



# Boston One Touch

Action Steps for Healthier and Greener Homes for Boston Families



**National Center for  
Healthy Housing**



Urban Edge Photo Archive/John Swan

**The National Center For Healthy Housing** (Formerly the National Center for Lead-Safe Housing) was founded as a nonprofit organization in October 1992, to bring the public health, housing, and environmental communities together to combat our nation's epidemic of childhood lead poisoning. As the National Center for Healthy Housing it continues its important role in reducing children's risk of lead poisoning and has expanded its mission to help to decrease children's exposure to other hazards in the home including biological, physical, and chemical contaminants in and around the home.

Since 2005, the National Center for Healthy Housing (NCHH), has worked with many partners in Boston to improve the environmental quality of Boston's affordable housing. The Boston One Touch Project involves identification and adoption of healthy and environmentally-friendly design practices by public agencies, property owners, developers, and advocacy groups.

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## Overview and Background

Where we live significantly influences our health and quality of life. While we each intuitively recognize the value of our homes in supporting family life, research has also begun to confirm the home's central role in family well being. Our living environment directly contributes to, and can detract from, our physical and mental health. Low-income families, and particularly children, have little influence over their environments and disproportionately suffer from poor health because of limited access to healthful foods, substandard housing, greater public safety risks, and other factors. The focus of our work is on the impact of housing on children's health.

Substandard housing conditions such as poor indoor air quality, mold, pest infestations, extreme hot and cold temperatures, and unsafe structural conditions, can lead to major health burdens for children including lead poisoning, asthma, and unintentional injury. In Boston, the neighborhoods of Dorchester and Roxbury have notably higher rates of these health burdens compared with the city as a whole. These neighborhoods also have higher concentrations of racial and ethnic minorities and economically disadvantaged people, representing a significant health disparities issue.

These families also face many hurdles when accessing public health programs, health care services, and housing programs, not the least of which are the bureaucratic hurdles imposed by categorical programs. Categorical programs, frequently tied to federal funding, address a single issue without regard for the multitude of overlapping or related factors. For example, weatherization money is for weatherization only. Lead poisoning prevention money is for lead hazard control work only. The potential for significant efficiencies in addressing related health and housing problems at the moment of intervention is all but lost. The burden of finding and applying for multiple programs can be overwhelming for families.

In an effort to address these issues, NCHH recently reviewed existing key health and housing programs serving low income children in Boston to identify where the most promising opportunities exist to improve children's health - to make every "touch" count. See Appendix A for program chart. Boston is a center of activity on healthy housing with city and state government and community groups actively engaged on the



issues. These groups have played a leadership role in innovating programs and coalitions. As we conducted our review we noted, and frequently were able to build on, existing efforts. Multiple initiatives are underway at the Boston Housing Authority (BHA), which has a pioneering integrated pest management program and has negotiated two energy and water performance contracts. The Boston Public Health Commission (BPHC) initiated one of the earliest Healthy Homes programs in the country. The Mayor's Green Task Force has

already recommended, and the Mayor has enthusiastically adopted, a greening agenda moving forward with greener affordable housing requirements and zoning. The strength of Boston's non-governmental advocacy groups is a core element of all these successful efforts. Boston is in a unique position to take another bold step toward achieving green and healthy housing by focusing and integrating these remarkable efforts. Boston is poised to share successes across the health and housing sectors. Based on our review we conclude that there are three critical action steps to leverage Boston's strengths:

- **Target the housing and housing problems that we know are making children sick.**
- **Focus on broad adoption of high impact, low-cost housing interventions to maximize health and environmental benefits.**
- **Make every "touch" count by using existing programs and staff for greater impact through coordination.**

While interviewing and researching the elements for this call to action, we shared in many promising early activities that will be the foundation for future action:

**Healthy Homes Training and BPHC Inspector Cross Training** – NCHH, in partnership with the Boston University Center for Healthy Homes and Communities, provided the NCHH 2- day healthy homes practitioner course. The staff session was well attended by BPHC, BHA, and Boston Inspectional Services Department (ISD). BPHC and BHA both requested more training. The Boston University Center for Healthy Homes and Communities has provided additional trainings on site at BPHC. The Boston Public Health Commission also cross trained their inspectors across healthy homes disciplines. For example, lead inspectors were trained in injury prevention.

**Comparison of Green Building Standards** – In an effort to assess how well "green" building programs addressed occupant health, NCHH compared existing national green building standards with its core Healthy Housing principles. *Comparing Green Building Guidelines and Healthy Homes Principles* (April 2006), evaluates the extent to which the major green and healthy building programs promote health protections. The guide was made widely available and is posted on the NCHH website for Boston developers and others to understand which green options relate to health. With Boston's adoption of the LEED rating system in most of its green efforts, developers can identify the measures and attendant "points" toward achieving a LEED rating that relate most to improving air quality and health for occupants.

**The 7 Sussex Street Healthy and Green Pilot** - Working with the Department of Neighborhood Development's Homeowner Services Division (HOS) and the Energy Star Homes program, NCHH has undertaken a pilot project at 7 Sussex Street in Roxbury to demonstrate that healthy and green actions can be cost effectively integrated into DND rehabilitation programs. See Appendix B for a more detailed case study of this exciting pilot. DND's HOS provides financial and construction oversight support to over a 1,000 units of housing per year which are undergoing small to large renovations. The 7 Sussex Street project is a gut rehabilitation which enabled us to look at almost all of the core specifications in the master specification list used by DND's HOS program. As we work through this pilot, we will be able to identify the common opportunities to integrate green and healthy specifications, alter the DND's master specifications, and help DND project managers, construction supervisors, and contractors learn to incorporate and build these changes into their way of doing business.

**Spray-Free Policy at Boston Housing Authority** - While reviewing baseline pesticide activities and comparing them with the success of the Integrated Pest Management (IPM) pilots undertaken with partners, BHA recognized that spraying is no longer needed as part of its menu of regular pest control activities. BHA has committed to not spray pesticides and to shift to IPM contracts across its portfolio. With their IPM partners at BPHC and in the community, they are working to educate tenants to eliminate tenant use of sprays as well.

**Healthy and Green Measures in Multifamily Properties** - While reviewing baseline activity within a sample of Boston community development corporations (CDCs) and the Boston Housing Authority, we identified healthy and green measures that could be beneficial to managers and residents, such as energy and water savings upgrades, green cleaning, and low VOC paint. We also identified areas where CDCs and the BHA are spending the majority of their maintenance dollars. In sharing the results of our survey, many groups have been interested in moving forward on implementation. Winn Development, a large property owner of over 13,000 units and manager of 100,000 units, is in the process of adopting recommendations for water conservation, low VOC paint, and green cleaning product standards at a number of their properties. This summer, they began piloting green cleaning products and low VOC paints at two of their Boston properties - Castle Square and Nuestra. As a result, Winn is switching over to Benjamin Moore Eco Spec low VOC paint. They are also moving forward on implementing cost saving green and healthy features such as high efficiency toilets.

We are excited about these early successes and want to build on them to help move Boston forward on creating healthier, greener homes for families. This document is organized around our three recommended areas for action. Each section offers a brief overview of the supporting research and technical information which informs our thinking. Each section also provides opportunities to implement these broader actions with specific short term actions.

We share this report with agencies and advocates recognizing that seizing these enormous opportunities to make strides on behalf of Boston's children will take coordinated action from all.

# Recommendation #1

## Targeting the housing and housing problems that make children sick

### A. Asthma, Injury, and Lead Make Boston's Children Sick

The specific childhood illnesses most commonly associated with unhealthy housing are asthma and other respiratory issues, unintentional injury, and lead poisoning. A review of Boston specific data reveals a continuing need to target efforts toward these environmental health issues. See Appendix C for more detailed health indicator data.

**Asthma:** Boston's asthma rates continue to be high – particularly among young children. Boston's rates are almost twice the state rate. Boston's emergency room visit rates for asthma are also highest among children under age 5.

	Hospitalizations rate per 100,000 age 0-4 per (2003-2005 discharge data)	Emergency Room visits per 100,000 age 0-4 (2005 ER data)
Boston	1207.2	3045
Massachusetts	645.5	1764

(Source: Massachusetts Department of Public Health CHIP Program)

**Injury:** Boston's unintentional injury rates among young children are higher than the state rate (102.83 per 1,000), with housing related falls being comparable to asthma for emergency room visits. Falls are the number one cause of unintentional fatal and non-fatal injury ER visits and hospital stays among Boston children. For young children, falls occur more than twice as often as the second leading cause of injury.

	ED/ER visits per 1,000	Hospitalization
Unintentional injury 0-5 general	108.01	4.47
Unintentional injury 0-5 falls	37.27	1.98
Unintentional injuries 0-5 housing related falls	26.09	1.28
Asthma 0-4	28	6.8

(Source: Massachusetts Department of Public Health Injury Surveillance Program )

**Lead:** Boston's lead poisoning rates have shown a significant decline, yet Boston still ranks 8th in the state in risk for childhood lead poisoning. Boston's elevated lead rates are twice the state rate.

	Elevated Blood Leads (2006 data)
Boston	2%
Massachusetts	.84%
National	1.21%

(Source: U.S. Centers for Disease Control Surveillance Data)



## B. Sick Children are Concentrated in Several Neighborhoods

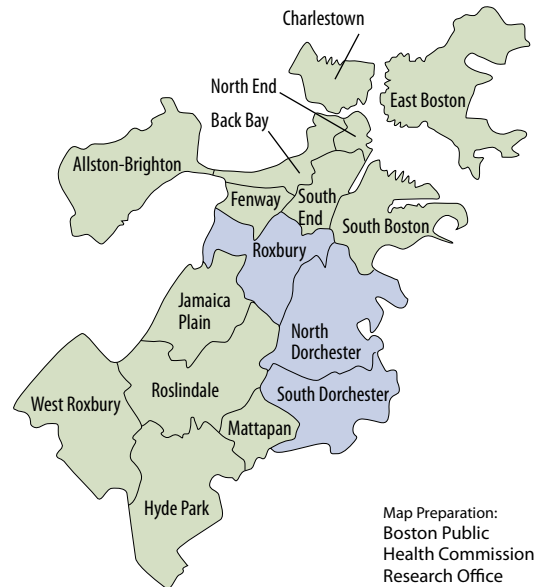
According to local health data, asthma, lead, and injury incidence in children overlap in just a handful of Boston neighborhoods – Roxbury, North Dorchester, and South Dorchester. These same neighborhoods also experience high emergency room visits and hospitalization rates, a clear indicator that that these neighborhoods are high priority areas for prevention efforts.

Although several Boston neighborhoods have high asthma hospitalization rates for children under the age of five, Roxbury’s rate is the highest. The rate for Roxbury is almost 50% higher than the rate for Boston overall.

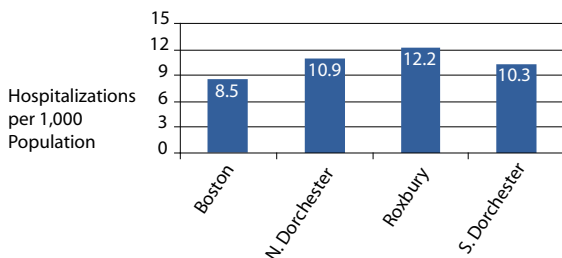
Similarly, the risk for childhood lead poisoning is not shared equally across neighborhoods. Elevated blood lead levels are highest in North Dorchester, with a rate almost double the overall Boston rate.

Roxbury and South End residents have the city’s highest emergency department visit rates. Those rates are nearly double the rate for the city overall. North Dorchester and South Dorchester follow, with rates well above the citywide rate. Emergency department visit rates also tend to be highest for children under age 10. Although data on type of ER visit by neighborhood was not available, we know that injury and asthma are among the top causes of ER visits for young Boston children.

**Boston Neighborhoods**

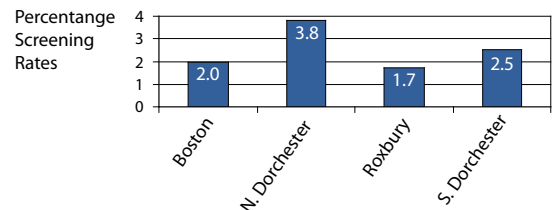


**Asthma Hospitalizations for Children Under 5 By Neighborhood**



Source: Health of Boston 2007

**Children with EBL By Neighborhood, Percentage Screened Population**



Source: Health of Boston 2007



### **C. Housing Condition Impacts Asthma, Injury, and Lead**

Housing in poor condition is known to influence health. Lead poisoning is most frequently the result of elevated lead dust levels from deteriorated paint. Frequently the paint deterioration is related to either moisture or structural decay. Similarly, many falls are the result of structural defects such as broken stairs

and railings. Several housing conditions are known to exacerbate asthma. The National Cooperative Inner City Asthma Study Phase I found the asthma risk factors most present in urban families included cockroach allergen; high levels of tobacco smoking among family members and caretakers; and high indoor levels of nitrogen dioxide, a respiratory irritant produced by inadequately vented stoves and heating appliances. The National Academy of Science has concluded that damp indoor spaces also increase the risk of asthma attacks and respiratory issues. With the exception of smoking, the pest and indoor air quality issues are tied to core housing quality.

Targeting health and housing efforts toward poor condition housing in these three neighborhoods - Roxbury, North Dorchester, and South Dorchester - is critical to reaching the most at-risk families. Looking closely at the housing conditions in these neighborhoods alongside the health data will further illuminate the factors causing asthma, injury, and lead poisoning in these homes and allow for targeted repairs. Marketing core housing quality improvement programs to homeowners and landlords in high-risk neighborhoods will have multiplying effects on health.

## Recommendation #2

Focus on cost effective interventions with big payoffs for children’s health and the environment.

Four key interventions have a dramatic ability to improve the environmental quality of homes and occupant health at minimal cost:

### A. Smoke-Free and Spray-Free Housing Policies

**Smoke-Free:** The home environment remains the number one exposure point for children to secondhand tobacco smoke. While there is a well-established relationship between smoking in the home and asthma, this is only part of smoking’s overall impact on children’s health. The Surgeon General’s “2006 Report on the Health Consequences of Involuntary Exposure to Tobacco Smoke” concluded that secondhand smoke causes premature death and disease in children. The report further found that children exposed to secondhand smoke are at an increased risk for sudden infant death syndrome (SIDS), acute respiratory infections, ear problems, and more severe asthma. Smoking by parents causes respiratory symptoms and slows lung growth in their children. Smoking is also the leading cause of fire-related deaths.

Smoke-free housing policies are legal. Smoke-free policies do not prevent landlords or agencies from renting to smokers; they simply do not allow smoking in the home environment. The policy is essentially free to implement and is completely effective in reducing children’s exposure in the home. The Surgeon General’s report concluded that only eliminating smoking in indoor spaces can fully protect nonsmokers from exposure to secondhand smoke. Separating smokers from nonsmokers, cleaning the air, and ventilating buildings cannot eliminate exposures of nonsmokers to secondhand smoke.

#### The Financial Burden

##### Non-Smoking Unit

Labor	12 hours X \$35/hour	\$420
Paint	3 Gallons	\$60
Ceiling Paint	2 Gallons	\$40
Carpet Shampoo		\$50
		<b>TOTAL \$570</b>

##### Smoking Unit

Labor	30 hours X \$35/hour	\$1,050
Paint	4 Gallons	\$80
Ceiling Paint	3 Gallons	\$60
Carpet Shampoo		\$50
Primer		\$100
Replace Rug Burns*		\$600
Replace Laminates*		\$800
		<b>TOTAL \$1,340 - \$2,740</b>

\*Costs depend on carpet and countertop condition

Analysis provided by Sanford Housing Authority, 2004, and Auburn Housing Authority, 2006. Courtesy Smoke-Free Housing Coalition of Maine

Smoke-free housing policies also offer landlords and property managers significant maintenance savings as the maintenance of smoking units is more costly. The Smoke-Free Maine Housing Coalition has estimated the cost of turnover in smoking units to be nearly three times the cost of non smoking units. The main barrier to the adoption of smoke-free policies is lack of awareness of its potential to improve health and decrease maintenance costs, and of the legality of smoke-free policies. Efforts to help landlords voluntarily adopt and implement smoke-free policies should be a priority. The Smoke-Free Housing Coalition of Maine has developed a program targeting rental housing, private and public, and has templates for materials which could easily be adapted for Boston. Urban Edge, a local CDC, found that 48% of residents surveyed would prefer to live in a smoke-free building. The New England Asthma Regional Council recently released a report supporting smoke-free housing policies. Sixty public housing authorities across the country have smoke-free policies. At the federal level, the Environmental Protection Agency and U.S. Department of Health and Human Services are partnering to promote smoke-free homes for Head Start families.

**Spray-Free:** Pest control was revealed as a significant cost in our analysis of Boston Housing Authority and Boston area Community Development Corporations maintenance costs. See Appendix D for survey. Boston studies have also found significant use of pesticide sprays and bombs for roach control both by property management and tenants. Spray pesticides represent a potentially toxic exposure and are known hazards for asthma. Sprays have also been demonstrated to be ineffective in controlling cockroaches and actually undermine the best practices of Integrated Pest Management. Several research efforts, including pilots at the Boston Housing Authority, have demonstrated that non-spray approaches, concentrating on exclusion and minimal application of gels and baits, are effective in controlling roaches.

Spray-free policies are free to implement and may save property managers money. Several groups working with the Boston Housing Authority to examine BHA pest control strategies and help them shift to IPM strategies

have demonstrated the lack of efficacy of sprays and resulted in a no-spray policy at BHA. A similar effort by the Providence Housing Authority has also shown more effective roach control with the shift away from pesticide sprays. Both agencies are working to educate tenants not to use sprays, both for their own health and because the sprays compromise the IPM strategy by inactivating the baits and gels. The major barrier to no-spray policies has been a lack of understanding of IPM and effective pest control using exclusion (keeping pests out), sanitation, and lower toxicity strategic use of baits and gels. No-spray policies, when combined with effective IPM activities and education, can reduce exposures for children at no cost while shifting these properties towards more effective control of cockroaches.

## **B. Energy Conservation Measures**

Energy costs, particularly winter heating, are a great burden to low-income families. There is evidence that families without sufficient



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resources reduce food and medical expenditures. A recent study, “Heat or Eat”, shows children of the same income not receiving heating assistance had reduced growth compared to those with heating assistance. For most owners and renters, utility costs are the second largest household expense. Energy conservation can help make resources available for other family needs. For property owners and managers it can help free resources for improved property maintenance and resident services.

The more significant impact of energy improvement measures may be their relation to improving indoor environmental quality. In our work, we have observed that many of the measures used for energy efficiency in the building shell (i.e. the roof, walls, windows, doors and foundation) hold the potential to improve building environmental quality by reducing unplanned air and moisture flow and reducing the ability of pests to enter and move within buildings. Focusing on building shell improvements also offers the greatest energy-efficiency gains because the primary energy use (and inefficiencies) in Boston relate to heating and cooling. A building shell that has improved ability to hold its temperature saves both on operational costs as well as allowing a reduction in the size of heating and cooling systems.



Nu-Wool Co, Inc.

The integrity of the building shell (i.e. the roof, walls, windows, doors, and foundation) is critical to the overall structural integrity of the building. Proper insulating and air sealing help to maintain a building’s exterior shell by reducing unplanned air flows. Unplanned air flows create unplanned moisture transit which can lead to serious air quality and moisture problems, including mold and rotting of building materials compromising their safety. Excess moisture and mold can also exacerbate asthma and other respiratory issues. Much of the deteriorated lead paint surfaces that create exposures can be traced to moisture-damaged building shell components. The loss of heat through unplanned holes and lack of insulation creates resident discomfort which, in addition to being a health risk, in itself frequently leads to risky resident actions such as heating with stoves or un-vented devices.

By insulating and air sealing (i.e. weather-stripping at doors, caulking around windows, sealing holes to the exterior and to the unconditioned attic space including electric and plumbing penetrations and cracks that have formed) homes resist temperature fluctuations in summer and winter and eliminate opportunities for water to condense within walls and attics. These measures also reduce the ability of pests, both roaches and rodents, to enter the housing and move between units.

Energy conservation measures focusing on the building shell, have relatively short payback periods; the investment in these measures can be recouped within a short period from energy savings. Reducing the size of heating and cooling equipment also saves money. Insulating and air sealing homes will change the air movement. In all houses, but particularly in renovation situations on existing stock where the leakiness

has provided air movement, it is critical to plan for appropriate air changes/ventilation rates. In most cases strategic use of exhaust fans in kitchens and baths can accomplish needed ventilation.

Other energy savers include compact fluorescent light bulbs and Energy Star appliances. Lighting represents twenty percent of household electric use. Compact fluorescent light bulbs (CFLs) use one third the electricity of traditional bulbs and last up to 10 times as long, saving approximately \$25 over the life of each bulb. There are current incentive programs in Boston making the switch to CFLs even more attractive. Given that CFLs contain mercury, educating consumers about the proper disposal of CFLs is important.

Energy Star rated appliances have an energy rating that ensures long term energy savings over non-Energy Star appliances. Many of the appliances (combustion sealed furnaces, boilers, and water tanks) and ventilation components (such as fans) recommended for indoor air quality are available as Energy Star products and may qualify for rebates.

### C. Ensuring Good Ventilation

Good ventilation helps remove moisture and unhealthy contaminants, while drawing outside air into the home. Some systems can also provide filtering. Natural ventilation generally refers to the use of operable windows to provide fresh air and to release moisture and contaminants. Natural ventilation systems are not sufficient in Boston's climate to successfully remove moisture and contaminants, particularly in the winter when the residents are unlikely to use them and their use creates significant heat loss. It is therefore critical to add mechanical ventilation to homes. It is also important to reduce introduction of unhealthy contaminants, particularly combustion products to the air. As mentioned in the smoke-free section, there is no ventilation system which can remove second hand smoke sufficiently. Similarly, care must be taken with combustion appliances (any heating or other equipment that burns oil, natural gas, propane, wood or other fuel) to provide dedicated air for combustion and plan the venting of the combustion products.

Kitchens and bathrooms contribute most of the added moisture to a home. Cooking further adds pollutants to the air both directly from the food and from the fuel sources used. Range hoods are the most effective method of venting the kitchen. Range hoods should contain fans that vent to the exterior to be used for ventilation purposes. Re-circulating hoods with carbon filters do not accomplish ventilation. A range hood must also be properly sized, with the smaller models being more appropriate to most kitchens. Industrial or professional range hoods draw too much air. All air drawn through a fan from the house must be made up. Most homes remain sufficiently "leaky" to provide this make up air, but putting oversized hoods can actually cause a phenomenon known as back drafting of other combustion equipment and is dangerous. Appropriate home range hoods cost approximately \$200, installation costs vary.



Bathroom fans are critical to removing the moisture generated from showers and bathing. Bathroom fans can also be used as whole house ventilation systems by being combined with programmers. Both for resident initiated use and for continuous or programmed use, having quiet fans is critical or residents will not use them or will actively disconnect them. The cost of an Energy Star rated quiet fan is approximately \$150. Adding controls to make the fan operate as whole house ventilation can add approximately another \$150.



Mostue and Associates

Additional cost savings are associated with placing hoods and fans where minimal ducting will be needed to vent to the outside. In existing housing stock this type of point source ventilation is the most cost efficient method of ventilation in the short term.

Combustion sealed appliances prevent combustion gases (carbon monoxide, nitrous and sulphur dioxides) from entering the living area. The appliance is “sealed” with a dedicated air intake and exterior vent for the gases. Combustion-sealed appliances are not substantially different in cost than other models. Many sealed combustion furnaces, boilers, and water storage tanks qualify for Energy Star rebates, making them less expensive than other models.

Clothes dryers require exterior venting. Dryer vents carry both particulates and moisture and should always be vented to the outside.

#### **D. Fixing water leaks and upgrading to water saving durable toilets**

A good building shell and proper ventilation can address the moisture sources that are common to homes and easily anticipated. Leaks add significant amounts of moisture to homes, leading to mold and structural degradation, and providing ideal conditions for pests. From our survey of maintenance costs and practices we know that leaks are not only a frequent problem, but also a costly one. See Appendix E. The mean annual water and sewer maintenance cost per unit was \$516. With Boston’s high water rates, wasted water is a significant expense. Therefore it is critical to prioritize leak detection and repair during routine maintenance and during rehabilitation.

Our survey work also confirms national consensus: leaky toilets are a large portion of the plumbing leaks and water costs. Water utilities have been testing and updating lists of toilets that continue to perform better on water conservation, flushing performance, and durability. EPA has developed the Water Sense label which helps identify the toilets that meet these stringent requirements. Specifying Water Sense fixtures, particularly toilets, when renovating or doing new construction can save money, provide improved environmental performance, and help cut down on leaks.

## Recommendation #3

### Make every “touch” count by using existing programs and staff for greater impact through coordination.

The city of Boston’s health, housing and inspection agencies touch many families at risk of housing based health problems. The opportunity to use these connections to better serve families and to incorporate green concepts into our interventions is great. Integrating services holds promise for providing families with more comprehensive care, while more efficiently allocating staff time. Taking advantage of key moments when city personnel interact with families and/or property owners regarding homes can leverage these opportunities for more green and healthy activities that benefit families and the city at large.

The city agencies involved in health and housing are the Boston Public Health Commission (Community Initiatives Bureau), the Inspectional Services Department (Housing Division) and the Department of Neighborhood Development (Homeowner Services and Residential Development). NCHH surveyed staff in these agencies and mapped the existing programs and services. We also interviewed and studied the Boston Housing Authority as one of the largest providers of housing for Boston’s low income families and Action for Boston Community Development (ABCD) the main provider of weatherization services for low income families. We found many opportunities for better “One Touch” coordination. These opportunities fall into four key areas:

- Integrate Intake
- Integrate Inspections
- Integrate Healthy and Green Measures in Interventions
- Increase Referrals within and across Departments

While there are multiple opportunities for better integration, there are three short term opportunities we recommend for immediate action.

#### **A. Create an interdepartmental Healthy and Green Homes Task Force modeled after the Distressed Properties Task Force.**

The Department of Neighborhood Development’s Homeowner Services division has facilitated a Distressed Properties Task Force including several city agencies (Elderly Commission, Inspectional Services Department, Boston Water and Sewer Commission (BWSC)) along with a host of elder service provider agencies and community agencies (including Ensuring Stability through Action in our Community (ESAC), ETHOS, Kit Clark, Urban Edge, Nuestra Comunidad and Boston Medical Center). The Distressed Property Task Force began as a response to addressing distressed properties where there was a senior citizen. Frequently the overlapping issues of social services and psychological and physical needs coupled with the financial limitations of many seniors citizen conspire to bring properties to an unhealthy and degraded state. Therefore a concerted cross disciplinary response was required to return the properties and the occupants to a healthier condition.



While families with children experiencing housing based health issues differ from seniors, a similar facilitated task force focusing on family's challenges and specific properties in the targeted neighborhoods could bring similar levels of creative cross disciplinary problem solving to the effort. It would also help break down the silos created by individual programs and assure families and properties were treated more comprehensively. We recommend that the Healthy and Green Homes Task Force be facilitated by DND and include ISD, BWSC, BPHC Community Initiatives Bureau (Asthma/Injury/Lead Programs), and Boston Housing Authority. Given ESAC, Urban Edge, and Nuestra's existing work on the distressed property task force and their work on healthy housing, it would be valuable to bring those groups to the table as well. Expansion of the group might include Action for Boston Community Development, and NStar to facilitate the inclusion of weatherization and energy efficiency elements.

### **B. Create a single integrated intake system for the BPHC Community Initiatives Bureau, modeled after the Mayor's Health Line.**

The Community Initiatives Bureau has programs addressing asthma, lead poisoning prevention, injury, and tobacco regulation. Despite these programs being contained in the same bureau, they act independently, having separate inspectors, case managers, educators, and initial points of contact. Any intake process should provide as seamless a connection for families to the range of city services.

The bureau currently runs a specialized referral program, the Mayor's Health Line. Using a software program (Real Benefits) and trained staff, the Health Line helps families identify and qualify for health insurance. This program also identifies families eligible for weatherization funds and food stamps. The operators are extremely skilled at interviewing clients and quickly assessing their eligibility for programs. Unofficially, operators screen families for referral to the lead poisoning prevention program, given the number of families with young children. The Mayor's Health Line offers an existing computerized intake system as well as trained and skilled operators and educators. It could be expanded to become the centralized intake point for the rest of the programs within the Community Initiatives Bureau including the asthma, lead, and injury prevention programs. To fully staff the Health Line and continue to provide timely service would require additional staffing on the Health Line. However, it should decrease the time required by program staff to field initial calls, and would increase the likelihood that families would receive more comprehensive care.

### **C. Create more integrated home visits and inspections.**

Under the current system all three health programs can provide some level of home inspection - lead inspection, safe home visit, and healthy homes inspections. The Inspectional Services



Urban Edge Photo Archive/John Swan

Department and Neighborhood Development Department Homeowner Services Division visit and inspect homes. Any time a city inspector enters a home, (s)he could be gathering key information to facilitate referrals across healthy homes programs. Each visit is an opportunity to identify housing related factors affecting health.

The Healthy and Green Task Force could be the forum where each agency agrees on the core set of inspection items and a referral process between agencies. In the interim, the Community Initiatives Bureau should develop a short (i.e. four items or less) list of core inspection criteria, regardless of program. The core set should be connected to referrals for services. All inspectors and home visitors in BPHC and ISD should also be cross trained to use the core criteria in inspections and home visits and know which agency has enforcement authority, financial resources or other services to support families and property owners.

# Call to Action

This report outlines key action steps to make Boston homes healthier and greener for its children. We have provided detail in the report and supporting materials, yet implementation of the ideas requires a concerted effort by all City of Boston agencies and community partners to achieve real change.

## Target the housing and housing problems we know are making children sick.

Our health data demonstrates that asthma, lead poisoning, and injury remain critical health problems for Boston children. The housing-based health problems cluster in a handful of neighborhoods. Current service programs should focus efforts in these neighborhoods and on these issues. Housing programs should focus effort on the housing in these neighborhoods. We can not shy away from these properties even knowing the effort to improve this housing will likely be harder and more costly. We must market the full range of housing programs to these neighborhoods and we should allocate targeted funds. We call on all partners, City and state agencies, community agencies, and community advocates to champion more targeted actions and increased funding of housing programs in these neighborhoods.

## Focus on broad adoption of high impact, low cost housing interventions to maximize health and environmental benefits.

Boston continues to show leadership in affordable housing, by competing for funds, and delivering new and rehabilitated housing. The Department of Neighborhood Development's new construction and rehabilitation programs should aggressively include the four high-value housing interventions described in this report: spray-free and smoke-free policies; energy conservation measures; good ventilation; and elimination of water leaks and use of water saving fixtures. Partner agencies including the Boston Housing Authority and community development corporations should adopt these measures by calling for them on renovation specifications and requiring them of their property management providers. Housing subsidy providers, including Boston Housing Authority, should help promote adoption in the private housing stock. New home ownership and homeowner education programs should similarly promote these core cost-effective interventions. New and broader funding mechanisms need to be developed to help these measures be implemented in the 1-4 family housing stock.

## Make every "touch" count by using existing programs and staff for greater impact through coordination.

We call on the City of Boston to move expeditiously to set up the Healthy and Green Homes Task Force to help assure true integration of the city agencies engaged in improving our housing and health. The task force will be a forum to directly address properties and support families facing housing based health issues. Through this integrated structure the City departments and agencies (Department of Neighborhood Development, Boston Public Health Commission's Community Initiatives Bureau, Inspectional Services Department

Housing Division, Boston Water and Sewer Commission, and Boston Housing Authority) will be able to more effectively integrate services for families and maximize the value of each touch.

The current intake system at the Boston Public Health Commission must be integrated to assure families fast and complete access to the range of healthy homes services available through the city. It is critical for City agencies to devise a better system for integrating home visits and inspections and assuring that all visits to homes by city health and housing personnel identify core issues and support healthy homes improvements.

**Boston's wealth of talented city and community partners working together has made Boston a leader in healthy homes. Together let us take this call to action and lead Boston to an even healthier and greener future.**

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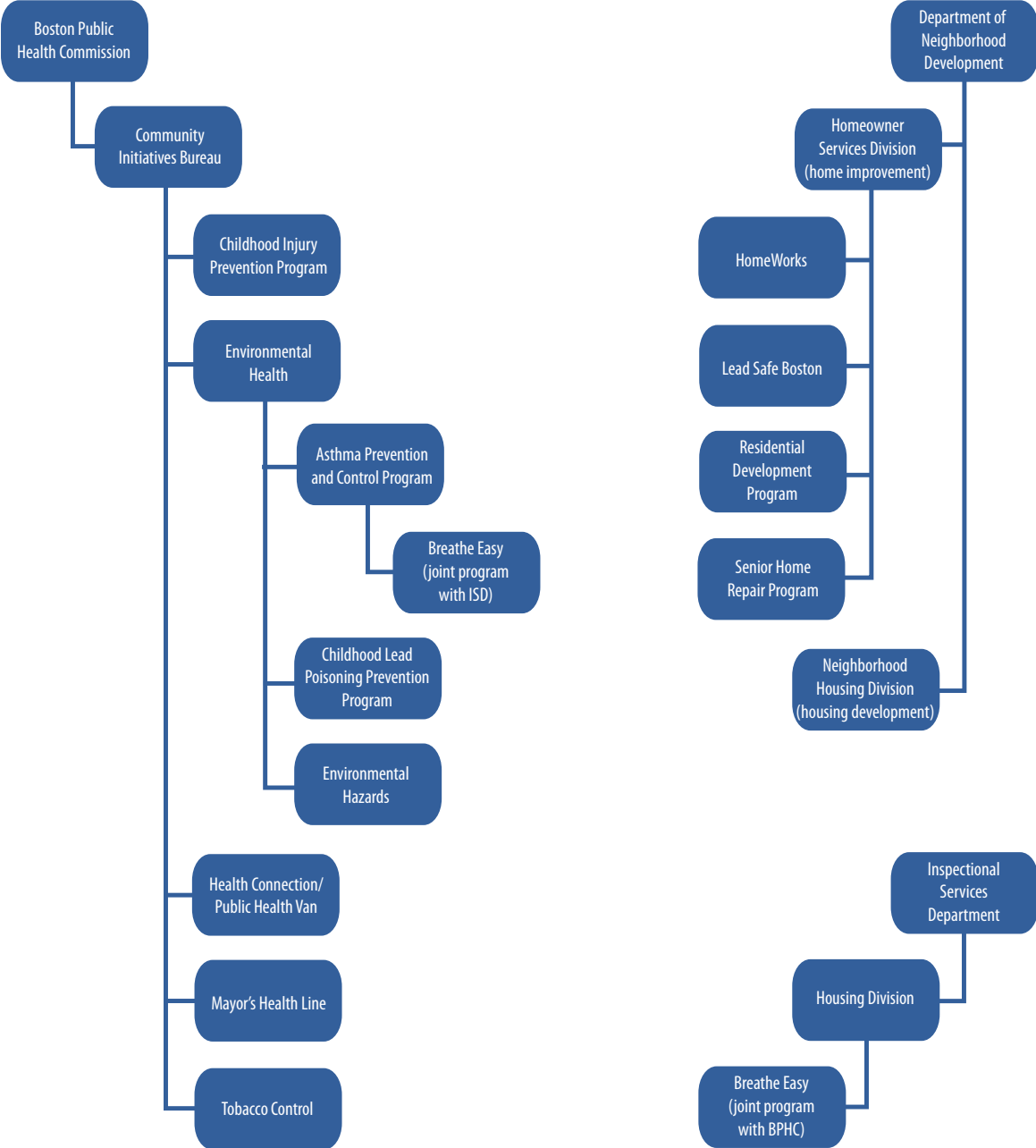
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# Appendix A

## Key “One Touch” City Health and Housing Programs



## Appendix B

# Boston One Touch Project

## The 7 Sussex Street Story

*Prepared by Naomi Mermin, Naomi Mermin Consulting for the National Center for Healthy Housing*

### Background

The National Center for Healthy Housing (NCHH) is working with many partners in Boston to improve the environmental quality of Boston's affordable housing. NCHH advocates for the integrated and systemic adoption of healthy and green practices within public agencies, with non-profit, public, and private property owners, with developers, and with advocacy groups that provide health, housing, and environmental services. The project, known as the Boston One Touch Project, grew out of the conviction that we could improve the health of low-income children by more systematically connecting the public health and housing services targeted to low-income families with interventions that more holistically address housing across a green and healthy continuum. The Boston One Touch Team includes Peggy Hegarty-Steck, Program Manager with the National Center for Healthy Housing, and Naomi Mermin and Ellen Tohn, Senior Advisors to the National Center for Healthy Housing.

To identify the opportunities to directly integrate health and housing measures in Boston's affordable housing, we partnered with the City of Boston's Department of Neighborhood Development (DND) Homeowner Services (HOS) division. HOS provides homeowners with services and financing to maintain and improve their homes. The division's focus on existing housing stock in lower income neighborhoods overlaps with the families at greatest risk for experiencing housing-based health threats. We are evaluating the opportunities and costs of achieving healthy and green goals in these renovation programs.



When the One Touch team met with the HOS staff, they were very supportive of the goals, particularly on the issue of health. However, they raised the concern that “green” items tend to be “budget busters.” The HOS managers constantly grapple with prioritizing how to best invest their limited funds. In most cases, property owners are also responsible for financing a share of the housing rehabilitation. Given the focus on low- and moderate-income owners and the need to maintain affordable rents, strategic investment of funds is critical.

We agreed to try a pilot program to see if recommended changes were feasible and how the changes would impact the budget.



A program within HOS, the Residential Development Program (RDP), allows low- to moderate-income families to purchase one to three unit, tax-foreclosed properties that need complete or “gut” rehabilitation. This comprehensive rehabilitation offered the perfect testing ground to address specifications for all systems in the houses.

Approximately three to four homes a year are renovated and brought back into the market through this program. The typical two-family project is financed with \$70,000 in HUD HOME funds, plus a mortgage (taken on by the owners) of \$250,000, for a total investment of \$320,000. The city provides the property for a nominal fee of \$100 to ensure the new owners have “equity” built upon completion of the rehabilitation project. Each property that comes into the program is unique and requires a unique set of specifications.

### **The Pilot Project**

7 Sussex Street is a single-family, brick row house in Roxbury, a neighborhood of Boston, Massachusetts. It is a three-story structure (including a walkout basement) of approximately 1,230 square feet, with two bedrooms, plus one and a half baths. The NCHH team met to walk through the building with the program manager Katie Cahill-Halloway and the construction specialist Steve McKiernan. We also invited Mike Schoenfeld from the Energy Star Homes program, then run by Conservation Services Group. In addition to addressing issues related to health, water, and energy efficiency, we wanted to see if we could achieve a recognized standard like the Energy Star Homes.

The house had moisture damage in a number of locations. We started by discussing the building shell and strategies to achieve a good thermal envelope, manage moisture, and assure required air changes. Mike Schoenfeld brought a tremendous amount of expertise in energy products – particularly related to insulating materials. He suggested we consider using spray foam insulation. While the foam is more expensive than fiberglass batts – the more traditional insulation used by DND – given the small surface areas along with foam’s ability to air seal and insulate, it appeared we could offset the material cost with labor cost savings. Mike used REM rate software to put together a model of 7 Sussex Street that could achieve Energy Star. The model called for R15 foam insulation for walls (@ 4”), Windows with U values SHGC of .35/.35, Ceiling R40 foam, Skylight area 3’x4’ U SHGC of .4/.4, Boiler AFUE 92% and an integrated tank off the boiler. Eight air changes/ hour at 50 p. This set of conditions would score 71, with the Energy Star threshold being 85 or lower.

Steve McKiernan took the information from Mike’s model and developed the required specifications, using the city’s SpecMaster program. The NCHH team and CSG agreed to review the specifications and make adjustments. When the specifications came back, the Energy Star Homes contract had moved from Conservation Services Group to ICF International. Dave Boettcher from ICF then joined the project as our energy expert.

Key Healthy and Green Specifications:

- Insulation and air sealing required insulation work to conform to the Energy Star Thermal Bypass Checklist. Required general contractor (GC) to notify RDP construction specialist when the

insulation is complete, but before the dry wall is installed to allow time for the Energy Star rater to inspect the work. Required GC to call the Energy Star rater for inspections when they arrived at the punch list stage with all mechanical systems operating for final inspection.

- Water-saving toilet (TOTO Aquia dual flush or equivalent), low flow shower head, and sink faucet no greater than 1.5 gpm
- Quiet, programmable Energy Star bathroom fan (Panasonic .5 sone)
- Sealed combustion appliances (boiler and water tank)
- Energy Star appliances (stove, refrigerator, washer, dryer), higher efficiency windows, boiler, and water tank
- Drainage pan for hot water tank
- Venting of fans, dryer, boiler, and water tank to exterior
- Pan flashing of all doors and windows
- Energy Star dehumidifier connected to drain for basement
- Required that the warranties and other materials be packaged in a 3-ring binder with appropriate envelopes/storage for each warranty, along with clear identification of where the product is installed in the home. Contractor to provide any maintenance information required for continued proper function of materials or products installed. All information keyed to a floor plan.
- Required that all interior paints and varnish must meet Green Seal Standard G-11, such as Benjamin Moore Eco-Spec.
- Detailed language on carbon monoxide detectors (MA law requires photoelectric smoke alarms within 20 feet of a kitchen or bathroom). Combination smoke and fire alarms must have simulated voice and tone alarms that clearly distinguish the two types of emergencies. (It wasn't clear that you could achieve both requirements, so we wrote it out specifying that if the technology wasn't available, then separate smoke and CO alarms would need to be included.)
- Required solid pine or exterior-grade plywood for closet shelves, and specified low or no-urea formaldehyde cabinetry for kitchen and bathrooms.

We helped identify rebates available both for recommended products and ones such as thermostats which were already specified.

The project went out to bid, and the bids came back well within range. They will be able to target the home to a family with a qualifying income between \$37,000 and \$46,000. They can potentially receive \$1,125 in rebates (Munchkin boiler, SuperStor water heater and programmable thermostat). They may achieve an additional \$750 incentive if they meet the Energy Star Homes criteria, and potentially the owners will get a \$2,000 tax credit if the energy efficiency gains are very significant. The energy efficiency and water efficiency measures will continue to save the family money, ensuring that more is available for the other necessities of life.

We will continue to follow the 7 Sussex story as the renovation is undertaken. We now know that specifications for health, indoor air quality, moisture control, water, and energy efficiency can be achieved without burdening projects with unreasonable costs, and that healthy and green need not limit affordability. Susan DiMatteo, Assistant Director of HOS, noted, “The savings are real. The \$800 plus on rebates alone for heating and hot water systems is an immediate return to the owner.”

The One Touch model supports the cross disciplinary work (health, green, affordable) tied to the real work the city program tackles every day. We were able to maximize the health and financial benefits for a family while achieving larger affordable housing and environmental goals. The HOS program “touches” over 1,000 units every year, offering the opportunity for over 1,000 families to be healthier and more economically secure while creating a greener, healthier city.

*For further information or updates on the 7 Sussex Street project contact Naomi Mermin, Naomi Mermin Consulting at [NMermin@maine.rr.com](mailto:NMermin@maine.rr.com) or 207-775-1927.*

## Appendix C

# Boston Health Indicator Data

	Age	Rate	ED/ER visits	Hospitalizations	Source
Asthma	0-4 years	NA	28.0 per 1,000	6.8 per 1,000	Health of Boston 2007 (Data: 2005)
Lead	0-6 years	20 per 1,000	NA	NA	Health of Boston 2007 (Data: 2006)
Unintentional Injury - General	0-5 years	NA	108.01 per 1,000	4.47 per 1,000	MA DPH Injury Surveillance Program (Data: FY2005)
Unintentional Injury - Falls	0-5 years	NA	37.27 per 1,000	1.98 per 1,000	
Unintentional Injury - Falls - Housing Related	0-5 years	NA	26.09 per 1,000	1.28 per 1,000	

### Sources:

*Health of Boston 2006* – Boston Public Health Commission

*Health of Boston 2007* – Boston Public Health Commission - <http://www.bphc.org/news/report.asp?id=224>

*Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* – FY 2005 - MA DPH Injury Surveillance Program - Their sources include MA Registry of Vital Records and Statistics, MA Department of Public Health; MA Hospital Discharge Database, MA Division of Health Care Finance and Policy; MA Outpatient Observation Stay Database, MA Division of Health Care Finance and Policy; MA Emergency Department Discharge Database, MA Division of Health Care Finance and Policy.

### Rate Calculations:

**Asthma** – All rates were taken directly from the Health of Boston 2007 report

**Lead** – All rates were calculated based on data provided in the Health of Boston 2007 report. Percentages were provided so we used that number to determine the rate per 1,000.

**Injury – ED/ER - General** – This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet. Rates were provided per 100,000 so we used that rate to determine the rate per 1,000.

**Injury – ED/ER - Falls** - This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet. Rates were provided per 100,000 so we used that rate to determine the rate per 1,000.

**Injury – ED/ER Falls – Housing Related** - This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet and the *Emergency Department Visit Fall External Cause of Injury Codes, Boston Residents, Ages 0-5, FY 2005* e-codes spreadsheet. We took the 1,435 ED/ER visits for falls and looked at the specific e-codes for those falls. Based on these specific codes, we made determinations about which codes were housing related. For example, “Fall on or from stairs or steps - Other stairs or steps” was considered housing related but “Fall on or from stairs or steps – Escalator” was not. We determined that 1,011 of the 1,435 falls may have been housing related. 70% of all ED/ER fall visits were considered housing related and we applied that percentage to determine the rate per 1,000.

**Injury – Hosp. - General** – This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet. Rates were provided per 100,000 so we used that rate to determine the rate per 1,000.

**Injury – Hosp. - Falls** - This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet. Rates were provided per 100,000 so we used that rate to determine the rate per 1,000.

**Injury – Hosp. - Falls – Housing Related** - This rate was calculated based on the *Leading Causes of Unintentional Fatal and Non-fatal Injury Among Boston Residents Ages 0-5* spreadsheet and the *Leading Causes of Unintentional Hospital Stay by External Cause of Injury Codes, Boston Residents, Ages 0-5, FY 2005* e-codes spreadsheet. We took the 76 hospitalizations for falls and looked at the specific e-codes for those falls. Based on these specific codes, we made determinations about which codes were housing related. For example, “Fall on or from stairs or steps - Other stairs or steps” was considered housing related but “Other fall from one level to another - fall from playground equipment” was not. We determined that 49 of the 76 hospitalizations for falls may have been housing related. Cells with less than six were suppressed. 64.5% of all hospitalizations for falls were considered housing related and we applied that percentage to determine the rate per 1,000.

## Appendix D

# Baseline Survey of Green and Healthy Practices

*Prepared by Ellen Tohn, Tohn Environmental Strategies for the National Center for Healthy Housing*

Organization:

Contact/Name & Email:

<i>Answer Y or N for each item.</i>	<b>Maintenance</b>	<b>Turn Over</b>	<b>Rehab</b>	<b>Construction</b>
<b>Safety</b>				
Carbon Monoxide detector				
Safety latches on storage cabinets				
Hard wired smoke detectors				
<b>Windows</b>				
Pan flashing				
Non vinyl windows				
<b>Appliances/Lighting</b>				
Dryers exhaust to outside				
Energy Star fixtures				
Energy Star bulbs				
<b>Flooring/Finishes</b>				
No carpet in wet areas				
No carpet in at least 1 bedroom				
Low VOC carpet – CRI Green Label				
Linoleum				
Vinyl floors				
Wood floors				
Low VOC paint				
Other green flooring				
No particle board for cabinets				
Solid doors				

<i>Answer Y or N for each item.</i>	<b>Maintenance</b>	<b>Turn Over</b>	<b>Rehab</b>	<b>Construction</b>
<b>Ventilation</b>				
Merv 8 filter				
ASHRAE 62.2 – new construction	NA	NA		
Sealed combustion equipment				
Kitchen fans – exterior exhaust				
Bath fans – exterior exhaust & Energy Star				
Bath fan on timer or continuous run				
<b>Pest Control</b>				
Seal holes/cracks corrosion proof materials				
Boric Acid in construction cracks				
<b>Plumbing</b>				
No plumbing in exterior wall				
Insulate cold water pipes				
<b>Walk Off Mats/Systems</b>				
<b>Less Toxic Cleaning Supplies</b>				
<b>Energy Star Home – HERS rated</b>	NA	NA		

Organization:

Date:

Name of Respondent:

Email

Phone:

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**Housing Characteristics**

1. Total number of housing units owned
2. Number of units managed by in house maintenance staff
3. Number of units managed by professional property management company
  - a. Name of property management/maintenance company
  - b. Contact at property management/maintenance company

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**Material & Utility Costs** (Provide cost data for last complete annual year)

1. Pest treatment costs (pesticides, pest exclusion, etc). If possible, provide copies of invoices for the past year. Invoices should identify total costs, amounts and types of pesticides applied.
2. Exterior landscaping costs. Separate out costs for lawn care and other activities involving toxics.
3. Water utilities (cost and usage).
4. Painting costs (if possible also indicate volume of paint & type of paint if known)
  - a. Maintenance
  - b. New construction
  - c. Renovation
5. Appliances costs of repairs/replacements (if possible, include # of appliances and if appliance is Energy Star rated; or total funds spent in last year)
  - a. Stoves
  - b. Bath fans
  - c. Kitchen fans
  - d. Ovens
  - e. Lighting fixtures
  - f. Light bulbs



6. Cleaning supply costs (indicate if materials are "green")

a. Maintenance

b. Other

7. Cabinets costs (indicate if "green" – and why)

a. Maintenance or unit turn over

b. New construction

c. Renovation

8. Windows – costs of replacement or new

a. Maintenance

b. New construction

c. Renovation

9. Do you collect/receive an asset management fee from the properties in your portfolio?

If so how do you calculate it (by unit, percent of income, other) and how much is it?

---

**Work Order Requests by Task and Trade**

(list total number over past year; if annual numbers are not available provide an estimate for a quarter of the year)

1. Plumbing (specify nature of problem: leaking toilet vs. leaking pipes)

2. Carpentry

3. Floors replacement

4. Cabinet repair/replacement

5. Light bulb replacement

6. Mold responses

7. Pest control

8. Screen replacement

9. Bulb replacement

10. Other most common repair requests

11. Unit turnover (total number of unit turnover per year)

## Appendix E

# Green and Healthy Property Maintenance Costs and Activities

*Prepared by The National Center for Healthy Housing, January 2007*

### Overview

Where are the opportunities to improve affordable housing property maintenance practices to achieve cost-effective green and healthy building objectives? The National Center for Healthy Housing (NCHH) surveyed the Boston Housing Authority and six Boston area Community Development Corporations (CDCs) about their property maintenance expenditures over the past year (generally 2005) and their property management structure. **The goal of this effort was to identify the most costly and frequent property maintenance activities and use this information to identify opportunities to advance resident health and green building practices in a cost effective manner.** The assessment does not address energy costs; these costs are being documented by a partner organization, New Ecology ([www.newecology.org](http://www.newecology.org)). The project team includes NCHH Advisors Ellen Tohn, Tohn Environmental Strategies LLC and Naomi Mermin, Naomi Mermin Consulting and NCHH program manager, Peggy Hegarty-Steck.

### Property Management Structure

The Boston Housing Authority (BHA) generally provides maintenance through its own staff; a limited number of services are addressed through outside contractors (e.g., pest control). The CDCs surveyed manage properties both internally and externally via professional private property management companies. One property manager, Maloney Properties, Inc., provides the majority of property management services to the CDCs surveyed. Table 1 below summarizes this information.

**Table 1: Property Management Characteristics**

CDC	Property Management Choice	Approximate # Units
Allston Brighton	Private	514
Asian	Private	88
Boston Housing Authority	In-House	12,738
Jamaica Plain Neighborhood Development Corporation	Private	130
Madison Park	Private	946
Nuestra Comunidad	In-House, transferring to private in 2007	406
Urban Edge	In-House	1,328

## Annual Property Maintenance Costs

The project team requested information on a subset of property maintenance activities that have potential linkages to green and healthy practices. Not all respondents were able to provide data in all the categories of interest. In many categories the costs incurred in a single year did not yield a per unit cost that exceeded \$0. Responses may vary year to year due to rehab or major maintenance activities. Below Table 2 depicts the range of costs on a per unit basis for selected activities, sorted by mean costs -- high to low.

**Table 2: Selected Annual Property Maintenance Costs Per Unit**

	<b>Low</b>	<b>Mean</b>	<b>High</b>
Water and sewer	\$117	\$516	\$977*
Pest control	\$32	\$75	\$156
Painting	\$13	\$72	\$189
Landscaping	\$0	\$72	\$187
Appliances	\$0	\$22	\$79
Cabinets - Maintenance	\$0	\$34	\$83
Cleaning supplies	\$2	\$33	\$65
Lighting fixtures and bulbs	\$6	\$17	\$38
Ovens and ranges	\$0	\$15	\$26
Windows	\$0	\$5	\$26
Lighting – Fixtures only	\$0	\$9	\$18
Kitchen and bath fans	\$0	\$9	\$2
Lighting - Bulbs only	\$0	\$3	\$6
Cabinets - New	\$0	\$0	\$0

\* High costs are due to an unnoticed water usage with an outside hose.

**Figure 1: Selected Annual Property Maintenance Costs Per Unit**

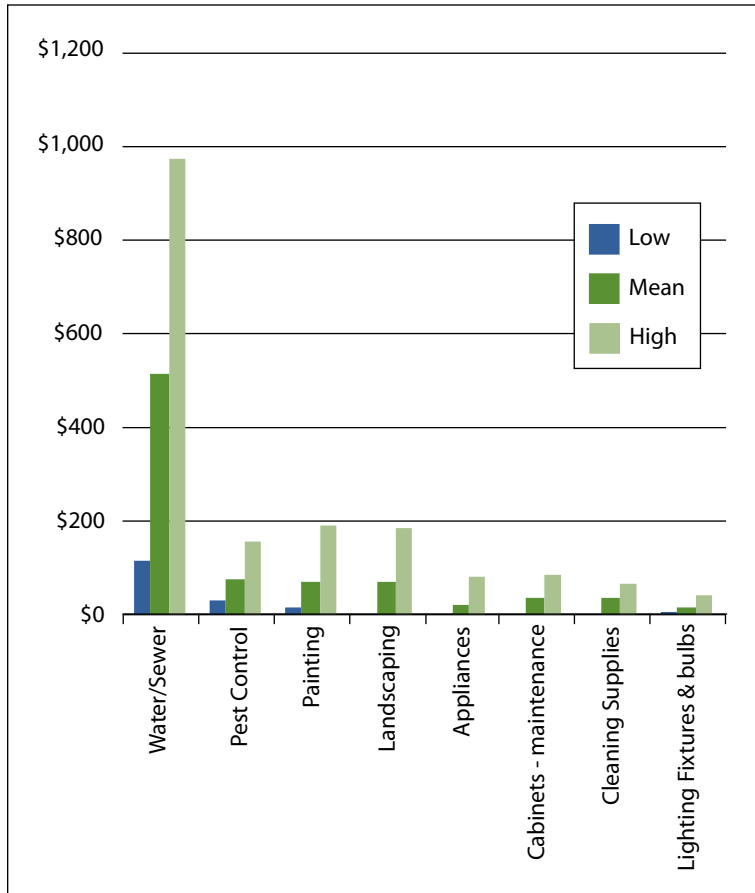


Figure 1 at left graphically presents the same information. The data clearly point to water/sewer utilities as a dominant expense. A second category of expenses merits attention: pest control, painting, landscaping (which is also categorized by tremendous variation), cabinet maintenance/ replacement, cleaning supplies and appliances (generally replacement).

### Frequent Property Maintenance Activities

In addition to costs, the team gathered data on the frequently cited work orders. The most common work orders are listed below:

- Plumbing repairs and leaks (particularly toilets)
- Carpentry (e.g., door replacement)
- Flooring replacement
- Repainting
- Light bulb replacement
- Screen replacement
- Pest control/extermination

## Green and Healthy Property Maintenance and Construction Activities

### a. What's Working

Several important green and healthy practices are undertaken by most owners/managers: installing carbon monoxide detectors, hard wiring smoke detectors, exhausting dryers to the outside in new construction and rehab, installing Energy Star fixtures and bulbs, avoiding carpet in wet areas, avoiding particle board in cabinets, using solid doors, exhausting kitchen and bath fans (Energy Star), sealing holes and cracks for pests, not placing plumbing on exterior walls, and insulating cold water pipes.

### b. Opportunities to Improve Maintenance and Unit Turnover Activities

Opportunities exist, however, to make the following green and healthy practices the norm and not the actions of a selected few.

Some practices are **rarely** followed:

- Install safety latches on storage cabinets.
- Use improved ventilation (MERV 8 or higher filters; ASHRAE 62.2), kitchen fans installed at unit turnover.
- Apply boric acid in cracks to control cockroaches both preventatively or in maintenance.
- Install pan flashing during window replacement.
- Use Green Label carpet (i.e., an industry certified standard for carpet with lower volatile organic compounds and off-gassing).

Some practices are **followed by some, but not most owners**:

Water:

- Replace older leaky toilets with high efficiency and conserving toilets.

Ventilation

- Check that bath and kitchen fans are operating and replace fans with Energy Star models.

Carpentry:

- Replace hollow doors with solid doors. This will likely help reduce the demand for carpentry repairs to replace doors and save owners funds over time.

Appliances/Lighting:

- Install Energy Star fixtures and bulbs.
- Exhaust dryers to the outside when possible.
- When replacing hot water systems use combustion sealed equipment.

Flooring/Finishes:

- Use low VOC paint.
- Provide no carpet in one bedroom at unit turnover.
- Install greener flooring when flooring replacement occurs.
- Use less toxic cleaning supplies.
- Install walk off mats, particularly in multi family buildings and units on busy streets.

### **c. Opportunities Rehab and New Construction Activities**

During rehabilitation and new construction, there are significant opportunities to incorporate green and healthy practices. They will often add the most modest of additional costs when undertaken as part of construction.

#### Ventilation:

Of particular note, few property managers are aware of or implementing green and healthy ventilation strategies. Require mechanical contractors to meet ASHRAE 62.2 (which requires use of a MERV 9 filter, exterior exhausting bath and kitchen fans).

Few property owners are implementing safety latches to reduce the risk of poisonings (one of 3 key injury risks). This is a relatively low cost add on.

#### Windows:

Pan flashing below windows and doors is not routinely completed when windows are installed. This flashing would typically increase the hard cost of the window by less than \$20 for windows that often cost upwards of \$400.

#### Walk off mats:

Be sure all new units have walk off mats, particularly in multi family buildings and units on busy streets. Walk off mats are low cost items that can minimize the track in of lead dust, allergens, and other contaminants. They also help to keep the building entrance cleanable.

#### Pest control:

Use boric acid in holes to help avoid future cockroach problems. This will require a licensed pesticide applicator.

#### Flooring/finishes:

If carpet is installed, insist on Carpet and Rug Institute's "Green Label" rating.

## **Conclusions and Opportunities**

The survey results point to four specific areas for change across nearly all affordable housing owners.

1. Undertaking water conservation actions that also reduce plumbing repairs will be a win-win. It can save money (utilities & repairs) and reduce moisture problems linked to asthma and mold.
2. Alternative approaches to pest control/extermination are needed that reduce costs and are more effective, both during maintenance and construction.
3. Additional attention is needed to provide consistent and effective ventilation that provides fresh air, remove exhaust contaminants and exhaust moisture that can lead to mold growth.
4. Modifying the current practices for window installation, bath fan installation, carpet installation, and painting can yield healthier and greener buildings with minimal costs.





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