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Dear Colleague,

The idea that housing directly affects health and well being is nothing new. More than a century ago, founder of modern nursing Florence Nightingale observed that “the connection between the health and the dwelling of the population is one of the most important that exists.” Since Nightingale’s time, we have made tremendous improvements in the safety and security of the places people live, work, play, and sleep.

In Rhode Island, such efforts currently include work to ensure drinking water and indoor air quality, prevent childhood lead poisoning, reduce secondhand smoke exposure, and much more. Despite this work, we know the living situations of many Rhode Islanders still put them at higher risk for injury, illness, and even death. Our struggle to create and ensure healthy homes for all is compounded by serious federal budget cuts for lead and healthy homes approved this year. These cuts pose a particular threat to the immigrant and low-income children at highest risk for lead poisoning.

Keeping housing healthy is everyone’s job, and Rhode Island children and families need your help now more than ever. For more than six years, the Rhode Island Department of Health has convened a group of health and housing stakeholders to design and implement a plan to promote safe housing. If you are not yet part of the Healthy Housing Collaborative, we urge you to join us today. (Email Nancy.Sutton@health.ri.gov)

We also encourage you to read this data book to learn more about what you and those around you can do to promote healthy environments for all Rhode Islanders. Thank you for your hard work and commitment.

Sincerely,

Michael Fine, MD
Director of Health
“Where, after all, do universal human rights begin? In small places, close to home—so close and so small that they cannot be seen on any maps of the world. Yet they are the world of the individual person; the neighborhood he lives in; the school or college he attends; the factory, farm, or office where he works. Such are the places where every man, woman, and child seeks equal justice, equal opportunity, equal dignity without discrimination. Unless these rights have meaning there, they have little meaning anywhere. Without concerted citizen action to uphold them close to home, we shall look in vain for progress in the larger world.” – Eleanor Roosevelt

Where we live matters! Substandard housing can have a direct impact on an individual’s health and wellness. Most Americans spend about 90% of their time indoors, and an estimated two-thirds of that time is spent in the home. Very young children spend even more time at home and are especially vulnerable to household hazards.

In the last few years, the federal government has made significant efforts to provide funding and identify policies to support housing that promotes positive health outcomes. Much has been done during this time to better understand how to make a home “healthy.” The National Center for Healthy Housing has developed seven key principles of healthy housing. According to these principles, a healthy home is one that is:

- **Dry:** Damp houses provide a nurturing environment for mites, roaches, rodents, and molds, all of which are associated with asthma.
- **Clean:** Clean homes help reduce pest infestations and exposure to contaminants.
- **Pest-Free:** Mice and cockroaches can trigger asthma in some children. The pesticides used to rid homes of pests can also worsen existing health problems and increase risks for neurological damage and cancer.
- **Safe:** The majority of injuries among children occur in the home. Falls are the most frequent cause of residential injuries to children, followed by injuries from objects in the home, burns, and poisonings.
- **Contaminant-Free:** Many contaminants in the home pose health risks. Harmful exposures can include lead, pesticides, and volatile organic compounds found in some household products, such as paints, aerosol sprays, and disinfectants. Notably, exposures to certain contaminants, like asbestos, radon, carbon monoxide, and second-hand tobacco smoke, are far higher indoors than outside.
• **Ventilated:** Studies show that increasing the fresh air supply in a home improves respiratory health.

• **Maintained:** Poorly-maintained homes are at risk for moisture and pest problems. Deteriorated lead-based paint in older housing is the primary cause of lead poisoning, which affects some 240,000 US children.

In 2011, The Rhode Island Department of Health (HEALTH) and The Providence Plan developed a Data Story to explore the effects of one harmful exposure in the home—lead poisoning—on children’s learning. Data Stories provide guided tours through selected data to investigate pressing issues in health, education, and other areas. Each story begins with an “Essential Question” and presents related data in easy-to-read interactive charts, maps, and tables. Detailed explanations help users understand, interpret, and draw conclusions from the data.

The Data Story developed by HEALTH and the Providence Plan opens by asking, “What can we learn about lead poisoning that could help target efforts to decrease the lead poisoning rate in Rhode Island?” It goes on to examine data related to Women, Infants, and Children (WIC) Program participation, maternal characteristics, low birth weight, early literacy skills, math and reading proficiency, and school entry. Rhode Island is now able to link these data and much more to children’s blood lead levels. HEALTH continues to work with the Providence Plan to explore the interconnectivity of health, housing, and school performance. To view the 2011 Data Story, see [www.ridatahub.org](http://www.ridatahub.org)

This data book discusses key indicators of healthy housing in Rhode Island and presents data on a variety of environmental conditions that impact health. It also describes steps that property owners, maintenance workers, families, and individuals can take to protect and promote health where they live, learn, work, and play.
As shown in the introduction to this data book, a home must have many characteristics in place to support health. Whether living in a restored Victorian mansion, a three-family home facing foreclosure, deteriorating older housing, or a new house in a suburban tract development, families routinely confront challenges as they attempt to live in safe and healthy homes. These challenges range from poverty and isolation to housing code issues such as pests and unsafe furnaces. Achieving health equity, so that all families have an opportunity for a healthy life, requires housing policies that recognize the complex relationships between housing and health. Advancing health equity requires switching from a categorical to a comprehensive approach to improve housing. The Rhode Island Department of Health (HEALTH) works to develop and strengthen such approaches.

Evaluating comprehensive methods to support healthy housing requires quantitative measures. Currently, no single database contains all the information needed to evaluate the degree to which housing in Rhode Island supports health; however, HEALTH is making progress towards its development.

Available data were not adequate to develop indicators for the seven principles of healthy housing. As such, Rhode Island KIDS COUNT and the Healthy Housing Collaborative developed two indicators of healthy housing: 1) the percentage of children living in older housing (built before 1980), and 2) the percentage of low-income children (less than 200% of the federal poverty level) living in older housing. Children in low-income families in Rhode Island are more likely to live in older housing than other children. From 2008-2010, 83% of low-income children in Rhode Island lived in older housing, compared to 60% of low-income children in the United States (Figure 1). Of all 50 states, Rhode Island continues to have the highest percentage of low-income children living in older housing.

These indicators provide a useful surrogate for the seven principles of healthy housing. In general, the older the home, the more likely that lead, asbestos, and other hazards may be present. Figure 2 shows the percentage of housing built before 1980 by Rhode Island census tract. Figure 3 shows, by census tract, the percentage of children younger than age 18 living in poverty (less than 200% of the federal poverty level). These indicators can be refined by overlaying childhood blood lead screening data. Figure 4 shows the percentage of Rhode Island children younger than age six with first-time elevated blood lead levels, by census tract. Combining these three measures into a single healthy housing indicator provides a more complete picture of the health of the homes in which Rhode Island children live.
comprehensive assessment of the overall housing status for a community census tract (Figure 5).

This combined indicator can only serve as an imprecise measure of healthy housing. Many older, well-maintained homes are desirable, safe, and healthy places to live, while some poorly-constructed and poorly-maintained newer homes do not support health as well. Address-specific data on housing conditions would enhance the overall healthy housing indicators. Computerized records of housing code violations and case management reports may provide future data. Despite current measurement limitations, the nature of the healthy housing challenge in Rhode Island is clear—too many children live in old houses within neighborhoods affected by poverty.

**Figure 2**  
HOUSING BUILT BEFORE 1980  
Prepared by The Providence Plan  
Source: United States Census Bureau, Census 2010

**Figure 3**  
CHILDREN YOUNGER THAN 18 YEARS OLD LIVING IN POVERTY, 2006-2010  
Prepared by the Providence Plan  
Source: 2006-2010 5-Year American Community Survey  
Notes: Poverty data are estimates of poverty for children for years 2006-2010. Several tracts’ estimates surpass a threshold of an acceptable margin of error, invalidating the estimate.

**Figure 4**  
CHILDREN YOUNGER THAN SIX YEARS OLD WITH FIRST-TIME ELEVATED BLOOD LEAD LEVELS, 2006-2010  
Prepared by The Providence Plan  
Source: Lead Elimination Surveillance System, Rhode Island Department of Health
FIGURE 5
COMPOSITE OF FIGURES 2, 3, AND 4
Prepared by The Providence Plan
Asbestos is a naturally occurring mineral with several unique properties. Asbestos is strong, flexible, resistant to heat and chemical corrosion, and insulates well. These features led to the use of asbestos in up to 3000 consumer products before government agencies began to phase it out in the 1970s because of its health hazards. Asbestos has been used in insulation, roofing, siding, vinyl floor tiles, fireproofing materials, textured paint, soundproofing materials, heating appliances (such as clothes dryers and ovens), and ironing boards. Much of the housing stock nationally and in Rhode Island was constructed before the phase-out of asbestos products. In fact, most of Rhode Island’s housing stock was built before 1950. This means that asbestos-containing materials may still be present in our homes.

Exposure to asbestos is a health concern when high concentrations of asbestos fibers are inhaled over an extended period of time. When asbestos fibers are inhaled, they are deposited deep into the lungs and can cause serious diseases such as asbestosis, mesothelioma, and lung cancer. Exposure to asbestos fibers can cause these diseases 10 to 40 years after the initial exposure. The risk for all of these conditions is amplified as the number of fibers inhaled increases. Smokers who inhale asbestos fibers are at even greater risk for lung cancer.

Neglected asbestos in the home is a dangerous air contaminant and may significantly contribute to an occupant’s exposure. A home may also contain a number of asbestos-containing materials that are damaged, which can lead to increased exposure. Some common products that contained asbestos in the past and conditions that may release fibers include:

- **Steam pipes, boilers, and furnace ducts** insulated with asbestos. These materials may release fibers if damaged, repaired, or removed improperly.
- **Resilient floor tiles (vinyl asbestos), the backing on vinyl floor sheeting, and adhesives used for installing floor tile.** Sanding or abrading tiles can release fibers, as may scraping or sanding the backing of sheet flooring for removal.
- **Patching and joint compounds for walls, ceilings, and textured paints.** Sanding, scraping, or drilling these surfaces may release asbestos.
- **Soundproofing and decorative materials sprayed on walls and ceilings.** Loose, crumbly, or water-damaged material may release fibers, as will sanding, scraping, or drilling the material.
- **Asbestos shingles, siding, and cement roofing.** These products may release fibers when sawed, cut, drilled, or sanded.
- **Door gaskets in furnaces and wood and coal stoves.** Worn seals can release fibers during use.
The magnitude of the problem

Lung cancer is the most significant health impact of asbestos exposure, but it is difficult to determine precisely which cases are asbestos-related. The Environmental Working Group at the Centers for Disease Control and Prevention (CDC) estimates that 10,000 lung cancer deaths per year are related to asbestos.

The maintenance and handling of asbestos-containing materials is highly regulated in public and commercial buildings, particularly in schools. It is estimated that asbestos is present in nearly 700,000 public and commercial buildings throughout the United States and is in a damaged condition in approximately 500,000 of those buildings. There is little data regarding asbestos conditions in the nation’s housing stock. In Rhode Island, a large percentage of the homes were constructed before 1970, many with asbestos-containing materials that may be damaged or could become damaged if improperly handled or removed.

What you can do

• Get educated. Learn about the risks of asbestos and how to identify and maintain asbestos-containing materials in the home.

• Do not disturb asbestos-containing materials that are in good condition. If the material is damaged or you plan to repair or renovate parts of your home that may contain asbestos, hire a professional.

• Test for asbestos. The only way of determining if building material contains asbestos is by sample analysis. The Asbestos Control Program at the Rhode Island Department of Health (HEALTH) certifies both Asbestos Inspectors and Analytical Laboratories that can collect and analyze samples for asbestos content. To find a professional, visit www.health.ri.gov/healthrisks/poisoning/asbestos

• Disclose asbestos during real estate transactions. The Rhode Island Asbestos Act does not prohibit the sale of a property that contains asbestos or require the seller to conduct inspections. Rhode Island General Law § 5-20.8-2 requires sellers to disclose all deficient conditions of which they have knowledge.

• Remove or repair asbestos. Asbestos-containing materials in homes should be maintained intact and in good condition. If repair or removal is desired, properly-trained Rhode Island licensed Asbestos Abatement Contractors should perform the work. A list of licensed contractors is available on the HEALTH website at www.health.ri.gov/includes/lists/asbestos/AbatementContractors.pdf

How to learn more

For more information about asbestos health risks, see www.health.ri.gov/healthrisks/asbestos
ASTHMA

Connections between housing, asthma, and health
Asthma is a chronic disease of the respiratory system in which the airways, or tubes that carry air in and out of the lungs, occasionally become swollen, inflamed, and lined with excessive amounts of mucus. These episodes, called asthma attacks, can be triggered by many conditions in the home, including secondhand smoke, dust mites, cockroaches, rodents, mold, pet dander (e.g., from cats, dogs, and birds); smoke (e.g., from wood burning stoves or kerosene heaters), strong odors and sprays (e.g., perfumes, air fresheners, paints, and cleaning solutions), and sulfites in foods (e.g., beer, wine, shrimp, dried fruit, and processed potatoes).

The magnitude of the problem
Rates of asthma among Rhode Island adults and children are determined from the Rhode Island Behavioral Risk Factor Surveillance System (BRFSS). In 2010, 17% of Rhode Island adults (ages 18+) reported that they had ever been diagnosed with asthma, and 11% of Rhode Island adults currently had asthma. In 2010, 15% of Rhode Island children (0-17 years of age) were reported to have ever been diagnosed with asthma, and 12% of Rhode Island children were reported to currently have asthma.

Among the many triggers for asthma, the impact of tobacco smoke has been studied extensively. Smoking and secondhand smoke can worsen inflammation of the airways for people with asthma. It is estimated that between 60% and 80% of adults are exposed to secondhand smoke. Exposure to secondhand smoke has been linked to poor asthma control and hospitalizations. In Rhode Island, 18% of adults with asthma in 2008 and 2009 combined were current smokers (Figure 6), and 19% of children with asthma lived in households with adult smokers (Figure 7).

For adults with asthma who smoke, their asthma-related quality of life is reportedly worse.
than those adults with asthma who are non-smokers. Adults with asthma who smoke are more likely to have no symptom-free days in the past month compared to non-smoking adults with asthma (29% vs. 17%), and to have their asthma disturb their sleep (34% vs. 27%).

A subset of BRFSS participants who report having asthma are asked to participate in the BRFSS Asthma Call Back Survey (ACBS) each year. The ACBS asks participants about some home conditions that may impact asthma and its control.

Figure 8 presents the percentage of Rhode Island adults (18 and older) with asthma whose home environment conditions are related to asthma triggers. More than half of adults with asthma do not use mattress covers to control dust and mites. Two-fifths of all adults with asthma do not regularly use kitchen exhaust fans to vent cooking to the outside, which may lead to excessive moisture and ultimately mold in the home. Nearly 40% of adults with asthma have been advised by their healthcare provider to change behaviors and/or conditions in their home to improve asthma. Sixteen percent of adults with asthma reported seeing or smelling mold inside their home, and 14% report that someone smoked inside their home in the past week. Six percent of adults have observed roaches or rodents in the home, which can also trigger asthma episodes.

What you can do

- **Change behaviors and conditions in the home.** Adults with asthma and caregivers of people with asthma can take many steps to eliminate or reduce asthma triggers in the home.
- **Consider low-cost housing interventions.** The Newport Housing Authority has demonstrated that low-cost interventions to improve moisture problems and eliminate smoking in apartment complexes can also improve children’s asthma.

How to learn more

The Rhode Island Asthma Control Program is developing and supporting four interventions to reduce home conditions that can cause asthma episodes and attacks and to educate families. For more information, see [www.health.ri.gov/programs/asthmacontrol](http://www.health.ri.gov/programs/asthmacontrol)
CARBON MONOXIDE

Connections between housing, carbon monoxide, and health

Carbon monoxide (CO) is a colorless, odorless, tasteless, but highly toxic gas. CO is produced by the incomplete burning of fossil fuels and can cause sudden illness and death if inhaled. CO forms when there is not enough oxygen to produce carbon dioxide (CO₂), such as when operating a stove or an internal combustion engine in an enclosed space.

Common CO-emitting products include oil or gas furnaces, gas hot water heaters, gas stoves, gas or charcoal grills, kerosene/portable heaters, portable generators, pressure washers, chainsaws and gas-powered tools, cars/trucks, and boat engines. CO from these sources can build up in enclosed or partially-enclosed spaces. Most unintentional poisonings (64%)¹⁰ occur in residential homes, and smaller percentages (21%)¹⁰ occur in occupational settings. Non-emergency poisonings are most often caused by faulty appliances and motor vehicles, although they are occasionally caused by the use of occupational tools (e.g. gas-powered pressure washers, forklifts).

Residential poisonings are more likely to occur during the fall and winter months when the use of home heating systems increases, especially among residents of the Northeast, where gas- and oil-burning furnaces are prevalent. Furnaces are one of the leading causes of unintentional CO poisonings.

Emergency poisonings occur during power outages, which usually result from severe weather events. Using alternative sources of power can cause CO to build up in the home and can poison the people and animals inside. Those at risk for CO poisoning in emergency situations include homeowners who own portable generators and live in regions susceptible to snow and ice storms, including the New England states.

The magnitude of the problem

CO is the leading cause of poison-related death in the United States. The Centers for Disease Control and Prevention (CDC) estimate that CO is responsible for nearly 500 deaths and 20,000 nonfatal injuries per year.

In the absence of an active national surveillance system for CO poisoning, estimates and surveillance activities rely on data sources not primarily designed for CO poisoning surveillance. Figure 9 illustrates the surveillance components of CDC’s CO poisoning surveillance framework. This framework focuses only on unintentional, non-fire related CO poisonings, because approaches to preventing intentional and fire-related CO exposures greatly differ.

The Rhode Island Department of Health (HEALTH) Rules and Regulations

---------------------------------------------
Pertaining to the Reporting of Communicable, Environmental and Occupational Diseases [R23-10-DIS] require medical providers, including physicians, clinical laboratories, and hospitals, to report both occupational CO intoxication and non-occupational acute CO poisoning to HEALTH. A CO Exposure and Action Report and instructions for acute CO incident reporting are available on the HEALTH website at: www.health.ri.gov/forms/reporting/CarbonMonoxidePoisoning.pdf

The Healthy Homes and Environment Team at HEALTH has a case management protocol for confirmed cases of acute CO poisoning. No reports were received in 2011, which indicates that reporting requirements are not being followed.

What you can do

Install CO alarms.
This may be the most effective step for protecting household occupants. Install the alarms according to the manufacturer’s instructions. The Consumer Product Safety Commission (CPSC) recommends that CO alarms be installed in the hallway outside the bedrooms in each sleeping area of the home. CPSC does not recommend installing CO alarms in kitchens or above fuel-burning appliances. Locations near heating vents or that can be covered by furniture or draperies should be avoided. Hard-wired or plug-in CO alarms should have battery backup. Test CO alarms monthly along with fire alarms, and change the batteries at least annually.

Know the symptoms of CO poisoning.
The most common symptoms of CO poisoning are headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion. Do not ignore symptoms, particularly if more than one person has them. Anyone experiencing symptoms of CO poisoning, even if a CO alarm is not going off, should get outside to fresh air immediately and call 911 from a safe location. Prompt medical attention is important for a proper diagnosis. Inform the medical provider if the person smokes cigarettes, because smoking tobacco increases the blood level of CO. If CO poisoning is confirmed, a qualified service person should check all combustible appliances in the home for proper operation before they are used again.

Prevent CO poisoning.

• Read and follow all instructions that accompany any fuel-burning device.
• Heat and ventilate with properly-installed and maintained equipment.
• Make sure vents for the dryer, furnace, water heater, and fireplace work.
• Never use a gas stove or dryer to heat a home.
• Never use a gas or charcoal grill indoors.
• Never use gas-powered equipment or tools indoors or in partially-enclosed spaces.
• During power outages, never use a generator inside a home, garage, carport, or shed, even if doors and windows are open. Placing generators outside more than 20 feet from the home is usually adequate to prevent the entry of CO into homes.
• Have heating systems, including chimneys and vents, inspected and services annually by a trained service technician.

How to learn more
For more information on carbon monoxide poisoning, see www.health.ri.gov/healthrisks/poisoning/carbonmonoxide
Connections between housing, drinking water, and health

Safe drinking water is one of the basic requirements of healthy housing. Protecting drinking water reservoirs and aquifers from sources of contamination enhances confidence in the safety of drinking water. Poorly-controlled sources of contamination include septic systems, fertilizers, insecticides, and herbicides as well as gas stations, petrochemical tank farms, and landfills. Certain contaminants, such as coliform bacteria and lead, are most common in older, poorly-maintained homes, regardless of whether the water source is public or private.

Municipal financial shortfalls are often associated with delayed repair of public water systems and distribution lines. Low water pressure, broken faucets, unsanitary storage reservoirs, dead end lines, and stagnation increase the risk of bacteria in the water. In some homes, high lead levels are associated with older plumbing, where lead solder was used to connect pipes and where taps were made with brass alloys containing lead.

Although the age of housing is a risk factor for lead pipes and solders, recent plumbing or remodeling activity may also increase the risk of lead in drinking water. New fixtures leach lead...
if they are made with lead-containing brass parts. Disturbing lead service lines and pipes can dislodge lead that gets caught in tap aerators. Routinely flushing lines whenever water has not been used for six hours or more and routinely cleaning aerators, especially after plumbing work, will reduce lead exposure.

The magnitude of the problem

Routine water quality monitoring provides direct evidence of the presence or absence of contaminants in drinking water. In Rhode Island, public water supply systems are regulated by the Department of Health (HEALTH) in accordance with the federal Safe Drinking Water Act. “Community” public water systems run by certified operators serve about 85% of Rhode Island homes. These systems have the advantage of the shared resources of their rate-paying customer base to comprehensively monitor water quality. They regularly conduct tests for more than one hundred potential contaminants and report findings to HEALTH. They also provide monitoring data to their customers by mailing them a Consumer Confidence Report each year, generally with their water bill.

In addition to monitoring for contaminants at the drinking water plant, public water systems analyze water from a representative sample of their customers’ homes, particularly those customers at greatest risk of having copper or lead contamination of their water. Even when the water supply is free of lead contamination, pipes, fittings, and fixtures, especially in older housing, can contain lead. HEALTH also tests drinking water at the homes of families with children with significant lead poisoning. For children younger than six years old, significant lead poisoning is defined as a venous blood lead level greater than or equal to 20 micrograms per deciliter (µg/dL), or two venous blood lead levels in the 15 to 19 µg/dL range tested between 90 and 365 days apart. In 2010, HEALTH conducted 52 comprehensive environmental lead inspections. Three residences (5.8%) had levels of lead above the Environmental Protection Agency action level of 15 parts per billion (or micrograms per liter). In 2011, HEALTH conducted 45 comprehensive environmental lead inspections. One home (2%) had elevated lead levels in the drinking water.

One measure of water system performance is the percentage of community systems that meet state health-based standards. Figure 10 indicates that several systems have improved over the past four years.

Private well owners are responsible for monitoring their own water quality. Private wells, regulated by local housing officials with assistance from the state’s Private Well Program, must be tested prior to occupancy of new homes, transfer of ownership, or the connection of new wells to existing homes.

The best source of information about the quality of water provided by your public water
system is the Consumer Confidence Report. These reports are available online at http://yosemite.epa.gov/ogwdw/ccr.nsf/Rhode+Island?OpenView. To date, there is no reliable way to estimate the quality of private well water across the state.

What you can do
For consumers of public water systems and maintenance workers
All consumers should learn about areas where bacteria can proliferate and how inadvertent connections between faucets, pipes, and storage systems can occur. Good maintenance can reduce risks, whether the water supply is public or private. To reduce lead and other plumbing-related risks:

- If your tap has not been used for more than a few hours, run cold water from the faucet for at least one minute or until the temperature drops before you drink it or cook with it. Never use hot water from the faucet for drinking, cooking, or making baby formula.
- Always use water from the cold water tap for drinking and cooking.
- Clean faucet aerators every few months.
- Use a kit (about $25 from State-certified labs) to test your tap water for lead. If testing shows a problem, consider an in-line filtration unit.
- If you have a lead service line, consider replacing or lining it. Call your water supplier to learn more.

For private well owners

- Keep the area around your wellhead free of potential sources of contamination, such as pet waste, fuels, and household chemicals.
- Regularly check for a missing cap, cracks and corrosion, and tight surface seals.
- If you have problems, ask a state-registered well driller to check your well construction and maintenance records. Keep those records current.

How to learn more
Rhode Island Office of Drinking Water Quality website: www.health.ri.gov/programs/drinkingwaterquality

United States Environmental Protection Agency Safe water website: www.epa.gov/safewater

The University of Rhode Island “Home A Syst” Program (a nationally-recognized program serving Rhode Islanders who want to know more about the safety of private drinking water wells): www.uri.edu/ce/wq/has/Private%20Wells/PRIVATE.HTM
Connections between housing, foreclosure, and health

Foreclosures threaten the stability of a community and the health of its housing. Unoccupied properties are more vulnerable to vandalism, which can result in damaged doors and windows and theft of copper, boilers, and fixtures. Neighborhood safety hazards from this type of damage include deteriorating lead paint conditions, distressed exteriors that let in water and pests, yards filled with garbage and broken glass, and exposure to additional damage from vandalism. Rampant vacancy due to foreclosure can seriously compromise public safety.

Homes with pending foreclosures also pose risks to their occupants. Maintenance and repairs are deferred when an owner cannot or does not wish to keep up the property. Utilities may be shut off, leaving households without heat and water. These conditions may not only affect the owner, but also the tenants in rental housing.

The magnitude of the problem

The foreclosure crisis has persisted since 2007 in Rhode Island. According to HousingWorks RI, in 2011 a total of 2,009 residential foreclosure deeds were filed in the state, averaging 167 per month compared to 157 per month in 2010. The number of foreclosures in Rhode Island fell from 2,840 to 1,891 from 2009 to 2010, but then increased 6.24% from 2010 to 2011 (Figure 11).

Rhode Island’s foreclosure crisis differs from that in other states because of the significant share of multi-family properties affected in the state’s urban communities. The foreclosure of a multi-family property typically leaves renters of that property with the threat of eviction. The increased demand for rental homes coupled with a decreased supply has made affording a quality rental home much harder for Rhode Islanders.
The communities most heavily impacted by multi-family foreclosures are Central Falls, with 80% of the city’s residential foreclosures in multi-family homes, and Providence, where multi-family foreclosures represented 63% of the city’s total foreclosures. Combined, these two cities accounted for 54% of the state’s total multi-family foreclosures from 2009 through 2011.11

As seen by comparing the maps below, foreclosures tend to concentrate in geographic areas already prone to other poor healthy housing indicators. These problems are particularly bad for lower-income renter households, such as the core cities of Central Falls, Pawtucket, Providence, and Woonsocket. Rhode Island defines a core city as one where the child poverty level is greater than 15%, according to 2010 Census data. In 2011, these cities represented about 38% of all Rhode Island foreclosures (Figure 12).

**What you can do**

**Connect with the Rhode Island Housing HelpCenter**

Rhode Island Housing’s HelpCenter is a United States Department of Housing and Urban Development (HUD)-approved center that offers individual counseling sessions. Trusted, trained counselors can help assess a homeowner’s situation and provide advice, education, resources, and referrals to help homeowners avoid losing their homes or cope with the loss of a home. Together with its partners, the HelpCenter occasionally offers free foreclosure workshops to communities throughout Rhode Island.

To schedule an individual appointment or learn about upcoming workshops, contact the Rhode Island Housing HelpCenter at 401-457-1130 or helpcenter@rhodeislandhousing.org, or visit www.rhodeislandhousing.org and click on the Help Center icon.
Apply for Hardest Hit Fund
Rhode Island Assistance
The United States Treasury implemented the Hardest Hit Fund Rhode Island (HHFRI) to prevent avoidable foreclosures in Rhode Island. HHFRI helps homeowners who cannot make their mortgage payments due to a hardship such as job loss or underemployment. Rhode Island Housing oversees HHFRI.

There are three ways to apply for HHFRI assistance:

• Work with a HUD-approved and HHFRI-certified counselor, including those employed by the Rhode Island Housing HelpCenter.

• For the unemployed and others who may qualify, contact the HHFRI Center at 401-277-1500 or info@HHFRI.org for an appointment with a HUD-approved and HHFRI-certified counselor.

• Work with the local bank or credit union that services the mortgage in Rhode Island. If the lender is Rhode Island Housing, call 800-854-1180.

![Figure 15](image-url)

**Figure 15**
GHII PROVIDENCE NEIGHBORHOOD INNOVATION PILOT TARGET AREA: O NEYVILLE / VALLEY
Source: Analysis by ProvPlan for City of Providence and the Green and Healthy Homes Initiative Providence 10/2011

- 145 Single-Family (87 Owner-Occupied)
- 237 2-Family (121 Owner-Occupied)
- 421 3-Family (179 Owner-Occupied)
- 803 Total Properties (387 Own-Occupied)

- **Demographics**
  - Total Population: 7806
  - Hispanic/Latino: 4725 (60.5%)
  - Non-Hispanic (NH) White: 1244 (15.94%)
  - NH Black or African American: 1138 (14.6%)
  - NH Asian: 248 (3.2%)
  - NH All Other: 451 (5.8%)
  - Total Population Under 18: 2555 (32.7%)

- Project Area
- Parcels: ≤ 3 units 1865-1945
GREEN & HEALTHY HOMES INITIATIVE

Providence Neighborhood Innovation Pilot (GHHIP NIP)
In 2009, Providence was designated by the Coalition to End Childhood Lead Poisoning as a demonstration site for the Green & Healthy Homes Initiative™ (GHHI). The initiative is designed as a comprehensive approach to deliver integrated health, safety, lead hazard reduction, energy efficiency, and weatherization interventions to low- to moderate-income families. GHHI Providence maximizes public and philanthropic investments for 5 major benefits:

• Creation of sustainable green and healthy homes in low- and moderate-income neighborhoods
• Measurable improvements in health outcomes for children, seniors, and families
• Wealth retention and improved property values
• Government innovation in service delivery
• Development of sustainable community-based “green collar” jobs.

Led by a Steering Committee of more than 20 city and state organizations and agencies, GHHI Providence is committed to meeting its goal of upgrading 250 City of Providence housing units that meet GHHI standards by the end of 2012.

In 2011, the City of Providence launched the Green & Healthy Homes Initiative Providence Neighborhood Innovation Pilot (GHHIP NIP). This program provides weatherization, health, and safety upgrades for low- to moderate-income families living in one- to three-unit structures located within a concentrated block area in the city's Valley and Olneyville neighborhoods. In partnership with a wide array of partner organizations, the city's Department of Planning & Development is coordinating a nine-month weatherization and healthy homes demonstration. This effort incorporates an intensive marketing and community-based education campaign, minority contractor training and development, and program evaluation. More specifically, the pilot seeks to:

• Complete 125 GHHI interventions within the target neighborhoods.
• Cross-train 10-12 minority contractors to compete for bids to perform weatherization, healthy homes, and/or Lead Hazard control work.
• Establish and train Resident Educators to work with participating families to improve energy, health, and safety related behaviors and practices.
• Create an electronic data collection system and comprehensive program evaluation that measures the program's impacts on energy efficiency and health related outcomes in the target neighborhood to determine the efficacy of a neighborhood-based approach.
HEALTHY WEIGHT

The connections between housing, obesity, and health

Neighborhood quality, which includes housing, has been shown to be a significant determinant of health. Perceived safety, traffic hazards, and poor access to fresh and healthy foods are neighborhood characteristics that are closely related to overweight and obesity risk and prevalence. As a result of the strong relationship between neighborhood-level factors and health, obesity prevention has become more focused on the built environment. The built environment refers to man-made surroundings that provide opportunities for or act as barriers to human activity. Such factors include housing developments, parks, transportation systems, land use decisions, and food establishments.

A growing body of research has shown that the environment significantly influences individual choices. The availability of affordable and healthy foods, as well as the over-saturation of fast food establishments, high energy-dense foods, and the dependence on corner stores to purchase foods in certain neighborhoods have been closely linked to obesity rates.

The availability of affordable and healthy foods, as well as the over-saturation of fast food establishments, high energy-dense foods, and the dependence on corner stores to purchase foods in certain neighborhoods have been closely linked to obesity rates.

That people who live in neighborhoods with safe opportunities for walking and recreation are more physically active.

The magnitude of the problem

A great deal of state weight data come from the Rhode Island Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey that collects self-reported information on health risk behaviors, preventive health practices, and healthcare access primarily related to chronic disease and injury. Sixty-one percent (61%) of adult Rhode Islanders reported a height and weight consistent with overweight (37%) or obesity (24%) in 2009.

The data have shown a slight difference in weight for children residing in core and non-core cities.* Local data indicate that there were more overweight and obese (33%) children residing in core cities compared to overweight and obese (30%) children in non-core cities. While a direct relationship between residence and obesity risk has not been established, urban core areas often have limited access to fresh fruits and vegetables, safe areas for play, and opportunities for community recreation.15,16

* Core cities are those with a child poverty level greater than 15%. When these data were analyzed, Rhode Island considered Central Falls, Pawtucket, Providence, Newport, West Warwick, and Woonsocket to be core cities, based on 2000 Census data. Newport and West Warwick are no longer core cities based on 2010 Census data.
A recent study used the National Survey of Children’s Health data to examine the impact of neighborhood conditions and the built environment on overweight and obesity prevalence among United States children. Children residing in unsafe neighborhoods or those with a concentration of poor housing and the presence of garbage and litter had about 30 to 60 percent higher odds of becoming obese or overweight than children living in better neighborhoods. The neighborhood environment must improve quality and access to healthy options in order to facilitate healthy behavior change.

What you can do

Individuals and families
Establish household goals to maintain a healthy weight:

• Limit sugar-sweetened beverages in your home.
• Encourage a healthy diet.
• Limit television and computer time. Adults need at least 30 minutes of physical activity per day, while children need at least 60 minutes.
• Eat meals together.
• Make staying fit and healthy a family goal.

If eligible, enroll in the Women, Infants, and Children (WIC) Program to receive supplemental foods and nutrition education.

Policy makers and urban planners
• Consider health impacts when planning, constructing, and managing housing and neighborhoods to help create an environment where people can eat smart and move more.
• Create environments that integrate physical activity and healthy eating into daily routines in order to make healthy choices easier choices.

How to learn more
For more information on healthy weight, see www.health.ri.gov/healthyweight
Connections between housing, homelessness, and health

Living in substandard homes contributes to poor health, which deteriorates even more when a person is homeless and moving from shelter to shelter or living on the street. Lack of consistent or available healthcare, poor nutrition, and crowded conditions all contribute to a high rate of poor health as reported by homeless housing service providers and those who are homeless.

Compared to their peers, homeless youth are at higher risk of a number of health problems due to life on the streets, including sexually transmitted infections, HIV/AIDS, and untreated health and mental health conditions. The homeless also experience a higher percentage of chronic health problems compared to the general population. The Rhode Island Emergency Shelter Annual Report for 2006-2007 indicates that 38.4% of homeless people have medical problems.

Rhode Island KIDS COUNT reports that homeless children are “more likely to experience illnesses such as stomach problems, ear infections and asthma.” These health concerns indicate...
housing problems before entry into shelter as well as the experience of living in crowded conditions (e.g., doubled up with relatives and friends and in family shelters).

The magnitude of the problem

The United Way 2-1-1 in Rhode Island, a 24-hour information and referral helpline, received 45% more calls on issues related to homelessness in Rhode Island in 2010 than in previous years. The long-term analysis shows that before the economic crash, Rhode Island had started to see progress towards reducing homelessness. However, with reductions in housing and service dollars and increased unemployment, the numbers of homeless Rhode Islanders continue to rise (Figure 16).

According to the Rhode Island Coalition for the Homeless, of the 4410 homeless Rhode Islanders who accessed an emergency shelter or transitional housing program in 2011:

- 40% were families (Figure 17).
- 25% were children (Figure 17).
- 9% were veterans.
- 30% had mental illness.
- 14% were physically disabled.

Lack of adequate income and lack of affordable housing are the top two reasons why people become homeless in Rhode Island. Rhode Island is one of the least-affordable places to live in the United States. The shortage of affordable housing makes it more difficult for people to exit homelessness. It also increases the risk of homelessness for low-income individuals and families.

Forty percent of Rhode Islanders are renters. Rhode Island’s foreclosure crisis has significantly affected renters in the state due to the large share of foreclosed multi-family properties. Nearly one-third of the residential foreclosure deeds filed from 2009 through 2011 were for multi-family homes, the bulk of which were located in the state’s urban core. Each multi-family foreclosure affects multiple rental homes, which in turn threatens tenants with possible eviction. For every multi-family property foreclosed, approximately two to three families find themselves without shelter.

What you can do

Help prevent homelessness by providing affordable and safe housing. Rhode Island programs focused on this goal include:
Figure 18
A Look at Renters in Rhode Island

Source: HousingWorksRI, Issue brief: Rental housing in Rhode Island—the persistent need for long-term affordable apartments, February 2012.
• Building Homes Rhode Island (BHRI): funded to develop quality, long-term, affordable rental and ownership homes. (www.housingworksri.org)

• Hardest Hit Fund Rhode Island (HHFRI): put in place in Rhode Island by the United States Treasury to help homeowners who are unable to make their mortgage payments due to a hardship such as job loss or underemployment. (www.hhfri.org)

• Green and Healthy Homes Initiative (GHHI): a national strategy to make sure all families and children live in homes that are healthy, safe, energy-efficient, and sustainable. (www.greenandhealthyhomes.org)

How to learn more
Call United Way 2-1-1 for additional resources for the Rhode Island homeless.
INDOOR AIR QUALITY

Connections between housing, indoor air quality, and health

Indoor air quality (IAQ) is a term used to describe the level of air pollution in homes and other indoor spaces. Indoor air pollutants are chemical, physical, or biological pollutants, such as secondhand smoke, chemicals in carpeting and treated wood, paint gases, mold, and dust mites. When these pollutants are present in high concentrations, they can cause or worsen health problems.

Children, the elderly, and those with compromised immune systems are particularly susceptible to pollutant exposure. Much of the research about the health effects of IAQ have focused on the risks associated with exposure to secondhand smoke. These can include increased risk of bronchitis and other respiratory diseases, non-specific symptoms such as headache, and cancer. IAQ is especially important for those with asthma, for whom a variety of pollutants can trigger asthma attacks.

Many factors affect IAQ. These factors include poor ventilation (lack of outside air), problems controlling temperature, high or low humidity, recent remodeling, and other activities in or near a building that can affect the fresh air coming into the building. Sometimes, specific contaminants like dust from construction or renovation, mold, cleaning supplies, pesticides, or other airborne chemicals (including small amounts of chemicals released as a gas over time) may cause poor IAQ.

Poor ventilation, problems controlling temperature, high or low humidity, recent remodeling, and other factors can affect the fresh air coming into the building.

The magnitude of the problem

The average person can spend nearly 90 percent of his or her time indoors.

Indoor air pollutants may be present at levels two to five times higher—and occasionally more than 100 times higher—than outdoor levels of pollutants.

What you can do

Follow the seven principles of healthy housing.

Keeping homes dry, clean, pest-free, safe, contaminant-free, ventilated, and maintained will help improve or maintain good IAQ.

Establish and maintain the right ventilation and building care.

The right ventilation and care can prevent and fix IAQ problems. Ventilation recommendations are based on a number of factors, including house tightness, occupancy levels, and the level of existing or potential moisture problems. One way to improve IAQ is to install or upgrade an existing bathroom fan that runs at a low flow continuous rate. An architect, builder, building official or auditor can determine the location and proper sizing of the ventilating fan. ASHRAE 62.2 is the national ventilation standard of design for all homes and multi-family buildings with up to three stories.

How to learn more

For more information about IAQ, see www.epa.gov or www.osha.gov. For more information about home ventilation, see www.ashrae.com
Molds are living organisms that, like bacteria, can be found everywhere. Outdoors, mold growth helps to break down dead organic materials. Actively growing mold can produce spores that travel through air. Once mold spores land on a surface, mold can grow as long as the right mix of moisture and food exists. Mold growth can look like spots, in many different colors, and can smell musty. The term mildew is often used for mold that has a musty odor.

Contact with mold happens every day, usually by touching, eating, or breathing it. Exposure to mold and mold spores can trigger allergic reactions such as watery eyes, runny nose, sneezing, itching, coughing, wheezing, headache, and fatigue. Mold affects everyone differently. Some people are more sensitive to molds than others, such as:

- Infants and children,
- Older adults,
- People with weak immune systems, such as those with HIV infection, with cancer, or who are undergoing chemotherapy, and
- People with chronic respiratory illnesses or respiratory conditions such as allergies and asthma.

Molds require moisture and a food source to grow. Several sources of moisture in a home can cause molds to develop, such as flooding, a damp basement or crawlspace, roof leaks, faulty plumbing, insufficient ventilation, and improperly-vented clothes dryers. A wide variety of materials will support mold growth, including paper, wood, leather, fabrics, and even clothing. Molds grow best at moderate to warm temperatures, but will even multiply at refrigeration temperatures.

Under certain conditions some molds can produce toxins called mycotoxins, which can cause serious illness. All molds can cause health symptoms, however, so any mold needs to be treated seriously and handled with caution during cleanup.

The magnitude of the problem
A robust scientific literature has conclusively shown many adverse health impacts associated with exposure to moldy and damp environments. World Health Organization guidelines emphasize the need to address moisture problems that support mold growth. These guidelines also critique the current methods used to measure mold levels as unreliable for determining the safety and health of indoor environments. There is no absolute level of mold in air that is known to be unhealthy, whether measured indoors or outdoors. In addition, no federal or state standards for mold levels exist. Mold occurs naturally in the environment and cannot be completely eliminated. The key is to be aware of its impact on health and to limit its growth. Outdoor mold levels typically vary with the seasons. The 2009

Connections between housing, mold, and health
Exposure to mold and mold spores can trigger allergic reactions such as watery eyes, runny nose, sneezing, itching, coughing, wheezing, headache, and fatigue.
WHO Guidelines for Dampness and Mold (Mould) are available at www.euro.who.int/__data/assets/pdf_file/0017/43325/E92645.pdf

**What you can do**

**Keep it dry to control mold growth.**
Quickly dry out materials that have become wet, as mold will begin to grow within 24 to 48 hours. As soon as you detect moisture—either by sight or smell—work to eliminate it. Water damage, moisture, or a musty smell signals that mold is most likely present. Sampling for molds is usually not necessary, and no federal or state standards or limits exist for mold. Mold can hide behind walls or above ceilings and may not be easy to locate. It is also important to inspect heating and/or air conditioning ducts to look for mold growing inside.

**Clean the area where mold was growing**
After eliminating the source of moisture, clean the area where mold was growing. If the area to be cleaned is less than ten square feet in size, you should be able to complete the job yourself. If the area of mold growth is larger than ten square feet, seek professional services. Do not let anyone with a chronic respiratory illness or a weak immune system clean up mold.

Unfortunately, porous surfaces such as upholstered furniture, carpets, ceiling tiles, drywall, and paper products often cannot be completely cleaned and must be discarded. You should be able to clean and save non-porous surfaces. An all-purpose detergent is usually sufficient to clean mold. Using bleach or fungicides to disinfect surfaces is typically not recommended, as they may be irritants. However, if sewage-contaminated flooding caused the water damage, you should disinfect. Simple precautions to prevent contact with and exposure to mold include wearing rubber gloves, eye protection,
and an N-95 respirator. Thorough cleaning with a stiff brush should remove the mold. Then, rinse the item with clean water and dry it completely. Confirm that the source of moisture has been eliminated.

Safe mold and mildew cleaner for people with asthma:

- **Baking soda, borax, or white vinegar:** Any of these can be used to scrub mold-infected areas. Dry areas when finished.
- **Lemon juice and salt or white vinegar and salt:** Mix a paste of lemon juice and salt or white vinegar and salt to scrub mold-infected areas. Dry areas when finished.

**People with chronic respiratory illnesses or weak immune systems**

Be careful to avoid exposure to mold, especially exposures that could occur from cleaning surfaces contaminated with mold.

**Medical community**

- Consider mold as a possible cause when patients present with respiratory and/or allergic symptoms.
- Ask respiratory patients if their homes have signs of mold or moisture problems, such as condensation on windows, a musty odor, or water stains on the ceilings or walls.
- Educate patients with compromised immune systems and high sensitivity to allergens about mold and how to limit its growth in the household.

**Housing community**

- When building houses, take simple precautions to minimize moisture build up, such as installing ventilation to the outside in high moisture areas, vapor barriers in crawl spaces, and dehumidifiers in damp areas such as basements. Other precautions include insulating cold water pipes to reduce condensation and using mold-resistant paints in high-humidity areas.
- Routinely inspect houses for sources of moisture and take steps to dry out moist areas.
- Promptly respond to reports of water infiltration or mold growth.
- Know that Rhode Island is one of 36 states in the US who have adopted the International Property Maintenance Code. The State Property Maintenance Code (SBC-6) addresses the underlying causes of mold growth. People with mold and moisture issues can call their local code and building officials.

**Landlords and household occupants**

- Learn about the causes of mold, its health effects, and how to take proper precautions in the home.
- Assess high-moisture areas in the home and consider taking precautionary steps such as installing ventilation to the outside in high moisture areas, vapor barriers in crawl spaces, and dehumidifiers in damp areas such as basements. Other precautions include insulating cold water pipes to reduce condensation and using mold-resistant paints in high-humidity areas.
- Thoroughly dry out flooded areas within 24 to 48 hours of the event.
- Promptly repair faulty plumbing, roof leaks, or any other causes of moisture.
- Seek professional assistance to handle significant mold problems such as growth covering an area larger than 10 square feet in size.
Connections between housing, radon, and health

Radon is an invisible, odorless, tasteless, radioactive gas that can cause lung cancer. It comes from the natural decay of uranium that is found in soil. The gas seeps into homes and buildings through cracks and openings in the basement floor or building foundation. Radon gas can also dissolve in ground water, diffusing into the home as well water is used. High radon levels inside the home increase an occupant’s risk for lung cancer. This risk stems from radon’s breakdown into “radon daughters” which emit high-energy alpha particles. These progeny enter the lungs, attach themselves, and eventually lead to lung cancer.

The condition of a home’s foundation and basement floor can have a significant impact on its occupants’ radon exposure. Homes are often constructed with loose fill under a basement slab and between the walls and the exterior ground. This fill is more permeable than the original ground. Houses typically draw less than one percent of their indoor air from the soil. However, houses with low indoor air pressures, poorly sealed foundations, and several entry points for soil air may draw up to 20% of their indoor air from soil, significantly increasing the occupants’ exposure. Inadequate ventilation in the home may also contribute to increased radon exposure and further reduce indoor air quality.

The magnitude of the problem

According to the Environmental Protection Agency (EPA), radon exposure in homes is believed to contribute to 21,000 lung cancer deaths in the United States each year. Prolonged exposure to high levels of indoor radon gas is second only to cigarette smoking as a cause of lung cancer. Smokers exposed to high levels of radon in the home are at an even greater increased risk of developing lung cancer. EPA has identified radon levels at or greater than four picocuries per liter (pCi/L) as levels at which remedial action should take place.

EPA data indicate that one in 15 homes in the United States contains radon at or above the EPA’s action level. In Rhode Island, approximately one in four homes contains radon at or above this action level. Extensive mapping of test results in Rhode Island revealed the highest percentage of elevated radon levels in Washington and Kent Counties in 2008. In some towns, more than 50% of tested homes exceeded the EPA action level. The
map opposite shows, by town, the percentage of tested homes with radon levels equal to or greater than four pCi/L.

Figure 21 compares EPA estimates of the annual radon-related lung cancer deaths to deaths from other selected cancers. US mortality estimates for other cancers come from the National Cancer Institute’s 2010 Surveillance, Epidemiology, and End Results (SEER) database.23

**What you can do**

Test for radon
Test houses for radon every two to five years. Radon levels vary from day to day and season to season. Short-term tests (2 to 90 days) are best if quick results are needed, but long-term tests (more than three months) yield better information on average, year-round exposure. A homeowner, occupant, or Rhode Island Licensed Radon Measurement Business can perform radon testing in residential properties. (See www.health.ri.gov/includes/lists/radon/MeasurementBusiness.pdf for a list of licensed businesses in Rhode Island.) Short-term test kits are available through the American Lung Association, major building supply stores, other retail outlets, and analytical labs. (See www.health.ri.gov/includes/lists/radon/AnalyticalLabs.pdf for a list of analytical labs in Rhode Island.)

Mitigate radon
If the radon level in your home exceeds the EPA action level (4.0 pCi/L), conduct mitigation and additional testing.

- Install a mitigation system if the test result is 4 pCi/L or higher.
- Hire a Rhode Island Licensed Radon Mitigation Contractor to conduct radon mitigation. (See www.health.ri.gov/includes/lists/radon/MitigationContractors.pdf for a list of contractors in Rhode Island.) Properly trained and licensed professionals have the technical training and knowledge to properly evaluate and address radon health risks. Testing should be performed after any radon mitigation activities.
- Consider radon-resistant new construction techniques when adding to or building a house.
- Learn about the risks of radon exposure.

How to learn more
For more information about radon, see www.health.ri.gov/healthrisks/poisoning/radon
**REFUGEE HEALTH**

**Connections between housing, refugees, and health**

Rhode Island resettles between approximately 150 and 200 refugees yearly who have fled from their countries due to war and threat of persecution. In 2011, 56,419 refugees were resettled in the United States. That same year, 144 were resettled in Rhode Island.

The resettlement of refugees is challenging. Resettlement agencies face extraordinary financial and time pressures in finding housing for refugee families. Resettlement stipends are not adequate to pay prevailing rents, and advance notice of the arrival of a new family is often only one week or less. The need to locate refugee families near service providers further narrows the pool of available housing. To address their healthcare needs, refugees require easy access to healthcare providers who are experts at treating diseases endemic to their home countries (usually a developing country in Africa or Asia). For Rhode Island refugees, healthcare provider offices on the bus route to Hasbro or Lifespan hospitals are usually the most accessible. To address their social and cultural needs, newly-resettled refugees need to live near others who speak their languages or share in their customs. To meet these critical needs, refugees are typically resettled in neighborhoods in the southern part of Providence, an area at the highest risk for unhealthy housing using the Healthy Housing Indicator maps. There has been resistance to expanding the areas for resettlement to include neighborhoods with better housing.

**Immigrants and refugee children are at high risk for lead poisoning due to previous lead exposure in their countries of origin, malnutrition, and iron deficiency.**

Immigrants and refugee children are at high risk for lead poisoning due to previous lead exposure in their countries of origin, malnutrition, and iron deficiency. The potential that refugees are disproportionately affected by other housing-related health problems has not been explored.

**The magnitude of the problem**

As part of their resettlement to the United States, refugees receive healthcare. Routine pediatric care is provided to refugee children, including screening for lead exposure. Because of the concerns that even older refugee children may be vulnerable to lead exposure, either due to previous exposure in their home countries or recent exposure in Rhode Island, screening is not stopped at age 6 but continues to the age of 16.

An analysis of lead screening data for refugee families in Rhode Island, most of whom are resettled in Providence, shows that refugee children have lead poisoning rates more than four times higher than non-refugee children in Providence. For the 257 refugee children who had blood lead screenings from 2008 to 2011, 23 children (9%) had at least one elevated blood lead level at or above 10 micrograms per deciliter (µg/dL), and 5 children (2%) had an elevated blood lead level of 15 µg/dL or greater (Figure 22).

The 2008-2011 screening data do not provide evidence that current housing placements in Rhode Island are contributing to a widespread lead poisoning problem in the refugee community.
Of the 22 children who experienced an increase of 2 µg/dL or more in their blood lead levels between two screens, half had relocated to a secondary housing placement since their initial screening, while half had remained at their initial placement. The second screening test for 8 of the 11 children in this latter group remained below the blood lead level of concern of 10 µg/dL.

Although refugee children have a higher prevalence rate of lead poisoning than non-refugee children, Rhode Island continues to observe decreased incidence rates of lead poisoning in refugee children. Most refugee children arrive in the United States with blood lead levels below 10 µg/dL and maintain low blood lead levels during childhood. Those children with initial elevated screening results all experienced declines in their blood lead levels over time. The increase in blood lead levels for children who remained at their initial housing placements may be due to normal fluctuations in the accuracy of the lead screening results.

While evidence of a widespread lead poisoning problem among refugee families does not exist, there is room to improve refugee housing placements. Most refugee families with children are placed in housing without a Certificate of Conformance for lead. The resettlement of refugee families in properties without these certificates jeopardizes refugee health and violates state law. Placing families in housing with fewer hazards would likely result in lower blood lead levels than those observed to date. The most recent change by the Centers for Disease Control and Prevention (CDC) to the blood level of concern underscores the need to improve housing placements for refugees. The CDC lowered the blood lead level of concern from 10 to 5 µg/dL. Notably, almost 40% of refugee children (100 of 257 screened from 2008 to 2011) fall into the 5 to 9 µg/dL range of concern.

**What you can do**

**Resettlement agencies and advocates for refugee health**
Form partnerships to identify more resources for finding refugees safe and affordable housing.

**Landlords**
Obey the law and obtain a Certificate of Conformance for lead to demonstrate to refugee tenants that their units are safe from lead hazards.

**How to learn more**
For more information on refugee health in Rhode Island, see www.health.ri.gov/healthcare/refugee
Connections between housing, tobacco, and health

Tobacco use is the leading cause of preventable death in the United States.\(^\text{24}\) In 2006, the United States Surgeon General stated unequivocally that there is no safe level of exposure to secondhand smoke, particularly for people who are already suffering from coronary heart disease and chronic bronchopulmonary (lung) disease. Additionally, babies and children who breathe secondhand smoke are sick more often with bronchitis, pneumonia, and ear infections.\(^\text{24}\)

Cigarette smoking plays a part in many diseases, including asthma. Tobacco smoke is a powerful trigger of asthma symptoms in people with asthma and increases the severity of attacks. This is true whether a person with asthma smokes or is exposed to secondhand smoke from someone else's cigarette, cigar, or pipe.

The Centers for Disease Control and Prevention (CDC) fund state tobacco control programs across the country, including Rhode Island, to work on four overarching goals: (1) prevent initiation of tobacco use among young people, (2) eliminate nonsmokers’ exposure to secondhand smoke, (3) promote quitting among adults and young people, and (4) eliminate tobacco-related disparities. While smoke-free housing initiatives primarily focus on the second goal, they also impact goal four by improving the air quality for low-income, disabled or elderly individuals.

In March 2005, Rhode Island implemented the *Smoke Free Public Places and Workplaces Act*, a comprehensive ban on indoor smoking covering all enclosed public places of business such as restaurants and bars, healthcare facilities, shopping areas, and offices.

The magnitude of the problem

With the increasing evidence of the dangers of secondhand smoke, Rhode Islanders have demanded and continue to advocate for the places where they live, learn, work, and play to be smoke-free. Since 2004, Rhode Island has experienced a downward trend in the report of adult exposure to secondhand smoke in the home, from 20% of adults reporting exposure to secondhand smoke in the past 7 days in 2004 to 13% in 2010. This reflects a 34% decrease in adult exposure to secondhand smoke in the home in just seven years and is consistent with national norms.\(^\text{26}\)

In March 2005, Rhode Island implemented the *Smoke Free Public Places and Workplaces Act*, a comprehensive ban on indoor smoking covering all enclosed public places of business such as restaurants and bars, healthcare facilities, shopping areas, and offices. While the smoke-free law does cover common spaces in multi-unit housing settings, it does not include individual dwelling units in these settings. In multi-unit settings, smoke travels through lighting fixtures, under doorways, through cracks in walls, and through heating ventilation systems, causing health problems for non-smoking residents.

Rhode Island is part of a growing cohort of pioneering states working to protect residents of multi-unit public and private housing from secondhand smoke. Efforts range from educating residents and housing authorities about the
dangers of secondhand smoke to providing education and technical assistance to help housing authorities pass policies banning smoking in 100% of multi-unit dwellings, including indoors and campus-wide.

Not only do smoke-free housing policies protect people from secondhand smoke, but they also provide additional benefits. These include a market advantage in that smoke-free units are easier to rent than those that smell of smoke. There is a reduced cost, fire risk, and legal liability associated with maintaining smoke-free units.

As shown in the map below, 16 Rhode Island public housing authorities have some form of smoke-free policy which strengthens the existing statewide ban on indoor smoking: Bristol, Burrillville, Central Falls, Cranston, Cumberland, Lincoln, Newport, Portsmouth, Providence, South Kingstown, Smithfield, Warren, Warwick, West Warwick, Westerly, and Woonsocket. It is anticipated that more housing authorities will adopt smoke-free policies in the near future.

What you can do

Landlords
Consider adopting a smoke-free policy for your rental properties to save money, cut your risk of fire damage, reduce complaints, improve the health of your tenants and building, and increase your rental marketability. Download smoke-free housing resources at http://www.livesmokefree.ri.gov/landlords_resources.html

Tenants
Understand the dangers of secondhand smoke and the benefits of a smoke-free policy in your building, and share this information with your neighbors and landlord. Download smoke-free housing resources at www.livesmokefree.ri.gov/tenants_resources.html

Public housing authorities
Consider adopting a smoke-free policy to reduce exposure to secondhand smoke for staff and residents, turnover costs, and the risk of fire. Download smoke-free housing resources at http://www.livesmokefree.ri.gov/publichousing_resources.html

How to learn more
For more information on smoke-free housing, see www.livesmokefree.ri.gov. For more information on smoke-free housing policies, contact the Rhode Island Department of Health (HEALTH) Information Line at 401-222-5960 / RI Relay 711 and ask for the Tobacco Control Program.
Unintentional injuries are a serious public health threat: nationally, they are the leading cause of nonfatal injury for all age groups and the leading cause of death for individuals aged 1 to 44. The magnitude of the problem
Rhode Island unintentional injury data show a serious and widespread problem, particularly with respect to falls among Rhode Island’s older population, motor vehicle crashes, and unintentional poisoning. Injuries kill at least one person in Rhode Island every day. Falls are the leading cause of unintentional injury death for Rhode Islanders aged 65 and older, as well as the second-leading cause of unintentional injury death for Rhode Islanders aged 55 to 64. Unintentional poisoning is the leading cause of unintentional injury death for Rhode Island adults ages 25 to 64. Prescription painkillers are involved in a majority of these deaths. Motor vehicle crashes are the leading

Connection between housing, unintentional injuries, and health
Unintentional injuries are injuries that are not inflicted purposely and that occur without intent of harm. These unplanned events include, among other things, falls, motor vehicle crashes, and poisonings. Unintentional injuries are a serious public health threat: nationally, they are the leading cause of nonfatal injury for all age groups and the leading cause of death for individuals aged 1 to 44. They are also a major cause of hospitalizations and disability regardless of age, gender, and racial/ethnic status. Many unintentional injuries occur in the home. These injuries are not “accidents;” they are predictable and preventable.
cause of injury-related deaths and hospitalizations for Rhode Islanders ages 16-20 years old.

**What you can do**
You can take many steps to prevent injuries in the home.

**Falls:**
- Keep walkways clear.
- Keep stairs in compliance with building codes.
- Install hand rails properly and use them.
- Ensure that all lighting works.
- Install gates on stairways.

**Fire and burns:**
- Test your smoke alarm monthly.
- Cook with care. Never leave food unattended, and restrict children's access to stoves.
- Set your water heater no higher than 120 degrees.

**Drowning:**
- Always keep a close eye on children in the tub or in a pool. Even small buckets of water can pose a drowning threat.
- Fence off pools for limited access.

**Poisoning:**
- Lock up all medications and poisonous materials, and keep them out of reach.
- Read and follow all instructions included with medications. Medications should be used by the intended person for the intended purpose.

**Suffocation:**
- When you put your baby “safe to sleep,” you reduce the risk of accidental suffocation and sudden infant death syndrome (SIDS).
  - Always place your baby on his or her back to sleep, for naps and at night.
  - Use a firm sleep surface, covered by a fitted sheet.
  - Keep soft objects, toys, loose bedding, and crib bumpers out of your baby's sleep area.
  - Do not let your baby sleep in an adult bed, on a couch, or on a chair alone with you, or with anyone else.
  - See www.health.ri.gov/safesleep for more information.
- Check your home on a regular basis for choking hazards. Any object that can fit through a roll of toilet paper can pose a choking hazard to a child.
- Know first aid and CPR.

**How to learn more**
In 2011, the Rhode Island Department of Health (HEALTH) received a multi-year grant from the United States Centers for Disease Control and Prevention for the Core Violence and Injury Prevention Program. This grant allows HEALTH to collaborate with public and private partners to develop, implement, and evaluate programs to reduce death and disability resulting from injuries identified as priorities in its state injury prevention plan. For more information about the Violence and Injury Prevention Program, see www.health.ri.gov/programs/saferi

For more information about unintentional injury in Rhode Island, see www.health.ri.gov/injury
Lead is a highly toxic metal. Because of its abundance, low cost, and physical properties, lead and lead compounds have been used in a wide variety of products, including paint, ceramics, pipes, solders, gasoline, batteries, and cosmetics. Since 1978, federal and state regulatory standards have helped to minimize or eliminate the amount of lead in both consumer products and occupational settings. Today, the most common sources of lead exposure to children in Rhode Island are lead-based paint in older homes, contaminated soil, household dust, and drinking water. An estimated 80% of Rhode Island homes were built before 1978 and likely contain lead-based paint.

Anyone can get lead poisoned. However, lead is most dangerous to children younger than six years old. Young children put their hands, toys, and other things in their mouths. Any of these objects could have lead dust on them. Compared to adults, young children absorb more of the lead they ingest into their bodies and their developing brains and nervous systems are more sensitive to lead's toxic effects.

In Rhode Island, 31 adults had elevated blood lead levels in 2011. Most adult lead poisoning comes from the inhalation of lead fumes in the workplace. Rhode Island occupations with common lead exposure include renovation and repair, marine craft building and restoration, and manufacturing. The Rhode Island Department of Health (HEALTH) offers free and confidential assistance to help employers follow Occupational Safety and Health Administration regulations and minimize employee exposure to lead.

Extreme lead exposure can cause a variety of neurological disorders, such as lack of muscular coordination, convulsions, and coma. Much lower lead levels have been associated with measurable changes in children's mental development and behavior. These include hyperactivity; deficits in fine motor function, hand-eye coordination, and reaction time; and lowered performance on intelligence tests.28 Lead poisoning is completely preventable. The Healthy Homes and Lead Poisoning Prevention Program at HEALTH coordinates statewide efforts to eliminate lead poisoning and reduce lead exposure.

Understanding blood lead levels

What is a level of concern?

A “level of concern” is the threshold used to define an elevated blood lead level. Children with a blood lead level greater than the level of concern should be monitored and re-tested according to lead screening guidelines. Primary prevention activities, such as community-wide environmental interventions and nutritional and educational campaigns, should be directed at bringing children's blood lead levels below the level of concern. The Centers for Disease Control and Prevention (CDC) currently define any blood lead level greater than or equal to 5 micrograms per deciliter (µg/dL) as a blood lead level of concern. There is no known safe level of lead.
The impacts of lowering the blood lead level of concern

In January of 2012 the Advisory Committee on Childhood Lead Poisoning Prevention (ACLPP) recommended that CDC lower the blood lead level of concern for young children from 10 µg/dL to 5 µg/dL. The CDC has accepted all of the panel’s recommendations in the past.

If the blood lead level of concern changes from 10 µg/dL to 5 µg/dL, the number of elevated blood lead level cases would dramatically increase. Nationally health officials think as many as 250,000 children have blood lead levels between 5 and 10 µg/dL, many of which remain undiagnosed. The proposed change could increase the lead poisoning case count to 450,000 cases. Rhode Island has responded to the ACLPP recommendations by tracking cases of blood lead levels greater than or equal to 5 µg/dL. Changing the definition of lead poisoning would increase prevalence rates in Rhode Island from 1.02% (276 cases) to 7.54% (2,034 cases).

Unfortunately, CDC’s Lead and Healthy Homes Program budget was recently cut from $29 million to just $2 million. For Rhode Island, this means that grant funding was cut to zero.

If CDC accepts the ACLPP recommendations, Rhode Island will be challenged over the coming year to meet state and federal mandates for lead poisoning prevention while attempting to help many more families of children with elevated blood lead levels.

What is an action level?

An action level is the threshold at which blood lead levels can be reduced if effective, evidence-based interventions exist and resources are available. It would not be effective to define one action level for all interventions, so different action levels trigger different interventions. According to CDC guidelines, community prevention activities,

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>ACTION LEVEL</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated Blood Lead Level (BLL)</td>
<td>BLL of 5-14 µg/dL</td>
<td>Capillary Test: Educational materials sent to the family. A letter is sent to the primary care provider recommending a venous test to confirm the BLL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous Test: Educational materials sent to the family. Family is referred to a lead center* for an in-home education visit and a visual assessment to identify lead hazards.§</td>
</tr>
<tr>
<td></td>
<td>BLL of 15-19 µg/L</td>
<td>Capillary Test: Letter sent to the primary care provider recommending a venous test to confirm the BLL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Venous Test: Family is referred to a lead center for an in-home education visit and some environmental intervention (e.g., temporary lead hazard control measures, window replacement).</td>
</tr>
<tr>
<td>Significant Lead Poisoning</td>
<td>One venous BLL &gt; 20 µg/dL</td>
<td>Family is referred to the lead center* for an in-home lead education visit and is offered an environmental lead inspection.</td>
</tr>
<tr>
<td></td>
<td><del>or</del> Two venous BLLs of 15-19 µg/dL done 90-365 days apart**</td>
<td></td>
</tr>
</tbody>
</table>

* A lead center is a non-profit agency funded by Medicaid that offers comprehensive case management services to families of children with lead poisoning.

** Two venous blood lead levels of 15-19 µg/dL done between 90-365 days apart may also be referred to as “Persistent Lead Poisoning.” Prior to January 1, 2006, two blood lead levels, capillary or venous, ≥ 15 µg/dL were used to define persistent lead poisoning.

§ Due to budget constraints midway through 2011 Lead Centers had to stop offering this service.
such as nutritional and educational campaigns, should be implemented when blood lead levels are greater than or equal to 5 µg/dL. Individual prevention activities, such as case management services and environmental investigations, should be implemented when blood lead levels are greater than or equal to 15 µg/dL.

Lead action levels in Rhode Island
The lead guidelines issued by CDC were used to define various action levels in Rhode Island. The action levels are detailed in the table on the preceding page. More information on Rhode Island interventions for children with elevated blood lead levels is available in a later section of this data book.

Understanding the lead data
In Rhode Island, healthcare providers are required by law to conduct at least two blood lead screening tests on all children by three years of age. High-risk children need to be screened annually until the child reaches six years of age. The screening process involves collecting a sample of blood from the child, either from a capillary (finger stick) or a vein (venous test), and analyzing the blood to determine the amount of lead in the sample. Blood lead levels are measured and reported as micrograms of lead per deciliter of blood (µg/dL or mcg/dL).

The data presented in this report are based on all blood lead results, both capillary and venous, performed on children from birth to six years of age in Rhode Island.* Although the guidelines recommend that children begin being screened at nine months of age, some children may be screened earlier if they are at high risk for lead poisoning. For the incidence and prevalence analyses, each child is counted only once in each year, regardless of how many times that child was tested for lead. The rates are based on confirmed blood lead results.

Race and ethnicity data
The collection of race and ethnicity data is an important part of public health. These data allow HEALTH to monitor disease trends, track health status, and assess progress in improving health among various populations. These data also help ensure nondiscriminatory healthcare access and treatments, identify issues surrounding access to care and discrimination, and track the extent to which members of minority groups are beneficiaries of and participants in federally-assisted programs.

Despite the mandate to collect this information, race and ethnicity data are too incomplete to include in this report. Approximately 50-60% of blood lead records collected from laboratories and hospitals in Rhode Island fail to report race and ethnicity. Efforts to improve the quality of race and ethnicity data have been unsuccessful.

* The numbers presented here are estimates, given that calculations in this document are based on screening data rather than population data for all children younger than six years of age.
Compliance with lead screening laws

Compliance with legal requirements for lead screening is assessed by measuring the proportion of children born in a given year with at least one blood lead test by 18 months of age and at least two blood lead tests by 36 months of age. These two blood tests should take place at least 12 months apart.

Although Rhode Island has some of the highest lead screening rates in the nation, there is room for improvement. Rhode Island has the tools in place to increase the number of children tested twice by 36 months of age. Rhode Island’s web-based, integrated child health information system, KIDSNET, allows healthcare providers to monitor lead screenings and to generate reports of unscreened patients in their practices at any time. Pediatricians and family practice providers are encouraged to use KIDSNET often to follow up on patients in need of screening.

To improve screening rates, HEALTH sends quarterly reports to all healthcare practices that have patients who have not been screened in accordance with Rhode Island law. In 2011, HEALTH created the first Lead Screening Report Card for all medical practices in Rhode Island that treat children younger than six years old in a primary care environment. Practices were able to individually compare their screening rates to the statewide practice averages.

Figure 25 shows the percentages of Rhode Island children screened at least once by 18 months and at least twice, with the two tests performed at least 12 months apart, by 36 months. Lead screening rates have not changed dramatically in recent years.

Incidence rate of lead poisoning in Rhode Island

The Rhode Island Healthy Homes and Childhood Lead Poisoning Prevention Program (HHLPPP) tracks and reports the number of cases of lead poisoning (For 2012 and prior years, reported as a blood lead level greater than or equal to 10 µg/dL) among children younger than six years of age. When a child screens positive for lead poisoning for the first time, this child is referred to as an incident case. The incidence of lead poisoning is a statistic calculated as the percentage of incident cases in a given time.
period among all children screened who have never been poisoned prior to that time period.

The annual incidence rate of lead poisoning in Rhode Island has declined dramatically from 5.8% (1,857/31,848) in 2001 to 0.8% (200/26,508) in 2011 (Figure 26). From 2010 to 2011, the number of incident cases declined from 252 to 200.

In January 2012, the Advisory Committee on Childhood Lead Poisoning Prevention recommended to CDC that the 97.5th percentile of childhood blood lead levels be used as a reference value indicative of lead exposure hazards. That level is 5 µg/dL instead of 10 µg/dL. The HHLPPP has responded to this recommendation by tracking the incident cases of blood lead levels greater than or equal to 5 µg/dL. Setting 5 µg/dL as a reference value, the number of incident cases in Rhode Island in 2011 increases from 200 cases to 1,279. The incidence rate* would increase from 0.8% to 5.3%.

Continued progress on primary prevention and lead-safe housing is needed to protect children from lead poisoning. Rhode Island must also prepare to respond to families of children with blood lead levels greater than or equal to 5 µg/dL, despite the absence of needed funds.

**Incidence rate of lead poisoning in core cities**
Cities where the child poverty level is greater than 15% are designated as core cities. As of 2011, Rhode Island defines four core cities based on 2010 Census data**: Central Falls, Pawtucket, Providence, and Woonsocket.

Although Rhode Island cities and towns have

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**FIGURE 26**
STATEWIDE INCIDENCE RATE OF LEAD POISONING, 2001-2011, AND PROJECTED IMPACT OF LOWERING THE BLOOD LEAD LEVEL OF CONCERN TO ≥5µg/dL IN 2011

Source: Lead Elimination Surveillance System, Rhode Island Department of Health

Note: Data are based on venous tests and confirmed capillary tests only.

* In 2011, the total number of children, 72 months or younger, screened for lead poisoning who never had a previous blood lead level ≥ 10 µg/dL was 26,508. 200 of these children had a blood lead level ≥ 10 µg/dL during 2011. The 2011 incidence rate of lead poisoning based on the ≥ 10 µg/dL cutoff was 200 cases/26,508 children, or 0.8%.

In 2011, the total number of children, 72 months or younger, screened for lead poisoning who never had a previous blood lead level ≥ 5 µg/dL was 23,953. 1,279 of these children had a blood lead level ≥ 5 µg/dL during 2011. The 2011 incidence rate of lead poisoning based on the ≥ 5 µg/dL cutoff was 1,279 cases/23,953 children, or 5.3%.

** In prior years, Rhode Island used 2000 Census data to designate Newport and West Warwick as core cities; these cities no longer demonstrate 15% or greater childhood poverty based on 2010 Census data.
experienced a dramatic decline in incidence over the last ten years, cases of lead poisoning continue to concentrate in the core cities. As shown in Figure 28, in 2011 the incidence of lead poisoning in the core cities was 1.2%, three times as high as the 0.4% incidence in other Rhode Island cities and towns.

The core cities also have a significantly higher incidence rate of blood lead levels greater than or equal to 5 µg/dL (7.4%) compared to other cities and towns (3.7%) (Figure 27).

The tables on the following pages show the 2011 incidence rates of lead poisoning by Rhode Island city and town. Figure 29 shows the incidence rates when a blood lead level of 10 µg/dL or greater is the cutoff for determining lead poisoning; Figure 30 shows these rates with a cutoff of 5 µg/dL or greater.
**Figure 29**

**2011 Incidence Rate of Lead Poisoning at a Blood Lead Level (BLL) Greater Than or Equal to 10 µg/dL, by City and Town**

Source: Lead Elimination Surveillance System, Rhode Island Department of Health

Notes: Core cities are highlighted. City-specific incidence rates for previous years can be found on the web at www.health.ri.gov/leadpoisoning

<table>
<thead>
<tr>
<th>TOWN</th>
<th># CHILDREN WITH BLL ≥ 10 µg/dL FOR THE FIRST TIME</th>
<th># CHILDREN SCREENED WITH NO PREVIOUS CONFIRMED ELEVATED BLL</th>
<th>INCIDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrington</td>
<td>0</td>
<td>466</td>
<td>0.0%</td>
</tr>
<tr>
<td>Bristol</td>
<td>3</td>
<td>559</td>
<td>0.5%</td>
</tr>
<tr>
<td>Burrillville</td>
<td>3</td>
<td>294</td>
<td>1.0%</td>
</tr>
<tr>
<td>Central Falls</td>
<td>6</td>
<td>932</td>
<td>0.6%</td>
</tr>
<tr>
<td>Charlestown</td>
<td>0</td>
<td>114</td>
<td>0.0%</td>
</tr>
<tr>
<td>Coventry</td>
<td>0</td>
<td>618</td>
<td>0.0%</td>
</tr>
<tr>
<td>Cranston</td>
<td>11</td>
<td>1703</td>
<td>0.6%</td>
</tr>
<tr>
<td>Cumberland</td>
<td>3</td>
<td>648</td>
<td>0.5%</td>
</tr>
<tr>
<td>East Greenwich</td>
<td>0</td>
<td>255</td>
<td>0.0%</td>
</tr>
<tr>
<td>East Providence</td>
<td>4</td>
<td>1488</td>
<td>0.3%</td>
</tr>
<tr>
<td>Exeter</td>
<td>0</td>
<td>101</td>
<td>0.0%</td>
</tr>
<tr>
<td>Foster</td>
<td>1</td>
<td>67</td>
<td>1.5%</td>
</tr>
<tr>
<td>Glocester</td>
<td>0</td>
<td>120</td>
<td>0.0%</td>
</tr>
<tr>
<td>Hopkinton</td>
<td>1</td>
<td>167</td>
<td>0.6%</td>
</tr>
<tr>
<td>Jamestown</td>
<td>0</td>
<td>54</td>
<td>0.0%</td>
</tr>
<tr>
<td>Johnston</td>
<td>1</td>
<td>523</td>
<td>0.2%</td>
</tr>
<tr>
<td>Lincoln</td>
<td>1</td>
<td>359</td>
<td>0.3%</td>
</tr>
<tr>
<td>Little Compton</td>
<td>0</td>
<td>63</td>
<td>0.0%</td>
</tr>
<tr>
<td>Middletown</td>
<td>1</td>
<td>331</td>
<td>0.3%</td>
</tr>
<tr>
<td>Narragansett</td>
<td>0</td>
<td>125</td>
<td>0.0%</td>
</tr>
<tr>
<td>New Shoreham</td>
<td>0</td>
<td>21</td>
<td>0.0%</td>
</tr>
<tr>
<td>Newport</td>
<td>6</td>
<td>562</td>
<td>1.1%</td>
</tr>
<tr>
<td>North Kingstown</td>
<td>1</td>
<td>437</td>
<td>0.2%</td>
</tr>
<tr>
<td>North Providence</td>
<td>3</td>
<td>557</td>
<td>0.5%</td>
</tr>
<tr>
<td>North Smithfield</td>
<td>1</td>
<td>173</td>
<td>0.6%</td>
</tr>
<tr>
<td>Pawtucket</td>
<td>28</td>
<td>2547</td>
<td>1.1%</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>0</td>
<td>285</td>
<td>0.0%</td>
</tr>
<tr>
<td>Providence</td>
<td>104</td>
<td>7103</td>
<td>1.5%</td>
</tr>
<tr>
<td>Richmond</td>
<td>0</td>
<td>84</td>
<td>0.0%</td>
</tr>
<tr>
<td>Scituate</td>
<td>0</td>
<td>172</td>
<td>0.0%</td>
</tr>
<tr>
<td>Smithfield</td>
<td>0</td>
<td>291</td>
<td>0.0%</td>
</tr>
<tr>
<td>South Kingstown</td>
<td>2</td>
<td>444</td>
<td>0.5%</td>
</tr>
<tr>
<td>Tiverton</td>
<td>2</td>
<td>374</td>
<td>0.5%</td>
</tr>
<tr>
<td>Warren</td>
<td>1</td>
<td>314</td>
<td>0.3%</td>
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<tr>
<td>Warwick</td>
<td>7</td>
<td>1564</td>
<td>0.4%</td>
</tr>
<tr>
<td>West Greenwich</td>
<td>0</td>
<td>116</td>
<td>0.0%</td>
</tr>
<tr>
<td>West Warwick</td>
<td>3</td>
<td>722</td>
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</tr>
<tr>
<td>Westerly</td>
<td>1</td>
<td>401</td>
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</tr>
<tr>
<td>Woonsocket</td>
<td>6</td>
<td>1342</td>
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</tr>
<tr>
<td>Unknown</td>
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<td>12</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Statewide</strong></td>
<td><strong>200</strong></td>
<td><strong>26508</strong></td>
<td><strong>0.8%</strong></td>
</tr>
</tbody>
</table>
### 2011 Incidence Rate of Lead Poisoning at a Blood Lead Level (BLL) Greater Than or Equal to 5 µg/dL, by City and Town

Source: Lead Elimination Surveillance System, Rhode Island Department of Health

Notes: Core cities are highlighted. City-specific incidence rates for previous years can be found on the web at [www.health.ri.gov/leadpoisoning](http://www.health.ri.gov/leadpoisoning)

<table>
<thead>
<tr>
<th>TOWN</th>
<th># CHILDREN WITH BLL ≥ 5 µg/dL FOR THE FIRST TIME</th>
<th># CHILDREN SCREENED WITH NO PREVIOUS CONFIRMED ELEVATED BLL</th>
<th>INCIDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrington</td>
<td>7</td>
<td>423</td>
<td>1.7%</td>
</tr>
<tr>
<td>Bristol</td>
<td>18</td>
<td>504</td>
<td>3.6%</td>
</tr>
<tr>
<td>Burrillville</td>
<td>16</td>
<td>276</td>
<td>5.8%</td>
</tr>
<tr>
<td>Central Falls</td>
<td>51</td>
<td>807</td>
<td>6.3%</td>
</tr>
<tr>
<td>Charlestown</td>
<td>5</td>
<td>103</td>
<td>4.9%</td>
</tr>
<tr>
<td>Coventry</td>
<td>13</td>
<td>587</td>
<td>2.2%</td>
</tr>
<tr>
<td>Cranston</td>
<td>72</td>
<td>1552</td>
<td>4.6%</td>
</tr>
<tr>
<td>Cumberland</td>
<td>13</td>
<td>626</td>
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</tr>
<tr>
<td>East Greenwich</td>
<td>7</td>
<td>246</td>
<td>2.8%</td>
</tr>
<tr>
<td>East Providence</td>
<td>68</td>
<td>1299</td>
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</tr>
<tr>
<td>Exeter</td>
<td>1</td>
<td>97</td>
<td>1.0%</td>
</tr>
<tr>
<td>Foster</td>
<td>1</td>
<td>62</td>
<td>1.6%</td>
</tr>
<tr>
<td>Glocester</td>
<td>4</td>
<td>116</td>
<td>3.4%</td>
</tr>
<tr>
<td>Hopkinton</td>
<td>7</td>
<td>153</td>
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</tr>
<tr>
<td>Jamestown</td>
<td>1</td>
<td>52</td>
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</tr>
<tr>
<td>Johnston</td>
<td>15</td>
<td>493</td>
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</tr>
<tr>
<td>Lincoln</td>
<td>11</td>
<td>347</td>
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<tr>
<td>Little Compton</td>
<td>3</td>
<td>58</td>
<td>5.2%</td>
</tr>
<tr>
<td>Middletown</td>
<td>13</td>
<td>318</td>
<td>4.1%</td>
</tr>
<tr>
<td>Narragansett</td>
<td>3</td>
<td>118</td>
<td>2.5%</td>
</tr>
<tr>
<td>New Shoreham</td>
<td>2</td>
<td>21</td>
<td>9.5%</td>
</tr>
<tr>
<td>Newport</td>
<td>43</td>
<td>531</td>
<td>8.1%</td>
</tr>
<tr>
<td>North Kingstown</td>
<td>14</td>
<td>405</td>
<td>3.5%</td>
</tr>
<tr>
<td>North Providence</td>
<td>24</td>
<td>523</td>
<td>4.6%</td>
</tr>
<tr>
<td>North Smithfield</td>
<td>2</td>
<td>169</td>
<td>1.2%</td>
</tr>
<tr>
<td>Pawtucket</td>
<td>133</td>
<td>2280</td>
<td>5.8%</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>8</td>
<td>272</td>
<td>2.9%</td>
</tr>
<tr>
<td>Providence</td>
<td>529</td>
<td>6081</td>
<td>8.7%</td>
</tr>
<tr>
<td>Richmond</td>
<td>3</td>
<td>80</td>
<td>3.8%</td>
</tr>
<tr>
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<tr>
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<td><strong>1279</strong></td>
<td><strong>23953</strong></td>
<td><strong>5.3%</strong></td>
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2011 incidence rate of lead poisoning in Rhode Island

Figure 31 below displays the distribution of children whose blood lead levels were greater than or equal to 10 µg/dL for the first time in 2011. Providence had the highest incidence rate (1.5%), as indicated by the darkest shade on the map. Thirty-five of Rhode Island’s cities and towns had an incidence rate lower than 1%.

Figure 32 below displays the distribution of children whose blood lead levels were greater than or equal to 5 µg/dL for the first time. Providence and Newport had the highest incidence rates (8.7% and 8.1%, respectively). Eighteen of Rhode Island’s cities and towns had an incidence rate lower than 3% or less than 5 cases.

Prevalence rate of lead poisoning in Rhode Island

The prevalence of childhood lead poisoning is the total percentage of children younger than six years of age who are lead poisoned at a given point in time. The data show a steady decline in the prevalence of childhood lead poisoning over the last ten years, from 8.07% in 2001 to 1.02% in 2011 (Figure 33).

Although the prevalence of lead poisoning in Rhode Island has steadily declined, 276 children were lead poisoned in 2011. In order to decrease prevalence in the future, Rhode Island must continue to promote policies to increase lead-safe affordable housing.

The 2011 prevalence of childhood lead poisoning, as defined by a blood lead level greater than or equal to 5 µg/dL, was 7.54%. A total of 2,034 children had blood lead levels greater than or equal to 5 µg/dL in 2011.
**Children’s blood lead screening and follow-up**

Rhode Island requires all children to receive two blood lead screening tests prior to 36 months of age. Additional tests and follow-up services may be offered to families, depending on the blood lead test results of children.

In Rhode Island, those non-medical, follow-up case management services are provided by four certified lead centers. These Medicaid-funded centers provide lead education, nutrition counseling, and coordination of medical care with families’ primary care providers.

Although substantial evidence suggests that blood lead levels as low as 5 µg/dL may cause neurological problems in children, Rhode Island currently uses a first-time venous blood lead level of 15 µg/dL as an action level to initiate the delivery of services. Resource constraints and a lack of data showing the effectiveness of interventions at lower blood lead levels are barriers to extending services to more children.

Rhode Island categorizes lead-poisoned children in two ways: those with elevated blood lead levels and those with significant lead poisoning. A child is described as having an elevated blood lead level if the child’s first-time venous blood lead level is 10 to 19 µg/dL. This could change to 5 to 19 µg/dL if CDC lowers the threshold for lead poisoning.

A child is described as having significant lead poisoning if the child’s venous blood lead level is greater than or equal to 20 µg/dL, or if the child has two venous blood lead tests that reveal levels of 15 to 19 µg/dL. These two tests must be done between 90 and 365 days apart.

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**Figure 33**

**STATEWIDE PREVALENCE RATE OF LEAD POISONING, 2001-2011, AND PROJECTED IMPACT OF LOWERING THE BLOOD LEAD LEVEL OF CONCERN TO ≥ 5µg/dL IN 2011**

Source: Lead Elimination Surveillance System, Rhode Island Department of Health

Note: Data are based on venous tests and confirmed capillary tests only.
Services offered to children with elevated blood lead levels and with significant lead poisoning are detailed below.

**Elevated blood lead levels**

*Blood lead levels of 5 to 9 µg/dL*

In 2011, 1,079 children had first-time blood lead levels of 5 to 9 µg/dL. Currently, Rhode Island only offers educational material by mail to families of children with blood lead levels in this range.

*Blood lead levels of 10 to 14 µg/dL*

In 2011, 138 children had first-time blood lead levels of 10 to 14 µg/dL. All 138 children and families received educational materials from HEALTH via mail. Of the 138 children, 52 children (38%) and their families were offered educational visits and visual inspections of their homes from a lead center. Lead Centers had to stop offering this service midway through 2011 due to budget constraints. Of the 52 visits offered, 44 families (85%) accepted the visits.

In 2010, 163 children had first-time blood lead levels of 10 to 14 µg/dL. Of the 163 children, 100% of them and their families were offered educational visits and visual inspections of their homes from a lead center. Of the 163 visits offered, 122 families (75%) accepted the visits.

*Blood lead levels of 15 to 19 µg/dL*

In 2011, 33 children had first-time elevated blood lead levels in the 15 to 19 µg/dL range. The families were all referred to one of Rhode Island’s four certified lead centers. The lead centers offered each family in-home lead education, nutrition counseling, and coordination of medical care with the family’s primary care provider. Of the 33 families referred to a center, 31 (94%) accepted services, while 2 (6%) declined, did not respond, or were unable to be located.

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**Figure 34**  
**Cases of Significant Lead Poisoning, 2004-2011**  
Source: Lead Elimination Surveillance System, Rhode Island Department of Health
Significant lead poisoning
As shown in Figure 34, the number of children with significant or persistent* lead poisoning has steadily decreased since 2004, with the exception of a slight increase from 2009 to 2010. The number of cases in 2011 decreased to 31 from 52 cases in 2010. Of the 31 cases, 4 children (13%) had confirmed blood lead levels above 45 µg/dL, and 2 (6%) required hospitalization.

Each family of a child with significant lead poisoning is offered non-medical case management services and an environmental inspection of their residence. This is in addition to continuous lead testing and clinical follow up, usually done through the child’s primary care provider or lead clinic. Non-medical case management is available until a child’s blood lead level decreases, the environment is safe, or the family no longer needs assistance.

Of the 31 families referred to lead centers in 2011 for significant lead poisoning, 28 (90%) accepted services. The remaining families either refused services or could not be contacted.

Environmental lead inspections
HEALTH offers comprehensive environmental lead inspections to families of children with significant lead poisoning at no cost. HEALTH neither requires nor seeks the permission of landlords for inspections.

In past years, HEALTH also offered environmental lead inspections to “At-Risk Occupants.” Lead centers made these referrals for families with children younger than six who had elevated blood lead levels less than 20 µg/dL and/or who lived in homes with visible lead hazards. Prior to 2011, pregnant women were also considered At-Risk Occupants. Due to budget constraints, however, HEALTH could no longer offer At-Risk Occupant inspections to pregnant women in 2011.

In 2011, HEALTH performed 10 At-Risk Occupant inspections. In 2012, cuts in lead funding have prevented HEALTH from offering any form of At-Risk Occupant inspections.

Under special circumstances, HEALTH has performed inspections for children older than six years who have developmental delays or elevated blood lead levels.

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* Two venous blood lead levels of 15-19 µg/dL done between 90-365 days apart may be referred to as Significant or Persistent Lead Poisoning.
As shown in the table above, in 2011 HEALTH offered 53 total environmental inspections. 45 families (85%) accepted an environmental inspection, 3 (5%) refused, 2 (4%) did not respond, and 3 (6%) moved prior to the inspection.

**Lead hazards in housing**

Upon completion of a comprehensive environmental lead inspection of a given property, HEALTH sends the homeowner a report with instructions for correcting problems. Initially, HEALTH tries to actively engage owners of properties with lead hazards through technical assistance, clearance inspections, and on-site consultations until lead hazard remediation is achieved.

In 2011, lead hazards were found in 44 (98% of) inspected properties. As in previous years, most homeowners did not voluntarily correct the lead hazards at their properties, so the majority of cases were referred to enforcement authorities. HEALTH struggles with limited staff and budget restraints but has continued to strengthen its relationships with municipal housing courts and the Rhode Island Office of the Attorney General in joint enforcement efforts.

**What you can do**

**For families**

- Have children younger than six years old tested for lead poisoning, and understand their test results. In Rhode Island, these tests are covered by insurance, and free screenings are available to the uninsured.

- Protect children from lead dust and lead paint in and around your home.
  - Clean windows, doorways, floors, and dusty areas regularly with a wet rag or mop to decrease lead dust.
  - Use a vacuum with a high-efficiency particulate air (HEPA) filter to trap lead dust.
  - Block areas of chipping or peeling paint with duct tape or furniture.
  - Discourage children from playing near or on the windowsills.
  - Keep children from playing in soil near older buildings that may be contaminated by lead paint chips or dust.

- To reduce lead in drinking water: if your tap has not been used for more than a few hours, run cold water from the faucet for at least one minute or until the temperature drops before you drink it or cook with it. Never use hot water from the faucet for drinking, cooking, or making baby formula. See the Drinking Water chapter in this data book for more information on lead in drinking water.
• Give your children foods that are high in iron, vitamin C, and calcium.

• If you rent your home, go to http://dualsearch.provplan.org to see if your apartment has a valid Certificate of Conformance* or Lead-Safe Certificate. Notify your landlord of deteriorating paint conditions.

• Do not sign a lease for a home built prior to 1978 without signing a lead disclosure form and receiving a copy of the Protect Your Family from Lead brochure.

• Hire properly-licensed professionals. A licensed Lead Hazard Control firm is required when renovations will disturb more than 6 square feet of interior paint per room or 20 square feet of exterior paint on a pre-1978 home. The firm should give the owner and any tenants the Renovate Right booklet before beginning work. More information about Rhode Island’s Renovation, Repair, and Painting Rule is available in the next section of this data book.

• See www.health.ri.gov/healthrisks/poisoning/lead/for/parents for lead information for parents and families and www.health.ri.gov/healthrisks/poisoning/lead/for/tenants for lead information for tenants.

For property owners

• Take the three-hour lead hazard awareness class to learn how to identify lead hazards on your property.

• Visually inspect your property to identify lead hazards.

• Use lead-safe work practices to do any repairs. More information on lead-safe practices is available in the next section of this data book.

* Owner-occupied properties with three units or less are not required to have a Certificate of Conformance.
If renovation, repair, or painting will disturb more than 6 square feet of interior paint per room or 20 square feet of exterior paint on a pre-1978 home, hire a certified lead professional to do the work or take an 8-hour Lead-Safe Remodeler/Renovator class and get licensed through HEALTH. More information about Rhode Island’s Renovation, Repair, and Painting Rule is available in the next section of this data book.

If you rent your property to other occupants, comply with the federal lead hazard disclosure requirements and provide incoming tenants with a copy of the booklet titled Protect Your Family From Lead in Your Home.

See www.health.ri.gov/healthrisks/poisoning/lead/for/homeowners for lead information and educational materials for homeowners and www.health.ri.gov/healthrisks/poisoning/lead/for/landlords for lead information and educational materials for landlords.

Worker safety and licensed individuals

The Rhode Island Renovation, Repair, and Painting (RRP) Rule

Hiring properly trained and licensed persons is an important part of maintaining a safe and healthy home. Common renovation activities like sanding, cutting, and demolition can create hazardous lead dust and paint chips by disturbing lead-paint,
which can be harmful to adults and children. It only takes a small amount of lead to contaminate an area. To protect against this risk, Rhode Island requires all people doing renovation, repair, and painting that disturbs lead-based paint in homes, child care facilities, and schools built before 1978 to be trained in specific work practices, to have a license from HEALTH, and to work for licensed Lead Hazard Control Firms.

In general, the RRP Rule applies to any renovation, repair, or painting that disturbs 6 square feet or more of paint per room on the interior or 20 square feet or more of paint on the exterior of a pre-1978 house or child care facility.

In addition to painting and surface preparation, the RRP Rule includes work such as window replacement, weatherization projects, repairs and modifications to plumbing or electrical systems, and the conversion of a building or part of a building into residential use or a child care facility. The RRP Rule even applies to landlords working on their own properties. Not all projects are regulated by the RRP rule. The table on the previous page describes who can do the work for various properties and projects.

The RRP Rule also requires the renovator or property owner to hire a licensed Inspector or Technician to do a Clearance Inspection of the work area prior to the occupants’ return.

Searchable lists of licensed Firms, Renovators, Inspectors, and Technicians are available at www.health.ri.gov/find/environmentallead/firms.

**Worker safety**

“Everywhere you go, you take something with you, and you leave something behind.” (Locard’s Theory)

Adults are primarily exposed to lead in the workplace. Lead adversely affects multiple organ
systems and can cause permanent damage. Lead exposure can lead to high blood pressure, kidney problems, cognitive dysfunction, and poor female reproductive outcomes. Early symptoms are often subtle and nonspecific, involving the nervous system (fatigue, irritability, sleep disturbance, headache, difficulty concentrating, decreased libido), the gastrointestinal system (abdominal cramps, anorexia, nausea, constipation, diarrhea), or the musculoskeletal system (joint paint, muscle pain). A high level of lead poisoning can result in delirium, seizures, and coma associated with lead encephalopathy, a life-threatening condition characterized by brain swelling. Some individuals may not be aware of any symptoms even if they are lead poisoned.31

Following lead-safe work practices not only protects the health of people near work areas, but also the health of workers and their families.

**While work is being performed, the Rhode Island Renovation, Repair, and Painting (RRP) Rule requires Lead-Safe Remodeler/Renovators and their workers to:**

- Contain the work area to prevent dust and debris from escaping.
- Refrain from using work methods that generate large amounts of lead-contaminated dust (e.g. dry sweeping, using heat guns at temperatures above 1100 degrees Fahrenheit, open flame burning, and using flammable or methylene chloride paint strippers).

**When work is complete, Lead-Safe Remodeler/Renovators and their workers must:**

- Clean dust and debris using a HEPA vacuum and wet mops.
- Have a Certified Environmental Lead Inspector or Technician conduct a clearance inspection.
- Remove contaminant barriers upon notification that the dust wipes passed clearance.

**If your job exposes you to lead:**

- Remove work clothes at work and wash your work clothes separately from the clothes you wear around your family. You can bring lead into the house on your shoes and work clothes.
- Get recommended blood tests. It is recommended that individuals who are exposed to lead at work have a blood lead test every six months.

**How to learn more**

For more information on lead poisoning, see [www.health.ri.gov/leadpoisoning](http://www.health.ri.gov/leadpoisoning)
REFERENCES


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9 Based on 2008-2010 combined Rhode Island Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call Back Survey using weighted data.


18 2011 Rhode Island KIDS COUNT Factbook

19 United Way Rhode Island Community Impact Report 2010-2011


21 Homeless in Rhode Island; An Overview of the Homeless Crisis and Proposed Solutions http://www.rihomeless.org/Portals/0/Uploads/Documents/Public/Overview%20of%20Homelessness%20updated.pdf

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DID YOU KNOW?

Home visitors are available to perform no-cost healthy housing assessments for pregnant women and families with young children across Rhode Island. To learn more or request a visit, call your local First Connections provider:

Central Falls, Cranston, Pawtucket, Providence
Children’s Friend / 401-721-6400

Northern Rhode Island
Family Resources Community Action / 401-766-0900

South County, Warwick, West Warwick
VNS Home Health Services / 401-782-0500

East Bay, Jamestown, Aquidneck Island
VNS of Newport and Bristol Counties / 401-682-2100