doors;
- (b) Plumbing facilities which conform to applicable law in effect at the time of installation, and maintained in good working order;
- (c) A water supply approved under applicable law, which is:
 - (A) Under the control of the tenant or landlord and is capable of producing hot and cold running water;
 - (B) Furnished to appropriate fixtures;
 - (C) Connected to a sewage disposal system approved under applicable law; and
 - (D) Maintained so as to provide safe drinking water and to be in good working order to the extent that the system can be controlled by the landlord;
- (d) Adequate heating facilities which conform to applicable law at the time of installation and maintained in good working order;
- (e) Electrical lighting with wiring and electrical equipment which conform to applicable law at the time of installation and maintained in good working order;
- (f) Buildings, grounds and appurtenances at the time of the commencement of the rental agreement in every part safe for normal and reasonably foreseeable uses, clean, sanitary and free from all accumulations of debris, filth, rubbish, garbage, rodents and vermin, and all areas under control of the landlord kept in every part safe for normal and reasonably foreseeable uses, clean, sanitary and free from all accumulations of debris, filth, rubbish, garbage, rodents and vermin;
- (g) Except as otherwise provided by local ordinance or by written agreement between the landlord and the tenant, an adequate number of appropriate receptacles for garbage and rubbish in clean condition and good repair at the time of the commencement of the rental agreement, and the landlord shall provide and maintain appropriate serviceable receptacles thereafter and arrange for their removal;
- (h) Floors, walls, ceilings, stairways and railings maintained in good repair;
- (i) Ventilating, air conditioning and other facilities and appliances, including elevators, maintained in good repair if supplied or required to be supplied by the landlord;
- (j) Safety from fire hazards, including a working smoke alarm or smoke detector, with working batteries if solely battery-operated, provided only at the beginning of any new tenancy when the tenant first takes possession of the premises, as provided in ORS 479.270, but not to include the tenant's testing of the smoke alarm or smoke detector as provided in ORS 90.325 (6); or

(k) Working locks for all dwelling entrance doors, and, unless contrary to applicable law, latches for all windows, by which access may be had to that portion of the premises which the tenant is entitled under the rental agreement to occupy to the exclusion of others and keys for such locks which require keys.

(2) The landlord and tenant may agree in writing that the tenant is to perform specified repairs, maintenance tasks and minor remodeling only if:

(a) The agreement of the parties is entered into in good faith and not for the purpose of evading the obligations of the landlord;

(b) The agreement does not diminish the obligations of the landlord to other tenants in the premises; and

(c) The terms and conditions of the agreement are clearly and fairly disclosed and adequate consideration for the agreement is specifically stated.

(3) Any provisions of this section that reasonably apply only to a structure that is used as a home, residence or sleeping place shall not apply to a manufactured dwelling, recreational vehicle or floating home where the tenant owns the manufactured dwelling, recreational vehicle or floating home, rents the space and, in the case of a dwelling or home, the space is not in a facility. Manufactured dwelling or floating home tenancies in which the tenant owns the dwelling or home and rents space in a facility shall be governed by ORS 90.730, not by this section. [Formerly 91.770; 1993 c.369 §6; 1995 c.559 §15; 1997 c.249 §32; 1997 c.577 §17; 1999 c.307 §20; 1999 c.676 §11]

Tenant remedies

90.365 Failure of landlord to supply essential services; remedies

(1) If contrary to the rental agreement or ORS 90.320 or 90.730 the landlord intentionally or negligently fails to supply any essential service, the tenant may give written notice to the landlord specifying the breach and that the tenant may seek substitute services, diminution in rent damages or substitute housing. After allowing the landlord a reasonable time and reasonable access under the circumstances to supply the essential service, the tenant may:

(a) Procure reasonable amounts of the essential service during the period of the landlord's noncompliance and deduct their actual and reasonable cost from the rent;

(b) Recover damages based upon the diminution in the fair rental value of the dwelling unit; or

(c) If the failure to supply an essential service makes the dwelling unit unsafe or unfit to occupy, procure substitute housing during the period of the landlord's noncompliance, in which case the tenant is excused from paying rent for the period of the landlord's noncompliance. In addition, the tenant may recover as damages from the landlord the actual and reasonable cost or fair and reasonable value of comparable substitute housing in excess of the rent for the dwelling unit. For purposes of this paragraph, substitute housing is comparable if it is of a quality that is similar to or less than the quality of the dwelling unit with regard to basic elements including cooking and refrigeration services and, if warranted, upon consideration of factors such as location in the same area as the dwelling unit, the availability of substitute housing in the area and the expense relative to the range of choices for substitute housing in the area. A tenant may choose substitute housing of relatively greater quality, but the tenant's damages shall be limited to the cost or value of comparable substitute housing.

(2) If contrary to the rental agreement or ORS 90.320 or 90.730 the landlord fails to supply any essential service, the lack of which poses an imminent and serious threat to the tenant's health, safety or property, the tenant may give written notice to the landlord specifying the breach and that the rental agreement shall terminate in not less than 48 hours unless the breach is remedied within that period. If the landlord

adequately remedies the breach before the end of the notice period, the rental agreement shall not terminate by reason of the breach. As used in this subsection, "imminent and serious threat to the tenant's health, safety or property" shall not include the presence of radon, asbestos or lead-based paint or the future risk of flooding or seismic hazard, as defined by ORS 455.447.

(3) For purposes of subsection (1) of this section, a landlord shall not be considered to be intentionally or negligently failing to supply an essential service if:

(a) The landlord substantially supplies the essential service; or

(b) The landlord is making a reasonable and good faith effort to supply the essential service and the failure is due to conditions beyond the landlord's control.

(4) This section does not require a landlord to supply a cooking appliance or a refrigerator if the landlord did not supply or agree to supply a cooking appliance or refrigerator to the tenant.

(5) If the tenant proceeds under this section, the tenant may not proceed under ORS 90.360 (1) as to that breach.

(6) Rights of the tenant under this section do not arise if the condition was caused by the deliberate or negligent act or omission of the tenant or a person on the premises with the tenant's consent.

(7) Service or delivery of actual or written notice shall be as provided by ORS 90.150 and 90.155, including the addition of three days to the notice period if written notice is delivered by first class mail.

(8) Any provisions of this section that reasonably apply only to a structure that is used as a home, residence or sleeping place does not apply to a manufactured dwelling, recreational vehicle or floating home if the tenant owns the manufactured dwelling, recreational vehicle or floating home and rents the space. [Formerly 91.805; 1995 c.559 §21; 1997 c.577 §20; 1999 c.603 §22; 1999 c.676 §14; 2007 c.508 §8]

Appendix B. American Housing Survey 2002 data for Portland, OR adapted from communication to MCHD from National Center for Healthy Housing

**American Housing Survey - Selected Elements Related to Health Homes
2002 Portland, OR-WA and 2003 National ***

Characteristic	Occupied		Owner Occupied		Rental		Severe Problems		Moderate Problems		Below Poverty		Central City	
	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Total Occupied Units(,000)	748	105,842	498	72,238	250	33,604	10	1,970	20	4,316	69	13,741	204	31,213
GENERAL														
Owner occupied(,000)	498	72,238	498	72,238			5	932	9	1,795	25	5,868	120	16,093
Renter occupied(,000)	250	33,604			250	33,604	5	1,039	12	2,521	45	7,873	84	15,119
Owner occupied	66.5%	-	100%	-	<0.1%	<0.1%	47.6%	-	43.2%	-	35.5%	42.7%	58.8%	51.6%
Renter occupied	33.5%	31.7%	<0.1%	<0.1%	100%	-	52.4%	-	56.8%	-	64.5%	57.3%	41.2%	48.4%
Units in Structure														
1, detached	67.1%	-	87.4%	82.6%	26.7%	24.1%	50.5%	46.8%	40.2%	46.4%	42.5%	45.0%	63.9%	49.7%
1, attached	5.9%	-	2.2%	5.1%	13.2%	7.7%	5.1%	6.4%	5.6%	3.1%	10.2%	6.2%	7.0%	8.1%
2 to 4	6.5%	7.9%	1.8%	-	16.0%	20.8%	7.6%	12.1%	18.6%	16.4%	8.3%	13.1%	8.3%	13.2%
5 to 9	4.4%	-	0.6%	-	11.9%	13.7%	5.6%	8.8%	11.4%	9.3%	9.3%	-	3.0%	7.8%
10 to 19	5.3%	4.2%	0.5%	-	14.8%	11.9%	7.2%	5.9%	6.7%	7.7%	9.9%	6.3%	5.2%	6.5%
20 to 49	3.2%	-	0.4%	-	8.7%	-	12.4%	6.9%	4.8%	5.7%	5.2%	-	6.3%	-
50 or more	2.7%	-	0.3%	-	7.3%	9.2%	3.5%	8.0%	7.3%	5.2%	7.4%	6.1%	5.5%	7.8%
Manufactured /mobile home or trailer	5.1%	6.5%	6.9%	7.6%	1.4%	-	8.0%	5.2%	5.4%	6.1%	7.3%	9.3%	1.0%	-
Year Structure Built														
Post-2000	4.8%	-	5.6%	-	3.0%	-	1.8%	-	2.8%	-	2.7%	-	2.8%	-
Post-1980	36.7%	32.2%	37.5%	35.1%	35.2%	26.0%	14.1%	16.9%	23.8%	16.2%	28.4%	24.5%	15.7%	21.1%
Pre-1980	63.3%	67.8%	62.5%	-	64.8%	74.0%	85.9%	-	76.2%	83.8%	71.6%	75.5%	84.3%	78.9%
Pre-1960	30.8%	35.4%	31.2%	33.7%	30.0%	39.2%	58.9%	52.1%	34.8%	52.9%	34.5%	41.0%	62.7%	48.8%
Pre-1940	14.1%	17.5%	14.9%	-	12.5%	22.2%	30.9%	-	18.3%	29.6%	16.2%	20.9%	34.7%	26.1%

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**American Housing Survey - Selected Elements Related to Health Homes
2002 Portland, OR-WA and 2003 National ***

Characteristic	Occupied		Owner Occupied		Rental		Severe Problems		Moderate Problems		Below Poverty		Central City	
	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Foundation (for 1-unit not manufactured)														
1-Unit not manufactured(,000)	545	74,026	446	63,322	100	10,704	6	1,047	9	2,138	36	7,035	144	18,035
With a basement under all of house	20.2%	33.0%	21.2%	34.6%	16.1%	23.7%	19.7%	31.4%	24.0%	16.5%	18.2%	26.5%	42.7%	33.0%
With a basement under part of house	10.5%	11.6%	11.2%	12.2%	7.4%	8.6%	24.0%	11.1%	12.1%	8.6%	10.3%	8.4%	18.2%	8.5%
With a crawl space	57.6%	25.5%	59.3%	24.5%	50.0%	31.4%	42.7%	31.8%	53.9%	-	48.6%	35.0%	26.7%	24.4%
On a concrete slab	10.1%	29.3%	6.9%	28.3%	24.5%	35.2%	13.7%	23.3%	2.3%	19.8%	20.8%	29.1%	11.0%	33.6%
In some other way	1.6%	-	1.5%	-	2.1%	-	<0.1%	2.4%	7.8%	0.9%	2.0%	-	1.4%	-
<hr/>														
EXTERIOR														
External Building Conditions														
Sagging roof	2.5%	-	2.5%	-	2.7%	-	6.3%	8.5%	11.1%	9.8%	3.2%	-	2.3%	-
Missing roofing material	3.1%	-	2.9%	-	3.4%	5.2%	16.7%	10.0%	6.9%	9.6%	5.2%	5.5%	3.9%	-
Hole in roof	1.5%	-	1.1%	-	2.3%	-	14.8%	8.1%	7.6%	9.1%	3.8%	-	2.5%	-
Missing bricks, siding, other outside wall material	2.8%	-	2.5%	-	3.3%	-	14.6%	9.5%	11.1%	-	4.6%	5.4%	3.4%	-
Sloping outside walls	1.8%	-	1.4%	-	2.4%	-	8.8%	5.5%	8.2%	7.5%	2.8%	-	1.7%	-
Boarded up windows	1.2%	-	1.0%	-	1.7%	-	12.5%	3.5%	3.9%	-	1.9%	-	2.4%	-
Broken windows	4.5%	-	4.5%	-	4.6%	5.2%	10.2%	-	7.5%	12.4%	4.0%	6.9%	6.0%	4.6%
Bars on windows	3.7%	-	4.1%	-	2.9%	6.6%	5.7%	7.8%	3.9%	8.4%	2.0%	6.2%	9.8%	-
Foundation crumbling or has open crack or hole	2.9%	-	2.8%	-	3.1%	-	9.9%	8.6%	9.5%	10.8%	3.9%	-	4.9%	-
None of the above	81.5%	-	82.7%	-	79.2%	73.5%	57.0%	63.5%	66.5%	57.3%	77.6%	72.4%	71.0%	-

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Characteristic	Occupied		Owner Occupied		Rental		Severe Problems		Moderate Problems		Below Poverty		Central City	
	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Water Leakage During Last 12 Months														
With leakage from outside structure	9.2%	10.5%	10.2%	11.1%	7.2%	9.3%	17.5%	16.1%	32.8%	29.5%	9.6%	10.2%	12.6%	10.0%
Roof	4.6%	5.3%	5.2%	-	3.5%	5.1%	13.7%	10.9%	22.0%	20.1%	5.5%	6.1%	4.9%	5.3%
Basement	2.5%	-	3.2%	-	1.2%	-	2.2%	-	7.6%	6.0%	1.9%	-	5.8%	2.9%
Walls, closed windows, or doors	2.8%	-	2.7%	-	2.9%	-	2.0%	-	16.9%	9.1%	3.5%	-	3.8%	-
Other or Unknown	1.2%	-	1.3%	-	1.1%	-	3.3%	-	6.6%	6.1%	1.3%	-	1.1%	-
INTERIOR														
Damage														
Holes in floors	0.6%	-	0.4%	-	1.0%	-	8.7%	6.3%	7.3%	9.5%	1.2%	-	0.7%	-
Open cracks or holes	5.1%	-	4.4%	-	6.4%	7.6%	27.4%	16.3%	37.3%	31.4%	5.5%	8.1%	6.2%	6.6%
Broken plaster or peeling paint	2.2%	-	2.0%	-	2.6%	-	15.1%	10.6%	20.4%	-	3.3%	-	3.9%	-
Water Leakage During Last 12 Months														
With leakage from inside structure	9.4%	8.1%	8.5%	6.8%	11.3%	-	21.3%	17.0%	39.5%	25.7%	11.6%	9.6%	10.6%	9.6%
Fixtures backed up or overflowed	3.6%	-	3.0%	-	4.8%	-	10.4%	7.0%	21.7%	9.9%	5.0%	-	3.7%	-
Pipes leaked	4.5%	-	4.1%	-	5.3%	5.6%	15.3%	8.9%	22.8%	15.4%	6.3%	5.3%	5.0%	4.4%
Broken water heater	0.9%	-	0.8%	-	1.0%	-	<0.1%	2.7%	1.5%	-	0.6%	-	1.4%	-
Other or Unknown	2.0%	-	1.8%	-	2.4%	-	4.4%	-	7.2%	5.8%	2.3%	-	2.6%	-

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2002 Portland, OR-WA and 2003 National ***

Characteristic	Occupied		Owner Occupied		Rental		Severe Problems		Moderate Problems		Below Poverty		Central City	
	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Rodents														
Signs of rats in last 3 mon.	0.8%	-	0.8%	-	0.8%	-	4.7%	5.1%	4.0%	-	1.5%	-	1.3%	-
Signs of mice in last 3 mon.	5.6%	6.0%	6.0%	5.4%	4.7%	7.3%	22.8%	11.4%	10.0%	16.1%	5.7%	9.2%	5.5%	6.6%
Signs of rodents, not sure which kind in last 3 mon.	0.4%	-	0.3%	-	0.5%	-	<0.1%	1.1%	3.1%	-	1.1%	-	0.9%	-
Electrical														
No electrical wiring	<0.1%	0.1%	<0.1%	0.1%	<0.1%	0.1%	<0.1%	2.5%	<0.1%	-	<0.1%	0.2%	<0.1%	-
Exposed wiring	0.5%	-	0.5%	-	0.7%	-	3.7%	-	1.8%	-	0.3%	-	0.9%	-
Rooms without electric outlets	1.4%	-	1.1%	-	2.0%	-	8.9%	8.4%	2.8%	-	1.6%	-	2.5%	-
Fuses/breakers blown in last 3 mon.	11.5%	9.2%	12.0%	9.4%	10.5%	8.8%	28.0%	12.5%	17.5%	15.6%	7.5%	7.9%	11.1%	9.4%
Sanitation														
Lacking complete kitchen facilities	1.5%	-	0.6%	-	3.2%	-	12.2%	7.3%	48.8%	32.7%	3.8%	-	1.8%	-
Lacking some or all plumbing facilities	0.8%	-	0.5%	-	1.2%	-	55.5%	68.8%	<0.1%	0.0%	2.3%	-	1.4%	-
Water not safe to drink	9.5%	-	7.1%	-	14.2%	-	22.4%	16.7%	21.6%	17.2%	13.9%	12.6%	13.5%	12.3%
Water stoppage in last 3 mon.	3.4%	-	2.6%	-	4.9%	-	8.9%	6.2%	7.6%	6.9%	6.7%	4.1%	3.2%	-
No flush toilets working some time in last 3 mon.	2.6%	-	1.5%	-	5.0%	-	7.8%	6.8%	18.2%	11.1%	5.7%	4.1%	3.5%	-
With sewage disposal breakdowns in last 3 mon.	0.9%	-	0.5%	-	1.6%	-	<0.1%	3.7%	3.8%	-	1.9%	-	0.8%	-
Septic tank, cesspool, chemical toilet	13.9%	20.7%	18.3%	26.7%	5.1%	7.9%	16.7%	13.3%	10.7%	18.2%	7.5%	17.7%	0.8%	-
With septic tank or cesspool breakdowns in last 3 mon.	0.2%	-	0.2%	-	0.3%	-	<0.1%	-	0.9%	-	0.2%	-	0.1%	-

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	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
HEATING/FUEL														
Main Heating Equipment														
Warm-air furnace	59.5%	-	72.3%	66.6%	34.0%	51.4%	49.3%	-	39.7%	33.6%	44.9%	54.2%	66.4%	58.6%
Steam or hot water system	1.6%	12.5%	1.2%	10.8%	2.3%	16.2%	12.5%	22.5%	0.9%	12.9%	2.9%	12.6%	3.9%	17.7%
Electric heat pump	6.7%	10.7%	9.3%	11.5%	1.5%	9.1%	5.3%	4.2%	0.9%	-	4.7%	8.4%	2.2%	8.5%
Built-in electric units	21.9%	4.5%	9.2%	3.0%	47.1%	7.6%	18.0%	4.3%	43.4%	4.5%	34.4%	5.9%	20.1%	3.7%
Floor, wall, or other built-in hot air without ducts	5.2%	-	2.9%	-	9.8%	9.0%	3.8%	8.8%	4.5%	5.5%	8.6%	8.1%	4.2%	7.0%
Room heaters with flue	0.6%	-	0.5%	-	0.9%	-	<0.1%	2.5%	0.8%	-	1.1%	-	1.3%	-
Room heaters without flue	0.2%	-	0.1%	-	0.2%	-	<0.1%	3.1%	5.6%	33.5%	0.3%	-	0.2%	-
Portable electric heaters	0.4%	-	0.3%	-	0.4%	-	1.8%	-	<0.1%	1.6%	1.0%	-	0.2%	-
Stoves	2.2%	-	2.8%	-	0.9%	-	5.8%	3.3%	2.6%	-	0.6%	-	0.3%	-
Fireplace with inserts	0.3%	-	0.4%	-	0.1%	-	<0.1%	<0.1%	<0.1%	0.1%	<0.1%	0.1%	0.1%	-
Fireplace without inserts	0.1%	-	0.1%	-	0.3%	-	<0.1%	0.2%	1.7%	<0.1%	<0.1%	0.1%	0.2%	<0.1%
Other	1.3%	-	0.8%	-	2.3%	-	3.7%	-	<0.1%	0.2%	1.4%	-	0.9%	-
No heating equipment	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	-
Cooking stove	<0.1%	-	0.1%	-	<0.1%	0.3%	<0.1%	0.2%	<0.1%	0.2%	0.3%	-	0.1%	-

Water Heating Fuel														
Electricity	64.8%	39.2%	55.9%	37.5%	82.5%	43.0%	73.9%	31.5%	76.2%	36.9%	80.2%	44.7%	60.9%	29.0%
Gas, LP/bottled gas	34.7%	55.4%	43.7%	57.6%	16.8%	50.7%	24.1%	57.7%	22.1%	57.8%	19.5%	50.1%	37.8%	64.3%
Fuel oil	0.2%	5.1%	0.2%	-	0.2%	6.1%	2.0%	10.4%	<0.1%	5.0%	<0.1%	4.9%	0.6%	6.4%
Kerosene or other liquid fuel	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	-	<0.1%	-
Other	0.3%	-	0.2%	-	0.5%	-	<0.1%	0.4%	1.7%	-	0.3%	-	0.7%	-

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	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Clothes Dryer Fuel(,000)	627	82,538	481	67,262	147	15,276	7	1,014	13	2,387	39	7,720	147	19,624
Electricity	94.3%	76.5%	93.4%	74.8%	97.1%	83.6%	97.4%	75.5%	92.7%	83.0%	98.0%	81.5%	92.5%	71.7%
Gas, LP gas (liquid propane)	5.7%	23.5%	6.6%	25.1%	2.9%	16.3%	2.6%	24.5%	7.3%	17.0%	2.0%	18.5%	7.5%	28.3%
Other	<0.1%	-	<0.1%	-	<0.1%	-	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	-	<0.1%	-
Heating Problems														
Uncomfortably cold for 24 hours or more last winter	9.8%	7.6%	7.9%	6.3%	14.3%	11.0%	62.3%	34.6%	23.1%	16.9%	15.7%	11.2%	12.6%	9.1%
Heating equipment breakdowns	2.3%	-	2.3%	-	2.5%	-	44.7%	26.7%	1.9%	-	1.0%	-	4.0%	-
Other causes	6.8%	4.9%	5.4%	4.4%	9.7%	5.9%	22.7%	8.6%	17.8%	10.6%	12.9%	6.8%	7.9%	5.3%
Utility interruption	1.3%	-	1.5%	-	0.9%	-	6.9%	1.3%	3.8%	-	2.6%	-	1.2%	-
Inadequate heating capacity	1.2%	-	0.8%	-	2.1%	-	8.7%	3.0%	2.8%	-	1.9%	-	1.4%	-
Inadequate insulation	1.9%	-	0.9%	-	3.9%	-	14.8%	3.2%	8.7%	3.6%	4.5%	-	2.7%	-
Cost of heating	2.7%	-	1.9%	-	4.5%	-	6.7%	0.8%	7.0%	2.2%	7.1%	1.1%	3.6%	-
Other	1.5%	-	1.4%	-	1.8%	-	4.2%	-	2.3%	-	2.1%	-	0.9%	-
SELECTED PHYSICAL PROBLEMS														
Severe Physical Problems(,000)	10	1,970	5	932	5	1,039	10	1,970	.	.	2	498	5	881
Severe physical problems	1.4%	-	1.0%	-	2.1%	-	100%	-	.	.	3.3%	-	2.4%	-
Plumbing	0.8%	-	0.5%	-	1.2%	-	55.5%	68.8%	.	.	2.3%	-	1.4%	-
Heating	0.6%	-	0.4%	-	0.9%	-	42.6%	25.1%	.	.	1.0%	-	1.2%	-
Electric	<0.1%	-	<0.1%	-	<0.1%	0.1%	1.8%	-	.	.	<0.1%	0.3%	<0.1%	0.1%
Hallways	<0.1%	-	<0.1%	0.0%	<0.1%	-	<0.1%	0.4%	.	.	<0.1%	-	<0.1%	-
Upkeep	<0.1%	-	<0.1%	-	0.1%	-	3.5%	-	.	.	0.3%	-	<0.1%	0.2%

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	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National	MSA	National
Moderate Physical Problems,(000)	20	4,316	9	1,795	12	2,521	20	4,316	3	1,107	6	1,746		
Moderate physical problems	2.7%	-	1.8%	-	4.6%	7.5%	100%	-	4.9%	8.1%	3.0%	5.6%		
Plumbing	0.3%	-	0.2%	-	0.6%	-	11.2%	4.5%	0.5%	-	0.4%	-		
Heating	0.2%	-	0.1%	-	0.2%	-	5.6%	33.5%	0.3%	-	0.2%	-		
Upkeep	1.3%	-	0.6%	-	2.8%	-	48.8%	32.7%	2.8%	-	1.3%	-		
Hallways	0.1%	-	<0.1%	-	0.2%	-	2.9%	-	0.3%	-	0.1%	-		
Kitchen	0.9%	-	1.0%	-	0.9%	-	34.7%	30.2%	0.9%	-	1.2%	-		
<hr/>														
OVERALL OPINION OF STRUCTURE														
1(worst)	0.3%	-	0.2%	-	0.4%	-	<0.1%	2.6%	3.3%	-	1.1%	-	0.3%	-
2	0.3%	-	0.2%	-	0.5%	-	5.6%	1.8%	<0.1%	1.6%	0.6%	-	0.2%	-
3	0.7%	-	0.2%	-	1.7%	-	3.7%	-	5.2%	3.3%	1.7%	-	0.8%	-
4	1.8%	-	1.0%	-	3.5%	-	5.9%	2.6%	4.6%	-	2.5%	-	1.7%	-
5	6.8%	5.6%	5.0%	-	10.3%	-	28.8%	10.7%	15.2%	14.0%	11.5%	8.9%	7.4%	-
6	7.0%	5.6%	5.2%	4.1%	10.5%	8.8%	8.4%	7.5%	10.6%	-	6.8%	6.2%	7.2%	-
7	16.9%	14.2%	14.6%	12.2%	21.4%	18.4%	13.4%	16.4%	17.8%	14.2%	17.1%	12.8%	18.7%	16.3%
8	29.5%	-	30.0%	-	28.7%	26.9%	15.7%	23.1%	24.5%	22.0%	22.7%	24.3%	29.4%	-
9	14.2%	15.8%	16.6%	17.8%	9.5%	11.4%	11.4%	10.1%	8.6%	10.2%	9.7%	11.1%	15.5%	14.1%
10(best)	22.5%	27.8%	27.1%	32.0%	13.4%	18.7%	7.3%	20.9%	10.2%	17.6%	26.2%	30.0%	18.8%	22.6%

* = National Statistic only reported if MSA is >=5% different from National. See www.healthyhometraining.org/ahs/ for more info.

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Overview

The survey is conducted by the Bureau of the Census for the Department of Housing and Urban Development (HUD). The results and details are available at www.census.gov/hhes/www/housing/ahs/ahs.html.

The American Housing Survey (AHS) collects data on the Nation's housing, including apartments, single-family homes, mobile homes, vacant housing units, household characteristics, income, housing and neighborhood quality, housing costs, equipment and fuels, size of housing unit, and recent movers. National data are collected in odd numbered years, and data for each of 47 selected Metropolitan Areas are collected currently about every six years. The national sample covers an average 55,000 housing units. Each metropolitan area sample covers 4,100 or more housing units.

The AHS returns to the same housing units year after year to gather data; therefore, this survey is ideal for analyzing the flow of households through housing.

Key Definitions Related to Healthy Homes

1. **Broken plaster or peeling paint (interior).** The area of peeling paint or broken plaster must be on the inside walls or ceilings and at least one area of broken plaster or peeling paint must be larger than 8 inches by 11 inches.
2. **Electric fuses and circuit breakers.** These statistics are presented for occupied housing units. The data show whether an electric fuse has blown or circuit breaker has tripped in the home in the 3 months prior to the interview, or while the household was living in the unit if less than 3 months. A blown fuse or tripped breaker switch results in the temporary loss of electricity until the fuse is replaced or the breaker switch reset. Blown fuses inside major pieces of installed equipment (such as some air conditioners) are counted as blown fuses or tripped breaker switches. The item may identify inadequate wiring, but it also happens commonly when people move into houses and are unfamiliar with which items can be turned on at the same time.
3. **Electric wiring.** A housing unit is classified as having exposed electric wiring if the unit has any wiring that is not enclosed, either in the walls or in metal or plastic coverings. Excluded are appliance cords, extension cords, chandelier cords, and telephone, antenna, or cable television wires.
4. **Electric wall outlets.** A housing unit is classified as having rooms without electric wall outlets if there is not at least one working electric wall outlet in each room of the unit. A working electric wall outlet is one that is in operating condition; that is, it can be used when needed. If a room does not have an electric wall outlet, an extension cord used in place of a wall outlet is not considered to be an electric wall outlet.
5. **Flush toilet and flush toilet breakdowns.** A privy or chemical toilet is not considered a flush toilet. Flush toilets outside the unit were not counted. The statistics on breakdowns of flush toilet are shown for housing units with at least one flush toilet for the household's use only. The flush toilet may be completely unusable because of a faulty flushing mechanism, broken pipes, stopped up sewer pipe, lack of water supplied to the flush toilet, or some other reason. For households with more than one toilet, the question asked about times when *all* toilets were unusable.
6. **Foundation.** This item is restricted to one-unit buildings and excludes mobile homes. A structure has a basement if there is an enclosed space at least partially underground in which a person can walk upright under all or part of the building. The basement is under all the building if it is under the entire main structure, excluding garages, car-ports, and porches. Crawl space is space between the ground and the first floor of the house, but it is not high enough for a person to walk upright. A house is built on a concrete slab

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if it is built on concrete that has been poured on the ground. The “other” category refers to a house built on stilts or pilings (for example, beach houses), boats, and motor homes. housing unit is still too cold for the occupants. *Inadequate insulation* refers to air drafts through window frames, electrical outlets, or walls that are cold. *Cost of heating* refers to the occupants turning down their thermostat or turning the equipment off altogether to save money. This category includes utilities/fuels that are unavailable due to unpaid bills.

7. **Holes in floors.** Respondents were asked about holes in the interior floors of the unit. The holes may or may not go all the way through to a lower floor or to the exterior of the unit. The holes are only counted if large enough for someone to trip in.
8. **Light fixtures in public halls.** These statistics are presented for housing units in two-or-more-unit structures. Data include whether or not there are light fixtures in the public halls and whether or not some, none, or all of the light fixtures are in working order. Light fixtures include wall lights, ceiling lights, or table lamps in the public halls of the building. Public halls are used by the occupants and guests to get to their apartment doors.
9. **Open cracks or holes (interior).** Statistics are presented on open cracks or holes in the interior wall or ceilings of the housing unit. Included are cracks or holes that do not go all the way through to the next room or to the exterior of the housing unit. Hairline cracks or cracks that appear in the walls or ceilings but are not large enough to insert the edge of a dime, are not counted. Very small holes caused by nails or other similar objects are also not counted.
10. **Plumbing facilities.** The category “With all plumbing facilities” consists of housing units that have hot and cold piped water as well as a flush toilet and a bathtub or shower. For units with less than two full bathrooms, the facilities are only counted if they are for the exclusive use of the occupants of the unit. Plumbing facilities need not be in the same room. Lacking some plumbing facilities or having no plumbing facilities for exclusive use means that the housing unit does not have all three specified plumbing facilities (hot and cold piped water, flush toilet, and bathtub or shower) inside the housing unit, or that the toilet or bathing facilities are also for the use of the occupants of other housing units. See also the definitions “Complete bathrooms,” “Flush toilet and flush toilet breakdowns,” and “Sewage disposal and sewage disposal breakdowns.”
11. **Signs of mice or rats.** The statistics on signs of mice or rats refer to respondents who reported seeing mice or rats or signs of mice or rats inside the house or building during the 3 months prior to interview or while the household was living in the unit if less than 3 months. Signs of mice or rats include droppings, holes in the wall, or ripped or torn food containers.
12. **Water leakage during last 12 months.** Data on water leakage are shown if the leakage occurred in the 12 months prior to the interview or while the household was living in the unit if less than 12 months. Housing units with water leakage are classified by whether the water leaked in from inside or outside the building and by the most common areas (roof, basement, walls, closed windows, or doors) or reasons (fixtures backed up or over-flowed or pipes leaked) of water leakage.
13. **Room heater without flue** refers to any room heater that burns kerosene, gas, or oil, and that does not connect to flue, vent, or chimney.

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AHS's Rating System for Physical Problems

Physical Problems	Severe (any one of 5 categories)	Moderate (any one of 5 categories but none severe)
Plumbing	Lacking hot or cold piped water or a flush toilet, or lacking both bathtub and shower, all inside the structure (and for the exclusive use of the unit, unless there are two or more full bathrooms).	On at least three occasions during the last 3 months, all the flush toilets were broken down at the same time for 6 hours or more.
Heating	<ol style="list-style-type: none"> 1. Having been uncomfortably cold last winter for 24 hours or more because the heating equipment broke down, and 2. It broke down at least three times last winter for at least 6 hours each time. 	Having unvented gas, oil, or kerosene heaters as the primary heating equipment.
Electric / Kitchen	<p><i>Electric Physical Problems</i></p> <ol style="list-style-type: none"> 1. Having no electricity, or 2. All of the following three electric problems: <ol style="list-style-type: none"> a. Exposed wiring, b. A room with no working wall outlet, and c. Three blown fuses or tripped circuit breakers in the last 90 days. 	<p><i>Kitchen Physical Problems</i></p> <p>Lacking a:</p> <ol style="list-style-type: none"> 1. Kitchen sink, 2. Refrigerator, or 3. Cooking equipment (stove, burners, or microwave oven) <p>inside the structure for the exclusive use of the unit.</p>
Hallways	<p>Having all of the following four problems in public areas:</p> <ol style="list-style-type: none"> 1. No working light fixtures. 2. Loose or missing steps. 3. Loose or missing railings. 4. No working elevator. 	Having any three of the four problems listed under "Physical problems—severe" under Hallways.
Upkeep	<p>Having any five of the following six maintenance problems:</p> <ol style="list-style-type: none"> 1. Water leaks from the outside, such as from the roof, basement, windows, or doors. 2. Leaks from inside structure such as pipes or plumbing fixtures. 3. Holes in the floors. 4. Holes or open cracks in the walls or ceilings. 5. More than 8 inches by 11 inches of peeling paint or broken plaster. 6. Signs of rats in the last 90 days. 	Having any three or four of the six problems listed under "Physical problems—severe" under Upkeep.

Appendix C. Successful housing policies and programs nationwide

The following table lists housing policies or programs that have been studied by researchers and found to have positive effects on the health of the residents. These policies and programs address individual issues related to affordability and poor housing conditions rather than providing system-wide solutions that address multiple housing-related determinants of health.

Housing-related concern	Policy or Program	Health Impacts on Residents	Research supporting this policy
Affordability	Low income home energy assistance program (LIHEAP)	- Better nutritional status less and lower risk of growth problems in children less than 3 years old in households receiving assistance vs. those not receiving assistance.	Frank DA, Neault NB, Skalicky A et al. 2006. Heat or Eat: The Low income home energy assistance program and nutritional and health risks among children less than 3 years of age. <i>Pediatrics</i> 118(5): 1293-1302
	Housing subsidies/vouchers	<p>- Fewer children with extremely low weight-for-age scores in families receiving subsidies vs. those not receiving subsidies especially among food-insecure families.</p> <p>- Less iron deficiency among children of low income families receiving housing subsidies vs. comparable families without housing subsidies</p> <p>- Lower stress level associated with less crowded living arrangements.</p> <p>- Compared with children in families receiving housing assistance, children in homeless families are more likely to be obese, more likely to experience hunger, and have increased behavior and academic problems.</p>	<p>Meyers A, Cutts D, Frank DA et al. 2005. Subsidized housing and children's nutritional status: data from a multisite surveillance study. <i>Archives of Pediatrics and Adolescent Medicine</i> 159:551-556</p> <p>Meyers, Alan, Dana Rubin, Maria Napoleone, and Kevin Nichols. 1993. Public Housing Subsidies May Improve Poor Children's Nutrition. <i>American Journal of Public Health</i> 83(1): 115.</p> <p>Mills, Gregory, Daniel Gubits, Larry Orr, David Long, Judie Feins, Bulbul Kaul, Michelle Wood, Amy Jones & Associates, Cloudburst Consulting, and QED Group LLC. 2006. Effects of Housing Vouchers on Welfare Families. Prepared for the U.S. Department of Housing and Urban Development, Office of Policy Development and Research by Abt Associates.</p> <p>Wood, David L., R. Burciaga Valdez, Toshi Hayashi, and Albert Shen. 1990. Health of Homeless Children and Housed, Poor Children. <i>Pediatrics</i> 86(6): 858-866.</p>
	HUD housing assistance	- Increases earnings and employment, decreases TANF and food stamp payment for families	Lee W, Beecroft E, Khadduri J, and Patterson R. 2003 Impacts of welfare reform on recipients of housing assistance: evidence from Indiana and Delaware.

		receiving housing assistance.	Prepared for the US Dept of Housing and Urban Development by Abt Associates.
<i>Pest infestation</i>	Integrated Pest Management	- Significant reduction in cockroach infestation after 6 months of integrated pest management. Cockroach allergen are known to lead to asthma and other health concerns	Brenner, Barbara L., Steven Markowitz, Maribel Rivera, Harry Romero, Matthew Weeks, Elizabeth Sanchez, Elena Deych, Anjali Garg, James Godbold, Mary S. Wolff, Philip J. Landrigan, and Gertrud Berkowitz. 2003. Integrated Pest Management in an Urban Community: A Successful Partnership for Prevention. Environmental Health Perspectives 111(13): 1649- 1653.
<i>High poverty neighborhood</i>	Moving to Opportunity housing voucher program	-Significant improvement in adult mental health outcomes comparable to that found in effective clinical and pharmacological mental health interventions. -Significant reduction in obesity among adults. - Reduced incidence of violence	Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz. 2006. Experimental Analysis of Neighborhood Effects. World Wide Web page. http://www.nber.org/~kling/mto/mto_exp.pdf accessed on 10/20/2008.
<i>Housing instability</i>	Housing assistance (service coordination, rental assistance or placement assistance)	- Significant increase in likelihood of entering medical care for chronic disease management among those receiving assistance vs. those not receiving assistance.	Aidala, Angela. 2005. Homelessness, Housing Instability and Housing Problems Among Persons Living with HIV/AIDS. Presentation at the 2005 National Aids Housing Coalition Research Summit. Atlanta, GA: Emory University, Center for AIDS Research, June 11-12.