A Warrant of Fitness to Improve Housing Quality for Child Safety

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Preface

This report is a review of the proposed legislation for a warrant of fitness (WOF) for rental housing. This initiative was initially suggested in 2007, following the media release of Professor Howden-Chapman's article on cold housing and poor health in children [1]. It has come up again with the publication of the recent 'Solutions to child poverty in New Zealand' report commissioned by the Children's Commissioner in August 2012 [2].

The report briefly outlines the settings of preventable child injuries and reviews the value of a WOF for rental houses in New Zealand. It investigates the success or otherwise of this type of initiative in other countries, reviewing the scientific literature and expert opinion from various perspectives.

There are different outlooks on the concept of a WOF. There is considerable support from the public health sector for a housing WOF. Those who support the proposal cite its potential to reduce health disparities in New Zealand [2], and help address the known social gradient for unintentional child injuries [3, 4]. It is likely a WOF for rental houses would also benefit age groups other than children. Regardless of the outcome of this review, a critical analysis is necessary and timely as unintentional child injury is a major health problem in New Zealand. Possible barriers to implementation, likely level of effectiveness, and potential unwanted consequences also need to be examined. For example, concerns have been expressed regarding potentially high initial costs and practicality [5].

The report presents whether using this intervention can reduce early childhood injury. It is intended that this work will contribute to the Children's Commissioner's work in finding solutions for poor quality housing, and thereby reduce rates of preventable injuries in children.

1 Introduction

Housing quality affects safety at home. Children, especially those in early childhood, are a sector of our population who have no say in their housing conditions, but who are injured living in poor quality housing [6, 7]. The United Nations Convention on the Rights of the Child (UNCROC) human rights treaty, which New Zealand has committed to uphold, states that all children have the right to a safe home, and it is our responsibility to protect children around the world [8]. Yet, those under five years of age in New Zealand have a higher rate of home injury than older children [7]. These children spend most of their time at home, a place we expect to be safe, and so this report focuses on a strategy many hope will reduce unintentional injury in this vulnerable age group.

Finding feasible and sustainable solutions to poor quality housing offers long-term improvement for child health and safety. In their report "Solutions to Child Poverty" for the New Zealand Office of the Children's Commissioner (OCC), the Expert Advisory Group on child poverty proposed a number of strategies to current policy settings to improve housing for New Zealand families and their children. One of these was to "regulate the quality of rental accommodation using a mandatory Warrant of Fitness" [9]. The Office of the Children's Commissioner in New Zealand is not the first agency to propose a housing WOF for rental housing. Professor Philippa Howden-Chapman's research programme on healthy housing in New Zealand generated discussion on the concept [1] and further work has been undertaken by her colleagues as part of that programme [10, 11]. Internationally, the World Health Organization (WHO), UNICEF, European and the Child Safety Alliance (Eurosafe), have also investigated similar strategies to reduce the incidence of unintentional child injury [2, 9, 12, 13].

Reviewing the use of a housing WOF as an intervention for improving quality of rental housing, this report seeks to add to the growing body of knowledge on this strategy. While there is a strong case of a WOF to address health issues including infectious and respiratory disease [1], the focus here is on intentional injuries, such as: falls, poisoning, burns and scalds, cuts and piercings, and drowning. Unintentional injury is an economic and social burden. In 2008, the cost of injury to ACC was $146.6 million [14]. How much of this cost was incurred by 0-4s at home is not easily identified but home injury among the 0-4s is a considerable proportion of child injury. This report considers the potential ability of the WOF to reduce childhood unintentional injury in the New Zealand home, in light of the common injuries among preschool aged children that are related to the physical environment.

Why do we need a home-based intervention?

As a whole, New Zealanders seem to perceive the home to be a lot less hazardous than current research might suggest. The New Zealand Injury Prevention Survey (NZIPS) 2009 results show that people's perception of risk does differ between locations of injury. Although this study was a cross-sectional study of 1,000 representative adults across New Zealand, results are still informative. A total of 69% of respondents perceived the road to be the most risky place for injury, and home to be the least risky place for injury (56%). In contrast, official statistics highlight that the home accounts for far more injury-related claims than the road [15, 16]. Transport injuries receive the highest level of government investment, because of high rates of fatality and injury but, nonetheless, home-based injuries can still be severe, and nationwide interventions to reduce injury in the home are required.

A home-based intervention should focus on rental properties, as they are more likely to be substandard than owner-occupied houses [17]. Compared to other OECD countries, New Zealand has low proportions of social and community housing. Consequently, a disproportionate number of low-income families must live in private rental housing, while they remain on waitlists for social housing through Housing New Zealand [18]. Private rental housing is largely unregulated, is of poorer quality than other tenures, and offers little security of tenure [2]. For these reasons it is important for a housing intervention to address both private rental housing as well as social housing sectors.

Structure of the report

Following the description of the method, the subsequent sections of this report examine the following:

2. **Child unintentional injury at home,** with a summary of epidemiological data on early childhood unintentional injury in the home setting is presented.
3. **Warrant of Fitness for housing** summarises what a WOF would do.
4. **Relevant New Zealand legislation and standards,** covering key legislation and standards to reduce home-based injury currently in place in New Zealand.
5. **Relevant overseas legislation and standards** which reviews key legislation and standards to reduce home-based injury that are currently in place overseas, with a focus on Scotland, England, Australia, Canada, USA, and Sweden.

6. **Components of a WOF for rental housing to reduce child injury in the home** which contains a list components of a WOF that would be required to reduce the risk of unintentional childhood injury in the home.
7. **Strengths and limitations of a warrant of fitness for rental houses:** This section discusses the pros and cons of a WOF for rental houses beginning with a public health viewpoint and comparing this with those of tenants and landlords. Potential barriers for the implementation of a WOF for rental houses are also discussed.
8. **Recommendations:** This section reflects on the available evidence on utilising a WOF for rental houses to reduce unintentional injury of children in the home and makes recommendations for future action.

Methods

The research questions underpinning this review arose from the interest in the concept of a housing WOF in the New Zealand context. Two questions were asked:

1. What are the strengths and limitations of a WOF for rental housing in New Zealand? In particular, could a WOF of rental housing reduce the incidence of unintentional child injury?

2. Are there other potentially effective strategies to improve the quality of rental housing?

To answer these questions a review was undertaken of the legislative provision of a WOF for all rental housing. The success or otherwise of this type of initiative in other countries was investigated by reviewing the scientific literature and expert opinion particularly for child injury prevention but also from various backgrounds including (but not limited to) social work, legislation, health economics, and public health.

This involved:

1. Reviewing the injury literature for a WOF using Ovid, Cochrane Library, Scopus, and Science Direct with keywords: Warrant of Fitness, audit, housing quality, safety check, housing inspection, and related words.
2. Reviewing existing references lists from identified articles.
3. Consulting people working in child injury prevention and/or housing quality fields.
4. Investigating the 'grey' literature for government reports and legislation.
5. Undertaking Google searches and visiting legislative websites for various countries

2 Child injury and the home

In New Zealand, on average, nearly two (1.6) children die from an unintentional injury each week (2001-2005), and 226 children suffer an unintentional injury severe enough to be admitted to hospital (2003-2007) [14]. New Zealand's rates of child injury compare poorly to other OECD countries. A UNICEF study ranked New Zealand 22 out of 26 OECD countries with a child fatality rate of 13.7 per 100,000. Sweden led the table with child fatality rate of 5.2 [19].

Injuries are the leading cause of death in children aged 0-4 years [20, 21], and a leading cause of hospitalisation in New Zealand [7] and in many other countries [22, 23]. Although children aged 0-4 years only make up 32% of New Zealand's 0-14 year olds [24], they have disproportionally high rates of injury. Between 1988 and 2011, the reported crude age-specific hospitalisation rate from injury was 1,193.8 per 100,000 0-4 year olds, and the mortality rate from injury was 21.1 between 1988 and 2009 [25]. Moreover, over half of all injury hospitalisations and death among 0-4 year olds occurs in the home [6]. Unintentional injury in the home is still much more common in 0-4 year olds than in older children (5-9 years or 10-14 years) [20, 21, 26]. Young children are particularly vulnerable to injury in the home as they spend an average of approximately 90% of their time at home [2, 27].

Tables 1 and 2 show the causes of home injury resulting in death or hospitalisation for children aged 0-14 years. Fire, suffocation and drowning are the leading causes of mortality in the home for children aged 0-4 years. The most common types of unintentional injury in the home resulting in hospitalisation are falls, poisoning, burns and scalds, cuts and piercings, drowning, and suffocation. Males have consistently higher rates of injury than females [7]. Most of these injuries are considered preventable, and modifications to the physical environment have improved safety for some causes [28]. However, the chain of events leading to an injury are complex, multifaceted and involve physical and social environments as well as human interaction [6, 29].

Data indicate that unintentional injuries in the home occur more frequently in more deprived areas [13, 30, 31]. One of the influential factors noted in global reports is that parents in poorer households may not be able to properly care for, and supervise, their children if the parents are at work or are unwell, and the children may need to be left alone or in the care of siblings [13].

A socioeconomic gradient has been identified from New Zealand's data. This further compounds the high rate of child injury in New Zealand indicated in comparative reports on child injury [32]. The Children's Social Health Monitor notes that "In New Zealand, there are currently large disparities in child health status, with Māori and Pacific children and those living in more deprived areas experiencing a disproportionate burden of morbidity and mortality" [31]. Hospital admission data show a very strong socioeconomic gradient for almost all causes of child unintentional injury [4]. This may be because children living in poverty may be exposed to hazardous environments, including: lack of space and facilities for safe play, cramped living conditions in disrepair, unprotected windows and house roofs, and stairs without handrails [13].

In addition, both injury admissions and mortality from injuries with a social gradient were consistently higher for Māori compared with European/other, and rates for Pacific children were variable [31]. Although injury admission data show that rates of admission to hospital have declined for all ethnic groups between 2000-2011, the rate of decline was faster for European/other than it was for Māori and Pacific children.

Table 1: Deaths from unintentional injury in the home in children aged 0-14: 1995 to 2009 in New Zealand * [33]

External Cause		0-4 years		5-9 years		10-14 years	
Major	**Minor**	**Number of Deaths**	**Crude Rate (per 100,000 persons)**	**Number of Deaths**	**Crude Rate (per 100,000 persons)**	**Number of Deaths**	**Crude Rate (per 100,000 persons)**
Drowning		94	2.01	2	0.04	.	.
Fall		11	0.23	2	0.04	2	0.04
Fire/hot object or substance	Fire/flame	50	1.07	27	0.57	12	0.25
	Hot object/substance	5	0.11	.	.	.	.
Firearm		.	.	.	.	2	0.04
Motor vehicle traffic	Occupant	2	0.04	.	.	.	.
	Pedestrian	1	0.02	.	.	.	.
Natural/Environmental		1	0.02	.	.	1	0.02
Other land transport		2	0.04	3	0.06	3	0.06
Pedal cyclist, other		1	0.02	.	.	.	.
Pedestrian, other		29	0.62	5	0.11	.	.
Poisoning		4	0.09	1	0.02	10	0.21
Struck by or against		7	0.15	.	.	1	0.02
Suffocation		274	5.85	5	0.11	21	0.44
Other specified		4	0.09	1	0.02	4	0.08
TOTAL		**485**	**10.36**	**46**	**0.98**	**56**	**1.18**

*Deaths on the NZ Coronial Register that were registered 1995 – 2009 with an unintentional intent, and where the scene of injury was at home.

Table 2: Hospitalisations from unintentional injury in the home in children aged 0-14: 1997 to 2011 New Zealand Public Hospital Injury Discharges* [33]

External Cause		0-4 years		5-9 years		10-14 years	
Major	**Minor**	**Number of Hospitalisations**	**Crude Rate (per 100,000 persons)**	**Number of Hospitalisations**	**Crude Rate (per 100,000 persons)**	**Number of Hospitalisations**	**Crude Rate (per 100,000 persons)**
Cut/Pierce		976	20.85	1372	29.19	1470	30.88
Drowning		202	4.32	20	0.43	5	0.11
Fall		9063	193.61	6264	133.28	2652	55.71
Fire/hot object or substance	Fire/flame	200	4.27	121	2.57	154	3.24
	Hot object/substance	2746	58.7	338	7.19	163	3.42
Firearm		7	0.15	15	0.32	44	0.92
Machinery		58	1.24	33	0.70	37	0.78
Motor vehicle traffic	Motorcyclist	3	0.06	6	0.13	10	0.21
	Occupant	22	0.47	17	0.36	7	0.15
	Other & Unspecified	1	0.02	.	.	1	0.02
	Pedal cyclist	2	0.04	2	0.04	2	0.04
	Pedestrian	33	0.70	6	0.13	2	0.04
Natural/Environmental		717	15.32	486	10.34	229	4.81
Other land transport		102	2.18	201	4.28	338	7.10
Other transport		9	0.19	6	0.13	7	0.15

Overexertion	100	2.14	61	1.30	103	2.17
Pedal cyclist, other	242	5.17	396	8.43	328	6.89
Pedestrian, other	374	7.99	89	1.89	27	0.57
Poisoning	3718	79.43	333	7.09	264	5.55
Struck by or Against	1552	33.16	744	15.83	514	10.80
Suffocation	536	11.45	34	0.72	23	0.48
Other specified	3311	70.73	1115	23.72	446	9.37
Other specified, nec	49	1.05	14	0.30	17	0.36
Unspecified	364	7.78	65	1.38	62	1.30
TOTAL	**24387**	**520.98**	**11738**	**249.75**	**6905**	**145.06**

* Discharges from hospital between 1997 and 2011 (inclusive) where the principle diagnosis was injury with an unintentional intent, and where the scene of injury was at home. Data excludes readmissions.

Data from the National Injury Query System (NIQS), Injury Prevention Research Unit, University of Otago. Accessed 21 January 2013.

Table 3: Frequency of hospitalisation (2002-2011) and death (2000-2009) in children aged 0-4 years from unintentional injury in the home[33]

External cause (ICD-10)	Hospitalisation (n)	Death (n)	Current NZ intervention/advice	What a WOF would do
W01 – Fall on same level from slipping, tripping and stumbling	646	-		Check path surfacing – steps
W10 – Fall on and from stairs and steps	385	-	Building regulations for the proportion of step/rise in designing steps, and requirements for railings	Ensure steps/stairs meet latest regulations
W13 – Fall from, out of, or through building or structure	529	2	Legal intention of Building Act (2004) includes safety from falling	Enforce locks, barriers, and safety glass on high or hazardous windows
W14 – Fall from tree	64	-	Standards for ground surfacing and play equipment only exist for public places and schools	Inspection of home play areas using building standards
W17 – Other fall from one level to another	508	2		Ensure steps/stairs or balcony design meet latest regulations
W18 – Other fall on same level	348	-		Ensure flooring intact
W20 – Struck by thrown, projected, or falling object	364	4		Ensure heavy furniture can be secured to the wall
W22 – Striking against or struck by other objects	397	-		Check house design for unsafe corner protection
W23 – Caught, crushed, jammed, or pinched in or between objects	1823	1		Ensure heavy furniture can be secured to the wall Ensure controlled door closing devices for slamming doors in windy areas of the home/external doors are installed
W25 – Contact with sharp glass	233	-		Safety glass installed in large windows Visual manifestations on full glass doors or large windows
W45 – Foreign body or object entering through skin	135	-		
W65 – Accidental drowning and submersion while in bath-tub	42	9	Advice to never leave young children along near water, or only supervised by young siblings	

External cause (ICD-10)	Hospitalisation (n)	Death (n)	Current NZ intervention/advice	What a WOF would do
W66 – Accidental drowning and submersion following fall into bath-tub	4	2	Advice to never leave young children along near water, or only supervised by young siblings	Design of bathroom Reduce means of easily climbing into bath
W67 – Accidental drowning and submersion while in swimming pool	16	3	Advice to never leave young children along near water, or only supervised by young siblings	
W68 – Accidental drowning and submersion following fall into swimming pool	27	24	Legislation requires fencing with self-closing gates for domestic swimming pools	Ensure legislative requirements are met
W75 – Accidental suffocation and strangulation in bed	22	184		Check there is sufficient room in house for a predetermined number of tenants to avoid overcrowding Sufficient affordable heating to avoid the need to minimise rooms used which can lead to overcrowding in spaces at night
W76 – Other accidental hanging and strangulation	7	4		Ensure blind cords and similar are of a safe design
W85 – Exposure to electric transmission wires	1	-	Building Act or Electrical Act for wiring	Check for no exposed wires (covered in Electrical Act). Check wiring installed by registered electrician Require replacement of wiring if older than currently advised/acceptable Check system has capacity for modern usage. Check system has sufficient power points to prevent overloading
W86 – Exposure to other specified electric current (electrocution)	21	-		
X00 – Exposure to uncontrolled fire in building or structure	14	14	Legislation requires smoke detectors in houses Reduce flammability of furniture Advice to keep fire lighting materials out of sight and reach of children	Same as above cell, plus: Smoke detector functioning and placement Check gas fittings meet legislative requirements

External cause (ICD-10)	Hospitalisation (n)	Death (n)	Current NZ intervention/advice	What a WOF would do
X02 – Exposure to controlled fire in building or structure	41	2	Legislation requires smoke detectors in houses Reduce flammability of furniture Advice to keep fire lighting materials out of sight and reach of children	Same as above cell, plus: Check gas fittings meet legislative requirements
X11 – Contact with hot tap-water	316	2	Legislation for hot water cylinder to be set at <60°C	Check hot water from taps in bathroom <55°C
X16 – Contact with hot heating appliances, radiators, and pipes	79	-	Regulations for different types of heaters	Check safety of fixed heaters
X44 – Accidental poisoning by and exposure to other unspecified drugs, medicaments, and biological substances	629	-	Legislation for child resistant packaging and for storage and packaging of certain toxic substances Advice to keep poisons and medications out of sight and reach of children	Ensure there is a locked cupboard for poisons and medications to be stored in
X49 – Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances	439	-	Legislation for child resistant packaging and for storage and packaging of certain toxic substances Advice to keep poisons and medications out of sight and reach of children	Ensure there is a locked cupboard for poisons and medications to be stored in
Driveway injuries	169^	18^^	Advice to separate driveway from play areas and maintain active and continuous supervision	Assess the safety of the driveway for separation from play areas

*Deaths on the NZ Coronial Register that were registered between 2000 and 2009 with an unintentional intent, and where the scene of injury was at home

^ Includes ICD-10 codes: V03, V09, V13, V43, V48, V49, V86 where location was 'home' and description contains 'driveway' AND 'runover' OR 'hit' OR 'struck' AND 'vehicle' or similar.

^^ Includes ICD-10 codes: V03, V04, V13, V84 where location was 'home' and description contains 'driveway' AND 'runover' OR 'hit' OR 'struck' AND 'vehicle' or similar.

Data from the National Injury Query System (NIQS), Injury Prevention Research Unit, University of Otago. Accessed 21 January 2013.

Housing quality

There is general agreement that complex social factors such as poor living conditions may increase the risk of unintentional injury in children [34, 35]. Poor quality housing is a cause of many health issues for children, including infectious diseases, respiratory illnesses, and preventable injuries [36]. Housing quality is of particular concern to infants and pre-schoolers, who depend on others for safety and spend a lot of time at home. Poor quality housing can seriously impede normal child development [37, 38]. There are disproportionately high numbers of low socioeconomic families, and Māori and Pacific families living in poor quality rental housing and this is further widening health disparities [39]. Many of these families also struggle with access to primary health care [40].

Studies have shown that children living in lower socioeconomic areas elsewhere are at higher risk of injury in the home compared to their higher socioeconomic counterparts [41]. Children living in socioeconomically disadvantaged areas are also more likely to be living in rental housing and may have limited access to healthcare [4]. In fact, over 70% of children living below the poverty line live in rental properties. Of these children, 50% live in private rental properties and only 20% live in either Housing NZ state houses or other social housing [42]. Children often live in marginalised communities, where there is poor housing, limited health services, and limited access to health care. One study of the indoor environment of homes found a dose-response relationship between the count of home injury hazards and the prevalence of ACC-reported home-related injury rates [43]. Interventions are needed to reduce the prevalence of unintentional injury in children by addressing the issues of the wider social, economic, and technological environments [35].

Compared with other rich OECD countries, New Zealand has relatively high rental costs and demand for rental housing [18], but relatively low standards of housing [44]. Many homes are not effectively insulated or heated, which can lead to cold and damp houses that negatively impact on children's well-being [1, 36]. Keall has identified a strong correlation between hazards in the home and unintentional injury in children [45]. Lower quality rental homes are also more likely to have hazards that may cause injury.

There are significant differences in access to high quality housing for Māori and non-Māori in New Zealand [39] as well as Pacific [31]. This is a strong determinant of health. It is no coincidence that Māori and Pacific children live in poorer quality housing and are disproportionately over-represented in unintentional injuries.

Cost of child injury in the home

Despite a continual decrease in reported unintentional injury trends over the past ten years, the cost of all child claims to the ACC scheme continues to increase [14]. Between 2003 and 2008, the average cost to the ACC scheme for injury claims in children under 4 years was $46 million per year (entitlement claims and medical fees). In 2003, the cost of these claims was $34.7 million. By 2008, the cost had risen to $59 million [14]. Other costs from child injury are not quantified. These include the long-term implications on future work and quality of life for the child as they grow up. Other cost are even less well recorded such as the parental income losses from missed work, property damage, and legal costs related to permanent disability and death [46]. The data are unclear how much of the ACC claim database is for home-related injury, but we know that a high proportion of injury to under 5's occurs in the home.

Many injuries to young children are predictable and preventable. Although the ACC report attempted to determine the cost of childhood injury, it is not possible to identify the actual total cost of childhood injury, let along itemise the events in the home, not least because informal costs to parents and families is rarely calculated, and only the more serious injuries are detailed in ACC records. While this would be a useful exercise, the funding allocated to child injury prevention in the home setting is small in comparison to the benefit that would be accrued. As said by Pless, "Those who control the purse strings must be persuaded that injuries are truly preventable and that the cost of failing to do so greatly outweighs the relatively small costs of prevention," [47].

3 Intervening for safety

A WOF for rental housing is a passive intervention and if properly implemented with ongoing maintenance could be successful in reducing injury. Effective injury prevention strategies often involve the provision of passive interventions, usually through a single one-time action (such as turning down the hot water thermostat to prevent burns and scalds) [48]. Passive interventions (those that do not require human thought or action to activate the safety device) are often delivered through legislation, and this is seen in some of the interventions intended to reduce injuries in the home environment. Not all interventions enacted through legislative meet the criteria for being considered passive, but the following are mandatory requirements: installation of smoke alarms, fencing of private swimming pools, child-proof packaging of certain medications and toxic chemicals, and temperature reduction for hot tap water [49]. It is evident from what a WOF offers that there are still elements of behaviour change and human adaption required even with what appears to be passive interventions. For instance, smoke alarms and stair gates can be installed but homeowners still need to check the batteries in their smoke alarms, and ensure stair gates are closed to ensure these interventions work [50].

Active interventions are necessary for child safety and may require behaviour change (for example, educating parents/guardians to have their children sitting when eating to avoid choking), but are rarely enforceable by legislation. Legislating that all parents/guardians feed children when they are stationary would be impossible to enforce even though running around while eating is known to increasing the likelihood of choking. While it is difficult to legislate for human behaviour, interaction between the physical context and human behaviour can be mediated. For instance, the dimensions of steps are prescribed in the building regulations in order to reduce the likelihood of falling. This does not control how someone descends steps however.

4 Relevant International Legislation and Standards

International rental housing Standards are varied. Many countries have some basic minimum standards for social housing, but do not have Standards for private rental properties. This section reviews international Standards from Australia, the United Kingdom, Scotland, the USA, Canada, Sweden, and the European Child Safety Alliance – 'Eurosafe'. Strengths from each section will be highlighted for use in a potential NZ rental housing WOF.

Australia

Similar to most OECD countries, some states of Australia have a framework to assess social housing [51]. However, the majority of these states do not have any formal accreditation framework in place, although formal accreditation is currently being considered in New South Wales and Victoria [51, 52]. Similar to New Zealand, there are no systems in place to monitor the standard of private rental housing.

The Tenants' Union of Tasmania are advocating for new Tenancy Quality Standards, based on the Minimum Housing and Health Standards of Alberta, Canada. The proposed standards would have three main criteria: (1) housing premises are structurally sound, in a safe condition, in good repair, and maintained in waterproof, windproof and weatherproof condition; (2) equipment and furnishings – occupants of housing premises must be supplied with adequate sanitary facilities, heat, potable water, utilities, and space for sleeping; and (3) the owner shall ensure that all rooms and other areas are provided in a clean and sanitary condition [53]. As the Tenancy Quality Standards is a proposal, no minimum standards are listed on their website [54].

United Kingdom (UK)

The Housing Health and Safety Rating Scheme (HHSRS) in the UK is currently the most comprehensive system worldwide for managing rental houses. The HHSRS has been used as a framework for developing minimum housing standards worldwide [10, 43, 55].

The HHSRS is a UK-based private rental housing quality rating system that works on a complaints basis. Tenants are instructed to approach their local councils if they believe their home is not meeting the minimum quality standards (injury hazards, mould, dampness). The HHSRS provides a means of rating the seriousness of hazards in the home, so it is possible to differentiate between major and minor hazards. An

inspector can generate a hazard score for each hazard and, if the hazard scores are large enough, the landlord is requested to fix the hazards within a certain time frame [56]. The HHSRS identifies 29 hazards that could occur in a rental property, and these hazards can be divided into four groups: physiological, psychological, infection, and accidents. A list of these hazards is available in Appendix B.

The HHSRS is supported by systematic reviews of research on the impact of housing conditions on health. The HHSRS focuses on threats to health and safety. It is not concerned with matters of quality, convenience, or comfort; except when such matters could impact a person's physical or mental health or safety. The HHSRS provides a means of assessing the dwelling, and is only concerned with deficiencies that can be attributable to the design, construction, and/or maintenance of the dwelling. This assessment disregards any current occupants and instead bases the risk of potential hazards in relation to the most vulnerable group of people who might typically occupy or visit the dwelling (often children <5 years or adults >60 years). This means that the assessment will not be affected by a change of occupant, and that an unoccupied dwelling can be assessed [56].

A numerical hazard score can be given to each hazard, based on the likelihood that an injury could occur in the next twelve months from this hazard, and the range of potential outcomes from such an occurrence. For instance, a window with a low internal sill, and with a loose and easy to open catch is a hazard for a small child, who could climb onto the sill and fall out through the window. The likelihood of this occurring in the next twelve months is judged to be around 1 in 180 (estimated from UK and USA data). If the window was in a room on the ground floor, with grass immediately below, the outcome would be relatively minor – 99% chance of bruising and 1% chance of a strain or sprain. However, if the same window was on the 2nd floor, with a concrete area immediately below, the outcome would be major – 10% chance of paralysis or death, 80% chance of serious fractures, 10% chance of a strain or sprain [57]. This would give a drastically different hazard score, which reflects the location of the window, even though the likelihood of a child climbing onto the sill and falling out the window is the same.

In theory, the HHSRS sounds a workable approach. In reality, only about 10% of all hazards are reported to the HHSRS programme. It is likely tenants from the lowest socioeconomic groups, who are most vulnerable and have the least secure leases, will not complain about their houses for fear of their tenancy being terminated [58]. Even though the HHSRS is considered the most comprehensive national programme for monitoring the quality of private rental housing [57], there is room for improvement. A complaints based-system is not an effective strategy and in order to reach the lowest socioeconomic groups (and those most at risk of injury from home hazards) all private rental houses must be assessed.

The UK also have the Decent Homes Standard, and more recently the Better Homes Programme for public housing, which requires the dwelling to meet the current statutory minimum standard for housing, be in a 'reasonable state of repair', have 'reasonably modern facilities and services', and provide a 'reasonable degree of thermal comfort' [59, 60]. These definitions are subject to interpretation. A more robust system is required for New Zealand, to minimise the subjectivity of housing inspections.

Scotland

The Scottish Housing Quality Standard (SHQS) is the principle measure of housing quality in Scotland applies only to publically funded rental homes and is voluntary for private rental housing. The SHQS covers five broad criteria. The house must: a) must meet minimum tolerable standard (i.e. the basic legal minimum standard), b) be free from serious disrepair, c) be energy efficient, d) have modern facilities and services, and, e) be healthy, safe, and secure [61]. The Scottish government has set a policy target that public sector landlords must bring their housing stock up to every element of the standard by April 2015. According to the latest progress update of the SHQS (2010/11), most social landlords have made progress towards the SHQS target, while only a few remain at risk of not achieving the Standard by 2015 [62]. Private sector landlords and owner-occupied households in Scotland are not subject to the SHQS, but any property can still be assessed against SHQS if required [61]. Other areas of the UK have similar housing quality standards in place – for example, England and Northern Ireland have the Decent Homes Standard, and Wales has the Welsh Housing Quality Standard.

USA

The USA has developed the Healthy Home Rating System (HHRS) based on the HHSRS (UK). Similar to the HHSRS, the HHRS is a system used to rate building hazards, is evidence-based, and focuses on deficiencies that can be attributable to the design, construction, and/or maintenance of the dwelling rather than occupants or occupant behaviour [57]. The HHRS is not used routinely to inspect houses; instead it is only used as a system to rate houses for research purposes.

The HHSRS along with the American Public Health Association's (APHA) Basic Principles of Healthful Housing (1938) was used to develop the HHRS. The Centres for Disease Control and Prevention (CDC) has also modelled its basic housing inspection manual after these principles. The APHA's principles fall into four categories: fundamental physiological needs, fundamental psychological needs, protection against contagion, and protection against accidents. Protection against

accidents included from falls, fire, burns, gas, mechanical injuries, electrical shock, building collapse, and traffic [63].

Similar to other countries, the USA has a system for social housing – the Housing Quality Standards (HQS). This minimum-quality social-housing system appears stricter than other international systems. All housing funded through the US Department of Housing and Urban Development's (HUD) Housing Choice Vouchers must comply with the HQS as a condition of receiving assisted tenancy through the Public Housing Agency (PHA). If a house does not meet all terms of the HQS it cannot be leased through the social housing system. This provides an incentive for social landlords to ensure their properties meet minimum quality standards. The HQS consists of thirteen aspects of housing quality, performance requirements, and acceptability criteria. Includes all housing types, and has specific requirements for special housing types such as congregate housing, single room occupancy, and shared housing [64]. Local public housing authorities conduct initial and annual inspections to ensure compliance with the HQS. Because of this, the HQS is more effective than the HHRS at measuring housing hazards such as overcrowding. HQS standards are available in Appendix B [65].

Fire safety regulations also require carbon monoxide detectors in new homes. The International Code Council (ICC) requires installation of carbon monoxide detectors in new and resold homes near bedrooms as well as rented dwellings for some states [66]. Carbon monoxide poisoning (often caused from malfunctioning or improperly used fuel-burning appliances or idling cars) is responsible for more deaths than burns and scalds in children aged 0-4 years, possibly because the gas is colourless, tasteless, and odourless. Currently, a carbon monoxide detector retails for approximately $15-60 USD.

Canada

In Canada, Alberta has developed the Minimum Housing and Health Standards, which state that an owner must maintain the dwelling according to the provincial Minimum Housing and Health Standards. Tenants can report a landlord to Alberta Health Services if they feel public health standards are not being maintained. Executive officers then inspect the premises to determine if the owner is not complying with public health regulations [55]. Although these standards seem robust, the intervention has not been formally evaluated. The Minimum Housing and Health Standards apply to both social and private rental properties (see Appendix B) [67].

Sweden

Building regulations in Sweden are well structured and cover mandatory provisions and general recommendations to reduce the risk of injury in the home (BFS 2011:26

– Safety in Use) [68]. The state government is responsible for the implementation and monitoring of the building regulations for new homes and any homes that have been altered after 2011. Safety audits of houses are not routinely conducted, however many houses were refurbished in the 1980s. In 1984, the government began a programme for the renewal and maintenance of flats and housing areas. This programme aimed to improve all remaining dwellings that lack proper fittings and to refurbish and convert fully-fitted older flats on a continuous basis [69].

The aim of Swedish housing policy is to provide good-quality housing for the entire population, rather than to target specific groups. By doing so, it is hoped that this will improve the overall housing situation, which in turn will improve housing conditions for vulnerable groups.

Eurosafe

Similar to New Zealand, unintentional injury in the home makes up a large proportion of child injury in Europe [70]. The Child Safety Action Plan Project is a multi-nation initiative driven by Eurosafe and aimed at increasing awareness of child injury and promoting the uptake of proven prevention strategies by government, industry, professionals, and organisations in areas that relate to child safety. Currently, 18 countries are involved in the Child Safety Action Plan project, and another five countries are observers [71]. Report cards have been developed for each country to identify strengths and weaknesses in relation to child safety and these include safety related behaviours and policies relating to the prevention of drowning, falls, burns, poisoning, choking/strangulation, and vehicle/pedestrian related safety. Each report is intended to be used for subsequent planning of policies for each country [12].

The European Child Safety Alliance has also developed a Child Safety Good Practice guide, which includes safety strategies with evidence of effectiveness. This guide has been distributed to practitioners, policy makers, and researchers across Europe. It was anticipated that countries would use the guide for the selection of suitable safety interventions in their countries. Several European countries are in the process of completing a government endorsed child safety action plan [72]. There is increased awareness of child safety as a result of the Child Safety Action Plan, and hopefully this will translate into new safety interventions in order to reduce child injury in the home; however the Action Plan is not mandatory.

5 A warrant of fitness for rental houses in New Zealand

New Zealand Housing

A Dunedin survey of 104 low-income private rentals in Dunedin in 2004 found only 36% of rentals passed their 'Dunedin Reasonable Rental Standard', which includes measures of safety (free of hazards for all who will use it), soundness (provides complete shelter in all weather conditions), suitability (provides basic amenities and services for living that encourage social inclusion), and value (the rental cost provides value for money). The authors concluded that the old age of housing and poor maintenance (including leaking roofs and rotten floors) was a significant issue. The continued demand for student accommodation made it difficult for low-income families to find suitable family homes at a decent quality and affordability. Low-income families were found to be living in poor quality houses with major injury and health hazards, yet a significant proportion payed more than 30% of their income on housing [73].

The 2010 BRANZ nation-wide housing conditions survey of approximately 500 dwellings (owner-occupied and private rental housing) found rental houses generally to be in worse condition that owner-occupied housing and to have a higher incidence of components in poor or serious condition. Nearly twice the numbers of rented houses were in poor condition compared with owner-occupied houses. Generally, rental home occupiers were overly optimistic about the condition of their house. BRANZ identified 22% of rental properties to be in good condition and 44% were considered to be in poor condition. In contrast, 80% of rental home occupiers believed their property to be in good condition, while only 2% believed their home to be in poor condition [17].

State housing (social housing) built in the 1930's and 1940's dramatically raised the standard of living in New Zealand. However, escalating building costs in the 1950's led to the standard of new state housing to be lowered. In areas such as South Auckland and Porirua, the dominance of this newer, but poorer quality of housing led to the disadvantaged residential areas that earlier governments had wanted to avoid. Housing New Zealand reports that sixty years on, the state housing stock is ageing, with many state houses needing significant upgrading to meet the current standards and needs of our growing population. However, the ability to meet this demand is restricted by funding [74].

Over the past decade, the Healthy Housing programme of Housing NZ [75] has had a strong focus on improving the risk of housing related diseases, often related to overcrowding and cold or damp homes, rather than reducing injury related to structural components of the dwelling [76]. However, one of the five goals listed in the 2010-2015 Housing NZ strategic plan is to "develop the housing portfolio to be 'fit for purpose' by type and location." Listed strategies include progressively reducing the gap between the 'agreed standards' (contained in the Acts described above) and the housing condition of the state houses [74]. Housing NZ consider a WOF for rental housing to be a promising and cost effective intervention strategy [76].

Minimum standards for social housing do exist [77], but there are no equivalent standards for private rental housing. Housing New Zealand, who is responsible for the upkeep of the majority of social housing in New Zealand, aims to have all houses inspected twice each year. Each inspection takes 15-20 minutes, and the inspector checks the condition of the house is maintained to the Housing NZ standards (ensures the plumbing, electrical wiring, and structure of the building is safe, and provides adequate water collection and storage for premises without reticulated water supply), confirms the property meets the Building Act (whichever Act the building was last modified under – not necessarily the 2004 act) and Fire Safety regulations, checks that smoke detectors are in place and functioning, and meets with the tenants to discuss any issues such as paying rent or overcrowding [77].

Although the Building Act 2004 states that new housing must meet safety criteria, building codes do not require compliance with subsequent regulations, so if housing construction was completed before 2004, unless housing alterations have been made after this date, it does not have to comply with changes made in the 2004 legislation. However, the Building Act 2004 does require territorial authorities to adopt policies on dangerous and unsanitary buildings that are likely to cause injury, death, or damage to other properties. This enables authorities to take action against owners of such buildings, regardless of when they were built. In reality, this part of the Building Act is rarely enforced and hazards in many houses remain at an unsatisfactory standard [17, 18].

6 Current New Zealand legislation, standards, and housing checks

Using legislation

A number of pieces of legislation are relevant to safe housing in New Zealand, and these are briefly described here. The criteria for inclusion are the potential for a housing WOF to use the clauses in these Acts and Standards, and also add further criteria for achieving safer housing. The WOF would not take the current regulations and put them in one Act – it would require that the various clauses in the current Acts were met – along with some new clauses that the WOF for rental houses would also check.

Building Act 2004

The Building Act 2004 (which superseded the Building Act 1991) and associated compliance documents and standards cover injuries related to falls and drowning. The Building Act includes safety from falling, stating all building work must comply with the Building Code (above) however a recent review of the Building Act found the regulatory system to be costly and inefficient [78]. One objective identified in the new review is to ensure that defects are effectively and efficiently identified, reported, and repaired as quickly as possible: has been enacted more as a liability issue for building contractors and homeowners who are renovating, rather than for tenants. The new proposal could expand to include WOF inspections for rental housing. As territorial authorities are currently responsible for building consent, they could oversee the enforcement of a WOF for rental housing.

New Zealand Building Code

Housing standards are enforced by a series of regulations, including the Building Act 2004, the New Zealand Building Code (NZBC) (containing 35 compliance documents – one for each Building Code clause, as well as optional compliance documents and alternative solutions), and various Building Standards. The Building Code sets out performance standards that building work must meet. It covers aspects of structural stability, fire safety, access, moisture control, durability, services, and facilities. The regulations are administered through agencies such as regional councils, local government, and Housing New Zealand. Whilst the regulations themselves may be a model of best practice, a WOF would merge these housing regulations and building acts into one act that would be far simpler to communicate, enforce, and evaluate. Not all regulations are well enforced, and the ambiguity of phrasing can mean that interpretations of standards are varied.

Within the Building Code, Clause F4 (Safety from falling) is in place to safeguard people from injury caused by falling. This clause covers design of buildings, and describes requirements for barriers (when potential falls are greater than one metre or on roofs with permanent access). This clause also states that swimming pools with a depth greater than 400mm shall have barriers provided. Barriers must be: continuous and extend for the full extent of the hazard, of appropriate height, adequate rigidity, adequate strength, and be constructed so they cannot readily be used as seats. The clause also contains an 'acceptable solution' document which provides diagrams and specifications of barriers [79].

New Zealand Standard 4102:2011 (Safety in the home)

The New Zealand Standard 4102:2011 (Safer house design: guidelines to reduce injury at home) is an important standard for the design of dwellings [80]. This standard identifies what actions are required under the NZBC and other legislation and also provides recommendations on design, building, and maintenance that are beyond legal requirements, but are good practice to reduce injury hazards in the home.

Electricity Act and Gas Act (1992)

Other Acts that are relevant to child injury in the home include the Electricity Act (1992) and Gas Act (1992). Both acts are in place to reduce the incidence of unintentional burns in the home. The Electricity and Gas Acts regulate the supply and use of electricity and gas, and detail the certification of electricians and gasfitters.

Building Regulations 1992 (G12.3.6 (hot water supplies)

Hot water temperatures are regulated through the Building Regulations 1992 (SR 1992/150) (as at 1st February 2009). G12.3.6 (Water supplies) states where hot water is delivered to sanitary fixtures and appliances used for the purpose of hygiene, it must be delivered at a temperature that avoids the likelihood of scalding [81].

New Zealand Standards 4512:2003 (Fire detection in buildings) and 4514:2002 (Smoke alarms in houses)

New Zealand Standards 4512:2003 (Smoke alarms: Fire detection and alarm systems in buildings) and NZS 4514:2002 (Smoke alarms: Interconnected smoke alarms for single household units) both relate to unintentional burns in the home. They cover information on the design, installation, testing, placement, and maintenance of smoke alarms.

Swimming Pools Act 1987

Unlike many other Acts, the Fencing of Swimming Pools Act 1987 (FSPA 1987) was enacted specifically to promote the safety of young children around swimming and spa pools. All pools (temporary or permanent) must have a surrounding fence if they are greater than 400mm deep. Fences must not be able to be climbed, and must be at least 1.2m above ground level. Gates must be fitted with a self-closing device and the latch must be at least 1.2m above the ground or only accessible from over the top of the fence. Pool owners are responsible for advising their local authority of the existence of a pool, and local authorities are required to ensure compliance with the FSPA 1987 within its district. This level of enforcement could be matched for a WOF for rental houses.

The Building Act 2004 also applies to drowning. It states that local authorities must not pass a bylaw that would allow swimming pool fencing to provide less protection than the FSPA 1987 provides. This applies to the construction of new pools, any alternations made to existing pools, or fencing around pools.

Housing Improvement Act 1947

Part one of the Housing Improvement Act 1947 is named 'Minimum Standards of Fitness for Houses' and contains thirteen chapters pertaining to the safety and health of home dwellers. The chapters cover safety, dampness and mould, and hygiene, as well as overcrowding (Part 2). Local authorities need the authority to inspect houses and ensure they meet the standards outlined in the Housing Improvement Act 1947. Aspects of safety are too vague to be used for a WOF for rental houses, for instance, chapter 18 states that "Every house and all the appurtenances and appliances of every house shall at all times be kept in a state of good repair," [82].

Housing Act 1955

The Housing Act of 1955 focuses on 'State Housing' in New Zealand, and gives the Minister of Housing the right to alter, enlarge, or otherwise improve any dwelling or building on any State land. However, no standards for housing quality existed, so it was up to the Minister's discretion. Clause 42 gives authorisation to local authorities or medical officers of health to require repairs and issue closing of dwellings if they are likely to cause injury to health of any persons living in the dwelling, by reason of the dwelling's situation or insanitary condition. However, the lack of current housing strategy in New Zealand means that legislation like this is not regularly enforced (see discussion below for recent situation).

Health Act 1956

The Health Act of 1956 highlights standards of fitness all dwellings must comply to. These are listed in section 120C (Regulations as to housing improvement and overcrowding), and are subject to the Building Act 2004 (listed in the text box below). However, as stated earlier, the lack of a current housing strategy prevents this Act from being fully enforced [83].

Box 1. Regulations of housing improvement and overcrowding – Health Act 1956

120C: Regulations as to housing improvement and overcrowding

(1)Subject to the Building Act 2004, for the purpose of prescribing standards of fitness with which any dwellinghouse, whether erected before or after the commencement of this section, must comply, regulations made under this Act may make provision for or with respect to—

(a)the construction, condition, and situation of dwellinghouses, and the space about dwellinghouses:

(b)the drainage, sanitation, ventilation, lighting, and cleanliness of dwellinghouses and of the land on which dwellinghouses are situated:

(c)the repair of dwellinghouses:

(d)the provision in respect of dwellinghouses of a proper supply of potable water and hot water, of bathing, laundry, cooking, and food storage facilities, and of sanitary conveniences:

(e)the protection of dwellinghouses from damp, excessive noise, and heat loss:

(f)the dimensions, cubical content, and height of rooms of dwellinghouses.

(2)Regulations may also be made under this Act for the purpose of preventing overcrowding in dwellinghouses.

(3)Without limiting the general power conferred by subsection (2), regulations may be made pursuant to that subsection for all or any of the following purposes:

(a)prescribing the number of persons permitted to reside in dwellinghouses, having regard to the number of rooms, the amount of floor space, air space, or ventilation thereof, and the amenities provided:

(b)prescribing methods of calculating the number of persons, the number of rooms, and the amount of the floor space, air space, or ventilation thereof:

(c)prescribing offences in respect of the contravention of or non-compliance with any regulations made under that subsection, and the amounts of fines that may be imposed in respect of any such offences, which fines shall be an amount not exceeding $500.

Section 120C: inserted, on 30 November 1979, by section 7(1) of the Health Amendment Act 1979 (1979 No 64).

Section 120C(1): amended, on 31 March 2005, by section 414 of the Building Act 2004 (2004 No 72).

Section 120C(1): amended, on 1 July 1992, by section 92(1) of the Building Act 1991 (1991 No 150).

Section 120C(1)(d): amended, on 1 July 2008, by section 8 of the Health (Drinking Water) Amendment Act 2007 (2007 No 92).

Residential Tenancy Act 1986

Currently the Tenancy Act 1986 states that rental houses must contain a stove with an oven, a water supply and a laundry facility. The house must be 'in a reasonable state of cleanliness' when the tenant goes into occupation. The act also states that the landlord must maintain the property 'to comply with building, health, and safety requirements' [84]. These requirements include making sure all locks work and the

property is reasonable secure; ensuring the plumbing, electrical wiring, and structure of the building is safe and working; and ensuring there is adequate water collection and storage without reticulated water supply. However, these definitions are subject to interpretation, which can mean their effect is almost meaningless except in the most exceptionally dilapidated dwelling. This is of some concern given the number of reports of substandard housing that is not meeting the basic human right to adequate housing [17, 73, 85].

7 The current situation in New Zealand

Housing improvement programmes operating in New Zealand

The Student Tenancy Accommodation Rating System (STARS) is a collaboration between the Dunedin City Council, the University of Otago, and the Otago Polytechnic. The current version of STARS is a pilot (available here: http://www.dunedin.govt.nz/student-housing/home/_nocache) and will be modified based on feedback. The free initiative is voluntary for landlords and uses the landlord's self-reported responses to an online questionnaire to automatically generate a STARS rating for each property. Each question is weighted differently and the overall rating is based on five categories. The five categories include: fire safety, security, insulation, heating and ventilation, and general amenities. To keep each property's rating up-to-date, each property's rating must be renewed after a 12-month period. As well as providing tenants with accurate information about potential rental properties, STARS also offer landlords a market advantage, as high ratings impact on the choices students make [86]. It would be beneficial to draw ideas from these schemes when developing a WOF for rental housing.

A study is currently being conducted by the Housing and Health Research Programme to compare the structure and regulation of the private and public rental housing market in NZ with a number of OECD countries. This study will investigate regulations pertaining to the rental housing market, such as building and maintenance standards, occupancy standards and tenancy legislation and other policy instruments such as rent control and accommodation supplements at central and local government level [75].

A new community-based intervention is the Tāmaki Transformation programme that started up in 2012. This urban regeneration group hopes to transform the Tāmaki area in Southeast Auckland over the next 15-25 years. While the focus of the programme is on creating opportunities for education, jobs, and safe public spaces, it intends to deliver more new homes and better-designed, warmer, drier homes to provide better housing options for the Tāmaki area [87].

Other housing programmes that are currently or have recently finished running in Auckland include Snug Homes/Warm'n'Well, Retrofit Your Holme (RYH) and Warm Up New Zealand Heat Smart, and Warm Up-Counties Manakau and Warm Up-Waitemata, [88]. Snug Homes/Warm'n'Well is no longer running but was aimed at

Community Services cardholders in rental or owner-occupied homes and paid for the insulation of over 8,000 homes built before 2000 in Auckland (and Wellington) [89]. RYH worked with Warm Up New Zealand Heat Smart (a nationwide programme), to fund insulation and clean heating for ratepayers in most pre 2000 houses. This programme retrofitted insulation in over 25,000 homes, heating in over 3,000 homes in Auckland, and insulation and heating in a further 1,400 homes [88, 90, 91]. Unlike the free Snug Homes/Warm'n'Well, the RYH allowed costs of insulation and heating to be paid back over a period of up to 9 years.

The only two free retrofitting insulation programmes that are currently running are Warm Up-Counties Manakau and Warm Up-Waitemata. Both programmes are available for low-income, high health needs households with a Community Services Card. Since December 2011, these programmes have insulated 1,778 and 360 houses, respectively [88, 92].

The WOF in a NZ context

A rental housing WOF could link with the housing evaluation standards from the Building Research Association of New Zealand (BRANZ). These standards are available for download on the BRANZ website however many standards are voluntary, not mandatory. It would need to be determined whether a rental housing WOF would override clauses of the Building Act that allow houses unmodified since 1993 to be exempt on safety issues. From a safety perspective, a WOF should include fixing hazards that have been identified in the most recent legislation, regulation, and standards. For instance, horizontal balcony rails on older homes should be replaced with vertical rails so that young children cannot climb up and be exposed to the risk of a significant fall.

A case for change

A WOF for all rental houses would be best enacted through legislation and enforcement [13]. It would primarily involve physical environmental modification, but also product modification, and possibly safety devices. Although a WOF for rental houses is a passive intervention and does not directly address behaviour change, it is possible that a WOF for rental houses might improve individuals' knowledge of hazards in the home, thereby influencing their behaviour [50]. The awareness that property inspectors could check for injury hazards might make both homeowners and tenants more aware of hazards in the home, and therefore more safety conscious.

A WOF cannot be expected to prevent all injury in the home environment. For example, a US study by Katcher et al used the modified Delphi technique to identify

the most important injury hazards in each area of the home. The modified Delphi technique involved surveying 34 experts (predominately from the USA) up to three times, and asked experts to identify and rank home injury hazards and prevention methods. Of the top ten identified injury hazards in the home, eight relate to physical properties of the home that could be monitored with a WOF. In order of ranking: access to firearms (1); direct access to a pool (2); access to fire starting materials (3); access to medications, poisons (5); unsecured windows (6); unsafe playground surfaces and equipment (8); excessive hot water temperature (9); and playing in driveway (10) [93]. Most of these hazards, with the exception of firearms, are implicated in common childhood injuries in NZ. Other hazards Katcher et al identified related to adult supervision (unsupervised around pool (4) and lack of adult supervision (7) which cannot be addressed through a housing WOF.

Although behavioural interventions have been found to be successful, they are difficult to legislate and implement on a national scale. On the other hand, passive interventions such as legislation for mandatory safety audits for all houses can be applied at a national level. One example of this is the New Zealand Healthy Homes Pilot Study. This study found the compulsory inspection of each house, and consequent remediation of the more important identified hazards to reduce the incidence of hospitalisation of young children over a two-year follow-up period. However this data was not specific to unintentional injury in children aged 0-4 years, and some hospitalisations included other home-related health issues such as respiratory health [10]. The overall conclusion was that the New Zealand Healthy Homes Pilot Study was successful with the assessment and improvement of 102 houses in the Lower Hutt area reducing hospitalisations in this cohort by 30%.

The piloting of the home assessment instrument used in the NZ Healthy Homes Pilot study, the Healthy Housing Index questionnaire, established that this house inspection process was a feasible approach to gathering data on health and safety-related features of a house [45]. The study focused on structural features of the house that were less likely to be adapted in response to perceptions of risk, rather than readily modifiable risk factors (such as mats or clutter being trip hazards).

Katcher et al's survey of hazards for child at home included interventions and passive strategies such as installing smoke alarms (1); setting water temperature <50°C (2); installing pool fencing (4); installing window guards (5); removing firearms from the home (6) or storing and locking firearms and ammunition separately (7); and creating safe play areas (10) were all identified as part of the top ten feasible injury prevention behaviours [93]. A housing WOF could address these hazards, however it must be noted that some of these seemingly passive strategies still require considerable human action. For instance, firearms must be locked away, safe play areas must be created, and batteries in smoke alarms must be kept up to date.

The most recent Cochrane review of home safety education and provision of safety equipment for injury prevention found there was a lack of evidence that home safety interventions reduced rates of thermal injuries or poisoning [94]. However, home safety interventions were effective in increasing the proportions of families with safe hot tap water temperatures (odds ratio (OR) 1.41, 95% confidence interval (CI) 1.07 to 1.86), functional smoke alarms (OR 1.81, 95% CI 1.30 to 2.52), storing medicines (OR 1.53, 95% CI 1.27 to 1.84) and cleaning products (OR 1.55, 95% CI 1.22 to 1.96) out of reach, having fitted stair gates (OR 1.61, 95% CI 1.19 to 2.17), and having socket covers on unused sockets (OR 2.69, 95% CI 1.46 to 4.96). The only other more 'active' intervention that was also effective at decreasing incidence of unintentional injury to children in the home was having poison control centre numbers accessible (OR 3.30, 95% CI 1.70 to 6.39). Overall, interventions providing free or low cost discounted safety equipment appeared to be more effective in improving some safety practices than those interventions that did not. Interestingly, four studies found educational campaigns and equipment loan schemes promoted positive behavioural change such as use of safety equipment, but had little influence on the incidence of injury [95-98]. There is better evidence for smoke alarm use and child-restraint packaging for poisoning following public health campaigns [99] although these have been noted to have limitations, for example, such as the maintaining the power source for the smoke alarms [100].

8 Components of a WOF for rental housing

It should be kept in mind that all properties contain hazards, for example electrical outlets and stairs. It is not possible to remove all hazards. The emphasis of a rental housing WOF should be to minimise the risk to health and safety, either by removing the hazard altogether or by minimising the risk.

Features of substandard housing that have been identified as risk factors for injury include: structural defects, lead, asbestos exposure, volatile organic compounds, radon, lack of smoke alarms or fire safety equipment, absence of stair barriers, and missing or substandard pool fencing. Other features of substandard housing that have been identified as major concerns for health include: inadequate insulation that can lead to dampness and mould, lack of heating and ventilation, lack of safe drinking water, ineffective waste disposal, inadequate facilities for food storage and preparation, and household pests [11, 28]. Table A1 in Appendix 1 contains a summary of components that should be included in a rental housing WOF.

Common areas where safety hazards were identified in the NZ Healthy Homes Pilot study include: pathway problems (e.g. too steep, slippery, overgrown), internal stair hazards (insecure carpeting), and structurally unsafe external stairs [45]. Keall and colleagues reported an estimated 22% increase in the odds of injury occurring with each additional injury hazard found in the home (95% CI 6 to 41%) [10]. This result suggests that even addressing some of the hazards in homes could drastically reduce the incidence of unintentional injury of children aged 0-4 years in the home.

Over the past decade there has been a major shift in the housing preferences of New Zealanders from low density, suburban, stand-alone housing towards higher density urban apartments. Liveability issues have become apparent as more people move towards this type of accommodation [101]. A WOF for rental houses would need to take these changes into account. Safety measures like barriers on windows higher than the second story to prevent falls might need to be implemented.

Other factors specific to unintentional injury to children in the home include driveway runovers and securing furniture to walls. Several risk factors for driveway runovers have been identified, including: longer driveways, driveways exiting onto local roads, an absence of sheltered parking, additional parking areas on the property [102], and an absence of physical separation of the driveway from children's play areas [36]. The presence of a separate pedestrian pathway from the footpath to the house [103] was associated with a lower risk of driveway runovers. While a WOF

would provide a useful way of measuring driveway safety, the ability to make changes to driveways and property entrances is very limited. Thus, the issue driveway safety remains largely unresolved.

Currently the responsibility for identifying housing issues in NZ lies with the tenants. However, most international jurisdictions require the landlord to have some responsibility for minimal health and safety quality of a rental property. A WOF for rental houses would require coordination between health care, safety, and building sectors. It is important to note that the WOF is separate from action that the tenant needs to take. The WOF is likely to highlight areas where legislation needs to be updated, enforced, or instigated, but the WOF is not the vehicle for testing new initiatives or strategies that could contribute to improved safety legislation or standards.

9 Strengths and Limitations

Strengths of a WOF for rental housing

Although not all unintentional injuries in the home are a consequence of poor housing, a WOF for rental housing would reduce the incidence of unintentional injury. Evaluations of New Zealand rental housing stock have indicated that many do not meet the minimum standards of housing [17, 73, 85, 104]. A WOF-based inspection has been showing considerable promise as an effective way of identifying hazards in the home. The Healthy Housing Index Pilot study [10] found the assessment and improvement of 102 houses in the Lower Hutt area to reduce hospitalisations in this cohort by 30% of which injury is one component. No other interventions are known to be as effective as this. It has been suggested that if an intervention similar to the Healthy Housing Index were rolled out over the entire Housing New Zealand children population, we would expect to keep approximately 2,000 children out of hospital each year [85].

A WOF for rental houses has the potential to provide both social and private housing sectors with a minimum quality standard. Access to reasonable quality, affordable housing improves social stability and community participation. Living in houses that are cold and damp or are in poor repair can negatively affect children's learning, which has long-term consequences.

A WOF for rental houses has additional benefits over and above injury prevention [2, 9]. It would not only improve NZ unintentional injury hospitalisations and deaths, but would also improve respiratory health, overcrowding, and educational attainment. A WOF for rental housing would address issues such as insulation, sanitation, adequate water supply, adequate warmth and dryness, protection from excess heat, adequate lighting and sunlight, protection from noise, security and privacy, energy efficiency, and sustainability of water use and waste disposal (See Appendix 1) [11]. Those in support of the proposed WOF cite its potential to reduce health disparities in New Zealand [2], which in turn would address the known social gradient for unintentional child injuries [3, 4]. In the long term, access to reasonable quality, affordable housing would also improve social stability and community participation. A WOF for rental housing (and subsequent installation of insulation and more effective heating) may also mitigate the effects of climate change. But we need to consider the following:

Practicalities of a WOF for rental housing

There are practical considerations to developing and implementing a housing WOF. International experience indicates it can be difficult to get interventions into legislation. A common argument when legislation is brought forward for consideration is who will enforce the intervention and how. This reason is often cited for not proceeding with adoption and implementation of the intervention. There seems to be a difficulty in balancing landlord requirements and health and safety of tenants, particularly from the perspective of enforcement (personal communication: Morag MacKay, European Child Safety Alliance, 23 January 2013) [105].

Looking to other countries for guidance [56, 62], it seems employing inspectors from local councils to run safety audits of houses is the best method, however for continuation the central government needs to create the rental housing WOF legislation and oversee the intervention to ensure it is enforced. Evaluations should be conducted annually, and feedback from tenants and landlords used to continually improve the intervention.

In the New Zealand housing market, landlords are likely to be questioning what value there is for their investment from complying with mandatory implementation of a rental housing WOF. This might have short-term implications for the rental housing stock available for tenants.

Economics of a WOF for rental housing

Although set-up of this scheme might cost more initially, the question is the savings that may accrue. Costs of any potential intervention to reduce unintentional injury in the home need to be weighed against the benefits of injuries potentially prevented. A recent evaluation of the HHSRS in the UK found for each £1 spent on the HHSRS, nearly £2 is saved by reduced costs of health care, tenancy failure, crime, and residential care [58].

An economic analysis of Keall and colleagues for the Healthy Housing programme found that most homeowners could fix common injury hazards in their homes and reduce the risk of injury for an average of $500 [106]. The authors estimated that unintentional injuries in the home (across all age groups) had a social cost of approximately $NZ 13 billion, which is about 3.5 times the annual social cost of road injury.

Fixing existing hazards immediately may not be feasible. The focus needs to be on the most serious hazards that pose the most immediate risk for injury. Conducting various cost benefit analyses to decide what is best for each hazard is one possibility. The HHSRS system determine payback time (for instance, to invest all money over one year, or make annual payments over ten years) by taking the cost of work to repair each hazard, and dividing this by the annual benefit to the national health system [107]. Although this seems a good budgeting strategy, it cannot address all injuries, which are often rare and a coalescence of many factors.

Barriers to the implementation of a WOF for rental housing

There is some concern that the introduction of a WOF for rental houses will result in New Zealanders being 'over-assessed'. Mass media reports contain opinions that a WOF would be reverting New Zealand back to the old 'nanny state' ways of social security or that the WOF would result in a loss of autonomy. International public health experiences and opinion suggest that a WOF for rental houses offers a progressive, forward-thinking initiative that can address costly health and safety liabilities among vulnerable populations, including young children. In the short-term, a WOF for rental houses promises improved respiratory health, reduction of hazards in the home, and potentially a reduced rate of unintentional injury. In the long-term, a WOF for rental houses could contribute to access to equitable houses for all, improve educational attainment of our children, set up New Zealand for future success, and save NZ costs in healthcare.

A WOF for rental houses would need to be mandatory, as a complaints based system has been shown to be ineffective (especially for low socioeconomic groups, who are most at risk of injury from home hazards). The most effective way to reach all rental houses is to make a WOF for rental housing mandatory, which causes concern. One criticism is that the added cost of meeting the requirements of a rental housing WOF could make rental investment unattractive to landlords, which may result in some selling their rental houses, thereby reducing the number of rental properties available. Opinions are mixed. Some individuals on online blogs and news sites have expressed the view that if landlords do decide to sell their rental properties, it will not change the number of available houses but may result in some landlords no longer investing in rental properties [108].

A number of concerns have been raised and these need careful consideration, not only because they may point to currently unidentified disadvantages, but also because they come from a sector that would be directly affected by an introduction of a housing WOF. The New Zealand Property Investors Federation (NZPIF) has

expressed concerns regarding potentially high initial costs and practicality [5]. Concerns also include regulation of the WOF, and whether tenants should have to meet some standards too. President of the NZPIF, Andrew King has been quoted as saying "when talking with proponents of a rental property WOF I have often said that if tenants are not happy with their accommodation they can find another rental property that meets their needs. The answer I usually get is that the tenant cannot afford to move and this indicates the real problem. Rent on an insulated property is more expensive. Forcing landlords to insulate their rentals will not make them any cheaper to insulate". This is a question of societal standards as it is about providing basic human rights for children [8, 109]. Often it is not an option to find 'another rental property.'

Compared with other OECD countries, New Zealand has relatively high rental costs and demand for rental housing [18], but relatively low standards of housing [44]. It is possible that a WOF for rental houses could increase rent because the cost of repairs has to be covered. The impact of this would likely be on low-income families, which may make it more difficult to find rental accommodation that does not cost an even greater proportion of their income than what they currently pay. As a further increase in the cost of rental properties must be avoided, a housing WOF needs to provide some incentives for landlords. One option is to offer a favourable tax write-off or tax reimbursement for landlord for repairs and improvements made to their properties to bring them in line with the WOF standards. Clearly landlords have concerns about the financial implications for them; so further consultation is required to identify worthwhile incentives.

Tenancy periods in New Zealand are relatively short-term by international standards. There is considerable turnover among landlords, which can contribute to unstable tenancies. The 2003 National Landlords Survey found that New Zealand landlords generally had short careers as landlords. Over one fifth of landlords (21.9%) reported being a landlord for one year or less, whilst over half (55.6%) were landlords for less than eight years [110]. Two main types of landlords in New Zealand are describe – those who see themselves as part of a service industry and intended to be in the rental market for the long-term and those who have a property portfolio in order to reap capital gains [111]. The latter group may tend to buy property because of land value in areas of high demand (e.g. downtown Wellington, North Dunedin, central Auckland). Where the house is run-down but the land value is high, there is little incentive for the landlord to upgrade their rental properties, because it does not improve their capital gain.

Other potentially effective strategies to improve the quality of rental housing

Alternatives to a rental housing WOF are still likely to require a process whereby the state of the house is assessed. The difference is in the vehicle used for requiring or advocating for change, whether legislation, product modification, environmental modification, safety devices or education, skills, and behaviour change. Some alternatives identified are discussed here.

The USA has a housing voucher program for very low-income families and individuals, in which low-income families can receive financial assistance for private rental housing. In this programme, the housing unit selected by the family must meet an acceptable level of health and safety before the Public Housing Agency (PHA) can approve the unit. The PHA must inspect the dwelling and determine that the rent requested is reasonable [64, 112]. An independent evaluation of the housing voucher program found the program to have fairly low coverage, but has certainly been of benefit to those who have received assistance. However, even for the few households who have received support, the program has not provided better neighbourhood conditions than the conditions available for unassisted eligible households. According to the evaluation, some urban planners and housing advocates believe that the voucher units are of lower quality than equivalent units that have the same rent. The evaluation went on to offer a proposal for reform aimed at promoting equity and better outreach by suggesting an entitlement program to provide fair support to *all* eligible families [113]. Such an outreach program is more similar to housing support in New Zealand.

Rental houses could be 'flagged' (for example as Earthquake Standards are [114]) so potential tenants are aware of the condition of the property. Currently, non-residential buildings and multi-unit, multi-story residential buildings that do not meet 33% or more of the Building Code Requirements must be strengthened to at least 67% of the Earthquake-Strengthening standard to be considered earthquake-safe. All earthquake-prone buildings must be strengthened, or demolished, within 15 years. Information as to whether the building meets the threshold will be made publically available.

Another option is for houses to have a current 'report card' before they can be sold or rented. This would inform potential tenants of any possible hazards in the home. However, it is unlikely that this approach would reach the most deprived, as the rental houses with the lowest rent are the ones most likely to have hazards. The most deprived are often the most vulnerable and have the least choice when it comes to rental housing.

In the UK a complaints based system (the HHSRS) has been instigated in which tenants of private or social rental housing can take housing hazard complaints to their local authorities [56]. A building inspector will then assess the hazard and the homeowner will be given a time frame in which to fix the hazard. This strategy has not been found to be effective for improving the conditions of housing. There has been considerable criticism of the system is focused on how the process reinforces inequalities. Those most at risk of injury are also the most vulnerable to being evicted, having no alternative accommodation, and not being in a position to negotiate better conditions. The potential for being evicted if they lodge a complaint is perceived to be very high [58].

10 Recommendations

We have made the following recommendations:

- A WOF for rental houses is a promising intervention to reduce the incidence of child unintentional injury in the home. Evidence to date suggests that auditing housing quality for safety is potentially an efficacious intervention.

- Points of intervention and possible strategies to enact in legislation to support the WOF:
    - Build on the lessons learnt from housing standards and inspections in other countries
    - Institute a requirement for a housing inspection before new tenants move in. Rental property must pass WOF before it can be leased
    - Work required with landlords to ensure WOF will operate and rent is fair
    - Incorporate WOF for rental housing in annual checks conducted by Housing NZ (residents are most at risk of injury and have limited access to healthcare)
    - System for recourse for current tenants after initial housing inspection to ensure quality is maintained. Ensure this system for recourse does not have the negative impact that the complaints based system in the UK has

- Central government, through the Ministry of Business, Innovation, and Employment should oversee WOF for rental houses and local government would administer WOF inspections. This is the same as the model used in the UK.

- A WOF for rental houses will require ongoing:
    - Improvement in the enforcement of existing legislation
    - Revision of existing legislation
    - Evaluation of new WOF legislation
- For a WOF for rental housing to be effective, the following need to be addressed:
    - Landlords concerns about a WOF for rental housing

- Develop incentives to assist with improvements. One option is to offer favourable tax rebates or similar on required improvements

- Funding of research to examine:
  - Cost
    - Undertake a cost benefit analysis that includes the cost of avoidable injury to members of the household. The analysis should include both direct and indirect costs, as ACC does not cover costs of loss of employment when a parent has to take time off work to care for an injured child, nor does it cover time required off work for injury that is less than a week. This loss of work could have a considerable negative impact on families, whether through loss of income or potential loss of the job.
  - Implementation
    - Evaluation of the outcomes from WOF implementation. Further examination of other strategies to complement the WOF. Evaluation to include effect on existing legislation and to incorporate landlord and tenant perspectives.

11 Conclusion

Such high incidences of unintentional injury resulting in hospitalisation or death should not be acceptable in a developed country such as New Zealand. The UNCROC, which was ratified by New Zealand and 192 other countries states that we are responsible for providing children with their fundamental rights to have a good life, good health, education, a safe home, participation with decision-making, and protection from abuse and exploitation [8, 19]. Currently, there are too many children in New Zealand who are missing out on their inherent human rights to live in a safe home [109]. Despite the magnitude of unintentional injury in the home, this issue is seldom raised and the level of investment is rarely equal to the problem.

A WOF for rental houses would address the high rate of unintentional injury in the home in young children, improve health statues, and improve educational attainment in children. The WOF would also improve New Zealand's rental housing stock, which is in desperate need of repair, and is lacking in comparison to other developed countries. Currently, investment in children is about half that of the OECD average, and New Zealand policies on health and safety for young children are ranked 29th out of 30 OECD countries [44]. Following a critical review of the literature, this report concludes that spending more on young children through strategies like the WOF for rental housing will improve indices of child health, reduce unintentional injury in the home, and reduce disparities in health. This report fully supports the Expert Advisory Board's recommendation to introduce a WOF for rental houses. An investment in the WOF would contribute to healthy housing for all.

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Appendix A Components of a WOF

Table A1: Links between housing quality features (and their associated hazards and methods of measurement by the New Zealand housing quality measurement tool) and likely outcomes (health, safety, and sustainability) [11]

Housing quality feature measured	Hazards associated with housing	Method of measurement	Health, safety, and sustainability outcomes
Adequate structural soundness: Adequate foundations Adequate walls, floors Adequate roof, cladding Adequate windows Adequate stairs Adequate chimneys Adequate internal walls Cylinders and header tanks have earthquake restraints	Structural collapse and falling elements	Visual inspection by trained assessor. Measurement of key dimensions (some structural elements)	Injury following natural disaster
Adequate water supply: Adequate portable water Adequate water for non-potable uses	Inadequate or contaminated water supply	Visual inspection by trained assessor Treatment method of water, if not reticulated	Enteric infections
Adequate sanitary areas and waste disposal: Sanitary and functional toilet Adequate personal washing facilities and hot water Sanitary and functional facilities for clothes washing Adequate solid waste storage and collection Safe and functional sewage disposal Safe and functional storm water, surface water, and ground water disposal	Infection from poor hand-washing and sewage Infection from pests (rodents, flies, etc)	Visual inspection by trained assessor, including subfloor inspection Test water temperature at hot tap Evidence of pests	Enteric infections

Adequate food preparation areas: Safe and functional cooking device Adequate space/area for food preparation and cleaning, hot water Adequate safe space for food storage	Infection from contaminated food	Visual inspection by trained assessor Test water temperature at hot tap Type and safety of cooking device Surface are and quality of food preparation area	Enteric infections
Adequate safety from falls and other injuries: Safe bath and shower areas Safe decks, surfaces, barriers Safe stairs, treads, risers Safe window sills Safe handrails and grab-rails Safe floor areas Safe outside paths and steps Safe doors and windows Adequate fencing of section Adequate fencing of pool Barriers to the road for young children	Falls associated with baths, etc. Falls on level surfaces, etc. Falls on stairs, etc. Falls between levels Vehicle injuries in driveways Drowning in pools Collision and entrapment Poor ergonomics and operation of amenities Crushed fingers in doors Driveway injury	Visual inspection by trained assessor Measurement of key dimensions (stairs, decks, windows, handrails, paths, pools, and fences) Door closers in windy locations Investigate shared driveways	Injuries and avoidable deaths in home
Adequate safety from fires, electrocution, and explosion: Safe and functional energy source Safe and functional electrical and gas installations Safe and functional wood burner, fire place, chimneys Smoke alarms Adequate escape route and exit ways	Electrical hazards Fire Flames, hot surfaces, etc Explosions	Visual inspection by trained assessor Test water temperature at hot tap Test smoke detectors	Burns, scalds, electrocutions and avoidable deaths in home

Hot water less than 55°C			
External containers of water and fire extinguishers			
Adequate warmth and dryness: Optimal orientation Adequate insulation Adequate draft stopping Adequate heating Adequate site/subfloor drainage Adequate ventilation Minimum indoor temperature	Damp and mould growth Excess cold	Visual inspection by trained assessor Measure thickness of ceiling insulation Test of moisture levels in walls	Excess winter hospitalisations and deaths Asthma
Adequate protection from excess heat: Optimal orientation and shading Adequate insulation Adequate ventilation Safe heating facilities Safe cooking facilities	Excess heat	Visual inspection by trained assessor	Excess summer hospitalisations and deaths
Adequate lighting and sunlight: Adequate natural lighting Adequate artificial lighting	Inadequate or excessive lighting Inadequate sunlight exposure	Visual inspection by trained assessor Measurement of light intensity	Falls at home Reduced sleep and psychological well-being Vitamin D deficiency and associated illnesses
Adequate control of indoor pollutants: Minimum asbestos products No lead paint Water pipes free from lead Minimum combustion products Minimum volatile organic compounds (VOCs)	Asbestos and manufactured mineral fibres Lead paint or pipes Biocides (e.g. timber treatments) Carbon monoxide and fuel combustion products Un-combusted fuel gas Volatile organic compounds – for example formaldehyde Radiation	Visual inspection by trained assessor – especially noting where building material has deteriorated, releasing fibres into the air Testing of paint for lead content Measurement of volatile organic compounds (VOCs) with hand-held device (although the concentration is highly variable over time, making them difficult to measure) Childproof latches on doors with poisons or medications	Acute toxicity or asphyxiation Respiratory illnesses Range of chronic illnesses

Adequate protection from noise: Minimum internal noise sources Adequate insulation from external noise sources	Noise	Visual and aural inspection by trained assessor	Reduced sleep and psychological well-being Potential chronic illnesses
Adequate security, privacy, and space: Secure windows and doors Adequate privacy from neighbours Adequate space for personal activities such as study	Entry by intruders Inadequate space Inadequate privacy	Visual inspection by trained assessor Measurement of floor area	Assaults at home Reduced sleep and psychological well-being Impaired educational attainment
Addresses energy efficiency: Adequate insulation Optimal orientation to sun Effective, sustainable heating Sustainable and non-polluting energy sources (e.g. solar water heating)	Environmental degradation (global warming; depletion of natural resources; environmental pollution)	Visual inspection of insulation in ceiling, walls, floor All heating sources listed	Environmental well-being
Adequate sustainability of water use and waste disposal: Water-saving technology Collection and re-use system for rainwater Sustainable sewage disposal Specific area for storage of recycling	Environmental degradation (global warming; depletion of natural resources; environmental pollution)	Collection of rainwater not currently noted Visual inspection of storm-water and site drainage	Environmental well-being

Keall's table of housing quality features to be examined in a WOF for rental housing [11]. The housing quality features that are in black are potential hazards for unintentional injury in children that a WOF for rental housing could address. The greyed housing quality features are other health hazards that do not relate to unintentional injury in the home.

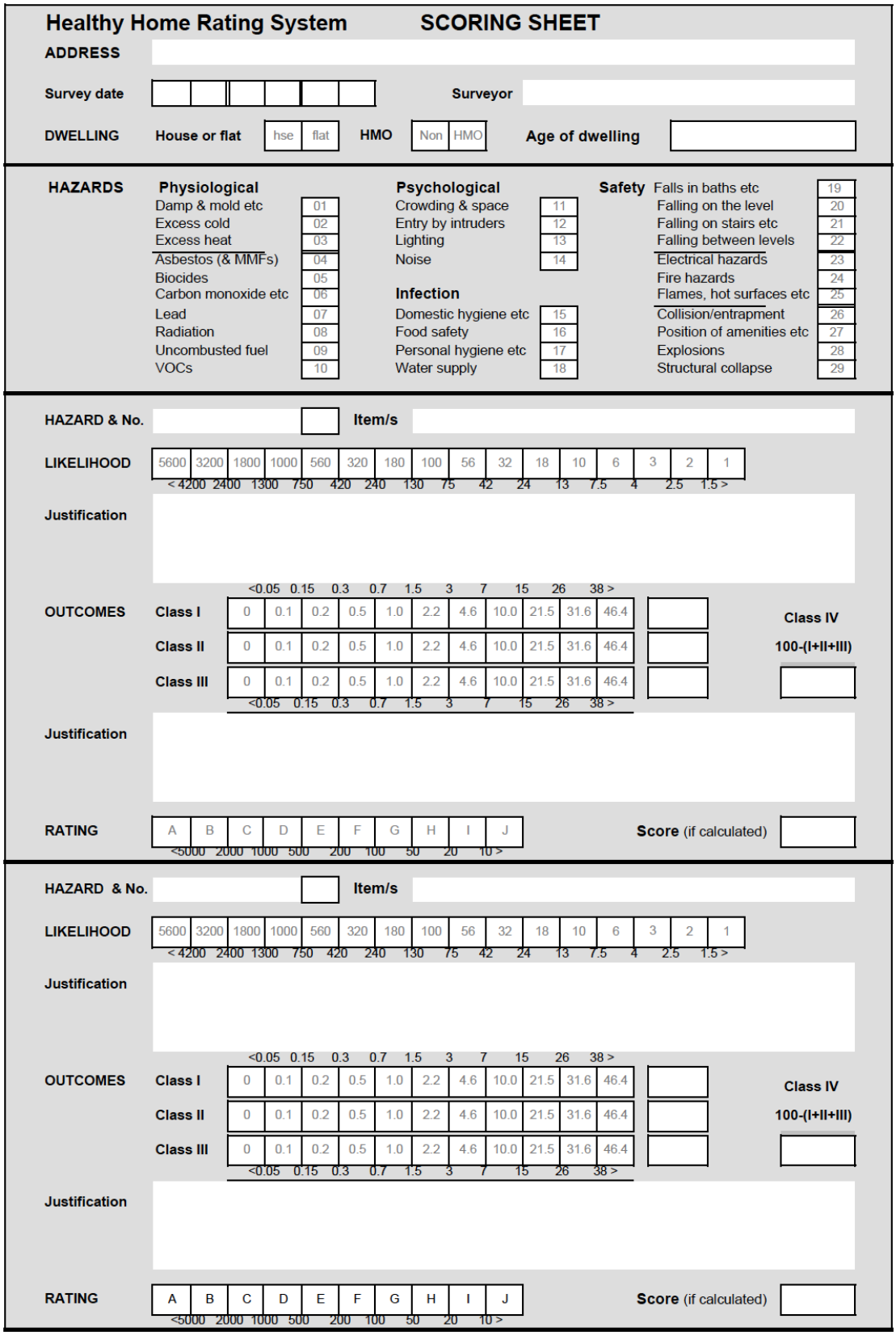
Appendix B International Housing Standards

The UK: Healthy Housing Safety Rating System – house hazards

Physiological	Psychological	Infection	Safety
• Damp & Mould Growth • Cold • Heat • Asbestos and man made fibres • Biocides • Carbon Monoxide • Lead • Radiation • Uncombusted fuel • Volatile organic compounds	• Crowding and Space • Entry by Intruders • Lighting • Noise	• Domestic Hygiene etc. • Food Safety • Personal Hygiene • Water Supply	• Falls in baths etc. • Falls on the level • Falls on stairs etc. • Falls from windows etc. • Electrical hazards • Fire hazards • Hot surfaces etc. • Collision/Entrapment • Ergonomics • Explosions • Structural collapse

[56]

Example HHSRS scoring form:



Healthy Home Rating System **SCORING SHEET**

ADDRESS

Survey date | | | | | | | **Surveyor**

DWELLING **House or flat** hse | flat **HMO** Non | HMO **Age of dwelling**

HAZARDS

Physiological		**Psychological**		**Safety**	
Damp & mold etc	01	Crowding & space	11	Falls in baths etc	19
Excess cold	02	Entry by intruders	12	Falling on the level	20
Excess heat	03	Lighting	13	Falling on stairs etc	21
Asbestos (& MMFs)	04	Noise	14	Falling between levels	22
Biocides	05			Electrical hazards	23
Carbon monoxide etc	06	**Infection**		Fire hazards	24
Lead	07	Domestic hygiene etc	15	Flames, hot surfaces etc	25
Radiation	08	Food safety	16	Collision/entrapment	26
Uncombusted fuel	09	Personal hygiene etc	17	Position of amenities etc	27
VOCs	10	Water supply	18	Explosions	28
				Structural collapse	29

HAZARD & No. | **Item/s**

LIKELIHOOD

5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	2	1
< 4200	2400	1300	750	420	240	130	75	42	24	13	7.5	4	2.5	1.5 >	

Justification

OUTCOMES

	<0.05	0.15	0.3	0.7	1.5	3	7	15	26	38 >
Class I	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4
Class II	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4
Class III	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4

Class IV **100-(I+II+III)**

Justification

RATING

A	B	C	D	E	F	G	H	I	J
<5000	2000	1000	500	200	100	50	20	10 >	

Score (if calculated)

HAZARD & No. | **Item/s**

LIKELIHOOD

5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	2	1
< 4200	2400	1300	750	420	240	130	75	42	24	13	7.5	4	2.5	1.5 >	

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Class II	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4
Class III	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4

Class IV **100-(I+II+III)**

Justification

RATING

A	B	C	D	E	F	G	H	I	J
<5000	2000	1000	500	200	100	50	20	10 >	

Score (if calculated)

HAZARD & No. ☐ **Item/s**

LIKELIHOOD

5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	2	1
< 4200	2400	1300	750	420	240	130	75	42	24	13	7.5	4	2.5	1.5 >	

Justification

OUTCOMES

	<0.05	0.15	0.3	0.7	1.5	3	7	15	26	38 >	
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Class II	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4
Class III	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4

Class IV 100-(I+II+III)

Justification

RATING

A	B	C	D	E	F	G	H	I	J
<5000	2000	1000	500	200	100	50	20	10 >	

Score (if calculated)

HAZARD & No. ☐ **Item/s**

LIKELIHOOD

5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	2	1
< 4200	2400	1300	750	420	240	130	75	42	24	13	7.5	4	2.5	1.5 >	

Justification

OUTCOMES

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Class II	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4
Class III	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4

Class IV 100-(I+II+III)

Justification

RATING

A	B	C	D	E	F	G	H	I	J
<5000	2000	1000	500	200	100	50	20	10 >	

Score (if calculated)

HAZARD & No. ☐ **Item/s**

LIKELIHOOD

5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	2	1
< 4200	2400	1300	750	420	240	130	75	42	24	13	7.5	4	2.5	1.5 >	

Justification

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Class III	0	0.1	0.2	0.5	1.0	2.2	4.6	10.0	21.5	31.6	46.4

Class IV 100-(I+II+III)

Justification

RATING

A	B	C	D	E	F	G	H	I	J
<5000	2000	1000	500	200	100	50	20	10 >	

Score (if calculated)

[56]

The USA: Housing Quality Standards

II. HQS's Provisions

(a) Performance and acceptability requirements

(1) This section states the housing quality standards (HQS) for housing assisted in the programs.

(2) (i) The HQS consist of:

(A) Performance requirements; and

(B) Acceptability criteria or HUD approved variations in the acceptability criteria.

(ii) This section states performance and acceptability criteria for these key aspects of housing quality:

(A) Sanitary facilities;
(B) Food preparation and refuse disposal;
(C) Space and security;
(D) Thermal environment;
(E) Illumination and electricity;
(F) Structure and materials;
(G) Interior air quality;
(H) Water supply;
(I) Lead-based paint;
(J) Access;
(K) Site and neighborhood;
(L) Sanitary condition; and
(M) Smoke detectors.

(3) All program housing must meet the HQS performance requirements both at commencement of assisted occupancy, and throughout the assisted tenancy.

(4)

(i) In addition to meeting HQS performance requirements, the housing must meet the acceptability criteria stated in this section, unless variations are approved by HUD.

(ii) HUD may approve acceptability criteria variations for the following purposes:

(A) Variations which apply standards in local housing codes or other codes adopted by the PHA; or
(B) Variations because of local climatic or geographic conditions.

(iii) Acceptability criteria variations may only be approved by HUD pursuant to paragraph (a)(4)(ii) of this section if such variations either:

(A) Meet or exceed the performance requirements; or
(B) Significantly expand affordable housing opportunities for families assisted under the program.

(iv) HUD will not approve any acceptability criteria variation if HUD believes that such variation is likely to adversely affect the health or safety of participant families, or severely restrict housing choice.

(b) Sanitary facilities

(1) Performance requirements. The dwelling unit must include sanitary facilities located in the unit. The sanitary facilities must be in proper operating

condition, and adequate for personal cleanliness and the disposal of human waste. The sanitary facilities must be usable in privacy.

(2) Acceptability criteria.

(i) The bathroom must be located in a separate private room and have a flush toilet in proper operating condition.

(ii) The dwelling unit must have a fixed basin in proper operating condition, with a sink trap and hot and cold running water.

(iii) The dwelling unit must have a shower or a tub in proper operating condition with hot and cold running water.

(iv) The facilities must utilize an approvable public or private disposal system (including a locally approvable septic system).

(c) Food preparation and refuse disposal

(1) Performance requirement.

(i) The dwelling unit must have suitable space and equipment to store, prepare, and serve foods in a sanitary manner.

(ii) There must be adequate facilities and services for the sanitary disposal of food wastes and refuse, including facilities for temporary storage where necessary (e.g, garbage cans).

(2) Acceptability criteria.

(i) The dwelling unit must have an oven, and a stove or range, and a refrigerator of appropriate size for the family. All of the equipment must be in proper operating condition. The equipment may be supplied by either the owner or the family. A microwave oven may be substituted for a tenant-supplied oven and stove or range. A microwave oven may be substituted for an owner-supplied oven and stove or range if the tenant agrees and microwave ovens are furnished instead of an oven and stove or range to both subsidized and unsubsidized tenants in the building or premises.

(ii) The dwelling unit must have a kitchen sink in proper operating condition, with a sink trap and hot and cold running water. The sink must drain into an approvable public or private system.

(iii) The dwelling unit must have space for the storage, preparation, and serving of food.

(iv) There must be facilities and services for the sanitary disposal of food waste and refuse, including temporary storage facilities where necessary (e.g., garbage cans).

(d) Space and security

(1) Performance requirement. The dwelling unit must provide adequate space and security for the family.

(2) Acceptability criteria.

(i) At a minimum, the dwelling unit must have a living room, a kitchen area, and a bathroom.

(ii) The dwelling unit must have at least one bedroom or living/sleeping room for each two persons. Children of opposite sex, other than very young children, may not be required to occupy the same bedroom or living/sleeping room.

(iii) Dwelling unit windows that are accessible from the outside, such as basement, first floor, and fire escape windows, must be lockable (such as window units with sash pins or sash locks, and combination windows with latches). Windows that are nailed shut are acceptable only if these

windows are not needed for ventilation or as an alternate exit in case of fire.

(iv) The exterior doors of the dwelling unit must be lockable. Exterior doors are doors by which someone can enter or exit the dwelling unit.

(e) Thermal environment

(1) Performance requirement. The dwelling unit must have and be capable of maintaining a thermal environment healthy for the human body.

(2) Acceptability criteria.

(i) There must be a safe system for heating the dwelling unit (and a safe cooling system, where present). The system must be in proper operating condition. The system must be able to provide adequate heat (and cooling, if applicable), either directly or indirectly, to each room, in order to assure a healthy living environment appropriate to the climate.

(ii) The dwelling unit must not contain unvented room heaters that burn gas, oil, or kerosene. Electric heaters are acceptable.

(f) Illumination and electricity

(1) Performance requirement. Each room must have adequate natural or artificial illumination to permit normal indoor activities and to support the health and safety of occupants. The dwelling unit must have sufficient electrical sources so occupants can use essential electrical appliances. The electrical fixtures and wiring must ensure safety from fire.

(2) Acceptability criteria.

(i) There must be at least one window in the living room and in each sleeping room.

(ii) The kitchen area and the bathroom must have a permanent ceiling or wall light fixture in proper operating condition. The kitchen area must also have at least one electrical outlet in proper operating condition.

(iii) The living room and each bedroom must have at least two electrical outlets in proper operating condition. Permanent overhead or wall-mounted light fixtures may count as one of the required electrical outlets.

(g) Structure and materials

(1) Performance requirement. The dwelling unit must be structurally sound. The structure must not present any threat to the health and safety of the occupants and must protect the occupants from the environment.

(2) Acceptability criteria.

(i) Ceilings, walls, and floors must not have any serious defects such as severe bulging or leaning, large holes, loose surface materials, severe buckling, missing parts, or other serious damage.

(ii) The roof must be structurally sound and weathertight.

(iii) The exterior wall structure and surface must not have any serious defects such as serious leaning, buckling, sagging, large holes, or defects that may result in air infiltration or vermin infestation.

(iv) The condition and equipment of interior and exterior stairs, halls, porches, walkways, etc., must not present a danger of tripping and falling. For example, broken or missing steps or loose boards are unacceptable.

(v) Elevators must be working and safe.

(h) Interior air quality

(1) Performance requirement. The dwelling unit must be free of pollutants in the air at levels that threaten the health of the occupants.

(2) Acceptability criteria.

(i) The dwelling unit must be free from dangerous levels of air pollution from carbon monoxide, sewer gas, fuel gas, dust, and other harmful pollutants.

(ii) There must be adequate air circulation in the dwelling unit.

(iii) Bathroom areas must have one openable window or other adequate exhaust ventilation.

(iv) Any room used for sleeping must have at least one window. If the window is designed to be openable, the window must work.

(i) Water supply

(1) Performance requirement. The water supply must be free from contamination.

(2) Acceptability criteria. The dwelling unit must be served by an approvable public or private water supply that is sanitary and free from contamination.

(j) Lead-based paint performance requirement

The Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821–4846), the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851–4856), and implementing regulations at part 35, subparts A, B, M, and R of this title apply to units assisted under this part.

(k) Access performance requirement

The dwelling unit must be able to be used and maintained without unauthorized use of other private properties. The building must provide an alternate means of exit in case of fire (such as fire stairs or egress through windows).

(l) Site and Neighborhood

(1) Performance requirement. The site and neighborhood must be reasonably free from disturbing noises and reverberations and other dangers to the health, safety, and general welfare of the occupants.

(2) Acceptability criteria. The site and neighborhood may not be subject to serious adverse environmental conditions, natural or manmade, such as dangerous walks or steps; instability; flooding, poor drainage, septic tank back-ups or sewage hazards; mudslides; abnormal air pollution, smoke or dust; excessive noise, vibration or vehicular traffic; excessive accumulations of trash; vermin or rodent infestation; or fire hazards.

(m) Sanitary condition—

(1) Performance requirement. The dwelling unit and its equipment must be in sanitary condition.

(2) Acceptability criteria. The dwelling unit and its equipment must be free of vermin and rodent infestation.

(n) Smoke detectors performance requirement—

(1) Except as provided in paragraph (n)(2) of this section, each dwelling unit must have at least one battery-operated or hard-wired smoke detector, in proper operating condition, on each level of the dwelling unit, including basements but excepting crawl spaces and unfinished attics. Smoke detectors must be installed in accordance with and meet the requirements of the National Fire Protection Association Standard (NFPA) 74 (or its successor standards). If the dwelling unit is occupied by any hearing-impaired person, smoke detectors must have an alarm system, designed for hearing-impaired persons as specified in NFPA 74 (or successor standards).

(2) For units assisted prior to April 24, 1993, owners who installed battery-operated or hard-wired smoke detectors prior to April 24, 1993 in compliance with HUD's smoke detector requirements, including the

regulations published on July 30, 1992, (57 FR 33846), will not be required subsequently to comply with any additional requirements mandated by NFPA 74 (i.e., the owner would not be required to install a smoke detector in a basement not used for living purposes, nor would the owner be required to change the location of the smoke detectors that have already been installed on the other floors of the unit).

Information from: http://www.healthyhomestraining.org/codes/HQS.htm (Accessed 28 January 2013)

Alberta, Canada: Minimum Housing and Health Standards

An owner must maintain the premises according to the provincial Minimum Housing and Health Standards. These standards are contained in a regulation made under the *Public Health Act*. These requirements go into considerably more detail and require the landlord to:

- Maintain the roof and exterior cladding of walls in a waterproof, windproof, and weatherproof condition;

- Keep windows and exterior doors in good repair;

- Protect against cold weather by providing storm windows or double-glazing in premises used during the winter;

- Provide screens for windows and other ventilation outlets at the times of year when insects are prevalent;

- Ensure exterior windows and doors can be locked;

- Maintain inside or outside stairs and porches, including treads, risers, supports, rails, guards, and balconies;

- Maintain all walls, windows, ceilings, floor and floor coverings such that they are in good repair and easy to clean;

- Ensure that the heating can heat the rooms to at least 22 degrees Celsius, unless the outside temperature is colder than a limit set by the Alberta Building Code. Then, the indoor temperature must be between 16 and 22 degrees Celsius;

- Ensure that there is a continuous supply of electricity, water, and heat unless the rental agreement provides that these are your responsibility;

- Ensure that all hot running water is maintained between 46 and 60 degrees Celsius;

- Ensure cooking and refrigeration equipment is provided and maintained unless the rental agreement states that you are responsible for these items; and

- Ensure the premises are free of pest infestations.

Landlords can be reported to Alberta Health Services if tenants feel public health standards are not being maintained. Executive officers enforce public health standards. An executive officer has the power to inspect premises to determine if an owner is complying with public health regulations. If an owner will not allow entry to the premises, the executive officer can apply for a court order. If the executive officer inspects the property and determines that public health standards are not being met, the officer can issue a number of different orders. The orders include declarations that the premises are unfit for human habitation, that the premises

should be vacated, or that work should be carried out on the property to ensure compliance with standards. The landlord can appeal to the Public Health Board.

Information from:
http://www.landlordandtenant.org/disputeresolutionfacts/health_requirements.aspx?id=241 (Accessed 15 February 2013).

More information available from: http://www.health.alberta.ca/documents/Standards-Housing-Minimum.pdf (Accessed 20 February 2013).