

Healthy Homes Research Agenda

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Abstract

The relationship between housing and health was established as early as the nineteenth century. Post industrialization improvements in sanitation, crowding and housing quality corrected most of the public health concerns about housing. A few residual problems remain, such as lead paint and radon, and occasionally product specific toxins (e.g. formaldehyde in manufactured housing) prompt remediation and more careful regulation. Otherwise, the relationship between housing and health has been attributed to the occupant's socio-economic status rather than housing itself. Recently researchers have paid greater attention to the housing-health nexus related to a variety of health effects from asthma to obesity. This paper outlines a comprehensive research agenda to address the housing-health nexus across a variety of health effects

Keywords: health, housing, healthy homes

Introduction

Although the nexus between housing and health has a long history of inquiry, this relationship only recently resurfaced as an important topic of investigation. This renewed interest stems from at least four factors.

- ?? The US housing stock continues to have a large number of homes that create health risks despite efforts over the past decades to decrease the quantity of substandard housing that contributes to the health risks.
- ?? The identification within the Healthy People 2000 report of significant environmental hazards associated with housing created a renewed focus on housing. As a result, in the section of Health People 2010 entitled Environment Health, specific goals and objectives are established under the heading, "Healthy Homes and Healthy Communities."²
- ?? The importance of public health in the ethos of public officials has been heightened because of the seriousness of and higher potential for new natural and intentional public health threats.

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² The seven goals listed in Healthy People 2010 for "Healthy Homes and Healthy Communities" are:

1. Reduce indoor allergen levels
2. Increase the number of office buildings that are managed using good indoor air quality practices.
3. Increase the proportion of persons who live in homes tested for radon concentrations.
4. Increase the number of new homes constructed to be radon resistant.
5. Increase the proportion of the Nation's primary and secondary schools that have official school policies ensuring the safety of the students and staff from environmental hazards.
6. Increase the proportion of persons living in pre-1950s housing that has been tested for the presence of lead-based paint.
7. Reduce the proportion of occupied housing units that are substandard.

- ?? New technologies that can monitor environmental conditions internal and external to the dwelling now enable researchers to use better metrics and methods for analyzing the relationships of housing to health.

Future Research Directions

Suggested research directions for the future

1. Housing and Infectious Diseases

- a. Research to further substantiate risk relationships (including hazard identification, dose response, and hazard exposure) for infectious diseases under different housing and socio-economic conditions.
- b. Research to establish risk relationships between housing and newly emerging infectious diseases such as West Nile or new resistant strains of diseases such as tuberculosis.
- c. Development of surveillance technologies that enable residents and housing officials to monitor more accurately the infectious disease risks associated with inferior housing conditions.

2. Housing and Chronic Illnesses

- a. Establish better empirical evidence for the relationships between housing conditions and chronic illnesses and between residential toxins and human developmental processes.
- b. Develop appropriate low cost technologies or interventions that can reduce exposure to chronic illness factors in housing . For example, although we know the chronic health risks to children from poor ventilation and thermal regimes, low cost means of ensuring proper thermal and ventilation levels in many lower income homes do not yet exist.
- c. Develop appropriate low cost technologies or interventions that can reduce exposure to residential toxins, e.g., lead or radon. For example, the evidence on the developmental effects of lead poisoning are well documented, but thousands of children are still at risk of exposure to it.
- d. Develop monitoring or surveillance systems that provide rapid assessments of risk levels in homes to alert residents of potential harmful exposures to toxin or conditions that increase the risk of chronic illnesses.
- e. Develop longitudinal data sets to analyze housing and health effects over the life span. Toxic exposures and some environmental conditions encountered by children, particularly at an early age, cause chronic conditions later in life, or lead to reduced physical or mental development throughout the life span. Quality longitudinal data and studies to confirm these effects should have a high priority on the healthy homes agenda.

3. Housing and Mental Illness

Although some empirical evidence links housing conditions, e.g., thermal conditions, crowding, or designs inhibiting social interaction, to mental health, the strength of the

evidence has not always compelling, and more empirical research is needed. Therefore, research on the links between housing and mental health should be continued and supported. Moreover, these relationships are thought to influence chronic illness. This chain of causality – housing conditions, mental illness, and chronic illness - should be on the housing research agenda for the future.

4. *Housing Affordability and Health*

Associations between housing affordability and health are complex and multi-dimensional. Inadequate housing, of course, creates risk factors that contribute to the unhealthy conditions discussed above. The lack of quality affordable housing also creates stress on the disposable income of families already forced to live in higher risk environments. If rents or mortgage payments require a higher proportion of income directed to housing, less is available for expenditures that influence health, e.g., nutritious food or primary care services. Studies that parse the complex interactions resulting from a deficiency in the affordable housing market are required to understand the separate and interactive effects of the dwelling, low income, and individual and household behaviors on health outcomes.

5. *Housing Disparities and Health*

Disparities in health status related to race and ethnicity are a major health policy issue. Evidence demonstrates that even when controlling for socio-economic status and relevant personal variables, these disparities prevail for some, although not all, health conditions. Disparities research has been a theme in housing, but linking housing disparities to health disparities has not been well researched. Whether housing disparities creates health disparities even when relevant socio-economic conditions are introduced have yet to be established.

6. *Neighborhood Effects and Health*

Neighborhood effects on health are multi-dimensional and complex. Areas for additional research include the following.

- a. Neighborhood effects on personal safety and injury rates are important considerations for future work. Research on neighborhoods designs such as better walkways or greenways or new technologies, e.g., new lighting approaches or surveillance systems to increase personal safety in high risk neighborhoods should be on the healthy homes agenda.
- b. Environmental hazards within or adjacent to neighborhoods have been a subject of considerable interest for some time. The health effects of hazardous exposures have been studied but considerable debate still exists as to exposure rates and the specific nature of their health effects. This is complicated by the fact that many of the health effects occur later in life. Additional empirical work is required.
- c. The evidence between health and environmental factors such as noise exposure or air quality is not as well documented as exposures to hazardous materials. Additional research should be supported.
- d. Existing research on the social organization of neighborhoods and health status suggest important effects. Social capital is believed to have positive impacts on the health of

residences but assessment of those effects requires better empirical evidence than currently exists.

- e. Peer relations of pre-teens and teens are known to influence health behaviors such as smoking, drug use, and risk taking. The strength of those relationships under different neighborhood conditions requires additional research.

7. *Urban Design and Health*

Public health officials have raised the question of whether urban designs impact health, particularly chronic illnesses. Initial research efforts raise interesting questions about design and health, but much more empirical evidence is needed before definitive causal statements are possible. Research is required to address some of these important design/health questions.

- a. Do designs for “active urban living” reduce the incidence of obesity and thus reduce rates of diabetes and cardiovascular diseases, for example? The endemic occurrence of obesity particularly among children heightens the importance of this research theme.
- b. Can urban design help reduce auto emissions to a level that can inhibit increases in chronic respiratory conditions such as asthma among urban residents?
- c. Can urban design contribute to the creation of greater social capital in neighborhoods and therefore, contribute to improved physical and mental health among residents?
- d. In this era of concern over homeland security, can urban design be a tool in improving the security of urban neighborhoods, or at a minimum, improving local governments’ ability to respond more quickly and effectively to natural or intended hazardous events?

8. *Multiple Scale Multi-Location Interaction Effects on Health*

Healthy home research has generally focused on one scale, i.e., the residence or neighborhood or one location such as the home, office, or school, yet it is the interaction of factors at different scales and different locations coupled with individual behavior that is required to fully explain health outcomes. The complexity of these interactions requires designs and methodologies that are sufficiently robust to identify the contributions of each to health outcomes. As yet, no research has been reported that adequately addresses these interactions. To fully understand the real effects of housing on personal health, multi-scale, multi-location research should be a high priority.

9. *Longitudinal Research on Health*

The health effects of housing conditions are not only multi-scale but many health outcomes, particularly in the cases of chronic illness and mental health, are manifested later in life. Thus, the links between housing and health may be obscured by the lack of good time series analyses. Some time segmented, cross-sectional studies have been undertaken, but the absences of well-designed longitudinal data sets make it difficult to assess the long-term effects of housing on health. Priority should be placed on the creation of data sets that can be used to examine the longitudinal relationships between health and housing. Such data sets would be important to research agendas in many of the health homes issue areas.