The cost of poor housing in Northern Ireland 2016

16 October 2018

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This report is based on the findings of the House Condition Survey 2016 which is published on the Housing Executive's website.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

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Executive Summary

This report summarises the results of analysis commissioned by the Northern Ireland Housing Executive (NIHE) to provide the cost of poor housing in the Northern Ireland housing stock. It uses the most recent 2016 NIHCS data and the revised annual NHS treatment cost methodology used for 'The full cost of Poor Housing' (Roys et al, 2016). The key findings are;

- In 2016, the total number of dwellings with any Category 1 hazard (poor housing) was 69,878, some 9% of the total housing stock.
- The most common Category 1 hazards were falls on stairs (3%), falls on level surfaces (2%) and excess cold (2%).
- The estimated average cost to reduce the Category 1 hazards in these 69,878 homes to an acceptable level is £4,366 per home; a total cost of £305 million for the whole stock.
- If remedial works were undertaken 'up front' to mitigate the Category 1 hazards, it is estimated that there will be a benefit to the National Health Service (NHS) of some £39.5 million per year.
- Remedial works to mitigate Category 1 hazards would pay for themselves in reduced NHS costs within 8 years. The quickest payback periods relate to mitigating Category 1 hazards associated with stairs and steps, excessive cold and entry by intruders; return on investment is four years for these three hazards.
- It is estimated that the annual cost of poor housing to the NHS represents only 10% of total societal costs; the latter estimated to be £401million per annum.

In order to obtain more robust and persuasive estimates for Northern Ireland to argue the case that investment to deal with HHSRS hazards makes economic sense, as well as improving the health and well-being of people who live in poor housing, it is important to ensure that the survey's sample size is large enough to produce reliable estimates for the most prevalent hazards. It's also vital that surveyors continue to receive appropriate training in making consistent judgements about HHSRS hazards.

Introduction

The cost of poor housing in Northern Ireland report published in 2012 estimated that some 144,000 (20%) of Northern Ireland's homes had at least one Category 1 hazard (in 2009) and so were deemed to be 'poor housing'. It suggested that if works were targeted to reduce the most serious health and safety hazards to an acceptable level, there would be a benefit to the NHS of some £33 million per year.

The NIHE has commissioned analysis to estimate the impact on NHS expenditure for first year treatment costs in treating the consequences of the poor housing that exists in the housing stock in 2016. There are important differences between the data and methodologies used for the 2012 publication and the data and methodologies used for this analysis. As a result, the summary findings for each report are not directly comparable. These key differences are;

1. The cost of poor housing in 2016 uses the revised annual NHS treatment cost methodology used for 'The full cost of poor housing' in England (Roys et al, 2016) to allow better estimates of these costs.

2. Since the previous report, the estimation of costs required to mitigate excess cold hazards has changed following the adoption of the latest SAP2012[1] methodology and the new Energy Performance Certificate (EPC) Improvements model for the NIHCS. The types of energy efficiency improvement measures and the order in which these are applied changed under the new EPC Improvements model. Furthermore, analysis of SAP has been undertaken to calculate risks of harm of excess cold as the health benefits of energy improvements were greatly underestimated in the previous model.

3. There was greater surveyor variability in the assessment of HHSRS hazards for the NIHCS 2009 (used for the 2012 publication), so the apparent large fall in the prevalence of poor housing between 2009 and 2016 should be treated with caution.

Although any direct comparisons of the cost of poor housing in Northern Ireland are problematic, the new methodology for this report does provide the NIHE with the most up to date approach. It's important to bear in mind that total repair costs to make homes safer are always indicative given that there will be some degree of error around the estimates e.g. sampling errors, low sample size and surveyor variability. This report will;

- Quantify the amount of poor housing in the stock and the types of homes where poor housing is more prevalent.
- Estimate the costs of repair and energy improvement measures required to mitigate Category 1 hazards so that risks of harm from these are no worse than average for the age and type of dwelling.
- Estimate the cost benefits to the NHS of improving homes.
- Estimate the cost to society of poor housing.
- In the summary findings, provide data from the 'The full cost of poor housing' in England for information.

[1] Following the release of version 9.93 of RdSAP 2012, U-values for solid brick, stone and cavity walls have been updated to more accurately reflect their thermal performance. As a result of these changes, SAP2012 was modelled for NIHCS 2016 data using the updated U-values

Category 1 HHSRS hazards in Northern Ireland

The NIHCS estimates that in 2016, 69,878 (9%) dwellings had at least one of the 26 Category 1 hazards collected by the survey and thus by our definition deemed to be 'poor housing'[2]. Among dwellings with a Category 1 hazard, 74% had one such hazard and a further 11% had two hazards. At the other end of the scale some 6% of these dwellings had between 6 and 13 hazards, the vast majority of these being vacant homes.

The three most common hazards were falls on stairs, falls on the level and excess cold (Table 1). None of the dwellings sampled were reported to have, for example, Category 1 hazards for falls associated with baths. This is likely to be a result of the small sample size for the survey rather than an indication that no such hazards exist. Given that the total number of surveys undertaken for the NIHCS is around 3,000 dwellings, it must be stressed that there is some degree of error around these estimates of poor housing.

Category 1 hazards and tenure

There was a far higher proportion of Category 1 hazards among owner occupied (10%) and private rented homes (9%) compared with public sector homes (4%). Over a third (36%) of vacant homes had a Category 1 hazard compared with 8% of occupied homes, Figure 1.

Category 1 hazards and dwelling age

Figure 2 shows the prevalence of Category 1 hazards among different age dwellings. Not surprisingly the oldest dwellings built before 1919 had the highest proportion of Category 1 hazards (27%).

[2] Note that in 2016 the Northern Ireland physical survey form changed creating four new types of extreme HHSRS risks (falls associated with baths, entry by intruders, noise and collision and entrapment); these were previously fully measured by the surveyor. The same approach has been adopted by the EHS since 2012.

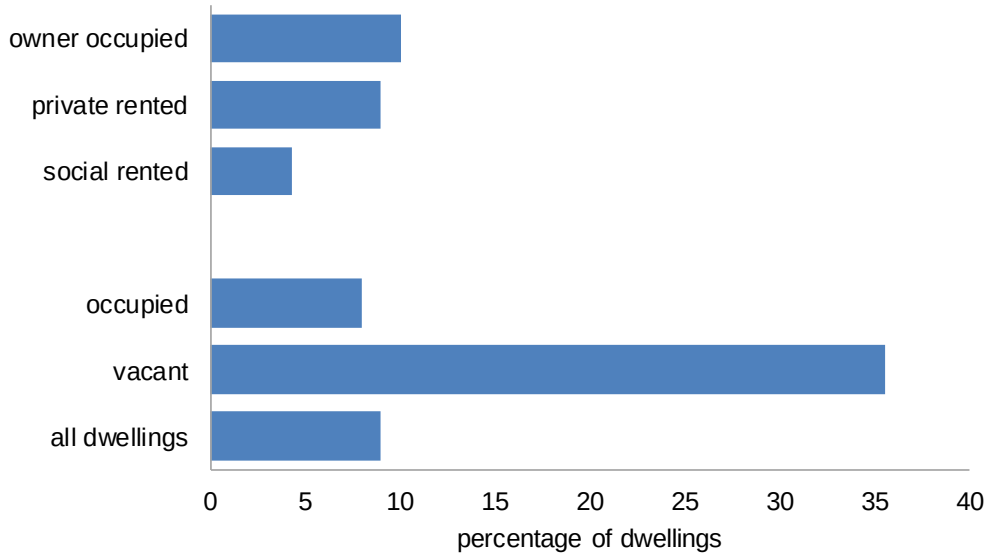
Table 1: Number and percentage of homes with Category 1 hazards in 2016*

	Number of dwellings	Percentage of dwellings
Falls on stairs	25,746	3.3
Falls on level surfaces	16,491	2.1
Excess cold	16,029	2.1
Falls between levels	8,258	1.1
Personal hygiene	8,125	1
Food safety	7,091	0.9
Radon	5,825	0.7
Position and operation of amenities	4,477	0.6
Entry by intruders	4,437	0.6
Water supply	3,734	0.5
Fire	3,535	0.5
Domestic hygiene	3,441	0.4
Lead	3,422	0.4
Electrical safety	2,000	0.3
Lighting	1,795	0.2
Damp and mould	1,559	0.2
Carbon monoxide	1,216	0.2
Structural collapse	489	0.1
Flames and hot surfaces	350	0.0
Explosions	280	0.0
Uncombusted fuel gas	280	0.0
Falls associated with baths#	0	0
Collision and entrapment#	0	0
Overcrowding#	0	0
Excess heat#	0	0
Noise#	0	0
Any Category 1 hazards	69,878	9.0

** individual items do not sum to the total because some homes have more than one Category 1 hazard.*

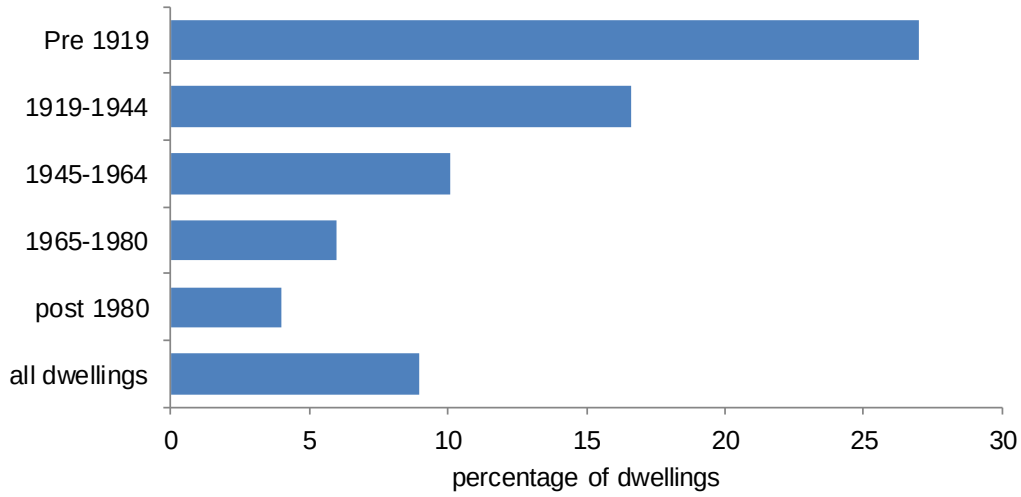
 # although there were no cases with these hazards in the survey sample, this does not mean that there are no dwellings with any of these hazards.

Figure 1: Percentage of dwellings with any Category 1 hazard by tenure and type of occupation, 2016



Base: all dwellings

Figure 2: Percentage of dwellings with any Category 1 hazard by dwelling age, 2016

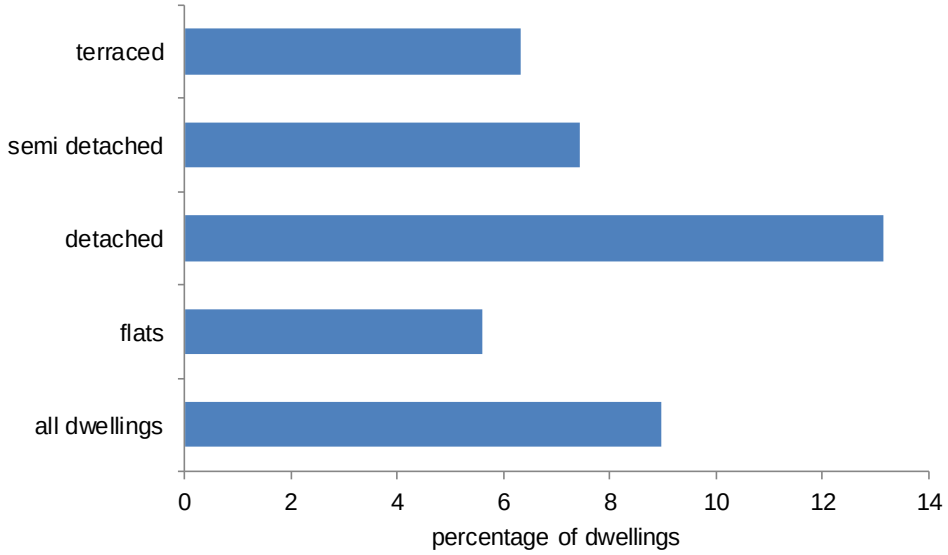


Base: all dwellings

Category 1 hazards and dwelling type

Figure 3 shows the proportion of these hazards among different types of dwellings. However, due to relatively small sample sizes for Category 1 hazards among flats, findings for these types of homes should be treated with caution. Detached homes had the highest prevalence of Category 1 hazards (13%).

Figure 3: Percentage of dwellings with any Category 1 hazard by dwelling type, 2016



Base: all dwellings

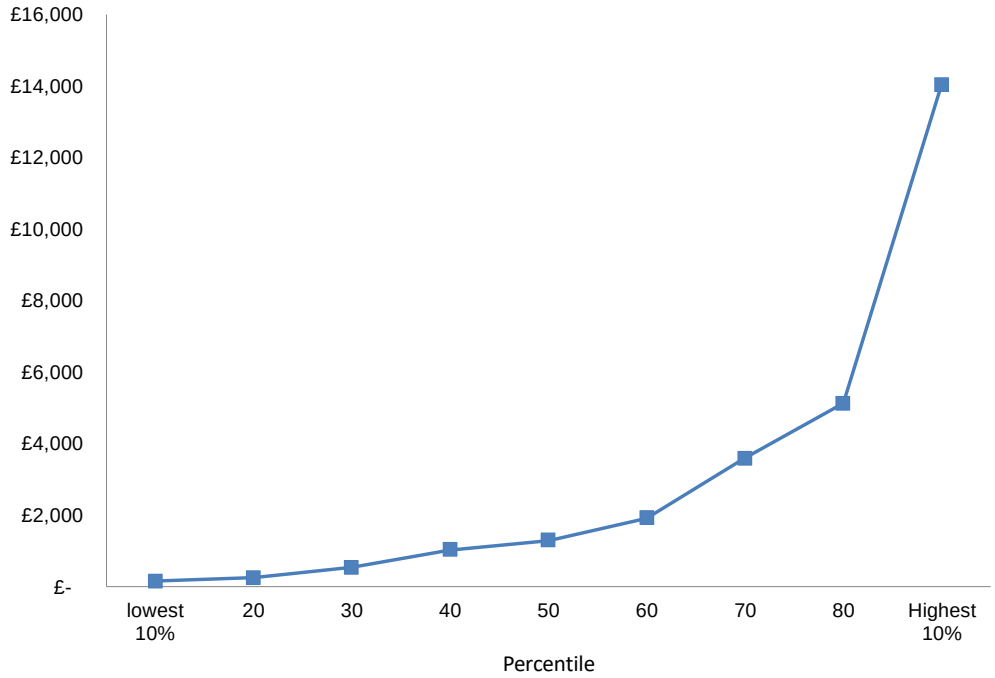
Cost to mitigate Category 1 hazards

As part of the NIHCS, surveyors identify remedial works required to reduce hazard risks that are significantly higher than average to an acceptable level – this level usually being the average for the type and age of dwelling. These remedial works are costed up using standard prices used for the English Housing Survey (EHS). For the modelled hazards (apart from excess cold) a 'typical' package of works has been used. For excess cold we use the latest EPC improvements model for Northern Ireland which means these costs are not directly comparable to the 2009 estimates of mitigating excess cold.

The NIHCS estimates that the average cost for reducing Category 1 hazards to an acceptable level would be £4,366.

The range of HHSRS repair costs is presented in Figure 4. For 20% of homes with Category 1 hazards, it would cost just under £250 to reduce the risk of harm so that it was no worse than the average for the age and type of dwelling. Half of homes would cost £1,300 or less to mitigate the Category 1 hazard. However, costs rise sharply for the highest costing 20% of homes, with some poor housing costing over £10,000 to remedy.

Figure 4: Distribution of costs for remedial action on HHSRS Cat 1 hazards (2016 prices).



Base: all dwellings with a Category 1 hazard

The costs of work vary by the type of hazard. Table 2 shows the average cost per dwelling for the remedial work required to deal with each type of Category 1 hazard. We also need to bear in mind that for many hazards, there is considerable variation around this average or mean value. The median cost, for example, for remedial works to mitigate fire hazards is £3,173; far lower than the mean cost. Figure 5 shows the total cost to mitigate each hazard in graphical format.

Table 2: Average cost per dwelling for remedial work for each type of hazard, 2016

Hazard	Number of Category 1 Hazards	Average cost per dwelling (£)	Total cost to mitigate hazard (£)
Excess cold	16,029	4,145	66,445,259
Falls on the level	16,491	2,243	36,993,849
Food Safety	7,091	5,114	36,264,648
Falls associated with stairs and steps	25,746	1,266	32,582,162
Damp and mould growth	1,559	20,572	32,079,214
Fire	3,535	8,011	28,320,680
Falls between levels	8,258	2,424	20,013,369
Domestic hygiene, pests and refuse	3,441	4,071	14,009,820
Personal hygiene, sanitation and drainage	8,125	1,613	13,106,456
Electrical hazards	2,000	3,846	7,693,151
Radon (radiation)	5,825	1,294	7,538,521
Lighting	1,795	3,900	6,998,818
Lead	3,422	1,910	6,534,899
Entry by intruders	4,437	1,026	4,552,775
Water supply for domestic purposes	3,734	1,058	3,949,330
Structural collapse and falling elements	489	6,515	3,185,795
Position and operability of amenities (ergonomics)	4,477	570	2,552,489
Carbon monoxide and fuel combustion products	1,216	570	693,105
Uncombusted fuel gas	280	570	159,533
Explosions	280	570	159,533
Hot surfaces and materials	350	120	41,877
Collision and entrapment	-	-	-
Falls associated with baths etc	-	-	-
Crowding and space	-	-	-
Noise	-	-	-
Excess heat	-	-	-
Total with any Category 1 hazard	**69,878**	**4,366**	**305,054,048**

[1] the total sum required to remedy all Category 1 hazards is less than the total number of Category 1 hazards multiplied by the average costs; this is because the modelling avoids the double counting of costs where repair work/energy improvements mitigate more than one hazard.

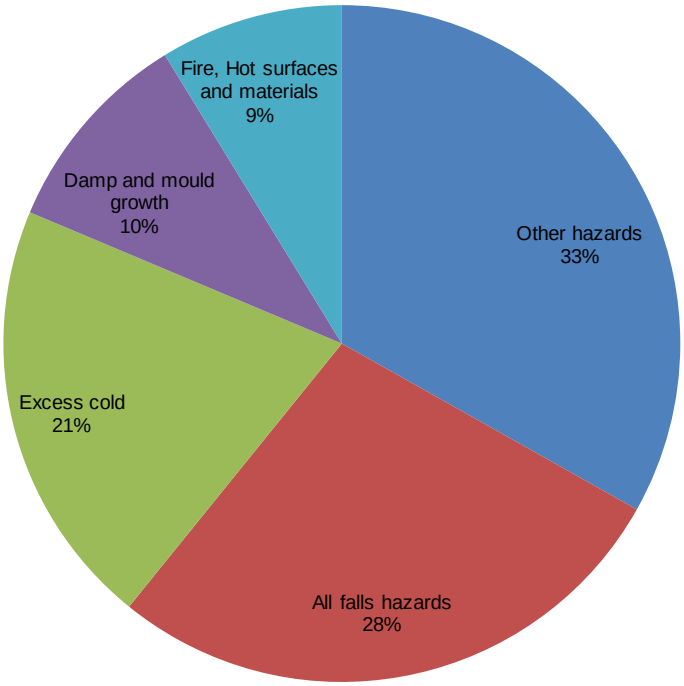
The total cost of dealing with HHSRS Category 1 hazards in Northern Ireland is estimated to be some £305 million in 2016.

Figure 5: Total cost to mitigate all Category 1 hazards, 2016

Base: all dwellings with a Category 1 hazard

Mitigating the cost of the three fall hazards identified in the survey comprises around one quarter of the total costs to make safe. Around one fifth of the estimated total cost of remedial work is required for making cold homes more comfortable, work which includes updating heating systems and providing or improving insulation, Figure 6.

Figure 6: Distribution of costs to remedy HHSRS Category 1 hazards, 2016



Note: Percentages based on total cost to mitigate all Category 1 hazards before double counting is removed
Base: all dwellings with a Category 1 hazard

For the 2011 NIHCS, the NIHE commissioned BRE to undertake analysis to estimate the cost to remedy Category 1 hazards for occupied homes only. It would be useful to undertake similar analysis of the 2016 data to investigate the impact of vacant dwellings on the average cost to make homes safer and distribution of the total costs.

The total cost of remedying poor housing in Northern Ireland was £469 million in 2009, with an average cost of £4,047 per dwelling. The rise in average costs in 2016 (£4,366) can be partly explained by inflationary factors (rising costs of repair work) but may also reflect;

- the cost of tackling longer term vacant homes which fall into greater disrepair
- the degree of error around the estimates due to low sample size.

The cost benefits to the NHS of improving homes

In 2016, BRE published an update to the Cost of poor housing methodology entitled 'The full cost of Poor Housing' (Roys et al, 2016). The original report for England was based on data that was over 10 years old, and it was felt that the data sources needed updating to reflect new knowledge and information that became available. There were two main factors to the change in calculating health benefits; these were re-calculating the health benefits associated with energy efficiency improvements; and using updated (2011) NHS treatment costs.

The health benefits of energy improvements were greatly underestimated in the previous model, as a comparison was made between homes which were only just severe enough to achieve a Category 1 hazard score and the average for the stock. Unfortunately, many homes had energy efficiencies much worse than this cut off value, and it was clear that there was great potential benefit in improving the homes with really poor energy efficiency. A methodology was therefore developed to allow SAP calculations to be used for estimating the likelihood of harm (from excess cold). Average SAP in homes with a Category 1 excess cold hazard could then be compared with a home with an average SAP score. This provided a greater distinction between these two groups, increasing the potential benefit of the interventions and hence significantly reducing the payback period for reducing this hazard.

The NHS costs for a few key hazards were updated to 2011 figures to provide a fair indication of the additional cost of treating some of the outcomes associated with the housing hazards. These new numbers were simplified into representative values in a way very similar to the original Cost or poor housing reports (England and Northern Ireland) and are summarised in Table 3.

Table 3: Revised representative cost to the NHS values

Cost value	Class I (£)	Class II (£)	Class III (£)	Class IV (£)
Revised representative cost (2011)	90,000	30,000	1,800	120

As a result of these modelling enhancements the findings suggest that the benefits of housing improvement have perhaps been understated in the past. Also as NHS costs appear to be racing ahead of inflation, it makes total sense to invest in poor housing now as a preventative measure to save costs (and unnecessary suffering) in the future.

Earlier, we calculated that the total cost of reducing the Category 1 housing hazards in Northern Ireland to an acceptable level (the average for their age and type) was some £305 million. For the hazards that were fully measured through the NIHCS, we have a 'likelihood' score for all homes with a Category 1 hazard, and we have an average likelihood score for the same home for its age and type. Using the difference between the actual score and the average for the whole stock, ***an estimate for the additional total annual treatment cost to the NHS due to poor housing can be calculated. In 2016 this is estimated to be around £39.5 million per year if the homes are left unimproved*** (Table 4). Using this information, ***the direct payback period for all hazards can be calculated at 7.7 years***, if the repairs or improvements are all made 'up front'. The payback period varies greatly according to the type of hazard, with remedial work for Category 1 falls on stairs, excess cold and entry by intruders estimated to deliver the fastest payback on investment.

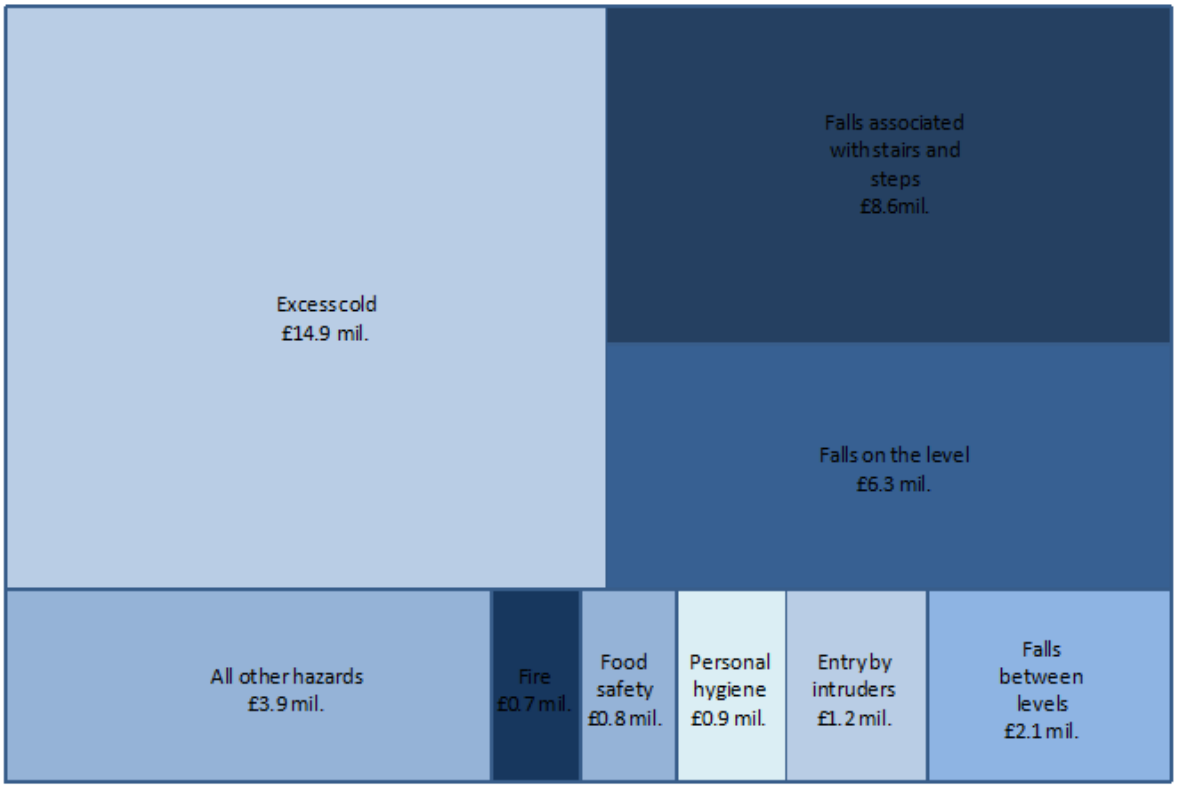
However, it must be stressed that there is a very large amount of uncertainty around these estimates because any calculations relating to cost benefits and payback periods are very sensitive to the mix of hazards present.

Table 4: The costs, and benefits to the NHS, of reducing HHSRS Category 1 hazards to an acceptable level, 2016.

Hazard	Total cost to mitigate hazard (£)	Savings to the NHS per annum if hazard mitigated (£)	Payback (years)
Excess cold	66,445,259	14,934,757	4
Falls associated with stairs and steps	32,582,162	8,578,037	4
Falls on the level	36,993,849	6,278,094	6
Falls between levels	20,013,369	2,076,890	10
Entry by intruders	4,552,775	1,236,725	4
Personal hygiene, sanitation and drainage	13,106,456	942,610	14
Food Safety	36,264,648	822,093	44
Fire	28,320,680	757,795	37
Position and operability of amenities (ergonomics)	2,552,489	537,986	5
Radon (radiation)	7,538,521	488,762	15
Water supply for domestic purposes	3,949,330	462,690	9
Damp and mould growth	32,079,214	455,439	70
Hot surfaces and materials	41,877	427,855	0
Lead	6,534,899	423,997	15
Domestic hygiene, pests and refuse	14,009,820	412,817	34
Electrical hazards	7,693,151	267,471	29
Lighting	6,998,818	205,587	34
Carbon monoxide and fuel combustion products	693,105	118,064	6
Structural collapse and falling elements	3,185,795	42,069	76
Uncombusted fuel gas	159,533	26,495	6
Explosions	159,533	25,124	6
Collision and entrapment	-	-	-
Falls associated with baths etc	-	-	-
Crowding and space	-	-	-
Noise	-	-	-
Excess heat	-	-	-
Totals	**305,054,048**	**39,521,357**	**8**

It is often difficult to visualise the difference in potential savings by hazard in a table so Figure 7 takes the same data and illustrates them in a diagram, where the area is proportional to the potential saving for each hazard. This highlights how the majority of the potential saving to the NHS is associated with excess cold, falls associated with stairs and steps and falls on the level. Tackling these two falls hazards is nearly as beneficial to the NHS as dealing with excess cold.

Figure 7: The costs and benefits to the NHS of reducing HHSRS Category 1 hazards to an acceptable level (using median harm proportions and revised cost estimates), shown by area, 2016



Base: all dwellings with a Category 1 hazard

The cost to society of poor housing in Northern Ireland

The previous cost of poor housing in Northern Ireland report estimated that that the annual cost to the NHS of treating Category 1 hazards accounted for a maximum of 40% of the total cost to society. Since this publication, a literature review has been undertaken for analysis into the cost of poor housing in England. The review concluded that the best way to assess the total cost to society is to use a tried-and-tested formula such as the one developed by TRL, which evaluates the costs of both fatal and non-fatal transport related injuries; the costs include human costs (pain, grief and suffering), indirect economic costs as well as direct medical costs. TLR have also conducted research for the RoSPA to value the impact of home accidents using these costs[3].

Using this approach the estimated total cost to society of the poor housing in Northern Ireland is £401 million per annum (Table 5)***. This estimate suggests, therefore, that the proportion of costs to the NHS is nearer 10% of societal costs of all poor housing in Northern Ireland.***

When considering the potential benefit to society of mitigating these hazards, excess cold dominates the findings, with about two thirds of all the potential savings. The potential savings to society from mitigating radon (radiation) and fire hazards stand out as both hazards are more dominant than they are when just considering potential benefits to the NHS, Figure 8.

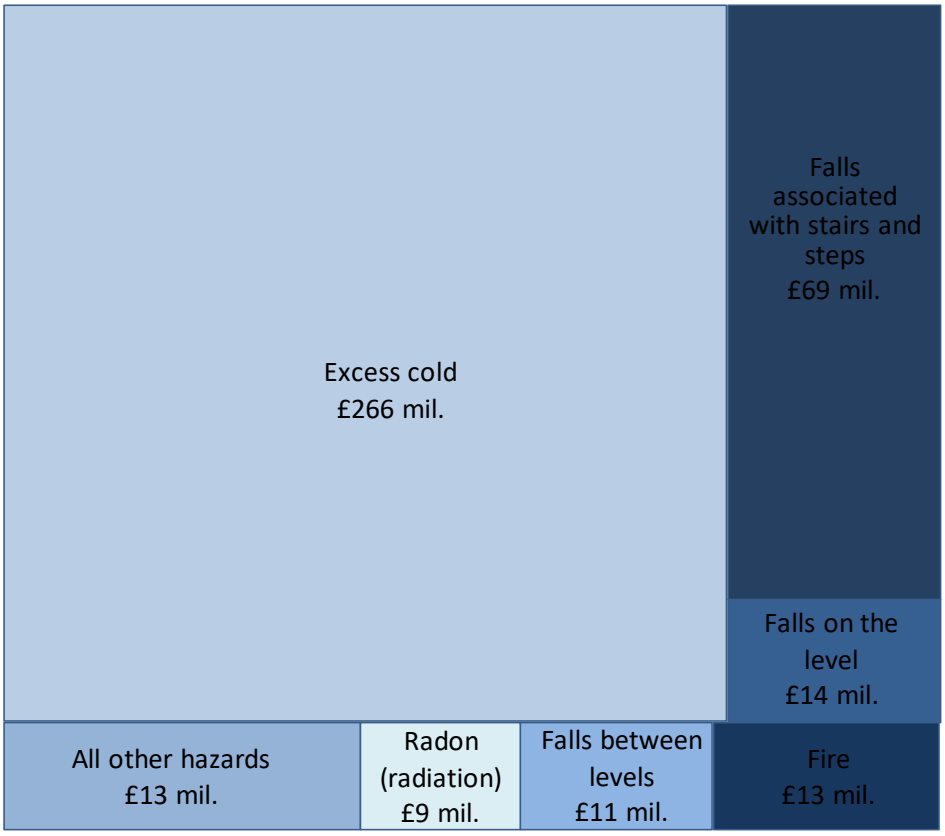
Using this information, ***the direct payback period to society for all hazards can be calculated at 0.8 years***, if the repairs or improvements are all made 'up front'. This payback period varies according to the type of hazard, ranging from less than one year to over 10 years. As with the potential savings to the NHS, it must be stressed that there is a very large amount of uncertainty around these estimates since calculations relating to cost benefits and payback periods are very sensitive to the mix of hazards present.

[3] Walter L K. Re-valuation of home accidents. TRL Published Project Report PPR483. Crowthorne, TRL, 2010.

Table 5: Summary of costs and benefits, with Category 1 hazards ordered by total cost to repair, 2016

Hazard	Number of Category 1 Hazards	Average cost per dwelling (£)	Total cost to mitigate hazard (£)	Savings to the NHS per annum if hazard mitigated (£)	Payback (years)	Savings to society per annum if hazard mitigated (£)	Societal payback (years)
Excess cold	16,029	4,145	66,445,259	14,934,757	4	265,943,105	0.3
Falls on the level	16,491	2,243	36,993,849	6,278,094	6	69,197,566	0.5
Food Safety	7,091	5,114	36,264,648	822,093	44	14,214,764	2.6
Falls associated with stairs and steps	25,746	1,266	32,582,162	8,578,037	4	11,139,241	2.9
Damp and mould growth	1,559	20,572	32,079,214	455,439	70	3,085,490	10.4
Fire	3,535	8,011	28,320,680	757,795	37	2,505,651	11.3
Falls between levels	8,258	2,424	20,013,369	2,076,890	10	2,185,291	9.2
Domestic hygiene, pests and refuse	3,441	4,071	14,009,820	412,817	34	13,070,369	1.1
Personal hygiene, sanitation and drainage	8,125	1,613	13,106,456	942,610	14	1,380,954	9.5
Electrical hazards	2,000	3,846	7,693,151	267,471	29	8,949,004	0.9
Radon (radiation)	5,825	1,294	7,538,521	488,762	15	1,122,632	6.7
Lighting	1,795	3,900	6,998,818	205,587	34	1,136,269	6.2
Lead	3,422	1,910	6,534,899	423,997	15	1,650,165	4
Entry by intruders	4,437	1,026	4,552,775	1,236,725	4	1,028,751	4.4
Water supply for domestic purposes	3,734	1,058	3,949,330	462,690	9	808,397	4.9
Structural collapse and falling elements	489	6,515	3,185,795	42,069	76	1,232,005	2.6
Position and operability of amenities (ergonomics)	4,477	570	2,552,489	537,986	5	992,436	2.6
Carbon monoxide and fuel combustion products	1,216	570	693,105	118,064	6	278,250	2.5
Uncombusted fuel gas	280	570	159,533	26,495	6	454,480	0.4
Explosions	280	570	159,533	25,124	6	257,021	0.6
Hot surfaces and materials	350	120	41,877	427,855	0	468,003	0.1
Collision and entrapment	-	-	-	-	-	-	-
Falls associated with baths etc	-	-	-	-	-	-	-
Crowding and space	-	-	-	-	-	-	-
Noise	-	-	-	-	-	-	-
Excess heat	-	-	-	-	-	-	-
Total with any Category 1 hazard	**69,878**	**4,366**	**305,054,048**	**39,521,357**	**8**	**401,099,844**	**0.8**

Figure 8: The costs and benefits to society of reducing HHSRS Category 1 hazards to an acceptable level (using median harm proportions and revised cost estimates), shown by area, 2016



Base: all dwellings with a Category 1 hazard

Conclusion and recommendations

This analysis has shown that 9% of dwellings in Northern Ireland had one or more Category 1 hazards in 2016. Simply living with these hazards is estimated to cost the NHS in Northern Ireland around £39.5 million per year.

The total cost of all the works required to reduce these hazards to an acceptable level is estimated to be £305 million and if these were undertaken now, they would pay for themselves in reduced NHS treatment costs within 8 years.

It is estimated that the cost of poor housing to the NHS represents just 10% of total societal costs, which are some £401 million per annum. If all remedial work were undertaken now to mitigate all poor housing, this would, overall, give a return of investment of under one year.

For information, Table 6 provides the key findings in this report with the England findings from 'The full cost of poor housing' publication; the latter were estimated using 2011 EHS data. In 2015, the EHS estimated there to be poor housing in 12% of English homes.

It is important to bear in mind that direct comparisons with England are not possible due to different methodologies to mitigate excess cold; the England analysis, for example, used a different EPC Improvement model. Furthermore, there are some long term vacant homes surveyed in the NIHCS, which, due to their derelict or near derelict state, would not be surveyed for the EHS. These derelict/near derelict homes will have a notable impact on average and total costs to make homes safer.

Table 6: Cost of poor housing summary findings, Northern Ireland and England

	NI 2016	England 2011
Number of Category 1 hazards	69,878	3,472,765
Proportion of Category 1 hazards	9	15
Average cost per dwelling (£)	4,366	2,875
Total cost to mitigate hazards (£million)	305	10,000
Savings to the NHS per annum if hazards mitigated (£million)	40	1,413
Savings to society per annum if hazards mitigated (£million)	401	18,667

The costs to mitigate Category 1 hazards in Northern Ireland and the benefits to the NHS and society in doing so, are indicative only. To model more robust and persuasive estimates for these to argue the economic case for investment to tackle poor housing, it is important to ensure that the survey's sample size is large enough to produce reliable estimates for the most prevalent hazards. To minimise surveyor variability, it is recommended that surveyors continue to receive appropriate training in making consistent judgements about HHSRS hazards.

The NIHCS includes the surveying of some long term vacant homes, including those where the surveyor has recommended that the dwelling be demolished as part of their assessment of fitness for habitation. Given that remedial works to tackle Category 1 hazards in these homes may be unrealistic from a practical and economic viewpoint, we suggest that this analysis be undertake on occupied homes only.

Appendix User guide

Method

The BRE 'Cost of poor housing methodology' comprises of four key stages;

1. Identification of poor housing using the Housing Health and Safety Rating System (HHSRS)

The 2016 NIHCS collected information on the presence of 26 of the 29 HHSRS hazards for each home sampled (the three hazards not collected – asbestos (and MMF), biocides, and volatile organic compounds – are uncommon in their extreme form and cannot be deduced from a non-intrusive survey). Dwellings with at least one of the 26 Category 1 hazards collected by the survey are deemed to be 'poor housing'.

2. Estimating the cost of repair work to remedy poor housing

As part of the NIHCS, surveyors identify remedial works required to reduce hazard risks that are significantly higher than average to an acceptable level; this level usually being the average for the type and age of dwelling. These remedial works are costed up using standard prices used for the English Housing Survey (EHS). For the modelled hazards (apart from excess cold) a 'typical' package of works has been used. For excess cold the latest EPC improvements model for Northern Ireland was used.

3. Estimating the cost of poor housing to the NHS

The approach relies on publicly available robust data to estimate these costs. The calculation of the costs of a health outcome of poor housing are based on the NHS treatment costs for up to one year of treatment following an accident or exposure to a hazard (https://www.gov.uk/government/publications/nhs-reference-costs-financial-year-2011-to-2012).

4. Estimating the cost of poor housing to society

This uses the approach and costs for 'The full cost of poor housing' in England report[4]. A literature review for that report highlighted the difficulty in obtaining a sensible value for the cost to society of accidental injuries and health effects. It was prudent, therefore, to use existing societal cost of poor housing values (used in the previous 'The cost of poor housing in Northern Ireland' report) based on publicly available estimates. The best estimates available for home accident costs to society are those commissioned by Royal Society for the Prevention of Accidents (RoSPA) and TRL[5] and are used for the methodology.

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[4] A briefing paper on these findings can be found here

https://www.bre.co.uk/filelibrary/pdf/87741-Cost-of-Poor-Housing-Briefing-Paper-v3.pdf

[5] Walter L K (2010). PPR483 Re-valuation of home accidents. TRL, PPR483. Crowthorne, TRL, 2010 and

Department for Transport (2012) Reported Road Casualties in Great Britain: 2012 Annual Report. A valuation of road accidents and casualties in Great Britain in 2012. TRL.

The Housing Health and Safety Rating System (HHSRS) – cost to make safe

As part of the NIHCS, surveyors identify remedial works required to reduce hazard risks that are significantly higher than average to an acceptable level; this level usually being the average for the type and age of dwelling. These remedial works are costed up using standard prices used for the English Housing Survey (EHS).

Costs to mitigate Category 1 HHSRS hazards, known as costs to make safe, provide notional costs to remedy each type of Category 1 hazard.

I. For the fully measured hazards, this involves two processes;

- costing the required works identified by the surveyor in the HHSRS section of the survey form; a 'typical' specification of work has been devised by an experienced HHSRS practitioner for the remedial action
- using repair cost work described elsewhere on the survey form.

II. For costs to mitigate excess cold at a dwelling the NIHCS uses the latest EPC improvements methodology to identify both the energy improvement work required and the associated cost.

III. For the modelled hazards, a typical action has been selected by an experienced HHSRS practitioner (as above for measured hazards). The exceptions are for the following types of hazard: falls associated with baths, entry by intruders, noise and collision and entrapment. For the 2016 NIHCS these were assessed as extreme risks, having previously been fully measured by surveyors. For these hazards the average costs of mitigating the hazard, based on previous years' data, is used.

Any double counting of work (e.g. heating improvements may be required to mitigate dampness and excess cold) is removed where feasible. This is very complicated because components have many areas of work that overlap. Actions are grouped into broad work areas e.g. insulation, heating, kitchens, stairs. Remedial work that do not fit into these classifications, and are independent of any other jobs, are grouped as 'other' e.g. work to mitigate the risk of harm from lead or overcrowding.

For more information on how the HHSRS is measured see Appendix G page 143 of the main 2016 NIHCS report.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

Quality information

Surveyors working on the 2016 NIHCS received training and support to help ensure their HHSRS assessments were consistent and robust. A re-fresher training session in 2016 explained the principles, how the form should be completed as well as conducting practical exercises with feedback sessions. While these measures ensure a good level of consistency in judgements, some surveyor variability is to be expected. The HCS approach to the HHSRS provides surveyors with a systematic approach with which to make these judgements.

In terms of the cost of poor housing modelling work the quality assurance of the four key stages focused on the correct functioning of data collation to provide accurate, reliable and transparent results. The process of development, quality assurance and creation of results followed an internal procedure so the work undertaken could be reviewed and assessed by project managers.

Examples of the quality assurance undertaken to validate cost of poor housing processes and results included:

- Updating and revising the methodology using the latest assumptions for this area of work.
- Checking of transformations undertaken and mathematical formulae.
- Internal checks of data inputs to assure translation was completed correctly.
- Checks of correct units for calculations.
- Check correct and latest external data sources were used.
- Sense check comparison to HHSRS results.
- Internal review of results and reporting.

Strengths and weaknesses

In order to obtain more robust and persuasive estimates for Northern Ireland to argue the case that investment to deal with HHSRS hazards makes economic sense, as well as improving the health and well-being of people who live in poor housing, it is important to ensure that the survey's sample size is large enough to produce reliable estimates for the most prevalent hazards. It's also vital that surveyors continue to receive appropriate training in making consistent judgements about HHSRS hazards.

Although any direct comparisons with previous cost of poor housing results are problematic, the new methodology for this report does provide the most up to date approach. It's important to bear in mind that total repair costs to make homes safer are always indicative given that there will be some degree of error around the estimates e.g. sampling errors, low sample size and surveyor variability.

Also it must be stressed that there is a very large amount of uncertainty around these estimates because any calculations relating to cost benefits and payback periods are very sensitive to the mix of hazards present.

The basis of this report is the 2016 NIHCS HHSRS statistics and the underlying NIHCS dataset. All results should be taken in the context of this background, and the survey and modelling assumptions which occur within these. See Appendix G page 143 of the main 2016 House Condition Survey report for more information on the HHSRS model and Appendix A page 88 for the survey's user guide.

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

References

Roys M, Nicol S, Garrett H and Margoles S, The full cost of poor housing, BRE FB 81. Bracknell, IHS BRE Press, 2016