



The role of home adaptations in improving later life

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November 2017

Acknowledgements

We would like to acknowledge the team at Centre for Ageing Better for funding this realist synthesis of evidence and for all the advice, feedback and support during the process. Advisory Group members have proved an excellent sounding board and fascinating discussion which has added much to the final product. We thank Sue Adams, Cheryl Coppell, Frances Heywood, Ann Netten, Alison Raw, Mandy Sainty and Martin Wheatley for the high-level advice and guidance. We would also like to thank members of the regional networks of Housing Champions coordinated by Care & Repair England and all those organisations and individuals supplying 'grey' literature. This was invaluable. Our colleagues Pauline Shaw and Professor Selena Gray were members of the project team and we thank them also for their contributions.

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Our focus is on public health economics, health and social care policy, critical research in health and wellbeing and conceptualising evidence for change in physical and social environments. The UWE team includes experts in the process of home adaptations service delivery, the Disabled Facilities Grant and home improvement agencies. The UWE team has considerable expertise in undertaking scoping reviews, systematic reviews, umbrella reviews, realist synthesis and evaluation. It has produced a number of reports on home adaptations delivery and the Disabled Facilities Grant.

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BRE is a leading multi-disciplinary building science centre with a mission to improve the built environment through research and knowledge generation. The team members working on this project have expertise in experimental design, data collection and qualitative and quantitative data analysis. They developed the Housing, Health and Safety Rating System (HHSRS) and have produced a series of reports on the Cost of Poor Housing, on the Accessibility and Adaptability of the Housing Stock and a Review of the Disabled Facilities Grant and Means Test. They contribute to the English Housing Survey annual reports published by Department for Communities and Local Government (DCLG) each year.

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Executive summary

Introduction

Background

Living in a suitable home is crucially important to a good later life. Good housing and age-friendly environments help people to stay warm, safe and healthy, close to those who make up their social circle, and enable them to do the things that are important to them.

The majority of older people in England live in mainstream housing, but that housing often has small room sizes, steep internal stairs, baths rather than showers and steps outside. As people get older these become increasingly difficult to manage, with increasing long-term conditions and disabilities impacting on day-to-day activities within the home. Very little attractive, affordable housing has been built in the right locations to enable people to move to properties that are more accessible.

Adapting the home can increase the usability of the home environment and enable the majority of people to maintain their independence for as long as possible. This could potentially reduce the risk of falls and other accidents, relieve pressures on accident and emergency services, speed hospital discharge and reduce the need for residential care.

The review aims to provide evidence to make the case for the importance and effectiveness of adaptations, primarily to influence policy-makers at national and local levels, practitioners and local commissioners. The objective is to strengthen their focus on housing in their strategic plans, and commit increased effort and resources to delivering both more extensive, better coordinated, more timely and personalised repair and adaptations services and better information and advice services.

The review was conducted by a team from the University of the West of England, Bristol (UWE), and related modelling work was conducted by Building Research Establishment (BRE).

Methodology

The overall aim was to synthesise the published evidence, and quality of that evidence, for how home adaptations can contribute to improving later life and to attempt to model the potential cost saving implications, to make recommendations for national policy, local service design and practice. This was done through a comprehensive review of the peer-reviewed literature, and professional and practitioner-led grey literature.

The key research questions were:

1. What is the strength and state of the best available evidence for 'what works' and 'what is cost-effective' in home adaptations?
2. How does the provision and use of home adaptations work best to improve the health and wellbeing outcomes of older people aged 65 and over living in the community?

This report is a summary of current research knowledge (from January 2000 to December 2016 inclusive) and identifies gaps in the existing research. Systematic reviews focus solely on the peer-reviewed literature with a very strong emphasis on randomised control trials (RCT) as the gold standard. This review recognises that there is likely to be limited availability of RCT evidence therefore also searched for good quality, robust evidence from a range of other methodologies, including: experimental designs, cohort studies, observational studies and research underpinned by a range of qualitative methodologies. It included identifying the best research from the grey literature rather than using purely academic sources.

Key findings

While the majority of the best evidence was from New Zealand and North America, where they have been able to take advantage of robust data from health and insurance records to be able to more accurately link housing interventions to health outcomes, there are some key headline findings that are relevant to the UK setting:

- There is strong evidence that minor home adaptations are an effective and cost-effective intervention for preventing falls and injuries, improving performance of everyday activities and improving mental health. Major adaptations have been less extensively studied, but the evidence shows that they can also support people in achieving these outcomes in some circumstances.
- There is strong evidence that minor adaptations are particularly effective at improving outcomes and reducing risk when they are combined with other necessary repairs and home improvements, such as improving lighting and removing trip and fall hazards.
- There is good evidence that greatest outcomes are achieved when individuals, families and carers are closely involved in the decision-making process, focusing on individual goals and what a person wants to achieve in the home.
- There is insufficient evidence at present to quantify the overall return on investment (ROI) from home adaptations. However, one aspect that has been measured is the ROI of home interventions in preventing falls on stairs. Preventive work to mitigate worse than average hazards associated with falls on stairs among households with an adult aged 65 or over

would cost in the region of £290 million and confer a benefit to society of around £470 million, which corresponds to a positive ROI of 62p for every £1 and a payback period of less than eight months.

- Available evidence finds that delays in installing adaptations can reduce their effectiveness.
- There is good evidence that people can be put off installing adaptations until they reach a point of crisis, in part because they do not wish to change or 'medicalise' their home.

While these are overarching headline messages, it is essential for policy and practice to reflect different needs across housing tenure, as what works for an individual in social rented or private rented accommodation, will vastly differ to those who own their home. There is very little research about the changes people do to their homes without statutory help.

The state of the evidence

While the overall quality of the evidence was good, the majority has been conducted outside of the UK, and there are some significant gaps. Important evidence gaps that need to be filled include: RCT or experimental design studies in the UK on the effectiveness of adaptations; cost-effectiveness evidence, especially quantifying a broader range of benefits of adaptations; longitudinal studies to provide evidence of the longer-term effects of adaptations; observational designs to better understand how adaptations can work best; and more prospective studies that collect before and after data rather than relying on personal recall post-adaptation.

Conclusions

People are living longer and as they get older, particularly in their later years, the likelihood of developing multiple long-term health conditions rises, and it becomes increasingly difficult to carry out day-to-day activities. However, the home environment, and how it can better support you to remain independent for longer, has received little attention in debates about the future of service delivery.

Our review finds good evidence that both minor and major home adaptations can improve a range of outcomes for people in later life, especially when they are done in combination with any necessary repairs, are delivered in a timely manner and are in line with people's personal goals. Most people will not be dependent on statutory services for home adaptations, so using all the resources in the community to enable people to plan ahead and spend their own money effectively is essential.

Background

Why this work was commissioned

Adaptations to make homes more accessible are becoming increasingly important as the population ages. The majority of older people in England live in mainstream housing, but that housing often has small room sizes, steep internal stairs, baths rather than showers and steps outside. These become difficult to manage as people get less mobile with age or have to deal with sight loss or other conditions. To remain independent at home older people, their families and carers need effective ways to adapt and modify their homes. This could potentially reduce the risk of falls and other accidents, relieve pressures on accident and emergency services, speed hospital discharge and reduce the need for residential care.

Over the last decade, there has been a considerable increase in the number of older people and there are more people with long-term conditions and disabilities and growing pressures on health and care services. Very little attractive, affordable housing has been built in the right locations to enable people to move to properties that are more accessible. The majority of older people will remain living in mainstream housing, mostly in the owner-occupied sector. Much of this was not built to modern accessibility standards. Adapting the home can increase the usability of the home environment and enable the majority of people to maintain their independence for as long as possible. Adaptations will also make it easier for them to be cared for at home as they approach the end of their life.

It has never been more important to recognise the importance and value of identifying the best available evidence of 'what works' in home adaptations and 'what is cost-effective' in making a difference to the lives of thousands of older people. Equally important is understanding how home adaptations work best to maximise health and wellbeing outcomes. This report aspires to bring a complex evidence base to life and to provide pragmatic 'real life' explanations to inspire change in the lives of older people.

The Centre for Ageing Better's vision is a society where everybody enjoys a good later life. As the home is the place in which older people spend the majority of their time it is vital that it is safe, secure and satisfying and allows people to live fulfilled and dignified lives. This review will provide evidence for older people themselves, for practitioners, policy-makers and service commissioners to guide decision-making and inspire future action.

Housing condition

A rapidly ageing population with rising levels of disability and physical impairment increases the need for adaptations. Other contributing factors include the age, condition and accessibility of the existing housing stock.

The English Housing Survey 2014-15¹ reveals that:

- I. Three in ten households (6.9 million) contain an adult aged 65 years or over.
- II. Three quarters (76%) of households where the oldest person was aged 65 and over are home owners.
- III. Almost half (47%) of those aged 75-84, and 61% of those 85 and over, live alone.
- IV. Three million households containing an adult aged 65 or over report a long-term illness or disability.
- V. The majority of older households live in pre-1980 housing not built to modern accessibility standards. A quarter of those aged 75-84 and a third of those aged 85 and over live in homes built before 1945.
- VI. One in five homes (20%) occupied by older people in England (2 million households) failed the Decent Homes Standard in 2014, and those aged 85 years or over were more likely to live in non-decent housing (29%) compared with all other age groups.
- VII. Close to half a million households (475,000; 40%) containing at least one adult aged 65 years or over, with a long-term illness or disability, self-reported the need for installation of at least one adaptation.
- VIII. Very few people needing adaptations are aiming to move and desire to move declines with increasing age.
- IX. In addition, 4% of households that included an adult aged 65 years or over are living in homes with the most serious risk of falls and a further 7% live in homes where such risks are less serious but still higher than average.

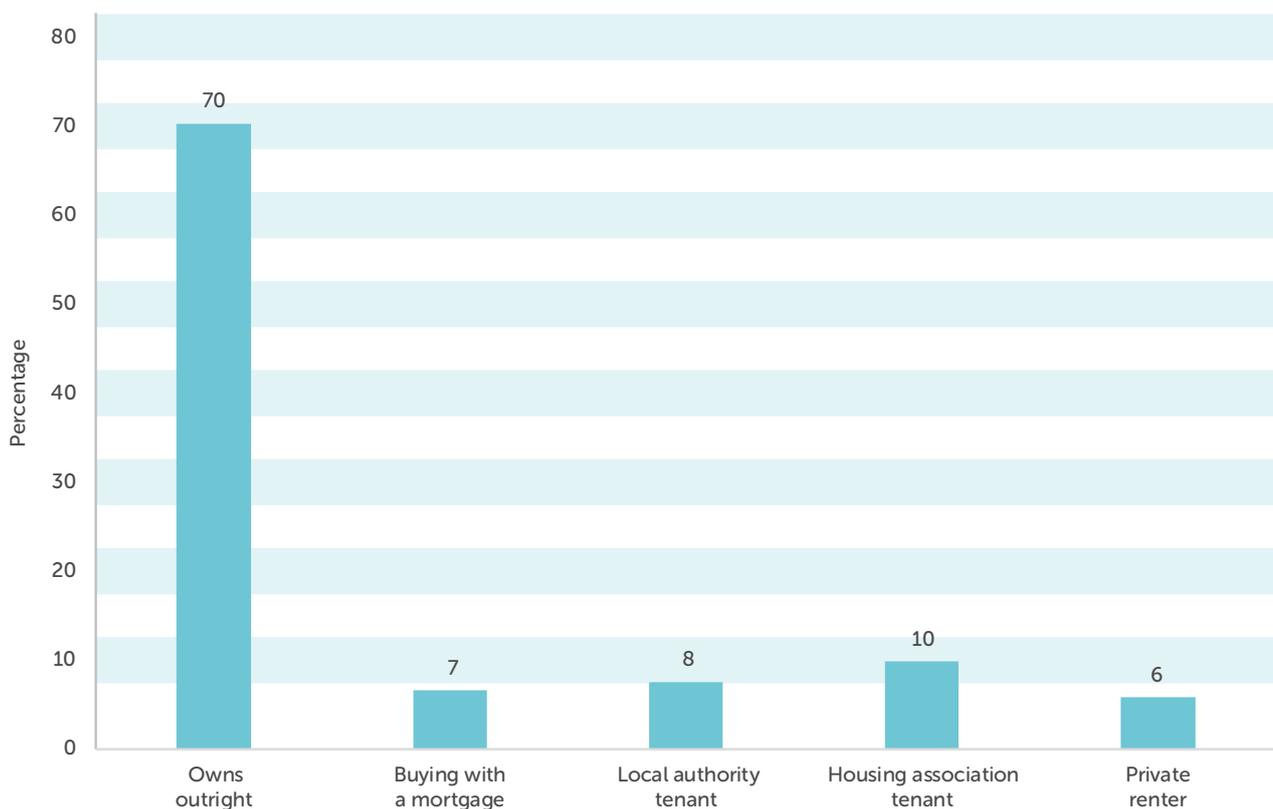
¹This report uses data from the English Housing Survey (EHS) 2014-15 as tables about older people and adaptations were not yet available from the 2015-16 survey. The EHS is the most comprehensive source of information about housing and the older population in England, but it has limitations. The EHS collates self-reported data about long-term illness and the need for adaptations, but there is some evidence that people do not readily label themselves as having a long-term illness or disability and the benefits of home adaptations are often not fully understood or appreciated (Proven, 2016). As a result the need for adaptations is likely to be underestimated. EHS statistics only provide a 'snapshot' of need at the time of the survey and therefore demographic changes or deterioration of the housing stock is not included in that picture.

X. Carers are also ageing. The Family Resources survey shows that over a quarter of all informal carers are aged 65 and above; a proportion of whom may have their own need for adaptations (DWP, 2017).

Tenure

The majority of people 65 years and over, in England, are owner occupiers (Figure 1). The proportion of older private renters is currently low but is growing and some estimates suggest a third of people aged 60 and over could be living in private rental property by 2040 (Perry et al, 2015). Private rented property has the highest proportion of non-decent homes compared to owner occupied homes and social rented homes (English Housing Survey, 2014-2015). Short-term tenancies and higher levels of disrepair may make adaptations in this sector more difficult to implement.

Figure 1: Tenure of homes where oldest person in the household was aged 65 and over

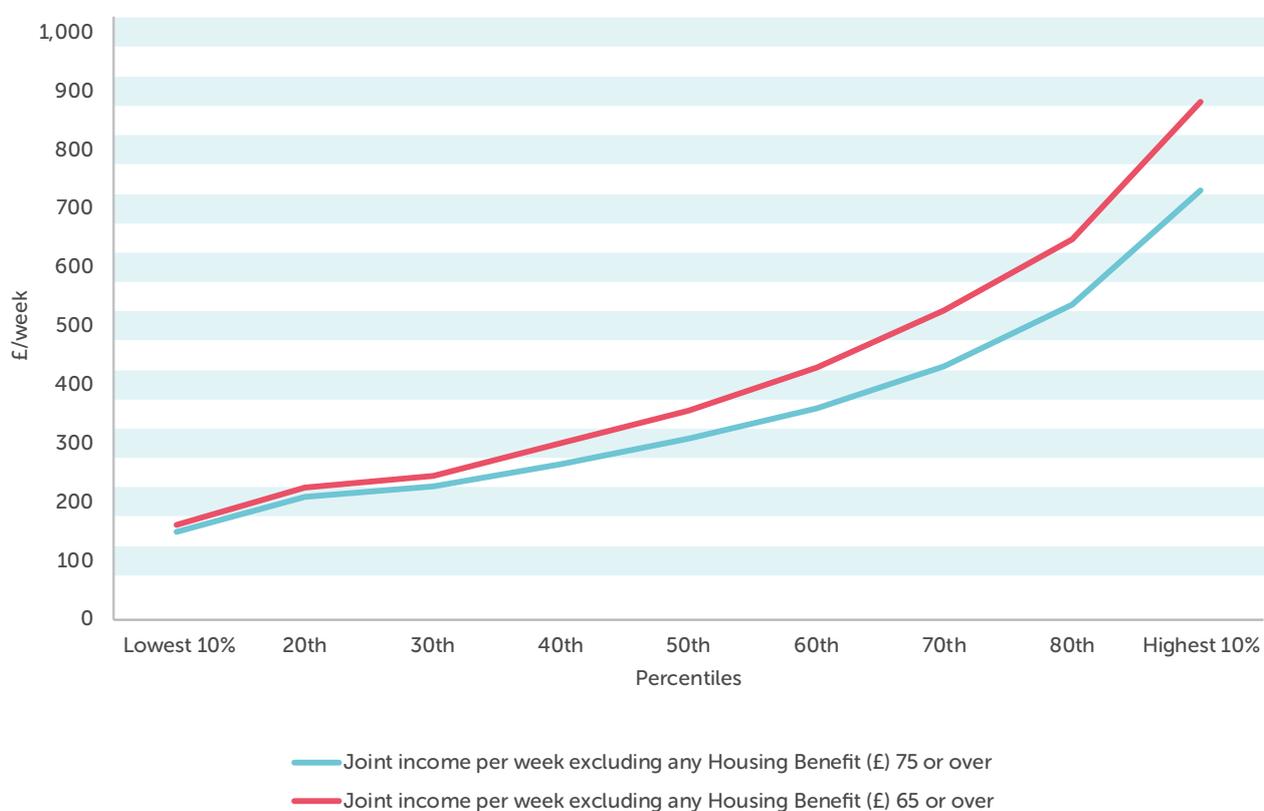


Source: English Housing Survey 2014-15

Less than 20% of older people live in social housing, however, 28% of people in the English Housing Survey who said they needed adaptations were in this sector, which may reflect unrecognised need.²

Apart from those on low incomes who may receive statutory help from their local authority, most home owners will have to take responsibility for adaptations themselves. Despite recent rises in the state pension, the majority of older home owners are on relatively low incomes, particularly those over 75 (Figure 2). Common modifications, such as fitting grab rails, are relatively inexpensive, but more major adaptations may be more difficult to afford. We need to understand more about how owners recognise the need for adaptations and the factors that encourage or hold them back from making those changes.

Figure 2: Joint income per week of households where the household reference person was 65 or over (excluding housing benefit) 2014-15



Source: English Housing Survey 2014-15

Across all tenures there are issues of inequality. People who have experienced greater levels of disadvantage and hardship during their lifetimes are more likely to have poor health, greater levels of disability and lower life expectancy (Marmot et al, 2010). There is evidence that inequality leads to significant differences in the onset of frailty, which may start up to ten years earlier in the most disadvantaged third of the population (Marshal et al. 2015). There are also regional

² Percentage is based on unmet need for adaptations in the homes of older people irrespective of the age of the person needing the adaptation.

differences in disability between North West and North East England compared with areas of London and the South East (DWP, 2017a). Not only are those on low incomes more likely to need adaptations, and need them earlier, they are also more likely to be living with housing disrepair (DCLG, 2016a). There are also higher levels of long-term illness amongst older Black, Asian and minority ethnic (BAME) groups than in the white population in England that need to be taken into account (Bécaresyet, 2013).

Aims and methods

The overall aim was to systematically review the published evidence for the role of home adaptations in improving later life to generate recommendations for national policy, local service design and practice.

The research questions were:

- What is the strength and state of the best available evidence for 'what works' and 'what is cost-effective' in home adaptations?
- How does the provision and use of home adaptations work best to improve the health and wellbeing outcomes of older people aged 65 and over living in the community?

The approach used in this report involved conducting a systematic review of evidence. There were three stages:

- A range of academic databases were searched and abstracts of studies were screened for relevance. Additional material was obtained from organisations and professionals working in this area.
- These articles and reports were screened for relevance and were then critically appraised and scored for quality.
- Realist synthesis was used to draw out theories and evidence about how the implementation of home adaptations contributes to good outcomes for people in later life.

Modelling

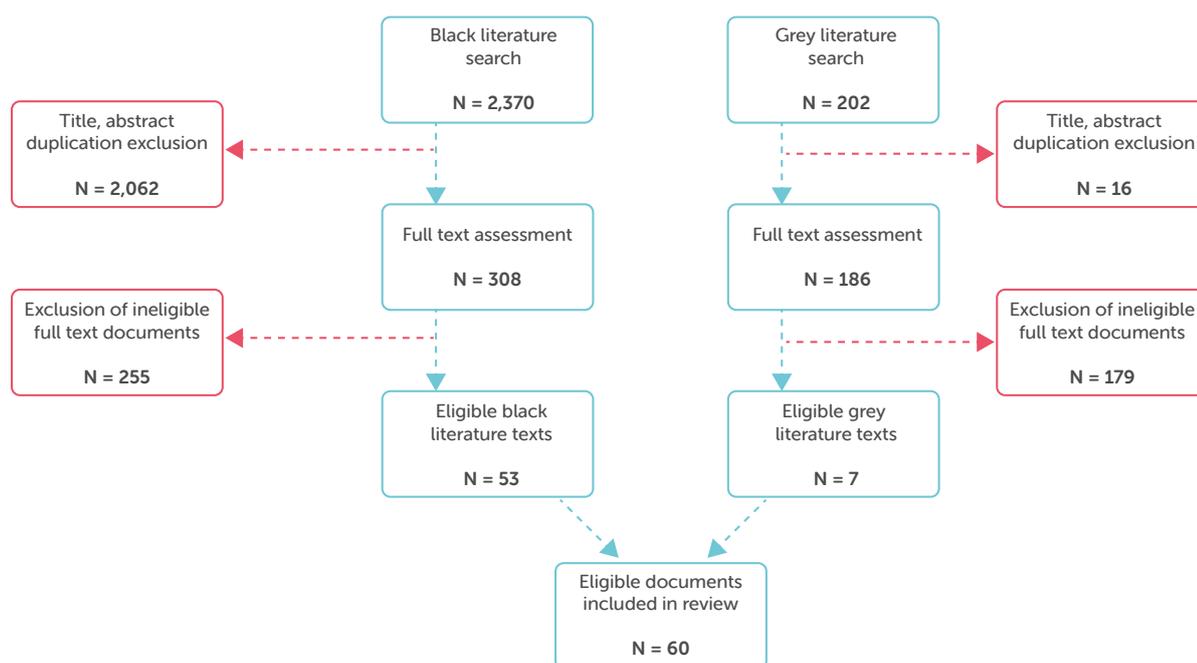
One of the objectives of this report was to model the population health impact and value of home adaptations. To achieve this, the team planned to model data from both the English Housing Survey, which provides population estimates for key housing and household characteristics, and estimates of cost-savings for all types of adaptations from the evidence review. However, due to availability of evidence and data, the modelling phase to accompany this evidence review was limited. This is discussed in the findings section and explained in more detail in the accompanying technical report from BRE, along with full details of the methodology used and evidence reviewed ([Appendix 9](#)).

The state of the evidence

Literature search results

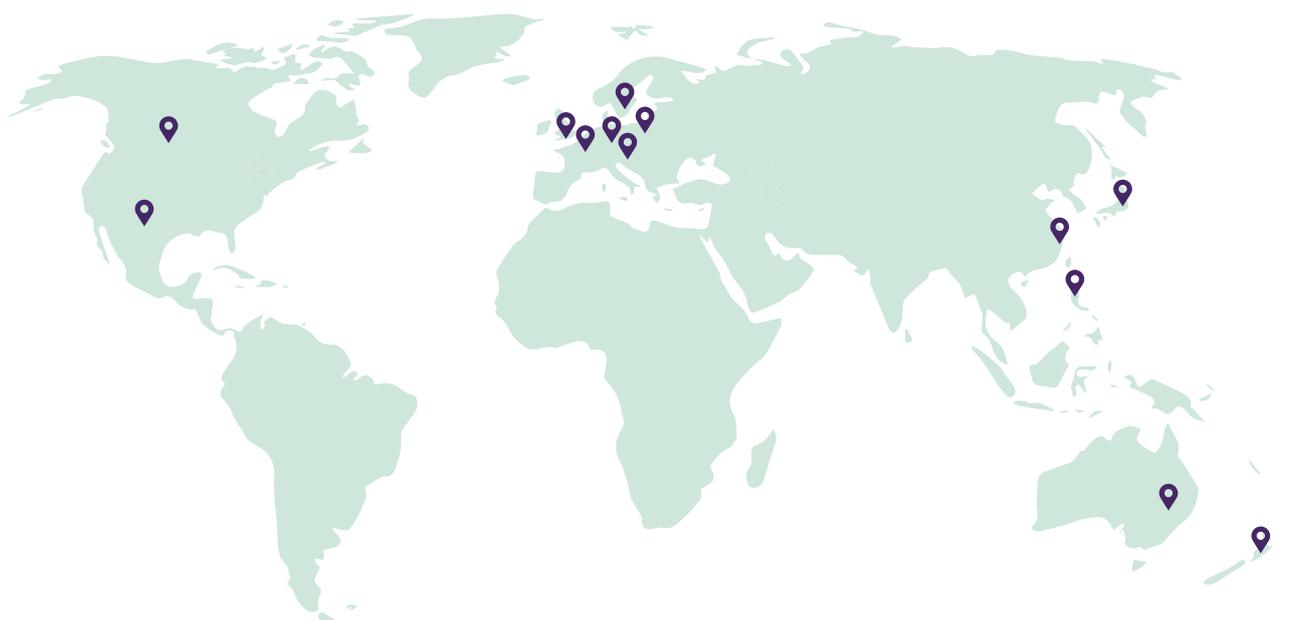
Figure 3 below presents the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart detailing the results of each stage of the evidence review process. In total, 60 studies were found to be eligible because they met the inclusion criteria.

Figure 3: PRISMA flowchart summarising literature search and inclusion



Eligible studies were from a variety of countries including Australia, New Zealand, Canada, United States, Taiwan, Japan, Korea and a number of European countries. The spread of international evidence is depicted in Figure 4 illustrating an evidence base from high-income countries according to the World Bank classification (World Bank, 2017). These countries are experiencing similar issues connected with ageing populations including increased rates of dementia, heart disease, diabetes, long-term conditions and frailty with a consequent impact on health, care and housing services. They also all aim to enable as many people as possible to remain living independently in their own homes in later life and in so doing reduce pressures on health and care services. As a result of these similarities it is possible to draw out key ideas that might inform future action in England.

Figure 4: Location of eligible studies



Evidence quality and study design

Quality appraisal of eligible studies was conducted using validated checklists that matched the study design (see [Appendix 4](#)). Eligible quantitative, qualitative and economic studies were rated according to level of rigour and classified into three quality categories (high, medium and fair) using established quality appraisal tools and approaches. As shown in Figure 5, ten studies were rated as high-quality evidence, 26 studies were rated as medium-quality evidence and 24 studies rated as fair-quality evidence.

Figure 5: Quality rating of eligible studies (includes grey literature)

Quality of evidence	Quantitative studies	Qualitative studies	Economic studies	Total
High	3	4	3	10
Medium	20	5	1	26
Fair	16	7	1	24
Total	39	16	5	60

The studies employed a wide range of study design. Figure 6 demonstrates the breakdown of research designs utilised among eligible studies.

Figure 6: Number and type of study design for eligible studies

Study types	Number
Randomised controlled trials	11
Quasi-experimental studies	5
Cohort studies	5
Longitudinal study	1
Cross-sectional studies	10
Before and after studies	3
Quantitative surveys	2
Economic evaluation	6
Qualitative studies of which: <ul style="list-style-type: none"> - 2 studies employed in-depth interviews - 10 studies employed semi-structured interviews - 3 studies were mixed methods, combining postal survey with semi-structured interviews - 1 study employed both semi-structured interviews and focus group discussion - 1 study employed focus group discussion 	17
Total	60

Although there were 11 randomised control trials none of these were from the United Kingdom, but were from the United States, New Zealand, Australia, Sweden and Germany. A feasibility trial for an RCT began in 2016 (the BATH-OUT study) looking at the outcomes of replacing baths with level-access showers in Nottingham (Whitehead et al., 2016). The findings are due out in 2018, but more work is required to build on this initial study and scale it up to national level. Further robust studies are also needed relating to the UK housing stock for other common adaptations, such as stair lifts.

A large number of qualitative studies were included in this review, which give in-depth evidence of the impact of adaptations on Activities of Daily Living, quality of life, independence and ability to age in place. Most observational studies included in the review were cross-sectional. These provide a useful 'snap-shot' at one point in time, but cannot provide much insight into theory about how adaptations work in the real world, or provide evidence of the long-term effects of adaptations.

There was an absence of studies observing people's actual behaviour (ethnographic studies) to capture the 'lived experience' of the use of the home before and after the installation of adaptations. There was also an absence of evidence about how people use their own resources to improve, repair and adapt their homes for later life.

Findings

This section sets out the key findings from the review, and then details and discusses the evidence that supports each finding.

- There is strong evidence that minor home adaptations are an effective and cost-effective intervention for preventing falls and injuries, improving performance of everyday activities and improving mental health. Major adaptations have been less extensively studied, but the evidence shows that they can also support people in achieving these outcomes in some circumstances.
- There is strong evidence that minor adaptations are particularly effective at improving outcomes and reducing risk when they are combined with other necessary repairs and home improvements, such as improving lighting and removing trip and fall hazards.
- There is good evidence that greatest outcomes are achieved when individuals, families and carers are closely involved in the decision-making process, focusing on individual goals and what a person wants to achieve in the home.
- There is insufficient evidence at present to quantify the overall return on investment (ROI) from home adaptations. However, one aspect that has been measured is the ROI of home interventions in preventing falls on stairs. Preventive work to mitigate worse than average hazards associated with falls on stairs among households with an adult aged 65 or over would cost in the region of £290 million and confer a benefit to society of around £470 million, which corresponds to a positive ROI of 62p for every £1 and a payback period of less than eight months.
- Available evidence finds that delays in installing adaptations can reduce their effectiveness.
- There is good evidence that people can be put off installing adaptations until they reach a point of crisis, in part because they do not wish to change or 'medicalise' their home.

A summary of the evidence that supports each key finding is presented in more detail below. Full details of all eligible studies are provided in [Appendices 7a and 7b](#).

Evidence that minor home adaptations are an effective intervention for improving performance of everyday activities, improving mental health and preventing falls and injuries

Over the past decade a home intervention programme the Community Ageing in Place – Advancing Better Living for Elders (the CAPABLE study) has been developed in Baltimore, USA. CAPABLE has been assessed through a number of multicomponent randomised control trials over the period 2012-15. This process culminated in a high-quality, cohort study that aimed to reduce the impact of disability among older adults aged 65 years and over on low incomes, and eligible for Medicare or Medicaid. The intervention addressed individual capacities and features of the home environment (Szanton et al., 2016). Participants were described as cognitively intact older adults with difficulty in performing at least four out of eight Activities of Daily Living. The five-month programme employed a holistic approach, delivered by an occupational therapist (six visits), a nurse (four visits) and handyperson (up to a day's work). The occupational therapist helped people develop strategies to overcome their difficulties, while the nurse helped participants identify issues they wanted to overcome relating to pain, depression, strength and balance, medication management or their communication with primary care providers. Findings revealed:

- Outcomes improved in 75% of cases (211/281) from baseline to follow-up
- A reduction in home hazards, from 3.3 per home at baseline, to 1.4 per home at follow-up
- Difficulty with Activities of Daily Living reduced by 75% on average
- Physical functioning increased by 49% on average from baseline to follow-up
- Symptoms of depression improved in 53% of participants from baseline to follow-up

The practical effect of improving from four to two areas of difficulty with Activities of Daily Living can be life changing for an older person who had previously had difficulty getting out of bed, going to the toilet or getting dressed and bathing. The authors concluded that success was related, at least in part, to the focus on supporting individuals to meet their individually determined goals for everyday activity (Szanton et al., 2016).

A mixed-methods study explored the impact of housing adaptations on the quality of life of people with disabilities in England (Heywood, 2001). Adults of all ages were eligible to participate, although the majority were older people. Minor adaptations included grab-rails, rails and seats in the bathroom, stair-rails and other small alternations. Findings revealed positive improvements in performing everyday activities in the home, including:

- Over three quarters of people in the study reported an improvement in health
- Almost half said they were able to bathe or shower with more confidence
- Over a third were subsequently able to use the toilet
- A quarter had been helped to get in and out of the home safely as a result of home adaptation

This has implications for mental health improvement, as feeling unclean, thinking that you smell, or having the indignity of someone else helping with functions that are normally done privately, are all factors that may adversely affect adversely mental health (Heywood, 2001).

One of the high quality studies was a randomised controlled trial (RCT) conducted in New Zealand among socially disadvantaged groups including pensioners, those who were unemployed and people on low incomes. The RCT assessed the injury prevention benefits of home adaptations following implementation of home improvements and home safety assessment in homes built prior to 1980 (Keall et al., 2015). It included households identified from households in a region of New Zealand that had recently received government-subsidised home insulation. Data on falls, medical interventions and costs were obtained from insurance records and were therefore not reliant on diaries or other forms of self-recording that are common in many other falls studies. All households had already had repair work done to their homes. The intervention involved home safety assessment and works conducted by a qualified builder, or receipt of a home safety pamphlet. Findings revealed a statistically significant reduction (26%) in rate of all injuries caused by falls at home per year exposed to the intervention, compared with the control group (relative rate = 0.74, 95% CI = 0.58-0.94).

Major adaptations have been less extensively studied, but the evidence shows that they can also support people in achieving these outcomes in certain circumstances

This review identified only a few studies of the effectiveness of major home adaptations. Most focused specifically on Activities of Daily Living which include washing, dressing, bathing and getting to the toilet – all essential activities that enable people to retain their independence and dignity at home. Most were retrospective and relied on the self-reported views of respondents rather than an objective assessment before and after an intervention.

Two such medium-quality before-and-after studies conducted in Sweden investigated change over time in Activities of Daily Living dependence and aspects of usability among a cohort of Swedish recipients of major home adaptations (Fange & Iwarsson, 2005a; Fange & Iwarsson, 2005b). The participants were described as people living in their current homes for at least three months before applying for adaptation grant. The majority of adaptations involved improvements to hygiene facilities such as the replacement of a bath with a shower, entrance adaptation (including balcony and patio), and stairway and door adaptation. Findings revealed no significant changes in overall Activities of Daily Living dependence (Fange & Iwarsson, 2005a), however, accessibility and usability was shown to improve significantly, with the number of physical environmental barriers decreased, and dependence on mobility devices decreased (Fange & Iwarsson, 2005b).

Moderate quality evidence (Petersson, 2008; Petersson et al, 2009) reported the results of two non-randomised controlled trials of people who had received major adaptations in Sweden. The participants included in the study were disabled Swedish adults living in community-based

dwellings. Self-assessment of outcomes showed improvement in levels of safety and ability to do Activities of Daily Living.

Several studies looked at the effectiveness of Disabled Facilities Grants in England. Heywood (2001) looked in particular at improvements to toilet facilities, replacing baths and providing stairlifts and indicated that major adaptations had an impact on both independence and wellbeing and in many cases were transformative. Clark (2012) looked at the effect of replacing baths with showers and found that most people needed less help with bathing and felt safer. However, these studies were retrospective and did not utilise an objective measure of level of improvement.

Minor adaptations are particularly effective at improving outcomes and reducing risk when they are combined with other necessary repairs and home improvements, such as improving lighting and removing trip and fall hazards

An important source of evidence identified as part of the review related to studies of the impact of minor adaptations on reducing home hazards (Ahn & Hedge, 2011; Berg et al., 2002; Campbell et al., 2005; Gitlin et al., 2006; Harvey et al., 2014; Jang & Lee, 2015; Kamei et al., 2014; Keall et al., 2015; Keall et al., 2016; La Grow et al., 2006; Lin et al., 2007; Nikolaus & Bach, 2003; Peel et al., 2000; Pega et al., 2016; Steinman et al., 2009; Stevens et al., 2001; Szanton et al., 2016). A large proportion of the peer-reviewed literature was specifically related to falls. Most falls-related studies evaluated the impact of interventions such as exercise programmes, reviews of medication, provision of supplements or role of professional support, and were thus deemed ineligible as they did not meet the inclusion criteria. There was little reference to the nature of the home, no assessment of people's ability to access crucial facilities such as the toilet or bathroom and little if any analysis of their safety on steps or stairs among these studies.

A total of 17 studies looked at home safety and the impact of minor adaptations. One of the high-quality studies identified was a randomised controlled trial (RCT) conducted in New Zealand which has been discussed in detail in the first section of this findings chapter (Keall et al., 2015). All intervention and control households in the study had already had repair work done to their homes before home safety assessment and minor adaptation work. This study demonstrates home repair and improvement is an important component of effectively preventing injury. However, the study also provides conclusive evidence about the positive impact of home safety assessment and minor adaptations on preventing falls and injuries in these circumstances (Keall et al., 2015).

Other studies have looked at the impact of minor adaptations and hazard removal on falls (Campbell et al., 2005; Heywood, 2004a; Heywood, 2004b; La Grow et al., 2006; Nikolaus and Bach, 2003). However, these studies are methodologically different in design and less robust. Findings from two medium-quality RCTs found no effect for home hazard reduction on falls-related outcomes (Kamei et al., 2014; Stevens et al., 2001). However, it is impossible to make direct comparisons because home repairs and improvements were not a feature of the RCTs

led by Kamei and Stevens (Kamei et al., 2014; Stevens et al., 2001). However, they were crucial to inclusion of households in the study led by Keall, and an important component of home safety and minor adaptations programme to prevent injuries in the home (Keall et al., 2015).

A number of other studies were identified that looked at the outcomes of minor adaptations, repairs and trip and fall hazard removal, usually carried out by handypersons. These were not specifically about falls, but were often used as part of a collaborative approach with the aim of supporting people to live independently in the community or to enable people to return home safely from hospital (Gitlin et al, 2006; Heywood, 2001; Lin et al., 2007; Lui & Lapane, 2009; Rantakokko et al, 2013; Stark et al, 2009; Szanton et al., 2016).

There were a number of medium and fair-quality studies examining the impact of minor adaptations on falls for people with a visual impairment (Campbell et al., 2005; Clarke, 2011; Clarke, 2015; La Grow et al., 2006). Adaptations seem to be very important as people with sight loss tend to fall more frequently (Campbell et al 2005; La Grow et al 2006). A medium-quality RCT investigated the impact and outcomes of adaptations on falls in community living older adults aged 75 and over with visual impairment in New Zealand (Campbell et al., 2005; La Grow et al., 2006). Participants were identified from several sources including optometry clinic and practice, low vision outpatient clinic and Royal New Zealand foundation of the blind register. There were three groups: group one received an intervention to assess and remove hazards and install minor adaptations; group two received exercise and strength and balance training; and the control group only had social visits. The hazard reduction programme was delivered by an occupational therapist and mostly involved removal of trip and fall hazards, rails outside, grab-rails in the bathroom and improved lighting. People kept diaries about falls and had follow-up phone calls at intervals to see how they were complying with the various programmes. There was a significant decrease in falls in the group that received the home hazard modification programme compared to those doing exercise, although there was a high level of drop-out in the exercise group which made the results less clear cut.

The effectiveness of improved lighting on health-related outcomes has also been researched. A medium-quality study by Bruunström et al. (2004) assessed the impact of lighting intervention on Activities of Daily Living among adults presenting at a low vision clinic in Sweden. A qualitative study of fair quality also investigated the impact of lighting intervention on quality of life among older adults with sight loss, recruited via two UK charities (Friends of the Elderly and Blind Veterans UK) (Clarke, 2015). Both studies found that lighting enhancements can increase Activities of Daily Living and wellbeing especially where the lighting allowed for safer movement around the home and better use of the living room, bathroom and kitchen.

Greatest outcomes are achieved when individuals, families and carers are closely involved in the decision-making process, focusing on individual goals and what a person wants to achieve in the home

Research indicates that there are a number of barriers that prevent people undertaking adaptations, and to overcome these it is essential that individuals, families and carers are fully involved in decision making (Aplin et al., 2015; Fange & Iwarsson, 2005a; Gitlin et al., 2001; Harvey et al., 2014; Heywood, 2001; Heywood, 2004b; Hong et al., 2015; Lindahl, 2004; Marquardt et al., 2011; Messecar, 2000; Pain, 2003; Pickering and Pain, 2003).

A high-quality qualitative study by Aplin and others aimed to explore, through qualitative interviews and thematic analysis, the impact of major home adaptations on clients and family experience in Australia (Aplin et al., 2013; 2015). In-depth interviews were conducted with recipient of home adaptations, their families and carers. The findings demonstrated involvement in decision-making and consultation strongly contributed to a positive experience of home adaptations. Some respondents had little involvement or were simply told what was going to be done, even when their input would have resulted in better solutions.

The qualitative arm of a mixed-methods study conducted in England aimed to investigate the impact of housing adaptation on quality of life of people with disabilities of all ages (Heywood, 2001). Heywood concluded that people struggled to face up to the challenges of growing older. They found it particularly embarrassing to talk about difficulties using the bathroom or toilet and that it takes time to build trust to enable these conversations to happen. People have also invested a great deal of effort into personalising their homes which often makes it hard to make the adaptations required. From interviews and discussions with older people both Heywood (2001, 2005) and Aplin et al. (2013) found that people disliked anything in their homes that looked medical or indicated that they were disabled. This is supported by the work of Tanner and colleagues (2008) in Australia in a small qualitative study about the meaning of home who concluded that if the result of adaptations was that the home looked 'disabled' or if there are too many alterations people felt they had 'lost' their home.

Fange and Iwarsson (2005a) from work in Sweden refer to the concept of 'person environment fit' and how important it is to personalise adaptations. This is also explored by Mackenzie et al. in a study of over 200 people aged over 75 in the suburbs of Sydney, Australia. This used semi-structured interviews to understand the meaning of home (Mackenzie et al., 2015). It showed that people are more likely to make changes to their own behaviour than to their environment "I fit with the house rather than the house fits me" (Mackenzie et al., 2015). The study found that as people age they become adept at negotiating hazards such as stairs or poorly designed bathrooms using "well-practiced and largely unconscious behaviours". Installing adaptation solutions is therefore not always simple and requires careful consideration of environmental, psychological, social and emotional factors. Petersson et al (2012) provide further evidence from qualitative work in Sweden which aimed to explore older people's experiences of safety following receipt of home adaptations. It was clear that people felt unsafe when they started

to lose trust in their own bodies, particularly when they lost the strength and ability to perform things like climbing stairs. Some people react by limiting their activities, but others try to continue as usual, helped by the fact that they understand the arrangement of the home and know where everything is. Adaptations were more successful when people's coping mechanisms were understood and they were enabled to be in control, have autonomy and maintain their daily routine and habits.

A medium-quality study in South Korea explored the psycho-social factors influencing use of major home adaptations among older adults with disabilities in low-income areas and their carers using qualitative methods (Hong et al., 2015). The study recruited participants eligible for Long-Term Care Insurance (LTCI) via home care centres. Home adaptations are relatively rare in the homes of older adults in South Korea. The study found economic status and whether the family was involved in caregiving influenced attitudes and knowledge about home modification. Negative perceptions of the cost of home adaptations and perceived stigma often prevented people from adapting their homes.

Carers' involvement in adaptations decisions was only examined in a small number of studies, none of which were considered high quality because of methodological issues (Messecar, 2000; Gitlin et al., 2001; Marquardt et al., 2011; Lindahl, 2004). However, they give some indication of the importance of involving carers in decisions. A qualitative study conducted in USA by Messecar (2000) explored the experiences of paid caregivers and concluded that a collaborative approach is required that ensures that the needs and preferences of both the older person and the caregiver are met. Caregivers also require additional support and training once adaptations and modifications have been installed. Another study, using a small sample, looked at the impact on both formal and informal carers before and after major adaptation work was completed (Lindahl, 2004). It described the considerable burdens placed on carers and the tiredness and isolation they often feel. It revealed that carer's views were seldom taken into account which resulted in less than optimal adaptations, such as bathrooms that were too cramped, narrow showers, doorways not wide enough for two people and poorly designed thresholds. When design was not right first time it was much harder to change things afterwards.

There were also two studies of people with dementia and their carers, both RCTs conducted in Baltimore, USA that were rated 'fair' (Gitlin et al, 2001; Marquardt et al 2011) . The study by Gitlin et al. (2001) was not conclusive, but indicated that where adaptations had been installed recipients had fewer declines in Activities of Daily Living, less decline in self-care, fewer behaviour problems and spouses were less depressed. Marquardt et al. (2011) found that installation of adaptations was quite low and most were used to combat physical difficulties rather than memory loss. Both Gitlin et al. (2001) and Marquardt et al. (2011) suggested that carers needed much more information about the potential benefits of adaptations as these were poorly understood. Like many of the other studies discussed above, Marquardt et al. (2011) said that carers did not want adaptations that made the home look 'disabled'.

We know more about the barriers to home adaptations than we do about what motivates people to undertake them. Lee and Vouchilas (2016) in a cross-sectional study using an online survey of people aged 50 and over in the USA found that maintaining independence was the strongest motivator, followed by staying in the community, upgrading or beautifying a home and it being a good investment. They also suggested that people may be more receptive to features that contribute to continued independence and maintenance of their lifestyle, as opposed to features that are predominantly safety-oriented. Another, less robust study of DIY adaptation improvements in Australia suggested that people wanted to use the skills they had in the family and control when things are done as well as how they are done (McNamara et al, 2014).

Evidence that minor home adaptations are a cost-effective intervention for preventing falls and injuries, improving performance of everyday activities and improving mental health

Five economic analysis studies were identified during the course of this review (Clarke, 2011; Jutkowitz et al., 2012; Keall et al., 2016; Pega et al., 2016; Salkeld et al., 2000). Two high-quality economic studies conducted a cost-utility analysis (Pega et al., 2016) and a cost-benefit analysis (Keall et al., 2016) of the impact of home modifications on falls-related outcomes as previously described (Keall et al., 2015). Pega et al's (2016) study estimated the health gain, cost-utility and health equity impacts from home safety assessment and modification for reducing injurious fall among older people. The cost analysis in this study was on a hypothetical sample of community dwelling older adults aged 65 years and above. Findings revealed that the intervention was associated with significant health gain and was shown to be cost-effective locally and at scale among older people in New Zealand. The intervention was also preceded by home improvements and repairs which improved the environment of the home and made it safer.

Another high-quality economic analysis was published in relation to an earlier phase of the study by Szanton and others in the US. The intervention known as CAPABLE aimed to reduce the impact of disability among low income older adults by addressing individual capacities and features of the home environment (Szanton et al., 2016). The study examined the efficacy of the intervention on life years saved. The study concluded that the intervention is cost-effective locally and nationally at scale. It also suggested that the cost of the intervention is favourable when compared alongside other home-based interventions for older adults (Jutkowitz et al., 2012).

The remaining economic analysis studies (Clarke, 2011; Salkeld et al., 2000) were deemed to be of lower quality than those previously reported (Jutkowitz et al., 2012; Keall et al., 2016; Pega et al., 2016). Clarke estimated the cost-effectiveness of lighting adaptations in the homes of elderly people at risk of falling. This study utilised data from literature sources on the cost of lighting adaptation and the benefit in terms of falls prevention. Salkeld et al. (2000) on the other hand, estimated the cost-effectiveness of a home hazard reduction programme among community living older adults recruited during a hospital stay. Results revealed that the home modification

programmes assessed were cost-effective; however, caution is urged when interpreting the findings as they are based on evaluation studies that were not methodologically robust.

UK context for cost effectiveness

One of the objectives of the review was to model the population health impact and value of the home adaptations in terms of costs. To achieve this, BRE planned to model data from both the English Housing Survey (EHS), which provides population estimates for key housing and household characteristics, and estimates of cost-savings for types of adaptations found from the literature review undertaken by University of the West of England.

The findings of this evidence review demonstrate that home adaptations are cost effective from the perspective of the funder and society, and can have a positive impact on prevention of injuries and falls. The most robust evidence, however, relates to the impact of minor home adaptations undertaken in other countries, and there was insufficient evidence to provide a usable estimate of the benefits associated with different adaptations in the UK, and for older people specifically.

Consequently, the modelling phase to accompany this evidence review was limited. We have good knowledge of the likely benefits of home adaptations, but it is not possible to accurately quantify these where they exist. Given limitations in the available evidence and data, mitigating worse than average hazards associated with falls on stairs has the best return on investment (ROI). Preventive work to mitigate worse than average hazards associated with falls on stairs among households with an adult aged 65 or over would cost in the region of £290 million and confer a benefit to society of around £470 million, which corresponds to a positive ROI of 62p for every £1 and a payback period of less than eight months.

The findings of this review have generated good knowledge of the likely benefits of home adaptations, but are currently unable to accurately quantify these. If further primary research is conducted to build the evidence base, then costing the benefits of adaptations can be added to the BRE model presented. A better understanding of these benefits would enable both better adaptation decision making, and provide a justification for greater investment in future minor and major adaptations of properties. See full BRE technical annex.

Timeliness

There are two issues in relation to the timeliness of adaptations that have emerged from this evidence review. One is that delays in referral and deliver systems for adaptations mean that help may come too late to maintain independence. The other is that people often do not seek help until they are forced into it because of a crisis. Both are key points to address if adaptations are to reduce pressures on health and care systems.

Evidence finds that delays in installing adaptations can reduce their effectiveness

Delays within the system of providing help with home adaptations may mean adaptations are installed too late to be of best value. However, there was only a certain amount of information forthcoming from this review. A number of interviews were carried out with practitioners in Bristol as part of a mixed-methods study (Cottrell and Plumb, 2012). They felt that adaptations needed to be done sooner to prevent people from losing their independence. Heywood's study of grant recipients in England found that there were sometimes long waits for assessments. This meant that some people had to be reassessed leaving people at risk of accidents in the meantime (Heywood, 2001).

Petersson et al. (2009) compared two groups with similar characteristics in Sweden, one which had received home adaptations and one which was still waiting. They were followed up at regular intervals over the course of six months. The results showed that those receiving home adaptations experienced less difficulties in everyday life than the comparison group. The authors noted that "for each month's wait for an adaptation the person's difficulty in performing everyday tasks increased" and that if adaptations are to be effective they need to be installed within a reasonable timeframe (Petersson et al., 2009, p. 84). The Bath-OUT study being conducted in Nottingham uses a similar methodology and may help to provide further information on the advantages of a speedier response and conversely the difficulties caused by delays (Whitehead et al., 2016).

Clarke (2015) conducted face-to-face interviews with people with visual impairment in England before and after lighting adaptations had been completed. The study noted that problems caused by delays were significant as two people had degenerative conditions which meant eventual improvements came too late.

There is also some information from the limited studies about dementia from the USA that adaptations have to take place at the right time. Modifications may need to be made in the early stages of the disease to increase acceptance as people with dementia can react with confusion or irritation if changes are made to their normal use of the home (Marquardt et al 2011).

Evidence that people can be put off installing adaptations until they reach a point of crisis, in part because they do not wish to change or 'medicalise' their home

People do not seek help for a number of reasons. As has been discussed above, growing old is a gradual process and people adapt to the imperceptible changes in their bodies. Most people maintain an optimistic view of their ability to cope even when this is not the case (Allen, 2005). As a result they seem more likely to make changes to their own behaviour than to their environment (Heywood, 2001; Heywood, 2004; Petersson et al., 2012; Mackenzie et al., 2015). They become adept at negotiating hazards using their instinctive knowledge of their home (Petersson et al., 2012; Mackenzie et al., 2015). Added to this is the desire not to be labelled

'disabled' which was identified by several authors (Aplin et al. 2013; Cottrell and Plumb, 2012; Heywood, 2001; Heywood, 2005) and not wanting to be stigmatised by their homes being made to look like a hospital (Aplin et al. 2013; Heywood, 2001; Heywood, 2005; Hong et al, 2015; Marquardt et al., 2011; Tanner et al, 2008).

The evidence does not tell us a great deal about what triggers people to undertake adaptations or to seek help. It appears from a study in Bristol in which recipients of Disabled Facilities Grants were interviewed that many people do not come forward until they can no longer cope effectively at home, their families become concerned and take action, or health and care organisations become involved because of a fall or other accident (Cottrell and Plumb, 2012). Heywood's study of grant recipients also suggests that it was problems with bathing, an accident or illness that had made the home unmanageable or the strains imposed on a carer that had caused people to seek help (Heywood, 2001, Heywood, 2005).

Several studies about falls found that adaptations were more likely to reduce falls in people who had already experienced a previous fall and that this might be the point when people were more likely to take action to undertake home modifications (Keall et al, 2013; Nikolaus & Bach, 2003; Salkeld et al, 2000; Clarke, 2011). Pega suggests that targeting home modification interventions on older people with previous injurious falls would be most effective and would reduce intervention and health system costs and improved cost-effectiveness (Pega, et al, 2016). More research is needed to understand the barriers and facilitators and to understand how people could be encouraged to seek help well before they reach crisis point.

Summary

The overall finding is that small adaptations can make a big difference, especially when they are done in conjunction with repairs and are in line with people's personal goals. There is evidence that they reduce falls and injuries, particularly in people with sight loss. Major adaptations are transformative, can restore Activities of Daily Living, improve safety and improve mental health and wellbeing. It is essential that individuals, families and carers are involved in decision-making as the home has a meaning far beyond bricks and mortar. It is a place where people spend a lot of their time and it is very personal. In addition each individual has unique needs and is adjusting to the ageing process in different ways which requires a customised response.

To reduce pressures on health and care services individuals need to be encouraged to do more adaptations themselves, or to come forward earlier, rather than waiting until they can no longer manage or experience an injury. This would give longer for local authority adaptation teams to respond and, once adaptations are installed, ensure that people could retain their independence for longer. As people appear to be coming forward only when they desperately need help it is imperative that local authority teams can respond quickly as the findings from Sweden suggest that delays result in greater difficulty in performing everyday tasks. We need better ways to find people before they reach this point, perhaps by working more closely with

GP surgeries and providing more publicity about the benefits of adapting the home to maintain an active and independent lifestyle in later life.

For adaptations to work well the key issue is to listen to people, observe how they use their home and involve individuals, their families and carers in decisions. However, we need much more research to understand what people do without statutory help and about the barriers and facilitators that encourage or prevent people carrying out adaptations. This is particularly important given that the majority of older people in the UK are homeowners.

Conclusions and recommendations

This review has presented the available evidence for the outcomes of home adaptations and their impact on later life. The evidence base is still incomplete with the most robust evidence coming from areas outside of the UK. However, key themes have emerged, and our review finds good evidence that both minor and major home adaptations can improve a range of outcomes for people in later life, especially when they are done in combination with any necessary repairs, are delivered in a timely manner, and are in line with people's personal goals.

Fundamental changes are needed to integrate housing into health and social care service delivery. This is imperative to address the rising levels of demand resulting from demographic change. However, getting housing issues on the agenda is a challenge, and it remains at the periphery, rather than the centre of health and social care policy. The first Sustainability and Transformation Plans to join up health and social care were produced in 2016, but a recent survey by Care & Repair England (July 2017) revealed that the majority of these include very few references to older people, even though older adults constitute the majority users of the NHS, and very few identify housing – apart from residential and nursing homes – as a potential contributor to NHS transformation. The mainstream home environment and the need for timely repairs or adaptations were missed entirely. There was some mention of social housing, but there appears to be a lack of awareness of the needs of the far greater numbers of older, low income home owners.

Despite this, there is clearly more awareness of the importance of home adaptations amongst senior policy makers and there has been a welcome injection of additional funding into the Better Care Fund for the Disabled Facilities Grant. At local level some authorities are in the process of completely restructuring the way services are delivered and there are examples of very good practice in the delivery of adaptations. However, this is still not universal and there are elements of a 'post-code lottery' in the way services are delivered (Leather and Mackintosh, 2016).

Many older people with resources will not look to statutory services for help because they own their own homes. There is a pressing need to act to enable older people to make decisions about living safely and well at home by providing accessible information and advice to link individuals and communities to reputable providers, services, products and designers. This will relieve pressure on the system. It is important to know more about the characteristics of older people, understand more about what prompts them to action and design local services to provide appropriate advice and support.

The focus of health care planning, the Care Act 2014 and the public health agenda in local authorities is all about prevention, but there is still a lack of implementation at local service level. The home is the centre of people's lives as they age and most are determined to remain living independently. Increasingly, the focus for delivery of health care is the home rather than hospital. As a consequence, local services need to centre more on the home environment.

Our review shows the potential value of local services that integrate repair, re-able and adaptation resources into local service design. However, as a senior national policy director pointed out, "It is still surprisingly rare for health and care services to recognise the benefit of investing in housing improvements, despite the return flowing to their services in the form of reduced hospital admissions and the ability to remain at home longer" (Jon Rouse, 2016).

In relation to home adaptations there is already funding available. There is the Community Integrated Equipment Service for minor adaptations and for major adaptations, and the Disabled Facilities Grant, which has recently had a major injection of resources. Disabled Facilities Grant funding could be top sliced for minor adaptations and repairs. These are often delivered by handypersons based in home improvement agencies, but, because they are seen as 'non-statutory', these services are underfunded and are closing just at the point that older people need them most. Reablement resources are deployed mostly in tertiary prevention, rather than in primary or secondary prevention.

Prevention is vital, however, people are not coming forward early enough because of unwillingness to face the ageing process, the stigma that is still associated with disability, or the belief that changes will make their homes less attractive. Age does not necessarily mean people will have long term conditions, and many will remain in full health and fitness later in life, however, the likelihood of having one or more long-term conditions that makes day-to-day life at home more difficult does increase with age. Once people lose muscle strength and start to deteriorate it is far harder to get effective results from adaptations. New ways need to be found to seek out people who may be struggling with their homes.

Once a need is identified, waiting for an Occupational Therapist is counter-productive. If the aim is to ensure that the maximum number of people retain their ability to self-manage and remain independent, an integrated and more collaborative approach is needed among practitioners. Any intervention needs to recognise people's own goals, their feeling for their home and the instinctive way they get around. Decisions about adaptations, modifications and repairs need to be made jointly with individuals, their family and carers.

Targeting people on low incomes and those living alone, who might otherwise be in danger of having accidents or going into care is very important. Re-able-Repair-Adapt programmes such as the CAPABLE project in Baltimore, USA have already demonstrated that they enable people to remain independent in the community and that they are cost-effective locally. The Baltimore programme is continuing, it is now in 13 cities in eight states in the USA and Michigan has just started a three-year Randomised Controlled Trial to provide further evidence of outcomes.

The learning so far stresses that it takes time to set up these programmes, as there is a lot of training needed. Occupational Therapists are very engaged and understand the role very well, although, as in England, there are concerns about staff shortages. Recent research in Baltimore has shown that Medicare and Medicaid savings are six times the cost of delivering the programme. The results will be published this autumn and should be available to support the arguments for the recommendations made in this report (Szanton et al, forthcoming). Christchurch New Zealand has also developed a preventative reablement service along similar lines which takes referrals from GPs as well as hospitals (Charles, 2017). More impact may be achievable in England due to universal health coverage, the welfare state and well established reablement and home adaptation systems.

The NHS has an important public health role in England through the Making Every Contact Count (MECC) initiative. MECC is an approach to behaviour change developed in recent years to make more out of the everyday opportunities presented by contact from NHS staff. MECC aims to 'complement existing integrated and social engagement approaches' to achieve more value from service delivery in the home. By engaging with individuals holistically and treating every conversation as an opportunity to motivate discussion of health issues, people are more likely to think about wellbeing and make positive changes. There is consequently scope for much closer working between adaptation teams and CCGs, GP practices, community nurses, care navigators and any other organisations visiting people at home.

There are also other ways to target help more effectively in line with the findings of this review that people only seek help after they have had an accident or a fall. In conjunction with local hospitals Manchester Care & Repair telephones every person over 65 who is being discharged to offer advice and practical support, including free home safety checks and use of their handyman service. This is a model that could be replicated elsewhere given the right funding.

With the majority of older adults living in current mainstream housing, there is a clear drive to focus attention on improving housing stock that is not fit for our ageing population. Only 7% of homes have the four key features of accessibility (level access, flush threshold, sufficiently wide doors and circulation space for a wheelchair, WC at entrance level). Homes that meet the needs of older people will be in much greater demand as our population ages, it is therefore also important for local authorities and housebuilders to plan to build a range of housing types, across tenures, that meet the current and future needs of their local populations and that these homes are accessible and adaptable to people's needs across the life course.

Recommendations

Home adaptations are an effective intervention to improve health and wellbeing and reduce or delay people's need for health and care services, and our review adds to a growing body of evidence demonstrating the central role that housing plays in our health. The inclusion of the Disabled Facilities Grant (DFG) in the Better Care Fund reflects this.

Research shows that low-cost home modifications can lead to a 26% reduction in falls that need medical treatment and savings of £500 million each year to the NHS and social care services in the UK. Adapting homes could also offset the need for residential care for many, the average Disabled Facilities Grant (used to adapt homes) is £7,000 (one-off payment) compared to the average residential care cost per person of £29,000 per year (Foundations et al, 2015). However, the Sustainability and Transformation Plans produced in 2016 predominantly do not identify housing – apart from residential and nursing homes – as a potential contributor to NHS transformation.

To date, effective local working between health, social care and housing commissioners remains patchy and generally limited (Care & Repair England, 2017). **Local Sustainability and Transformation partnerships** should:

- Include **specific commitments** to improve the quality of mainstream housing, including providing repairs and adaptations, in their strategic plans, recognising the evidence for the wide-ranging health and wellbeing benefits of good quality, adapted homes.
- Put in place **preventive strategies** to identify and support people who are at risk in their home environment with **holistic, person-centred home quality and safety checks** and subsequent delivery of repairs and adaptations.

While the DFG is generally used to fund major adaptations, our review is clear on the strong evidence for the effectiveness and cost-effectiveness of minor adaptations and repairs. **Local authorities** should:

- Focus not just on installing major adaptations, but also on ensuring that services are available to provide timely, preventive **minor adaptations and repairs**, making use of the flexibility allowed in the use of the Disabled Facilities Grant to fund both major and minor adaptations.
- Provide **sufficient and secure funding to handyperson and Home Improvement Agency services or other local services** to ensure that there is sufficient local capacity to deliver both minor and major repairs and adaptations in a timely and coordinated way.

Much more should be done to improve people's access to good information and advice about how adaptations and repairs can help, how to access assessments and funding and how to find reputable local tradespeople and suppliers to get the work done. This is a legislative requirement within the Care Act 2014, and yet currently advice and support is not sufficient in some areas.

- **Local authorities** should ensure that people have access to **good quality, impartial information and advice** on how home adaptations could benefit them and what local services are available, in line with the Care Act 2014.
- National advice services such as **First Stop** (<http://www.firststopcareadvice.org.uk>) could be expanded and more widely promoted to the public.

While the majority of people in later life own their own homes (77.8% per cent of people over 65 in 2015-16), a significant proportion live in social housing (16.5%), and the proportion of older people living in private rented accommodation is small but growing (5.8% currently but some estimates predicting a third of people aged 60 and over could be living in private rental property by 2040; Perry et al, 2015).

- **Housing associations and Arms-Length Management Organisations** have an important role to play in supporting tenants to adapt their homes as they age, and should ensure that tenants have prompt access to advice about, assessment for and delivery of the repairs and adaptations they need.
- **Social housing landlords** often have little or no control over the tenants they receive, and as such are regularly forced to remove modifications and adaptations made for a previous tenant when new tenants move in. **More sophisticated and planned matching of tenants to properties** would avoid this unnecessary waste.
- Access to adaptations can be particularly difficult for people living in **privately rented accommodation**, particularly those on short-term lets. Privately rented property has the highest proportion of poor-quality housing of any tenure type. **Regulations and local enforcement powers need to be applied more vigorously** to tackle landlords who are not maintaining their properties or helping to meet tenants' health needs through adaptations.

Adaptations and repairs work best when people are fully involved. Those responsible for assessing, approving and installing adaptations (such as **occupational therapists, surveyors, home improvement agencies and handypersons' services**) should:

- **Fully involve people** in the decisions, responding to their individual goals.
- Ensure that assessments and specifications look **holistically** at the home environment, considering the need for repairs alongside adaptations.
- Ensure assessors, caseworkers, surveyors and handypersons are trained to deal with **specialist adaptation needs** such as sight-loss and dementia.
- **Involve families and carers** to ensure that the adaptations do not detract from their use of the home and that the changes help them care more effectively.

The qualitative research covered by our review demonstrated how off-putting adaptations can be for people, which can delay people installing adaptations and deter landlords from investing in adaptations. **Retailers and designers** should work to improve access to well-designed, affordable adaptations that look and feel less medical and therefore less stigmatising.

Further research

While the overall quality of the evidence was good, there is still more work to be done to improve the evidence base. The majority has been conducted outside of the UK, and there are some significant gaps. Important evidence gaps which need to be filled include: Randomised Control Trials or experimental design studies in the UK on the effectiveness of adaptations, particularly major adaptations; cost-effectiveness evidence, especially quantifying a broader range of benefits of adaptations; longitudinal studies to provide evidence of the longer-term effects of adaptations; observational designs to better understand how adaptations can work best; and more prospective studies which collect before and after data rather than relying on personal recall post-adaptation.

Summary

In summary, our review finds good evidence that both minor and major home adaptations can improve a range of outcomes for people in later life, especially when they are done in combination with any necessary repairs, are delivered in a timely manner, and are in line with people's personal goals.

This report has made some recommendations to improve later life based on insight from a body of evidence. Its conclusions are also based on population data demonstrating major structural inequalities in England. Housing and growing older affects everyone, and it is important the value of prevention is central to debates about improving later life. Most people would like to remain living safe and well at home and be able to continue to be independent members of the community for as long as possible. Getting later life right for individuals is important for the health and wellbeing of families, carers and the wider community, and a good home environment is central to achieving this.

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The Centre for Ageing Better received £50 million from the Big Lottery Fund in January 2015 in the form of an endowment to enable it to identify what works in the ageing sector by bridging the gap between research, evidence and practice.