EffectivenessMatters

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Housing improvement and home safety

- **The homes we live in impact on health, wellbeing and health inequalities**
- **Treating illnesses directly related to living in cold, damp and dangerous homes costs the NHS £2.5 billion per year**
- **Ensuring affordable warmth through insulation and more efficient heating can improve health and wellbeing**
- **Home safety assessment and modification can reduce falls and risk of falling in older people**
- **Education, promotion of exercise and wearing of appropriate footwear, environmental modifications and training of healthcare workers can reduce the rate of fall-related injuries (including fractures) in older people**
- **Homes can be made safer through education delivered by health or social care professionals, school teachers, lay workers, and voluntary organisations**
- **Home assessment followed by tailored packages and co-ordinated care from healthcare providers and social services can reduce the number of asthma-symptom days, school absenteeism and acute-care visits amongst children and adolescents**

This issue of *Effectiveness Matters* has been produced by the Centre for Reviews and Dissemination (CRD) in collaboration with the National Institute for Health Research School for Public Health Research (NIHR SPHR), the London School of Hygiene & Tropical Medicine and the MRC Social and Public Health Sciences Unit (MRC SPHSU), University of Glasgow.

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This issue of *Effectiveness Matters* summarises the research evidence on housing improvement and home safety.

The evidence is derived from methodologically robust, up-to-date systematic reviews. Within categories of intervention, the content, implementation, and outcomes varied between studies, as did individual study quality. This can lead to apparently conflicting findings and where this occurs we have attempted to interpret the evidence.

Background

Housing is an important public health issue. The homes we live in impact on health, wellbeing and health inequalities.[1] Vulnerable groups, especially older people, the unemployed and those with poor health, are most likely to live in inadequate housing and spend long periods of time indoors, increasing their exposure to poor housing conditions. In 2012, 22% of households in England failed to meet the "decent home" standard (see box). The private rented sector had the highest proportion (33%) of non-decent homes, but 20% of owner occupied homes also failed to meet the standard.[2]

To meet the decent home standard, a home must:

- meet minimum safety standards for housing
- be in a reasonable state of repair
- have reasonably modern facilities and services
- have a reasonable degree of "thermal comfort" (effective insulation, efficient heating)

Any home that does not meet all four criteria will fail the standard.

Department for Communities & Local Government[21]

In 2013 nearly six million households in the UK were in fuel poverty (households spending more than 10% of their income on fuel to maintain satisfactory heating).[3] Cold housing is associated with circulatory diseases, respiratory problems and mental ill-health. Cold is thought to explain the extra "winter deaths" occurring each year between December and March,[4] with older people and children being particularly at risk.[5]

Excessive dampness in the home is a threat to health. Damp, warm conditions can lead to rapid increases in mould as well as house dust mites, and both are linked to an increased risk of respiratory problems, including asthma, especially in children.[5] In 2012, 4% of households in England lived in a damp home and in the private rented sector this rises to 10%. Vulnerable groups including older people and households with a child under five, with long term illness or disability or living in poverty are particularly affected.[6]

Unintentional injuries and deaths occur frequently in the home, most commonly from falls, poisoning, fires, poor design and poor lighting.[1,5] Older people and children are at greatest risk, with reported deaths highest in children under five years of age.[1] Costs of treating children's injuries caused by accidents in the home were estimated at £146m per year in 2010. Falls and fractures (all) in older people accounted for 4 million hospital bed days each year in England, at a cost in 2011 of approximately £2 billion.[7]

Overall, treating people with illnesses directly related to living in cold, damp and dangerous homes costs the NHS at least £2.5 billion per year.[8] This figure includes costs of GP consultations, associated treatments, hospital in-days and hospital out-day referrals.

Housing improvement

The effects of housing improvement including interventions targeting warmth and energy efficiency and through changes to the structure or fabric of houses (often government investment programmes) were assessed in a review of 27 studies.[9] Interventions included installation of central heating, loft and/or cavity wall insulation and double glazing. General, respiratory and mental health can be improved, especially when interventions are targeted at people with poor health and at those living in poor quality, cold homes.

Improvements in energy efficiency and provision of warmth which is affordable, where household income is low, allows families to heat more rooms, increasing the amount of usable space in the home. Greater usable living space provides increased levels of privacy and may lead to improved relations across family members. These changes can improve health and wellbeing in the long term and reduce absences from school or work.[9]

Housing-led neighbourhood renewal involves housing improvement or provision of new housing as part of a programme of wider neighbourhood changes to the physical environment and other regeneration activities. Components often vary according to the neighbourhood population and the extent of housing improvement experienced by occupants differs. This may explain why health improvements following these programmes are not always clear.[9]

Improving home safety

Providing safety equipment and modifying the home

Home safety assessments followed by adaptations and provision of aids for personal care and mobility can be effective in reducing the rate of falls and risk of falling in older adults. Interventions are more effective when delivered to those at greater risk of falling, and when delivered by an occupational therapist.[10]

Programmes aimed at older people combining home hazards assessment and modification, medication review, exercise and health/bone assessment failed to show a reduction in injuries that could be directly linked to the interventions. Similarly, none of the studies focusing on children demonstrated a reduction in injuries. However, it is important to note that many of the studies were under-powered to detect a change in injuries and many were carried out in homes where major hazards had been removed, which means only modest changes could be achieved.[11]

Distributing free smoke alarms failed to improve installation rates and provision of electrical socket covers, bath mats, fire guards and stair gates did not increase regular use of the equipment beyond 12 months.[12] Programmes to supply and/or install free or discounted home safety equipment failed to reduce injury rates in children.[12] Providing on-going support with installation, maintenance and use of safety equipment, is likely to make these interventions more effective.[13]

Education, support and raising awareness

Programmes which encourage safer practices at home are effective in raising awareness and in changing behaviours. However, increases in knowledge and improvements in behaviours and practices do not consistently lead to reductions in rates of injuries, although very few studies reported injury related outcomes.[12, 14, 15]

A review[14] of 98 controlled studies found that one-to-one, face-to-face education delivered by health or social care professionals, school teachers, lay workers, voluntary or other organisations increased the adoption of home safety practices, such as:

- safe hot water temperatures
- a functional smoke alarm
- a fire escape plan
- safe storage of medications and cleaning products
- poison control centre telephone number accessible
- fitted stair gates and covers on unused sockets.

Co-ordinated programmes including education, promotion of exercise and wearing of appropriate footwear, environmental modifications, plus training of healthcare workers in hazard reduction, can be effective in reducing the rate of fall-related injuries (including fractures) in older people.[16]

Home interventions for people with respiratory disease

A review of two studies suggests that reductions in dust mite counts and antigen levels can be achieved through humidity control using a mechanical ventilation heat recovery system. While small improvements in asthma symptoms occurred it is unclear if these were clinically beneficial. Findings were inconsistent in terms of the impact of dehumidification using mechanical ventilation on quality of life, symptom scores, medication use, requirement for oral corticosteroids, visits to the GP, or emergency department, and hospitalisations in people with asthma.[17]

A review of nine studies assessing the impact of high-efficiency particulate air filters (HEPA filters) on house dust mites also reported inconsistent findings for asthma symptom scores, medication use and particulate levels for people with allergic rhinitis.[18]

The studies included in these two reviews were of variable quality and likely to have been underpowered to detect an effect, which may explain the inconsistencies in findings.[17,18]

A review of 55 randomised controlled trials suggests that mattress encasings, vacuum cleaning, air filtration, ventilation, washing, and chemical interventions (acaricides) do not improve morning peak flow, symptom scores or reduced medication use amongst people with asthma.[19] Such interventions alone are unlikely to lead to meaningful reductions in allergens, explaining why respiratory outcomes are not improved. Multi-component interventions including asthma and self-management education, with co-ordinated care between healthcare providers and social services can reduce the number of asthma-symptom days, school absenteeism and acute-care visits in children and adolescents. Fewer studies have been conducted with adults and the findings are inconsistent.[20]

NOTE: The NICE topic engagement exercise for homes: preventing accident and injury quality standard is currently underway. Stakeholders can register an interest at http://www.nice.org.uk/get-involved/Stakeholder-Registration.

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About *Effectiveness Matters*

Effectiveness Matters is a summary of reliable research evidence about the effects of important interventions for practitioners and decision makers in the NHS and public health. *Effectiveness Matters* is extensively peer reviewed.

Further details of included reviews can be found at: http://www.york.ac.uk/inst/crd/pdf/Effectiveness-Matters-Housing-tables.pdf