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Exposures in housing

Mild negative impact based on uncertain evidence with uncertain resource implications

Impact

Resources

Evidence

Studies

10

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Access data

Related: Exposure to air pollution, Sanitation, Noise pollution

Description

Housing refers to houses or buildings collectively, with a house defined as a building for human habitation, often the place of residence of a family (Oxford English Dictionary, 2022). In the literature, housing was investigated as either an intervention or an exposure. This Toolkit page summarises the evidence on housing exposures, which were commonly assessed via self-reported methods such as surveys or by directly observing housing

characteristics.

Findings

Ten reviews examined the health impacts of housing environments, which included over 500 primary studies. Overall, exposure to poor housing was negatively associated with communicable and non-communicable diseases, poor physical and mental health, and mortality. The most significant impacts on health in housing were cold, dampness, mould, and poor indoor air quality due to a lack of adequate ventilation.

Most reviews considered all age groups or did not specify age, with one review focusing on adolescents (Knöll 2017). Half restricted their geographical scope with two focusing on the USA (Maly 2018; Miller 2011), Brazil (Kloos 2008), Europe (Knöll 2017), and sub-Saharan Africa (Alaazi 2020). The rest did not geographically restrict the evidence, with the highest proportion of studies being from North America, Europe, and Oceania.

There were strong associations between housing characteristics and diseases:

- Overcrowding was associated with a greater risk of infectious and respiratory disease, and poor mental health (Phibbs 2011; Alaazi 2020; Wimalasena 2021; Eder 2018);
- Damp or mouldy housing was associated with respiratory disease, meningococcal infection, eczema, asthma and rhinitis (Phibbs 2011; Alaazi 2020; Wimalasena 2021). In children, the odds of asthma and asthmatic symptoms, such as wheezing and cough, are two or more times greater in damp houses than in non-damp ones (Alaazi 2020);
- Toxic materials used in housing construction or cleaning, such as lead (Pb), asbestos, indoor allergens, ozone and radon, were injurious to health, including cognitive disabilities, neurodevelopmental defects, asthma cancer, asbestosis, and death (Alaazi 2020; Wimalasena 2021; Phibbs 2011; Miller 2011). Daily cleaning activities were associated with the prevalence of asthma or asthmatic symptoms, with evidence of the chemicals in cleaning agents reducing lung function in women who regularly use cleaning products in the home and children exposed to household air cleaners that are ozone emitting (Wimalasena 2021);
- Cold/low temperatures were associated with respiratory infections, hypothermia, bronchospasm, and heart disease (Phibbs 2011);
- Homelessness was associated with a range of physical ailments, causing ill health and aggravating poor health (Phibbs 2011).

Poor housing design predisposed residents to accidents and injuries, which increased in children and the elderly (Phibbs 2011). Features such as a lack of shared recreational space, private gardens, or housing with deck access, were found to have a negative impact on

mental health (Gong 2016). Defective walls were conducive to the survival of disease-hosting rodents, such as rats and mice, which increase the prevalence of pest-borne diseases, particularly Lassa fever (Alaazi 2020).

Indoor household air pollution from multiple sources (e.g. biomass and solid fuels used for cooking and heating) negatively impacted health including eye infections, respiratory-related diseases and deaths, cancers, and hypertension (Alaazi 2020; Rojas-Rueda 2021). Thus kitchens using liquefied petroleum gas (LPG) or electric stovetops are preferred (Rojas-Rueda 2021), although indoor nitrogen oxide (NO2) concentrations should be monitored (Wimalasena 2021). For children and adolescents, tobacco smoking in the home increased the risk of respiratory disease later in life (Wimalasena 2021). Allergens from pets lead to exacerbation of asthma and wheezing, with evidence of long-term negative impacts of early life exposure on the respiratory system (Wimalasena 2021).

Housing quality (i.e. poor housing) was associated with disease incidence and vector abundance, including malaria, leishmaniasis, Chagas disease and schistosomiasis (Eder 2018; Kloos 2008). Living conditions, such as small living spaces and lack of air conditioning, increased dengue transmission in the US-Mexican border area (Eder 2018).

Housing insecurity and lack of housing affordability was a psychosocial stressor that affected both physical and mental health. High utility bills required lower-income families to choose between housing, heating, food, medical care, and other basic needs, which negatively affect the growth and development of children (Miller 2011). Residential relocation because of the lack of affordable housing caused a disruption in health care (Miller 2011). Housing status was a predictor of pain for people with chronic pain, due to the stress burden of homelessness or living in a low-income neighbourhood (Maly 2018). Housing circumstances (e.g. housing tenure, single-parent households) were determinants of adolescent health and wellbeing (Knöll 2017).

Impact

All reviews found that poor housing, including overcrowding, poor structures and design, coldness, dampness, mould, toxicants, and indoor air pollution had a negative impact on health. Addressing a person's housing status and overall state of poverty may be an important part of preventing or addressing chronic diseases. Other recommendations include:

- policies for ensuring adequate ventilation, thermal performance standards, including heating, cooling and insulation, smoke-free homes and cleaner fuels, such as liquefied petroleum gas (LPG) or electricity in homes. Governments should subsidise clean fuels to promote usage;

- health promotion agendas that focus on infrastructural improvements, access to education, healthcare, and basic water and sanitation
- public and private sector collaborations for housing and health agencies

Resources

The ten included reviews did not report any direct information on the cost or resource implications of housing exposures. However, one review mentioned the financial challenges for low and middle-income countries, which drives the usage of solid fuels and inefficient cookstoves, along with the occupancy of dwellings with poor thermal performance and overcrowding (Wimalasena 2021).

Quality of the evidence

There were five literature reviews, two formal systematic reviews, one narrative review, one scoping review and one overview of systematic reviews. No reviews conducted a meta-analysis. Searches for evidence were conducted between 2010 and 2020 in a median of three databases. Two reviews used a tool to assess the risk of bias or quality, with one reporting moderate-quality evidence (Wimalasena 2021) and the other did not report their assessment outcomes (Gong 2016). Since the majority of reviews (80%) did not assess the quality of the evidence the overall evidence score was uncertain.

The uncertain evidence is due to gaps and limitations, including large heterogeneity in study designs, limiting comparability, with the majority of included studies being cross-sectional, meaning that the direction of causation and effect over time could not be identified. Future research should focus on gathering more robust evidence that uses larger sample sizes and is longitudinal in nature to provide time to understand the longer-term health impacts of housing exposures. Clear exposure and health outcome definitions and standardised housing quality measures are required to improve the quality of synthesised evidence.

External links to related sources

- WHO (2018): Housing and health guidelines
- WHO (2022): Lead
- UK Parliament (2022): Housing
- Crisis (2022): Housing
- Designing Buildings (2021): Lifetime homes
- National Housing Federation (2022)
- Resolution Foundation (2022): Housing outlook
- The Health Foundation (2022): Housing

- The Health Foundation (2021): Relationship between health and number of housing problems
- The Health Foundation (2020): Better housing is crucial for our health and the covid-19 recovery
- The Health Foundation (2017): How does housing influence our health
- The King's Fund (2022): Housing – our work on housing and its role in people's health
- The King's Fund (2018): Housing and health – opportunities for sustainability and transformation partnerships
- The King's Fund (2016): The economics of housing and health – the role of housing associations
- The King's Fund: Warmer and safer homes

References of included reviews

Alaazi, Dominic A., and Gamel A. M. Aganah. 2020. "Understanding the Slum-Health Conundrum in Sub-Saharan Africa: A Proposal for a Rights-Based Approach to Health Promotion in Slums." *Global Health Promotion* 27 (3): 65–72.

Eder, Marcus, Fanny Cortes, Noêmia Teixeira de Siqueira Filha, Giovanny Vinícius Araújo de França, Stéphanie Degroote, Cynthia Braga, Valéry Ridde, and Celina Maria Turchi Martelli. 2018. "Scoping Review on Vector-Borne Diseases in Urban Areas: Transmission Dynamics, Vectorial Capacity and Co-Infection." *Infectious Diseases of Poverty* 7 (1): 90.

Gong, Yi, Stephen Palmer, John Gallacher, Terry Marsden, and David Fone. 2016. "A Systematic Review of the Relationship between Objective Measurements of the Urban Environment and Psychological Distress." *Environment International* 96 (November): 48–57.

Kloos, Helmut, Rodrigo Correa-Oliveira, Humberto Ferreira Oliveira Quites, Márcia Christina Caetano Souza, and Andréa Gazzinelli. 2008. "Socioeconomic Studies of Schistosomiasis in Brazil: A Review." *Acta Tropica* 108 (2-3): 194–201.

Knöll, Martin, and Jennifer J. Roe. 2017. "Ten Questions Concerning a New Adolescent Health Urbanism." *Building and Environment* 126 (December): 496–506.

Maly, Angelika, and April Hazard Vallerand. 2018. "Neighborhood, Socioeconomic, and Racial Influence on Chronic Pain." *Pain Management Nursing: Official Journal of the American Society of Pain Management Nurses* 19 (1): 14–22.

Miller, Wilhelmine D., Craig E. Pollack, and David R. Williams. 2011. "Healthy Homes and Communities: Putting the Pieces Together." *American Journal of Preventive Medicine* 40 (1

Suppl 1): S48–57.

Phibbs, Peter, and Susan Thompson. 2011. "The Health Impacts of Housing: Toward a Policy-Relevant Research Agenda." Australian Housing and Urban Research Institute Limited. August 24, 2011. https://www.ahuri.edu.au/research/final-reports/173.

Rojas-Rueda, David, Emily Morales-Zamora, Wael Abdullah Alsufyani, Christopher H. Herbst, Salem M. AlBalawi, Reem Alsukait, and Mashael Alomran. 2021. "Environmental Risk Factors and Health: An Umbrella Review of Meta-Analyses." *International Journal of Environmental Research and Public Health* 18 (2). https://doi.org/10.3390/ijerph18020704.

Wimalasena, Nipuni Nilakshini, Alice Chang-Richards, Kevin I-Kai Wang, and Kim N. Dirks. 2021. "Housing Risk Factors Associated with Respiratory Disease: A Systematic Review." *International Journal of Environmental Research and Public Health* 18 (6). https://doi.org/10.3390/ijerph18062815.

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