

1. Housing Health and Safety

The annual costs of Category 1 Hazards to the NHS

Introducing the Housing Health and Safety Rating System (HHSRS)

- 1.1 The Housing Health and Safety Rating System (HHSRS) replaced the former fitness standard and is a prescribed method of assessing individual hazards, rather than a conventional standard to give a judgment of fit or unfit. The HHSRS is evidence based – national statistics on the health impacts of hazards encountered in the home are used as a basis for assessing individual hazards.
- 1.2 The HHSRS system deals with a much broader range of issues than the previous fitness standard. It covers a total of 29 hazards in four main groups:
 - » Physiological Requirements (e.g. damp & mould growth, excess cold, asbestos, carbon monoxide, radon, etc.)
 - » Psychological Requirements (crowding and space, entry by intruders, lighting, noise)
 - » Protection Against Infection (domestic hygiene, food safety, personal hygiene, water supply)
 - » Protection Against Accidents (e.g. falls on the level, on stairs & steps & between levels, electrics, fire, collision...)
- 1.3 The HHSRS scoring system combines two elements:
 - » The probability that deficiency (i.e. a fault in a dwelling whether due to disrepair or a design fault) will lead to a harmful occurrence (e.g. an accident or illness); and
 - » The spread of likely outcomes (i.e. the nature of the injury or illness).
- 1.4 If an accident is very likely to occur and the outcome is likely to be extreme or severe (e.g. death or a major or fatal injury) then the score will be very high.
- 1.5 All dwellings contain certain aspects that can be perceived as potentially hazardous, such as staircases and steps, heating appliances, electrical installation, glass, combustible materials, etc. It is when disrepair or inherent defective design makes an element of a dwelling significantly more likely to cause a harmful occurrence that it is scored under the HHSRS.
- 1.6 The HHSRS generates a numerical Hazard Score, and Hazard Bands have been devised as a simple means for handling the wide range of possible Scores. There are ten Hazard Bands, with Band J being the safest, and Band A being the most dangerous. Hazard Bands A to C (i.e. Hazard Scores of 1,000 and above) are the most serious hazards, and these are known as Category 1 (serious) hazards. Hazard Bands D to J (i.e. Hazard Scores below 1,000) are known as Category 2 (other) hazards. A local authority has a duty to deal with any Category 1 hazards found and has discretionary power to deal with Category 2 hazards.
- 1.7 In this Chapter we consider HHSRS Category 1 hazards and how potential investment in reducing the risk could achieve savings for health services. The analysis is based on the HHSRS Costs Calculator Toolkit, which was developed by the BRE on behalf of the Chartered Institute of Environmental Health (CIEH).

Impact of Remedying Category 1 Hazards

- 1.8 As previously noted the HHSRS considers a wide range of different hazards that could affect occupiers' health. In doing so it considers and scores:
- » The likelihood of an incident occurring
 - » Severity of the outcome
 - » Overall hazard score based on the risk
- 1.9 Every dwelling has a risk of an incident occurring due to a hazard, so any housing interventions will seek to reduce likelihood of the hazard or try to reduce its severity and minimise risk. In so doing, the CIEH HHSRS Cost Calculator provides useful basis for assessing the health impact of housing interventions in terms of cost.
- 1.10 Figure 1 shows an analysis of the payback period for remedial works associated with the “Falling on stairs” hazard using the CIEH HHSRS Costs Calculator. The worked example below is for an assumed stock of 100,000 dwellings.

Figure 1: Stair Falls using HHSRS Calculator Screenshot

	likelihood 1 in ...	%	expected number	Annual cost to NHS
Class I harms	14545	2.2%	7	£ 350,000
Class II harms	6957	4.6%	14	£ 280,000
Class III harms	1488	21.5%	67	£ 100,500
Class IV harms	446	71.7%	224	£ 22,400
Total all harms	320	100.0%	313	£ 752,900

Estimated total cost of works where an incident is expected £ 105,794

Ratio remedial works costs/NHS annual costs (if >1, need more than 1 year for payback) 0.14

- 1.11 The HHSRS identifies that, on average, there is a 1 in 320 likelihood of a fall on stairs occurring each year – therefore, given an assumed stock of 100,000 dwellings, the HHSRS Costs Calculator establishes that there would be an expected 313 falls each year (100,000 divided by 320 equals 313).
- 1.12 In assessing the severity of the outcome, the HHSRS separates possible harm into four classes, with Class I being the most serious harm and Class IV being the least serious harm. On average, the HHSRS identifies that the “Falling on stairs” hazard will have a Class I (Extreme) outcome on 2.2% of occasions – so on the basis of a total of 313 falls each year, 2.2% represents 7 falls that would have a Class I (Extreme) outcome in the above example.

- ^{1.13} Similarly, the HHSRS identifies that the “Falling on stairs” hazard will have a Class II (Severe) outcome on 4.6% of occasions, a Class III (Serious) outcome on 21.5% of occasions and a Class IV (Moderate) outcome on the remaining 71.7% of occasions (with the likelihood across all four Classes totalling 100%). Using these rates, the HHSRS Cost Calculator establishes the expected number of incidents within each class – with totals of 14 Class II (Severe), 67 Class III (Serious) and 224 Class IV (Moderate) falls in the above example.
- ^{1.14} The HHSRS Cost Calculator then uses this information to assign an average treatment cost on the following basis:
- » Class I: Extreme = £50,000 per incident
 - » Class II: Severe = £20,000 per incident
 - » Class III: Serious = £1,500 per incident
 - » Class IV: Moderate = £100 per incident
- ^{1.15} By considering these costs in the context of the number of incidents in each Class, the Cost Calculator establishes the overall costs likely to be incurred each year by the NHS in treating injuries sustained following falls on stairs. In the previous example based on 100,000 dwellings, the total cost was calculated to be £752,900; of which almost half (£350,000; 46.5%) was associated with the seven Class I (Extreme) incidents and a further third (£280,000; 37.2%) was associated with the fourteen Class II (Severe) incidents. Therefore, the substantial majority of the projected costs (£630,000; 83.7%) are associated with only 21 of the 313 incidents (6.7%).
- ^{1.16} The final stage of the model considers the likely costs for the necessary housing interventions to mitigate the risks associated with the hazard. On the basis of data from the English House Condition Survey (EHCS), the median cost for interventions associated with the “Falling on stairs” hazard was £338 in 2005-06; therefore the Cost Calculator determines that the cost of intervention would have totalled £105,794 for the 313 dwellings where falls occurred. Taking this cost alongside the treatment cost previously calculated yields an overall payback period of 0.14 years (£105,794 divided by £752,900 per year equals 0.14 years).
- ^{1.17} Overall, this appears to indicate a relatively cost effective return for investment in falls prevention. However, this calculation needs to be treated with caution:
- » The calculation cannot predict those dwellings where 313 falls are likely to occur within the 100,000 stock – **there is still a need to identify where intervention work is necessary**
 - In reality, it would be necessary to undertake interventions in far more than 313 dwellings meaning higher costs and longer payback period
 - » Intervention will only **reduce likelihood and/or severity of an incident** – it cannot eliminate it
 - There will always be a residual risk of harm
 - Additional cost will thus be incurred
 - » **Costs assumptions** used in the model may not replicate those to be found more locally through effective procurement
- ^{1.18} Given this context, for the West Dorset study we have developed the concepts introduced by the CIEH HHSRS Costs Calculator and integrated these with the stock condition survey data to understand the potential benefits of targeted housing interventions.

Category 1 Hazards in Private Sector Housing

- 1.19 The West Dorset Stock Condition Survey identified that the overall proportion of dwellings with a Category 1 hazard was 20.5% compared with 14.7% found in the EHS 2012. This represents around 9,790 dwellings across West Dorset having a Category 1 hazard.
- 1.20 A breakdown of Category 1 hazards by hazard type is given in Figure 2. Excess cold hazards are the most prominent reason for failure in dwellings.

Figure 2: Category 1 hazard reasons for failure by tenure (Source: West Dorset SCS 2013)

Category 1 hazard	Dwellings with Category 1 Hazards	
Excess cold	6,660	52%
Falls on stairs	2,220	17%
Flames & hot surfaces	650	5%
Damp & mould	580	5%
Entry by intruders	550	4%
Food safety	450	4%
Falls on the level	430	3%
Noise	200	2%
Falls between levels	190	1%
Personal hygiene	160	1%
Water supply	160	1%
Collision & entrapment	130	1%
Carbon monoxide	110	1%
Falls associated with bath	100	1%
Domestic hygiene	80	1%
Structural collapse	80	1%
Electrical hazard	0	0%
Excess heat	0	0%
Explosions	0	0%
Fire hazard	0	0%
Lighting	0	0%
Operability of amenities	0	0%
Overcrowding	0	0%
Uncombusted fuel gas	0	0%
Total hazards	12,750	-
Total dwellings with a Category 1 hazards	9,790	100%

Incidents caused by Category 1 Hazards

- ^{1.21} In undertaking an HHSRS assessment at each property, surveyors scored the likely risk and spread of outcomes for each hazard. For dwellings with Category 1 hazards, by definition either the likely risk was above average and/or the spread of outcomes was more severe; so these dwellings will account for many of the incidents that require treatment.
- ^{1.22} Figure 3 details the assessed risk of incidents arising in those properties where a Category 1 hazard was identified, together with the implied number of annual incidents that would be expected given the total number of dwellings with Category 1 hazards. For example, “Excess cold” was identified as a Category 1 hazard in 6,660 dwellings with a 1 in 230 chance of an incident occurring; equivalent to 29 incidents each year (6,660 divided by 230 equals 29).
- ^{1.23} The table also provides details for the average risk for each hazard across all dwellings, and shows the associated number of incidents that would be expected each year if those dwellings with Category 1 hazards were improved to average standards. Taking this information together with the number of incidents calculated given the presence of Category 1 hazards identified the potential reduction in incidents if housing interventions were put in place to mitigate the hazards. For example, the analysis shows that “Excess cold” incidents would reduce from 29 incidents to 18 incidents each year, a potential reduction of 11 incidents.

Figure 3: Incidents caused by Category 1 hazards by hazard (Source: West Dorset SCS 2013. Note: Figures may not sum due to rounding, all calculations based on unrounded figures)

Category 1 hazard	Dwellings with Cat 1 hazards	Assessed risk where Cat 1 hazard identified		Average risk for hazard across all dwellings		Potential Reduction
		Rate 1 in ...	Annual Incidents	Rate 1 in ...	Annual Incidents	
Excess cold	6,660	230	29	380	18	11
Falls on stairs	2,220	29	76	245	9	67
Flames & hot surfaces	650	29	23	180	4	19
Damp & mould	580	2	291	460	1	289
Entry by intruders	550	2	226	40	14	212
Food safety	450	6	73	4,960	0	73
Falls on the level	430	32	14	135	3	10
Noise	200	3	65	900	0	65
Falls between levels	190	6	32	1,690	0	32
Personal hygiene	160	6	26	7,750	0	26
Water supply	160	3	54	1,423,649	0	54
Collision & entrapment	130	1	84	39	3	81
Carbon monoxide	110	1	103	1,250	0	103
Falls associated with bath	100	17	6	4,026	0	6
Domestic hygiene	80	1	89	5,585	0	89
Structural collapse	80	4	19	11,170	0	19
Total incidents	-	-	1,210	-	52	1,156

- 1.24 The analysis demonstrates that the number of incidents resulting from across all Category 1 hazards could reduce from 1,210 incidents to 52 incidents each year, an annual reduction of 1,156 incidents, if the hazards were addressed.
- 1.25 In addition to reducing the number of hazards, suitable housing interventions could also reduce the severity of harm caused. As previously identified, whilst Class I (Extreme) and Class II (Severe) hazards may only constitute a small proportion of incidents, these can account for a large proportion of the consequential costs.
- 1.26 Figure 4 identifies that housing interventions in dwellings with Category 1 hazards has the potential to reduce the number of Class I (Extreme) outcomes from 12 incidents to 6 incidents each year, an annual reduction of 6 incidents (49.3%); and the number of Class II (Severe) outcomes from 19 incidents to 2 incidents each year, an annual reduction of 17 incidents (88.7%).

Figure 4: Outcome of Incidents caused by Category 1 hazards by severity (Source: West Dorset SCS 2013. Note: Figures may not sum due to rounding, all calculations based on unrounded figures)

Hazard Outcome	Incidents associated with Cat 1 hazards	Average incidents across all dwellings	Potential reduction	
			Number	%
Class I (Extreme)	12	6	6	49%
Class II (Severe)	19	2	17	89%
Class III (Serious)	127	8	119	94%
Class IV (Moderate)	1,052	36	1,016	97%
Overall	1,210	52	1,158	96%

- 1.27 Using the treatment costs set out by the HHSRS Costs Calculator, we can calculate the potential savings for the NHS in not having to treat injuries caused by Category 1 hazards.
- 1.28 On this basis, Figure 5 identifies an overall potential cost saving of £922K per year, which is mainly associated with fewer Class I (Extreme) and Class II (Severe) incidents requiring treatment.

Figure 5: Potential reduction in incidents and costs from addressing Category 1 hazards (Source: West Dorset SCS 2013)

Hazard Outcome	Potential reduction in Incidents	Average treatment costs	Potential reduction in cost	
			£	%
Class I (Extreme)	6	£50,000	298,700	32%
Class II (Severe)	17	£20,000	343,600	37%
Class III (Serious)	119	£1,500	178,100	19%
Class IV (Moderate)	1,016	£100	101,600	11%
Overall	1,158	-	922,100	100%

- 1.29 The information summarised in Figure 4 and Figure 5 is presented in more detail in Figure 6, which provides a breakdown of the overall potential reduction in terms of the likely severity of those incidents which could be avoided given suitable intervention. It also provides a breakdown of the potential savings associated with each hazard.

^{1.30} Figure 7 then places this information alongside the breakdown of Category 1 hazard remedial costs that the Private Sector Stock Condition Survey established for each type of hazard. Using this information together, we can then establish the “payback period” for any housing intervention works in the context of savings in treatment costs.

Figure 6: Potential reduction in incidents and costs from addressing Category 1 hazards by hazard (Source: West Dorset SCS 2013. Note: Figures may not sum due to rounding, all calculations based on unrounded figures)

Category 1 hazard	Potential Reduction				Total Potential Reduction	Potential Savings £K
	Class I Extreme	Class II Severe	Class III Serious	Class IV Moderate		
Excess cold	4	1	2	5	11	212
Falls on stairs	2	7	15	44	67	248
Flames & hot surfaces	< 1	< 1	4	15	19	13
Damp & mould	< 1	3	29	257	289	142
Entry by intruders	< 1	< 1	19	192	212	52
Food safety	< 1	1	16	56	73	59
Falls on the level	< 1	1	5	4	10	35
Noise	< 1	1	6	59	65	28
Falls between levels	< 1	1	3	28	32	32
Personal hygiene	< 1	1	6	20	26	21
Water supply	< 1	1	5	49	54	23
Collision & entrapment	< 1	< 1	3	77	81	14
Carbon monoxide	< 1	< 1	2	101	103	13
Falls associated with bath	< 1	< 1	1	5	6	11
Domestic hygiene	< 1	< 1	1	88	89	12
Structural collapse	< 1	< 1	2	18	19	7
Total incidents	6	17	119	1,016	1,158	922

Figure 7: Category 1 hazard remedial costs by hazard (Source: West Dorset SCS 2013. Note: Figures may not sum due to rounding, all calculations based on unrounded figures)

Category 1 hazard	Dwellings with Cat 1 hazards	Total Cost of Interventions £K	Potential Savings on NHS Costs £K per year	Payback period years
Excess cold	6,660	16,860	210	79
Falls on stairs	2,220	730	250	3
Flames & hot surfaces	650	490	10	39
Damp & mould	580	790	140	6
Entry by intruders	550	220	50	4
Food safety	450	550	60	9
Falls on the level	430	90	40	2
Noise	200	120	30	4
Falls between levels	190	60	30	2
Personal hygiene	160	130	20	6
Water supply	160	160	20	7
Collision & entrapment	130	20	10	1
Carbon monoxide	110	110	10	8
Falls associated with bath	100	80	10	7
Domestic hygiene	80	50	10	4
Structural collapse	80	20	10	3
Overall	-	20,470	920	22

- ^{1.31} On the basis of this analysis, it would appear that investment in housing interventions to prevent falls (including falls on stairs, falls on the level and falls between levels) could each yield savings in treatment costs with payback periods of up to 3 years. Similarly, housing interventions associated with reducing the risk of hazards associated with entry by intruders and noise could also have a relatively short payback period (around 4 years). Other less prevalent hazards with relatively short payback periods include collision and entrapment, domestic hygiene and structural collapse.
- ^{1.32} The analysis shows that payback periods of up to 10 years would be likely for interventions associated with damp and mould and food safety, as well as less common hazards associated with personal hygiene, water supply, carbon monoxide and falls associated with bath.
- ^{1.33} Excess cold is the most common Category 1 hazard in West Dorset housing stock, affecting 6,660 dwellings – but with a total cost of £16.9M to improve these dwellings and potential savings in treatment costs of only £0.2M each year, this would imply an overall payback period of nearly 80 years. Of course, such investment could also yield other benefits – so this saving should not be considered in isolation.

Chapter 1 Summary

- » *The Housing Health and Rating System (HHSRS) considers a range of different hazards, and scores the likelihood of an incident occurring and the severity of the outcome to derive an overall Hazard Score based on the risk.*
- » *Hazard Scores of 1,000 and above are the most serious hazards, and these are known as Category 1 hazards.*
- » *The proportion of dwellings with at least one Category 1 hazard in West Dorset is just over 20% compared with 15% for England overall.*
- » *Category 1 hazards are more common in Privately rented dwellings (just over 25%) compared with owner occupied homes (20%).*
- » *Excess cold and falls on stairs are the most common forms of Category 1 hazard, as is the case nationally.*
- » *Based on the HHSRS scoring, around 1,200 incidents are likely to occur each year due to Category 1 hazards. With suitable housing interventions, this number of incidents could be reduced to around 50 per year.*
- » *Using costs from the HHSRS Costs Calculator, suitable housing interventions could reduce the treatment costs associated with incidents caused by Category 1 hazards by around £0.9 million per year in West Dorset.*
- » *The total cost of remedial works to alleviate just Category 1 hazards is £20.5 million, so the overall “payback period” for all intervention works would be around 22 years.*
- » *Housing investment to prevent falls (including falls on stairs, falls on the level and falls between levels) could each yield savings in treatment costs with payback periods of up to 3 years.*
- » *Improvements to damp and mould, food safety and personal hygiene could yield payback within 10 years.*
- » *The costs associated with treating excess cold is around £16.9 million and the payback period in the context of treatment costs would be nearly 80 years; however investment could also yield other benefits, so this saving should not be considered in isolation.*