

# 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
<b>Total all harms</b>	<b>320</b>	<b>100.0%</b>	<b>313</b>	<b>£ 752,900</b>

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.

- <sup>1.13</sup> 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.
- <sup>1.14</sup> 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
- <sup>1.15</sup> 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%).
- <sup>1.16</sup> 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).
- <sup>1.17</sup> 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
- <sup>1.18</sup> Given this context, for the Weymouth and Portland 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 Weymouth and Portland Stock Condition Survey identified that the overall proportion of dwellings with a Category 1 hazard was 18.5% compared with 14.7% found in the EHS 2012. This represents around 5,450 dwellings across Weymouth and Portland 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: Weymouth and Portland SCS 2013)

Category 1 hazard	Dwellings with Category 1 Hazards	
Excess cold	2,360	38%
Falls on stairs	1,180	19%
Damp & mould	600	10%
Falls on the level	530	9%
Falls between levels	240	4%
Collision & entrapment	210	3%
Entry by intruders	200	3%
Flames & hot surfaces	200	3%
Fire	190	3%
Food safety	160	3%
Crowding and Space	90	1%
Personal hygiene	90	1%
Falls associated with bath	60	1%
Operability of amenities	30	<1%
Carbon monoxide	0	0%
Domestic hygiene	0	0%
Electrical hazard	0	0%
Excess heat	0	0%
Explosions	0	0%
Lighting	0	0%
Noise	0	0%
Structural collapse	0	0%
Un-combusted fuel gas	0	0%
Water supply	0	0%
<b>Total hazards</b>	<b>6,140</b>	<b>-</b>
<b>Total dwellings with a Category 1 hazards</b>	<b>5,450</b>	<b>100.0%</b>

## Incidents caused by Category 1 Hazards

- <sup>1.21</sup> 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.
- <sup>1.22</sup> 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 2,360 dwellings with a 1 in 159 chance of an incident occurring; equivalent to 15 incidents each year (2,360 divided by 159 equals 15).
- <sup>1.23</sup> 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 15 incidents to 6 incidents each year, a potential reduction of 9 incidents.

**Figure 3: Incidents caused by Category 1 hazards by hazard (Source: Weymouth and Portland 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	2,360	159	15	380	6	9
Falls on stairs	1,180	24	49	245	5	44
Damp & mould	600	2	299	460	1	298
Falls on the level	530	26	20	135	4	16
Falls between levels	240	8	29	1690	0	29
Collision & entrapment	210	1	206	39	5	201
Entry by intruders	200	2	121	40	5	116
Flames & hot surfaces	200	14	14	180	1	13
Fire hazard	190	114	2	4760	0	2
Food safety	160	4	38	4960	0	37
Overcrowding	90	70	1	8000	0	1
Personal hygiene	90	4	21	7750	0	21
Falls associated with bath	60	12	5	4026	0	5
Operability of amenities	30	3	9	12925	0	9
<b>Total incidents</b>	-	-	<b>829</b>	-	<b>27</b>	<b>801</b>

- 1.24 The analysis demonstrates that the number of incidents resulting from across all Category 1 hazards could reduce from 829 incidents to 27 incidents each year, an annual reduction of 801 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 7 incidents to 2 incidents each year, an annual reduction of 5 incidents (68.2%); and the number of Class II (Severe) outcomes from 15 incidents to 1 incidents each year, an annual reduction of 13 incidents (91.3%).

**Figure 4: Outcome of Incidents caused by Category 1 hazards by severity (Source: Weymouth and Portland SCS 2012. 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)	7	2	5	68%
Class II (Severe)	15	1	13	91%
Class III (Serious)	96	4	91	96%
Class IV (Moderate)	711	20	691	97%
<b>Overall</b>	<b>829</b>	<b>28</b>	<b>801</b>	<b>97%</b>

- 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 £710K 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: Weymouth and Portland SCS 2012)**

Hazard Outcome	Potential reduction in Incidents	Average treatment costs	Potential reduction in cost	
			£	%
Class I (Extreme)	5	£50,000	237,300	33%
Class II (Severe)	13	£20,000	267,600	38%
Class III (Serious)	91	£1,500	137,200	19%
Class IV (Moderate)	691	£100	69,100	10%
<b>Overall</b>	<b>801</b>	<b>-</b>	<b>711,200</b>	<b>100.00%</b>

- 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.

<sup>1.30</sup> 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: Weymouth and Portland SCS 2012. 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	3	1	2	4	9	160
Falls on stairs	1	5	11	27	44	175
Damp & mould	< 1	3	30	264	298	146
Falls on the level	< 1	2	8	6	16	49
Falls between levels	< 1	1	3	25	29	27
Collision & entrapment	< 1	< 1	8	193	201	36
Entry by intruders	< 1	< 1	11	105	116	29
Flames & hot surfaces	< 1	< 1	3	10	13	9
Fire hazard	< 1	< 1	1	1	2	9
Food safety	< 1	1	8	28	37	30
Overcrowding	< 1	< 1	< 1	1	1	11
Personal hygiene	< 1	< 1	5	16	21	17
Falls associated with bath	< 1	< 1	< 1	4	5	9
Operability of amenities	< 1	< 1	1	7	9	6
<b>Total incidents</b>	<b>5</b>	<b>13</b>	<b>91</b>	<b>691</b>	<b>801</b>	<b>711</b>

Figure 7: Category 1 hazard remedial costs by hazard (Source: Weymouth and Portland SCS 2012. 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	2,360	6,340	160	40
Falls on stairs	1,180	1,330	180	8
Damp & mould	600	1,990	150	14
Falls on the level	530	130	50	3
Falls between levels	240	90	30	3
Collision & entrapment	210	30	40	1
Entry by intruders	200	80	30	3
Flames & hot surfaces	200	150	10	18
Fire hazard	190	220	10	26
Food safety	160	190	30	6
Overcrowding	90	440	10	40
Personal hygiene	90	70	20	4
Falls associated with bath	60	40	10	5
Operability of amenities	30	10	10	1
<b>Overall</b>	-	<b>11,120</b>	<b>710</b>	<b>16</b>

- <sup>1.31</sup> On the basis of this analysis, it would appear that investment in housing interventions to prevent 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 collisions and entrapment, entry by intruders, personal hygiene and operability of amenities could also have relatively short payback periods too.
- <sup>1.32</sup> The analysis shows that payback periods of up to 10 years would be likely for interventions associated with falls on stairs and (affecting 1,180 properties), as well as less common hazards associated with food safety, and falls associated with bath. A payback of up to 15 years would be expected in relation to interventions relating to damp & mould growth.
- <sup>1.33</sup> Excess cold is the most common Category 1 hazard in Weymouth and Portland's housing stock, affecting 2,360 dwellings – but with a total cost of £6.3M to improve these dwellings and potential savings in treatment costs of only £0.2M each year, this would imply an overall payback period of 40 years. Of course, such investment could also yield other benefits – so this saving should not be considered in isolation.
- <sup>1.34</sup> The other Category 1 hazards identified all had longer payback periods – 18 years for flames and hot surfaces and 26 years for fire hazards. Of course, hazards associated with fire are often the focus for improvement works given the possible severe outcomes – but even in properties where Category 1 hazards were identified, the risk of fire breaking out is still relatively low and therefore the annual treatment costs are significantly lower than for incidents caused by other more common hazards.

### 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 Weymouth and Portland is just under 19% compared with 15% for England overall.*
- » *Category 1 hazards are more common in privately rented dwellings (just over 24%) compared with owner occupied homes (16%).*
- » *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 830 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 30 per year.*
- » *Using costs from the HHSRS Costs Calculator, suitable housing interventions would reduce the treatment costs associated with incidents caused by Category 1 hazards by around £0.7 million per year in Weymouth and Portland.*
- » *The total cost of remedial works to alleviate just Category 1 hazards is £11.1 million, so the overall “payback period” for all intervention works would be around 16 years.*
- » *Housing investment to prevent falls on the level, falls between levels, collision and entrapment and entry by intruders could each yield savings in treatment costs with payback periods of up to 3 years.*
- » *Improvements to food safety and fall on stairs could yield payback in up to 10 years.*
- » *The costs associated with treating excess cold is around £6.3 million and the payback period in the context of treatment costs would be around 40 years; however investment could also yield other benefits, so this saving should not be considered in isolation.*