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The UK's Housing Health and Safety Rating System:
where are we now, and where are we going

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INTRODUCTION

The Housing Health and Safety Rating System (HHSRS) has introduced an evidence based risk assessment approach to assessment of housing condition, and enables housing hazards to be ranked in order of seriousness both within a dwelling, and between dwellings. It was developed by the University of Warwick in collaboration with the Building Research Establishment (BRE), and is the intended replacement for the current minimum standard of fitness for human habitation at section 604 of the Housing Act 1985, as amended. Version 1 of the HHSRS has been introduced as a nationwide pilot of the system, and the Office of the Deputy Prime Minister (ODPM) has now commissioned the Safe and Healthy Housing Research Unit at University of Warwick to Develop Version 2.

WHERE ARE WE NOW

Version 1 of the HHSRS was introduced with Guidance (DETR 2000a), and accompanying software for handheld computers (DETR 2000b), thirty two months ago. This period has enabled practitioners to put the system on trial, and provide feedback for further development. However, primary legislation needs to be introduced before the HHSRS can be used as a replacement for the current minimum standard.

The HHSRS is a means of assessing the potential effect of housing faults (whether these be design defects or the result of deterioration) on the health and safety of occupants and their visitors. Risk assessment is used to evaluate faults identified by the survey of a dwelling. Only those hazards which can be controlled wholly, or at least in part, by the owner (or landlord), rather than the occupier, are considered for rating. Housing hazards which are not within the control of the owner are not considered by the HHSRS. For example, the hazard of tobacco smoke is not considered. This stems from the intention that the HHSRS will replace the current minimum housing fitness standard, which is enforced against dwelling owners, rather than occupants. The hazards considered by the HHSRS are listed at Table 1.

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Earlier research carried out by the BRE with assistance from the

Table 1 Potential Housing Hazards

- a. Hazards associated with Excessive Indoor Temperatures, including from Excessive Cold and Excessive High Temperatures
- b. Fall Hazards including Falls on Stairs, Steps or Ramps, Falls on the Level, Falls between Levels, Falls involving Windows or from Balconies and Landings, and Falls associated with Baths etc
- c. Hazards from Fire
- d. Hazards associated with Hot Surfaces and Materials
- e. Hazards associated with Damp and Mould Growth etc
- f. Hazards from Carbon Monoxide etc including from Oxides of Nitrogen, Sulphur Dioxide, Volatile Organic Compounds, and Biocides
- g. Hazards from Radiation
- h. Electrical Hazards
- i. Hazards from Noise
- j. Hazards from Lead
- k. Hazards from Asbestos and Other Particulates
- l. Hazards associated with Entry by Intruders
- m. Hazards associated with Crowding and Space
- n. Hazards from Explosions
- o. Hazards associated with Domestic Hygiene including associated with Pests, with the Design, Construction and Maintenance, and the Storage and Disposal of Household Waste
- p. Hazards from Inadequate Provision for Food Safety
- q. Hazards associated with Inadequate Provision for Maintaining Personal Hygiene
- r. Hazards associated with Inadequate Sanitation or Drainage
- s. Hazards from Contaminated Domestic Water
- t. Hazards from Structural Failure
- u. Hazards from Inadequate Lighting
- v. Hazards from Uncombusted Fuel Gas
- w. Entrapment and Collision Hazards
- x. Hazards from Poor Ergonomics

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University of Warwick (Cox et al 1995, Raw et al 1995), and commissioned by the then Department of the Environment (DoE), identified all housing hazards which exist in UK housing, their effects on health, the numbers of people who are affected annually, and the seriousness of their ill-health or injury. For the first time it allowed hazards in English housing to be put in rank order of seriousness.

The DoE also commissioned the University of Warwick to research the effectiveness of the current minimum standard of fitness for human habitation at section 604 of the Housing Act 1985, as amended (LRI 1998). By reference to the two earlier BRE reports (Cox et al 1995, Raw et al 1995), it was demonstrated that the current minimum standard does not address the most serious hazards that exist in UK housing, and the proposal was made for the development of a rating system.

The main advantages of the HHSRS over the existing fitness standard are -

- All housing hazards are addressed
- There is a grading of housing conditions, through a spectrum of those which are dangerous through to those with only minor hazards – unlike the fitness standard where properties fall either side of a line: as fit, or unfit. As a result the HHSRS will allow better targeting of action and resources
- The *effect* of housing conditions on occupants' health and safety is the prime consideration, rather than the condition of the building and what is provided
- There is potential to apply a progressively higher standard as conditions improve and expectations rise
- Decision making on housing conditions is made on the basis of current evidence available on housing hazards, and the requirement for evidence provides a focus for health and safety research and development
- There is potential to modify and update the system as new evidence on health and safety risks becomes available

In 1998 the (then) Department of the Environment, Transport and the Regions (DETR) commissioned the University of Warwick, in collaboration with the BRE, to develop the HHSRS. Work on Version 1 was complete in 2000, and a report on the development work was published (DETR 2000c).

Criteria for application of the HHSRS

In common with other risk assessment procedures the HHSRS considers the likelihood of exposure to a hazard, balanced with the

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severity of outcome that can result from exposure. The time period for assessment of risk is twelve months.

Risk assessment based on age group most vulnerable

Each hazard is considered on the assumption that the age group most vulnerable to the hazard is exposed to it. For example, statistically, elderly people are more likely to fall on stairs, and when they fall their injuries are worse than any other age group. Thus, when the hazard of falls on stairs is considered, the likelihood of an occurrence (the likelihood of a fall) and the possible health outcome(s) which could result, are assessed on the assumption that the dwelling is occupied by elderly person(s).

By adopting this approach, rather than carrying out the rating for current occupants, dwellings with similar hazards will be rated similarly, and vacant dwellings can be assessed. In addition, if the risk assessment is carried out for the most vulnerable age group, then if a dwelling is judged to be free from serious hazards, it will be safe for all ages that might occupy it in the future.

The formula and expression of hazard ratings

To allow a numerical score to be attached to a hazard rating, the likelihood of exposure to a hazard, and the health outcome that could result from exposure, are both expressed numerically.

Numerical expression of likelihood

The likelihood is expressed as a probability or ratio (considered over a 12 month period).

Numerical expression of health outcome

To allow comparison of the very different health outcomes that can result from exposure to different housing hazards a method was devised to classify health outcomes (or harms), and then weightings were assigned to introduce a numerical basis for expression of the health outcomes (Raw 2000). This method of classifying harms allows, for example, migraine to be equated with the loss of a finger, or serious fractures to be equated with serious burns. Four classes of harm are considered by the HHSRS, and each are assigned a weighting, to reflect the degree of incapacity suffered. The classes of harm, examples of injuries and health conditions included in each class, and the weighting attached, are given at Table 2.

The formula

Because there are a number of possible outcomes which can result from exposure to most hazards, the percentage spread of harm expected to result from exposure to a hazard is included in the formula, together with the class of harm weightings, and the

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likelihood of an occurrence (expressed as a probability). A worked example of the HHSRS formula is given at Table 3.

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Table 2 - Classes of Harm with Examples and Weightings

Class of Harm	Examples of Harm	Weighting
I Extreme	Death, permanent paralysis below the neck, malignant lung cancer, regular severe pneumonia, permanent loss of consciousness, and 80% burn injuries.	10,000
II Severe	Chronic confusion, mild strokes, regular severe fever, loss of a hand or foot, serious fractures, very serious burns and loss of consciousness for days.	1,000
III Serious	Chronic severe stress, mild heart attack, regular and persistent dermatitis, malignant but treatable skin cancer, loss of a finger, fractured skull, severe concussion, serious puncture wounds to head or body, severe burns to hands, serious strain or sprain injuries and regular and severe migraine.	300
IV Moderate	Occasional severe discomfort, chronic or regular skin irritation, benign tumours, occasional mild pneumonia, a broken finger, sprained hip, slight concussion, moderate cuts to face or body, severe bruising to body, 10% burns and regular serious coughs or colds.	10

Table 3: Example of Hazard Score Formula, HHSRS Version 1

Class of Harm	Weighting	Likelihood		Spread of Harm (%)		
I	10,000	100	X	0	=	0
II	1,000	100	X	10	=	100
III	300	100	X	30	=	90
IV	10	100	X	60	=	6
		Hazard Rating			=	196

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Hazard bands

Hazard scores are grouped into hazard rating bands, given at Table 4. This prevents too much emphasis being placed on hazard scores, which, when generated using the Survey Programme (DETR 2000b), are an indication of what is an approximate assessment of the risk. There are a limited number of options for selection of likelihood and spread of harms offered by the Survey Programme: sixteen options for likelihood, ranging from 1:10,000 to 1:1; and twelve options for each class of harm percentage, ranging from 0%, then 0.1%, to 100%; both on roughly logarithmic scales. Users select the likelihood and spread of harms with the closest fit to conditions observed.

Table 4: Hazard Rating Bands and Scores

Score	Rating Band
5,000 or more	A
2,000 – 4,999	B
1,000 – 1,999	C
500 – 999	D
200 – 499	E
100 – 199	F
50-99	G
20-49	H
10-19	I
9 or less	J

Assessment of risk

Statistical evidence of the risk posed by home hazards nationally is used to inform the decision making process in scoring hazards.

The statistical evidence for HHSRS Version 1 was prepared by the BRE. In order to assist in the assessment of likelihoods and

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possible outcomes from exposure to the various housing hazards, evidence on the potential for harm from each housing hazard was gathered. This involved consideration of a number of data sources, including the Home Accident Surveillance System (DTI 1999), the Home Accident Death Database (DTI 1994) and the 1995 English House Condition Survey (DoE 1998). This enabled the determination of the vulnerable age group (if any) for each hazard, calculation of the average spread of harms suffered by the vulnerable group, and the statistical averages for the likelihood of an occurrence in all English housing, and also in pre 1919 and post 1980 housing.

Average hazard scores and bands were calculated for each hazard category using the HHSRS formula. However, it is important to note that the base group of property considered for the HHSRS Version 1 statistics varies by hazard, such that the averages given do not necessarily reflect the average in the total stock, or in all pre1919 or post 1980 housing. For example, the base group considered for the hazard of falls on stairs is the population of people living in dwellings with stairs or stairs to the normal access to the dwelling; and the base group considered for the hazard of damp and mould growth etc is the population of people living in dwellings that are damp or have defective ventilation or heating.

Practical application of the HHSRS

The HHSRS has several potential applications, including –

- To identify individual dwellings with unsatisfactory conditions for enforcement action purposes or in the assessment of allocation of grant aid
- To determine the standard to be attained in carrying out works as a result of enforcement action or grant aid
- To measure housing condition in terms of health and safety as part of local or national house condition surveys

For any of these applications the survey technique is similar to that adopted in other dwelling condition inspections or surveys. The survey method involves identifying faults with the building (both design faults and those resulting from disrepair), in much the same way as in other condition surveys. Once the survey is complete, the surveyor considers the faults, and which hazards result from them, and then scores each hazard at the property. Only significant hazards will be scored, and each hazard category is scored once only at a dwelling. If there is little risk to health resulting from a hazard, then an experienced surveyor will recognise this and not score.

Software (DETR 2000b) for use on handheld computers was

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developed to allow survey data to be captured electronically on site, with a separate section for scoring, with the HHSRS formula incorporated to allow ready scoring of hazards. .

It is not essential to use the survey programme in order to carry out the HHSRS survey and score hazards. Some users prefer to record the faults (or defects) as they have done previously (on paper or with a Dictaphone), and use the Survey Programme for scoring only. Paper based assessment of hazards is also possible, and was used for five hazards measured by the 2001 English House Condition Survey (EHCS).

The scoring section of the Survey Programme is interactive and allows the user to enter different likelihoods and spreads of harms for each hazard, and to see at a glance how altering the average likelihood and harm affects the score band result. Behind the interactive screen the programme calculates the score and band using the HHSRS formula. For each hazard the programme shows, for the vulnerable group, the average likelihood in pre 1919, post 1980, and all English housing. It also shows the average percentage spread of the four classes of harm for members of the vulnerable group who suffer ill-health or injury as a result of exposure to the hazard. In scoring the surveyor assesses how hazards at the dwelling in question deviate from the averages given.

The application of the HHSRS requires that each hazard present at a dwelling be scored once only. It is usual procedure when scoring to make a note of all faults identified in the survey which contribute to the hazard in question. It is the cumulative effect of all dwelling faults which contribute to a hazard that are considered. For example, if there is damp in three rooms of a dwelling, the "damp and mould growth" hazard is scored just once, considering the cumulative effect of damp in the three rooms. Similarly, if there are two flights of internal stairs, and outside steps to a dwelling, then for the hazard of "falls on stairs" the cumulative risk from all three flights are considered when scoring.

In addition to the averages given in the Guidance, and replicated on the Survey Programme scoring screen, the DETR published a series of Worked Examples (DETR 2001a), which demonstrate the scoring of hazards. Surveyors can refer to these examples to assist with scoring.

WHERE ARE WE GOING

The Office of the Deputy Prime Minister (ODPM) has now commissioned the University of Warwick to develop Version 2 of the

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HHSRS. Also, the ODPM intends to publish three research reports that followed the release of Version 1. The first is an evaluation of the HHSRS Version 1 and associated software, work carried out by DTZ Pieda Consulting, which involved a large scale survey of local authorities in England and Wales. The second is a report, by the BRE, on the application of the HHSRS to Houses in Multiple Occupation (HMOs). The third is updated statistical evidence to support the HHSRS, prepared by University of Warwick and the London School of Hygiene and Tropical Medicine (LSHTM). These three reports will shape the development of Version 2 of the HHSRS. The brief from the (then) Department of Transport, Local Government and the Regions (DTLR, now ODPM) for each of the three projects was that the underlying principles of the HHSRS are considered to be sound, including the formula for calculating the hazard scores. Radical changes to the HHSRS are therefore not expected when Version 2 is developed. However, there will be improvements.

Software

A number of criticisms have been made of the Survey Programme, mainly relating to items missing from drop down lists, and also in relation to recording of HMO survey data. Some surveyors simply prefer using pen and paper on site. As a result many HHSRS users choose to record survey data on paper, using the survey programme for scoring only. Problems are also experienced with uploading data and its manipulation on PCs, a data transfer and handling programme not having been released specifically for the purpose with Version 1. As a result, the ODPM is reviewing the approach to software, and a paper-based alternative is to be developed as part of Version 2.

The minimum standard, enforcement, and scoring decisions

The intention for the HHSRS remains as a replacement for the current minimum standard of fitness for human habitation found at section 604 of the Housing Act 1985, as amended. As it stands the HHSRS is not itself a minimum standard. However, if a maximum acceptable hazard score is determined, then the HHSRS can be applied as a standard. An enforcement regime for the standard can then be set around this score.

It is anticipated that the forthcoming draft Housing Bill, expected March 2003, will include proposals for legislation to introduce the HHSRS as the minimum housing standard.

There has been consultation (DETR 2001b) on a suggested enforcement regime, and the main proposals were -

- For hazards scoring 1,000 or more it would be mandatory for

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the local housing authority to consider the most appropriate action to deal with the hazard

- Whether a member of the vulnerable group is in current occupation to be considered in determining the most appropriate action

The options for legal notices/action proposed were -

- Prohibition notice, to prevent use of the premises, or part of the premises
- An improvement notice, to carry out works to negate the hazard
- A suspended prohibition or improvement notice (possibly an option where the current occupants are not members of the vulnerable group)
- Hazard awareness advice, not requiring any action, but advising of the hazard and its seriousness (this might be the only option where there are other legal considerations, for example where a building is listed preventing alteration of architectural features)

The consultation paper (DETR 2001b) suggested that the proposed enforcement regime should not extend to local authority owned housing. This follows the present situation with the current fitness standard, where local authorities cannot enforce against themselves. However, the HHSRS is to be applied as a measure of the state of public sector housing through the Decent Home Standard (ODPM 2002). A "decent home" is one which meets all of the following criteria:

- it meets the current statutory minimum standard for housing (currently the fitness standard, but set to be replaced by the HHSRS)
- it is in a reasonable state of repair
- it has reasonably modern facilities and services
- provides a reasonable degree of thermal comfort

The government target (DETR and DSS 2000) is that all social housing (broadly local authority and housing association housing) should be "decent" by 2010, and that the number of households living in non-decent housing should be reduced by a third between 2001 and 2004. The HHSRS will not have replaced the fitness standard before the 2004 target date. However, it is expected to have been introduced and be part of the assessment for the overall target in 2010. The Decent Home Standard will be measured through the EHCS, which is now being conducted as a rolling programme, rather than at the previous five yearly intervals, to allow assessment of progress with targets to be made. Although no

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specific targets have been set for the Decent Home Standard in the private sector, the standard will be monitored in the private sector as well as in social housing through the EHCS.

The results from the consultation on enforcement of the HHSRS (DETR 2001b) have not been published, and it is therefore not possible to anticipate the extent to which the proposals might be adopted. However, the Evaluation of Version 1 of the HHSRS conducted by DTZ Piedad Consulting (as yet unpublished) identified enforcement as one of the key concerns raised about the HHSRS. Officers involved in regulation of housing standards (Environmental Health Practitioners) raised concerns over a lack of confidence in being able to justify to a Court their decisions on likelihoods and percentage spread of harms, and the hazard scores and bands resulting from those decisions. The ODPM is reviewing the Guidance to address this issue in Version 2. However, if there is a discretionary power to take action on hazards with scores below the threshold for mandatory consideration of the most appropriate action, then a focus on the rating band or score selected will be less relevant to grounds for appeal against enforcement action.

The availability of more statistical information on averages in Version 2 is also expected to increase the confidence of users of the system. Average likelihoods and spread of health outcomes for the vulnerable group for each hazard could be given for five age ranges of housing: pre 1920, 1920-1945, 1945-1979, post 1980, and mixed ages. Also separate statistics could be given for HMOs or flats

For Version 1 of the HHSRS, average likelihoods were given for each hazard, but the number of dwellings used as the base differed for each hazard, as discussed earlier. The adoption of different bases for each hazard has been criticised and was a cause of confusion for some users. This has been reviewed in the work on refining and updating the statistical evidence that will support Version 2.

Combination of hazard bands/scores

As it stands, there is no means of assessing the combined risk from a number of hazards. The Version 1 Guidance (DETR 2000a) advises that hazard scores should be considered individually, and priority given to dwellings with the highest individual hazard score bands. It seems inappropriate to simply add hazard scores to achieve an overall dwelling score, because the figures used to generate a hazard score include a probability (the likelihood). However, determination of a method for calculation of the combined risk from a number of hazards is appropriate, because clearly there is a greater risk of harm if there are two hazards at a dwelling than

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one, whether those hazards are related or not.

Some hazards are distinct, and the increased risk from multiple hazards is not associated with the effect of one hazard on another. For example, a hazard associated with inadequate sanitation or drainage would not usually increase the hazard of falls on stairs. However, there is a greater risk of some harm to health occurring with both hazards present than with just one.

Conversely, there are some hazards which when found together will result in a more serious outcome than if either were present in isolation. The presence of the two hazards producing a "cocktail effect", with one hazard increasing the effect of another. For example, the effect of the hazard of cold is aggravated by the presence of the hazard of damp and mould.

If a method is to be developed to consider the combined risk from hazards, then the system must take account of related hazards as well as distinct hazards, either when the individual hazards are scored, or when the multiple hazards are combined.

Timetable for introduction of Version 2 HHSRS

Approval of legislation introducing the HHSRS as the minimum housing standard with an associated enforcement regime is expected in early 2004 (dependent on progress of the anticipated draft Housing Bill through Parliament). Development of Version 2 will clearly have to be complete in advance of the legislation, when it is anticipated that the improved statistical information, together with improved Guidance and updated and extended Worked Examples, will result in the HHSRS being more user friendly.

Further ahead in the future

Statistics

The scope for increasing the information provided by statistical evidence for the HHSRS is vast. In the future, with improvements in the quantity and quality of data collected, statistical analysis could allow average likelihoods and spreads of harms to be given by, for example, dwelling construction type, and even by post code. Wider analysis of data might allow likelihoods and spread of harm outcomes for other age groups as well as the vulnerable group to be provided. This would be particularly relevant if the proposal for enforcement of the HHSRS dependent on current occupants (DETR 2001b) were adopted.

Further research

The assessment of the likelihood of an occurrence and the spread of harms resulting from exposure to a hazard is not solely based on consideration of statistical averages. Another element of the

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decision making process is determination of how existing conditions might affect health, and which dwelling features in particular are important in health terms. Identification of dwelling features most relevant to health outcomes are not only important for scoring, but also for determination of action appropriate to ameliorate hazards. Development of the HHSRS involved collation of available information on dwelling features which increase or reduce hazards, and some research was carried out specifically for Version 1 of the HHSRS, resulting in the Version 1 Guidance (DETR 2000a) including relevant dwelling features to consider as part of a survey. Further research in this area is necessary, and as more information becomes available it should further inform judgements made by users of the system. One area where information is lacking in particular is the relationship between dwelling condition and mental health.

International development

It is entirely feasible that the HHSRS could be adapted for use in other countries. The approach adopted with the HHSRS would be applicable, but the risk from individual hazards might differ dependent on climate, geography, and the local building vernacular (Ormandy 2002). Statistical evidence relevant to local conditions would need to be obtained. For example, the hazard of excessive cold, which is the most prevalent housing hazard in the UK, would be of little significance in countries nearer the equator.

As housing conditions improve there will be fewer cases of injury to health resulting from each hazard, making assessment of serious hazards less easy, since it is the consideration of the average likelihoods and spread of harms which assist the surveyor in scoring hazards. It may be that statistics gathered relating to conditions in other countries could be useful to inform the risk assessment in the UK. For example, since water closets have become virtually universal in dwellings in the UK, the risks associated with inadequate provision for sanitation is difficult to quantify. This has been one of the areas where few statistics are available, and the average statistics provided to inform scoring judgements become less reliable. If this information was gathered in countries where sanitation and drainage facilities are not universal, then these could be used to better inform judgments in the UK when occasional instances of poor sanitation arise.

Policy development

The evidence base generated by the development of the HHSRS, and also the information on the state of housing which will result from use of the system, has enormous potential for shaping housing policy; and in turn, the HHSRS can be used itself as a measure of

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the impact of policy.

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