



Making a Difference Housing and Health: A Case for Investment

2019



Authors

Ian Watsonⁱ, Fiona MacKenzieⁱ, Louise Woodfineⁱⁱ, Sumina Azamⁱⁱ.

ⁱ Building Research Establishment Ltd

ⁱⁱ Policy and International Health, World Health Organization Collaborating Centre on Investment in Health and Well-being, Public Health Wales

Acknowledgements

We would like to thank Professor Mark A. Bellis and Dr Gill Richardson, Public Health Wales for their advice and guidance during the development of this report. Our thanks also to Dr Charlotte Grey, Adam Jones, Dr Kirsty Little, Alex Osmond and Lindsay Cordery-Bruce for their helpful feedback and suggestions.

Suggested citation:

Watson I, MacKenzie F, Woodfine L and Azam S. (2019). Making a Difference. Housing and Health: A Case for Investment. Cardiff, Public Health Wales.

ISBN 978-1-78986-071-9

© 2019 Public Health Wales NHS Trust

Material contained in this document may be reproduced under the terms of the Open Government Licence (OGL) www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ provided it is done so accurately and is not used in a misleading context.

Acknowledgement to Public Health Wales NHS Trust to be stated.

Copyright in the typographical arrangement, design and layout belongs to Public Health Wales NHS Trust.

Investing in Health and Housing in Wales



Those at greatest risk from poor housing are:

- Older people
- Children
- Those with existing health problems
- The unemployed

Health and Well-being Impacts

10% of excess winter deaths can be attributed to **fuel poverty**



People who live in homes which are cold, damp and unsafe are more at risk of:

- > poor physical and mental health and well-being
- > cancers, circulatory, cardiovascular and respiratory ill-health
- > more falls and serious injury
- > arthritic and rheumatic conditions

Unhealthy homes

18% of homes pose an unacceptable risk to health

Cold homes impact on physical health, social isolation, stress, and financial capability

Damp or mouldy homes increase **respiratory problems by 30-50%**, mainly in children

12% of households are in fuel poverty

Unsuitable homes

3 in 4 over 65s live in their own home

30% of over 65s and **50% of over 80s** have a fall each year

Accidental injuries are a leading cause of death for children and young people

Overcrowding is linked to stress, alcohol abuse and depression

Homelessness

Those with **4+ Adverse Childhood Experiences** are **16 times more likely** to become homeless



A third of homelessness is caused by a health problem

Costs to the NHS and Costs to Society

Poor quality housing in Wales costs per year:

The NHS

> £95m

(first year treatment costs)

> £1bn

(distress, economy, life-long care, welfare, finances)

Welsh society

The cost to mitigate poor housing is:

£584m

in repairs, improvements, reducing falls and cold hazards

The removal of hazards in the home offers:

Payback in **6 years** for immediate health savings

Payback in just over **6 months** for societal savings

6

Priority Areas for Preventative Action



Housing quality

- Healthy, safe and well managed homes regardless of tenure
- Eliminate cold, damp and mouldy homes, and improve ventilation
- Energy efficiency measures and fuel poverty schemes
- Support vulnerable households instead of area-based interventions
- Good home quality standards, particularly in the privately rented sector
- Improve planning through housing strategies and Health Impact Assessment



Suitable housing

- Integrating adaptations with personal health care plans
- Home modifications and adaptations based on need, not location or tenure
- Falls prevention programmes
- Support independence for older people through extra care schemes
- Homes that promote social inclusion
- Tackle overcrowding



Homelessness

- Early intervention and prevention e.g. tackling Adverse Childhood Experiences
- Co-ordinated approaches to improve access to health and care services
- Person-centred approaches taking services to people and supporting people into homes e.g. avoiding complex systems, more assertive outreach, Housing First
- Raise awareness at a local level of what benefits and support people are entitled to receive



Housing inequality

- Develop evidence on the cost and impact of poor housing on health and society
- Identify those with the greatest need through partnership working and shared intelligence



Partnerships

- Alignment of housing, health and social care, maximising collaboration and integration
- Increased involvement of housing sector in partnerships e.g. Regional Partnership Boards

Return on Investment



Housing quality

£1 spent on central heating generates 42p in health benefits



3.9% reduction in GP visits for respiratory conditions in **Nest scheme** beneficiaries (compared to 9.8% increase in the control group)



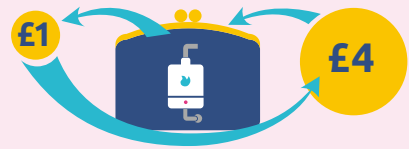
£1 spent on insulation interventions provides a return of **£1.87¹**



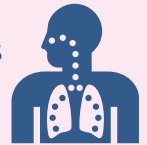
Improving **heating and ventilation** improves asthma in children and is cost-effective



£1 spent on improving warmth in vulnerable households results in **£4** of health benefits



39% fewer hospital admissions for cardiorespiratory conditions and injuries in those with **upgraded houses**



Unsuitable homes



Falls prevention results in pay back in less than 3 years



Adaptations to reduce falls pay back in 5-6 years in NHS costs



Home modifications result in 26% fewer injuries requiring medical treatment (caused by falls) per year

£1 spent on adaptations prior to hospital discharge generates **£7.50** of cost savings for health and social care



Extra care schemes reduce NHS health costs by **£1,786** per person per year



Homelessness

Housing First models for homeless individuals with complex needs returns **£3.60** for every **£1** spent



Every **£1 invested** in moving people out of homelessness generates **£2.80** in benefits



Preventing homelessness results in savings of **~£9,266** per person compared to allowing homelessness to persist for 12 months

¹ Translated from findings of intervention carried out in New Zealand.

Foreword

The case for investing in housing to improve the health and well-being of the Welsh population has never been stronger. We know that poor quality housing in Wales cost the NHS more than £95m per year in first year treatment costs alone and the cost to Welsh society is over £1bn.

An extensive body of evidence now exists showing the critical importance that good housing has on health and well-being and its impact across the life-course. Poor housing is associated with poor physical and mental health and causes, or contributes to, many preventable diseases and injuries including respiratory and cardiovascular diseases and cancer. More needs to be done to realise the type of population health improvement required to sustainably change the health and well-being outcomes of the people of Wales and pivotal to this is a truly integrated health, care and housing relationship.


In challenging times, we need to be working closer together and sharing our resources. Organisations have an excellent opportunity to move to a new model of health, care and well-being through health and housing working together and innovating across public, voluntary and private sectors. There is a need to make full use of shared assets and continue to shift our focus to supporting people to live as healthy and independently as possible at home and in the community.

The barriers to effective relationships between housing and the NHS and social care can be a challenge. However, it is heartening to see through this report the range of innovative work going on within and outside Wales which brings together health, social care and housing. We can see the importance of learning from case studies and approaches across Wales which are holistic and person-centred in nature, such as the Healthy Homes Healthy People project, the Hospital to Home service and the Community Care Hub for Homelessness. All of these look to maximise mental and physical health and well-being outcomes, particularly for those who are the most vulnerable.

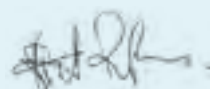
This report shows us the importance of investing in housing for the significant health and well-being benefits that can be achieved, and the significant cost savings that can be made. In looking at just a few examples we can see that upgrading houses can give us 39% fewer hospital admissions for cardiorespiratory conditions, and that £1 spent on improving warmth in vulnerable households can result in £4 of health benefits. Improving ventilation improves children's asthma and is likely to reduce school absence, and home adaptations can generate £7.50 of health and social care cost savings for every £1 spent. The benefits of prevention and early intervention are also demonstrated such as falls prevention initiatives paying back in less than 3 years, and that preventing homelessness can result in savings of around £9,266 per person compared to allowing homelessness to persist for 12 months.

These are only a few of many highlights in the report of effective and sustainable health and housing solutions that are worth investing in to optimise health and well-being in Wales; they also support the delivery of key Welsh policies, including *A Healthier Wales* and *Prosperity for All*.

With this report, Public Health Wales and Community Housing Cymru are seeking to enable an all-Wales commitment to make a positive change to further integrate health, social care and housing, realise cost savings across organisations, and make a real difference to people's lives.



Dr Tracey Cooper
Chief Executive,
Public Health Wales



Stuart Ropke
Chief Executive,
Community housing Cymru

Contents

Infographic	i
1. Purpose	1
2. Methodology	2
3. Limitations	2
4. Public Health context	2
5. Inequalities	4
6. Impact of housing on health in Wales	6
6.1 Children and families	8
6.2 Young people	12
6.3 Working age	13
6.4 Older age	16
7. Effective interventions	25
7.1 Housing quality	27
7.2 Unsuitable homes	31
7.3 Homelessness	34
8. What is already being done?	37
8.1 Housing quality	37
8.2 Unsuitable homes	40
8.3 Homelessness	41
9. Conclusion	43
10. Priority areas for preventative action	44
10.1 Housing quality	44
10.2 Unsuitable homes	46
10.3 Homelessness	47
10.4 Housing inequality	48
10.5 Partnerships	48
References	49
Glossary	54
Appendix I	56

Making a Difference Housing and Health: A Case for Investment



1. Purpose

This report is an extension to Public Health Wales’ Making a Difference publications and aims to inform, support and advocate for wider health policy and cross-sector approaches and interventions offering benefits to the people, health system, society and the economy. The report summarises the impact housing (across tenure) has on health and well-being across the life course; sets out the case for investing in housing as a determinant of health by identifying what interventions work and are value for money; and identifies priority areas for preventative action within Wales.



‘Housing’ is a broad term spanning a wide remit including planning, affordability, neighbourhood, and adaptability. This report does not attempt to be an exhaustive resource investigating every conceivable link between housing (in all its connotations) and health, and instead focuses on three key areas:

- **housing quality** (for example disrepair, fuel poverty and hazards such as cold, falls, damp),
- **unsuitable homes** (for example households requiring support services and adaptations)
- and **homelessness** (for example includes street homeless or rough sleepers, and the hidden homeless who have temporary living arrangements, such as those sofa surfing, living in bed and breakfast accommodation)



2. Methodology

The literature review utilised the methodology established for the Public Health Wales Making a Difference Project, outlining the process of identifying, reviewing and reporting the evidence of effective interventions. However, where evidence was missing or incomplete, or where the protocol yielded limited information, grey literature and case studies have also been used to help inform the evidence-base. Further details of the methodology used can be found in Appendix I.

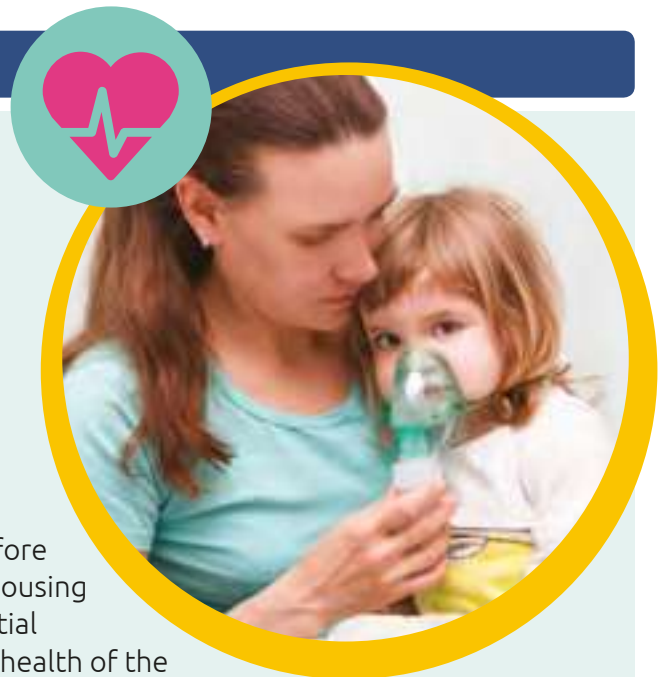
3. Limitations

Echoing the comments of the Parliamentary Office of Science and Technology (POST) (2018), gathering robust evidence related to housing is difficult due to:

- a) the diversity of housing conditions and the mix of people of different demographics covered in the interventions limits comparisons;
- b) small sample sizes and short follow up times of some studies mean that long-term health benefits may be missed;
- c) those living in poor housing are often exposed to many health hazards as well as other elements of deprivation. More than one of these elements may have a negative impact on their health, meaning if it is only possible to improve one hazard, there may not always be a clear benefit due to the continuing impacts of these other elements.

4. Public Health context

Housing quality and condition has a direct impact on the health of occupiers and visitors to those dwellings. Most occupiers spend longer in their own home than anywhere else; therefore, it is imperative to understand the effects housing may have on health. Examples of how housing conditions affect health are: dangerous stairs and trip hazards causing falls; cold dwellings causing illnesses such as pneumonia and heart attacks; overcrowding causing stress leading to depression, damp and mould resulting in colds and asthma. It is therefore important to understand the condition of the housing stock in Wales in order to appreciate the potential impact of housing quality and condition on the health of the Welsh population.



The current means of assessing 'bad housing' is the Housing Health and Safety Rating System (HHSRS), which classifies defects in dwellings by assessing their potential effect on the health and safety of occupants and visitors. The system allows the seriousness of any hazard to be rated, differentiating between minor hazards and those where there is an immediate threat of major harm. Where a hazard scores 1,000 or more on the HHSRS it is deemed to be a category 1 hazard and any dwelling with such a hazard is considered to be below the minimum acceptable standard for housing and thus classified as 'poor' or 'bad' housing.

The HHSRS Operating Guidance (ODPM, 2006) defines 29 hazards divided into those which cause physiological conditions, psychological illness, infection and accidents. The HHSRS concentrates on threats to health and safety and is generally not concerned with matters of quality, comfort and convenience.

Wales has the oldest housing and, proportionately, the highest treatment costs associated with poor housing in the UK (Nicol, Roys, Ormandy, and Ezratty, 2017). It also has some of the least energy efficient housing in Europe, with 65-70% of the housing stock predicted to still be in existence in the 2050s having been built before 2000 (NLA, 2018). Housing which is not energy efficient can lead to excess cold and related health conditions, as well as financial hardship and fuel poverty for the occupiers. However the percentage of households in fuel poverty in Wales has decreased from 29% in 2012 to 12% in 2018 (Welsh Government, 2018a).



Findings from the latest Welsh Housing Conditions Survey (WHCS), estimate that 18% of the housing stock contains a deficiency posing a health and safety risk to the occupant. Furthermore, the prevalence of category 1 hazards is much higher in older houses (34% for pre-1919 houses compared with 5% for post-1980 houses).

With the findings from the WHCS recently published (Welsh Government, 2018b), the Building Research Establishment (BRE) has updated its original 'Cost of Poor Housing in Wales' analysis (Davidson et al., 2011). Using the latest profiles of housing conditions across Wales and updating the methodology in line with the more recent Full Cost of Poor Housing (Roys et al., 2016) report to reflect improved understanding of poor housing impacts, **it is estimated that poor quality housing in Wales costs the NHS more than £95m per year (Nicol and Garrett, 2019)**. This represents first year treatment costs relating to illness and accidents caused by issues such as poor heating and dangerous stairs. Looking more widely at the costs to society as a whole, which takes into account the wider impacts of housing related illnesses and injuries, such as distress, reduced economic potential, life-long care and increased burden on welfare finances, **the full cost of poor housing in Wales is over £1bn. The analysis estimates that the cost to mitigate poor housing, for example carrying out repairs or improvements to reduce falls and cold hazards, would be £584m, if it was available to be spent now. Funding the removal of hazards in the home therefore offers a payback period of 6 years where immediate health savings are considered, or just over 6 months where societal savings are included.** This return on investment, however, varies depending on the intervention, as discussed further in this chapter.

Funding the removal of hazards in the home offers a payback period of 6 years where immediate health savings are considered, or just over 6 months where societal savings are included

Source: Nicol and Garrett (2019)

5. Inequalities

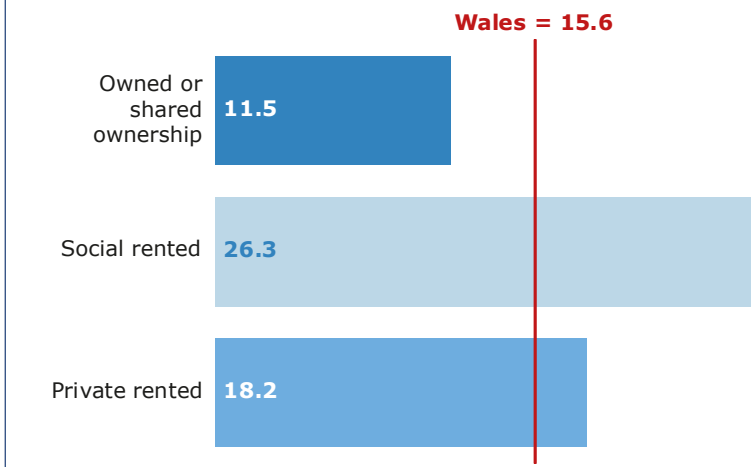
Inequalities in health, prosperity and quality of life arise because of inequalities in society – in which people are born, grow, live, work and age. People who have experienced greater levels of disadvantage and hardship during their lifetime are more likely to have poor health, greater levels of disability and lower life expectancy (Marmot, Allen, Goldblatt et al., 2010). Housing conditions, suitability and homelessness vary across different population groups.



For example, as shown in Figure 1 the 2011 census revealed that over a quarter of households with children living in social rented accommodation are overcrowded. This is substantially higher than both privately rented and owned accommodation.

Furthermore, as Figure 2 shows below, healthy life expectancy for both male and females is higher in rural areas than urban areas.

Figure 1: Percentage of households with dependent children that have more than 1.5 persons per bedroom by tenure, Wales, 2011



Source: Public Health Wales Observatory (2018a), using Census 2011 data

Figure 2: Healthy life expectancy at birth, 2010 to 2014
Life expectancy at birth, 2013 to 2015

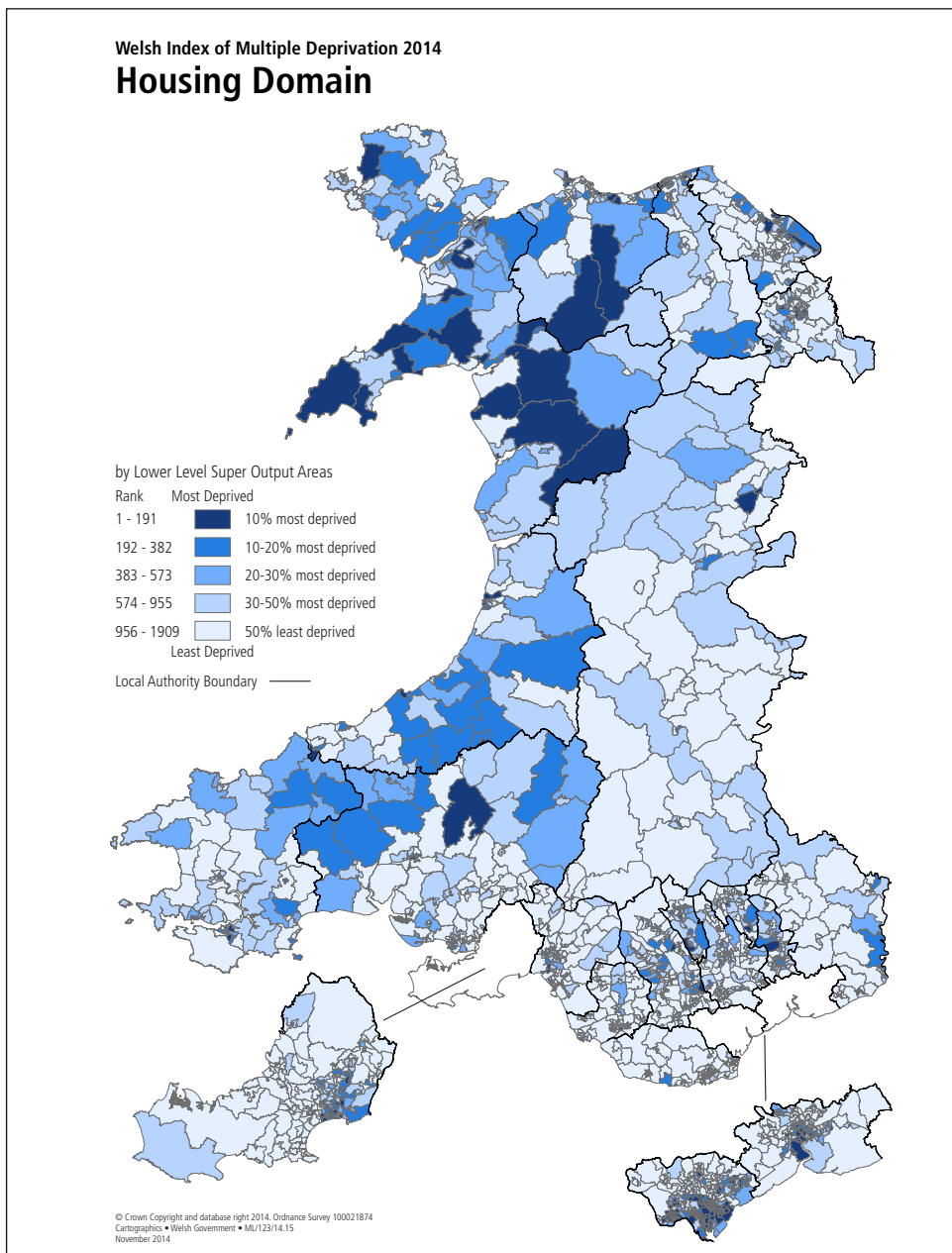


Source: Public Health Wales Observatory (2018b)

Housing Deprivation

The Welsh Government’s official measure of deprivation, the Welsh Index of Multiple Deprivation (WIMD) is designed to identify small areas - Lower Super Output Areas (LSOA) - typically comprising 1,600 people, where there are the highest concentrations of different types of deprivation. The WIMD includes a housing domain which, due to the scarcity of housing data, contributes only 5% to the complete sum of deprivation scores which form the WIMD (Welsh Government, 2014a). This housing domain is limited to two indicators which are both derived from the 2011 census; firstly, two thirds of the weighting is from the proportion of people living in overcrowded households (based on bedroom numbers), and secondly, the remaining third of the weighting is from people living in households with no central heating. Each LSOA is ranked in order, with the most deprived LSOA ranked as 1, and the least deprived ranked as 1,909. Map 1 shows the distribution of the housing domain across Wales, with pockets of high housing deprivation in urban areas such as the large South Wales cities, and in more rural areas such as in the North West. Cardiff has the highest proportion (37%) of LSOAs in the most deprived 10% in Wales, with Monmouthshire and Caerphilly not having any LSOAs in the most deprived 10%.

Map 1: Housing deprivation by Lower Super Output Area across Wales



Source: Welsh Government (2014b)

6. Impact of housing on health in Wales

Summary



Children and families

- Accidental injuries are a leading cause of death for children and young people in Wales. Every year, over 145,000 children and young people attend emergency departments because of an unintentional injury (Children in Wales, 2019)
- In 2017, local authorities in Wales determined 2,229 unintentionally homeless households, with the presence of dependent children or a pregnant woman in the household the most commonly stated priority need category. The main reasons for homelessness are loss of rented accommodation, loss of accommodation associated with employment, followed by relationship breakdown.
- Childhood adversities are substantially over-represented in homeless individuals, with those reporting 4 or more Adverse Childhood Experiences (ACEs) being 16 times more likely to experience homelessness in adulthood. A history of childhood adversity has been related to particularly poor outcomes among the homeless.



Young people

- Overcrowding can lead to psychological distress and mental disorders, especially those associated with a lack of privacy and childhood development. Higher than average levels of overcrowding are found in both the social and private rented sectors, with over a quarter of children living in social rented accommodation experiencing overcrowding.
- Allergens and dust mites, which grow more rapidly in damp and humid environments, are an important cause of asthma for under 14 year olds.
- Young people experiencing disruption or trauma during childhood are significantly more likely to become homeless.



Working age

- On a typical night in 2017, there were 188 rough sleepers in Wales, an increase from 141 in 2016 and 82 in 2015.
- In 2016, of the 5,100 households experiencing homelessness in Wales, 3,100 were 'sofa surfers' i.e. people staying temporarily with households other than their immediate family in overcrowded conditions.
- An audit of the health needs of homeless people in Wales found 33% reported that their current homelessness was caused, at least in part, by a health problem.
- Compared with the general public, healthcare costs for people who are homeless in England are four times higher for use of acute hospital services and eight times higher for inpatient services.





Older age

- It is predicted that the number of people aged over 65 admitted to hospital because of a fall, is set to increase from 15,024 in 2017 to 24,429 in 2035.
- 30% of over 65s and 50% of over 80s have a fall each year.
- The majority of older households live in owner-occupied properties.
- Health is at risk when indoor temperatures fall below 18°C, and with every degree drop below 18°C outdoors, mortality increases by 1.4%.
- Cold weather has a variety of effects on people’s health including direct effects on the incidence of heart attack, stroke, respiratory disease, flu, falls and injuries and hypothermia.
- Living in a cold home can lead to social isolation, stress and worry. 10% of people suffering from a common mental disorder were unable to keep their homes warm in winter, compared to 3% of people without such a disorder.
- It is estimated that in England and Wales 10% of excess winter deaths can be attributed directly to fuel poverty.
- In 2018, 155,000 households in Wales (12% of households) were estimated to be in fuel poverty, of which 130,000 are vulnerable i.e. households containing someone who is elderly, a child, disabled or living with a long-term illness.



Exposure to poor housing can have detrimental effects on health, with more significant impacts associated with different ages and vulnerabilities. For example, children are more susceptible to accidents in the home. For older people, the general increase in frailty associated with increased age means they are more vulnerable to cold and falls and therefore more likely to require support and adaptations in the home. Homelessness, which is strongly associated with economics, relationships and health, is more likely to affect younger adults and the working age population.

This is supported by the classification used in the HHSRS Operating Guidance (ODPM, 2006), which defines 29 hazards divided into those which cause physical conditions, psychological illness, infection and accidents. It also identifies the age groups for whom the risk arising from a hazard is greater than for any other age group in the population.



6.1 Children and families

Evidence reviewed in the recent Parliamentary Office of Science and Technology (POST, 2018) briefing showed that “children who live in persistent bad housing conditions are more likely to have poor physical and mental health outcomes”.

Unintentional injuries

Children in Wales report that Accidental injuries are a leading cause of death for children and young people in Wales. While figures specifically for the home could not be found, every year there are 14 fatalities, and almost 9,000 hospital admissions and 89,000 Emergency Department attendances for childhood injury (aged 0-17 years), with higher rates experienced by children living in the most deprived areas (Lyons et al., 2017).

Falling between levels typically includes falls from windows, balconies, landings and climbable roofs (ODPM, 2006). The health outcomes range from a fatality due to a fall from a high building, to a few bruises from a less serious fall. The main interventions are fitting stair gates, safety windows, window guards and railings.

... accidental injuries are a leading cause of death for children and young people in Wales



Homelessness

Homelessness is a spectrum of insecurity. Rough sleeping is the most visible form (described in Section 6.3) but homelessness can also include temporary living arrangements ('hidden' homelessness). Where someone is eligible for assistance, not intentionally homeless and falls within a specified priority need group they are classified as being statutory homeless. In 2017, local authorities in Wales determined 2,229 households were in priority need, and on a typical night, there were 2,142 households living in temporary accommodation (Welsh Government, 2018c).

There are many more households however that are hidden, for example sleeping on sofas and floors of friends or families, and there are even more households in precarious positions spending large proportions of their income on rent or living in unsuitable housing. The UK Government's changes to the benefit (social security) system has been reported to be contributing to an increase in those experiencing or at risk of homelessness (National Audit Office, 2017).

Statutory homelessness

Of those 2,229 households which were unintentionally homeless and in priority need the presence of dependent children or a pregnant woman in the household was the most commonly stated priority need category followed by cases where a member of the household was vulnerable due to mental illness, a learning disability or learning difficulties (see Table 1).

During 2017-18 ...

9,072 households in Wales were assessed as being threatened with homelessness,

11,277 households were assessed as being homeless and owed a duty to help secure accommodation, and

2,229 households were assessed to be unintentionally homeless and in priority need

Welsh Government (2018d)

Table 1: Households eligible, unintentionally homeless and in priority need (Section 75) by priority need and household type, during 2016-17 and 2017-18 in Wales

Outcomes	2016-17		2017-18	
	Number of households	Percentage (%)	Number of households	Percentage (%)
Households with dependent child(ren)	864	41.7	882	39.6
Households where a member is pregnant and there are no other dependent children	102	4.9	126	5.7
Households where a member is vulnerable due to:				
Old age	36	1.7	39	1.7
Physical disability	210	10.1	237	10.6
Mental illness / learning disability / learning difficulties	372	17.9	393	17.6
Other special reasons	30	1.4	45	2.1
A care leaver or person at particular risk of sexual or financial exploitation, 18 years or over but under the age of 21	69	3.3	81	3.7
A 16 or 17 year old	63	3.0	66	2.9
A person fleeing domestic abuse or threatened abuse	237	11.4	270	12.1
A person leaving the armed forces	< 3	0.1	9	0.4
A former prisoner who is vulnerable as a result of having served a custodial sentence	84	4.1	72	3.2
Households homeless in emergency	6	0.3	9	0.4
Total households	2,073	100	2,229	100

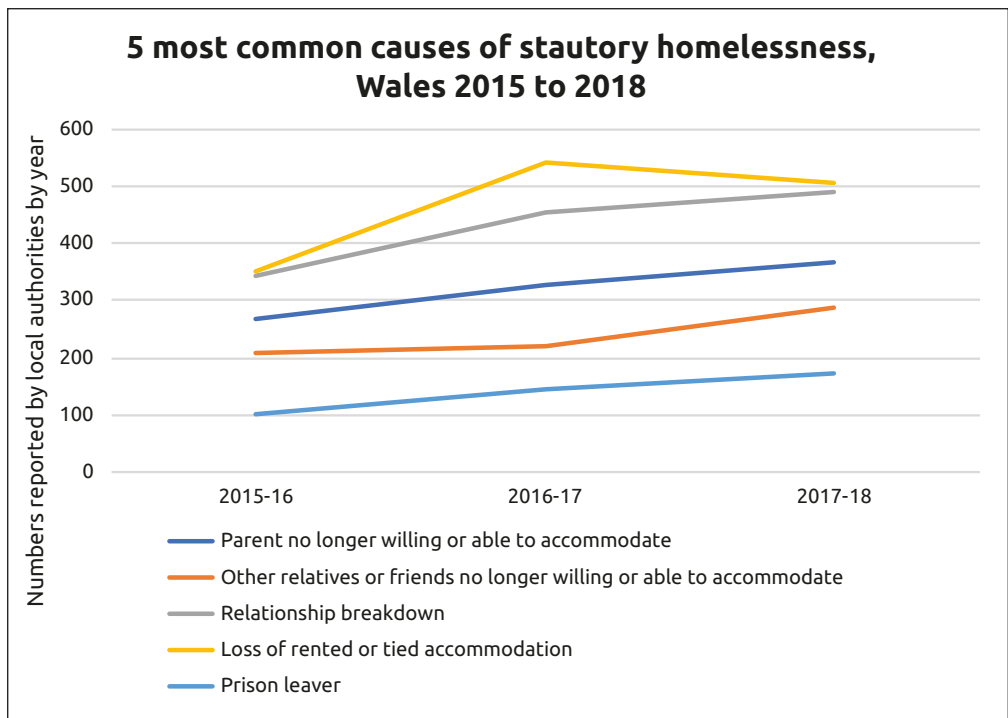
Source: Welsh Government (2018d)

Reasons for homelessness

Of the eligible households who were unintentionally homeless and in priority need, the main reasons for the loss of their last settled home are shown in Figure 3 for the three years since 2015-16. Since 2015, loss of rented accommodation or accommodation tied to employment has consistently been the most frequent reason, followed by relationship breakdown. Such insecurity, especially where it is recurrent, can affect health, education, ability to obtain and sustain employment, and community cohesion (The Academic – Practitioner Partnership, 2016). These households qualified for the duty to have accommodation secured for them, and in 2017-18 78% of these households accepted an offer of permanent accommodation (compared with 81% in 2016-17 and 80% in 2015-16).

... loss of rented accommodation or accommodation tied to employment has consistently been the most frequent reason, followed by relationship breakdown ...

Figure 3: The 5 most common causes of statutory homelessness reported by local authorities by year, 2015 to 2018

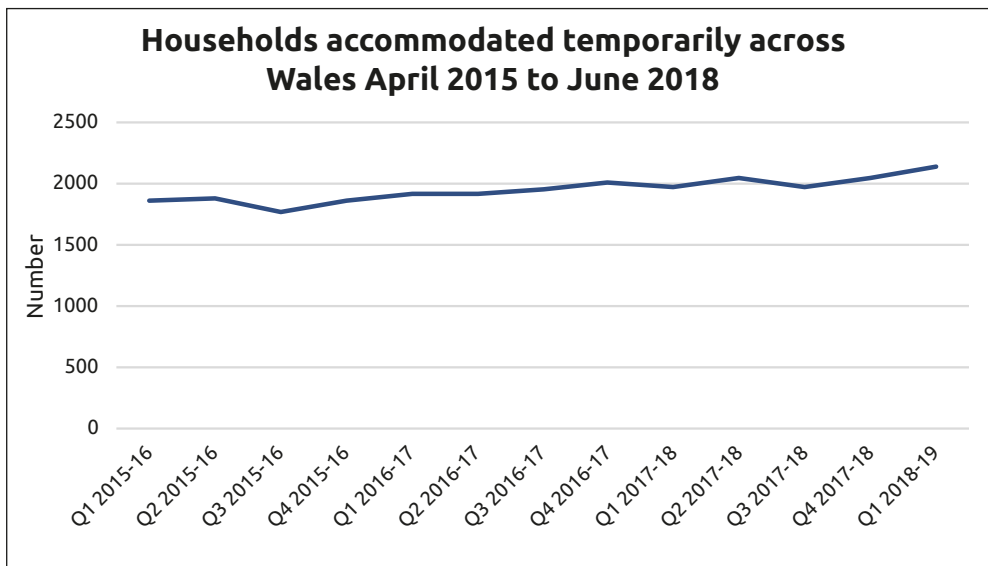


Source: Welsh Government (2018c)

Temporary accommodation

At the end of June 2018, there were 2,142 households in temporary accommodation, dispersed between the private sector, public sector, hostels, women’s refuges and bed and breakfast accommodation (Welsh Government, 2018c). As Figure 4 shows there has been a general increase since the end of June 2015, although there is no analysis to show that this is statistically significant.

Figure 4: Households accommodated temporarily across Wales by year quarter, April 2015 to June 2018



Source: Welsh Government (2018c)

Adverse Childhood Experiences (ACEs)

Childhood adversities such as poverty, problematic role models, hints of damaging psychological experiences, general household strain, family dysfunction, and distress have all been found to be disproportionately present in the childhood backgrounds of homeless adults (Koegel, Melamid and Burnam, 1995). Furthermore, significant associations between childhood adversity and lifetime homelessness have also been observed in an American study (Roos et al., 2013), where individuals with lifetime homelessness experienced higher rates of all childhood adversities compared with individuals without lifetime homelessness. The most prevalent childhood adversities for both women and men experiencing lifetime homelessness were physical abuse, physical neglect and general household dysfunction. Even accounting for mediating risk factors such as mental health disorders, the links between each type of investigated adverse experience in childhood and future homelessness remained “highly significant”.



A Public Health Wales (2015) report investigated how traumatic experiences that occur during childhood could influence health behaviours and health outcomes in adolescence and later life. Factors that directly hurt a child, for example maltreatment, or affect them through the environment in which they live, such as growing up in a house with domestic violence, were considered. The greater the exposure to these ACEs, the more likely the child was to go on to develop health-harming and anti-social behaviours, often during adolescence. These behaviours include binge drinking, smoking and drug use. Ultimately, such poor health and social behaviour means individuals progress more rapidly to develop diseases such as diabetes, cancer, cardiovascular disease and mental illness (Felitti et al., 1998; Anda et al., 2006; Bellis et al., 2014).

Data analysed from a national Welsh survey that took place in 2017, found that the prevalence of lifetime homelessness in the Welsh population was 7% (weighted to reflect the Welsh national adult population), and that the likelihood of lifetime homelessness increased with the number of ACEs reported. Those reporting 4 or more ACEs were 16 times more likely to report experiencing homelessness as an adult. However if they experienced resilience assets as a child, for example a supportive adult and/or family, or attending school, this helped to protect them from homelessness later in life (Grey and Woodfine, 2019).



6.2 Young people

Overcrowding

Overcrowding occurs where a household has fewer numbers of bedrooms than it needs and can lead to psychological distress and mental disorders, especially those associated with a lack of privacy and childhood development. Overcrowding also poses an increased hygiene risk, increases the spread of infectious disease and risk of accidents (ODPM, 2006), and negatively affects children (POST, 2018). Overcrowding does not occur in isolation and a recent study into multiple risk factors (Sabates and Dex, 2012) showed that overcrowding for young children was significantly linked to other problems faced by parent(s) with whom they lived, including financial stress, not working, violence at home, alcohol abuse and depression. According to the 2011 census, overcrowding in Wales among households with dependent children was more common in social and private rented homes compared with the owner occupied rented sector (Public Health Wales Observatory, 2018b).

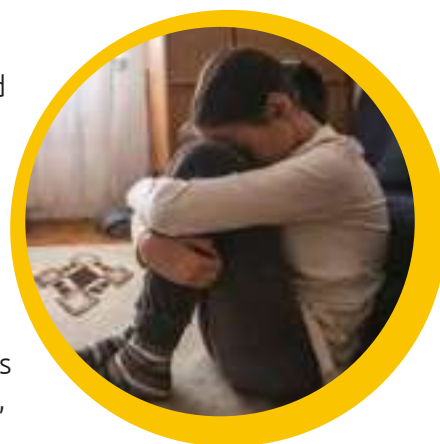
Damp and mould

Allergens and dust mites, which grow more rapidly in damp and humid environments, are an important cause of asthma for under 14-year olds (ODPM, 2006). Whilst this hazard is predominantly associated with respiratory conditions, the HHSRS guidance states that “the mental and social health effects of mould or damp staining and the smells associated with damp and mould can cause depression and anxiety” and that these “feelings of shame and embarrassment can lead to social isolation” (ODPM, 2006: p. 55). These psychological aspects can impact all ages in the household and can last a lifetime.

Allergens and dust mites ... are an important cause of asthma for under 14-year olds

Homelessness

Young people experiencing disruption or trauma during childhood are significantly more likely to become homeless (Llamau). The experience of Llamau (a charity helping to provide homeless teenagers with a safe place to stay) is that of the homeless youth they support, 25% have been in care, 90% have at least one current mental health issue and 15% have had an involvement with youth offending services (Llamau, 2018). One of the issues identified by the National Assembly for Wales Research Service (2018) is that many homeless 16 and 17-year olds are being placed into temporary Bed & Breakfast accommodation, rather than being found a permanent place to live.





6.3 Working age

Homelessness - rough sleeping

Welsh Government data (2018c) identified that on a typical night in 2017, there were 188 rough sleepers, which is an increase from 141 in 2016 and 82 in 2015. These numbers are smaller than the number of homeless sleepers estimated by local authorities which are counted over a two-week period and have also seen an increase between 2015-16 and 2017-18 - see Table 2.

Table 2: Number of rough sleepers across Wales 2015 to 2018

Year	One-night count rough sleepers	Estimated number of homeless sleepers
2017-18	188	345
2016-17	141	313
2015-16	82	240

Source: Welsh Government (2018c)

Homelessness - health needs

In 2016, the Welsh Government commissioned an audit of the health needs of homeless people in Wales. 322 surveys were completed from homeless people across Wales including people who had slept rough; stayed in a hostel, foyer, refuge, night shelter or bed and breakfast establishment; stayed with friends or relatives because they had no home of their own; or applied to the council as homeless (Cymorth Cymru, 2017). The vast majority of the respondents were white UK citizens with only two identifying themselves as refugees. Two thirds were male, and the sample was disproportionately comprised of younger people compared with the general population (16% 15-19, 29.5% 20-29, 21.5% 30-39, 19.5% 40-49, 11% 50-59, and 2.5% 60-64).

- 27% were “permanently unable to work due to long-term sickness or disability”, and another
- 9% “intend to look for work but were prevented by temporary sickness or disability”.

The research also distinguished between whether responders had presented to the local authority as homeless. Those who had presented reported more physical and mental health needs than those who had not. Table 3 shows the top three primary and secondary reasons behind the current situation of homelessness.

Table 3: Top three primary and secondary reasons for the cause of current homelessness

Primary reasons for homelessness (top 3)	Secondary reasons for homelessness (top 3)
Parents / care-givers no longer able / willing to accommodate	Other relatives or friends no longer able / willing to accommodate
Eviction or threat of eviction	Drug or alcohol problems
Non-violent relationship breakdown with partner	Mental or physical health problems

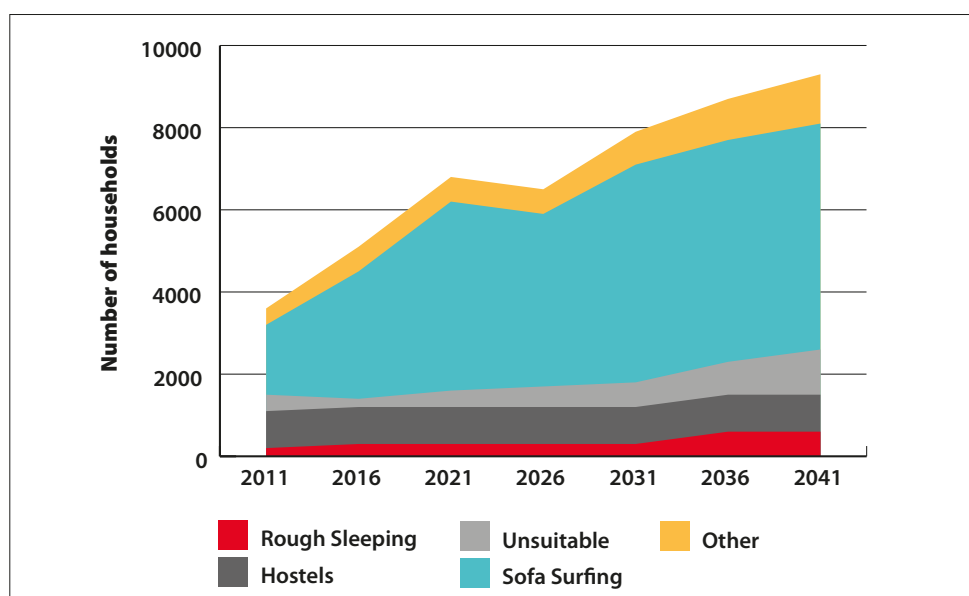
Overall, 33% of the sample reported that their current homelessness was, at least in part, due to either a physical or mental health problem (including drug and alcohol problems). The research found that on average, each homeless person had 2.29 physical health problems such as joint problems, dental health issues and asthma, and 2.28 mental health problems most commonly depression and anxiety. The most common reasons for not being able to access treatment and support was the inability to get an appointment for physical health issues, and waiting lists for mental health issues, with drug and alcohol use contributing to access barriers. While two thirds

(64.4%) of respondents had no dependency issues, problems with drugs were more prevalent (25.5%) than problems with alcohol (19.3%).

Comparing these findings with England, the researchers estimated that homeless people in Wales have a 30% higher chance of experiencing both physical and mental health problems than homeless people in England, but are approximately 10% less likely to have drug issues. The study also found high proportions of homeless people not registered with mainstream health services such as GPs and dentists. The authors made recommendations including: that access to health services for homeless people is improved; services are more responsive and proactive in the early identification of homeless risks; different organisations and services work closely together to deliver more joined up support; and new approaches, such as Housing First (See Section 7.3), are developed to address complex needs.

However, statutory homeless and rough sleeping is only a small part of the homelessness spectrum. The charity Crisis, which helps homeless people in the UK, estimated that in 2016, of the 5,100 households experiencing homelessness in Wales, 3,100 were 'sofa surfers' – i.e. people staying temporarily with households other than their immediate family in overcrowded conditions (Crisis, 2017). These are typically households comprising single adults of working age, but there are also a significant number of families and children within this group. Based on current trends and forecast changes to the economy, labour market, housing affordability and current policy settings in Wales, it is projected that homelessness will increase significantly in future years (Figure 5). The majority of homeless people are hidden - i.e. living outside mainstream homelessness accommodation, living in squats, on the floors or sofas of friends or families as well as other forms, including cars, tents and night shelters. This component is considerable and predicted to increase significantly.

Figure 5: Forecasts of homelessness by main component, Wales 2011-41



Source: Crisis (2017)

The mean age at death of homeless people was 44 years for men, 42 years for women and 44 years for all persons between 2013 and 2017 (ONS, 2018a). The researchers also estimated the standardised mortality ratios (SMRs) for different ages as shown in Table 4¹. Homeless people in England aged 16-24 have twice the chance of dying as the general population; those aged 25-34 four times; those aged 35-44 year olds five times; and those aged 45-54 three times.

¹ SMR measures mortality which take into account the age structure of the population being considered. It is calculated using a standard set of age-specific death rates which are used to determine how many deaths could be expected in a particular population, given its size and age structure. This gives a total number of 'expected' deaths. This figure is then compared with the actual number of 'observer' deaths which occurred.

Table 4: Standardised Mortality Ratios (SMRs) for all causes of death by age-group

Age	SMRs
Age 16-24	200
Age 25-34	418
Age 35-44	513
Age 45-54	305

Source: Crisis (2012)

For selected causes of death as shown in Table 5, homeless people have higher mortality ratios compared to the general population; for example, the chances of homeless people dying from alcohol-related causes are seven times higher than for the general population and dying from drug-related causes is 20 times higher for the homeless population. Homeless people are twice as likely to die as the general population from heart attacks and chronic heart disease, at an average age of 59 years, younger than the general population.

Table 5: Average age of death and SMRs for cause of death in England

Cause	SMRs for homeless people	Average age of death	
		Homeless people	General population
Alcohol	710	48	51
Drugs	1971	34	35
Suicide	340	37	46
HIV & Hepatitis	682	41	blank
Respiratory	306	56	76
Heart attacks	190	59	75
Falls	716	45	77

Source: Crisis (2012)

Department for Health (2010) analysis aimed at improving understanding of the health needs and relative healthcare costs of people who are homeless, estimated that this population’s use of acute hospital services cost **four** times as much as for the general public. Inpatient services cost **eight** times as much. The analysis showed that although this client group had almost three times the average length of stay of the 16-64 population, this was due to the severity of their health conditions rather than differences in delays for discharge. It also found that this client group are much more likely to be admitted as an emergency.



A Ministry of Justice report (Williams, Poyser and Hopkins, 2012) summarises the accommodation backgrounds and needs of **newly sentenced prisoners**, and the links between these and reoffending on release. It found that more than three-quarters of prisoners (79%) who reported being homeless before custody were reconvicted in the first year after release, compared with less than half (47%) of those who did not report being homeless before custody. Therefore, addressing homelessness may not only contribute to improvements in health, but there may be additional societal benefits, for example reduced criminality.



6.4 Older age

Falls

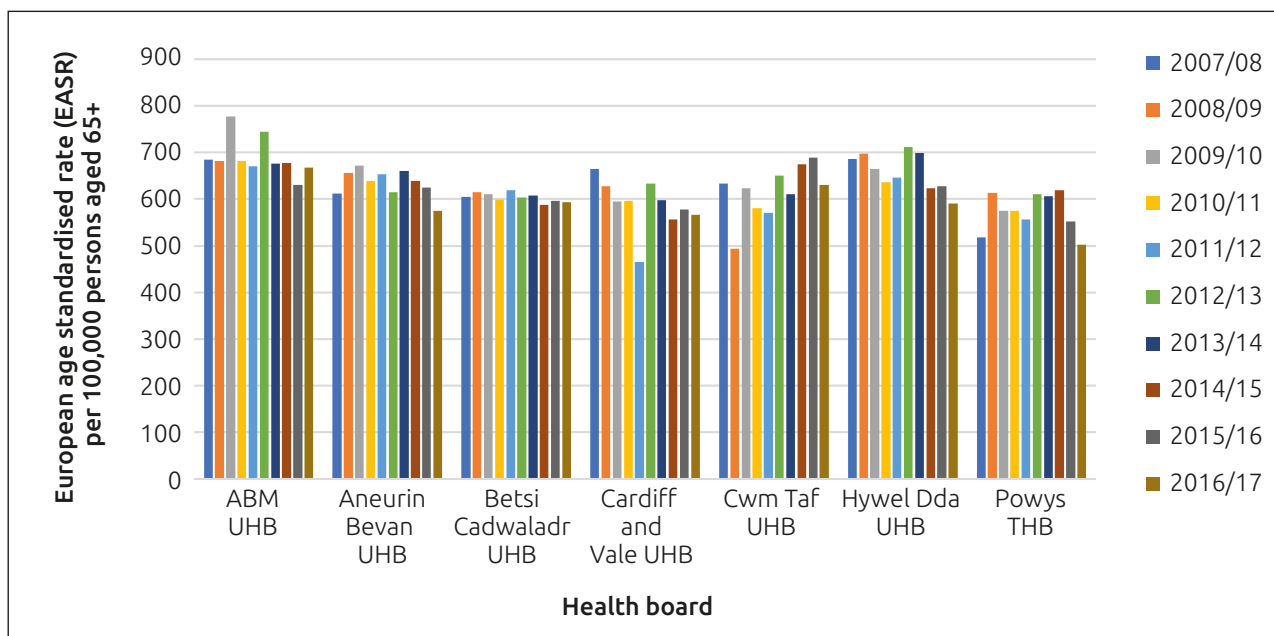
The main fall hazards affecting older people are falls in baths, falls on stairs and falls on level surfaces (trips and slips). A Public Health England (PHE) literature review (2018) confirms that falls are common for people over 65 years of age, with 30% of this age group having a fall each year, increasing to 50% for the over 80s (NICE, 2013). Falls in bathrooms may be more severe both because the person falling is not protected by clothing and because of the hard projections and surfaces commonly found. Injuries to an elderly person typically result in a general deterioration leading to cardio-respiratory illness including heart attack and pneumonia (ODPM, 2006). Falls on stairs account for around 25% of falls in the home and are more likely than other falls to lead to a fatality or extreme health outcome (ODPM, 2006). Hip fractures are the most common injury associated with falling on stairs and this can again result in a general deterioration of health. Falling on level surfaces are more common than falls on stairs but are less likely to lead to significant harm.



According to Public Health Wales Observatory, in 2016/17 there were 3,719 hip fractures in older people. Data is also available for individual health boards as seen in Figure 6. The highest rates of hip fractures were in Abertawe Bro Morgannwg University (ABM) and Cwm Taf health boards. Comparing the rates between health boards for 2016/17 however, did not show any statistically significant differences.

...in 2016/17 there were 3,719 hip fractures in older people...

Figure 6: Hip fractures among older people by year, and by health board



Source: Public Health Wales Observatory (2018b)

Disability

Wales (along with the North East and the East Midlands) has the highest percentage of people from any region or country in the UK reporting a disability. In 2016/17, 25% of the adult population in Wales (0.8 million) reported having a disability (ONS, 2018b). Welsh Government report that in 2017 there were 117,667 people in Wales who were over 65 and had a mobility impairment, which is predicted to increase to 178,134 by 2035 (Welsh Government, 2018e). Between 2017 and 2035, it is also predicted that the number of people aged 65 admitted to hospital because of a fall, is set to increase from 15,024 to 24,429, and the number of people living alone will increase from 292,380 to 388,608.

Table 6: Population aged 65 and over various metrics, projected to 2035 (Wales)

Variable	Estimated number of people aged 65 or over		Estimated change from 2017 to 2035
	2017	2035	
People	646,960	860,300	+33%
Mobility impairment	117,667	178,134	+51%
Limiting long term illness	228,907	316,540	+38%
Falls - hospital admission	15,024	24,429	+63%
Dementia	44,275	72,769	+64%
Unable to manage at least one domestic task on their own	261,320	381,580	+46%
Unable to manage at least one self-care activity on their own	214,363	312,907	+46%
Living alone	292,380	388,608	+33%

Source: Welsh Government (2018e)

According to the previous Living in Wales 2008 survey, the majority of older households live in the owner-occupied sector (Welsh Government, 2018e). As Table 7 shows, 76% of those aged 65 and over live in their own homes.

Table 7: Tenure (owner-occupied, rented from council, other social rented, or private rented) for selected age groups, 2008

	Owner-occupied	Local authority	Housing association	Private rented
People aged 16-24	128,791	60,757	43,646	138,533
People aged 25-44	425,955	98,121	68,989	147,856
People aged 45-64	611,666	80,250	41,373	52,089
People aged 65 and over	410,410	70,343	32,398	26,052
Total population aged 16 and over	1,576,822	309,470	186,406	364,529

Source: Welsh Government (2018e)

Excess cold

Exposure to cold indoor temperatures can adversely affect health. Health is understood to be at risk when indoor temperatures fall below 18°C, and with every degree drop below 18°C outdoors, mortality is estimated to increase by 1.4% (Donaldson, 2010). While excess cold can have an impact on all age ranges (Ruse and Garlick, 2018), it does have a notable effect on older people, particularly those over 65 who are expected to spend a greater amount of time indoors. The effects of excess cold are increased deaths and illness including cardiovascular and respiratory disease, mental health and well-being and other conditions. The main interventions involve improving the heating and thermal efficiency of the dwelling.



Impact of cold on excess winter morbidity and mortality

The National Institute for Health and Care Excellence (NICE, 2016) Quality Standard QS117 covers the prevention of excess winter deaths and health problems associated with cold homes. Cold weather has a variety of effects on people's health including direct effects on the incidence of heart attack, stroke, respiratory disease, influenza, falls and injuries and hypothermia. Furthermore, there are indirect effects of cold and damp weather, for example mental health problems including depression. Excess winter death (EWD) refers to the higher death rate in the winter months (December to March inclusive) compared with the average number of deaths occurring in the preceding August to November and the following April to July. In England, these EWDs are related to outdoor winter temperatures of 4-8°C which cause increases in respiratory and cardiovascular issues (Public Health England, 2017). As temperatures fall further, the risk of illness and death increases. In their study linking the postcodes of resident deaths from cardiovascular disease to data on housing conditions, while not a linear relationship, Wilkinson et al., (2001) observed that people living in the least energy efficient quarter of homes were a fifth more likely to die during winter than householders from the warmest properties.

“For each Celsius degree drop in outdoor temperature, mortality rate increased by 2.8% for people in the coldest 10% of homes, compared with only a 0.9% rise in the warmest 10% of homes” (Wilkinson et al., 2001)

The NICE Quality Standard states that in general it tends to be older people who are affected by EWD. For example ONS reported that in 2014/15:

- 56% of cold-related deaths were in people aged 85+
- 27% were in people aged 75-84

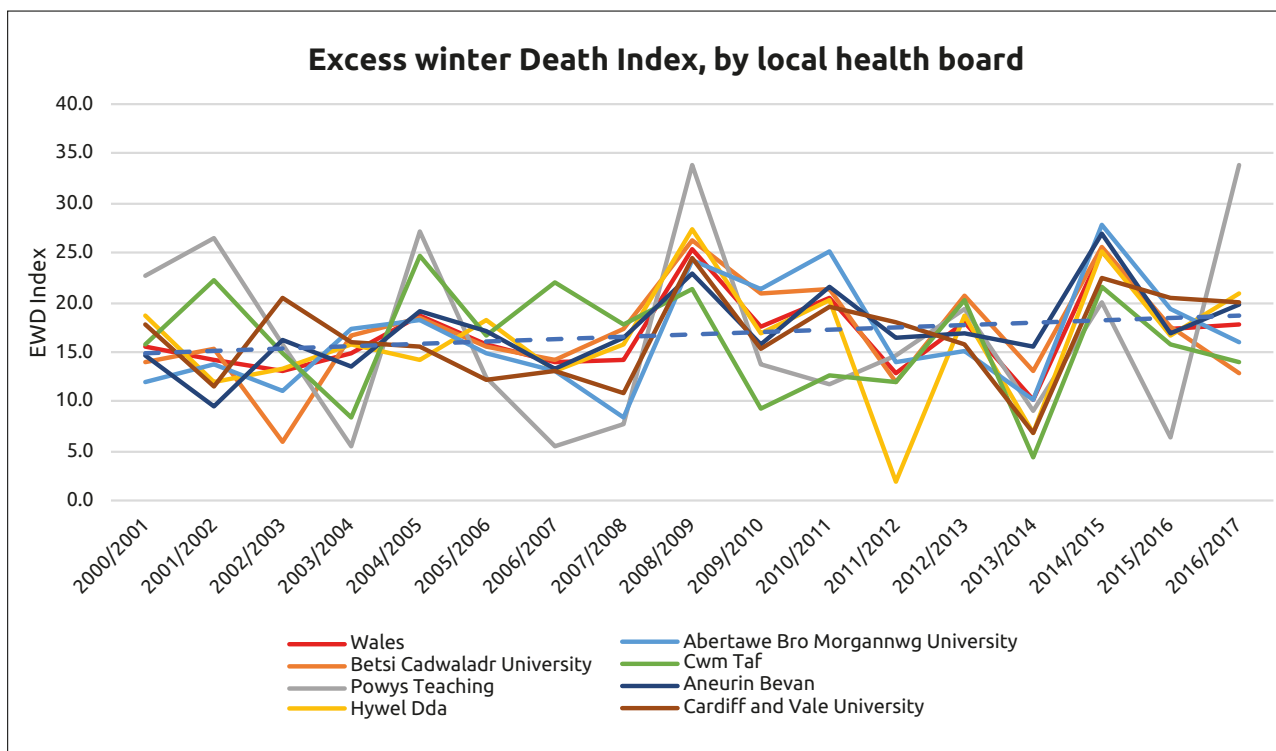
The three leading causes of EWD are circulatory diseases, respiratory diseases, and dementia and Alzheimer's disease (ONS, 2017a). The relationship with cold temperature is however more complex, but every year thousands die prematurely or succumb to avoidable ill-health and suffering caused by low temperatures in the home (Association for the Conservation of Energy, 2016). Maintaining healthy temperatures are a factor of energy efficiency which determines the cost of heating, energy costs, and the ability of the householder to adequately heat the home. Collectively, these factors are evaluated through the concept of fuel poverty.

For Wales, the provisional 2017/18 EWD figure (ONS, 2018d) is 3,400, compared with 1,850 in 2016/17 and 1,790 in 2015/16. Allowing comparisons to be made between regions, an EWD Index is calculated as the number of excess winter deaths divided by the average non-winter deaths. Across England and Wales, in 2017 to 2018 the highest regional EWD index was in Wales with 32.8%, followed by the North East and East of England, both with 31.0%. In comparison with the England and Wales average (30.3%), only Wales' EWD index was statistically significantly higher

whereas London was the only region whose index was statistically significantly lower (27.3%) (ONS, 2018e). The large increase in Wales’ EWD index may have been due to the high levels of influenza activity. At local authority level (excluding the Isle of Anglesey where there is a negative EWD figure), the most recent data available covers 2016/17 and shows Powys had the highest EWD Index at 33.8%, which was a significant increase compared with 2015 to 2016 (6.5%). Gwynedd had the lowest EWD index in Wales at 6.5%, which decreased significantly from 17.9% in 2015 to 2016 (ONS, 2018d).

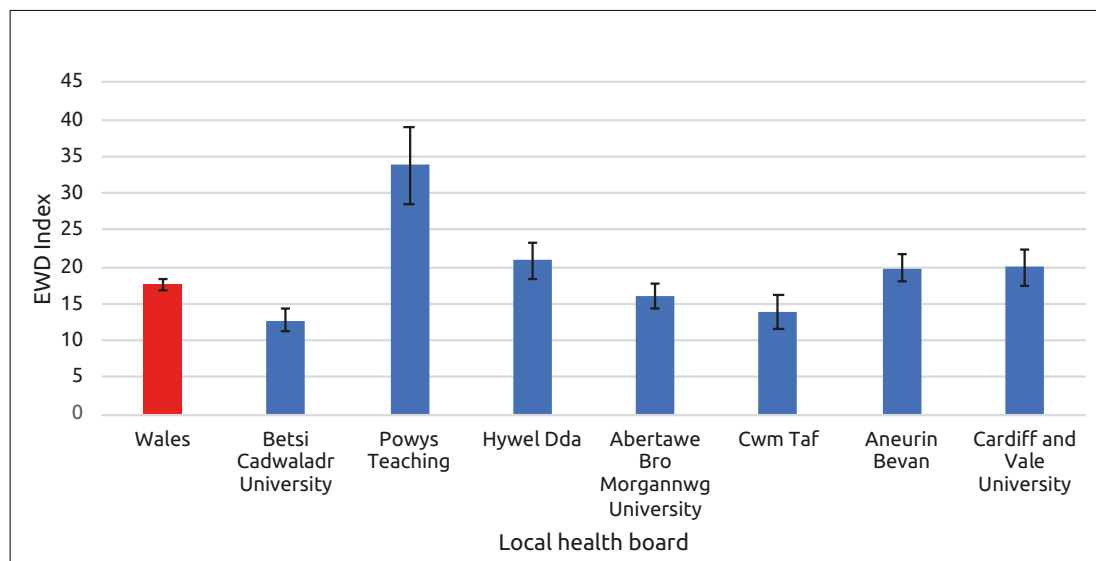
The most recent EWD data available for Welsh local health boards is for 2016/17. Figure 7 plots the EWD Index for each of the 7 health boards from 2000 to 2017. A trendline for the Welsh average has also been added which shows an increase over time.

Figure 7: Excess Winter Death Index, by local health board, 2000 to 2015



Source: ONS (2017c; 2018c; 2018d)

Figure 8 shows the EWD Index for each of the 7 health boards. The data provides values showing with 95% confidence where the true value lies. The upper and lower 95% confidence limits (28.6-38.9) for Powys Teaching Health Board do not overlap those of Wales (16.9-18.5), indicating the rates for Powys are statistically significantly higher than the Wales average. Those for Betsi Cadwaladr University and Cwm Taf Health Boards are statistically significantly lower. However, there is considerable variability year on year as the data for 2014/15 (ONS, 2017c) showed that the rate for Powys Teaching Health Board was statistically significantly lower than those of Wales.

Figure 8: Excess Winter Death Index by local health board, 2016/17

Source: ONS (2018c)

Impact of cold on respiratory disease

Respiratory disease is linked to cold, damp homes. Cold air can increase the risk of bronchitis, pneumonia and bronchoconstriction in people with asthma and chronic obstructive pulmonary disease (COPD). Onset of the most common respiratory diseases are likely to be associated with a range of bacterial and viral respiratory pathogens including influenza. Homes with damp or mould can cause a 30-50% increase in respiratory problems, with children being particularly affected (Ruse and Garlick, 2018). Asthma and respiratory infections could also mean work and school days lost, affecting both the household's and the national economy and educational attainment. This is highlighted in the report by the Marmot review team (2011) giving evidence of the effect of excess cold on children and vulnerable families, as well as on older people (Rodgers et al., 2018).

Individuals with pre-existing respiratory conditions are likely to be particularly susceptible to cold indoor temperatures. A study in Aberdeen showed that COPD patients living in warmer homes were found to have better health status (Osman et al., 2008). Patients experiencing fewer days at 21°C for at least 9 hours had significantly worse respiratory symptom scores. Patients who were continuing smokers were more vulnerable to lower indoor temperatures.

Impact of cold on cardiovascular disease

Deaths from cardiovascular disease are more likely to occur in cold temperatures. Cold causes blood pressure to increase due to narrowing of blood vessels, therefore increasing the risk of thrombosis, heart attack or stroke (Ruse and Garlick, 2018).

Impact of cold on mental health

Numerous studies have shown strong associations between self-reported mental ill-health, fuel poverty and cold homes. Living in a cold home can lead to social isolation, stress and worry about heating bills and debt. This can affect children as well as adults and have a negative impact on various aspects of life, including attainment at school (Ruse and Garlick, 2018).

Research by NatCen found that 10% of people suffering from a common mental disorder were unable to keep their homes warm in winter, compared to 3% of people without such a disorder (Harris et al., 2010).

Impact of cold on different age groups

Older people, especially those over 75 years old, are more vulnerable to cold (Table 8). This could be partly because of an increased likelihood of suffering from pre-existing chronic illness, reduction in fat to retain body heat, or increased vulnerability to indoor cold because of the increased time they spend at home and a higher prevalence of fuel poverty (Public Health England, 2017).

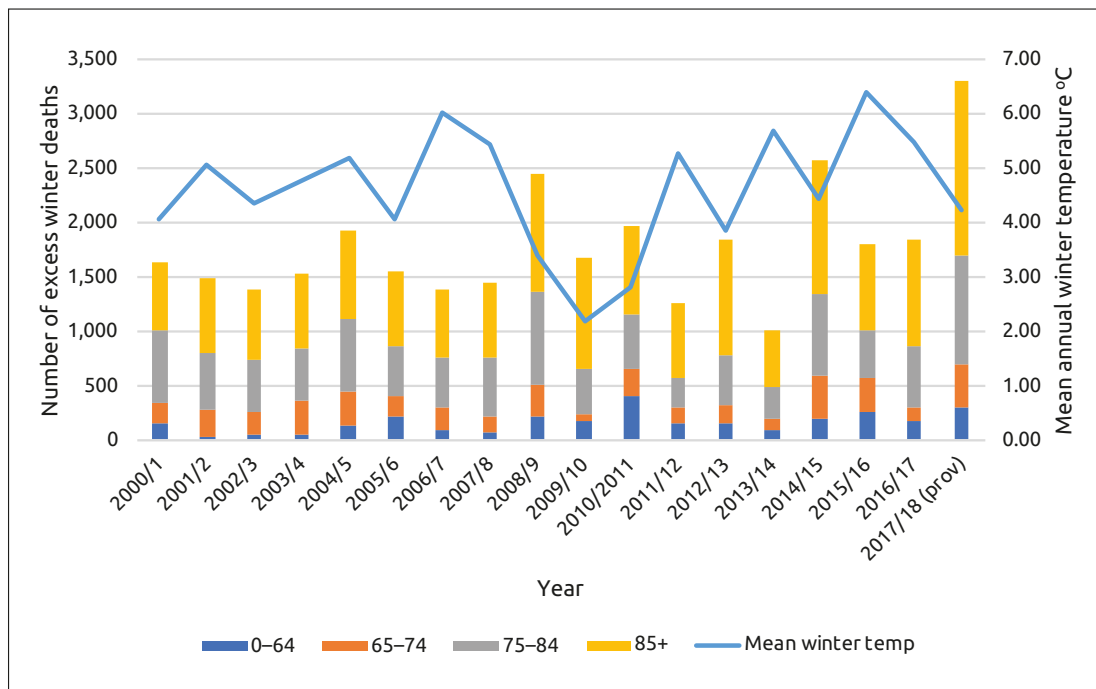
Table 8: Number and percentage of excess winter deaths by age group (all person), Wales, 2017/18

Age group	Excess Winter Deaths	Percentage of excess winter deaths (%)
0–64	300	9
65–74	400	12
75–84	1,000	29
85+	1,600	47
All ages	3,400	100

Source: ONS (2018d)

Figure 9 shows the number of EWDs by age group by year, with mean annual winter temperature also plotted.

Figure 9: Number of excess winter deaths by age group, Wales, 2000/01 to 2017/18, with mean annual winter temperature



Source: Excess winter deaths by age ONS (2018d), mean annual winter temperature Met Office (2019)

Fuel poverty

Based on evidence from Sir Michael Marmot's 2011 report on the impact of cold homes, the 2012 UK Government review of fuel poverty estimated that:

"10% of excess winter deaths could conservatively be attributed directly to fuel poverty" (p. 24; DECC, 2012).

Given that in Wales there were 1,800 excess winter deaths in 2016/17 (ONS, 2017), fuel poverty presents a significant public health challenge that cannot be ignored.

"Fuel poverty is a long-standing health issue: the impact of cold housing on health and the stresses brought on by living in fuel poverty have been recognised for decades...Cold housing and fuel poverty can be successfully tackled through policies and interventions if there is a will to do so...fuel poverty is avoidable and it contributes to social and health inequalities." (p.5; Marmot Review Team, 2011)

In Wales, a household is defined as being in fuel poverty if they need to spend 10% or more of their income on keeping their home at a reasonable temperature (Welsh Government, 2018f). Generally, it can be regarded as "the condition of being unable to afford to keep one's home adequately heated". It is therefore a measure of income, energy costs and energy efficiency. In his report on the impact of cold housing on health (The Marmot Review Team, 2011), Sir Michael Marmot not only confirmed the well-established link between cold homes and ill-health, but also acknowledged a social gradient in fuel poverty, where households on lower incomes are more likely to be in fuel poverty than those on higher incomes.

Using the 2008 Living in Wales dataset as a baseline, in 2016 the Welsh Government commissioned BRE to update the predictions of fuel poverty levels in light of subsequent energy efficiency reported measures, and changes in fuel price and household income. The national levels of fuel poverty for Wales were predicted to be higher than in England but lower than in Scotland or Northern Ireland (as a percentage of all households). 291,000 households (23% of households) were predicted to be in fuel poverty of which 261,000 were vulnerable (i.e. households containing someone who is elderly, a child, disabled or living with a long-term illness). Data taken from the latest 2018 Housing Conditions Survey in Wales now shows this figure to be estimated at 155,000 households (12% of households) to be in fuel poverty, of which 13,000 were vulnerable (Welsh Government, 2018a).

As Table 9 shows, despite an estimated increase in 2014, through a combination of (moderately) rising household incomes, reduction in household energy consumption due to energy efficiency improvements, and decreasing gas and oil prices since 2014, fuel poverty levels across all Welsh households has decreased to an estimated level of 23% in 2016 (Welsh Government, 2016a), and a further decrease to 12% in 2018 (Welsh Government, 2018a).

Table 9: Number and percentage of households in fuel poverty in Wales

Year	Number of households in fuel poverty (000s)	Percentage of households in fuel poverty (%)
2012	364	29
2013	351	28
2014	376	30
2015	305	24
2016	291	23
2018	155	12

Source: Welsh Government (2016a)

Please note that the 2018 fuel poverty estimates are not comparable with the levels estimated in 2016. The definition of vulnerable households was expanded in 2016 to include households containing young people under 25, and a different target heating temperature was used in living areas for households with older people or people with disabilities or chronic illnesses. The 2016 estimates also relied on housing data from the 2008 Living in Wales dataset, while the latest figures use data from the Welsh Housing Conditions Survey 2017-18 (Welsh Government, 2019).

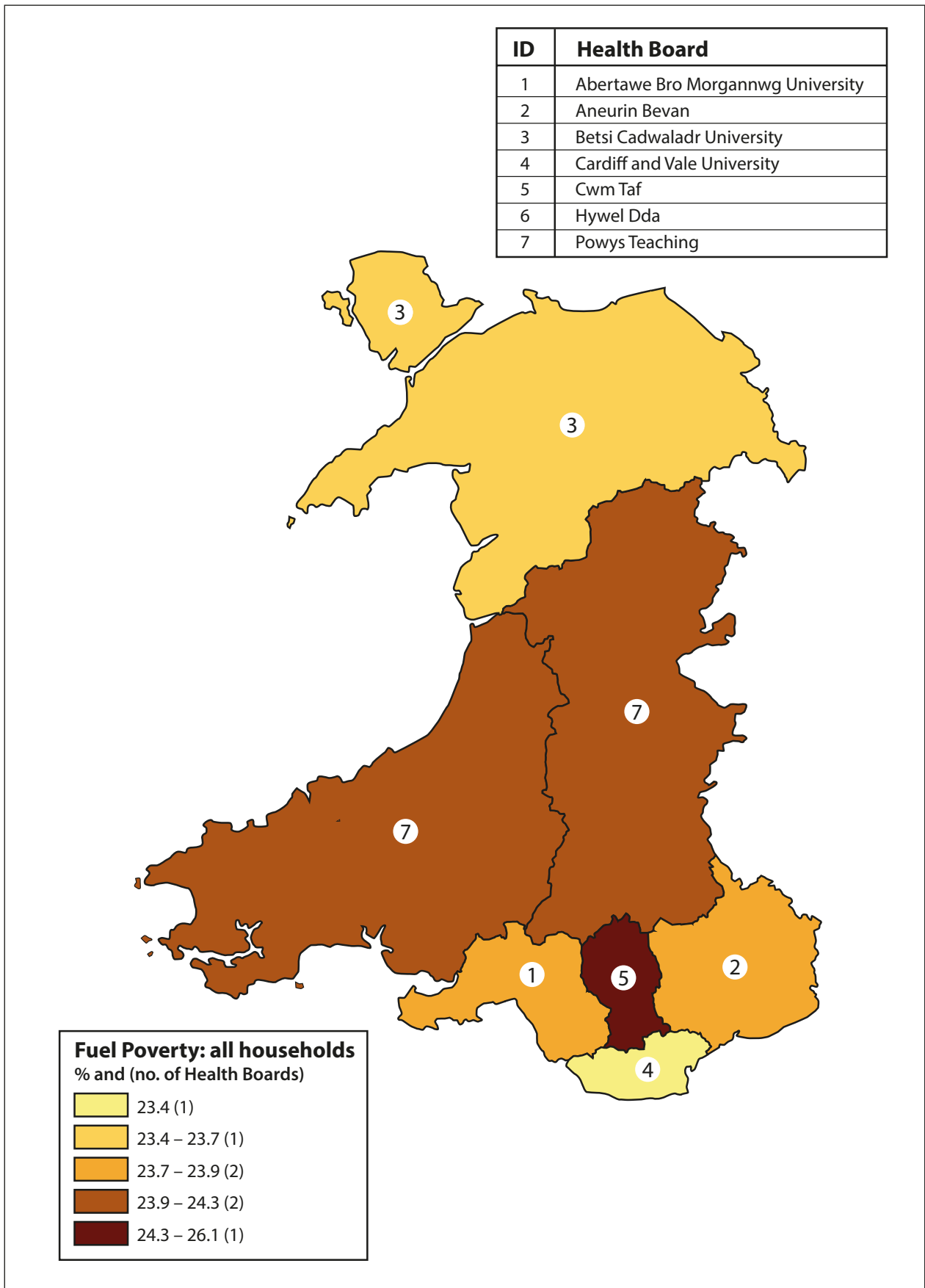
To supplement the 2015 national estimates, modelling was also carried out to produce estimated fuel poverty data at local area level including local authority level (this is not available for 2016). The highest proportion of fuel poverty (above 26% fuel poor) was in Gwynedd in the north and concentrated in the south around Merthyr Tydfil, Rhondda and Blaenau Gwent. The lowest proportions were found in the far north-eastern and south eastern areas (Table 10). In terms of health boards, Cwm Taf had the highest rate, and Cardiff and Vale University the lowest (Map 2).

Table 10: number and percentages of households fuel poor by local authority and health board, 2015

Area	Total households	Fuel poor households	Percent fuel poor (%)
Gwynedd	51,099	14,029	27.45
Anglesey	29,808	7,220	24.22
Conwy	49,849	11,890	23.85
Denbighshire	39,442	9,176	23.26
Wrexham	55,533	12,241	22.04
Flintshire	62,110	13,590	21.88
Betsi Cadwaladr	287,841	68,146	23.67
Powys Teaching	56,844	13,825	24.32
Ceredigion	30,684	7,643	24.91
Carmarthenshire	76,771	18,934	24.6
Pembrokeshire	51,761	12,083	23.34
Hywel Dda	159,216	38,660	24.28
Neath Port Talbot	58,780	14,450	24.58
Swansea	100,787	24,394	24.2
Bridgend	56,976	12,873	22.59
Abertawe Bro Morgannwg University	216,543	51,717	23.88
Rhondda Cynon Taf	97,015	25,437	26.22
Merthyr Tydfil	23,618	6,102	25.84
Cwm Taf	120,633	31,539	26.14
Blaenau Gwent	29,600	7,863	26.56
Caerphilly	72,541	17,641	24.32
Newport	59,547	14,073	23.63
Torfaen	37,480	8,704	23.22
Monmouthshire	37,215	8,073	21.69
Aneurin Bevan	236,383	56,354	23.84
Cardiff	138,858	33,060	23.81
The Vale of Glamorgan	52,100	11,692	22.44
Cardiff and Vale University	190,958	44,752	23.44
Wales			24

Source: Welsh Government (2016b)

Map 2: Proportion of households in fuel poverty (10% definition), by local health board, 2015



Source: Welsh Government (2016b)

7. Effective Interventions

Summary



Housing quality

- Evaluation of the Kirklees Warm Zone project estimated that **for every £1 spent on installing central heating, 42p worth of health benefits was generated.**
- Evaluation of the Warm at Home programme by Sheffield Hallam University, which improved energy efficiency and helped vulnerable households keep warm, estimated that **for every £1 of funding distributed to vulnerable households there were £4 of health benefits.**
- In New Zealand, insulation interventions costing \$1,800 resulted in \$3,374 of benefits, of which 61% were health benefits. This means **for every \$1 invested, \$1.87 was returned.**
- Nottingham City Homes replaced over 10,000 boilers. Using findings from the WHO they estimated the prevalence of respiratory problems halved in these homes, presenting an estimated saving on NHS asthma treatment costs of over **£180,000.**
- Improving heating and ventilation in Welsh homes led to a 17% movement for children with severe asthma to moderate asthma compared to 3% in the control group, costing **£12,300 per child moved from the severe to the moderate asthma group or £1,718 per child treated.**
- The Central Heating Evaluation programme (Scotland) found that **40%** of recipients of central heating improvements who had previously reported respiratory, circulatory or rheumatic health conditions said **their condition had eased or improved post-intervention.**
- The Welsh Government's Warm Homes Nest scheme provides energy efficiency advice and improvements to vulnerable households. **The number of GP visits** for respiratory conditions **decreased by 3.9%** in beneficiaries, compared to a 9.8% increase for the control group.
- The initial cost of external wall insulation in Stockton-on-Tees were estimated to be paid back in **7.9 years** when considering total benefits which included fuel costs, health care costs and health-related quality of life.
- Welsh residents aged 60 years and over benefiting from upgraded council houses (receiving a range of housing improvements) were found to have **39% fewer hospital admissions** for cardiorespiratory conditions and injuries compared to those living in homes that were not upgraded.



Unsuitable homes

- Bridgend County Care & Repair Improvement Agency aims to support **older people** to live independently in their own homes. Given the operating costs, a social return on investment for bed days saved is estimated at **£5.50 per £1 invested, with potentially £9 saved per £1 invested** if re-admissions, post discharge care and falls are prevented.
- Home modifications such as handrails, grab rails, outside lighting, and slip resistant surfaces, can **reduce the rate of injuries requiring medical treatment caused by falls at home by 26% per year.**

- Interventions to mitigate falls on stairs among households with an adult aged 65 and over were estimated to provide a **return of £1.62 for every £1 invested**, and a **payback period of less than eight months**.
- In England, the annual cost to the NHS of not undertaking preventive adaptations, or other home interventions, was estimated at £414 million, with an additional £115 million from avoiding costlier reactive home adaptations following a harmful event. Adaptations/home interventions that reduce falls **paid back in five to six years** in terms of NHS (England) costs.
- Analysis by Care and Repair Cymru of the Rapid Response Adaptations programme identified that every **£1 spent generated £7.50 of cost savings** for health and social care associated with quicker hospital discharge, prevention of people going into hospital and prevention of accidents and falls in the home.
- Preventive health care and day-to-day chronic illness support at extra care schemes showed 19% of older residents reverted to a 'resilient' state from a 'pre-frail' state helping to reduce overall NHS costs, with frail residents' **health costs on average reducing from £3,374 to £1,588 per person per year**.



Homelessness

- Price Waterhouse Coopers (PWC) estimated that **for every £1 invested** in solutions to move people directly out of homelessness, **£2.80 will be generated in benefits**. Examples of cashable savings and well-being value for every £1 invested included:
 - **£3.70 for people living in emergency accommodation without a plan for rapid rehousing**
 - **£3.60 for Housing First for those rough sleepers with high and complex support needs**
 - **£3.30 in benefits for low to medium support solution**
 - **£2.60 for long-term supported accommodation**
 - **£1.90 for supported accommodation solution for young people**
- The estimated savings in preventing homelessness through appropriate interventions at an early opportunity, were between **£3,000 to £19,500** per person per year compared to allowing homelessness to persist for 12 months.
- On average, preventing homelessness for one-year resulted in a reduction in public expenditure of **£9,266** per person.

This section provides information about the interventions which can be made to mitigate the issues discussed in the previous section. It also provides some examples of cost benefit analyses where they are available. It again categorises the interventions into three main areas covering housing quality, unsuitable homes and homelessness.

7.1 Housing quality

Posing risks to individual health and well-being, productivity and the economy, the housing stock generates costs for health and other services. Some older and lower income home owners are unsure about maintenance and repair or unable to meet the costs, and given the findings from the recent WHCS, some private landlords may be choosing to minimise repair, maintenance and improvement expenditures. Problems are more evident where older owners are concentrated, or where private renting has expanded and plays an increasing role in housing vulnerable and low-income households (The Academic – Practitioner Partnership, 2016).

Indoor air quality

In a systematic review of the relationship between buildings and health (Ige et al., 2018), a Welsh study evaluating the effectiveness of installing **ventilation systems** in the homes of children with asthma was considered a moderate quality study. The study found that of the participating children who had moderate to severe asthma, 17% moved from having severe asthma to moderate asthma, compared to 3% in the control group when heating and ventilation was improved (Edwards et al., 2011). The mean cost of the intervention was £1,718 per child treated and £12,300 per child moved from the severe to the moderate asthma group. This provided an Incremental Cost-Effectiveness Ratio (ICER) of £234 per point improvement on the 100-point asthma scale. On the basis that NICE suggest a cost-effective ceiling of £30,000 per Quality Adjusted Life Year (QALY - equal to 1 year of life in perfect health) for health interventions, the investigators concluded that there was a 75% chance that improving heating and ventilation for children with asthma was cost-effective.



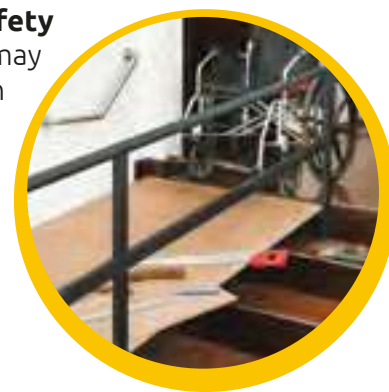
Unintentional injuries in the homes

A NICE report (2010) considered the evidence relating to interventions for unintentional injuries in the home for under-15s. It concluded that there was a lack of data relating to types, causes and severity of injuries – especially for falls. There is limited high quality evidence from the UK on the effectiveness of home safety equipment and awareness and a lack of studies looking at cost-effectiveness.

For older people, evidence reviewed by POST (2018) showed that **safety modifications** e.g. ramps reduce the rate of falls, risk of falling and may also increase older people's ability to carry out day-to-day activities in the home.

A Public Health England (PHE) literature review identified cost-effective interventions to prevent falls in older people (2018). The main interventions for falls involved fitting stair rails, balustrades, grab rails, repairing paths and other suitable home modifications.

The PHE review found that the published evidence showed home safety assessment and modification was likely to be a cost-effective intervention for falls reduction in the older age groups. One particular study (Pega et al., 2016) found an incremental cost for the intervention was \$9,000 (NZ\$) per QALY compared with the base case, and the intervention was cost-effective for all age groups, level of risk and regardless of ethnicity. Another analysis covered in the review (Frick et al., 2010) showed that home modification was most likely to have the highest economic benefit for reducing fall related hip fractures in older people (compared with exercise, medical review etc.) when QALYs were valued at \$50k (US\$). The report did however question the applicability of the results conducted in New Zealand and USA to the NHS and social care setting.



Studies cited in a report (Ige et al., 2018) which assessed health outcomes associated with housing renewal, modification / improvement showed a positive correlation between falls prevention and health improvement – which could be from simple ramps, rails, lighting improvements and level-access showers.

In BRE's most recent report modelling the full costs to the NHS and society from substandard housing (Roys et al., 2016), a specific cost-benefit case study for one property which had repairs and modifications including additional external lighting, handrails and balustrades was included. The cost of the upgrade was £533 with potential savings to the NHS of £133 per year and resulting in a payback period to the NHS of 3.48 years.

Cold and fuel poverty

Evidence reported by POST (2018) concluded "a subsidy to help with fuel bills was found to be associated with improved diet in infants, as families were able to spend more on food" and "energy efficiency improvements benefit mental health" (p.4).

The Central Heating Evaluation Programme (Scotland) showed that 40% of recipients who had previously reported respiratory, circulatory or rheumatic health conditions said the condition had improved post-intervention (Sheldrick and Hepburn, 2004).

Two-fifths of households who received measures through the Warm and Healthy Homes Fund Partnerships programme reported improvements to their physical and or mental health. 42% said their physical health was either a little or much better than before the intervention, and 39.6% said that their mental health was either a little or much better (NEA, 2017).

Evaluation of a pilot study in Cornwall assessed health outcomes before and after installing central heating in 59 damp properties where children had previously been diagnosed with asthma (Somerville, Mackenzie, Owen and Miles, 2000). The children's health outcomes were assessed using a symptom-based outcome measure for asthma and time lost from school. Whilst the evaluation lacked a comparison group so could not eliminate factors of age and season, it did find a reduction in the number of school days missed due to asthma (a drop from 9.3 out of 100 days to 2.1 days) and reductions in the number of nocturnal coughing incidences.

The Welsh Government has developed an all-Wales fuel poverty scheme called **Warm Homes Nest** providing measures to improve the energy efficiency of homes occupied by vulnerable and low income households. Levels of health service use were compared for 16,353 recipients of home energy efficiency measures and a control group of 24,895 people who were eligible but who had not yet received measures. Evaluation of the scheme found that energy efficiency measures provided a health protective effect, decreasing the number of GP visits for respiratory conditions in the intervention group by 3.9%, compared to a 9.8% increase for the control group (Morrison-Rees, 2017).

In tandem with Nest, which targeted individuals at-risk of fuel poverty, the Welsh Government's Warm Homes programme also included **Arbed**, targeting areas containing low-income households. An evaluation used multiple methods including data linkages to assess the impact of the intervention on health service use, community-based study to investigate the short-term health and psychosocial impacts of the intervention, and indoor temperature and humidity monitoring. While the intervention raised indoor temperatures, reduced energy use, and improved subjective well-being and a number of psychosocial outcomes, the study found no evidence of changes in physical health or reduction in health service usage (Poortinga et al., 2018).



Comparing these findings to the demand led Nest approach, it appears that a more **targeted approach** assisting vulnerable households was more effective than an area-based approach.

Nottingham City Homes replaced over 10,000 boilers on the basis of World Health Organization findings that prevalence of childhood respiratory disease is doubled for those living in homes with low-quality heating, estimating that the prevalence of respiratory problems would halve from 2,038 to 1,039 in those homes which had replacement boilers (Jones, Valero-Silva, and Lucas, 2016). Quoting the National Asthma Campaign's estimates that the annual average cost to treat a child with asthma was £181, they suggested the **heating improvements** undertaken could save the NHS over £180,000.

A cluster randomised trial of insulating existing older houses in low income communities in New Zealand found that indoor temperatures were warmer and less humid after the measures were installed despite energy consumption also reducing (Howden-Chapman et al., 2007). For respiratory conditions such as pulmonary disease and obstructive airways diseases, people from insulated houses were less likely to be admitted to hospital.

Evaluation of the Warm Front scheme (Green and Gilbertson, 2008) found that recipients of **energy efficiency measures** were 48% less likely to report high levels of psychological distress after the intervention compared to before, and the incidence of reported Common Mental Disorders dropped from 300 per 1,000 to 150 per 1,000.

Examples included in the recent "Under One Roof" report are (Ruse and Garlick, 2018):

An evaluation of the Kirklees Warm Zone project, which showed that for every £1 spent on installing central heating, 42p worth of health benefits was generated (Liddell et al., 2011).

A Sheffield Hallam University study evaluating the Foundations Independent Living Trust Warm at Home Programme showed that for every £1 of funding there were £4 of health benefits (Bennett et al., 2017).

In New Zealand, insulation interventions costing \$1,800 resulted in \$3,374 of benefits, of which 61% were health benefits (Chapman et al., 2009).

The "Under One Roof" report (Ruse and Garlick, 2018) also showed the benefits to improving dwelling energy efficiency and reducing fuel costs can reduce the risk of fuel poverty, which in turn may mean more money is available to spend on higher quantity and better quality of food, with a lower risk of malnutrition.

A study evaluating the costs and benefits of **external wall insulation** (EWI) in Stockton-on-Tees, estimated that the costs of the initial investment were paid back in 7.9 years when considering total benefits which included fuel costs, health care costs and health-related quality of life (Brown, Fattakhova, Bamba et al., 2017). Solid wall houses which do not have EWI can result in damp and mould and excess cold hazards, which in turn can cause health problems such as respiratory and cardiovascular disease.

The Full Cost of Poor Housing report (Roys et al., 2016) provided a specific cost-benefit case study for one property which had basic upgrades to wall and loft insulation, hot water cylinder and a new boiler. The cost of the upgrade was £1,760 with potential savings to the NHS of £194.71 per year and resulting in a payback period to the NHS of 9.04 years.

General housing quality improvements

Results from studies also suggest that hospital admissions can be avoided through improving **whole home quality standards**. A study (Rodgers et al., 2018) involving the upgrade of 8,558 council houses to the Welsh Housing Quality Standard found for residents aged 60 years and over, living in homes where improvements were made, there were 39% fewer hospital admissions for cardiorespiratory conditions and injuries compared to those living in homes that were not upgraded. The upgrade included whole home intervention of internal and external improvements including electrical systems (smoke detectors, carbon monoxide detectors, security lights, kitchen and bathroom extractor fans, and internal rewiring), windows, doors, wall insulation and garden paths.

Reviewing the published evidence to assess the health and social impacts on residents following improvements to the physical fabric of housing, Thomson et al., (2013) identified thirty-nine studies reporting quantitative or qualitative data from a range of studies including randomised controlled trials (RCTs) and non-experimental studies of warmth improvements, rehousing or retrofitting, provision of basic improvements in low or middle income countries, and non-experimental historical studies of rehousing from slums. They concluded that housing investment which improves **thermal comfort** in the home can lead to health improvements, especially where the improvements are targeted at those with inadequate warmth and those with chronic respiratory disease. The benefits of neighbourhood approaches are less clear, so interventions should **target according to levels of individual need**.

An evaluation of systematic reviews looking at the evidence of the impact of housing and neighbourhood interventions on health and health inequalities found 130 relevant publications (Gibson et al., 2011). It found strong evidence that improvements in **warmth and energy efficiency** have positive impacts on the health of low income groups, particularly when targeted at the elderly or those with health conditions.

...improvements in warmth and energy efficiency have positive impacts on the health of low income groups.

BRE have modelled the costs and savings to the NHS in England from mitigating a range of serious housing defects (Roys et al., 2016). As the hazard profiles and costs to remedy these should be comparable to Wales, it is worth noting the findings for the most common hazards identified by the recent Wales House Condition Survey (Table 11).

Table 11: Modelled costs and savings to the NHS from mitigating a range of serious housing defects for England

Category 1 hazard	Vulnerable age group	Average cost per dwelling	Payback (years)	QALY saving per dwelling repaired (years)	ICER (£)
Excess cold	Age 65 or over	4,574	7.14	0.107	42,949
Damp and mould growth	Age under 14	7,382	25.27	0.002	3,032,254
Fire	Age 60 or over	3,632	18.62	0.037	96,970
Falling on stairs etc.	Age 60 or over	857	5.60	0.013	64,507
Falling between levels	Age under 5	927	2.64	0.065	14,337
Falling on level surfaces etc.	Age 60 or over	780	3.32	0.003	250,780

Source: Roys et al., (2016)

It is important to remember that the responsibility for improvement works to rented properties lies with the landlord; therefore, the cost of repairs may not be borne by the local authority or NHS.

7.2 Unsuitable homes

A recent systematic review of the published evidence into how adaptations can contribute to improving later life (Centre for Ageing Better, 2017a) identified evidence from New Zealand and North America, where more robust data linking health outcomes and housing interventions is recorded for health insurance purposes. The review concluded that there was strong evidence that **minor home adaptations** were an effective and cost-effective intervention for preventing falls and injuries, improving performance of everyday activities and improving mental health. For example, an intervention in Baltimore, USA involving visits from an occupational therapist, nurse and handyman to address individual capacities and features of the home environment led to a **reduction in home hazards** from the baseline 3.3 per home to 1.4 per home, 75% improvement in the performance of Activities of Daily Living (ADL), 49% increase in physical functioning and reduction of depressive symptoms in 53% participants (Szanton et al., 2016). The average cost of delivering the program was \$2,825 per participant, but the study didn't consider health cost savings. However, the authors concluded that as the odds of having high health care costs increase substantially with ADL difficulty (Alexih et al., 2010), they expected the decreased difficulties would be cost-saving over time.

A randomised controlled trial carried out in New Zealand consisted of a treatment group which received immediate **home modifications such as handrails, grab rails, outside lighting, and slip resistance surfaces**, and a control group placed on a 3-year waiting list for modifications (Keall et al., 2015). Using insurance claim data, after adjusting for age, sex, ethnic origin and previous falls, findings included a statistically significant reduction (26%) in the rate of injuries requiring medical treatment caused by falls at home per year exposed to the intervention (risk ratio (RR) 0.74, 95% CI 0.58–0.94) and a 39% reduction in injuries specific to the home-modification intervention per year exposed (RR 0.61, CI 0.41–0.91). The average cost of modifications per house was £290. Referring to WHO's (2001) suggestion that interventions costing less than three times gross domestic product (GDP) per capita for each disability adjusted life-year (DALY) averted represented good value for money, and less than parity to be very cost effective, the authors estimated the potential savings to the population of New Zealand if the interventions could be rolled out nationally. They estimated 15,800 DALYs over 20 years could be prevented, with the interventions costing \$14,300 per DALY. This means the intervention was classified as very cost effective, with a single DALY representing approximately 31% of the GDP per person. Even if the lower boundary of the confidence interval were used to consider DALY's prevented, according to the WHO suggestion this would still offer a cost-effective intervention. Of note, a PHE (2018) literature review decided to exclude this study citing an "ineligible comparator".

The effectiveness on outcomes is particularly positive when they are combined with other necessary repairs and home improvements such as improving lighting and removing trip and fall hazards, and when the beneficiary and people around them are involved in the decision-making process (Centre for Ageing Better, 2017a). Fewer studies were available investigating the benefits of major adaptations, but the evidence shows that they can also support people in achieving similar outcomes in some circumstances.

Supporting the Centre for Ageing Better review (2017a), BRE modelled population health impacts and the potential value of home adaptations (based on housing and household characteristic data from the English Housing Survey, and cost saving estimates from the literature review). It found that while there were likely benefits, there was currently insufficient evidence to quantify the overall return on investment from home adaptations in the UK (Centre for Ageing Better, 2017b). Figure 10 highlights the likely direct benefits to the NHS and adult social care budgets relating to changes in care needs as a result of an adaptation. The nature of these adaptations are listed in order of prevalence in the English housing stock, which is likely to be similar to Wales. In addition to these direct benefits, indirect benefits to society are likely to occur from the adaptation. As part of this study, limited modelling was carried out. For example, interventions to mitigate against hazards associated with falls on stairs for households with an adult aged 65 years and over resulted in an estimated 62p return on investment for every £1 and a payback period of less than eight months (Centre for Ageing Better, 2017b).

Figure 10: Direct and indirect benefits of adaptations

Adaptation	% of total	Reason			Direct benefit				Indirect benefit					
		Access and usability	Personal security	Other reason	Reduced care in the community	Reduced risk from falls	Better personal hygiene	Delayed long term care requirements	Increased dignity	Social interaction	Social integration	Improved quality of life	Less burden on carers/relatives	Improved well-being/mental health
Grab rail or other rail	13.03%	Highly likely				Highly likely				Likely				
Bath/shower seat	9.64%	Highly likely			Likely	Highly likely		Likely	Likely			Likely	Likely	
Toilet seat	7.24%	Highly likely			Likely		Highly likely		Likely					
Shower replacing bath	5.86%	Highly likely				Highly likely		Likely	Likely			Likely	Likely	
External rail to steps	5.63%	Highly likely				Highly likely				Likely				
Stair lift	4.87%	Highly likely			Likely	Highly likely		Likely		Likely			Likely	
External ramp	4.68%	Highly likely				Highly likely		Likely		Likely				
Adjustable bed or related aid	4.41%	Highly likely			Likely	Highly likely						Likely	Likely	
Graduated floor shower	3.78%	Highly likely				Likely	Highly likely	Likely				Likely	Likely	
Shower over bath	3.32%			Highly likely	Likely		Highly likely		Likely			Likely	Likely	
Redesign bathroom	3.27%	Highly likely			Highly likely			Likely	Likely			Likely	Likely	
Wheelchair accessible parking	2.91%	Highly likely						Likely		Likely			Likely	
Additional/relocate toilet	2.75%	Highly likely					Highly likely	Likely	Likely			Likely	Likely	
New bath/shower room	2.72%	Highly likely			Likely		Highly likely	Likely	Likely			Likely	Likely	
Wide paths	2.56%	Highly likely								Likely			Likely	
Individual alarm system	2.53%		Highly likely			Likely			Likely			Likely	Likely	
Wide doorways	2.21%	Highly likely							Likely	Likely			Likely	
Redesign kitchen	2.01%	Highly likely			Highly likely			Likely		Likely			Likely	
Entry phone	2.01%		Highly likely						Likely	Likely			Likely	
Low level bath	1.96%	Highly likely			Likely	Highly likely	Highly likely	Likely	Likely			Likely	Likely	
Other external adaptation	1.64%	Highly likely												Likely
Additional heating	1.52%			Highly likely				Likely		Likely			Likely	
Wide gateway	1.48%	Highly likely								Likely			Likely	
Extension of home	1.47%	Highly likely			Likely		Highly likely	Likely	Likely			Likely	Likely	
Other modification of kitchen	1.25%	Highly likely			Likely				Likely	Likely			Likely	
Relocate bath/shower	1.18%	Highly likely			Likely		Highly likely	Likely	Likely			Likely	Likely	
Hoist	1.15%	Likely		Highly likely			Highly likely					Likely	Likely	
Visual/hearing impairment related	1.11%			Highly likely					Likely	Likely	Likely	Likely		Likely
Electrical modifications	1.02%			Highly likely										Likely

Highly likely Likely

Source: Centre for Ageing Better (2017b)

The London School of Economics (Snell, Fernandez and Forder, 2012) has also carried out modelling to estimate the benefits of the annual Disabled Facilities Grants (DFGs) programme in England, mainly relying on a review of examples evidencing reductions in service demand through targeted adaptations. The findings informed a model suggesting that equipment and adaptations lead to reductions in the demand for other health and social care services worth on average £579 per recipient per annum (including both state and private costs). In addition, the services led to improvements in the quality of life of the dependent person worth £1,522 per annum. Societal benefits therefore totalled £2,101 per year. The cost of providing the adaptations was estimated to be approximately £1,000 per individual per annum, taking into account the likely life expectancy of the equipment. This represented a return on investment of £2.10 for every £1 invested (or £1.10 net of cost). While the results suggest adaptive technologies provide a good return on investment, given the inconsistencies of the methodologies underpinning the model, the findings need to be used with caution.

BRE has also modelled the impacts of **preventive home adaptations** to reduce NHS use and the need for reactive adaptation among those with long-term illness or disability (Garrett et al., 2016). They used information on: the state of housing from the English Housing Survey; the risk of health issues occurring given hazards; NHS treatment costs related to those hazards; the costs of reactive adaptation compared to the costs of preventive adaptations. Findings included the following:

- In England, the annual cost to the NHS of not undertaking preventive interventions was estimated at £414 million, with an additional £115 million in avoided reactive adaptation. The estimated cost of fitting these adaptations was £6.4 billion.
- The overall payback time in terms of NHS cost reductions was 15.2 years.
- For some adaptations, the payback time was much quicker: adaptations that reduce falls paid back in five to six years, whereas the payback for tackling solely damp was more than 500 years in terms of NHS costs.

An analysis by Care and Repair Cymru (2014) of the outcomes of their **Rapid Response Adaptations** programmes identified that every £1 spent generated £7.50 of cost savings for Health and Social Care. These savings were associated with quicker hospital discharge, prevention of people going into hospital and prevention of accidents and falls in the home.

...every £1 spent generated £7.50 of cost savings for Health and Social Care.

There is also evidence that housing is an important setting for older people to maintain their independence and even reverse their frailty scores (Buck, Simpson and Ross, 2016). Housing associations and other organisations can help achieve these goals. For example, the impact of an **informal drop-in service** for preventive health care and day-to-day chronic illness support at extra care schemes showed 19% of older residents reverted to a 'resilient' state from a 'pre-frail' state (Holland et al., 2015). This helped to reduce overall NHS costs, which were most significant among frail patients –reducing on average from £3,374 to £1,588 per person per year.

7.3 Homelessness

Research from the USA (Culhane, Metraux, and Hadley, 2002) which followed 4,679 homeless people with severe mental health disabilities found that offering **supportive housing** reduced shelter use, hospitalisations, length of stay per hospitalisation and time incarcerated. The savings from these reductions outweighed the costs of the supportive housing. **Housing First**, which provides immediate access to housing without preconditions with support by either mobile teams or on-site services is an increasingly popular approach to addressing homelessness which was borne out of the learning from the USA. Traditionally, treatment has been offered first, and individuals have to demonstrate the capacity to live independently before being offered access to permanent housing.

Using international studies like this, and findings from homelessness prevention schemes in England (Housing First and the Crisis Skylight Programme), Pleace (2015) used four illustrative vignettes to give an overview of the additional costs of homelessness. This included: a young woman experiencing homelessness; a man in his 30s who became a rough sleeper; a man with a learning difficulty who lost his existing home; and a woman in her 20s escaping domestic violence. It demonstrated the savings which could be achieved in **preventing homelessness** through appropriate interventions at an early opportunity, suggesting **savings of between £3,000 to £19,500** compared to allowing homelessness to persist for 12 months. Drawing on interviews with 86 people who had been homeless for at least 90 days about the services they had used and the support that would have prevented homelessness, Pleace and Culhane (2016) estimated that on average, preventing homelessness for one year would result in a reduction in public expenditure of £9,266 per person.

Despite this, and other evidence from Europe showing Housing First was cheaper than traditional services, Bellis and Wilson's briefing paper for the House of Commons Library (2018) reported there were limits to the UK based analyses. However, this report was then followed by Price Waterhouse Coopers (2018) being commissioned by Crisis to estimate the total economic costs and expected benefits of ending homelessness through the different combinations of interventions (solutions) which Crisis deemed necessary (Table 12).

Table 12: The economic costs and benefits from ending homelessness in Wales, by each homeless criterion, and return on investment using UK figures.

Crisis' objectives	Numbers in Wales 2016	Projected numbers in Wales in 2041	Cost £million	Benefits £million	Return on Investment of £1 (for UK) £
No one sleeping rough	320	370	18	60	3.2
No one forced to live in transient or dangerous accommodation such as tents, squats and non-residential buildings	3,989	6,161	370	1,043	2.8
No one living in emergency accommodation	1,049	1,532	101	240	2.7
No one homeless as a result of leaving a state institution such as prison or the care system	1,157	1,452	3	11	3.2
Everyone at immediate risk of homelessness gets the help they need that prevents it happening	41,606	50,702	42	118	2.7
Total			£535	£1,472	2.8

Source: Price Waterhouse Coopers (2018)

Of the benefits, it was predicted that:

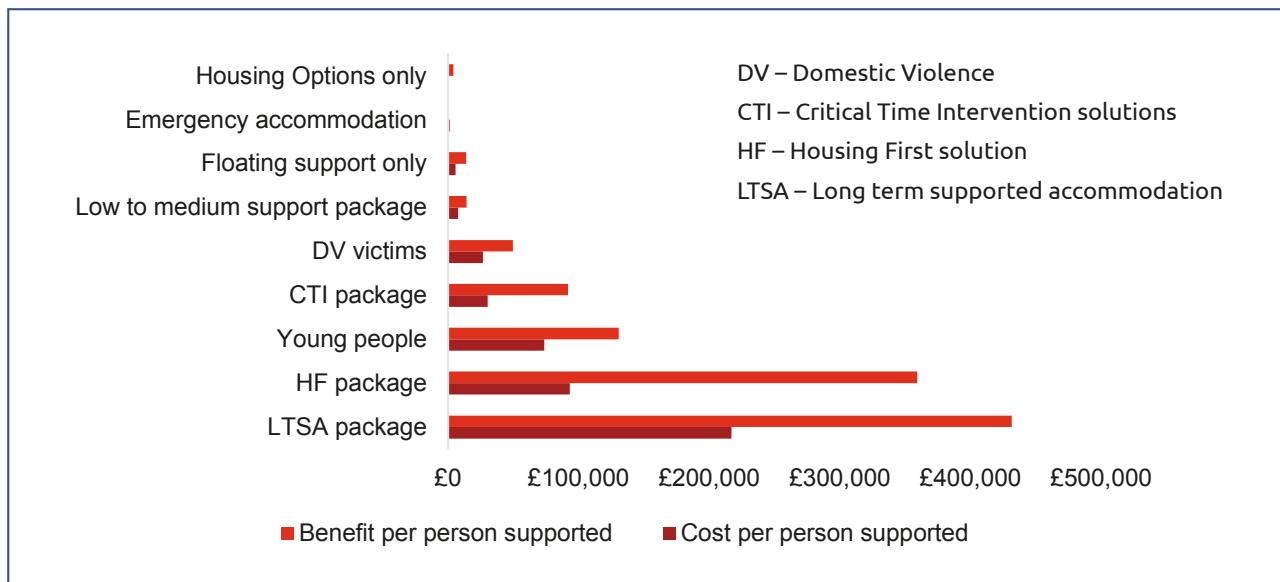
- nearly half will accrue to local authorities through reduced/avoided use of homeless services e.g. reduced need for spending on temporary accommodation and other housing and support based services for homeless people funded by local authorities;
- 27% is for improved well-being as a result of people obtaining secure housing;
- 12% will be increased economic output as a result of people entering employment (an estimate of their increased earnings);
- and 12% is for the Exchequer in terms of health care and criminal justice savings.

In terms of the recommended solutions to move people directly out of homelessness, overall, for every £1 invested, it estimated that £2.80 would be generated in benefits – this included cashable savings and well-being value. Other examples of return on investment estimates included:

- For £1 invested in **Housing First** for those rough sleepers with high and complex support needs, £3.60 would be generated in benefits, and £3.70 for people living in emergency accommodation without a plan for rapid rehousing
- For £1 invested in long term **supported accommodation**, £2.60 would be generated in benefits, £1.90 would be generated in benefits (cash and well-being) for supported accommodation solution for young people
- For £1 invested in **low to medium support solution**, £3.30 would be generated in benefits

Figure 11 shows the costs and benefits per person of the main solutions that Crisis is recommending. The more intensive long term supported accommodation and Housing First solutions had higher costs, but also had greater benefits.

Figure 11: Cost and benefit per person supported for each of Crisis’ recommended solutions (present value, £, 2017 prices)



Source: Price Waterhouse Coopers (2018)

Although there is growing evidence for Housing First, there are challenges to its implementation and an underlying good support structure is needed.

Psychologically Informed Environments (PIE)

'PIE' refers to working in a way that is therapeutic, and trauma-informed, taking into account the psychological context of the people involved for example those who are experiencing or at risk of homelessness. PIE also aims to develop a restorative and supportive culture within organisations.

Key elements of Psychologically Informed Environments include:

1. Relationship-building: a focus on relationships (between staff and clients, clients and peers, and beyond) as a tool for change
2. Staff support: staff are supported to become more confident and resilient
3. Physical environments should not feel clinical or institutional, but safe and welcoming
4. Psychological framework: the links between thoughts, feelings and behaviours
5. Evidence-generating practice: a focus on the continuous development and improvement of support
6. Reflection

PIE is not a new concept, and there are organisations across Wales who currently operate according to PIE and others are currently being trained in this approach. The training has undergone early evaluation, and is recognised as an area of good practice within the housing sector.

Assertive outreach

The importance of assertive outreach when working with the homeless population cannot be over emphasised. By providing person centred approaches, and taking services to people rather than expecting them to navigate complex systems is essential for successful outcomes.

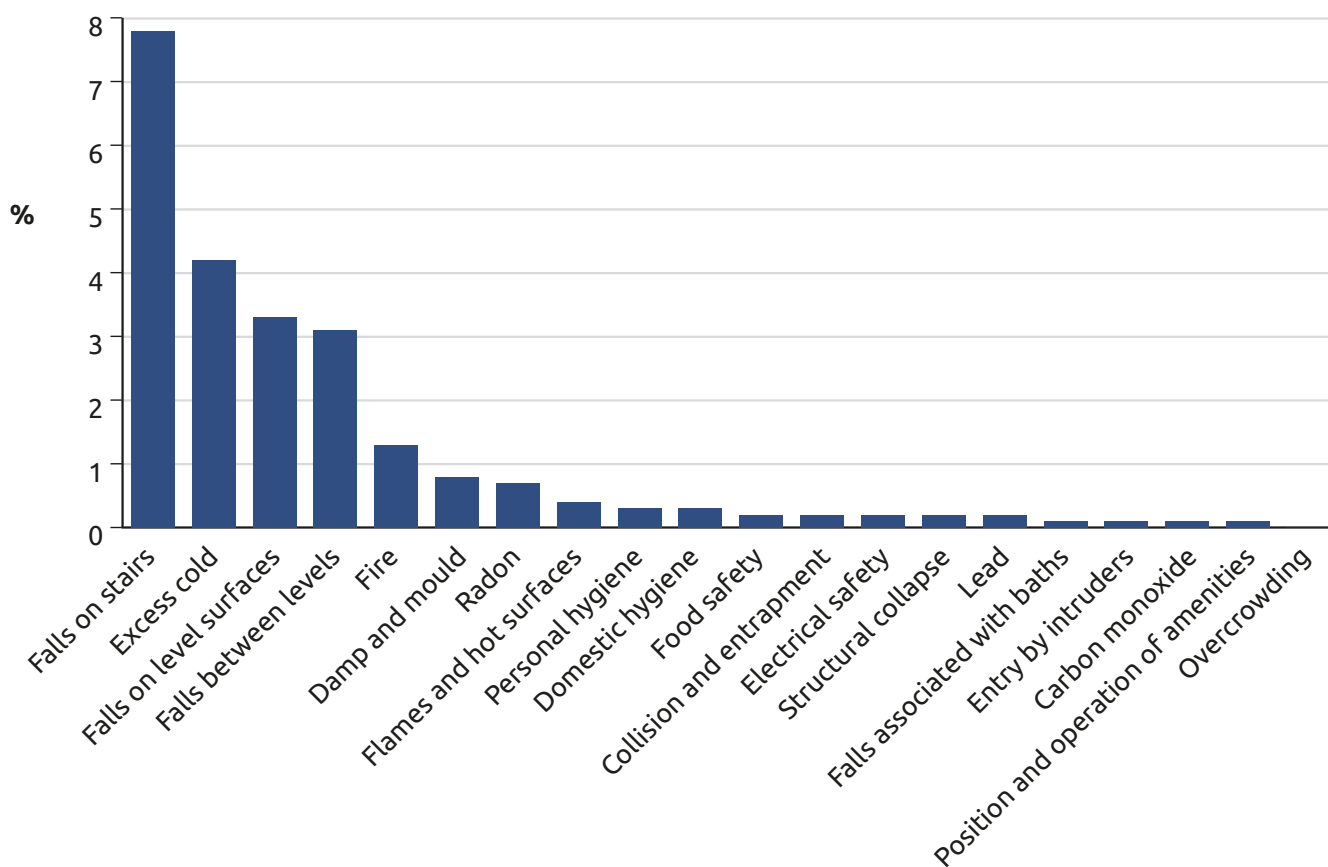
Many people who are at risk of becoming homeless or currently experiencing homelessness are unaware of what they are entitled to and subsequently end up in crisis which could have been avoided if they were more aware of their entitlements.

8. What is already being done?

8.1 Housing quality

According to the latest Welsh Housing Conditions Survey (WHCS), of the 1.34 million dwellings in Wales, 18% contained a category 1 hazard. This is an improvement from the 2008 Living in Wales property survey finding 29%. In terms of tenure, social housing has the lowest proportion of category 1 hazard at 7%, 19% of owner occupied dwellings contained a category 1 hazard, and the highest were found in private rented dwellings at 24% (Welsh Government, 2018g). As Figure 12 shows, the most common hazards identified were for falls on stairs (7.8%), excess cold (4.2%), falling on level surfaces (3.3%), falling between levels (3.1%), and fire (1.3%).

Figure 12: Percentage of Welsh housing stock containing category 1 hazards by hazard type



Source: Welsh Housing Conditions Survey, 2017-18, Welsh Government (2018)

Local authority environmental health teams predominantly deal with private rented accommodation where improvements can be affected through landlord enforcement. The WHCS estimated there were 42,500 private rented properties with category 1 hazards.

Collecting annual returns from Welsh planning authorities, the Welsh Government report information on the condition of residential properties, including Houses in Multiple Occupation (HMOs), assessed by local authorities under the Housing Health and Safety Rating System (HHSRS).

Table 13: Number of Category 1 hazards identified by local authorities for the year 2016-17.

Category 1 hazard	Vulnerable age group	Non-HMO	HMO	Total
Excess cold	Age 65 or over	621	288	909
Damp and mould growth	Age under 14	343	78	421
Fire	Age 60 or over	236	268	504
Falling on stairs etc.	Age 60 or over	177	80	257
Falling between levels	Age under 5	98	120	218
Personal hygiene, sanitation and drainage	Age under 5	78	21	99
Electrical hazards	Age under 5	78	38	116
Falling on level surfaces etc.	Age 60 or over	76	17	93
Crowding and space	None	75	9	84
Entry by intruders	None	61	50	111
Structural collapse and falling elements	None	60	8	68
Food safety	None	55	23	78
Domestic hygiene, pests and refuse	None	28	38	66
Explosions	None	21	8	29
Carbon monoxides and fuel combustion products	Age 65 or over	13	2	15
Collision and entrapment	Age under 5	9	16	25
Uncombusted fuel gas	None	8	1	9
Lighting	None	8	6	14
Flames, hot surfaces	Age under 5	8	3	11
Excess heat	Age 65 or over	5	14	19
Asbestos and manufactured mineral fibres (MMF)	None	5	0	5
Water supply	None	5	1	6
Position and operability of amenities	Age 60 or over	1	1	2
Biocides	None	0	0	0
Lead	Age under 3	0	0	0
Radiation	None	0	0	0
Volatile organic compounds	None	0	0	0
Noise	None	0	0	0
Falls associated with baths etc.	Age 60 or over	0	0	0
Total		2069	1090	3159

Source: Welsh Government (2017c)

As Table 13 shows, cold, damp, fire and falls were the most common category 1 hazards identified by local authorities, with fire being more prominent in houses occupied by multiple households.

Looking at the figures for previous years, Table 14 shows the total numbers of category 1 hazards as well as category 2 hazards (conditions posing a lesser risk and where the local authority has discretion over taking enforcement action) reported by local authorities between 2011-12 and 2016-17. This presents an overall picture of the demand on local authorities, which can be seen to remain constant. Based on local authorities mitigating 3,100 category 1 hazards per year, it can be estimated that it would take almost 14 years to address the most serious hazards in the private rented sector, assuming no new hazards emerge and that the hazards reported relate only to the private rented sector. Commenting on the position in England where the size of local authority environmental health teams has diminished despite an increase in the number of inadequate

dwellings and an expanded private rented sector, The Academic-Practitioner Partnership (p.15; 2018) stated “in many cases current levels of staffing are inadequate to address the demands associated with local authorities’ responsibilities towards private sector housing and their residents..” and “in the three years ending in 2016/17, local housing authorities dealt with less than 3% of private rented sector dwellings with at least one totally unacceptable risk to health, using the powers in the Housing Act 2004, as is their statutory duty.”

Table 14: Total numbers of category 1 and also category 2 hazards (conditions posing a lesser risk and where the local authority has discretion over taking enforcement action) reported by local authorities.

Year	Number of category 1 and category 2 hazards identified by LAs
2016-17	12,948
2015-16	12,691
2014-15	11,237
2013-14	12,353
2012-13	12,989
2011-12	12,153

Source: Welsh Government (2017c)

Welsh Housing Quality Standard

The Welsh Housing Quality Standard (WHQS) is the Welsh Government standard of housing quality aiming to ensure that all dwellings are of good quality and suitable for the needs of existing and future residents. It was introduced in 2002 and measures 42 elements within seven categories which include repair, safety, security, energy efficiency, age of key amenities, environment and suitability of accommodation for household. While developed for all housing, guidance produced in 2008 (Welsh Government, 2010) specified its use for assessing social housing, and the Welsh Government provides £108m of capital funding every year for improving existing social housing which can be used to help meet this standard (Welsh Government, 2018b). The most recent update (Welsh Government, 2018h) reports that 91% of social housing dwellings (204,468 dwellings) were compliant with the WHQS (including acceptable fails) compared to 86% a year earlier. The two components with the lowest levels of WHQS compliance continued to be ‘Gardens and external storage’ and ‘Roofs and associated components’, at 93% and 96% respectively, Figures on compliance in the private sector are not available from either the 2008 or 2018 Welsh Housing Conditions surveys.

Case Study: Healthy Homes Healthy People North Wales

Funded by Wales and West Utilities, Healthy Homes Healthy People North Wales aims to remove residents from fuel poverty, improving health and well-being and reducing avoidable health inequity. The scheme involves the local authority, Care and Repair and North Wales Energy Advice Centre, Police and Fire service. Households in fuel poverty are identified and provided with advice and support. Furthermore, patients can be referred for support from GPs. The cost of the scheme from November 2017 to May 2018 was £40,000, and it generated estimated savings to householders of £111,000 through reduced utility bills and assistance with housing costs.

More information is available at:

<https://www.warmwales.org.uk/healthy-homes-healthy-people/>






8.2 Unsuitable homes

To allow older and disabled people to live a healthy lifestyle, and continue contributing to society, appropriate housing (through the development of new specialist housing or making better use of the existing stock through adaptations) is required. For some people this can be minor adaptations like a handrail, while for others it may be considerable, such as an extension or a through-floor lift.

In Wales, there are a number of grants that fund adaptations for different tenures which may be accessed through a single system, known as “ENABLE – Support for Independent Living”. It is intended to enable disabled and other people to better access adaptations funding with three broad levels of assistance:

- ‘Small’ e.g. grab rails and stair rails.
- ‘Medium’ e.g. adaptations such as walk-in showers, stair lifts and ramps.
- ‘Large’ e.g. a significant adaptation which may require major structural changes such as extensions or relocating a bathroom or kitchen.

Figure 13: Current provision of adaptations by funding, tenure and landlord in Wales, 2015-16 and 2016-17

Tenure	Disabled Facilities Grants 	Housing Revenue Account funding of adaptations to local-authority housing ⁷ 	Physical Adaptation Grants 	Rapid Response Adaptation Programme 	Landlord use of own resources 
Owner occupier	● (provided by all 22 authorities)	●	●	● (provided in all 22 authorities)	●
Tenant of a local authority	● (provided in 2 of 11 local-authority areas)	● (provided by all 11 local authorities)	●	●	●
Tenant of an LSVT housing association	● Provided in 6 of 11 local-authority areas	●	●	●	● (provided by all 11 LSVT associations)
Tenant of traditional housing association	●	●	● (provided by all 22 housing associations)	●	● (provided in 10 of 22 housing associations)
Tenant of a private rented landlord	● Provided in 20 of 22 local-authority areas	●	●	● (provided in all 22 authorities)	— Not collected

Source: Wales Audit Office (2018)

In 2015-16, £60.3 million was invested in adaptations from a range of sources including central government, social landlords, and some health boards (Wales Audit Office, 2018). This benefitted 31,941 people in 2015-16, an increase compared with 28,594 in 2013-14. However, the existing delivery of adaptations through large numbers of organisations, and with complex funding arrangements has been criticised by the Wales Audit Office as reinforcing inequalities for some disabled and older people. The effect of this can be illustrated by Figure 13 showing how eligibility for adaptations was affected by location, and tenure rather than simply by need.

Case study: Bridgend County Care & Repair - Hospital to Home service

Bridgend County Care & Repair improvement agency aims to support older people to live independently in their own homes, with increased comfort, safety and security. They provide Healthy Home assessments and technical support for home improvements and adaptations. Located with hospital discharge planning, the 'Hospital to Home' service facilitates easy access to patients and ensures health professionals recognise the benefits and are actively engaged in the pathways for home improvements. From an initial 3 hour a week pilot to a fully funded 5-day week service, it helped 1,272 patients in 2016. Increasing hospital bed capacity through speeding up discharge decisions and assisting older patients to return home more quickly, and improving rehabilitation and reablement, an evaluation carried out in 2016 estimated a cost avoidance of almost £3 million. Given the operating costs, a social return on investment for bed days saved is estimated at £5.50 per £1 invested, with potentially £9 saved per £1 invested if readmissions, post discharge care and falls are prevented.

More information is available at: www.careandrepair.org.uk/files/9515/2828/3807/Case_Study__Bridgend_Hospital_to_Home_Service_E.pdf

8.3 Homelessness

The Welsh Government (2018i) have published "Housing First (HF) – National Principles and Guidance for Wales" acknowledging that Housing First can play an important role in tackling longer term rough sleeping. Following this publication, in February 2018, the Minister for Housing and Regeneration confirmed that the Welsh Government was funding 10 Housing First pilot projects (National Assembly for Wales, 2018). Responding to the increase in homelessness experienced in Wales, Shelter Cymru (2018) stated "*we have very little Housing First accommodation in Wales, which is often a better option for people with long-term mental health and substance misuse problems.*" A new ministerial group was launched in June 2018 to tackle homelessness and advise on the implementation of the Housing First approach across Wales and its evaluation (Welsh Government, 2018j).

The Welsh Youth Homelessness Positive Pathway (2016) is a framework for local authorities to approach housing options for young homeless people. The pathway includes information and advice for young people, targeted early interventions, a virtual hub to accommodation and support, and a range of housing options. By the end of 2017, a further £12.6 million was made available to support the End Youth Homelessness campaign. Furthermore, the main actions being taken by the End Youth Homelessness coalition are:

- Identifying early indicators of what can lead to homelessness and how these might be prevented
- Understanding and reducing the links between homelessness and educational disengagement, the care system and the youth justice system
- Ensuring crisis support programmes are in place
- Ensuring availability of employment opportunities to those vulnerable to homelessness
- Ensuring those vulnerable to homelessness are supported at institutional and social levels

Case study: Psychologically Informed Environments, 'PIE' (The Wallich)

There is a requirement for all The Wallich staff to receive PIE training (Section 7.3). Although there are resource implications, there are practical and wider financial benefits, such as the benefits to society of entrenched homeless people being able to work and maintain their own tenancies.

"PIE isn't something new, it's a combination of good practice and continual improvement; it has people at the centre of everything – not policy, procedure and statistics"

(Source: Therapist supporting PIE rollout at the Wallich)

Street Homelessness Information Network

The Wallich also continues to host the Street Homelessness Information Network (SHIN) project; local authorities and other organisations will be able to use this system to store and retrieve data about homeless people on the streets across Wales.

Case study: Tackling Health Inequalities for Homeless Rough Sleepers (Gwynedd)

22 homeless people in Gwynedd were actively identified and interviewed (January to March 2017) to gather information about their experiences of living with poor health and the barriers they encounter to accessing health services. As a result, by liaising with health services in the area, rough sleepers will now always be seen by GP services, will be offered flu vaccinations (as they are considered a vulnerable group), have access to emergency dentistry, and have improved access to mental health services both in the community and in hospital.

The strong partnership developed between North Wales Housing Association and the local health board has had a positive impact in encouraging rough sleepers with mental and physical health issues to engage with services. Costs to deliver this improved service for a vulnerable population were covered under existing staffing budgets.

Source: 2025 Movement North Wales (2018)

Case study: Community Care Hub, Wrexham

Homeless people and rough sleepers are able to access health care, housing advice and a range of other health and social care services in an informal, supportive and respectful environment. Service providers are able to work together more effectively. The **'Everyone in the Room'** model employed at the Hub brings together individuals and agencies across all sectors of the community, tapping into existing resources, good practice and community assets. By working together, a more coordinated, holistic and resource efficient approach is provided which also addresses the previous delays caused by referral from one service to another.

This model is a cost-effective way of delivering services to homeless and rough sleepers (and potentially to other vulnerable groups as well). It provides a platform for agencies that want to interact with this client group in a way that vastly reduces missed appointments, leads to better engagement with service users, a reduction in crises, and less recourse to emergency interventions.

"I was taken aback how the Hub humanised the support system for its users and created a community; users and support staff knew each other by name, I saw users happy to engage with agencies, and equally I could see other users positively interacting with each other, providing important social interaction"

Source: Community Care Hub Business Case (2018)

9. Conclusion

The evidence from the literature review is clear, there are associations between poor housing conditions and ill-health, particularly around falls and cold hazards. Interventions to improve **housing quality** and tackle these deficiencies, which are found in 18% of the Welsh housing stock are therefore required to safeguard the health and well-being of the population. The most cost-effective interventions are in the area of falls prevention, however other hazards should not be ignored. Responsibility for housing improvements depend on tenure, with private landlords controlling conditions in the sector which experiences the highest prevalence of hazardous housing. Improvements here can be secured by local authority environmental health teams, but current activity is not able to address the scale of the problem if hazards in private rented accommodation are to be managed.

Ill-health can be both a cause and consequence of **homelessness**, although it is not always identified as the trigger of homelessness. The underlying causes may be structural such as housing supply and access, or poverty, or individual such as poor health, experience of violence or relationship breakdown. Given the complexity and wide-ranging causes and contributory factors, identifying particular interventions are problematic, and for most people who are at risk of, or experiencing homelessness, it is unlikely that a single intervention can tackle this on its own, at population or at an individual level. Given the predicted value for money of utilising the Housing First model, and its ability to flexibly deal with a wide range of causes and contributory factors, the findings from an evaluation of the pilot projects in Wales should be used to consider the rolling out of this intervention further. In addition to this, more innovative models for supporting the homeless which provide a holistic and person centred approach such as one stop shop 'Community Care Hubs' need to be explored.

With an ageing population, and predicted increases in mobility impairments, **adapting homes**, particularly owner-occupied houses are a key factor in meeting the needs of the current and future populations. Adaptations are generally accepted to offer value for money, given the likely savings to health services.

The All-Party Parliamentary Group on Healthy Homes and Buildings (2018) has recently published the white paper "Building our Future Laying the Foundations for Healthy Homes and Buildings". They make it clear the multiple benefits of healthy homes and buildings contributing to lower costs to the NHS and a healthier population; better educational attainment and workplace productivity; reduced emissions, lower energy bills and a lower carbon footprint; improved health, well-being and comfort; greater life chances; and independent living and care.

Ensuring everyone lives in a secure, healthy and appropriate homes is therefore of paramount public health importance, avoiding a significant burden of ill-health, and reducing health inequity.

10. Priority areas for preventative action

Action to improve housing quality, housing suitability and tackle homelessness is complex and multi-faceted. Structural issues such as poverty or availability of low-cost accommodation, inequality created by service design and funding structures, and promotion of social change to encourage householders to plan for older age or persuade home owners or landlords of the benefits of safe healthy homes all need addressing. Everyone in Wales is a stakeholder as anyone could find themselves requiring support to find suitable accommodation to meet their needs at some point in their lifetime. Integrated services and joint working are therefore required.



10.1 Housing quality

Healthy and safe housing should be available to all, across every tenure, whether owner occupied or social and private rented. This can be achieved through:

Improving the heating and thermal efficiency of homes

- Investing in mitigating against excess cold in homes results in a payback in 7 years.
- There is strong evidence that improvements in warmth and energy efficiency have positive impacts on the health of low income groups, particularly when targeted at the elderly or those with health conditions.
- Two-fifths of households who received such interventions reported improvements to respiratory, circulatory or rheumatic health conditions as well as to their mental health.
- An all-Wales **fuel poverty scheme** to improve the energy efficiency of homes occupied by vulnerable and low income households decreased the number of GP visits for respiratory conditions by 3.9%, compared to a 9.8% increase for those that did not receive the intervention.
- Focusing on **assisting vulnerable households** has been found to be more effective than an area-based approach.
- **Insulating existing older houses** in low-income communities has been found to increase indoor temperatures whilst reducing energy consumption and reducing hospital admissions from respiratory conditions.
- **External wall insulation**, which reduces cold, damp and mould, results in the initial investment being paid back in 7.9 years as a result of reduced fuel costs, health care costs and improved health-related quality of life.

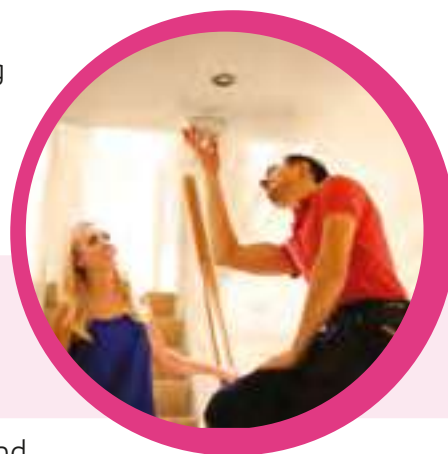


Improving whole home quality standards

- This consists of internal and external improvements including electrical systems (smoke detectors, carbon monoxide detectors, security lights, kitchen and bathroom extractor fans, and internal rewiring), windows, doors, wall insulation and garden paths.

- Upgrading homes to the Welsh Housing Quality Standard for residents aged over 60 years results in 39% fewer hospital admissions for cardiorespiratory conditions and injuries.

- Providing assistance to vulnerable home owners on repairs and maintenance can support older and lower income home owners who may be unsure about maintenance and repair or are unable to meet the costs of improving housing quality.



Improving the quality of privately rented homes

- 24% of private rented homes contain a category 1 hazard i.e. failing the minimum standard for housing, with landlords being responsible for undertaking improvements. Improvements can be achieved through supporting local authority housing /environmental health teams' ability to determine sufficiency for affecting improvements - local authority capacity is key.

Improving ventilation in homes

- Damp and mould contribute to respiratory disease such as asthma, to mental health problems such as anxiety and depression, and social health effects such as isolation.
- Installing ventilation systems in the homes of children with asthma can reduce the proportion of children with severe asthma, at a cost of £12,300 per child moved from the severe to the moderate asthma group.

Improving housing through better planning

- Whilst not the focus of this report, local housing strategies can be used to ensure existing and new housing stock contribute to achieving better health and well-being. The requirement to undertake Health Impact Assessment as part of the Public Health (Wales) Act, 2017 can help to incorporate health and well-being as key considerations in housing and built environment planning.





10.2 Unsuitable homes

A rapidly ageing population and projected increases in demands on health services requires a greater focus on upstream interventions, such as housing adaptation to allow older and disabled people to continue to live in their communities.

Adaptations offer value for money, resulting in savings to health and social care services and a return on investment for society. Priority areas for action include:

Home adaptations

- 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.
- Carrying out adaptations using an **integrated approach**, for example, by addressing housing disrepair or integrating adaptations with personal health care plans can have additional benefits. One study has shown visits from an occupational therapist, nurse and handyperson increases individual capacities and leads to a reduction in home hazards, resulting in 75% improvement in the performance of Activities of Daily Living, and a reduction of depressive symptoms in 53% of participants.
- Supporting **disabled people** to stay in their own homes through essential housing adaptations has been shown to improve quality of life, reduce demand for other health and social care services and provide a good return on investment.
- **Rapid Response Adaptations** involve carrying out minor adaptations such as ramps and handrails, to enable people to return safely to their own homes following hospital discharge. Benefits such as quicker hospital discharge, preventing people going into hospital and preventing accidents and falls in the home mean that every £1 spent generates £7.50 of cost savings for health and social care.
- **Preventive home adaptations** reduce the need for reactive adaptation and NHS use among those with long-term illness or disability. The overall payback time in terms of NHS cost reductions is 15.2 years, although the payback time is much quicker for adaptations that reduce falls (five to six years).
- Currently complex funding arrangements for adaptations means that eligibility is based on location and tenure rather than need. Reorienting services to **focus on need** will help to address inequalities in access and health and well-being outcomes.



Falls prevention

- Cost-effective interventions to prevent falls include fitting stair rails, balustrades, grab rails and repairing paths. Studies have shown there is a positive correlation between housing renewal/modification/improvement (such as simple ramps, rails, lighting improvements, and level-access showers) and falls prevention and health improvement.

- **Home modifications** such as handrails, grab rails, outside lighting, and slip resistance surfaces are considered to be very cost-effective and have been found to result in a 26% reduction in the rate of injuries requiring medical treatment caused by falls and a 39% reduction in injuries specific to the home-modification intervention.
- Investing in interventions to mitigate against defects that can cause falls results in a payback over a period of between 2.6 to 3.6 years.

Supporting independence

- Housing is an important setting for older people to maintain their independence. This can involve supporting older people to live in accessible homes suitable for independent living. **Extra care schemes** consist of purpose-built, accessible buildings that promote independent living, where there is access to care and support services. Impacts of such schemes include reduced frailty and reduced NHS costs.



10.3 Homelessness

For every £1 invested in moving people out of homelessness, it is estimated that there is £2.80 return on investment, due to reduced use of homeless services, improved well-being, increased economic productivity due to people entering employment and reduced spend in health care and criminal justice services. Priority areas for preventative action include:

Prevention of homelessness

- Preventing homelessness through **early interventions** results in savings of between £3,000 to £19,500 compared to allowing homelessness to persist for 12 months.
- Interventions that help to tackle **Adverse Childhood Experiences**, for example by increasing resilience assets such as having a supportive adult and / or family or increasing school attendance can help protect children against homelessness in later life. There are a range of interventions already available in Wales, which focus on raising awareness and encouraging ACE-based approaches including through ACE-informed training for the housing sector.



- **Homeless young people** are more likely to have been in care, have mental health issues and have had involvement with youth offending services. Actions already underway include identifying early indicators of homelessness, with the aim of prevention, and breaking the link between homelessness and educational disengagement, the care system and the youth justice system.

Access to health and care services

- **Co-ordinated**, effective and cost-effective approaches, such as the 'Everyone in the Room' model provide examples of how homeless people can access multiple agencies and health and care services in a **supportive environment**. Outcomes include reduced missed appointments, reduction in crises and requirement for emergency interventions.

Holistic and person-centred services supporting people into homes

- In the United States, **supportive housing** for those lacking housing and who face a number of complex medical, mental health and/or substance use issues, results in reduced shelter use, hospitalisations and length of stay, and time incarcerated. The savings from these reductions outweigh the costs of the supportive housing.

- **Housing First**, which builds on the learning from previous supportive housing models, provides immediate access to housing without preconditions. £1 invested in Housing First for rough sleepers with high and complex support needs generates £3.60 in benefits.



10.4 Housing inequality

- The housing domain of the **Wales Index of Multiple Deprivation (WIMD)** is limited to two indicators (people living in overcrowded households; people living in households with no central heating). Additional indicators that could increase the robustness of this domain include inadequate housing conditions, fuel poverty and lack of affordable housing.

- Findings from the latest Welsh Housing Conditions Survey (2018) can be used to better understand and **develop further evidence of the impact of poor housing quality on health and societal costs.**

- The biggest returns on investment rely on targeting the vulnerable groups and households most in need, rather than on an area-based approach. **Identifying groups with greatest need** requires cross organisational working and sharing of intelligence.



10.5 Partnerships

Priority areas for action include:

- Closer alignment of housing, health and social care, to maximise benefits of collaboration and integration. This requires a greater recognition by the health and care sectors of the significant contribution housing brings in improving health and well-being both at an individual and population level.



- Greater involvement and contribution of the housing sector to community well-being through partnership groups, such as at Regional Partnership Boards.

References

- Alexih L, Shen S, Chan I, Taylor D, and Drabek J (2010). *Individuals living in the community with chronic conditions and functional limitations: a closer look*. Available at: <https://aspe.hhs.gov/system/files/pdf/75961/closerlook.pdf> [Accessed 19th October 2018]
- All party parliamentary group for healthy homes and buildings (2018). *Building our Future Laying the Foundations for Healthy Homes and Buildings*. White Paper, October 2018. Available at: <https://healthyhomesbuildings.org.uk/wp-content/uploads/2018/10/HHB-APPG-White-Paper-V1.pdf> [Accessed 31st October 2018]
- Anda R, Felitti V, Bremner J, Walker J, Whitfield C, Perry B, Dube S, and Giles W (2006). The enduring effects of abuse and related adverse experiences in childhood: a convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience*. 256(3):174-186.
- Association for the Conservation of Energy (ACE) (2016). *Chilled to Death: The human cost of cold homes*. Available at: <http://www.ukace.org/wp-content/uploads/2015/03/ACE-and-EBR-fact-file-2015-03-Chilled-to-death.pdf> [Accessed 10 October 2018]
- Bellis M, Hughes K, Leckenby N, Perkins C, and Lowey H (2014). National Household Survey of adverse childhood experiences and their relationship with resilience to health-harming behaviours in England'. *BMC Medicine*. 12:72. Available at: <https://bmcmmedicine.biomedcentral.com/articles/10.1186/1741-7015-12-72>
- Bellis A and Wilson W (2018). House of Commons Library Briefing Paper Number 08368, 17 July 2018. *Housing First: tackling homelessness for those with complex needs*. Available at: <http://researchbriefings.files.parliament.uk/documents/CBP-8368/CBP-8368.pdf> [Accessed 25th October 2018]
- Bennett E, Dayson C, Eadson W, Gilbertson J, and Tod A (2017). *Warm, safe and well: The Evaluation of the Warm at Home Programme, Summary Report*. Sheffield Hallam University, Centre for Regional Economic and Social Research. Available at: https://www4.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/warm-safe-well-eval-warm-home-programme-summary_1.pdf [Accessed 25th October 2018]
- Brown H, Fattakhova G, Bambra C, and Taylor P (2017). Making healthy homes? A pilot study of the return on investment from an external wall insulation intervention. *BMC Research Notes*, vol. 10, no. 1. Available: <https://bmcresearchnotes.biomedcentral.com/track/pdf/10.1186/s13104-017-3067-x> [Accessed 25th October 2018]
- Buck D, Simpson M, and Ross S (2016). *The economics of housing and health: the role of housing associations*. Available at: https://www.kingsfund.org.uk/sites/default/files/field_publication_file/Economics_housing_and_health_Kings_Fund_Sep_2016.pdf [Accessed 22nd October 2018]
- Care and Repair Cymru (2014). *Indicative budget 2015/16 – written evidence for finance committee*. Available at: <http://www.senedd.assembly.wales/documents/s30185/FIN4%20-%202015-16WGDB07%20Care%20and%20Repair%20Cymru.pdf> [Accessed 31st October 2018]
- Centre for Ageing Better (2017a). *The role of home adaptations in improving later life*. Available at: <https://www.ageing-better.org.uk/sites/default/files/2017-12/The%20role%20of%20home%20adaptations%20in%20improving%20later%20life.pdf> [Accessed 17th October 2017]
- Centre for Ageing Better (2017b). *The role of home adaptations in improving later life Appendices: The role of home adaptations in improving later life*. Available at: <https://www.ageing-better.org.uk/sites/default/files/2017-12/Appendices%20the%20role%20of%20home%20adaptations%20in%20improving%20later%20life.pdf> [Accessed 19th October 2018]
- Chapman R, Howden-Chapman P, Viggers H, O'Dea D, and Kennedy M (2009). Retrofitting houses with insulation: a cost—benefit analysis of a randomised community trial. *Journal of Epidemiology and Community Health* 4:271
- Children in Wales (2019). *Accident Prevention*. Available at: <http://www.childreninwales.org.uk/our-work/accident-prevention/> [accessed 9th June 2019]
- Crisis (2012). *Homelessness kills: An analysis of the mortality of homeless people in early twenty-first century England; Summary*. Available at: https://www.crisis.org.uk/media/236799/crisis_homelessness_kills_es2012.pdf [Accessed 22nd October 2018]
- Crisis (2017). *Homelessness projections: Core homelessness in Great Britain; Summary report*. Available at: https://www.crisis.org.uk/media/237582/crisis_homelessness_projections_2017.pdf [Accessed 22nd October 2018]
- Culhane, D. P., Metraux, S., & Hadley, T. (2002). Public service reductions associated with placement of homeless persons with severe mental illness in supportive housing. *Housing Policy Debate*. 13(1):107-163
- Cymorth Cymru (2017). *Health Matters. The health needs of homeless people in Wales*. Available at: http://www.cymorthcymru.org.uk/files/5115/1791/4790/Cymorth_Cymru_Health_Matters_report.pdf [Accessed 10th October 2018]
- Davidson M, Nicol S, Beaumont A, and Roys M (2011). *The cost of poor housing in Wales*. Watford: IHS BRE Press
- DECC (2012). *Getting the measure of fuel poverty. Final Report of the Fuel Poverty Review*. Available at: <http://sticerd.lse.ac.uk/dps/case/cr/CASereport72.pdf> [Accessed 10th October 2018]
- Department of Health (2010). *Healthcare for Single Homeless People*. Available at: https://www.housinglin.org.uk/_assets/Resources/Housing/Support_materials/Other_reports_and_guidance/Healthcare_for_single_homeless_people.pdf [Accessed 22nd October 2018]
- Donaldson L (2010). *2009 Annual report of the chief medical officer*. Department of Health. Available at: http://www.sthc.co.uk/Documents/CMO_Report_2009.pdf [Accessed on 31st October 2018]
- Felitti V, Anda R, Nordenberg D, Williamson D, Spitz A, Edwards V, Koss M, and Marks J (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the Adverse Childhood Experiences

(ACE) Study.' *American Journal of Preventive Medicine* 14:245–258.

Frick K, Kung J, Parrish J, and Narrett M (2010). Evaluating the Cost-Effectiveness of Fall Prevention Programs that Reduce Fall-Related Hip Fractures in Older Adults. *The American Geriatrics Society*. 58(1):136-141

Garrett H, Roys M, Burris S, and Nicol S (2016). *The cost-benefit to the NHS arising from preventative housing interventions*. Watford: IHS BRE Press

Gibson M, Petticrew M, Bambra C, Sowden A, Wright, K, and Whitehead M (2011). Housing and health inequalities: a synthesis of systematic reviews of interventions aimed at different pathways linking housing and health. *Health & place*: 17(1), 175-84. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3098470/> [Accessed 22nd October 2018]

Green G and Gilbertson J (2008). *Warm Front: Better Health: Health impact evaluation of the Warm Front Scheme, Sheffield*. Sheffield Hallam University, Centre for Regional Social and Economic Research. Available at: <https://www4.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/warm-front-health-impact-eval.pdf> [Accessed 10th October 2018]

Grey, C and Woodfine, L (2019). The prevalence of Adverse Childhood Experiences (ACE) amongst homeless people in Wales: a step towards an ACE-informed approach in homelessness and housing services. Public Health Wales NHS Trust. *In Preparation*.

Harris J, Hall K, Meltzer H, Jenkins R, Oreszcyn T and McManus S (2010). *Health, mental health and housing conditions in England*. National Centre for Social Research: London

Holland C, Carter M, Cooke R, Leask G, Powell R, Shaw R, West K, Clarkesmith D, Collins J, Hagger B, Kay A, Lambie J, Lidell L, Wallis S, and Boukouvalas A (2015). *Collaborative research between Aston Research Centre for Healthy Ageing (ARCHA) and the ExtraCare Charitable Trust*. Available at: <http://www.aston.ac.uk/EasySiteWeb/GatewayLink.aspx?allid=245545> [Accessed 24th October 2018]

Howden-Chapman P, Matheson A, Crane J, Viggers H, Cunningham M, Blakely T, Cunningham C, Woodward A, Saville-Smith K, O'Dea D, Kennedy M, Baker M, Waipara N, Chapman R, Davie G, Thomson, and Petticrew (2007). Effect of Insulating Existing Houses on Health Inequality: Cluster Randomised Study in the Community. *BMJ*. 7591:460.

Ige J, Pilkington P, Orme J, Williams B, Prestwood E, Black D, Carmichael L, and Scally G (2018). The relationship between buildings and health: a systematic review. *Journal of Public Health* fdy138.

Edwards R, Neal R, Link P, Bruce N, Mullock L, Nelhans N, Pasterfield D, Russell D, Russell I, and Woodfine L (2011). Enhancing ventilation in homes of children with asthma: cost-effectiveness study alongside randomised controlled trial. *British Journal of General Practice*. 61(592): 733–741.

Jones A, Valero-Silva N, Lucas D (2016). *The effects of 'Secure Warm Modern' homes in Nottingham: Decent Homes impact study*. Nottingham: Nottingham City Homes. Available at: <http://irep.ntu.ac.uk/28087/> [Accessed 24th October 2018]

Keall M, Piersie N, Howden-Chapman P, Cunningham C, Cunningham M, Guria J, and Baker M (2015). Home modifications to reduce injuries from falls in the home injury prevention intervention (HIPI) study: A cluster-randomised controlled trial. *The Lancet*, 385(9964):231-238.

Koegel P, Melamid E, and Burnam M (1995). Childhood Risk Factors for Homelessness among Homeless Adults. *American Journal of Public Health*. 85(12):1642-1649.

Liddell C, Morris C, and Lagdon S (2011). *Kirklees Warm Zone, The project and its impacts on well-being*. University of Ulster. Available at: http://uir.ulster.ac.uk/19116/1/KIRKLEES_PROJECT_and_COST_BENEFIT_REPORT.pdf [Accessed 23rd October 2018]

Llamau (2018). *What causes youth homelessness?* Available at: <https://www.llamau.org.uk/what-causes-youth-homelessness> [Accessed 19th December 2018]

Lyons R, Williams V, Marchant E, Todd C, Turner S, Walters A, Lyons J, John A and Fry R (2017). *Preventing Child Injuries in Wales: Needs Assessment*. Swansea University. Available at: http://www.childreninwales.org.uk/wp-content/uploads/2017/08/June-2017_CHILD_INJURY_NEEDS_ASSESSMENT_FINAL1.pdf [Accessed 9th January 2019]

Marmot Review Team (2011). *The Health Impacts of Cold Homes and Fuel Poverty* (London: Friends of the Earth). Available from: https://www.foe.co.uk/sites/default/files/downloads/cold_homes_health.pdf [Accessed 23rd October 2018]

Met Office (2019). UK and regional series. *Year ordered statistics, Wales Mean Temp*. Available at: <https://www.metoffice.gov.uk/climate/uk/summaries/datasets> [Accessed 9th January 2019]

Morrison-Rees S (2017). *The Fuel Poverty Data Linking Project Findings Report No. 1: Initial findings on the impact on health of the Warm Homes Nest scheme*. Welsh Government, Government Social Research Analysis for Policy. Available at: <https://gov.wales/docs/caecd/research/2017/170404-fuel-poverty-data-linking-project-findings-report-1-en.pdf> [Accessed 30th October 2018]

National Assembly for Wales (2018). Plenary 06/02/2018. *Statement by the Minister for Housing and Regeneration: Tackling Rough Sleeping and Homelessness*. Available at: <http://record.assembly.wales/Plenary/4903?lang=en-GB#A41443> [Accessed 29th October 2018]

National Assembly for Wales Research Service (2018), *How do we end youth homelessness in Wales?*, Blog Post, <https://seneddresearch.blog/2018/11/15/how-do-we-end-youth-homelessness-in-wales/> [Accessed 4th December 2018]

NEA (2017). *Health & Innovation Programme: Warm and Healthy Homes Fund Interim Report*. Available at: https://www.nea.org.uk/wp-content/uploads/2017/09/WHHF_Report_2017-FINAL-FOR-PRINT.pdf [Accessed 24th October 2018]

NEA (2018). *Cold Homes and Excess Winter Deaths A Preventable Public Health Epidemic That Can No Longer Be Tolerated*. Available at: <https://www.e3g.org/library/cold-homes-and-excess-winter-deaths-a-preventable-public-health-epidemic>. [Accessed 3rd May 2019]

NICE (2010). *Unintentional injuries in the home: interventions for under 15s*. Available at: <https://www.nice.org.uk/guidance/>

- ph30/resources/unintentional-injuries-in-the-home-interventions-for-under-15s-pdf-1996290755269 [Accessed 23rd October 2018]
- NICE (2013). *Falls – Assessment and prevention of falls in older people*. Available from: <https://www.nice.org.uk/guidance/cg161/evidence> [Accessed 24th October 2018]
- NICE (2016). *Preventing excess winter deaths and illness associated with cold homes*. Available at: <https://www.nice.org.uk/guidance/qs117/chapter/introduction> [Accessed 24th October 2018]
- Nicol S and Garrett H (2019). *The cost of poor housing in Wales, 2017*. BRE. Watford
- Nicol S, Roys M, Ormandy D, and Ezratty V (2017). *The cost of poor housing in the European Union*. BRE. Watford.
- NLA (2018). *Improving the Private Rented Sector in Wales making it happen for landlords and tenants*. Sponsored by NLA and supported by Citizens Advice Cymru. Available at: <https://landlords.org.uk/sites/default/files/2018-03/C224741%20NLA%20Improving%20The%20Private%20Rented%20Sector%20in%20Wales%20SP.PDF> [Accessed 23rd October 2018]
- ODPM (2006). *Housing Health and Safety Rating System, Operating Guidance*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf [Accessed 17th October 2018]
- ONS (2017a). *Statistical bulletin: Excess winter mortality in England and Wales: 2016 to 2017 (provisional) and 2015 to 2016 (final)*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/2016to2017provisionaland2015to2016final> [Accessed 10th October 2018]
- ONS (2017b). *Excess winter mortality data, England and Wales, 2016 to 2017 (provisional) and 2015 to 2016 (final)*. Available at: <https://www.ons.gov.uk/file?uri=/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/excesswintermortalityinenglandandwalesreferencetables/2016to2017provisionaland2015to2016final/ewm201617.xls> [Accessed 10th October 2018]
- ONS (2017c). *Excess winter deaths for English clinical commissioning groups and Welsh health boards, 2000 to 2001 to 2014 to 2015*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/adhocs/006667excesswinterdeathsforenglishclinicalcommissioninggroupsandwelshhealthboards2000to2001to2014to2015> [Accessed 10th October 2018]
- ONS (2018a). *Statistical Bulletin: Deaths of homeless people in England and Wales: 2013 to 2017*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsofhomelesspeopleinenglandandwales/2013to2017#main-points> [Accessed 1st May 2019]
- ONS (2018b). *Family Resources Survey 2016/17*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692771/family-resources-survey-2016-17.pdf [Accessed 18th October 2018]
- ONS (2018c). *Excess winter deaths for English clinical commissioning groups and Welsh health boards, between 2015 to 2016 and 2016 to 2017*. Available at: <https://www.ons.gov.uk/file?uri=/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/adhocs/009368excesswinterdeathsforenglishclinicalcommissioninggroupsandwelshhealthboardsbetween2015to2016and2016to2017/finalfile.xls> [Accessed 8th January 2019]
- ONS (2018d). *Excess winter mortality data, England and Wales, 2017 to 2018 (provisional) and 2016 to 2017 (final)*. Available at: <https://www.ons.gov.uk/file?uri=/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/excesswintermortalityinenglandandwalesreferencetables/2017to2018provisionaland2016to2017final/reftable-ewm201718.xls> [Accessed 8th January 2019]
- ONS (2018e). *Statistical bulletin: Excess winter mortality in England and Wales: 2017 to 2018 (provisional) and 2016 to 2017 (final)*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/2017to2018provisionaland2016to2017final> [Accessed 9th January 2019]
- Osman L, Ayres J, Garden C, Reglitz K, Lyon J, and Douglas G (2008). Home warmth and health status of COPD patients. *European Journal of Public Health*. 18(4):399–405.
- Oxford University Press (2018). *English Oxford Living Dictionary*. Available at: https://en.oxforddictionaries.com/definition/fuel_poverty [Accessed 26th October 2018]
- Parliamentary Office of Science and Technology (2018). *Health in Private-Rented Housing*. Available at: <http://researchbriefings.files.parliament.uk/documents/POST-PN-0573/POST-PN-0573.pdf> [Accessed 18th October 2018]
- Pega F, Kvizhinadze G, Blakely T, Atkinson J, and Wilson N (2016). Home safety assessment and modification to reduce injurious falls in community-dwelling older adults: cost-utility and equity analysis. *Injury Prevention* 22:420-426.
- Pleace N (2015). Centre for Housing Policy, University of York. *At what cost? An estimation of the financial costs of single homelessness in the UK*. Available at: https://www.crisis.org.uk/media/20677/crisis_at_what_cost_2015.pdf [Accessed 25th October 2018]
- Pleace N and Culhane D (2016). *Better than Cure? Testing the case for Enhancing Prevention of Single Homelessness in England*. Available at: https://www.crisis.org.uk/media/20680/crisis_better_than_cure_2016.pdf [Accessed 25th October 2018]
- Poortinga W, Rodgers S, Lyons R, Anderson P, Tweed C, Grey C, Jiang S, Johnson R, Watkins A, and Winfield T (2018). The health impacts of energy performance investments in low-income areas: a mixed-methods approach. *Public Health Research*. 6(5).
- Price Waterhouse Coopers (2018). *Assessing the costs and benefits of Crisis' plan to end homelessness*. Available at: https://www.crisis.org.uk/media/238957/assessing_the_costs_and_benefits_of_crisis-plan_to_end_homelessness_2018.pdf [Accessed 25th October 2018]
- Public Health England (2017). *Cold Weather Plan for England, Making the Case: Why long-term strategic planning for cold weather is essential to health and well-being*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652568/Cold_Weather_Plan_Making_the_Case_2017.pdf [Accessed 31st October 2018]

- Public Health England (2018). *A structured literature review to identify cost-effective interventions to prevent falls in older people living in the community*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/679885/Structured_literature_review_report_falls_prevention.pdf [Accessed 23rd October 2018]
- Public Health Wales NHS Trust (2015). *Adverse Childhood Experiences and their impact on health-harming behaviours in the Welsh adult population*. Available at: [http://www2.nphs.wales.nhs.uk:8080/PRIDDocs.nsf/7c21215d6d0c613e80256f-490030c05a/d488a3852491bc1d80257f370038919e/\\$FILE/ACE%20Report%20FINAL%20\(E\).pdf](http://www2.nphs.wales.nhs.uk:8080/PRIDDocs.nsf/7c21215d6d0c613e80256f-490030c05a/d488a3852491bc1d80257f370038919e/$FILE/ACE%20Report%20FINAL%20(E).pdf) [Accessed 25th October 2018]
- Public Health Wales NHS Trust (2016). *Making a Difference: Investing in Sustainable Health and Well-being for the People of Wales. Executive Summary*. Available here: http://www.wales.nhs.uk/sitesplus/documents/888/PHW%20Making%20a%20difference%20ES%28Web_2%29.pdf [Accessed 31st October 2018]
- Public Health Wales Observatory (2018a). *Health and its determinants in Wales Informing strategic planning*. Available at: [http://www2.nphs.wales.nhs.uk:8080/PubHObservatoryProjDocs.nsf/85c50756737f79ac80256f2700534ea3/6c7599bb-12c79de78025820b005995a2/\\$FILE/Health&determinantsinWales_Report_Eng.pptx](http://www2.nphs.wales.nhs.uk:8080/PubHObservatoryProjDocs.nsf/85c50756737f79ac80256f2700534ea3/6c7599bb-12c79de78025820b005995a2/$FILE/Health&determinantsinWales_Report_Eng.pptx) [Accessed 23rd October 2018]
- Public Health Wales Observatory (2018b). *Public Health Outcomes Framework Reporting Tool*. Available at: <https://public.tableau.com/views/PHOF2017Characteristics-Area/Area?:embed=y&:showVizHome=no> [Accessed 23rd October 2018]
- Rodgers S, Bailey R, Johnson R, Berridge D, Poortinga W, Lannon S, Smith R, and Lyons R (2018). Emergency hospital admissions associated with a non-randomised housing intervention meeting national housing quality standards: a longitudinal data linkage study. *Journal of Epidemiology & Community Health*. 72 (10)
- Roos L, Mota N, Afifi T, Katz L, Distasio J, and Sareen (2013). Relationship Between Adverse Childhood Experiences and Homelessness and the Impact of Axis I and II Disorders. *American Journal of Public Health*. 103(S2):S275–S281.
- Roys M, Nicol S, Garrett H, and Margoles S (2016). *The full cost of poor housing*. Watford: IHS BRE Press
- Ruse J and Garlick K (2018). *Under one roof: health & housing sectors tackling fuel poverty and cold-related ill health together*. Available at: <http://www.nea.org.uk/wp-content/uploads/2018/09/NEA-Under-One-Roof-FULL-REPORT.pdf> [Accessed 17th October 2018]
- Sabates R and Dex S (2012). *Multiple risk factors in young children's development*. Institute of Education University of London. Available at: <http://www.cls.ioe.ac.uk/library-media/documents/WP%202012-1%20Multiple%20risk%20factors%20in%20young%20children's%20development%20-%20SABATES,%20R%20AND%20DEX,%20S.pdf> [Accessed 24th October 2018]
- Sheldrick B and Hepburn D (2004). *Assessing the impact of the central heating programme on tackling fuel poverty@ report on the first year 2001-2002*. Available at: <https://www.gov.scot/Resource/Doc/17002/0025513.pdf> [Accessed 24th October 2018]
- Shelter Cymru (2018). Why is rough sleeping on the rise in Wales? Available at: <https://sheltercymru.org.uk/why-is-rough-sleeping-on-the-rise-in-wales/> [Accessed 29th October 2018]
- Snell T, Fernandez J, and Forder J. (2012). *Building a business case for investing in adaptive technologies in England*. PSSRU at London School of Economics and Political Science. Available at: <https://www.pssru.ac.uk/pub/dp2831.pdf> [Accessed 19th October 2018]
- Somerville M, Mackenzie I, Owen P, and Miles D (2000). Housing and health: does installing heating in their homes improve the health of children with asthma? *Public Health*. 114(6):434
- Szanton S, Leff B, Wolff J, Roberts L, and Gitlin L (2016). Home-based care program reduces disability and promotes aging in place. *Health Affairs*: 35(9):1558-1563.
- The Academic – Practitioner Partnership (2016). *Good Housing Better Health*. University of Birmingham, Housing and Communities Research Group. Available at: <https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/SPSW/Housing/2016/good-housing-better-health-2016.pdf> [Accessed 1st November 2018]
- The Academic – Practitioner Partnership (2018). *Delivering Healthy Housing*. University of Birmingham, Housing and Communities Research Group. Available at: <https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/SPSW/Housing/2018/delivering-healthy-housing.pdf> [Accessed 1st November 2018]
- The Marmot Review (2010). *Fair Society, Healthy Lives*. Available at: <http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report-pdf.pdf> [Accessed 18th October 2018]
- The Marmot Review Team. *The Health Impacts of Cold Homes and Fuel Poverty*. London: Friends of the Earth and the Marmot Review Team; 2011.
- Thomson H, Thomas S, Sellstrom E, Petticrew M (2013). Housing improvements for health and associated socio-economic outcomes. *Cochrane Database of Systematic Reviews*. Issue 2. Art. No.: CD008657. Available at: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD008657.pub2/epdf/full> [Accessed 25th October 2018]
- Wales Audit Office (2018). *Housing Adaptations*. Available at: <http://www.audit.wales/system/files/publications/housing-adaptations-2018-english.pdf> [Accessed 16th October 2018]
- Welsh Government (2010). *Living in Wales 2008: Welsh Housing Quality Standard*. First Release. SDR 225/2010. Available at: <https://gov.wales/docs/statistics/2010/101217sdr2252010en.pdf> [Accessed 8th January 2019]
- Welsh Government (2014a). *Welsh Index of Multiple Deprivation (WIMD) 2014; Revised*. Available at: <https://gov.wales/docs/statistics/2015/150812-wimd-2014-revised-en.pdf> [Accessed 22nd October 2018]
- Welsh Government (2014b). StatsWales. WIMD Maps. *WIMD 2014 – map of housing deprivation*. Available at: <https://statswales.gov.wales/Download/File?fileId=548> [Accessed 22nd October 2018]

- Welsh Government (2016a). *The production of estimated levels of fuel poverty in Wales: 2012-2016*. Available at: <https://gov.wales/docs/caecd/research/2016/160711-production-estimated-levels-fuel-poverty-wales-2012-2016-en.pdf> [Accessed 18th October 2018]
- Welsh Government (2016b). *Map - Estimated levels of fuel poverty in Wales*. Available at: <http://lle.gov.wales/map/fuelpoverty> [Accessed 18th October 2018]
- Welsh Government (2017c). StatsWales. *Category 1 and 2 hazards identified by hazard type, dwelling and category*. Available at: <https://statswales.gov.wales/Catalogue/Housing/Hazards-and-Licences/category1and2hazards-by-hazardtype-dwelling-category> [Accessed 18th October 2018]
- Welsh Government (2018a). *Fuel Poverty Estimates for Wales as at 21 May 2019*. Available at: <https://gov.wales/fuel-poverty-estimates-wales-headline-results-2018> [accessed 31 May 2019]
- Welsh Government (2018b). *Welsh Housing Conditions Survey 2017-18: Headline Report*. Available at: <https://gweddill.gov.wales/docs/statistics/2018/181206-welsh-housing-conditions-survey-headline-report-2017-18-en.pdf> [Accessed 19th December 2018]
- Welsh Government (2018c). Stats Wales. *Homelessness*. Available at: <https://statswales.gov.wales/Catalogue/Housing/Homelessness> [Accessed 10th October 2018]
- Welsh Government (2018d). Statistical first release. *Homelessness in Wales, 2017-18 – Revised*. Available at: <https://gov.wales/docs/statistics/2018/180801-homelessness-2017-18-revised-en.pdf> [Accessed 15th October 2018]
- Welsh Government (2018e). Daffodil v7.1. Available at: <http://www.daffodilcymru.org.uk/index.php> [Accessed 18th October 2018]
- Welsh Government (2018f). Fuel poverty, 3 April 2018. Available at: <https://gweddill.gov.wales/topics/environmentcountryside/energy/fuelpoverty/?lang=en> [Accessed 18th October 2018]
- Welsh Government (2018g). *Welsh Housing Conditions Survey results viewer*. Available at: <https://gov.wales/docs/statistics/2018/181221-welsh-housing-conditions-survey-results-viewer-2017-18-en.xlsb> [Accessed 15th January 2019]
- Welsh Government (2018h). *Welsh Housing Quality Standard (WHQS), as at 31 March 2018*. Statistical First Release. SFR 88/2018. Available at: <https://gov.wales/docs/statistics/2018/181004-welsh-housing-quality-standard-31-march-2018-en.pdf> [Accessed 8th January 2019]
- Welsh Government (2018i). *Housing First (HF) – National Principles and Guidance for Wales*. Available at: <https://gov.wales/docs/desh/publications/180206-housing-first-en.pdf> [Accessed 29th October 2018]
- Welsh Government (2018j). News. *New Ministerial group to tackle homelessness in Wales launched*. Available at: <https://gov.wales/new-ministerial-group-tackle-homelessness-wales-launched> [Accessed 29th October 2018]
- Welsh Government (2019). Statistical First Release. Fuel poverty estimates for Wales 2018: Headline results. Available at: <https://gov.wales/sites/default/files/statistics-and-research/2019-05/fuel-poverty-estimates-for-wales-2018-headline-results-717.pdf> [Accessed 3rd June 2019]
- World Health Organization (WHO) (2010). *Macroeconomics and health: investing in health for economic development—report of the Commission on Macroeconomics and Health*. Available at: <http://apps.who.int/iris/bitstream/handle/10665/42435/924154550X.pdf?sequence=1&isAllowed=y> [Accessed 19th October 2018]
- Williams K, Poyser J, and Hopkins K (2012). Ministry of Justice Research Summary 3/12. *Accommodation, homelessness and reoffending of prisoners: Results from the Surveying Prisoner Crime Reduction (SPCR) survey*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/278806/homelessness-reoffending-prisoners.pdf [Accessed 25th October 2018]
- Wilkinson P, Landon M, Armstrong B, Stevenson S, Pattenden S, McKee M, and Fletcher T (2001). *Cold comfort: The social and environmental determinants of excess winter deaths in England, 1986-96*. Available at: <https://www.jrf.org.uk/file/36717/download?token=i0CVJRhB&filetype=full-report> [Accessed 17th October 2018]

Glossary

ACE	Adverse Childhood Experience Traumatic experiences that occur during childhood and may influence health behaviours and outcomes in adolescence and later life
Adaptations	Adaptations to the house to make it suitable for the occupants. Adaptations are recognised as a means to improve health outcomes
Category 1 hazard	Under the Housing Health and Safety Rating System (HHSRS) a category 1 hazard is a serious hazard. A dwelling with a category 1 hazard is considered to fail the minimum standard for housing
Category 2 hazard	Under the Housing Health and Safety Rating System (HHSRS) a category 2 hazard refers to any hazard which is not classified as a category 1 hazard and is therefore less serious
Common mental disorder (CMD)	Comprises 6 different types of depression and anxiety – depression, generalised anxiety disorder, panic disorder, phobias, obsessive compulsive disorder and not otherwise specified mental disorders
COPD	Chronic Obstructive Pulmonary Disease A lung disease where chronic obstruction of the airflow to the lungs interferes with normal breathing
DALY	Disability Adjusted Life-Year DALYs are the sum of years of life lost and years lived with disability. One DALY is one year of healthy life lost.
DFGs	Disabled Facilities Grants Grants available from councils for people who are disabled and need to make adaptations to their home
Disrepair	Based on former Decent Homes Standard criteria which states that a dwelling fails this if it is not in a reasonable state of repair – this is based on the dwelling age and condition of a range of building components including walls, roads, windows, doors, electrics and heating systems
EHS	English Housing Survey National survey of housing, including condition, energy efficiency and households
EWI	External Wall Insulation Used to insulate dwellings with solid walls, since they do not have cavities to fill with insulation
Excess Winter Deaths	Refers to the higher death rate in the winter months (December to March inclusive) compared with the average number of deaths occurring in the preceding August to November and the following April to July
Fuel poverty	In Wales a household is defined as being in fuel poverty if they need to spend 10% or more of their income on keeping their home at a reasonable temperature
HHSRS	Housing Health and Safety Rating System A risk assessment tool to help local authorities identify and protect against potential risks and hazards to health and safety related deficiencies, covering 29 categories of hazards
Housing First	A method of reducing rough sleeping by moving those who are sleeping rough into their own accommodation and provide support to help maintain that situation. The method is currently being trialled in several pilot areas in the UK
Housing interventions	Interventions applied to a dwelling in order to improve certain aspects for the occupier

HMO	House in Multiple Occupation. Legal definition contained in Housing Act 2004, but generally a dwelling containing 3 or more tenants forming more than one household sharing amenities, or where a conversion into self-contained flats has taken place without meeting appropriate Building Regulations.
Homelessness – rough sleeping	Broad indication of rough sleeping levels on the night of the count based on data provided by local authorities. There are a range of factors which can impact on single-night counts of rough sleepers, including location, timing and weather.
ICER	Incremental Cost-Effectiveness Ratio Used to assess the cost-effectiveness of a health intervention
LGBT	LGBT Lesbian, Gay, Bisexual, Transgender
LSOA	Lower Super Output Area Geographic area designed for statistical purposes – they are areas of geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. Built from census output areas, approximately 400 households
Overcrowding	Occurs where a household has fewer bedrooms than it needs for the number of occupiers
Payback period	The time taken (in years) to break even on an investment
Public Services Board	Each local authority area in Wales has a Public Services Board. Part of their role is to assess and improve various aspects of well-being in their area, including social and environmental well-being
Regional Partnership Boards	There are seven statutory regional partnerships in Wales whose role it is to steer strategic regional delivery of social services work together with health services
SMR	Standardised Mortality Ratio The ratio of observed deaths in a particular group compared to expected deaths in the general population
Sofa surfers	People staying temporarily with households other than their immediate family in overcrowded conditions
Vulnerable households	Households containing someone who is elderly, a child, disabled or living with a long-term illness
WHCS	Welsh Housing Condition Survey A national survey collecting information about the condition and energy efficiency of housing in Wales
WHQS	Welsh Housing Quality Standard Welsh Government standard of housing quality introduced in 2002 aiming to ensure that all dwellings are of good quality and suitable for the needs of existing and future residents. It measures 42 elements within seven categories which include repair, safety, security, energy efficiency, age of key amenities, environment and suitability of accommodation for the household
WIMD	Welsh Index of Multiple Deprivation Enables identification, at small area level, of the most deprived areas in Wales

Appendix I

Our literature review focused on the evidence on the effectiveness of interventions designed to improve housing conditions, address homelessness, and the benefits of adaptations. This included access to a range of academic journals and databases supplemented by hand-searching and conversations with experts.

The Public Health Wales Protocol for Evidence Review for Making a Difference (MaD) Project provides a template for the process of researching and reviewing evidence and where practicable, this was utilised to identify, review and report the evidence of effective interventions. This included:

- Preference given to reports published within last 10 years,
- High level sources i.e. systematic reviews, evidence synthesis combined with modelling, or guidance
- From reliable and / or recognized sources e.g. expert body.
Sources identified included systematic reviews of interventions linking housing and health, reviews on socio-economic outcomes, guidelines from expert bodies such as NICE and government departments, and articles from recognised journals such as Cochrane Database of Systematic Reviews and Public Health Research.

In addition to the published research into interventions, this project also includes published statistics, for example Welsh Government data on current homelessness, to assist with context.

Our Priorities 2018-2030

**Building
and mobilising
and knowledge and
skills** to improve
health and well-
being across
Wales

**Influencing
the wider
determinants
of health**

**Improving
mental well-being
and resilience**

Working to Achieve a Healthier Future for Wales

Supporting
the development of a
sustainable **health and
care system focused on
prevention** and early
intervention

**Promoting
healthy
behaviours**

**Protecting
the public** from
infection and
environmental
threats to
health

Securing a
healthy future
for the next
generation

Our Values:

*Working
together with
trust and respect
to make a difference*



Building Research Establishment
Bucknalls Lane
Watford
Hertfordshire, WD25 9XX

Community Housing Cymru
2 Ocean Way
Cardiff, CF24 5TG

Public Health Wales
Number 2 Capital Quarter
Tyndall Street
Cardiff, CF10 4BZ

Tel: 029 2022 7744
Email: general.enquiries@wales.nhs.uk

phw.nhs.wales

