Kiwi Pride? A Snapshot of Wellington Paediatric Admissions
An Audit of Potential Risk Factors in Child Hospitalisation

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EXECUTIVE SUMMARY

This Report is the culmination of a Public Health Project undertaken by a group of fourteen 4th Year Medical Students from the University of Otago Wellington School of Medicine. The project was carried out as part of the 4th Year of the MBChB programme. The Report has been produced for the Project’s two clients, the Office of the Children’s Commissioner and the Sub-Regional Child Health Project.

The project aimed to identify the prevalence of exposure to specific modifiable risk factors in a group of children hospitalised acutely at Wellington Regional Hospital over a two week, mid-winter period.

For at least three decades there has been an implicit promise from successive New Zealand Governments that public policy will reduce adverse health inequalities between ethnic groups without producing convincing results. However, due to continuing large ethnic disparities in health in New Zealand and more specifically in the Capital and Coast District Health Board (CCDHB) catchment, we were interested to know about how differential exposure to hazardous housing risk factors might play a role in health inequality. A further aim of the project was to investigate the potential for more routine identification of such exposures in a hospital setting and to identify priorities for future research.

The study design encompassed both quantitative as well as a significant qualitative element. Key informant interviews were undertaken with 22 individuals and organisations to try to place our work within a wider social context.

We administered a standardised questionnaire to the parents/guardians of children admitted acutely to the paediatric wards during a two-week period in July 2012. The questionnaire was designed to identify exposures of children to a range of factors relevant to their health, including: housing conditions, access to primary care, health literacy of the primary care-giver, injury hazards, vaccination status, experience of racism, and financial hardship. To our knowledge this is the first time a standardised questionnaire aimed at assessing a child’s exposure to these factors has been used in an unselected cohort of children in a New Zealand hospital.

All acute childhood admissions during the study period were eligible for inclusion. Elective surgical admissions and children over the age of 15 were excluded. We interviewed the parents/guardians of 106/149 (71%) of eligible admissions. 30/149 (20%) were discharged prior to interview, and 13/149 (9%) declined to participate.

Key informant interviews were undertaken with 22 people, including parliamentarians, public servants, clinicians and health managers and leaders in the NGO sector. The objective of the key informant interviews was to identify the information requirements of a range of stakeholders, to solicit opinions and identify themes in relation to the aims of the study.

The main quantitative findings of the study were as follows. Firstly, Pacific Island children were over-represented in our sample when compared to the proportion of Pacific children in the CCDHB catchment area (23% vs. 13%). Secondly, children from highly socio-economically deprived areas (2006 NZDep, Index 8-10) were over represented in our study. We found that 40% of the children in
this study were from these highly socio-economic deprived areas, compared to only 26% of children in the CCDHB catchment area.

There was a significant association between Pacific ethnicity and exposure to cold and crowded homes. Pacific children were five times more likely to be exposed to a cold home than the NZ European population (OR 5.0, 95% CI 1.8-16.4, P<0.01) and almost six times more likely to live in overcrowded houses (OR 5.6, 95% CI 2.1-15.6, P<0.01) than non-Pacific children. Seventy-nine per cent of Pacific Island parents/guardians reported that their children lived in a house colder than they would have liked in the last month.

Twenty-six per cent of Māori children lived in overcrowded houses. Seventy per cent of Māori children had at least one exposure to a risk factor associated with cold with 20% reporting exposure to all 4 risk factors. These findings were not statistically significant, probably due to our small sample size.

We also found that a high proportion (40%) of the children in our study was exposed to second-hand cigarette smoke compared to a national average of 11%. There was a weak association between children exposed to 2nd hand smoke and admissions for respiratory conditions OR=2.1 (95% CI 0.9-4.9, p-value 0.0735). Of all the types of diagnoses in our cohort, respiratory diagnoses were the most frequent. Respiratory diagnoses made up 32% of the total, with the next most common diagnosis being gastro-intestinal (16%).

Key Informant interviews enabled us to gather a range of perspectives on the issue of poor child health and the potential role for more routine identification of children at high risk of exposure to household hazards in the hospital setting. We were able to identify a number of themes from the key informant interviews. Participants were in general agreement about the importance of improving child health and were able to identify significant barriers which have historically slowed progress. However, there was fundamental disagreement amongst those interviewed about the correct way forward in terms of legislative, budgetary and regulatory matters in relation to both housing and health, as well as the status of children in legislation and planning at the level of government.

The study demonstrated that a 15-20 minute questionnaire can be applied by relatively inexperienced students in a hospital setting to determine a child’s exposure to known modifiable risk factors. Given the impact these risk factors have on a child’s health and safety, this study raises the question of whether such a questionnaire (or a shortened screening version), should be routinely used on paediatric wards to identify children who have exposure to these risk factors.

The study’s findings provide strong endorsement of the importance of housing issues for Pacific communities living in the CCDHB catchment area. It supports the existing body of evidence that demonstrates that Pacific Island children and children from low-income families suffer a greater burden of ill-health in New Zealand. Our findings also support the evidence that identifies cigarette smoke and cold and crowded houses as important risk factors for children’s health.

This was largely a descriptive study due to its small sample size. Some issues were identified around whether the comparator datasets were truly comparable due to different inclusion/exclusion criteria used. This could make extrapolation and transferability problematic. There was some heterogeneity
in terms of the approach of the 14 students who undertook the interviews in terms of how primary
diagnoses and determinations of preventability were assigned. In addition, we have not analysed the
demographics or clinical presentation of the 30 admissions (20%) discharged prior to interview and
this may constitute a bias.

Over the past decade there have been significant efforts to categorise hospitalisations according to
whether they may be preventable at a population level – these are termed population preventable
hospitalisations (PPH) or preventable through changes in primary care – termed ambulatory (care)
sensitive hospitalisations (ASH). Our study confirmed that children admitted acutely to Wellington
Hospital have significant exposures to potentially modifiable risk factors in the form of both PPH and
ASH. It also solicited opinions from within the health, social and housing sectors as to what policy
and service initiatives might lessen these exposures.

We recommend that serious consideration is given to the further development and implementation
of in-hospital screening of acute childhood hospital admissions for exposure to preventable risk
factors.
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INTRODUCTION

New Zealand is a relatively prosperous nation with a high standard of healthcare, education and other social services (1). However, compared to other countries in the Organisation for Economic Co-operation and Development (OECD), New Zealand has a low standard of child health and safety (1). The ‘Doing Better for Children’ report (2), released in 2009, revealed that New Zealand is ranked 29th out of 30 countries in the OECD for overall child health and safety. The report ranked New Zealand as (1):

- 21st for infant mortality,
- 20th for the percentage of children living in poor houses,
- Having 14 times the average OECD rate of rheumatic fever, and
- Having rates of whooping cough and pneumonia 5-10 times greater than the United Kingdom and United States.

Child health and safety in New Zealand has not always been this poor (1). In the 1970s, New Zealand was ranked in the top third of the OECD for most indicators of child well-being (1). However, during the early part of the 21st century New Zealand slipped to the bottom third (1). The current, poor state of child health and safety in New Zealand has not gone unnoticed (3). Policy makers, academics, advocacy groups and hospital and community clinicians have all expressed concern and placed great emphasis on the improvement of child health (3).

A number of initiatives in the 2000s sought to investigate and rectify the state of child health in New Zealand. These culminated in 2010 with a report from the Public Health Advisory Committee entitled ‘The Best Start in Life: Achieving effective action on child health and wellbeing’ (1). However, despite this interest in the area, the state of child health and safety in New Zealand has not improved (3). Both national and Capital and Coast District Health Board (CCDHB) rates of acute childhood hospital admissions have been increasing since 2006 (4). CCDHB acute paediatric hospital admissions have been increasing at a faster rate than national rates since 2006 (4).

Craig et al. analysed all acute hospitalisations of children in New Zealand between the years 2005 and 2009 and found that 47.4% of these hospitalisations could be classified as potentially avoidable hospitalisations (PAH), 34.3% as ambulatory-care sensitive hospitalisations (ACSH), and 9.7% as non-avoidable (5). According to Craig et al. many of the hospitalisation in children in New Zealand may be preventable (5). PAH are hospitalisations preventable by a focus on the broader determinants of health, whereas ACSH are hospitalisations that are preventable by early and effective primary care (5).

The data from Craig et al. demonstrate that not only has there been an increase in the number of children admitted to hospital since 2006, but that the majority of these admissions were probably avoidable, given appropriate action (5). Amongst the important modifiable risk factors in the ASH category are: access to primary health care, as well as the health literacy of parents/guardian of the
children. In terms of PAH, it is known that there has been an increasing focus on housing as a central determinant of child health (3). Poor housing has been shown to have direct effects on numerous health outcomes (3), including: respiratory symptoms, coronary events, deaths from fire, injury from home hazards and mental health problems.

The genesis of the present study was an expression of concern received by the Department of Public Health from Paediatricians about the high number of potentially avoidable childhood admissions at Wellington Hospital. The Department hosts a large interdisciplinary research team focussing on housing and health led by Professors Philippa Howden-Chapman and Michael Baker.

The aim of our study was to identify the prevalence of exposure to potentially modifiable risk factors for children who were admitted acutely to Wellington Hospital over a two week period in July 2012. To our knowledge this is the first time a standardised questionnaire aimed at assessing a child’s exposure to these risk factors has been used in an unselected cohort of children in a New Zealand hospital.

We were also interested to know about any ethnic disparities that might be present in terms of exposure to the risk factors. In New Zealand there are significant ethnic inequalities in child health outcomes. Barnett and Malcolm (6) examined hospital admission data from 2005-2007, comparing avoidable hospital admission rates between General Practice Clinics in Christchurch. They found that Māori and Pacific children had an avoidable admission rate around one and a half times higher than European children (6). A pertinent illustration of the severity of ethnic inequalities in health lies in the example of the rates of acute rheumatic fever. For the years 1996-2005, 5-14 year old Māori and Pacific children comprised only 4.7% of the New Zealand population, but they accounted for 59.5% of the cases of acute rheumatic fever (7). This is a potentially life threatening condition which is all but eradicated in many developed nations. Many of these large ethnic disparities are also known to exist in the CCDHB catchment area. Discrimination on the basis of ethnicity was also an area interest in our study.

A further aim of the project was to investigate the potential for more routine identification of such exposures in a hospital setting and to identify priorities for future research.

AIMS

1. To measure the prevalence of probable risk factors for child hospitalisation in the CCDHB area, with a particular focus on housing conditions and other modifiable exposures. Cases were children less than 15 years of age admitted to hospital with an acute illness or injury.

2. To identify the proportion of acute admissions that was potentially avoidable hospitalisations (PAH). This analysis could distinguish those preventable by population health interventions (population preventable hospitalisations/PPH) and/or by effective primary care (ambulatory sensitive hospitalisations/ASH).

3. To assess the feasibility of a potential study (case-control or case-case) to quantify the impact of risk factors for child hospitalisation using a suitable control population (eg. children under 15 years of age having elective hospital admissions or children identified through other means).
RESEARCH QUESTIONS

• What is the prevalence of exposure to probable housing hazards and poor housing conditions (and potentially other important risk factors) in the inpatient paediatric population?

• How are these exposures distributed according to ethnicity and socioeconomic position?

• Does the classification of conditions as PAH (and sub-categories such as PPH and ASH) appear valid when considering the individual circumstances of admitted patients?

• Is there a coherent subset of housing related PAH?

• Is there potential to measure the prevalence of hazardous exposures as part of comprehensive child health surveillance?

• Is there a group of paediatric inpatients, who could be used as a control population in a future study to assess the impact of housing hazards on paediatric admissions? Or other useful sources of data on control/comparison populations of NZ children?

• Is there evidence of important barriers to primary medical care for children (including cost and travel) and are these barriers contributing to PAH?

• What is the level of knowledge (health literacy) among parents about important health hazards and diseases affecting children and how to prevent and treat them?

• Would screening for poor housing conditions be justified based on the prevalence of such exposures and their likely impact on the health of children?

• If such screening was implemented, what hazards should be screened for? And what interventions might result from such screening.
LITERATURE REVIEW

This literature review investigates the current body of research surrounding the context of the questionnaire that forms the basis of our study. It focuses on a range of potentially avoidable risk factors for the hospitalisation of children in New Zealand. There are some uncertainties around the relative contribution of adequate, affordable primary care services and the broader determinants of health, such as housing and fuel poverty, to health outcomes. In this literature review we consider the role of health services, the contribution of housing to health and various interventions trialled in the community setting. We also discuss the existing body of evidence and confusion regarding the term health literacy.

Potentially Avoidable Hospitalisations

There has been increasing interest in the reduction of avoidable hospitalisations, particularly by increasing access to primary care. New Zealand has a large socioeconomic gradient in hospitalisations for many paediatric conditions, which suggests that the social determinants of health (housing, income, employment) also greatly influence avoidable hospitalisations (5). The study by Anderson and Craig et al (5) attempts to develop potentially avoidable and ambulatory care sensitive indicators for the New Zealand paediatric population. Potentially avoidable hospitalisations (PAH) incorporate the broader determinants of health, such as national or local government policies (5). Ambulatory Care Sensitive Hospitalisations (ASH) are intended to reflect the role of primary care in reducing hospitalisation rates and include conditions that are sensitive to early prophylactic or therapeutic interventions (4,5). The rates of avoidable hospitalisations are highest in infancy with the most common cause being infectious diseases (11). Children 1-14 years have a lower rate than infants but avoidable hospitalisations still account for 47% of all admissions in 1997-1998 (11). The most common cause was asthma (11). Many PAH tend to be infectious or respiratory in nature (5), which are the types of diseases where housing conditions might influence their development or exacerbation.

Ethnicity/Inequality

Disparities in health status between different population groups are found worldwide (28). In New Zealand, ethnic inequalities in health between Māori and non-Māori are wide-spread (28). Health inequalities are “unnecessary and avoidable, but in addition are considered unfair and unjust” (as cited in (28)). The concept of health inequalities is important in our study, because they appear very early on in life and can be shown for the most common causes of hospitalisation and injury (29).

Māori and Pacific children aged 5-14 comprised 59.5% of cases of acute rheumatic fever in NZ from 1996-2005, yet comprised only 4.7% of the NZ population (7). These data show how concentrated this disease is in these specific populations (7). Rates were 10.0 times higher for Māori and 20.7 times higher for Pacific Islanders compared to European. In addition to this, rates were decreasing for New Zealand Europeans and Others through this time period, whilst rates for Māori and Pacific Islanders were increasing.
Barnett and Malcolm (6) examined hospital admission data for 2005-2007, comparing avoidable hospital admission rates between GP surgeries in Christchurch. They found that there were significant differences in rates according to levels of deprivation and ethnicity (6). With regards to ethnicity, Māori and Pacific children had avoidable admission rates of 1.6 and 1.5 times greater than that of European children (6).

Discrimination on the basis of ethnicity is also an area of interest in our study. In a national survey, Māori reported the highest rate of ‘ever’ experiencing racial discrimination and were also more likely to report experiencing multiple forms of racial discrimination (28). A cross-sectional study by Crengle et al. showed that the experience of ethnic discrimination has been associated with a range of adverse health outcomes (30).

**Housing and Health**

**Cold / Damp**

A cross-sectional study (12) explored the relationship between damp housing and health. The influence of cold housing on health was the most important housing variable in relation to health status and had a greater effect on health than any other health related behaviours such as exercise and smoking. Cold environments also had a positive dose response relationship with poor health status. Dampness also had a significant and linear association with health status, though not to the magnitude of dampness.

A study of trends and determinants of excess winter mortality in New Zealand (13), indicated that mortality from diseases of the respiratory system were the most dependent on seasonal effects.

An article by Howden-Chapman et al. investigated policies, research and health impacts associated with cold housing and fuel poverty in New Zealand (14). The authors suggested possible explanations for why people live in cold houses (lack of disposable income to adequately heat homes as one possibility) and also highlighted the disparity between the residential electricity use in NZ and other OECD countries. Further points were that low income houses pay a high proportion of their income for residential energy in New Zealand and fuel poverty and cold, damp houses remains a significant policy problem.

More investigation from Howden-Chapman et al. (15) describes interventions that have been successful in increasing temperatures in existing homes along with the three objectives served by improved household heating, namely improved health, improved energy security and a reduction in CO2 emissions. The authors again pointed out that demand for energy was affected by socioeconomic and cultural patterns of household heating as well as local factors such as architectural traditions and building conditions. For example, NZ houses tend to be older, lightly constructed and more poorly insulated than houses in other countries with similar climates. Rental properties tend to be older and in poorer condition. Overall, NZ homes are under-heated by international standards.

Internationally, Bhattacharya (16) analysed data from Centers for Disease Control and Prevention (CDC) and the Consumer Expenditure Survey between 1980 and 1998 to determine the potential link
between health and expenditure on food and fuel, comparing wealthy and poor families. Researchers noted a clear decrease in food expenditure and increase in fuel expenditure during winters; poorer families reduced their food intake in winter in order to afford minimal house heating. The same pattern was **not** observed in wealthier families. The authors concluded that the nutritional well-being for poorer families, including children in the household, was more vulnerable in cold winters due to resource allocation towards fuel (heating) consumption.

**Overcrowding**

Crowding occurs when the dwellings that people live in are too small to accommodate the number of people in that household (17). One measure used for crowding is the Canadian National Occupancy Standards (17). Rates of crowding for the total population have steadily decreased between 1986-2001 (17). According to Statistics New Zealand, approximately 16% of children in New Zealand live in crowded houses (17). Māori have consistently lived in more crowded conditions than Europeans, but Pacific peoples have experienced the highest levels of crowding in recent years (17). Rates of crowding are particularly high among children in some ethnic groups, especially Māori and Pacific children (17). There are numerous factors that have been said to influence the different rates of crowding among ethnic groups including: recent migration, larger households, living arrangements, lower incomes and lack of large homes, particularly rental homes (17).

Jaine et. al.(18) compared hospitalisation data with Census data to determine household overcrowding and found that ARF rates were positively related to household crowding across all age groups. Living in crowded conditions increases the risk of the spread of infectious diseases (17). Baker et al. (19) also found that children living in crowded houses are at greater risk of contracting meningococcal disease, tuberculosis and rheumatic fever. Analysis of emergency admission rates for common presentations in London (20) also identified overcrowding as the strongest risk factor correlated with admissions for breathing difficulty.

**Air / Respiratory Problems**

Schwartz (21) describes child lungs as more susceptible to air pollution. The physiological/anatomical explanation is that children have a larger lung surface area/kg of body weight than adults and breathe 50% more air/kg of body weight than adults leading to lasting effects on respiratory health. Infants are more sensitive to fluctuations in temperature that would be comfortable for older individuals (22).

A report on the burden of asthma in New Zealand in 2001 (23) noted that NZ had one of the highest prevalence rates in the world, with 15% to 20% of children affected. Asthma was the most common cause of hospital admission in children in NZ, which was one of the highest rates of hospital admission for asthma in the world. Māori and Pacific Island children had a prevalence of 22% and 20% respectively, compared with Non-Polynesian prevalence of 15%.

Asthma exacerbations and acute hospitalisations are positively correlated with dampness (24), independent of hypersensitivity to moulds or dust mites. This finding suggests that dampness alone is an independent risk factor for asthma exacerbation.
There is also an association between environmental tobacco smoking exposure with an increased risk of hospital admission with pneumonia for children under 5 (25). The effect of having more than one smoker in the house was no different to having one and parental smoking did not have a greater association than having others in the house smoking. This study was undertaken in Vietnam, which has a different smoking profile to that of New Zealand, which has smoke-free environments and other smoking behaviours such as a tendency to smoke outdoors therefore there are limits to the generalisability of the study.

**Skin Infections**

A study by O'Sullivan et. al.(26) suggests that hospital admissions for serious skin infections have increased in New Zealand between 1990 and 2007. The researchers conducted a retrospective analysis of hospital admissions and found a 50% increase in total with more marked increases for at-risk groups – those with greater socio-economic deprivation, Māori and Pacific. The risk of admission for infectious disease was heightened in the most economically deprived, Māori and Pacific peoples and the youngest and oldest population groups (4). Ethnic and deprivation-related disparities also increased significantly over this time and contributed significantly to the increasing incidence of disease, however these factors cannot explain the total increase as rates have risen across the population. The authors identified inequality as a risk factor for childhood serious infection. Ethnic inequalities in risk had a much stronger effect on infectious disease than non-infectious disease (4). Baker et al. (4) found that from 1989-2008, the age standardised rate of infectious diseases increased strikingly compared with non-infectious disease (51.3% versus 7.3% respectively). Most of these infectious disease admissions were made up of lower respiratory tract infections, skin and soft tissue infections and enteric infections (4).

**Home Hazards and Injury**

Keall et. al.(27) conducted a study of 102 households in the greater Wellington region, assessing the relationship between home hazards and injuries in the home. The hazards included: inadequate handrails for the stairs, steep slippery outdoor paths, unsafe electrical wiring, insecure carpets on stairs(27). Injury outcomes were assessed using data from the New Zealand Accident Compensation Corporation (ACC). There was a statistically significant 22% increase in the odds of injury as the number of identified home hazards increased (27). However contrary to other literature in this area, this study found that there was a decreasing trend for reported injuries as the deprivation level increased (27).

**Housing Interventions**

Findings based on work done in the Healthy Housing Programme (31) that operated in Counties Manukau DHB from 2001 to 2007 suggested improved health with housing improvements. The study involved 9736 homes and examined the influence of health and social service interventions such as insulation, heating, ventilation and overcrowding initiatives on acute hospital admissions. Almost all homes were ethnically Pacific, all were NZDep 10. The study found reduced rate of acute admission to hospital in those aged 0-34, with a significant reduction in housing-related hospitalisations.

The Housing, Insulation and Health study implemented in 2007, aimed to determine whether insulating existing homes would increase indoor temperatures and improve the participants health.
This was a randomised control trial based in seven low income communities throughout New Zealand, where the intervention group had their houses insulated after baseline measures were taken in the study’s first winter (32). The insulation of existing homes demonstrated significant improvements in self-reported health for the occupants, occurrence of wheeze, winter cold and flu and morning phlegm, along with a less significant reduction in primary and hospital care (33). The study also highlighted reduced energy consumption in the newly insulated homes, suggesting a cost saving in heating.

An economic analysis of the insulation study showed that further to the health benefits associated with insulation of existing homes, there are net cost benefits associated with this type of intervention (34). These include health benefits such as GP, hospital admissions and time off work, energy benefits and greenhouse gas emissions. Chapman et al. (34) found a significant benefit-cost ratio of 1.87:1, two-thirds of which related to reductions in hospital admissions.

Internationally, a study conducted by Frank et. al.(35) measured the effect of a federal home energy assistance program for low-income families on aspects of health. The researchers found that those children who did not receive home energy aid had a 30% greater adjusted odds ratio of acute hospitalisation.

A systematic review of the literature on the health effects of housing improvements (36) since 1887 included 18 primary intervention studies, 11 of which were prospective. Many demonstrated improvements in at least self-reported health outcomes following re-housing however the contribution of housing to health (as judged through effect sizes found) tended to be small. Significantly, improvements in general, respiratory and mental health following warmth and energy efficiency interventions were noted in New Zealand studies, but when reproduced in the UK findings were less significant. Most studies did not show statistical significance with hospitalisation and housing conditions however the authors noted the material heterogeneity between studies and the poor quality of many studies. It was also noted that most studies tended to have short durations thus underestimating benefits by neglecting to examine the full potential of interventions. The greatest benefits from interventions lay with low socioeconomic status groups with poor health, living in poor housing.

**Access to Healthcare**

Tan et. al. (8) have reported on the impact of primary healthcare investment in Capital and Coast District Health Board (CCDHB). They found that investment to improve equity of access and investment in services to influence social determinants of health resulted in reduced ambulatory sensitive hospitalisations and ED attendances for the enrolled population. These improvements were particularly striking for Māori, Pacific, high deprivation and youth populations. The authors concluded that reducing cost barriers to primary health care is important to reduce inequalities between populations. Another study by Mills (9) details the cost of child health inequalities in Aotearoa New Zealand. The author analysed hospital admissions for children <15 yrs in the period 2003-2007, identifying areas of health inequity between indigenous Māori and non- Māori children and classifying potentially avoidable admissions. Mills determined that 36% of admissions in the age group were potentially avoidable and areas of inequity included pharmaceutical claims, avoidable mortality, lab utilisation and primary care. The author concluded that health inequities between the
two groups described remain significant and persistent, particularly in relation to infectious diseases, injury and infant and child mortality rates.

A study that assessed access to general practice for Pacific peoples (10) identifies factors in primary care that could act as barriers to access for Pacific peoples. Participants were recruited by Pegasus Health (a Christchurch-based PHO) through known Pacific networks. Semi-structured interviews were utilised. There is evidence that access to healthcare for Pacific peoples is less than for other population groups. Analysis of the interviews revealed five themes; Language and communications, rushed consultations, appointment availability, reception and Pacific presence as difficulties in accessing primary healthcare.

**Health Literacy**

Health literacy is a relatively new term in New Zealand leading to very little academic literature on the concept. Internationally it has been defined in terms of health illiteracy, individual patient’s literacy levels and as an important part of health education.

Multiple definitions exist for the term health illiteracy. For example it can be defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions’ (Kickbusch et. al. 2005, cited in (37)). The majority of research in this area deals with reading and communication skills within a medical setting. We found a limited amount of research that evaluated how much a population’s health education is assessed. It was also difficult to find tools to evaluate the knowledge of patients in regards to their condition, general health or the factors that promote or protect health.

Health literacy can also be viewed as a description of the relationship between a patient’s literacy level and their ability to understand and use health information (38). Health education is one tool used in the promotion of health and the prevention of disease. Over the past two decades, health promotion has been the accepted way of addressing public health concerns in Australia and New Zealand and there is the perception that increasing levels of health literacy will enhance health promotion (Wise & Signal, 2000, cited in (39)).

WHO (cited in (38)) defines health literacy more broadly; “Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health. Health literacy means more than being able to read pamphlets and successfully make appointments. By improving people’s access to health information and their capacity to use it effectively, health literacy is critical to empowerment”.

A systematic review by Dewalt et al. (40) and others looked at literature published between 1980 and 2008 on literacy and health outcome. Researchers found that child and parent literacy appeared to be associated with important health outcomes, but the mechanism was unclear.

In New Zealand, a health literacy report by the Ministry of Health (37) commented that the majority of New Zealanders are limited in their ability to obtain, process and understand basic health information and services in order to make informed and appropriate health decisions. Furthermore, Māori had much poorer health literacy skills compared to non-Māori, regardless of gender, age,
level of education, labour force status, household income, or rural/urban location and this was likely
to have a negative impact on Māori health status.

Nutbeam (38) states “Health education could raise awareness of the social, economic and
environmental determinants of health, and be directed towards the promotion of individual and
collective actions which may lead to modification of these determinants”. This suggests that health
literacy is important for the improvement and maintenance of health. While health literacy is
significant, the social, economic, political and environmental determinants of health also play an
important role.

Naidu (39) investigated the impact of low health literacy levels on population-level health in New
Zealand. The author reports on previous work in the area showing an association between low
health knowledge and reduced health outcome. Multiple pathways mediate these findings. For
example, healthcare access, seeking medical help, and healthy lifestyle choices. These factors work
on the individuals’ level of how to improve health.

From the limited research in this area, there is potential benefit from improving levels of health
literacy in the population. Health literacy plays an important role in good communication and
navigation of the healthcare system. However, there is little literature on the effect of health
knowledge on health outcomes and appropriate ways to assess health literacy in a wider context.

Conclusions

Keall and Baker et al. (3) describe the need to provide and develop housing quality assessment tools
that link practical measures of housing conditions to their effects on health, safety and sustainability.
The development of these tools is important because housing conditions are a determinant of
health. This literature review has examined various determinants of health for children, with a focus
on housing conditions and environment, access to primary and secondary care and the role of the
new concept of health literacy.
STUDY METHODS

**Literature Review:**
We performed a literature search using Medline, Scopus and Google Scholar. The project supervisors provided additional literature and published material. Search terms included:

- Housing interventions AND Health outcomes
- Housing temperature AND Health
- Household crowding
- Access to health care AND New Zealand
- Housing AND health AND New Zealand
- Health Literacy

**Questionnaire:**
We developed a questionnaire using standardised questions from previous studies where possible. This included questions consistent with those asked in the New Zealand Health Survey (41). The questionnaire focused on modifiable risk factors, particularly those that related to housing condition. It also contained questions concerned with healthcare access, health literacy, injury hazards, unfair treatment and financial hardship. Appendix III contains the full questionnaire.

For the purpose of this study we used the Canadian National Occupancy Standard (CNOS) to measure the amount of household crowding in our study population (42).

**Audit:**
We conducted an audit of probable risk factors for child hospitalisation at Wellington Hospital. To achieve this we aimed to interview the parents of all acute paediatric admissions over a two-week period (14/07/2012 - 27/07/2012). The protocol for these interviews is outlined in Appendix I. The inclusion and exclusion criteria for our study are outlined in Appendix II. Figure 1 shows the numbers of patients included in and excluded from our study.
Key Informant Interviews:
We interviewed 22 key informants to gather further information. We selected interviewees from a range of occupational groups based on advice from our project supervisors. Key informants included:

- Parliamentarians, from across the political spectrum
- Public servants in the health and housing sectors
- Public health, primary care and hospital clinicians and managers
- Leaders of Non-Governmental Organisations
- Academics.

We developed an information sheet and list of questions for our key informant interviews. These items are included in Appendix IV. We did not adhere strictly to these questions; rather we used them as a guideline for the interviews. Where possible we emailed the key informants with our questions prior to their interview.

Data Analysis:
We entered questionnaire data into Microsoft Excel as it was collected. We analysed our data by creating frequency tables and generated proportions for each answered question. We then undertook more detailed analysis on subset groups. Subsets that had further detailed analysis undertaken included questions relating to ethnicity, respiratory illness, age, difficulty accessing

Figure 1: Schematic representation of inclusion and exclusions of the study
healthcare and respiratory admissions. These were selected after seeking advice from the Departmental Biostatistician and after tested the power of the statistical analysis used for significance testing (OpenEpi for chi-square analysis) to ascertain the size of the sample required (43). Frequencies were compared between subgroups believed to be of sufficient size for example housing exposures by ethnicity. A third level of analysis was undertaken in relations to respiratory-related admissions comparing the frequencies of more than two subgroups for example respiratory related admissions by ethnicity and housing exposures.

We performed a thematic qualitative analysis of the data we collected from key informant interviews.

**Analysis of Hospitalisation Data:**

The steps we took for collecting and analysing hospital data from the CCDHB and national data sets are similar to the methods used in the study by Baker et al. (4). We used the same filtering approach but our data was less filtered than this study. We chose to include: day cases, readmissions and overseas visitors.

**Diagnosis:**

A diagnosis was entered on the questionnaire by interviewers at the end of the interview. Whilst interviewers were explicitly instructed in the standard operating procedure not to refer to patient notes except as a last resort, in practice, many interviewers did refer to patient notes to inform their diagnosis.

**Preventability:**

At the end of each questionnaire, interviewers (fourteen 4th year medical students) judged for themselves whether a condition was preventable or not and at what level it could be prevented. A paediatric review of the issue of preventability was planned, but this was not conducted because of the very limited time available to complete the study.

The original intent of the study was to integrate approaches that had been used in the past including approaches to determining ASH and PPH numbers via analysis of hospital records (see Fig 2.)
RESULTS

Demographics

Of the 106 children included in our study, 63% were male and 37% female.

Forty-five percent of the sample identified as New Zealand European, 23% Pacific Island, 15% Māori, 10% Asian and 7% Other.
Prioritised ethnicity data from our sample data from the CCDHB area in the same age range is represented in Figure 4. The prioritised CCDHB ethnicity data were based on a method for assigning a single mutually exclusive ethnicity to a subject based on a predetermined hierarchy (e.g. multiple ethnic identities).

Compared to Prioritised CCDHB Data Pacific Island children were overrepresented in our study; 23% of the sample identified as Pacific Islander, while only 13% of children under 15 in the CCDHB catchment area identify as Pacific Islander (44). New Zealand European children were underrepresented in our sample (45%) (Figure 3), compared with the CCDHB catchment area (56%) (Figure 4) (44). Children from more socio-economically deprived backgrounds were overrepresented in our study. By matching addresses taken from the questionnaire to NZ Deprivation Index deciles, it was calculated that 20% of children in the study were from NZDep 10 areas and 40% were from NZDep 8-10 areas. By comparison, 12% of under 25s in the CCDHB catchment area come from NZDep 10 areas and 26% come from NZDep 8-10 areas (44).

![Figure 4: Prioritised Ethnicity of Under 15s, CCDHB Catchment, 2006 Census](image-url)
Reasons for Admission

At analysis, we grouped reasons for admission into eight categories (see Fig. 5) according to the written diagnosis at the time of questionnaire. These diagnoses were informed by the information recorded in the patient’s medical file available to us through Citrix and/or interviewer discretion based on information disclosed by the interviewee pertaining to the reason for admission. The eight diagnostic categories are shown in Figure 5.

The Other category represents other diagnoses that were encountered but were not common enough to warrant individual categories. Figure 5 shows the population profile of our study sample.

![Pie chart showing the composition of the study sample by reason for admission.](image)

**Figure 5:** Overall disease profile of admissions in absolute values (n=106). Pie graph showing the composition of our study sample by broad disease category.

The largest proportion of reason for admission were for respiratory conditions, which made up 32% (34 children). Of this group 35% were due to bronchiolitis. The next largest group following respiratory conditions were gastro-intestinal (GI) symptoms which contributed 16% (17 children) of all admissions.
The proportion of each disease group was compared with CCDHB and Total NZ annual hospital admission data for children (including electives and day cases) for the period 2007-2012 (Figure 6) and for the winter months of June and July from 2007-2012 (Figure 7). We found a high proportion of respiratory conditions in our sample compared with CCDHB and NZ generally. The same can be seen for GI symptoms and skin infections but the disparity was not as marked as for respiratory conditions.

**Figure 6: Comparison of percentage of total admissions age 0-14 contributed by specific conditions between study sample, CCDHB and Total NZ using annual data.**

**Figure 7: CCDHB and Total NZ figures for the months of June and July from 2007-2012**
Access to Healthcare

The majority of admissions occurred within 0-2 days (51.9%), 3-5 days (23.6%), or 14 or more days (12.3%) following the development of the illness or injury.

Figure 8: Number of days before admission since child became ill or injured

Figure 9: Health workers seen before admission to hospital (n=88, excludes 18 who did not see any health worker prior to admission)
The number of admissions that had seen a health worker prior to hospital admission was 88 (83% of total admissions). Figure 9 shows that of these 88, 51 (58%) saw their usual GP or practice, followed by 16 (18%) attending an after-hours medical centre and 13 (15%) going straight to the emergency department.

![Bar graph showing reasons for not being able to see a GP when required in the last 12 months (n=18)](image)

**Figure 10: reasons for not being able to see a GP when required in the last 12 months (n=18)**

Eighteen respondents (17%) reported that in the last 12 months they had been unable to see a GP for their child when they needed to. Of these, 18 respondents, 14 (78%) reported the reason(s) was that they could not get an appointment soon enough or at the right time (Figure 10). Five (28%) respondents reported not being able to get in touch with the doctor and 3 (17%) that it was after-hours.
The majority of interviewees (56%) stated that they had no difficulty seeing a GP when they needed to for the current admission (Figure 12). However, 15 of the 106 (14%) interviewees stated they had had difficulty seeing a GP relating to this current admission. If the 29 (27%) interviewees that went directly to hospital are excluded, the proportion of those that had difficulty accessing a GP when they needed to rises to 20% (15/77). However, in addition to this, the proportion of interviewees who did not experience difficulties in seeing a GP when they needed to also rises, to 79% (61/77).

Of those that reported difficulty seeing a GP, 47% (7/15) believed that the delay in treatment contributed to the hospital admission. This is compared with 40% who did not believe the delay contributed to the hospital admission and 13% who did not know.

**Vaccinations**

About 87% of interviewees stated the child was up to date on all vaccinations (Figure 13); 12% believed the child was not up to date on all vaccinations and 1% did not know.
**General Health**

Children whose parent/caregiver reported excellent or very good health accounted for 74% of all admissions (Figure 14). Only 8.5% of participants considered their child to have fair or poor health overall.

![General Health of Child](image)

*Figure 13: Caregiver report of child’s general health*

**Long-Term (Chronic) Health Problems**

Out of the 106 children, 40 (38%) had chronic health conditions and between them had 46 chronic conditions. Figure 15 shows the distribution of their chronic conditions. The most common conditions were asthma which made up 20% (9/46), eczema was 17% (8/46) and bronchiolitis 9% (4/46). Overall, 15/40 children with chronic health conditions suffered from respiratory-related illness (38%).
Previous Hospital Admissions in the Past 12 Months

In our study, 34 children out of the 106 we interviewed had a previous admission in the past 12 months. Figure 16 shows that of those children with previous admissions to hospital, 17 children had one previous admission, 11 had two previous admissions and two had three previous admissions. Of the three children who had ten or more previous admissions, two were asthma related and the other was due to leukaemia.
**Housing Temperatures**

Approximately half (51%) of the sample population reported their house was colder than they would like during the past month. These results are illustrated in Table 1, which also provides a breakdown of the ‘yes’ group into ‘always’, ‘often’ and ‘sometimes’.

Table 1: Frequency of responses to the question ‘during the last month, has your house been colder than you would like?’

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>10</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>13</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>52</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2 illustrates how often people had to sleep in the same room as another family member to keep warm during the previous month. The majority of parents/caregivers (83%) had never had to do this, however, out of all the ‘yes’ responses, ‘always’ was the most common subcategory (10%). In total, 16% of the population interviewed said they had had to sleep in the same room as another family member, just to keep warm during the last month.

Table 2: Frequency of responses to the question ‘during the last month, have you slept in the same room as family members to keep warm?’

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>11</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>2</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>88</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3 illustrates how common it was for parents/caregivers to shiver in their house during the preceding month. The most common response was ‘never’ (accounting for 68% of responses),...
followed by 2 or 4 times (18%), 4 or more times (9%), and once (2%). In total, 28% of the population interviewed said they had shivered in their house at least once during the previous month.

Table 3: Frequency of responses to the question ‘during the last month, has your house been so cold you have shivered inside?’

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or more times</td>
<td>9</td>
</tr>
<tr>
<td>2 to 3 times</td>
<td>19</td>
</tr>
<tr>
<td>Once</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>72</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>4</td>
</tr>
</tbody>
</table>

The frequency of responses to the question addressing the issue of the parents/caregivers being able to see their breath inside within the last month is shown in Table 4. The majority (71%) reported, ‘never’. Of the population that reported being able to see their breath at least once, the majority said 4 or more times (15% of all responses) followed by 2 or 3 times (7%) and once (6%). In total, 27% of the population interviewed reported being able to see their breath inside at least once during the last month.

Table 4: Frequency of responses to the question ‘during the last month, has the house been so cold you could see your breath inside?’

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or more times</td>
<td>16</td>
</tr>
<tr>
<td>2 to 3 times</td>
<td>7</td>
</tr>
<tr>
<td>Once</td>
<td>6</td>
</tr>
<tr>
<td>Never</td>
<td>75</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>2</td>
</tr>
</tbody>
</table>

The questions addressed in tables 1, 2, 3 and 4 provided four exposures to help us assess the coldness of the child’s home. A response which signified a cold home was determined for each exposure and tallied, giving each individual a total number of exposures out of 4. The percentage
reporting each number of exposures was assessed for each ethnicity and the results are illustrated in figures 29 a-d.

Figure 29a shows that the majority (54%) of the New Zealand European population reported no cold exposures and a small proportion (9%) recorded 3 or 4 exposures. New Zealand Europeans had a significantly lower odds (OR= 0.37, CI 95% 0.2,0.8, p<0.01) of being exposed to one, or more of these exposures, compared to the rest of the sample population. Within the Pacific Island population approximately half (52%) reported 3 or 4 exposures whereas a small percentage (13%) had no exposures (figure 29c). The Pacific Island population had a significantly higher odds (OR=5.0 CI 95% 1.8,16.4, p<0.01) of reporting one or more exposures compared to non-Pacific Islanders in the study. For Māori, 70% had at least one exposure with 20% reporting all four (figure 29b) which was not significantly different to the non-Māori population. For the Asian population (n=12), 50% reported no exposures and 25% reported 3 or more exposures (figure 29d) which was not significantly different to the non-Asian population.

**Figure 16: Distribution (proportions) of the number of exposures to cold recorded amongst (a) New Zealand European, (b) Māori, (c) Pacific Island and (d) Asian**

The frequency of the different exposures to cold between parents/caregivers living in a rental home and those living in their own home are presented in Table 5. The numbers were similar between the
two groups when the level of exposure was often, sometimes or no. However, 8 parents/caregivers living in a rental home reported the house was always cold, compared to two individuals in the self-owned group. These differences were not statistically significant.

Table 5: Frequency distribution of level of exposure to a cold house (always, often, sometimes or no) according to ownership status

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renting</td>
<td>8</td>
<td>7</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td>Self-owned</td>
<td>2</td>
<td>6</td>
<td>15</td>
<td>27</td>
</tr>
</tbody>
</table>

Having identified there might be a difference in ownership status and exposure to cold, Figure 30 illustrates the proportion renting amongst the different ethnicities. The proportion of Māori and Pacific Islanders renting was at least double that for New Zealand European and Asian. In total, the number of New Zealand European, Māori, Pacific Islanders and Asians renting were 17, 15, 19 and 4 respectively.

![Figure 17: Home rental by ethnicity](image)

The three main forms of heating used in the living area were (in order of most to least common) heat pump, enclosed fire/wood burner and electric portable heater, as illustrated in Figure 31. Heat pumps accounted for 27% of the results, which were set to an average temperature of 22.7°C. In contrast, the main form of heat used in the child’s bedroom was predominantly electric portable heaters which accounted for 54% of results. ‘Do not use heating’ was the second most common answer (14%).
Crowding

We found that 26% (n=27) of the sample live in crowded households (Table 6). However, when we added two additional factors, (1) whether the child sleeps with more than two people per bedroom, or (2) shares a bed with at least one person, with bedroom deficit per household, we found that the percentage of exposure to crowding increased to 47%.

Table 6: Households’ distribution

<table>
<thead>
<tr>
<th>Description</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households with 1 bedroom deficit</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Households with 2+ bedroom deficit</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Total crowded households (1+ bedroom deficit)</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>National Data (1+ bedroom deficit) ages 0-14.</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>
We also determined that 12% (n=13) of children live in severely crowded conditions (2+ bedroom deficit) and 13% (n=14) live in household with a one bedroom deficit (Table 6).

Table 7 represents the proportion of crowding exposure in relation to Ethnicity. Our study found that Pacific Islanders had the highest proportion of overcrowding (48%), followed by Māori (26%), New Zealand Europeans (19%) and Asian (7%). The odds of a Pacific Island child living in a crowded home were 5.6 compared with non Pacific Island children (OR=5.62 95% CI 2.09 - 15.58, p<0.05)

Table 7: Percentage of crowding exposure in relation to ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Māori</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>NZ European</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>48</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 8 and 9 show the proportion of the sample population sharing bedrooms and beds respectively. We found that the majority of children had their own beds (80%), had their own bedrooms or shared with one other person (66%) and slept in their own beds (80%). However, 34% of children slept in bedrooms with two or more people and 20% of children shared the same bed with at least one person.

Table 8: Percentage of the sample sharing bedrooms

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own bedroom or sharing with one person</td>
<td>66</td>
<td>70</td>
</tr>
<tr>
<td>2+ people in Child's Bedroom</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>106</td>
</tr>
</tbody>
</table>

Table 9: Distribution and Percentage of child sharing the same bed with others
Smoking and our study

Smoking is one of the modifiable risk factors we wanted to look at in our study. In New Zealand, by using the data from the National Health Survey 2006/07 (NHS) we know that Maori children are more likely to be exposed to second hand smoke in their homes compared to non-Maori children (41). In households containing at least one child (0-14 years), 18.9% of Maori households had at least one member that smoked compared to 8.4% in New Zealand European/other households (41). The average exposure for a New Zealand child is 9.6% (41).

Table 2.9: Second-hand smoke exposure for children in their home, by ethnic group (unadjusted)

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Prevalence (95% CI)</th>
<th>Number of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>European/ Other</td>
<td>8.4 (7.1–9.6)</td>
<td>54000</td>
</tr>
<tr>
<td>Māori</td>
<td>18.9 (16.4–21.4)</td>
<td>37000</td>
</tr>
<tr>
<td>Pacific</td>
<td>9.6 (7.3–11.9)</td>
<td>9500</td>
</tr>
<tr>
<td>Asian</td>
<td>6.1 (4.2–7.9)</td>
<td>4600</td>
</tr>
</tbody>
</table>

Sources: 2006/07 New Zealand Health Survey
Note: Total response standard output for ethnic groups has been used.

The NHS asked two questions to ascertain whether children were exposed to second-hand smoke.¹

1 By looking at the data tables provided, those that answered ‘yes’ or ‘sometimes’ to one of these

¹ 4.10 Does anyone smoke inside your house? [Circle one]

1 Yes
5 No
3 Sometimes
.K Don’t know
.R Refused

4.11 Thinking about the car that [child’s name] usually travels in, does anyone smoke in that car? [Circle one]

i If respondent says, “Yes, but not when child is inside car” code as 3.

1 Yes
5 No
3 Sometimes
.K Don’t know
.R Refused
questions were included as being exposed to passive smoking. This makes their data relatively comparable to ours.²

Of those that were exposed in our study, that is answered ‘yes’ to at least one of the above questions, 93% were picked up with question 31 and the remaining 7% by question 32, which have comparable equivalents in the NHS. Question 32 from our survey slightly differs from the NHS equivalent by placing a time frame as to when the child was exposed which may have led to underestimation in our results relative to those in the NHS but given the much larger prevalence in our study we doubt this makes much difference. The only respondent to our study that answered yes to question 33, which has no equivalent in the NHS study, had already been picked up by question 31.

From our study we found that 40% of the children admitted had been exposed to cigarette smoke, much higher than the expected for any ethnic group. When this was broken down by ethnicity we found that New Zealand European children had an exposure of 13%, a little over the expected of 8.4%. Asians had an exposure of 33%, again higher than the expected 6.1%. Maori had an exposure of 60%, a value that is much greater than the expected 18.9%. The group with the highest exposure however, was those classed as Pacific Islander with an exposure of 75%. This was also the greatest disparity from the expected with Pacific Islanders having a prevalence of 9.6% in the general population. This is shown in Figure 21 (values rounded to the nearest whole percent).

![Figure 19: Prevalence of exposure to second hand smoke for children under 15 years by ethnic group](image)

One way in which our exposed group was defined differently to that in the NHS was with regards to ethnicity. In the NHS ethnicity is analysed using total response standard output, that is participants

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31) Are there any smokers currently living in [CHILD’S NAME] usual house (that is people who smoke 1 or more cigarettes a day)?

32) Has anyone smoked inside a house or car, with [CHILD’S NAME] present, in the past 7 days [SHOWCARD 15]?

33) To the best of your knowledge, has [CHILD’S NAME] ever smoked?
were counted in each of the four ethnic groups they identified with (European/other, Māori, Pacific, Asian) and thus some results were counted twice. In our analyses we used prioritised ethnicity, which may explain some of the differences found in our results.

Those exposed were also looked at in terms of cause of admission, classed either as respiratory or non-respiratory. Children admitted with respiratory illness were found to have an exposure of 50% compared to 32% in those presenting with non-respiratory illnesses, shown below in Figure 22. When compared using chi-squared analyses, an odds ratio of 2.13 (95% CI 0.92-4.9, p-value 0.07345) was found. This is suggestive evidence of a statistically significant increase in the odds of a respiratory admission compared to non-respiratory being associated with a smoker in the house.

![Figure 20: Prevalence of exposure to second hand smoke in our study in comparison to the New Zealand average and to the type of illness on admission](image)

An interesting finding from the literature that we didn’t ask about was perception on smoking on the health. From the literature, Māori were more likely to think that smoking didn’t have a harmful effect on them compared to non-Māori with a rate of 14.2% versus 5.7% (46). For future studies, it would be interesting to ask a question relevant to this e.g. “Smoking is harmful to my child’s health” with options of strongly agree, through to strongly disagree and see how this matches up with the available data.

**Respiratory versus Non-respiratory Admissions**

Respiratory vs. non-respiratory conditions were a significant theme of the results. We focused on comparing respiratory admissions to other variables, because respiratory conditions provided 32% of the total proportion of admissions.
We analysed case by case whether an admission was respiratory. A child was determined to have a respiratory condition if they were admitted for diagnoses of shortness of breath, asthma, bronchitis, wheezy/noisy breathing, or cold/flu symptoms.

Table 10: Ethnicity and Numbers of Respiratory and Non-Respiratory admissions

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Respiratory</th>
<th>Non Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand European</td>
<td>12</td>
<td>34</td>
</tr>
<tr>
<td>Māori</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Respiratory illnesses were highest in Pacific Island (50%) and Māori (40%) admissions (Figure 34). This was higher than the proportion of respiratory admissions in both NZ European and Asian populations.

Figure 21: Ethnicity and Percentage of respiratory and non-respiratory admission
Respiratory Conditions in Different Age Groups

The proportion of respiratory admissions dropped significantly beyond this age range. Respiratory admissions comprised 8% of the 5-9 year age group; there were no cases of children between 10 and 14 years. This suggests that the burden of respiratory illness lies primarily in children less than 5 years of age. Children under 5 years of age were 21 times more likely (OR=21, 95% CI 3.8, 472 p<0.01) to be admitted for a respiratory admission than children five years and over.

Figure 22: Percentage of respiratory and non-respiratory admissions versus the number of hazards identified in the home

Table 11: Age and Number of respiratory and non-respiratory admissions

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Respiratory</th>
<th>Non Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1yo</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>1-4yo</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>5-9yo</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>10-14yo</td>
<td>0</td>
<td>18</td>
</tr>
</tbody>
</table>

Respiratory conditions accounted for 43% of admissions in the age categories of younger than one year and between one and four years (Table 11). The proportion of respiratory admissions dropped significantly beyond this age range. Respiratory admissions comprised 8% of the 5-9 year age group; there were no cases of children between 10 and 14 years. This suggests that the burden of respiratory illness lies primarily in children less than 5 years of age. Children under 5 years of age were 21 times more likely (OR=21, 95% CI 3.8, 472 p<0.01) to be admitted for a respiratory admission than children five years and over.
Hazards were defined as risk factors which increase the chances of respiratory illness. They included:

- Leakage in the roof of the house;
- Dampness/mildew on surfaces of bedrooms or living areas;
- Poor indoor air quality judged by whether the house smelt mouldy;
- Cold temperature;
- Use of a bottled gas heater.

Results were analysed out of five, according to the number of respiratory hazards, and grouped as having no hazards, one hazard, two or more hazards. A higher proportion of respiratory admissions had at least one hazard present. Figure 35 shows that non-respiratory admissions had a higher proportion of no hazards present (31.9% vs. 17.6%). We did not find these differences to be significant (p>0.05, 95% CI 0.8, 6.3).

**Respiratory admissions and self-reported housing conditions**

When participants were asked to rate the condition of the house the child was currently residing in, the majority rated it as either excellent or good. We therefore analysed the proportion of each response with the number of respiratory or non-respiratory admissions.

![Figure 23: Admission type and self-reported housing conditions](image)

The results showed that respiratory and non-respiratory conditions are distributed in similar proportions in all categories of self-reported housing conditions (Figure 36). There was no
statistically significant difference between respiratory or non-respiratory admissions for self-reported housing conditions.

**Respiratory Conditions and Crowding**

Because a reasonably high proportion of our admissions lived in crowded conditions, according to the Canadian National Occupancy Standard (Table 12), we analysed the results to determine the proportion of these cases admitted for respiratory conditions.

**Table 12: respiratory conditions and crowding**

<table>
<thead>
<tr>
<th>Crowding</th>
<th>Respiratory</th>
<th>Non Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowding</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>No Crowding</td>
<td>12</td>
<td>42</td>
</tr>
</tbody>
</table>

Table 12 and Figure 37 show that there was a positive association between respiratory admissions and exposure to household crowding. The relationship was not statistically significant (OR=2.12, 95%CI 0.92, 4.86, p=0.074).
Respiratory Conditions and Previous Hospital Admissions

This was analysed to determine whether the children currently admitted for a respiratory condition were more or less likely to have been previously admitted to hospital.

![Figure 25: Type of admission and Percentage of previous admissions to hospital](image)

Our results suggested both groups were similar. There was no significant difference between respiratory and non-respiratory admissions as to whether or not they have been previous admitted (Figure 38).

Respiratory Admissions and Access to Health Care

We analysed whether the children admitted for a respiratory condition had more difficulty seeing healthcare professionals (Figure 39). Difficulty with access was defined by whether or not interviewees had trouble seeing a GP prior to this current admission, or in the last 12 months.
The results suggested that both respiratory and non-respiratory admissions had similar responses regarding difficulty of healthcare access.

**Respiratory Conditions and House Ownership Status**

This graph (Figure 39) suggests children were more likely to be admitted with a respiratory condition, if they resided in rental housing (35.7%) compared to self-owned housing (28%), however there was no significant difference between the two groups.
**Health Knowledge and Behaviours**

The majority of interviewees (78%) either *strongly agreed* or *agreed* that it was easy for them to arrange a non-urgent appointment to see their GP (Figure 17). The same number of interviewees neither *agreed* nor *disagreed* compared with the group that *disagreed* (10% each) whilst only one interviewee *strongly disagreed* with this statement.

![Figure 28: Caregiver perception of ease to arrange a non-urgent GP appointment for their child](image)

Again the majority of interviewees (75%) either *strongly agreed* or *agreed* with the statement that it was easy for them to arrange an urgent appointment to see their GP (Figure 18). The number that *disagreed* was greater than in the previous question, 14%. Two of the interviewees stated that their children were in the Whiti Te Ra study and therefore the question was not applicable to them.
Only 47% of interviewees found it easy for their child to see a GP outside of normal opening hours (Figure 19). One third (33%) disagreed or strongly disagreed with this statement, while 17% neither agreed nor disagreed with the statement.
The above graph (Figure 20) represents the sample population and their collective attitudes towards access to health across the three questions. The majority of respondents (51%) did not think it was easy to see a GP outside of normal opening hours.

Figure 31: Percentage of study population reporting difficulty accessing GP in all three questions
Figure 32: Percentage of a negative response to all three questions when they have experienced difficulty accessing a GP in the last 12 months

In comparison with the population group, the group that experienced difficulty accessing a GP for the current admission, or in the previous 12 months, showed a higher proportion of negative responses in all questions relating to ease of GP access, i.e. the majority (67%) did not think it was easy to access a GP outside of normal hours.

Figure 33: Respondent looking after a child who is unwell
Figure 22 demonstrates that 81% (86/106) of interviewees strongly agreed or agreed that they were confident to look after a child who is unwell. Whilst 14% (15/106) neither agreed nor disagreed with this statement, only 4% (4/106) disagreed or strongly disagreed with the statement.

88% (93/106) of interviewees either strongly agreed or agreed that they were confident knowing when to call a doctor when their child was unwell (Figure 23). Fewer were neutral on this topic at 7% (7/106), while those that disagreed or strongly disagreed with the statement comprised 5% (5/106) of interviewees.

48% of interviewees answered that they would always or often take a child aged 5-14 with a sore throat to see the doctor (Figure 24). 27% said they would sometimes do this while the remaining 25% stated they would rarely or never take a child to the doctor with this problem.
The majority of interviewees (89%) stated they would *always* or *often* take their child to see a doctor for a skin infection that had lasted a few days (Figure 25), 6% would do so *sometimes* and 6% would *rarely* or *never* see a doctor for this condition.

78% of interviewees would *always* or *often* take their child to see a doctor for vomiting or diarrhoea lasting more than one day, 15% would only *sometimes* take their child to see the doctor while 7% would *rarely* or *never* take their child to the doctor for this condition (Figure 26).
The majority of interviewees would always or often see a doctor for a toddler with a cough and noisy or wheezy breathing (80%). Figure 27 shows that 17% would do this sometimes whilst the remaining 3% would rarely or never see a doctor for this condition.
**Preventability**

In our analysis of preventability, we defined half of all cases were either entirely, or partially, preventable (51%). Approximately one quarter of cases were not preventable (23%) and in a quarter of cases we could not determine this, based on the information provided by the questionnaire (26%) (Figure 41). We also attempted to assess the distribution of these cases for each ethnic group, but due to the relatively small numbers involved, we did not consider the results to be reliable.

*Figure 39: Prevention status of each admission*
KEY INFORMANT INTERVIEWS

Over the five-week course of the study, 22 key informants were interviewed. They were a mixture of parliamentarians, public servants, health managers, clinicians, staff of NGOs and academics. These informants are listed below:

**Parliamentarians**

**Hon Tariana Turia**  
Minister for Disability Issues and Whanau Ora  
Associate Minister for Health, Housing and Social Development  
Co Leader of Māori Party

**Dr Paul Hutchison, MP (National)**  
Chairman of the Health Select Committee

**Kevin Hague, MP (Green Party of Aotearoa New Zealand)**  
Health Spokesperson

**Jacinda Ardern, MP (New Zealand Labour Party)**  
Spokesperson for Social Development

**Public Servants**

**Dr Russell Wills**  
Children’s Commissioner

**Dr Amanda D’Souza**  
Office of the Children’s Commissioner  
Public Health Physician  
University of Otago, Wellington

**Dr Patricia Laing**  
Senior Analyst  
Customer Intelligence  
Research and Forecasting  
Housing New Zealand Corporation

**Helen Sears and Team**  
Building and Housing Group  
Department of Building and Housing  
Ministry of Business, Innovation and Employment

**Anne Kelly**  
Senior Policy Analyst Strategic & Community Porirua City Council

**Vicki McLaren and Team**  
City Housing,  
Wellington City Council
Health Managers

Chris Kerr
Clinical Director, Compass Health

Ranei Wineers
General Manager Primary Care Services, Compass Health

Clinicians

Dr Archie Kerr
Clinical Leader
Sub-Regional Child Health Project

Dr Margot McLean
Medical Officer of Health
Regional Public Health

Mr Brendon Bowkett
Paediatric Surgeon
CCDHB

Dr Jens Richter
Masters Intern
Department of Public Health
University of Otago, Wellington

Dr Ken Greer
General Practitioner, Wellington

Marcella Gregan
Community Paediatric Nurse, CCDHB

NGOs

Alan Johnson
Co-Director and Housing Spokesperson
Child Poverty Action Group

Willemijn Vermaat
Project Manager
Warm Fuzzies Sustainability Trust

Academics

Dr Nikki Turner, GP
Director of Immunisation
Advisory Centre

Dr Elizabeth Craig
Director of the New Zealand Child and Youth Epidemiology Service
Results of Key Informant Interviews

A standardised question template was emailed to key informants in advance of the interviews. In order to gather a range of information, the interviews were conducted by all 14 authors of the study. Information from these interviews assisted the group with direction towards available literature and also to other potential key informants. Due to time constraints, a preliminary thematic analysis was undertaken by NL and KG. Through this process we were able to identify a number of key themes. These were grouped under the headings: Optimism, Irony, General Consensus, Barriers, and Debate.

Optimism: Almost all key informants identified the sheer volume of work being undertaken currently by the Government related to improving children’s health and welfare. (e.g., MSD Green Paper, Māori Affairs Select Committee Inquiry, Health Select Committee Inquiry, The Children’s Commissioner’s Expert Advisory Group report on Solutions to Child Poverty (released on 28 August 2012), Sub-Regional Child Health Project in Wellington).

Irony: This optimism was however coupled for a number of Informants with a sense of irony in that although there might be a high level of concern, it was highly likely that there would be further exacerbations of poor child health consequential to recent and on-going reforms. For example: several key informants cited changes in housing and social welfare policies, which they believed would be detrimental to child health. An example was given of changes to housing policy, which resulted in actions taken by Housing New Zealand to move away from being a social services provider and to more towards being a “good landlord”. Another example given by key informants was the social reforms that led to the requirement for mothers to return to work earlier, when their second child was at a much younger age than for their first child. Several Informants also expressed concerns about the lack of new housing stock in the pipeline for New Zealand.

General Consensus: Key informants largely agreed that housing quality is an important determinant of children’s health as well as other poor outcomes, such as education and justice. A common theme we discovered was one of resources constraints at all levels.

Barriers: Several key informants also identified that there were significant barriers to change in this area. For example (anecdotally) there had been many reports over many years. Also, children can’t vote and so are not a strong lobby group. A further barrier identified is that children have traditionally been viewed as ‘property.’

An interesting issue raised was the potential legal barrier to implementing changes to sub-standard houses. Any measures taken, such as reducing cold and moisture, often require approval from a landlord.

The main areas of concern amongst our informants were that the current methods to address housing issues are complex and poorly integrated. The relevant agency to refer to differs depending on what type of housing the child/family may be in and there is no single coordinating body for these activities to take place. This was especially so where the patients were domiciled in private rental accommodation. Several Informants drew our attention to the need for better targeting criteria. In addition to this, several informants identified the need for better coordination of services.
between primary and secondary-tertiary health care agencies. It was proposed that to be effective, the programme would require better integration with primary care, including IT/information sharing.

In order for improved hospital-based targeting systems to be taken up in practice by clinicians, several Informants suggested clinicians would need to have a greater degree of confidence that the use of these would actually result in action being taken than is the case with current systems in place.

**Debate:** Several Informants suggested there was a risk of over emphasising the importance of housing. They expressed concern that this could be used to de-emphasise the importance of a more holistic approach to improving the wider social determinants of health and minimising work in other important areas such as access to primary care and other areas of preventative care.

Whilst Informants were generally dissatisfied with the rate of change on addressing determinants of children’s poor health, they did draw attention to some positive work and attitudinal shifts which are taking place (e.g., Marmot Report; NZMA Paper; Employment of a paediatrician as Chief Scientific Adviser to the Prime Minister; Evaluations of the effects of housing conditions on children’s health; Healthy Housing Programme; renewals programmes in social housing; free after-hours primary care for under 6s).

Key Informants offered a range of views on the potential for targeting housing interventions through identifying cases for follow-up at the time of a hospital admission. Some believed that this process would be more appropriate in the community setting whilst others recognised the potential for utilising the time children and their parents spend on hospital wards during an admission. Identifying cases at hospital level might be a good idea if we considered that children in hospital are a sensitive indicator of high need. The potential for secondary prevention (e.g., as a way to reduce the number of recurrent admissions) was suggested.

There was disagreement about the extent to which targeted interventions are consistent with or at odds with efforts to improve the wider social determinants of health. One key informant proposed that the concept of “universal proportionally” (as espoused by Marmot) was essentially the same as targeting. The implication here appeared to be that the two approaches may be indistinguishable. Whilst some informants espoused the concept of reciprocal responsibility – i.e. the need for government interventions to be coupled to behaviour change, the same informants were also in favour of immediate intervention in extreme cases. They were unable to say where the line was or how this would be determined.

There was disagreement about the role that legislation/regulation should play in addressing the issues identified. In particular, attention was drawn to proposals around the possibility of a Children’s Act and a Children’s Minister. Another area of strong disagreement was in relation to proposals to regulate the private rental market.
DISCUSSION

Major findings

*Exposure to cold and overcrowded houses as a risk factor for acute paediatric admission to Wellington Hospital:*

Our study identified the prevalence of hazardous housing conditions in our small sample population. Our results are similar to that of previous research in the area (14,15,32) which identified cold indoor temperatures, poor indoor air quality and overcrowding as risk factors for childhood admission to hospital.

Our study found Pacific children were significantly overrepresented amongst acute paediatric admission at Wellington Regional Hospital. These children were five times more likely to have at least one exposure related to coldness of the home than the NZ European population (OR 5.0, 95% CI 1.8-16.4, P<0.01) and almost six times more likely to live in overcrowded houses (OR 5.6, 95% CI 2.1-15.6, P<0.01) than non-Pacific children.

Although we did not undertake an analysis of ethnicity by NZDep in our cohort, these results are broadly consistent with the expectations of the study’s authors. Pre-existing data suggest Pacific children are amongst the most deprived segment of the population served by Wellington Regional Hospital and the within the Capital & Coast District Health Board area.

Our study used the Canadian National Occupancy Standard (CNOS) measure of household crowding. In interpreting these results it should be noted that there are potentially a range of cultural issues around the use of CNOS to measure household crowding in particular in relation to Pacific families.

According to the CNOS measure, 26% of our sample was classified as living in a crowded home. However, when we added two additional factors – (1) whether the child sleeps with more than two people per bedroom, or (2) shares a bed with at least one person – we found that the percentage of exposure to crowding increased to 47%. Twelve per cent of the children in our cohort were categorised as living in severely crowded conditions which is classified by CNOS as a 2+ bedroom deficit (17). Amongst the Pacific children in our cohort the percentage living in overcrowded houses was 48%.

Approximately half (51%) the sample population reported that their houses were colder than they would have liked. Around 28% of the sample reported their homes were so cold that they had shivered at least once in the last month. Seventy-nine per cent of the Pacific children live in homes that were colder, than desirable in the past month.

Both Māori and Pacific children in our cohort were more than twice as likely to be living in rented accommodation as New Zealand European and Asian children.

*Exposure to smokers and second hand smoke:*

Our findings suggest evidence of a modest, but not statistically significant, association between exposure to cigarette smoking in the home and the risk of respiratory admission compared with non-
respiratory admissions. In our cohort, 37% of children lived in a house where at least one member of the household smoked. There was a large ethnic difference in terms of exposure of children to second hand smoke and children in our study were considerably more likely to be exposed to second hand smoke than of children studied by the National Health Survey. This was true for all ethnicities studied. Smoking in the home was differentially associated with children being admitted with respiratory illness, compared to being admitted with a non-respiratory illness in our cohort (OR=2.13; 95% CI 0.92-4.9, p-value 0.073). As the association was weak, this finding needs to be treated with some caution given some of the other weaknesses in our analysis.

**Risk Factors that Increase the Chance of a Respiratory Admission:**

The impacts of housing conditions on respiratory admissions were of major interest. Respiratory illness was the largest cause of acute paediatric admission in the two-week winter period. Children under four years old in our sample were more likely to present with a respiratory complaint than any other condition (43% of cases). This number drops significantly beyond this age range.

Māori (50%) and Pacific Island children (40%) have the highest rates of respiratory admissions compared to other ethnic groups at 50% and 40% respectively compared to 26% for European children and 17% for Asian children. Due to our small sample size however, we were not able to say whether this difference was statistically significant.

For the purpose of our analysis, we classified the following risk factors as having the potential to increase the likelihood of a respiratory admission: leakage in the roof of the house; mould or mildew in the main living areas or bedrooms; mouldy or musty smell; the use of unflued gas heater; and cold temperature.

A higher proportion of the respiratory admissions had exposure to at least one of these hazards. These are important results, because these are areas that could potentially be modified with the appropriate intervention.

**Poor Access to Health Care:**

Parents/guardians of 17% of the children admitted to Wellington hospital that we interviewed reported their child had been unable to see a General Practitioner (GP) when they needed to at least once within the last 12 months. Of that 17%, the vast majority (78%) felt that this was due to the fact that they were unable to arrange an appointment soon enough. The next most common reasons were not being able to get in touch with the GP (27%) was that the appointment needed was after-hours (17%).

When the sample was asked hypothetical questions about their perception of access to health care, 25% did not agree it was easy to arrange an urgent appointment for their child to see the GP, whereas only 12% did not agree it was easy for them to arrange a non-urgent appointment.

Due to the small sample size we were not able to undertake an analysis of usage patterns across different ethnic groups represented in the study population.
The present study was undertaken on the cusp of the introduction of free after-hours services for under 6 year olds. If the study was repeated it could be used to evaluate the impact of this policy change on parental perceptions of primary care access.

**Health Literacy:**

Parents/guardians were asked whether they would take a child to see a doctor/nurse when presented with a series of hypothetical health scenarios related to a child’s health. We were particularly interested in the question asking whether the parent/caregiver would take a child aged 5-14 years to see a doctor, if they had a sore throat. This is due to a current advice being given to Māori and Pacific families promoting early intervention in sore throats due to the high incidence of acute rheumatic fever and chronic rheumatic heart disease in these ethnic groups (7). Only 48% of our population responded that they would *always/often* take a child aged 5-14 with a sore throat to see a doctor or nurse while 25% stated they *would rarely or never do* this.

**Assessing Preventability:**

We were unable to define admissions as Population Preventable Hospitalisations (PPH) or Ambulatory Sensitive Hospitalisations (ASH). A range of methods were employed by interviewers to determine preventability. Many interviewers used the patients’ medical records in order to make a clinical judgement on preventability. Interviewers also based their assessment on the risk factors identified in the questionnaire.

**Exposures to risk factors amongst Māori children:**

For many of the risk factors including cold houses, crowding, rental housing, environmental tobacco smoke, those children who were identified as Māori had considerably higher rates of exposure. Despite this we did not find statistically significant associations between Māori ethnicity in our study and these exposures. This is likely due to the small sample size of our study.

Given our finding of much higher than expected exposures of children to smokers and by association second-hand smoke and in particular amongst Māori it would be interesting for future questionnaires to include questions about perceptions of parents and guardians about smoking on the health of their children. From the literature Māori were more likely to think that smoking did not have a harmful effect on them compared to non-Māori with a rate of 14.2% versus 5.7% (46).

**Strengths and weaknesses of research**

There were several limitations to our study. The two-week period in which the interviews were carried out restricted the number of interviews we could perform. This in turn led to a small sample size, limiting the statistical power of the study. In particular, sub-analysis of data was not possible in a number of circumstances.

The study’s objective to determine preventability and classify these cases according to ASH and PPH was not met. This was due to a combination of time constraints and methodological issues (discussed above). A further unmet aim of our study was to examine the feasibility of conducting a
case-control study; the possibility of utilising a control group of children admitted to hospital for elective procedures was mentioned.

Our interview-based method of data collection had important limitations. A significant proportion of the content of the questionnaire addressed sensitive issues. We believe that the sensitive nature of these questions may have discouraged some parents from providing the most accurate information. This may lead to an underestimation of the true findings in several areas, such as reports of experiences of discrimination, description of the condition of their home, including reports of mould/mildew, income support and general impression of the child’s health.

Many of the questions also had a degree of subjectivity which led to a variation in the way parents/caregivers both understood and then answered the question. For example: Question 37 asks “During the last month, has [CHILD’S NAME]’s usual house been colder than you would like [SHOWCARD 15]?” Some people prefer warmer environments so would always answer ‘yes’ to this question.

Interviews were performed by 14 different medical students. Whilst we all have similar training, the interviewing styles of each student differ and this may have impacted on the answers received from different parents, especially when it came to the degree of sensitive information that the interviewer could elicit. On the other hand there is ample anecdotal evidence, that patients are often more willing to disclose sensitive information to medical students, when they may not be willing to do so to other clinical staff. This observation may need to be taken into account in relation to the question of transferability of our findings into a clinical setting.

There were some data analyses that were not performed in this study, which could have been beneficial. For example, the views of those who we sought to interview, but who declined to participate. The questionnaire had a limited capacity to capture qualitative information beyond what yes/no questions asked for. We did not take into account confounding factors due to time constraints. It is likely that these would impact on the results calculated. A further example of an analysis that might have been useful is a comparison of children’s reported exposure to second hand smoke in our study with comparable measures used by the NZ Health Survey (41). In our cohort 38% of children were reported as suffering from chronic health conditions (Figure 15). However, we undertook no analysis of the relative contribution of chronic health conditions in relation to the question of exposure to potentially modifiable risks.

There were also some issues identified around how comparable the national and CCDHB datasets were that we used to compare our result with. For example, the prioritised ethnicity data we used to compare our demographics to the CCDHB demographic were based on a method for assigning a single mutually exclusive ethnicity to a subject based on a predetermined hierarchy (e.g. multiple ethnic identities). This system was dispensed with in 2005 by Statistics NZ (2005 report in statistical standards for ethnicity). The very high respiratory admissions rate in our cohort as compared to CCDHB and national data needs to be interpreted with great care as the CCDHB and National data included both elective and outpatients data whereas these were excluded from our study.

A few of the short or overnight admissions were missed by the interviewers, leading to potential systematic bias in the process of data collection.
Strengths of the study include that we used questions that have been widely used before and which were well supported by previous research. The participation rate was high at 90%, leading us to believe that parents were generally happy to take part. The questionnaire process took 15-20 minutes to complete and was easily implemented. It is likely that any health care professional could administer this questionnaire, with very little training required. This study is easily reproducible and could be trialled in other centres.

This study has shown that there is potential to measure the prevalence of hazardous exposures as part of more comprehensive child health surveillance than is presently undertaken in health settings in New Zealand. We asked a range of questions to assess many different potentially hazardous exposures for children. We believe that any health practitioner has the ability to use this questionnaire and that these questions could easily be adapted so that they could be used as an extended form of a social history.

It is important to note that our questionnaire did not address all potentially hazardous exposures for a child’s health in the home. We chose to exclude any questions on emotional, physical and sexual abuse and about psycho-social stressors such as drug and alcohol problems in the household. We acknowledge that these are hazardous exposures for children, but we felt that we did not have the training to ask these questions or deal with the results.

Finally whilst several questions were included in the questionnaire in relation to whether parents/guardians would take advantage of a screening/follow-up service responses to 2/3 of these questions were not coded due to a miscommunication. We hope to be able to analyse and present these at a later date.

**Conclusion and Recommendations**

Our study identified the prevalence of potentially modifiable risk factors associated with acute childhood admission to hospital in our sample population. We conclude these are likely to play a significant role in such hospitalisations.

Pacific children and children from low socioeconomic areas were significantly overrepresented amongst the acute childhood admissions we studied. Whilst we were unable to analyse the NZDep data in detail due to lack of time, Pacific children were also disproportionately exposed to the potentially modifiable risk factors we studied.

These results confirm that significant work needs to be undertaken at the policy and health care level to reduce exposures of children to preventable risk factors acute hospitalisations (including cold, overcrowding and exposure to smoke) especially amongst Pacific Island and Māori children and children from low socioeconomic areas within the CCDHB / Wellington Hospital catchment.

Interviews with key informants confirmed that there remains a growing level of concern within Government and other agencies regarding child health and safety. Although they agree that this has resulted in a number of initiatives aiming to rectify this situation, some key informants are sceptical about this because a number of recent and on-going reforms are going to exacerbate poor child health in New Zealand.
A key area of concern addressed by this study was the exposure of children to health hazards associated with substandard housing and housing conditions. In our study there was a significant association between Pacific ethnicity and exposure to cold and crowded homes. Pacific children were five times more likely to be exposed to a cold home than the NZ European population (OR 5.0, 95% CI 1.8-16.4, P<0.01) and almost six times more likely to live in overcrowded houses (OR 5.62;P<0.01, 95% CI 2.1-15.6, P<0.01) than non-Pacific children. Seventy-nine per cent of Pacific Island parents/guardians reported that their children lived in a house colder than they would have liked in the last month.

A 2006 study indicated that, on average, every dollar spent on insulating houses in New Zealand saves almost two dollars in health care and other societal costs (45). In addition, improved housing is likely to not only benefit the child, but the siblings and parents living in the same house. Health gains may also apply to areas, other than decreased demand for secondary care, such as an improved ability for the child to perform in the school environment. Despite this knowledge and the establishment of several organisations dedicated to improving substandard housing across the country however, there remains room for significant improvement.

A number of key informants highlighted that there are significant barriers to improving the housing stock in New Zealand. These were the fact that children are a weak political lobby group, that a lot of alterations to houses would have to be approved first by landlords, and that the current methods for addressing housing issues are complex and poorly integrated. However other key informants stated that there is a risk that the impact of housing conditions will be over-emphasised.

Whilst there is general agreement that one way to improve child health is to target housing interventions more effectively, there is a lack of consensus regarding how, where and when vulnerable children should be identified.

Our study raises the question of whether hospital-based screening could play a role in targeting interventions in addressing exposures of acutely hospitalised children to risk factors such as substandard housing. One such scheme, run by the Canterbury District Health Board, encountered difficulties in targeting those families with the poorest housing. Our study demonstrated the potential for a questionnaire similar to the one we developed for this study to be used as a screening tool to identify children at risk of exposure to housing hazards and other potentially modifiable risk factors.

We propose that a tool similar to our questionnaire could be developed to screen for housing risk factors in paediatric wards. We envisage that such a tool could be an extension of the standard social history taken by clinicians and could facilitate standardisation of hospital case-management and discharge reporting of housing related risks.

We recognise that in order for clinicians to agree to utilise such a tool there would need to be a transparent process providing clinicians with a clear view of the consequences of its use. This would require further work to be done on integration of discharge planning and meaningful interventions taking place in the community. It is also important to note that there are already public health interventions targeting these areas (14,32). As rental properties in New Zealand tend to be of poorer quality than self-owned houses (15) it may be prudent to target future interventions towards children living in rental accommodation.
Our study has provided preliminary evidence for the feasibility and efficacy in identifying children and families at risk by using such an approach. Seventy-eight per cent of respondents agreed that they would use a free service if it were available that would involve someone coming to their house to look at its condition and things that affect health and safety for children.

We believe that it may be worth-while for a similar study design to be trialled in other centres and on a larger scale and speculate that if housing conditions are improved, then the number of preventable acute childhood hospital admissions will be reduced.
REFERENCES


Appendix One

SOP TO BE HELD BY GROUP LEADERS

The Group Leader from each team is responsible for:

- Obtaining the USB and locker key from the previous team before your session.
- Arranging to hand the USB and locker key to the Group Leader of the team for the following session after your session is complete.
- Completing steps 1-5 outlined below.
- Bringing a laptop that runs Citrix to each session.

STEP ONE: PREPARING PATIENT DATABASE IN ADVANCE

a. Open your Clinician Homepage in Citrix – this should be set up in My Preferences to show ALL current admissions in Wards 1 and 2. This list will constitute all children whose parents/guardians are included in our study AS WELL AS some exclusion.

b. Click the “Download CSV” link below the Multiple Ward list. This will open an excel spreadsheet within Citrix.

c. Open excel on your computer. Copy and paste the CSV data from the Citrix spreadsheet into an excel spreadsheet on your computer, outside of Citrix.

d. SAVE AS an Excel Worksheet to the USB, with the following filename format: “YYMMDD HHHH (Time of medical handover at beginning of YOUR session 0800, 1600, 2230) Paeds List” (eg 120714 0800 Paeds List). This document is the “Paeds List” for your session and WILL NOT BE EDITED from this point onwards. “Paeds Lists” are a series of documents that will serve as a back-up reference for which patients were in the hospital during each session.

e. Open the most recent “Handover” document on the USB. The file format for this will be “YYMMDD HHHH (Time of medical handover at beginning of THE PREVIOUS SESSION 0800, 1600, 2230) Handover.”

f. Compare the new “Paeds List” to the most recent “Handover”. If there are no new patients AND no patients to follow up from the previous session on the handover, you may cancel your session. Otherwise, copy and paste any new patients from your “Paeds List” to the “Handover” document.

g. SAVE AS an excel document onto the USB -format: “YYMMDD HHHH (0800, 1600, 2230) Handover.” (eg 120714 0800 Handover). DO NOT JUST “SAVE” – we need this to be a new document. “Handovers” will be a series of documents that get longer after each session as new patients are added. This will be your working spreadsheet for the session.

h. Please colour code new admissions appropriately and consistently, and make full use of the notes column on the handover document. The following coding system has been developed:
   - BLUE = To be followed up. Note the questionnaire number and any details: (e.g. interview rescheduled – has info sheet but wishes to be interviewed at 2pm)
   - GREEN = Questionnaire completed. Note the questionnaire number.
   - RED = Declined to be interviewed. Note the questionnaire number.
   - ORANGE = Elective admission (exclusion).
   - GREY = Discharged before the interview could take place.
   - YELLOW = Uncertain status. Note any details.
   - PINK = Child >15y (exclusion).
STEP TWO: PREPARING THE QUESTIONNAIRES

a. Pick up the red folder of incomplete questionnaires from the designated locker.
b. Pick up blank questionnaire sheets, info sheets and show-cards from the designated pigeonhole in the locker room. Each interviewer may keep one set of show-cards to use in future sessions.
c. IMMEDIATELY NUMBER both the cover sheet and first page of questionnaires in the following format: “day of month/number” (eg: 1400, 1401, 1402 etc... for 14th July). Approximate how many you will need for the session. If you are not the first session of the day, make sure you do not double up on numbers used earlier that day – discontinuous numbers are better than repeats.

STEP THREE: IDENTIFYING ALL ACUTE ADMISSIONS

Please attempt to be minimally intrusive to ward staff.

a. Attend the medical handover in the Interview Room on Ward. Ask for a printout of the Handover notes from the ward staff – these are useful for each person to keep notes on but do not replace our spread sheet system. Aim to identify the nature of new admissions to the wards. You may discover:
   • Some ELECTIVE admissions (excluded from study).
   • Patients soon to be DISCHARGED or transferred (parents need to be approached as soon as possible).
   • Cases which may require sensitivity.
   • Cases which may require translation.
   • Patients which are in ISOLATION (enter these rooms through gowning rooms, wear gown, and gel hands at the very least, even if you are just handing an information sheet).
   • Patients who have been in hospital since birth (excluded from study)
   • There may be patients on the ward staff’s handover list that are in the NICU or ICU – these do not show up in our ward search and are also not a part of the study.

b. DO NOT AT ANY STAGE refer to patient notes or approach ward nurses/clerks to identify the nature of any new admissions that were not discussed at the medical handover.
c. Update the colour coding on the handover document to reflect this information.
d. Locate patients. Ward whiteboards are located near nurse’s station in Wards 1 and 2. These will give patient’s room number.
   • Please note that acute surgical patients may be in surgery during which time they can appear to “disappear along with their notes” from the ward, but they will return to Wards 1 and 2 eventually. It should be possible to interview them when they return.

STEP FOUR: APPROACHING PARENTS/GUARDIANS AND CONDUCTING INTERVIEWS

Sensitivity
Some of the questions in our questionnaire are quite sensitive and may be perceived as casting judgment especially around such factors as the condition of homes. It is important to ask questions in a non-judgmental manner and with sensitivity and respect. A good guideline is to align your views
with the views of the parent. Parents will inevitably be under stress and may already feel that they
are to blame for the admission. If you identify serious concerns about the patient’s health and safety,
please speak to ward staff as appropriate.

**Standard operating procedure for conducting interviews**

a. Assign each team member parents/guardians to approach. If there are fewer interviews to
conduct than team members, have the team leader train others in how to use the spreadsheet
system.

b. Begin by having the team hand out information sheets and introduce themselves, the study
purpose and the protocol. Try to hand out all information sheets at the start of your session to
give parents time to read them. Arrange a suitable time to come back – remember that unless
the patient is to be discharged soon, the interview can take place during another session.

- Whiti Te Ra (The Bronchiolitis Study): If eligible participants say they have been
approached by the Whiti Te Ra study, ask whether they are happy to be interviewed
twice. If not, explain to them that the other study takes preference. To accommodate
this study, we are restricting our interviews with parents of children <2y to after
11.30am each day.

c. Keep records on the handover spreadsheet of parents who are sleeping, tired, have a lot of
family around or appear to be occupied with other activities. Consider deferring contact or
suggesting that you return at a later time.

d. Record any parents who immediately decline to be interviewed on one of the numbered
questionnaires – write “DECLINED” at top of cover sheet and fill in the patient’s NHI. Record this
on the handover spreadsheet and colour code appropriately.

e. Conduct interviews at the pre-arranged times - it is desirable that if one team member has
handed out an information sheet but does not conduct the questionnaire that they introduce
the new team member to the parent/guardian.

- Add a patient sticker to the cover sheet of one of the numbered questionnaires
- Be flexible with timing, be prepared for interruptions.
- If you have difficulty with questions or parent’s answers, ask the rest of the team. If still
in doubt write a description of the problem next to the question.
- Ensure to note contact details if the parent consents to further follow-up.

f. Ensure your team members fill out the evaluation section of the questionnaire immediately after
the interview. This includes:

- Noting language barriers and any other difficulties
- Filling in the diagnosis section, utilising patient notes or the knowledge of ward staff if
uncertain.

(g. In addition, the Group Leader is responsible for:

- Co-ordinating the team members.
- Keeping a running record during your session of the status of each interview on the
handover spreadsheet, using colour coding and descriptions in the status column.
- Providing support and encouragement to team members to assist in problem solving
where necessary.
- Recording any issues with interviews in the spreadsheet.
STEP FIVE: CLOSING THE SESSION

a. Collect all questionnaires and order them by questionnaire number.
   • Double check that questionnaires are all filled out correctly.

b. Ensure the handover document is completely up to date. Ensure there are detailed descriptions in the status column for any admissions that you are leaving coded BLUE for follow up (eg: info sheet given, parents were busy throughout session, seem to be willing to do study, child in isolation room 5)

c. SAVE the document to the USB (do not need to change the filename/"save as" - this was done before the session).

d. Place any incomplete questionnaires in the red folder for follow up.

e. Tidy up after yourselves in the interview room.

f. Return completed questionnaires to the blue folder in the designated locker, the red folder to the locker and any blank questionnaires to the designated pigeonhole.

g. Arrange to give the USB and locker key to the Group Leader for the next session with sufficient time before it starts.
Appendix Two

Inclusion and Exclusion Criteria

Admissions that met ALL of the following criteria were included:

1. The patient was an acute admission to Ward 1 or Ward 2 at Wellington Hospital. This included:
   a. Acute medical admissions.
   b. Acute surgical admissions.
   c. Acute oncology admissions (e.g. febrile neutropenia).
2. The patient was under the age of 15 years at the time of the admission.

Admissions that met ANY of the following criteria were excluded:

1. The patient’s parents had already been approached by our team. This included:
   a. Admissions whose parents had been interviewed in the development phase of our questionnaire.
   b. Repeat admissions during the interview period.
2. The patient was in the NICU or ICU when the potential for questioning was assessed.
3. The patient was a neonate who had never been discharged from hospital.
4. The patient’s admission was planned or elective. Elective admissions were identified at handovers or by asking ward staff. They included:
   a. Elective surgical admissions.
   b. Elective admissions for eating disorders.
   c. Planned oncology appointments.

Parents of admissions that met ALL of the following criteria were only approached after 11.30am*:

1. The patient was under the age of 2.
2. The patient was admitted with a respiratory condition.

*This procedure was arranged to accommodate another study being conducted in the paediatric wards over our questionnaire period.
Appendix Three

Questionnaire

AUDIT OF CHILD ADMISSIONS IN WELLINGTON REGION
Questionnaire – 13 July 2012

“Hullo, I am ____________
I am a medical student [or other occupational group]
We are doing a project looking at ways of keeping children out of hospital.
And we are talking to the parents of children that come into hospital in July.
Have you been given the information sheet about the study and had a chance to read it?
Do you have any questions about the study?
Are you happy to answer questions about your child coming to hospital?
[If no, thank them and end the interview]
The interview will take about half an hour.
We can go through the questionnaire in one go or stop at any time and arrange another time to come back if needed.”

a. Questionnaire No. _________
b. Name of child: __________________________________
c. Name of person interviewed: ________________________________
d. Relationship to child : ________________________________
e. NHI of child: _______________________
f. Home address (state if multiple addresses and identify the address of interest for this questionnaire) :
   ____________________________________________________________
   ____________________________________________________________
g. Did the parent / caregiver give verbal consent to participate in this study?
   • Yes
   • No, record reason:
     • Could not locate parent or caregiver
     • Language insufficient to conduct interview
     • Too distressed to conduct interview
     • Declined to participate
     • Other reason, specify ________________________________

ASK FOLLOWING QUESTION AT THE END OF THE INTERVIEW

h. Did the parent / caregiver give verbal consent to be followed up for a further interview if required?
   • Yes → Record contact details for parent/caregiver (phone numbers: home, work, mobile)
   • No
INTERVIEW DETAILS
1. Questionnaire No: ______________
2. Name of interviewer: ___________________________
3. Date of interview ___ July 2012
4. 1 Interview source
   • Parent
   • Caregiver
   • Other, please specify (4.2) _______________________
5. 1 Centre
   • Wellington Hospital
   • Other (e.g. transfers – note details) (5.2) ______________

“Firstly, I would like to ask you some questions about your child.”
6. Just to confirm, is [CHILD’S NAME] male or female?
   • Male
   • Female
7. Date of birth: Day ____ Month ____ Year ______
8. Which ethnic group or groups does your child belong to (choose all that apply) [SHOWCARD 1]? 
   (8.1) ________ (8.2) _______ (8.3) _______
9. On a usual weekday from 9 to 5, where does [CHILD’S NAME] spend most time [SHOWCARD 2]? 
   __________________

“I would like to ask you some questions about your child’s admission.”
10. What day did [CHILD’S NAME] come to Hospital? ___ July 2012
11. What was the illness [or injury] that caused him/her to come to hospital?
   __________________
12. How many days before admission did [CHILD’S NAME] become ill [or have the injury]?
   [SHOWCARD 3 WITH CALENDAR]
13. Did he/she see any health worker(s) before coming to the hospital on this occasion? 

**SHOWCARD 4**
- Yes, indicate all that were seen: _____________________________________________
- No
- Don’t know

14. Does he/she have a GP clinic or medical centre that he/she is usually taken to when he/she is feeling unwell or injured?
- Yes
- No
- Don’t know

15. In the last 12 months, has there been any time when [CHILD’S NAME] needed to see a GP about her/his health, but didn’t get to see any doctor at all?
- Yes
- No
- Don’t know

16. The last time he/she was not able to see a GP when he/she needed to, what was the reason? 
**[Multiple responses possible]** Probe “Any other reason?” until no other reason.
Indicate all that apply **SHOWCARD 5** ___________________________________________

17. (17.1) Thinking about this current admission to hospital, did he/she have any difficulty seeing a GP when he/she needed to?
- Yes, then identify reason or reasons **SHOWCARD 5** _____________________________
  - (17.2) Did this difficulty delay treatment for him/her or contribute to this hospital admission?
    - Yes, describe how (17.3) ___________________________________________________
    - No
    - Don’t know
- No
- Not applicable as went direct to hospital
- Don’t know

18. Is [CHILD’S NAME] up to date on all vaccinations **SHOWCARD 6**?
- Yes
- No
- Don’t Know

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"I would like to ask you some questions about [CHILD’S NAME]’s general health."

19. In general, would you say his/her health is **SHOWCARD 7**: 
- Excellent
- Very good
- Good
- Fair
20. Does he/she have any long-term (chronic) health problems that need regular treatment or visits to the doctor?
   - Yes, specify health problems: ________________________________
   - No
   - Don’t know

21. In the past 12 months (excluding this admission), has [CHILD’S NAME] been admitted to a hospital? 
   - Yes, number of times: (21.2) ____________
   - Reason(s):(21.3) ________________________________
   - No
   - Don’t know

---

HEALTH KNOWLEDGE AND BEHAVIOURS

22. “I’m going to read out some statements and I would like you to tell me how much you agree or disagree with them [SHOWCARD 8]”

   22.1 I find it easy to arrange a non-urgent appointment for my child to see their GP ___
   22.2 I find it easy to arrange an urgent appointment for my child to see their GP ___
   22.3 I find it easy for my child to see a GP outside of normal opening hours ___
   22.4 I feel confident looking after a child who is unwell ___
   22.5 I feel confident knowing when I should call a doctor when I have an unwell child ___

“I’m going to show you a list of health problems that affect children. [SHOWCARD 9]”

23. For which of these would you take a child to see a doctor or nurse?

   23.1 A sore throat in a child aged 5 to 14 years? _____
   23.2 A skin infection with pus or hot red painful skin lasting a few days? _____
   23.3 Diarrhoea or vomiting lasting more than 1 day? _____
   23.4 A baby or toddler with cough and noisy or wheezy breathing? _____

---

   a) Lives at one home with parent(s) or caregiver(s)
   b) Moves between two homes, but spends most time at one place
   c) Moves between two homes with about equal time at each place
   d) Other living arrangement, specify: ________

   If moves between 2 homes, then choose one of the following options:

   OPTION A: If spends most time at one home:
   “For the following questions we are interested in the house in which [CHILD’S NAME] spends the most time. We will call this the ‘usual’ house.”

   OPTION B: If spends approximately equal time at each place
“For the following questions we are interested in the house in which [CHILD’S NAME] was living when he/she got sick/injured. We will call this the ‘usual’ house.”

25. Which statement best describes the ownership of [CHILD’S NAME] usual house [SHOWCARD 11]? ⁵

__________________________________________

26. How would you describe the house [SHOWCARD 12]? ⁵

- House or townhouse (NOT joined to any other)
- House, townhouse, unit or apartment joined to one or more other houses, townhouses, units or apartments
- Moveable dwelling, for example CARAVAN, BOAT, TENT, etc.
- Other, for example BOARDING HOUSE (specify): ________________________________

27. Approximately when was this house built [SHOWCARD 13]? ¹

__________________________________________

28. 1 How long has [CHILD’S NAME] lived at this address? ¹

- ________ Years

How many moves have you had in the last 12 months?

28.2 _____ total moves in last year
28.3 _____ moves because your landlord made you
28.4 _____ moves due to poor housing conditions

29. How would you describe the condition of the house [SHOWCARD 14]? ³

__________________________________________

30. Are there any leaks in the roof of this house?

- Yes
- No
- Don’t know

INDOOR AIR POLLUTION

31. Are there any smokers currently living in [CHILD’S NAME] usual house (that is people who smoke 1 or more cigarettes a day)? ²

- Yes, how many smokers? (31.2) _______
- No
- Don’t know

32. Has anyone smoked inside a house or car, with [CHILD’S NAME] present, in the past 7 days [SHOWCARD 15]? ²

- Yes – Always
- Yes – Often
- Yes – Sometimes
• No
• Don’t Know

33. To the best of your knowledge, has [CHILD’S NAME] ever smoked?
  • Yes, at least one cigarette a week
  • Yes, at least one cigarette a month
  • Yes, but less than once a month this winter
  • Only a puff or two ever
  • Never
  • Don’t know

34. Have you noticed dampness on any walls, ceilings or floors in the bedrooms or living areas of the house [SHOWCARD 15]? ²
  • Yes – Always
  • Yes – Often
  • Yes – Sometimes
  • No
  • Don’t Know

35. Is there mould or mildew on any surface in the bedrooms or living areas of the house [SHOWCARD 15]? ²
  • Yes – Always
  • Yes – Often
  • Yes – Sometimes
  • No
  • Don’t Know

36. Does the house smell mouldy or musty [SHOWCARD 15]? ²
  • Yes – Always
  • Yes – Often
  • Yes – Sometimes
  • No
  • Don’t Know

37. During the last month, has [CHILD’S NAME]’s usual house been colder than you would like [SHOWCARD 15]? ²
  • Yes – Always
  • Yes – Often
  • Yes – Sometimes
  • No
  • Don’t Know

38. During the last month, have you needed to sleep in the same room as other family members just to keep warm in the house [SHOWCARD 15]?
  • Yes – Always
  • Yes – Often
39. During the last month, has the house ever been so cold that you shivered inside [SHOWCARD 16]?2
   - Yes - Sometimes
   - No
   - Don’t Know

40. During the last month, has the house ever been so cold that you could see your breath inside [SHOWCARD 16]?
   - 4 or more times
   - 2 to 3 times
   - Once
   - Never
   - Don’t Know

41. Has the house been insulated?
   - Yes
   - No
   - Don’t know

42. Of all types of heating you used, which was your MAIN form of heating for your family area this winter [SHOWCARD 17]? 1
   Main heating method: ________________________________
   Heat pump (option f) temp (if relevant) (42.2)________________________

43. Which is the MAIN form of heating for [CHILD’S NAME]’s usual bedroom [SHOWCARD 17]?
   Main heating method: ________________________________
   Heat pump (option f) temp (if relevant) (43.2)________________________

44. During the last month, has an unflued bottled gas heater been used at the house (tick all that apply)? [SHOWCARD 18]
   - Yes – in the area where the child sleeps
   - Yes – in other areas
   - No
   - Don’t Know

45. During the last 12 months, have you been unable to pay your electricity or gas bills by the due date [SHOWCARD 16]?
   - 4 or more times
   - 2 to 3 times
   - Once
   - Never
   - Don’t Know

46. During the last 12 months, have you had your power stopped because of unpaid bills (includes prepayment meters running out) [SHOWCARD 16]?
CROWDING

47. How many bedrooms are there in [CHILD’S NAME]’s usual home?  
   ____ Bedrooms
   
   Note: Count rooms or sleep outs furnished as bedrooms and any caravan that this household uses as a bedroom

48. What is the usual number of people that live in the home?  
   48.1 ____ Men aged 18 or over
   48.2 ____ Women aged 18 or over
   48.3 ____ Boys aged 5 to 17 years
   48.4 ____ Girls aged 5 to 17 years
   48.5 ____ Boys under 5 years
   48.6 ____ Girls under 5 years
   48.7 ____ Total people, including child
   48.8 ____ Couples (among those already recorded)

49. How many other people usually sleep in the same bedroom as [CHILD’S NAME]?
   49.1 ____ Children under 18 years
   49.2 ____ Adults
   49.3 ____ Total people, including child

50. How many other people usually sleep in the same bed as [CHILD’S NAME]?
   50.1 ____ Children under 18 years
   50.2 ____ Adults
   50.3 ____ Total people, including child

HOME INJURY HAZARDS

51. 1 Are there smoke alarms in [CHILD’S NAME]’s usual home?
   • Yes
   51.2 Have these smoke alarms been tested as working in the last 6 months?
       o Yes
       o No
       o Do not know

   • No
   • Don’t know
52. Do you have a child-proof storage area in the bathroom or kitchen where you can safely store medicines and cleaning products?
   • Yes
   • No
   • Don’t know

53. 1 Are there stairs inside the house?
   • Yes
   53.2 Do the stairs have a handrail?
      o Yes
      o No
   53.3 Is there a child gate blocking the stairs?
      o Yes
      o No
      o Not applicable as no children <5 years in house
   • No
   • Don’t know

54. 1 Do you have outside steps leading to the house?
   • Yes
   54.2 Do the steps have a handrail?
      o Yes
      o No
   54.3 Is there an outside light for these steps?
      o Yes
      o No
   • No
   • Don’t know

55. 1 Is there a deck or veranda at the house?
   • Yes
   55.2 Is there a guard rail around the deck or veranda?
      o Yes
      o No
   • No
   • Don’t know

56. Is the property fenced to prevent children walking onto the road?
   • Yes
   • No
   • Not Applicable (situations where there is no outside property, such as most apartments)
   • Don’t know

UNFAIR TREATMENT
“I would now like to ask you a couple of questions about how people react to your ethnicity.”
57. Have you ever been treated unfairly (for example, kept waiting or treated differently) by a health professional (that is, a doctor, nurse, dentist etc) because of your ethnicity in New Zealand?
   - Yes, within the past 12 months
   - Yes, more than 12 months ago
   - No
   - Don’t know

58. Have you ever been treated unfairly when renting or buying housing because of your ethnicity in New Zealand?
   - Yes, within the past 12 months
   - Yes, more than 12 months ago
   - No
   - Don’t know

“Just to finish up I would like to ask you some questions about government benefits”

59. Do you receive income from any of these sources [SHOWCARD 19]?
   - Yes
   - No

60. Do you have or are you eligible for a Community Services Card?
   - Yes
   - No

“I would now like to ask you some questions about follow-up from this interview”

61. Is there anything else you would like to say about the condition of your house that you think has affected the health of your child that we have not covered?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

62. If there was a free service available that would involve someone coming to your house to look at its condition and things that affect health and safety for children, would you use this service?
   - Yes
   - No
   - Don’t know

63. Would you be willing to be contacted for a further interview if required?
   - Yes→ Record response on cover sheet
   - No
   - Don’t know
64. Would you be willing for us to link the information you have given us in this interview to your child’s health and hospital records? This would be done using their national health number. We would not be able to identify your child by name.
   • Yes
   • No
   • Don’t know

65. How long did the interview take? ____________ minutes

66. Were there any problems with the interview (mark all that applied)
   • Subject had difficulty understanding English / English was second language
   • Subject appeared to have difficulty understanding questions
   • Subject appeared to find subject matter distressing or intrusive
   • Subject didn’t live in ‘usual house’ referred to by questions
   • Subject appeared not to know much about house they lived in
   • Other difficulty (specify) ______________________________________________________

EW – COMPLETED AFTER INTERVIEW

67. [Do not read aloud] Was this hospitalization preventable?
   • Entirely
   • Partly
   • Not preventable
   • Indeterminate

68. [Do not read aloud] What broad strategy might have contributed to this admission being preventable?
   • Population preventable hospitalization
   • Ambulatory sensitive hospitalization
   • Not preventable
   • Indeterminate

69. [Do not read aloud] Would interventions be appropriate to improve housing conditions for this child to reduce the risk of re-admission for this or a similar condition?
   • Yes
   • No
   • Indeterminate

70. [Do not read aloud] Was this hospitalization preventable?
   • Entirely
   • Partly
   • Not preventable
   • Indeterminate
71. **[Do not read aloud]** What broad strategy might have contributed to this admission being preventable?
   - Population preventable hospitalization
   - Ambulatory sensitive hospitalization
   - Not preventable
   - Indeterminate

72. **[Do not read aloud]** Would interventions be appropriate to improve housing conditions for this child to reduce the risk of re-admission for this or a similar condition?
   - Yes
   - No
   - Indeterminate

[Do not read aloud] To the best of your knowledge, what was the principal diagnosis (may have to consult a paediatrician)?

[Do not read aloud] List any additional diagnoses.

---

**Question sources (for reference):**

H.O.M.E. Study

Southern Hemisphere Influenza & Vaccine Effectiveness Research & Surveillance 2012

Housing, Heating and Health Study 2006

Bronchiolitis (RSV) Study 2012

NZ Census 2006

NZ Health Survey 2011
Appendix Four

Information for Interviewees (Key Informants):

Aims of our study:

1. To measure the prevalence of probable risk factors for child hospitalization in the CCDHB area, with a particular focus on housing conditions and other modifiable exposures. Cases will be children less than 15 years of age admitted to hospital with an acute illness or injury.
2. To identify the proportion of acute admissions that is potentially avoidable hospitalisations (PAH). This analysis could distinguish those preventable by population health interventions (population preventable hospitalisations/PPH) and/or by effective primary care (ambulatory sensitive hospitalisations/ASH).
3. To assess the feasibility of a potential study (case-control or case-case) to quantify the impact of risk factors for child hospitalisation using a suitable control population (eg. children under 15 years of age having elective hospital admissions or children identified through other means).

Questions and discussion points for Interviews:

- What is your involvement in the area of child health?
- What is your involvement in the area of housing?
- What kinds of information do you need to support your work in these areas?
- Do you think that some child hospitalisations are potentially avoidable?
  - Please explain and give examples.
- Are there important risk factors for child illness and injury that are contributing to children being admitted to hospital?
  - Please explain and give examples.
  - Are some of these risk factors related to housing conditions?
- Are some groups of children more at risk of illness and injury than others?
- Do you think that we should be routinely screening child admissions to hospital for exposure to important risk factors and hazards?
  - What sorts of risk factors and hazards?
  - What sorts of housing-related risk factors and hazards?
  - What interventions might result from such screening?
- Whose responsibility is it to identify and deal with housing hazards?
  - The homeowner or landlord
  - The parents/caregivers of children
  - Local authorities
  - Public health services of DHBs
  - Housing NZ
  - Other Government agencies
  - Someone else?
- Is the link between housing and health something that your organisation/service is interested in?
  - Would it assist you/your organisation to have on-going information about the prevalence of exposure to housing hazards for NZ children?
Would it be useful to have a periodic audit of such exposures in children admitted to NZ hospitals?
Could this be part of comprehensive child health surveillance?
• What stops people from seeking health care? Is there evidence of important barriers to primary medical care for children (including cost and travel) and are these barriers contributing to PAH?
• Do you think that it would help if people (parents) knew more about how the health system works?
• What is the level of knowledge (health literacy) among parents about important health hazards and diseases affecting children and how to prevent and treat them?
• What is your organisation/service doing at the moment in the above area? What other important things are going on?
• Is there anything that you think is important that we haven’t addressed?
## Appendix Five

### Frequency table of responses to questions

**Q.6 Just to confirm, is [CHILD’S NAME] male or female?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>67</td>
<td>36.8</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
<td>63.2</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100</td>
</tr>
</tbody>
</table>

**Q.7 Age Range**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1yo.</td>
<td>30</td>
<td>28.3</td>
</tr>
<tr>
<td>1-4y.o</td>
<td>18</td>
<td>17.0</td>
</tr>
<tr>
<td>5-9y.o</td>
<td>46</td>
<td>38.3</td>
</tr>
<tr>
<td>10-14y.o</td>
<td>12</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100</td>
</tr>
</tbody>
</table>

**Q.8 Which Ethnic Group do you Belong to?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Cook Island Maori</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Indian</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Maori</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>NZ European</td>
<td>56</td>
<td>52.8</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td>Samoan</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100</td>
</tr>
</tbody>
</table>

**Q.9 On a usual weekday from 9 to 5, where does [CHILD] spend most time?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Extended day care</td>
<td>12</td>
<td>11.3</td>
</tr>
<tr>
<td>b. Preschool/kindergarten</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>c. Primary school</td>
<td>17</td>
<td>16.0</td>
</tr>
<tr>
<td>d. Secondary school</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>e. Home</td>
<td>59</td>
<td>55.7</td>
</tr>
<tr>
<td>Other place (specify)</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Q.12 How many days before admission did the child become ill or have the injury?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 days</td>
<td>55</td>
<td>51.9</td>
</tr>
<tr>
<td>Time Frame</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>--------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>3-5 days</td>
<td>25</td>
<td>23.6</td>
</tr>
<tr>
<td>6-9 days</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>10-13 days</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>14 days or more</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.13 See any health worker(s) before coming to the hospital on this occasion?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>88</td>
<td>83.0</td>
</tr>
<tr>
<td>NO</td>
<td>17</td>
<td>16.0</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.13 Yes, indicate all that were seen

<table>
<thead>
<tr>
<th></th>
<th>(x/88)</th>
<th>(x/88)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Usual GP or practice</td>
<td>51</td>
<td>58.0</td>
</tr>
<tr>
<td>b. Other GP or practice (i.e. casual)</td>
<td>6</td>
<td>6.8</td>
</tr>
<tr>
<td>c. An after-hours medical centre</td>
<td>16</td>
<td>18.2</td>
</tr>
<tr>
<td>d. A hospital outpatient department</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>e. Pharmacist</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>f. A hospital emergency department</td>
<td>13</td>
<td>14.8</td>
</tr>
<tr>
<td>g. Ambulance staff</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>h. Wellchild nurse e.g. Plunket, Tamariki Ora, Karitane worker</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>i. Other nurse e.g. asthma nurse, district health nurse</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>j. Physiotherapist</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>k. Chiropractor or Osteopath</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>l. Midwife</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>m. Other health care provider (please specify)</td>
<td>8</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Other health care providers that were seen

- ambulance from kenepuru
- called healthline
- healthlink
- liver transplant nurse specialist
- pediatric specialist
- rang health line
- rheumatologist
- self referred - parents both GPs
- specialist (ENT)

Q.14 Does he/she have a GP clinic or medical centre that he/she is usually taken to when he/she is feeling unwell or injured?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>104</td>
<td>98.1</td>
</tr>
<tr>
<td>NO</td>
<td>1</td>
<td>0.9</td>
</tr>
</tbody>
</table>

89
Q.15 In the last 12 months, has there been any time when [CHILD’S NAME] needed to see a GP about her/his health, but didn’t get to see any doctor at all?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>NO</td>
<td>86</td>
<td>81.1</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Q.16 The last time he/she was not able to see a GP when he/she needed to, what was the reason? [Multiple responses possible] Probe “Any other reason?” until no other reason.

Of those who say 'Yes' (n=19) - x proportion of them think:

<table>
<thead>
<tr>
<th>Reason</th>
<th>x/19</th>
<th>(x/19)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Costs too much</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>b. Had no transport to get there</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>c. Lack of childcare</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>d. Couldn’t get an appointment soon enough/ at a suitable time</td>
<td>14</td>
<td>73.7</td>
</tr>
<tr>
<td>e. It was after-hours</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>f. Couldn’t get in touch with the doctor</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>g. Couldn’t spare the time</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>h. Didn’t want to make a fuss</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>i. Other [Specify]_________________________</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>j. Don’t know</td>
<td>1</td>
<td>5.3</td>
</tr>
</tbody>
</table>

k is omitted here as it is not relevant for this calculation (see above for 'k')

Q.17.1 Thinking about this current admission to hospital, did he/she have any difficulty seeing a GP when he/she needed to?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td>No</td>
<td>61</td>
<td>57.5</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Not applicable as went direct to hospital</td>
<td>29</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Q.17.2 Did this difficulty delay treatment for him/her or contribute to this hospital admission? for those who answered 'yes' ONLY

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7</td>
<td>46.7</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>40.0</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>2</td>
<td>13.3</td>
</tr>
</tbody>
</table>

Q.18 Up to date on all vaccinations?
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>92</td>
<td>86.8</td>
</tr>
<tr>
<td>NO</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100</td>
</tr>
</tbody>
</table>

**Q.19 In general, would you say his/her health is?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCELLENT</td>
<td>45</td>
<td>42.5</td>
</tr>
<tr>
<td>VGOOD</td>
<td>32</td>
<td>30.2</td>
</tr>
<tr>
<td>GOOD</td>
<td>20</td>
<td>18.9</td>
</tr>
<tr>
<td>FAIR</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>POOR</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
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</tbody>
</table>

**Q.20 Does he/she have any long-term (chronic) health problems that need regular treatment or visits to the doctor?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>40</td>
<td>37.7</td>
</tr>
<tr>
<td>NO</td>
<td>65</td>
<td>61.3</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*If Yes see 20.2 it's a list, see different page.*

**Q21 In the past 12 months (excluding this admission), has [CHILD'S NAME] been admitted to a hospital?**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>34</td>
<td>32.1</td>
</tr>
<tr>
<td>NO</td>
<td>71</td>
<td>67.0</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*if yes see 21.1 for no. of times and reason*

**Q.22.1 I find it easy to arrange a non-urgent appointment for my child to see their GP**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>39</td>
<td>36.8</td>
</tr>
<tr>
<td>b. Agree</td>
<td>44</td>
<td>41.5</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Q.22.2 I find it easy to arrange an urgent appointment for my child to see their GP**
### Q22.3 I find it easy for my child to see a GP outside of normal opening hours

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>17</td>
<td>16.0</td>
</tr>
<tr>
<td>b. Agree</td>
<td>33</td>
<td>31.1</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>18</td>
<td>17.0</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>28</td>
<td>26.4</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q22.4 I feel confident looking after a child who is unwell

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>39</td>
<td>36.8</td>
</tr>
<tr>
<td>b. Agree</td>
<td>47</td>
<td>44.3</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q22.5 I feel confident knowing when I should call a doctor when I have an unwell child

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>46</td>
<td>43.4</td>
</tr>
<tr>
<td>b. Agree</td>
<td>47</td>
<td>44.3</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Q23 For which of these would you take a child to see a doctor or nurse?

#### Q.23.1 A sore throat in a child aged 5 to 14 years?

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
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<td>28.3</td>
</tr>
<tr>
<td>b. Agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Disagree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q.23.2 A skin infection with pus or hot red painful skin lasting a few days?</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>a. Strongly Agree</td>
<td>77</td>
<td>72.6</td>
</tr>
<tr>
<td>b. Agree</td>
<td>17</td>
<td>16.0</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>106</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q.23.3 Diarrhoea or vomiting lasting more than 1 day?</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>62</td>
<td>58.5</td>
</tr>
<tr>
<td>b. Agree</td>
<td>21</td>
<td>19.8</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>16</td>
<td>15.1</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>106</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q.23.4 A baby or toddler with cough and noisy or wheezy breathing?</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Strongly Agree</td>
<td>66</td>
<td>62.3</td>
</tr>
<tr>
<td>b. Agree</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>c. Neither Agree nor Disagree</td>
<td>18</td>
<td>17.0</td>
</tr>
<tr>
<td>d. Disagree</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>e. Strongly Disagree</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Not Applicable w.r.t Child</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>106</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Lives at one home with parent(s) or caregiver(s)</td>
<td>94</td>
<td>88.7</td>
</tr>
<tr>
<td>b) Moves between two homes, but spends most time at one place</td>
<td>9</td>
<td>8.5</td>
</tr>
<tr>
<td>c) Moves between two homes with about equal time at each place</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>d) Other living arrangement, specify: ______</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>106</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Q25. Which statement best describes the ownership of [CHILD’S NAME] usual house?

<table>
<thead>
<tr>
<th>Ownership</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Owned by myself or my family trust</td>
<td>50</td>
<td>47.2</td>
</tr>
<tr>
<td>b. Owned by one of the other people living in the house</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>c. Rented from family</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>d. Rented from Housing New Zealand</td>
<td>21</td>
<td>19.8</td>
</tr>
<tr>
<td>e. Rented from City Council</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>f. Rented from a private landlord</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>g. Long-term care institution</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>h. Other housing situation (tenure) _____ specify</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q26 How would you describe the house [SHOWCARD 12]?

<table>
<thead>
<tr>
<th>Type of House</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>House or townhouse (NOT joined to any other)</td>
<td>82</td>
<td>77.4</td>
</tr>
<tr>
<td>House, townhouse, unit or apartment joined to one or more other houses, townhouses, units or apartments</td>
<td>22</td>
<td>20.8</td>
</tr>
<tr>
<td>Moveable dwelling, for example CARAVAN, BOAT, TENT, etc.</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other, for example BOARDING HOUSE (specify):</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q27 Approximately when was this house built [SHOWCARD 13]?

<table>
<thead>
<tr>
<th>Year Range</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. In or after 2000</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>b. 1990-1999</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>c. 1978-1989</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>d. 1960-1977</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td>e. Before 1960</td>
<td>34</td>
<td>32.1</td>
</tr>
<tr>
<td>f. Do not know</td>
<td>24</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q28.3 and 28.4

<table>
<thead>
<tr>
<th></th>
<th>Cases out of 106</th>
</tr>
</thead>
<tbody>
<tr>
<td>moves due to landlord made them</td>
<td>2</td>
</tr>
<tr>
<td>moves due to poor housing conditions</td>
<td>3</td>
</tr>
</tbody>
</table>

Q29 How would you describe the condition of the house [SHOWCARD 14]?

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>excellent</td>
<td>44</td>
<td>41.5</td>
</tr>
<tr>
<td>good</td>
<td>40</td>
<td>37.7</td>
</tr>
<tr>
<td>average</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>Poor</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>--------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Very poor</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.30 Are there any leaks in the house?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>17.0</td>
</tr>
<tr>
<td>No</td>
<td>84</td>
<td>79.2</td>
</tr>
<tr>
<td>DK</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.31.1 Are there any smokers currently living in [CHILD’S NAME] usual house (that is people who smoke 1 or more cigarettes a day)?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>39</td>
<td>36.8</td>
</tr>
<tr>
<td>No</td>
<td>67</td>
<td>63.2</td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.31.2 How many smokers are there in the household?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 smokers</td>
<td>67</td>
<td>63.2</td>
</tr>
<tr>
<td>1 smoker</td>
<td>28</td>
<td>26.4</td>
</tr>
<tr>
<td>2 smokers</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>3 smokers</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>4 smokers</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>5 or more</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.32 Has anyone smoked inside a house or car, with [CHILD] present, in the past 7 days?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>No</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.33. To the best of your knowledge, has [CHILD’S NAME] ever smoked?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, at least one cigarette a week</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Yes, at least one cigarette a month</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Yes, but less than once a month this winter</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Only a puff or two ever</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Never</td>
<td>105</td>
<td>99.1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.34. Have you noticed dampness on any walls, ceilings or floors in the bedrooms or living areas of the house?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>No</td>
<td>73</td>
<td>68.9</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.35. Is there mould or mildew on any surface in the bedrooms or living areas of the house?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>No</td>
<td>80</td>
<td>75.5</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.36. Does the house smell mouldy or musty?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>7</td>
<td>6.6</td>
</tr>
<tr>
<td>No</td>
<td>94</td>
<td>88.7</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.37. During the last month, has [CHILD] usual house been colder than you would like?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>Yes – Sometimes</td>
<td>31</td>
<td>29.2</td>
</tr>
<tr>
<td>No</td>
<td>52</td>
<td>49.1</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.38. During the last month, have you needed to sleep in the same room as other family members just to keep warm in the house?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – Always</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>Yes – Often</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

96
### Q.39. During the last month, has the house ever been so cold that you shivered inside?

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or more</td>
<td>9</td>
</tr>
<tr>
<td>2 to 3 times</td>
<td>19</td>
</tr>
<tr>
<td>Once</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>72</td>
</tr>
<tr>
<td>DK</td>
<td>4</td>
</tr>
<tr>
<td><strong>106</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### Q.40. During the last month, has the house ever been so cold that you could see your breath inside?

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or more</td>
<td>16</td>
</tr>
<tr>
<td>2 to 3</td>
<td>7</td>
</tr>
<tr>
<td>Once</td>
<td>6</td>
</tr>
<tr>
<td>Never</td>
<td>75</td>
</tr>
<tr>
<td>DK</td>
<td>2</td>
</tr>
<tr>
<td><strong>106</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### Q.41. Has the house been insulated?

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>72</td>
</tr>
<tr>
<td>NO</td>
<td>18</td>
</tr>
<tr>
<td>DK</td>
<td>16</td>
</tr>
<tr>
<td><strong>106</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### Q.42.1 OF ALL TYPES OF HEATING METHODS USED WHICH IS THE MAIN FORM OF HEATING YOU USED for your family area this winter?

<table>
<thead>
<tr>
<th>(x/106)</th>
<th>(x/106)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Open fire</td>
<td>4</td>
</tr>
<tr>
<td>b. Enclosed fire/wood burner/multi-burner</td>
<td>24</td>
</tr>
<tr>
<td>c. Wood pellet burner</td>
<td>1</td>
</tr>
<tr>
<td>d. Flued gas heater (fixed heater with an exhaust pipe that goes outside the house)</td>
<td>9</td>
</tr>
<tr>
<td>e. Unflued gas heater (usually movable but may also be on wall with no exhaust to outside)</td>
<td>1</td>
</tr>
<tr>
<td>f. Heat pump</td>
<td>29</td>
</tr>
<tr>
<td>g. Electric fixed heaters (i.e. attached to wall)</td>
<td>8</td>
</tr>
<tr>
<td>h. Electric portable heater (i.e. oil column, fan, radiant bar)</td>
<td>20</td>
</tr>
</tbody>
</table>
i. Central heating 7 6.6
j. Electric blanket 2 1.9
k. Oven 0 0.0
l. Water bottle with lots of blankets 1 0.9
m. Other: _______ 1 0.9
n. Do not use heating 3 2.8

Q.42.2 OF ALL TYPES OF HEATING METHODS USED WHICH IS THE MAIN FORM OF HEATING YOU USE for your Child’s usual bedroom?

<table>
<thead>
<tr>
<th>(x/106)</th>
<th>(x/106)%</th>
</tr>
</thead>
</table>
a. Open fire | 1 0.9 |
b. Enclosed fire/wood burner/multi-burner | 2 1.9 |
c. Wood pellet burner | 0 0.0 |
d. Flued gas heater (fixed heater with an exhaust pipe that goes outside the house) | 1 0.9 |
e. Unflued gas heater (usually movable but may also be on wall with no exhaust to outside) | 1 0.9 |
f. Heat pump | 9 8.5 |
g. Electric fixed heaters (i.e. attached to wall) | 8 7.5 |
h. Electric portable heater (i.e. oil column, fan, radiant bar) | 57 53.8 |
i. Central heating | 7 6.6 |
j. Electric blanket | 4 3.8 |
k. Oven | 0 0.0 |
l. Water bottle with lots of blankets | 1 0.9 |
m. Other: _______ | 2 1.9 |
n. Do not use heating | 15 14.2 |

For those who use heat pumps the average temperature is 21.9 degrees Celsius

Q.44. During the last month, has an unflued bottled gas heater been used at the house (tick all that apply)?

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – in the area where the child sleeps</td>
<td>1 0.9</td>
</tr>
<tr>
<td>Yes – in other areas</td>
<td>8 7.5</td>
</tr>
<tr>
<td>No</td>
<td>97 91.5</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0 0.0</td>
</tr>
<tr>
<td>106 100.0</td>
<td></td>
</tr>
</tbody>
</table>

Q.45 During the last 12 months, have you been unable to pay your electricity or gas bills by the due date?

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or more times</td>
<td>4 3.8</td>
</tr>
<tr>
<td>2 to 3 times</td>
<td>7 6.6</td>
</tr>
<tr>
<td>Once</td>
<td>4 3.8</td>
</tr>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>----------------</td>
<td>-----</td>
</tr>
<tr>
<td>Never</td>
<td>90</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>106</td>
</tr>
</tbody>
</table>

Q.46 During the last 12 months, have you had your power stopped because of unpaid bills (includes prepayment meters running out) [SHOWCARD 16]?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>4 or more times</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>2 to 3 times</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Once</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>Never</td>
<td>98</td>
<td>92.5</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.47 How many bedrooms are there in your home?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>10.4</td>
</tr>
<tr>
<td>3</td>
<td>54</td>
<td>50.9</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>28.3</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.48 Total People Including Child

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
<td>21.7</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>20.8</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>23.6</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>17.0</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.49 Sleeping in Same bedroom as child (including child)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>47</td>
<td>44.3</td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>27.4</td>
</tr>
<tr>
<td>---</td>
<td>----</td>
<td>------</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.50 Sharing same bed as child (including child)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>85</td>
<td>80.2</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>12.3</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.51.1 Are there smoke alarms in [CHILD’S NAME]’s usual home?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>96</td>
<td>90.6</td>
</tr>
<tr>
<td>NO</td>
<td>9</td>
<td>8.5</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q51.2 For those with smoke alarms, have they been tested?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>71</td>
<td>74.0</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>16.7</td>
</tr>
<tr>
<td>DK</td>
<td>9</td>
<td>9.4</td>
</tr>
<tr>
<td></td>
<td>96</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.52 Do you have a child-proof storage area in the bathroom or kitchen where you can safely store medicines and cleaning products?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>80</td>
<td>75.5</td>
</tr>
<tr>
<td>NO</td>
<td>26</td>
<td>24.5</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.53.1 STAIRS INSIDE HOUSE?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>52</td>
<td>49.1</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
<td>50.9</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.53.2 If yes, do they have handrails?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>41</td>
<td>78.8</td>
</tr>
<tr>
<td>no</td>
<td>11</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Q.53.3  And does it have a child gate?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>14</td>
<td>26.9</td>
</tr>
<tr>
<td>N</td>
<td>31</td>
<td>59.6</td>
</tr>
<tr>
<td>N/A as no children &lt;5years in house</td>
<td>7</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.54.1 STEPS LEADING TO THE HOUSE

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>73</td>
<td>68.9</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>31.1</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.54.2  If yes does it have a handrail?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>41</td>
<td>56.2</td>
</tr>
<tr>
<td>no</td>
<td>32</td>
<td>43.8</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.54.3  And outside light for these steps?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>64</td>
<td>87.7</td>
</tr>
<tr>
<td>no</td>
<td>9</td>
<td>12.3</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.55.1 DECK OR VERANDA?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>57.7</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>40.4</td>
</tr>
<tr>
<td>DK</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.55.2 If yes, does it have a guard rail around the deck or veranda?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>23</td>
<td>76.7</td>
</tr>
<tr>
<td>no</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.56 IS THE PROPERTY FENCED TO PREVENT CHILDREN WALKING ONTO THE ROAD?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>69</td>
<td>65.1</td>
</tr>
<tr>
<td>NO</td>
<td>33</td>
<td>31.1</td>
</tr>
<tr>
<td>NA</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Q.57 Have you ever been treated unfairly (for example, kept waiting or treated differently) by a health professional (that is, a doctor, nurse, dentist etc) because of your ethnicity in New Zealand?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, within the past 12 months</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Yes, more than 12 months ago</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>90.6</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.58 Have you ever been treated unfairly when renting or buying housing because of your ethnicity in New Zealand?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, within the past 12 months</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Yes, more than 12 months ago</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>90.6</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.59 Do you receive income from any of these sources [SHOWCARD 19]?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>32</td>
<td>30.2</td>
</tr>
<tr>
<td>No</td>
<td>74</td>
<td>69.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.60 Do you have or are you eligible for a Community Services Card?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>24</td>
<td>46.2</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>53.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>52</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.62 If there was a free service available that would involve someone coming to your house to look at its condition and things that affect health and safety for children, would you use this service?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>83</td>
<td>78.3</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>18.9</td>
</tr>
<tr>
<td>DK</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q63 AND 64 NOT RELAVANT

Q.67 Was the hospitalisation preventable?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entirely</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td>Partly</td>
<td>39</td>
<td>36.8</td>
</tr>
</tbody>
</table>

102
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not preventable</td>
<td>24</td>
<td>22.6</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>28</td>
<td>26.4</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.68 What broad strategy might have contributed to this admission being preventable?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>Ambulatory Sensitive Hospitalization</td>
<td>22</td>
<td>20.8</td>
</tr>
<tr>
<td>Population + ASH</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>23</td>
<td>21.7</td>
</tr>
<tr>
<td>NP</td>
<td>23</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Q.69 Would interventions be appropriate to improve housing conditions for this child to reduce the risk of re-admission for this or a similar condition?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>35</td>
<td>33.0</td>
</tr>
<tr>
<td>NO</td>
<td>56</td>
<td>52.8</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>15</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>100.0</td>
</tr>
</tbody>
</table>