

## **Science Supports Action Now to Make High-Risk Homes Healthier**

Researchers have understood for centuries that our homes can harm our health.<sup>1, 2</sup> Indeed, thousands of peer-reviewed studies have identified a multitude of health and safety risks in our homes that cause injury, illness, and death. Over the past decade, the body of scientific evidence has grown substantially as scores of new studies have assessed a range of health and safety hazards in housing, identified sources and pathways of exposure, established dose-response relationships, and quantified risks.

However, the most notable advance in the past decade is the emerging consensus among leading experts about the significance of health hazards in housing and, even more importantly, the effectiveness of a range of corrective measures. Solid evidence and the judgment of leading researchers across many fields identify practical steps to make American housing healthier and safer, in many cases through measures that are relatively simple and low cost. This paper reviews the state of the science and argues that broad implementation of maintenance and repairs to prevent and reduce health and safety hazards in housing is in everyone's interest.

## **Growing Consensus on the Significance of Health and Safety Hazards in Housing**

As evidence of multiple health and safety hazards in housing continues to mount, experts in the U.S. and abroad have recently reached consensus on the significance of important risk factors.

- A 2000 Institute of Medicine report recognized the following six factors in homes as asthma triggers: secondhand smoke, dust mite allergens, mold allergens, cockroach allergens, rat and mouse dander, and pet dander.<sup>3</sup> Asthma is a complex disease, with both genetic and environmental factors, but these conditions in housing play an important role.
- In 2004, another Institute of Medicine panel found that children who live in homes or attend schools with moisture and mold problems have twice the risk for asthma and other respiratory problems.<sup>4</sup>
- In 2005 and 2011, the World Health Organization examined more than a dozen risk factors and developed comprehensive estimates of the significant health burden of inadequate housing as measured in disability adjusted life years and avoidable fatalities.<sup>5, 6</sup>
- The U.S. Census American Housing Survey makes clear the prevalence of a wide range of conditions in housing that pose health hazards as well as striking disparities by race and income, which account for some share of health disparities, possibly a significant share.<sup>7</sup>
- The risk is widely acknowledged that weatherization measures to improve energy efficiency can inadvertently create health hazards if adequate airflow and moisture control are not ensured.<sup>8</sup> Steadily growing interest in energy efficiency highlights the need for safeguards to avoid exacerbating health hazards in housing.

## **Hazards in Housing Add Billions to National Healthcare Costs**

The evidence shows that health and safety hazards in our homes add billions of dollars to national healthcare costs, as the following examples make clear:

- Unintentional injuries in the home cause more than 21 million medical visits per year at a cost more than \$222 billion per year; falls in the home account for \$100 billion per year alone<sup>9</sup>; and the direct medical cost of each broken hip is \$65,000 - \$68,000.<sup>10</sup>
- Approximately seven million children aged 0-17 in the United States have asthma, with poor and minority children suffering a greater burden of the disease.<sup>11</sup> Asthma persists into adulthood, accounting for \$14.7 billion in direct medical costs plus \$5.0 billion in other costs per year.<sup>12</sup>
- Radon in homes is the second leading cause of lung cancer – 21,000 deaths per year.<sup>13</sup>
- Indoor exposures to air pollutants are 2-10 times higher than outdoors,<sup>14</sup> contributing to a host of acute and chronic diseases including asthma, hypertension and stroke, neurological effects of pesticide and lead exposures, and the effects of carbon monoxide exposure – from flu-like symptoms to fatalities.

### **Many Low-Cost Measures Effectively Reduce Health and Safety Risks in Housing**

Just as importantly, advances in science over the past decade have demonstrated the effectiveness of a range of interventions to reduce risk factors in housing.

- Multifaceted treatments of asthma triggers in the home have been found cost-effective for pediatric asthma patients with a history of hospital and emergency room visits, saving \$2.42 for each dollar spent.<sup>15</sup>
- According to the American Academy of Orthopaedic Surgeons, “Most hip fractures occur as a result of a fall, and most falls occur in the home. Many falls can be prevented by simple home safety improvements, such as removing clutter, providing enough lighting, and installing grab bars in bathrooms.”<sup>16</sup>
- With support from the Centers for Disease Control and Prevention, NCHH convened experts from many fields and disciplines in 2009 to review the evidence and reach consensus about the effectiveness of a wide range of interventions.<sup>17, 18, 19, 20</sup> These experts found “sufficient evidence” that many interventions reduce housing-related disease and injuries, including the following:
  - Lead hazard control
  - Multifaceted tailored asthma interventions
  - Integrated pest management
  - Mold and moisture control
  - Smoking bans
  - Smoke alarms
  - Hot water temperature control

In fairness, it deserves note that this consensus panel concluded that more field evaluation is still needed to document the benefits of other common, well-regarded interventions, such as:

- Installing handrails, grab bars, and improved lighting for fall prevention
- Reducing excessive humidity in homes
- Improving the safety of combustion appliances

Of course, additional research and evaluation of these and other health and safety hazards in housing will be valuable. But the promise of more definitive insights from future studies is no excuse to delay action to provide common sense, low-cost interventions. Researchers and practitioners understand the conditions that pose health and safety risks in homes, and have high confidence in the direction of changes needed to reduce many significant risks.

## Putting the Principles of Healthy Homes into Action

To focus attention on practical measures to reduce injury and disease, NCHH adopted and promoted the Seven Principles of Healthy Homes.<sup>21</sup> The *Surgeon General's Call to Action to Promote Healthy Homes* endorsed these principles in June 2009.<sup>22</sup>

- Keep It Dry
- Keep It Clean
- Keep It Pest-Free
- Keep It Safe
- Keep It Contaminate-Free
- Keep It Well Ventilated
- Keep It Maintained

NCHH recently developed a new set of tools and trainings to translate these principles into practice in high-risk homes. Rebuilding Together, which makes critical home repairs at no charge to low-income homeowners, has adopted these tools and made safe and healthy housing its strategic priority. These tools are now helping Rebuilding Together affiliates across the country identify all significant hazards, make repairs safely and effectively, and track the impact of their repairs using consistent metrics. The low cost and relative simplicity of many health and safety repairs makes them ripe for broad replication.

## Conclusion

Solid scientific evidence shows that multiple hazards that pose significant risks to occupants' health and safety are widespread in U.S. housing. These hazards add billions to healthcare costs and disproportionately affect low-income persons living in older housing. Evidence-based housing improvements and interventions effectively reduce these risks and prevent unnecessary illness, disease, and death. Current knowledge justifies action now to implement a range of relatively simple measures to make high-risk homes healthier and safer. All American homeowners and rental property owners deserve information about simple repairs to correct health hazards in their properties as well as the value of regular property maintenance and visual checks for moisture and other problems. Those concerned about controlling healthcare costs should encourage and support efforts to put the principles of healthy homes into practice on a broad scale.

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<sup>5</sup> *Report on the WHO Technical Meeting on Quantifying Disease from Inadequate Housing, Bonn Germany, November 28-30, 2005*. Copenhagen, Denmark: World Health Organization Regional Office for Europe; 2006 April.  
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