Do those who consume breakfast daily have a higher perceived quality of life than non-daily breakfast consumers?

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Preface

The Canterbury Health, Ageing, and Lifecourse (CHALICE) study is a multidisciplinary prospective random cohort study of fifty year old males and females residing in the Canterbury District Health Board (CDHB) region. Planning for this study began in 2009 and participant recruitment and baseline data collection commenced in August 2010. Participants were recruited to CHALICE by 20th June 2012. The data used in this thesis is baseline data from the first 300 participants of a sample of 1000 to be achieved over five years.

CHALICE participants complete seven modules assessing socio-demographic, physical, cognition, mental health, clinical history, family and social, cardiovascular, and lifestyle domains in a four to six hour clinical interview. Data collected includes laboratory tests, interviews and self-completed questionnaires. Each participant will complete a brief annual questionnaire in addition to a five year follow-up assessment where the full seven modules will be repeated.

This study examines whether there is a link between vitality and general health, as measured by the Medical Outcomes Study 36-Item Short Form (SF-36v2) questionnaire, and regular breakfast consumption.
As part of this thesis, the candidate:

- observed full study participant interviews (modules 2-7)
- checked returned participant food and beverage diaries (FBD) weekly for any food or beverage omissions or foods requiring clarification, and formulated questions for the interviewers to obtain the required information from participants
- entered 50 food and beverage diaries into the nutrient analysis programme
- ensured food and beverage choices from the old nutrient analysis programme were accurate and appropriate when entered into the more current nutrient analysis programme
- updated the existing assumptions list for the more current nutrient analysis programme and created a database of these assumptions
- completed all statistical analyses presented in this thesis
Abstract

**Objective:** To investigate if daily breakfast consumption is associated with higher vitality and general health scores in 50 year old Cantabrians.

**Design:** Cross-sectional pilot study using baseline data collected for the prospective longitudinal Canterbury Health, Ageing and Lifecourse (CHALICE) study. Participants were 50 years old (n=300) and living within the Canterbury District Health Board (CDHB) catchment area. Vitality and general health were scored using the Medical Outcome Studies 36-Item Short Form (SF-36v2) Questionnaire and breakfast frequency was measured using the How you eat and what you eat questionnaire. Daily breakfast consumers (DBC) were defined as those who ate breakfast every day and non-daily breakfast consumer (NBC) were defined as those who ate breakfast < 7 days a week. Other relevant data collected included: demographics, standard of living using the Economic Living Standard Index Short Form (ELSI SF), body mass index (BMI kg/m²), alcohol consumption using the Alcohol Use Disorders Identification Test (AUDIT), psychological status (depression) using the Mini-International Neuropsychiatric Interview (MINI) and smoking habits. Participants were categorised into high and low groups for all categorical variables (breakfast consumption, standard of living, ethnicity, depression, alcohol consumption and smoking), except for the continuous variable BMI kg/m². A Pearson Chi-square test was used to investigate differences between males and females. Linear regression models were used to examine the Beta co-efficient (β) values of vitality and general health scores and associated confidence intervals (CIs) in DBC compared with NBC for all subjects together and for males and females, separately.
**Results:** The prevalence of DBC in this study was 74.6%. Daily breakfast consumption was not associated with having a higher vitality or general health score. An association that almost approached significance was observed for DBC and vitality in men. ELSI_{SF}, depression and BMI were associated with vitality and general health for all subjects. Depression had the most significant effect on vitality ($\beta$ -6.65 CI -10.49, -2.81) and general health ($\beta$ -7.44 CI -10.86, -4.02) for men. Smoking was the greatest contributor to decreased vitality ($\beta$ -7.77 CI -12.79, -2.75) and general health ($\beta$ -5.70 CI -10.63, -0.77) for women. DBC smoked less, consumed less alcohol, were less depressed and/or had lower BMIs compared to NBC.

**Conclusions:** Breakfast consumption was not associated with the vitality or general health scores of participants in this study; however those who consumed breakfast every day had healthier lifestyle habits compared to those who did not. Further research is required to assess specific breakfast foods and nutrients, and the change in breakfast consumption patterns in relation to quality of life and well-being in a middle-aged population.
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1.0 Introduction

Breakfast is the first meal that breaks the overnight fast. A balanced diet, of which breakfast plays a role, is necessary for maintaining optimal health and in the prevention of non-communicable diseases (NCD) (1). The Western world has experienced a steady decline over recent decades in the proportion of those consuming breakfast regularly (2). According to data from the New Zealand Adult Nutrition Survey 2008/09, only 66.9% of the total population aged 15 years and over consumed breakfast daily, and 6% did not usually consume breakfast (3). Data on the reasons why some New Zealanders do not consume breakfast are scarce but the results from previous research show some common reasons Americans skip breakfast are “not hungry right after waking”, “not enough time”, “it’s not convenient”, “forget”, and “not sure what to eat” (4).

To date, there have been a number of studies examining the detrimental effects of breakfast skipping practices on a variety of psychological health outcomes including cognitive function, well-being and general health. The World Health Organisation (WHO) (5) has indicated neuropsychiatric disorders (of which poor psychological health can play a role) as being the third highest burden of disease (disability-adjusted life years (DALY)) in the world after lower respiratory infections and diarrhoeal diseases, and the leading burden of disease (DALY) within high-income countries. Neuropsychiatric disorders are expected to rise to be the number one burden in the world by the year 2030, yet mental health services remain insufficient to meet this growing burden (6).
The Medical Outcomes Study 36-Item Short Form (SF-36v2) questionnaire is commonly used to assess self-reported physical and mental health status in relation to eight domains of health where scores are expressed on a 0-100 scale (7). Results from the 2007 Health Survey of New Zealand (7) has shown ‘vitality’, followed by ‘general health’, to be scored the lowest of the eight health domains across all age groups, and were the lowest domains scored among the 55-64 year age group along with ‘bodily pain’. A general decline in scores across all health domains with increasing age was also observed.

A high level of vitality is defined as feeling full of energy all of the time; whereas a low level is reported as feeling tired and worn out all of the time. Subsequently, a high score for general health perception is when an individual evaluates their own health as excellent; whereas a low score is evaluated as poor health and a belief it is likely to get worse (7).

This thesis examines whether daily breakfast consumption is associated with the perceived vitality and/or general health, as assessed by the SF-36v2 questionnaire, of the first 300 participants of the CHALICE study. CHALICE is a longitudinal cohort study of the health and well-being of 50 year olds living in the CDHB area.
2.0 Literature Review

Risk factors for chronic disease such as cardiovascular disease, increase with increasing age, and tend to become apparent around middle-age (aged 50) (7). While there is a significant body of research investigating the role of a healthy diet, including regular breakfast consumption, there is less evidence for its role in psychological health. The majority of research in this area has focused on aspects such as cognitive function, rather than vitality and general health.

2.1 Breakfast and cognitive function

Many studies have examined the relationship between breakfast consumption and cognitive performance. The majority of studies have focused on children and adolescents (8-10) with fewer in adults (11) and the elderly (12).

2.1.1 Cognition in children

Hoyland et al (10) published a systematic review including forty-five studies that have been cited in forty-one papers between 1950 and 2008. This review included acute experimental studies, school feeding programmes and studies of habitual breakfast intake to evaluate the effects of breakfast on cognitive performance in both well-nourished and under-nourished or stunted children. The results indicated that breakfast consumption positively affected children’s cognitive function, predominantly in tests on memory and attention tasks performed in the late morning period even when different measures of cognitive testing were used. Moreover, children who were under-
nourished or stunted experienced the most apparent benefits of all study subjects. Although benefits of breakfast on cognition were illustrated, it is necessary that future research incorporates the effects of different sized breakfasts and varying food compositions on cognitive function in children for the purpose of establishing a dietary recommendation for the most optimal breakfast intake for children. With that said, the body of evidence illustrates there is a clear effect of breakfast consumption on cognitive function in children and adolescents.

2.1.2 Cognition in adults

Few studies examine the effects of breakfast consumption on cognitive function in middle-aged adults. However, a more practical application of breakfast consumption effects on cognition, was assessed in a cross-sectional study by Chaplin and Smith (11). This particular study examined the health and safety of 870 nurses with a mean age of 45 years by comparing the differences in self-reported cognitive failures at work and outside of work; and stress at work and outside of work between those who regularly consumed breakfast and those who did not. Breakfast frequency was determined by a standard food frequency questionnaire (FFQ) involving a 5-point scale from “Never” to “Everyday”. Cognitive failures were measured via a questionnaire that asked participants the frequency of problems they experienced with memory, attention tasks, making mistakes at work and accidents or injuries both at work and outside of work. The results indicated that those who skipped breakfast experienced greater levels of stress at work; whereas those who consumed breakfast daily had fewer accidents, injuries and cognitive failures.
In a study of elderly adults, Kaplan et al (12) showed that a breakfast high in carbohydrate had an acute, positive effect on short-term memory tasks, and in a paragraph recall task, a high protein breakfast was associated with a reduction in forgetting. As cognitive function declines naturally with age, future intervention studies on the effects of breakfast on cognitive performance in the middle-aged may be beneficial in determining possible intervention strategies on preventing cognitive decline in later life. The literature clearly identifies that breakfast consumption has a positive effect on memory and attention tasks in children; however less definitive conclusions can be made for adults and the elderly. Although the results indicate there is a positive correlation between breakfast and cognition in adults and the elderly, more research in large cohort studies is required to extend and confirm these results.

2.2 Breakfast and well-being

The concept of ‘well-being’ has become increasingly important in the field of nutrition research (13). This is due to the fact that a more holistic approach to health focusing on quality of life rather than just treatment of disease continues to be acknowledged. Traditionally, research has focused more on the negative psychological effects of skipping breakfast; however there has been a shift in the research approach to focus more on the positive psychological effects of consuming breakfast. Smith’s definition of well-being incorporates one’s ability to function well both physically and mentally and to maintain a positive mood state (13). The effects of breakfast on well-being have been investigated in a number of studies and examples of key research in this area are discussed in the following section.
2.2.1 Effects of breakfast on a positive mental state

In a study by Smith (14), 126 subjects from the general population of South Wales, aged between 20 and 79 years, were included to investigate the relationship between breakfast consumption and self-reported, subjective reports of health related behaviours and mental health using validated questionnaires. These questionnaires assessed both global (emotional distress and stress) and specific aspects of mental health (anxiety and depression). Those who consumed breakfast cereal everyday reported being less depressed, less emotionally distressed and perceived their stress levels to be lower than the non-breakfast eaters and those who consumed other breakfast foods. Moreover, breakfast eaters had overall healthier diets and lifestyles compared to non-breakfast eaters, and were less likely to drink alcohol or to smoke cigarettes. However, the relationship between breakfast cereal consumption and mental health did not reflect these differences in diet, alcohol consumption and smoking. Therefore, further research is required to attempt to disentangle these results.

As a result of the previous study, Smith (15) conducted a follow-up study in an attempt to replicate and extend the results of the previous study. The 262 participants aged between 21 and 85 years from the general population were included in the study. The results indicated that daily breakfast cereal consumption was associated with better mental and physical health compared to those who did not consume breakfast cereal daily. Furthermore, this association was still present after lifestyle factors and demographic factors were accounted for. Further intervention studies are now required to extend these findings and to determine which types of breakfast cereals/other
breakfast foods and their nutritional components may be associated with a more positive mood state.

Irrespective of breakfast consumption, depression has been independently associated with poorer health (16). In a cohort study of 425 middle-aged women using the SF-36v2 questionnaire to assess health, Joffe et al (16) found depression had a robust negative effect on five of the eight health domains even after adjustment for sleep disturbance and vasomotor symptoms (which commonly disrupt quality of life in middle-age). As this particular study is the only recent study to investigate depression on SF-36v2 outcomes, it is important that depression be included as a variable of interest in the analyses of this thesis.

2.2.2 Effects of breakfast on vitality

Breakfast has been linked to a reduction in fatigue and increased measures of vitality in two recent studies; however no effect on energy expenditure was observed in another. In a two day, open, randomised, cross-over trial of 26 healthy men, Pasman et al (17) found that a breakfast high in complex carbohydrates resulted in a higher satiety score and a lower fatigue score compared to those who consumed a breakfast consisting predominantly of simple carbohydrates. Contrasting results were found when Halsey et al (18) conducted a two-week, randomised, cross-over trial of 49 young adults assessing the effects of breakfast on activity levels. For the first week of the trial, half of the participants received a high carbohydrate breakfast while the other half received no breakfast. For the second week of the trial, participants swapped interventions.
Using heart-rate monitors and pedometers to assess energy output, Halsey et al found no difference in energy expenditure between the two experimental groups concluding that breakfast consumption has no influence on activity levels. Evidently, the results of studies with such small sample sizes and short trial durations must be interpreted with caution as the findings may have differed if the trials had greater numbers of participants and/or ran for a longer time period.

As both studies reported contradictory results on the short-term effects of breakfast on fatigue and energy expenditure, the role of long-term or ‘usual’ breakfast consumption has not been investigated, with the exception of one study. In this cohort study, Huang et al (19) investigated the associations of breakfast skipping with health-related quality of life in a national representative sample of 15,340 individuals from the 2005 Taiwanese National Health Interview Survey. Using the SF-36v2 quality-of-life questionnaire, results indicated that those who skip breakfast regularly had significantly poorer well-being compared to regular breakfast eaters. Breakfast skippers had lower scores on five out of eight domain scores on the SF-36v2 including; lower general health, reduced vitality, poorer social functioning, poorer emotional roles and reduced mental health.

The limited literature available suggests there is a positive association between breakfast consumption and a positive well-being; however results from the one small clinical trial showed that breakfast had no influence on an individual’s energy expenditure. It is not completely definitive whether breakfast consumption leads to a more positive well-being, or if those who have a more positive well-being make
healthier lifestyle choices overall. Further research is needed to determine if these results can be generalised to other populations.

2.3 Breakfast and general health

Regular breakfast consumption has been associated with a better diet quality and less total daily energy intake (20-22); better micro- and macronutrient profiles (23-26) and better weight management (19, 22, 27), all of which attribute to optimal general health.

2.3.1 Effects of breakfast on diet quality

A study by Kant et al (22) combined data from three continuous National Health and Nutrition Examination Surveys (NHANES) (1999-2004) to examine differences in the energy density (ED) of diets between breakfast consumers and non-consumers. In those who reported consuming breakfast, Kant et al also examined the association of breakfast food EDs with non-breakfast food EDs consumed over a 24 hour period, BMI and diet quality. Results showed that breakfast consumers had a less energy dense dietary intake over 24 hours compared to non-breakfast consumers, and female breakfast consumers had a lower BMI than non-consumers. Moreover, the higher the ED of the breakfast foods consumed, the higher was the ED and fat of other foods consumed throughout the day.

Another similar study by Deshmukh-Taskar et al (20) also used the NHANES (1999-2002) data to assess whether skipping breakfast and breakfast-type affects diet quality
in young adults. Results showed that those who consumed ready-to-eat breakfast cereals had a better quality of diet compared to both breakfast skippers and those classified as ‘other breakfast consumers’ by including more fruit and vegetables, total/whole grains, dairy products, dietary fibre and carbohydrates into their diets.

A study in a Korean population by Min et al (21) found that ‘regular breakfast eaters’ had a better diet quality than both the ‘often’ and ‘rare breakfast eaters’; however ‘regular breakfast eaters’ also had elevated serum triglyceride concentrations compared to the other two groups. The differences between the results of Min et al and those of the previous two NHANES studies may be attributed to the role that culture has on individual food choice. Korean diets differ vastly from American diets. Thus, this must be taken into account when study results are interpreted and compared. Nevertheless, the evidence does suggest that breakfast consumers have a better quality of diet overall when compared to non-breakfast consumers, which in turn has an effect on general health outcomes.

2.3.2 Effects of breakfast on micronutrient and macronutrient profiles

Gibson and Gunn (25) conducted a large dietary analysis using the seven day weighed food records of 1724 adults totalling 12 068 person-days of dietary analysis from the National Diet and Nutrition Survey in the UK. Results indicated that breakfast consumers had lower total fat and higher carbohydrate intakes compared to non-breakfast consumers, but breakfast cereal consumers had the most favourable macronutrient compositions compared to other breakfast type consumers including; lower dietary fat, saturated fat, non-milk extrinsic sugars and higher carbohydrate and
protein intakes. Furthermore, breakfast cereal consumers had micronutrient compositions 30-90% higher than non-breakfast consumers and those consuming other breakfast foods-types. A similar study by Williams (26) examined the diets of 10,851 Australian adults from the Australian National Nutrition Survey (1995) and found that those who did not typically eat breakfast cereals were more likely to have inadequate dietary nutrient intakes of calcium, thiamin, riboflavin, magnesium and iron. Furthermore, regular breakfast eaters were more likely to rate their health as ‘good’ or ‘excellent’ compared to non-breakfast eaters. However, there was no difference in dietary fat intakes or the BMI of regular breakfast eaters compared to non-breakfast eaters in this study; thereby suggesting a positive psychological effect of habitual breakfast consumption. These studies reveal breakfast consumers to have more adequate micro- and macronutrient intakes compared to non-breakfast consumers, with most of the evidence proposing that ready-to-eat breakfast cereals contribute to the most optimal nutrient intakes overall.

As a result, Galvin et al (23) examined the adequacy and safety of the micronutrient intakes of breakfast cereal consumers in a large Irish study. Using a seven day food diary to assess habitual food intake, Galvin et al found that even small quantities of breakfast cereals (mean 28.6g day) made an important contribution to the intakes of carbohydrate, starch, dietary fibre and non-starch polysaccharides (NSP) in consumers, and cereal consumers had greater compliance to the dietary recommendations for fat, carbohydrate an NSP. Moreover, fortified cereals contributed greatly to dietary intakes of iron, thiamine, riboflavin, niacin, vitamin B6, folate and vitamin D, and increased consumption of breakfast cereals was associated with a lower prevalence of dietary inadequacy of calcium, iron, riboflavin and folate, particularly in female consumers.
Results also showed that the risk of exceeding the Tolerable Upper Intake Level for any micronutrient by cereal consumers is not likely.

The literature suggests that breakfast consumption contributes to a more optimal dietary intake of both micro- and macronutrients in adults, with the most optimal intakes associated with breakfast cereals. This is likely due to the fortification of many nutrients in ready-to-eat breakfast cereals. Further research to determine the effects of ready-to-eat breakfast cereals on specific health outcomes is now required in order to establish any general health benefits of these cereals.

### 2.3.3 Effects of breakfast on weight management

The increasing rates of obesity in New Zealand (NZ) have been of great concern in both children and adults, as obesity is associated with a number of diseases such as type two diabetes mellitus and cardiovascular disease (28). Three recent studies show the association between breakfast consumption and BMI.

In a cross-sectional study by Yang et al (27), 1609 Taiwanese adolescents had their dietary patterns and BMI analysed. Irregular breakfast eaters had a 51% greater chance of becoming overweight compared to regular breakfast eaters. Similarly, in a large study of Taiwanese adults Huang et al (19) demonstrated that the prevalence of obesity increases as the frequency of breakfast consumption decreases. Lastly, an American study by Kant et al (22) revealed that BMI increases with increasing ED of breakfast foods for men, but for women, BMI increases when foods not consumed at breakfast...
have a higher ED. The evidence highlights the benefits of consuming breakfast regularly, as it is positively correlated with a lower BMI in both adolescents and adults. As the evidence shows an association between breakfast and a lower BMI, it may be implied that eating breakfast regularly may contribute to an effective weight management strategy. Consequently, regular breakfast consumption may have the general health benefit of preventing obesity and subsequent chronic diseases.

Obesity (BMI > 30kg/m$^2$) is associated with impairment of physical health as assessed by the SF-36v2 questionnaire in a large Chinese study (29). In this particular study, Wang et al (29) found obesity to be associated with the decrease in three physical health and one mental health domain in women aged 18 - 80 compared to those of normal weight (BMI 18.5 – 24.9kg/m$^2$). Similarly, another 26 year prospective cohort of 6776 middle-ages Americans (30) found BMI had significant inverse-graded associations with all 12 Health Status Questionnaire scores including measures of physical, mental and social well-being. Normal weight persons (BMI 18.5 < 25.0kg/m$^2$) were most likely to report their health as good or excellent and this decreased as BMI increased. Given that BMI is a strong, independent predictor of health, it is essential that this variable be included in analyses performed in this thesis.

In NZ, standard of living as assessed by the Economic Living Standard Index Short Form (ELSI$_{SF}$) and the New Zealand Deprivation Index (NZDep2006) has been significantly associated with poorer health outcomes (3) and higher mortality (31). Moreover, New Zealanders living in the lower socio-economic regions (quintiles 4 and 5) are more likely to rate their health more poorly than those in the more affluent
regions (quintiles 1 and 2) (32). Socio-economic (SES) status has also been linked to a more available source of food in the household (3), and with more nutritional knowledge necessary to make healthy dietary choices (33). As standard of living and SES have such a convincing effect on the health outcomes of New Zealanders, it is imperative that the CHALICE participants’ standard of living assessed using the ELSI SF be included in the analyses of this thesis.

The literature clearly shows an association between breakfast consumption and its positive effects on several health outcomes. However, it is now vital that future research focuses on the individual’s perceived health status with regards to breakfast intake, to determine how breakfast consumption might affect general health from a subjective, psychological perspective.

2.4 Conclusion

The definition used for the term breakfast has had considerable variation between studies. Given this variation, one might also expect to see variation in the observed effects of breakfast on the particular outcome. However, the literature shows that there is generally a good consensus of both health and well-being effects of consuming breakfast; even though there are fewer studies to examine these effects from the individual’s subjective perspective.
After examining the literature here, one conclusion which can be drawn is that breakfast is good for you. This generally holds true for children both well-nourished and under-nourished, adolescents, adults and the elderly.

Most international research has examined the relationship between breakfast consumption and varying measures of health in adolescents and school-aged children. Fewer studies have examined this relationship in a middle-aged population, none of which are based specifically on the NZ population. No other study has looked at all the variables of interest included in this study in relation to the relationship between breakfast and vitality and general health. Previous studies have only examined these variables in relation to either breakfast or general health (but not vitality). As a result, the primary aim of this thesis is to determine whether breakfast consumption may have an effect on subjective measures of health (vitality and general health) among free-living older adults in NZ, and whether those who consume a daily breakfast make healthier lifestyle choices overall.
Table 2-1: Studies investigating the effects of breakfast on cognitive function

<table>
<thead>
<tr>
<th>Reference, study design and sample size (n)</th>
<th>Methods used to measure cognitive function</th>
<th>‘Breakfast consumer’ as defined in study</th>
<th>Method used to measure breakfast consumption</th>
<th>Age</th>
<th>Findings</th>
<th>Candidate’s rationale for inclusion of study in literature review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollitt E and Mathews R., 1998 Pooled integrative summary N = 24 studies</td>
<td>The most widely studied tasks were those relating to short-term memory. Measuring tools most commonly used were IQ tests, MFFT (picture identification), HCIT (attention processes), MAST (addition, sentence verification), SMST (stimulus discrimination)</td>
<td>Varied between studies: Breakfast served at 0800-0830 hours, breakfast served at 0800 hours, breakfast served at 0700 hours, breakfast served at 075 hours, breakfast served between 0800-0820 hours.</td>
<td>Varied between studies depending on study design i.e. randomised controlled trials provided breakfast to participants at a certain time in the morning; whereas observational studies participants were categorised based on their habitual intakes. Other studies used self-reported definition of usual foods consumed</td>
<td>School aged children and adolescents</td>
<td>Omitting breakfast negatively impacts cognition and learning in children. Breakfast consumption enhances the quality of the student’s diets and improves school attendance. Effects are most pronounced in the under-nourished</td>
<td>Large review including studies on both children and adolescents</td>
</tr>
<tr>
<td>Smith AP., 2010 Clinical trial using ‘separate groups’ design N = 213</td>
<td>Validated questionnaires used were: Bi-polar visual analogue scale, profile of fatigue-related symptoms, Hospital Anxiety and Depression Scale, Mood, Symptom check-list and Digestive function</td>
<td>The ‘breakfast consumers group’ consisted of those children who both regularly consumed breakfast and those who did not regularly consume breakfast; whereas the ‘non-breakfast group’ only consisted of those children who did not usually consume breakfast each day</td>
<td>Breakfast cereal type was provided by the researcher. Children had to consume their desired quantity of cereal daily for the 14 day trial duration at any time in the morning that was most convenient to them</td>
<td>Mean age 8.11 y</td>
<td>All three types of breakfast cereals were associated with reports of lower depression, emotional distress and fatigue, greater alertness, fewer cognitive problems, and fewer minor symptoms and bowel problems</td>
<td>Large clinical trial among children. Parent’s perceptions of their child’s mental health status were assessed</td>
</tr>
<tr>
<td>Study</td>
<td>Methods</td>
<td>Results</td>
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<tr>
<td><strong>Chaplin K and Smith AP., 2011</strong>&lt;br&gt;Survey of a cohort&lt;br&gt;N = 800</td>
<td>Cognitive failures at work/outside work were assessed by questions: “How frequently do you find that you have problems of memory (e.g., forgetting where you put things), attention (e.g., failures of concentration) or action (doing the wrong thing) at work?” The number of accidents at work requiring medical attention in the last 12 months was recorded. Stress at/outside work were measured using single item 5 point scales from ‘Never’ to ‘Extremely’&lt;br&gt;Participants were divided into two groups: those who responded as never consuming breakfast (42%) and all other participants were classified as breakfast consumers</td>
<td>Frequency of breakfast consumption measured by 5-point rating scale questionnaire from ‘Never’ to ‘Every day’. Validated with a weighed dietary intake method</td>
<td>Mean age 45 y</td>
<td>Breakfast consumption was associated with lower stress, fewer cognitive failures, accidents and injuries at work. Omitting breakfast was associated with higher stress, more cognitive failures and injuries outside of work</td>
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<tr>
<td><strong>Kaplan RJ et al., 2001</strong>&lt;br&gt;Clinical trial using a repeated-measures cross-over design&lt;br&gt;N = 22</td>
<td>Eight versions of a modified Rey Auditory-Verbal Learning Test were used as word list recall tests to assess verbal declarative memory. Eight paragraphs similar to the Logical Memory subtest of the Wechsler Memory Scale-Revised were used to assess paragraph recall. Twelve versions of the standard Trails Part A and B Adult Form (26) were used to measure speed for visual search, attention and mental flexibility&lt;br&gt;Participants received one of four beverages (carbohydrate, placebo, protein or fat) on four mornings each separated by approximately one week, in the laboratory setting, after a 10-12 hour night fasting period</td>
<td>Breakfast beverages were produced and administered to participants by the researcher</td>
<td>61-79 y</td>
<td>Breakfast high in carbohydrate had a positive effect on short-term memory and high protein breakfast was associated with a reduction in forgetting words in a paragraph recall task</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2-1: continued

<table>
<thead>
<tr>
<th>Hoyland A, Dye L and Lawton CL., 2009 Systematic review</th>
<th>Varied between studies but included: CPT and MFFT (attention), Map task (spatial memory), arithmetic test, RAVLT (visual perception), Letter cancellation test (visual acuity, attentiveness, vigilance), I&amp;D (word recall)</th>
<th>This varied between studies but breakfast was generally considered to be the first food consumed that day. Intervention studies did not control for prior breakfast intake</th>
<th>The majority of studies compared habitual breakfast eaters with habitual non-breakfast eaters where the definition of each varied between studies, interventions provided participants with breakfast, four studies assessed habitual breakfast quality as determined by food diaries, thirteen studies compared school breakfasts compared to no school breakfast (either breakfast at home or no breakfast)</th>
<th>Children and adolescents (aged 4-18 y)</th>
<th>Breakfast consumption has a positive effect on children’s cognitive performance, particularly attention tasks and memory. Effects are most prominent in the under-nourished</th>
<th>Large, recent systematic review including forty-five studies between 1950-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 45 studies</td>
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</tbody>
</table>
Table 2-2: Studies investigating the effects of breakfast on well-being

<table>
<thead>
<tr>
<th>Reference, study design and sample size (n)</th>
<th>Methods used to measure well-being</th>
<th>‘Breakfast consumer’ as defined in the study</th>
<th>Method used to measure breakfast consumption</th>
<th>Age</th>
<th>Findings</th>
<th>Candidate’s rationale for inclusion of study in literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith AP., 1998 Cross-sectional study N = 126</td>
<td>Validated questionnaires: Perceived Stress Scale (stress), Beck Depression Index (depression), Emotional distress scale of Profile of Fatigue Related States (emotional distress), Spielberger Trait-State Anxiety Inventory (anxiety)</td>
<td>Participants categorised into one of three categories: the irregular group (&lt; 1 time per week), occasional consumer (2-5 days per week), daily consumers</td>
<td>Frequency of breakfast consumption measured by 5-point rating scale questionnaire from ‘Never’ to ‘Every day’</td>
<td>20-79 y</td>
<td>Breakfast consumption associated with less depression, less emotionally distress and lower levels of perceived stress compared to non-breakfast eaters. Breakfast eaters had a healthier lifestyle overall</td>
<td>Assesses self-reported, subjective reports of mental health and health-related behaviours</td>
</tr>
<tr>
<td>Smith AP., 1999 Cross-sectional study N = 262</td>
<td>Validated questionnaires: Perceived stress scale, Depression scale from the revised Middlesex Hospital Questionnaire, Anxiety scale from the revised Middlesex Hospital Questionnaire, Emotional distress (mental health); Cohen-Hobermann Index of Physical Symptoms, Fatigue (physical health); sleep, alcohol consumption, smoking, eating habits (health-related behaviours)</td>
<td>Participants categorised into one of three categories: the irregular group (&lt; 1 time per week), occasional consumer (2-5 days per week), daily consumers</td>
<td>Frequency of breakfast consumption measured by 6-point rating scale questionnaire from ‘Never’ to ‘Every day’. Food diary used to record type of breakfast cereals consumed by participants</td>
<td>Mean age 60.9 y</td>
<td>Breakfast associated with better reports on mental health and physical health compared to no breakfast</td>
<td>Follow-up study in middle-aged population to Smith AP’s previous 1998 study that extended the previous study’s results</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>N</td>
<td>Methodology</td>
<td>Results</td>
<td></td>
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</tr>
<tr>
<td>Pasman WJ et al., 2003</td>
<td>Two day, open, randomised cross-over trial</td>
<td>26</td>
<td>Health assessed by the medical questionnaire and physical examination. Well-being (fatigue) assessed by the Profile of Mood States questionnaire. Participants categorised as receiving either the simple carbohydrate breakfast (SCB) or the complex carbohydrate breakfast (CCB). Both the SCB and the CCB were given their breakfast by researchers each day and were required to consume them within a 10 minute time frame.</td>
<td>Complex carbohydrate breakfast associated with higher satiety and lower fatigue scores in healthy men compared to a breakfast high in simple carbohydrates. Clinical trial comparing two breakfast types on fatigue levels in healthy men.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halsey LG et al., 2011</td>
<td>Two week randomised cross-over trial</td>
<td>49</td>
<td>Pedometers and heart-rate monitors tracked energy expenditure. Self-perceived health was assessed using SF-36 questionnaire. Food ingested between 08.00 and 09.15 hours. Participants were given their breakfasts each day in the laboratory setting. Other daily food intake was measured using food diaries.</td>
<td>No difference in energy expenditure was observed between those who consumed a high carbohydrate breakfast compared to those who did not consume breakfast over two weeks. Breakfast did not influence activity levels. Recent clinical trial measuring energy expenditure differences between a breakfast and no breakfast condition to assess activity levels.</td>
<td></td>
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</tr>
<tr>
<td>Huang CJ et al., 2010</td>
<td>Cross-sectional study</td>
<td>15340</td>
<td>SF-36 questionnaire assessed quality of life. Breakfast skippers were defined as those who ate breakfast once per week or less or never. All other participants were classified as regular breakfast consumers. The frequency of breakfast eating was assessed by the following question: ‘Typically, how many days a week do you eat breakfast?’ The five response categories were: (1) never, (2) about once a week or less often, (3) 2–3 days a week, (4) 4–5 days a week and (5) every day or almost every day.</td>
<td>Breakfast associated with higher general health, vitality, social functioning, emotional role and mental health SF-36 scores compared to those who do not consume breakfast. Large cross-sectional study in a Taiwanese population looking at ‘vitality’ levels using SF-36 questionnaire.</td>
<td></td>
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</tbody>
</table>
Table 2-3: Studies investigating the effects of breakfast on general health

<table>
<thead>
<tr>
<th>Reference, study design and sample size (n)</th>
<th>Methods used to measure general health</th>
<th>‘Breakfast consumer’ as defined in the study</th>
<th>Method used to measure breakfast consumption</th>
<th>Age</th>
<th>Findings</th>
<th>Candidate’s rationale for inclusion of study in literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kant AK et al., 2008 Cross-sectional study N = 12 316</td>
<td>ED was computed using ED for the entire 24 hour recall, for foods and beverages consumed at breakfast and for foods and beverages consumed at non-breakfast eating occasions. Diet quality was measured by categorising dietary intake into 5 major food groups and by analysing dietary micronutrient intake. Weight measured via BMI (kg/m²)</td>
<td>Participants who mentioned eating occasions named at breakfast were classified as breakfast consumers</td>
<td>24 hour dietary recall</td>
<td>&gt;= 20 y</td>
<td>Breakfast consumers had a lower 24 hour ED than non-consumers, women breakfast consumers had a lower BMI than non-consumers, with increasing ED of breakfast consumed so was the ED of the diet overall.</td>
<td>Large, recent American survey using data from 4 combined NHANES and the only study to report on breakfast consumption with dietary ED and breakfast with subsequent food intake and body weight</td>
</tr>
<tr>
<td>Deshmukh-Taskar PR et al., 2010 Cross-sectional study N = 2615</td>
<td>Diet quality was assessed using the Healthy Eating Index HEI-2005</td>
<td>Self-reported by participant</td>
<td>24 hour dietary recall</td>
<td>20-39 y</td>
<td>Results showed those who consumed ready-to-eat breakfast cereals had a better quality of diet compared to breakfast skippers and those classified as other breakfast consumers by including more fruit and vegetables, total/whole grains, dairy products, dietary fibre and carbohydrates into their diets.</td>
<td>Only recent study examining breakfast skipping and breakfast type on diet quality in young adults</td>
</tr>
</tbody>
</table>
Table 2-3: continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Participants</th>
<th>Measures</th>
<th>Methods</th>
<th>Data Collection</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min C et al., 2011</td>
<td>Cross-sectional study</td>
<td>N = 415</td>
<td>Anthropometric measurements, 3 day dietary intake (using 24 hour recall and 2 day diet record), blood pressure and blood analyses</td>
<td>Defined as meal eaten in the morning, and any food or beverages consumed in the morning. Participants were divided into one of three groups based on their 3 day dietary intake records: ‘Rare breakfast eaters’ (skipped breakfast on 2 or more of the 3 days); ‘Often breakfast eater’ (skipped breakfast on 1 of 3 days) and ‘Regular breakfast eater’ (did not skip breakfast on any of the 3 days)</td>
<td>3 day dietary intake using 24 hour recall and 2 day diet record on two weekdays and one weekend day</td>
<td>30-50 y</td>
</tr>
<tr>
<td>Gibson SA and P Gunn., 2011</td>
<td>Cross-sectional study</td>
<td>N = 1724</td>
<td>Seven day weighed food records over 12 068 person-days was used to assess foods consumed, macronutrient and micronutrient intakes</td>
<td>Breakfast was defined by the time of day (any item consumed between 0600 and 1000 hours. Breakfast meal was classified according to whether it included cereal, non-cereal, nothing or a drink only</td>
<td>Seven day weighed food records over 12 068 person-days</td>
<td>19-64 y</td>
</tr>
<tr>
<td>Source</td>
<td>Methodology</td>
<td>Participants</td>
<td>Findings</td>
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<tr>
<td><strong>Williams PG., 2005</strong></td>
<td>Cross-sectional Study: N = 10,851 24 hour recalls, FFQ and food habit questionnaires assessed dietary intake. Anthropometric measurements were taken to assess physical status and BMI</td>
<td>19 + y</td>
<td>Breakfast eaters were more likely to rate their health as excellent or good compared to breakfast skippers. Those not eating breakfast cereal were more likely to have inadequate nutrient intakes of calcium, riboflavin, magnesium, iron and thiamine compared to skippers.</td>
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<tr>
<td><strong>Galvin MA, Kiely M and Flynn A., 2003</strong></td>
<td>Cross-sectional study: N = 1379 7 day food diary to assess dietary intake of food, beverages and supplements consumed validated by the researcher weighing the respondent’s typical food portion. Photos of suggested serving sizes and average food portion sizes for UK adults by the Ministry of Agriculture, Fisheries and Food were also used. Nutrient intakes were assessed using the Irish Average Requirement cut-off</td>
<td>18-64 y</td>
<td>Breakfast cereal consumers had increased nutrient density for a number of micronutrients without exceeding the Tolerable Upper Intake Level.</td>
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</tbody>
</table>
| **Holmes BA et al**  
Cross-sectional study  
N = 3728 | 24 hour recall ‘multi-pass’ method on 4 non-consecutive days within a 10 day period and self-completion questionnaire (dietary intake), anthropometry and bloods (physical status), nutrient databank developed for the UK NDNS (nutrient intakes) | Self-reported by participant | 24 hour recall ‘multi-pass’ method on 4 non-consecutive days within a 10 day period and self-completion questionnaire (dietary intake) | 2 y + | Breakfast cereal consumers had higher intakes of folate, vitamin B6, B12, iron, zinc, thiamine, riboflavin, biotin and niacin than non-consumers. Breakfast cereals contribute significantly to nutrient intakes of those with a low socioeconomic status in the UK | Recent study assessing dietary quality in the materially deprived in the UK |
| **Yang RJ et al., 2006**  
Cross-sectional study  
N = 1609 | Anthropometry assessed BMI, questionnaires assessed dietary intake and eating occasion and frequency | Breakfast eating was defined as a meal taken before 0900 a.m. each weekday (Monday to Friday). Irregular breakfast eating was defined those who reported eating breakfast 3 days or fewer and regular breakfast eating was defined as those who reported eating breakfast 4 or 5 days | Frequency of breakfast was determined via questionnaire asking questions: “Generally speaking, how many days did I eat breakfast between Monday and Friday?” | 12-20 y | Regular breakfast eaters had a lower risk of becoming overweight compared to irregular breakfast eaters. Irregular breakfast eaters had 51% increase risk of becoming overweight compared to regular breakfast eaters | Recent, large study of the effects of breakfast on BMI in Taiwanese adolescents |
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample Size</th>
<th>Anthropometry</th>
<th>Definition of Breakfast Skippers</th>
<th>Frequency of Breakfast Eaten</th>
<th>Age Range</th>
<th>Observations</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huang CJ et al., 2010</td>
<td>Cross-sectional</td>
<td>N = 15,340</td>
<td>Anthropometry assessed BMI</td>
<td>Breakfast skippers were defined as those who ate breakfast once per week or less or never. All other participants were classified as regular breakfast consumers</td>
<td>The frequency of breakfast eating was assessed by the following question: ‘Typically, how many days a week do you eat breakfast?’ The five response categories were: (1) never, (2) about once a week or less often, (3) 2–3 days a week, (4) 4–5 days a week and (5) every day or almost every day.</td>
<td>18-64 y</td>
<td>Rates of obesity decreased as the frequency of breakfast consumption increased</td>
<td>Recent, large study of the effects of breakfast on BMI in Taiwanese adults</td>
</tr>
<tr>
<td>Kant AK et al., 2008</td>
<td>Cross-sectional</td>
<td>N = 12,316</td>
<td>Anthropometry assessed BMI</td>
<td>Participants who mentioned eating occasions named at breakfast were classified as breakfast consumers</td>
<td>24 hour dietary recall</td>
<td>&gt;= 20 y</td>
<td>BMI increases with increasing ED of breakfast foods for men, but for women, BMI increases when foods not consumed at breakfast have a higher ED.</td>
<td>Large, recent American survey using data from 4 combined NHANES and the only study to report on breakfast consumption with dietary ED and breakfast with subsequent food intake and body weight</td>
</tr>
</tbody>
</table>
Table 2-4: Studies investigating other variables of interest included in this thesis

<table>
<thead>
<tr>
<th>Reference, study design and sample size (n)</th>
<th>Methods used to measure general health</th>
<th>Age</th>
<th>Findings</th>
<th>Candidate’s rationale for inclusion of study in literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joffe et al., 2012</td>
<td>Structured clinical interview for DSM-IV (SCID) to assess depression status and SF-36 annually during the 6 year follow-up to assess quality of life</td>
<td>Middle-aged women</td>
<td>Depression alone is associated with a decreased health related quality of life on 5 of the 8 SF-36 health domains</td>
<td>A recent study including a middle-aged population showing depression has an independent effect on SF-36 health scores</td>
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<tr>
<td>Longitudinal community-based study</td>
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<tr>
<td>N = 425</td>
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<tr>
<td>Wang et al., 2011</td>
<td>SF-36 questionnaire assess quality of life in a Chinese population. BMI used to measure obesity</td>
<td>18-80 y</td>
<td>Obesity (BMI &gt; 30kg/m²) is associated with the impairment of physical health as assessed by the SF-36</td>
<td>Uses the SF-36 to assess health in relation to obesity. Uses both the international and Asian BMI cut-offs to SF-36 scores</td>
</tr>
<tr>
<td>Cross-sectional study</td>
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<tr>
<td>N = 3600</td>
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</tr>
<tr>
<td>Daviglus et al., 2003</td>
<td>BMI used to measure obesity. Health Status Questionnaire 12 scores (measures physical, mental and social well-being).</td>
<td>Middle aged men and women</td>
<td>After a 26 year follow-up, BMI in middle-age is associated with poorer quality of life with all 12 scores on the Health Status Questionnaire</td>
<td>Uses a similar Questionnaire to SF-36 in assessing health. Looks specifically at a middle-aged population after a long 26 year follow-up period</td>
</tr>
<tr>
<td>Prospective cohort</td>
<td></td>
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<tr>
<td>N = 6766</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pearson A, Apparicio P and Riva M. 2013</td>
<td>Examines all-cause mortality in relation to deprivation and standard of living from 1991-2006 in small areas in New Zealand</td>
<td></td>
<td>Those living in the most deprived neighbourhoods in New Zealand have a higher rate of all-cause mortality compared to less deprived areas.</td>
<td>Examines how poverty/lower SES effects mortality in a specific New Zealand population</td>
</tr>
<tr>
<td>N = 1621</td>
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</tr>
<tr>
<td>Groth MV, Fagt S and Bronsted, 2001</td>
<td>7 day estimated diet record was used to assess diet. Social background information obtained through a face-to-face interview</td>
<td>18-80 y</td>
<td>A higher education (as a marker for a higher SES) was the most important variable in a healthier dietary intake</td>
<td>An increase in knowledge/education causes individuals to make healthier dietary choices (in particular an increase intake of fruits and vegetables)</td>
</tr>
<tr>
<td>Cross-sectional study</td>
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<tr>
<td>N = 852 men and 870 women</td>
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3.0 Objective Statements

1. To assess the prevalence of regular breakfast consumption in fifty year olds from Canterbury.

2. To describe the health characteristics of daily breakfast consumers and of those who do not consume breakfast daily and to determine whether breakfast consumers make healthier lifestyle choices compared to those who do not consume breakfast daily.

3. To investigate whether daily breakfast consumers have higher SF-36v2 vitality and general health scores compared to those who do not consume breakfast daily.

3.1 Hypothesis

That middle-aged, free-living adults in New Zealand who consume breakfast daily have a higher perceived quality of life and make healthier lifestyle choices compared to those who do not consume breakfast daily.
4.0 Participants and Methods

4.1 The CHALICE study

CHALICE is an observational longitudinal study of 50 year olds currently living in the region of Canterbury, New Zealand.

Data were collected from pre-assessment questionnaires and through seven modules of physical testing and interviews in a four to six hour clinic visit. Participants were asked to complete lifestyle questionnaires after completing the clinic visit. It is planned that each participant will be followed-up every five years to repeat the full seven modules. In addition, a brief annual questionnaire will be sent to all participants. Ethical approval was obtained from the Upper South A Regional Ethics Committee and Maori consultation was undertaken throughout the design process of this study (Appendix A).

4.2 Study Procedures

The broader CHALICE methods have been published previously (34) and standardised CHALICE protocols relevant to this thesis are described in this section.

4.2.1 Sample Selection

In August 2010, a health research extract was obtained from the Electoral Roll Centre to invite potential participants. Potential participants aged between 49 and 50 years (born between the 19th June 1959 and the 18th June 1960) and registered in the
following territorial authorities that align with the CDHB area: Kaikoura District, Hurunui District, Waimakariri District, Christchurch City, Selwyn District, and Ashburton District were identified as being potentially eligible to take part in CHALICE. From this health research extract, 413 people who identified themselves as being of Maori descent and 6328 non-Maori were extracted. Participants were randomly ordered and selected in a ratio of 4:1 non-Maori to Maori. Those selected were randomly allocated to one of four CHALICE interviewers who contacted them. There will be a new health research extract of people aged 49 to 50 years requested annually for five years, to identify potential participants until the CHALICE sample size of 1000 participants is achieved.

4.2.2 Participant Contact

The interviewers used the addresses listed in the electoral roll to send participants a letter of invitation. If participants did not respond to the letter, the interviewers tried to call them up to four times using numbers listed in the White Pages and on the internet. A second letter was sent to participants six weeks from the time of initial contact if there was still no response. In a final attempt to contact the participant, the interviewer visited the participant at home to personally invite them to be a part of the study. People were considered to have declined participation if all attempts to make contact were unsuccessful.
4.2.3 Participant Interview

As part of the wider CHALICE study, participants attended a four to six hour assessment that included multiple interviews and procedures. The majority of participants completed the assessment over one day but for some participants, two days was required. The following modules were completed on the interview day(s):
Table 4-1 CHALICE modules included in the assessment procedure

<table>
<thead>
<tr>
<th>Four pre-interview assessments and seven modules</th>
<th>Data collected</th>
<th>Variables used in this thesis extracted from data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-interview assessments:</td>
<td>The Medical Outcomes Study 36-Item Short Form (SF-36v2) questionnaire, the Birmingham Irritable Bowel Syndrome symptom questionnaire, self-completed Warwick Edinburgh Mental Well-Being Scale and a questionnaire on food behaviour. Participants bring the completed questionnaires with them on the day the clinical interview takes place. Refer to Appendix B for full SF-36v2 questionnaire.</td>
<td>The Medical Outcomes Study 36-Item Short Form (SF-36v2) questionnaire (vitality and general health scores).</td>
</tr>
<tr>
<td>1. Physical Measurements</td>
<td>Blood and urine samples, body measurements including body mass index (BMI kg/m²), bioimpedance assessment, blood pressure, pulse and retinal exam.</td>
<td>BMI kg/m²</td>
</tr>
<tr>
<td>2. Personal Health History</td>
<td>Questionnaire including demographics, chronic health conditions, Alcohol Use Disorders Identification test (AUDIT), the Economic Living Standard Index Short Form (ELSIg), health service utilisation, risk and protective factors. Refer to Appendix C for module questionnaire.</td>
<td>Demographics including sex and ethnicity, the ELSIg scores to determine standard of living, current smoking status and AUDIT scores to determine alcohol intake.</td>
</tr>
<tr>
<td>3. Family, Social and Cultural History</td>
<td>Family health history, Attitudes and opinions questionnaire including job satisfaction, perceptions about ageing, preventability of health issues, medical scepticism, religious/spiritual beliefs and experience of discrimination.</td>
<td></td>
</tr>
<tr>
<td>4. Heart Health Assessment</td>
<td>Blood pressure, pulse, echochardiogram and Echo.</td>
<td></td>
</tr>
<tr>
<td>5. Mental Health</td>
<td>The Mini-international Neuropsychiatric Interview (MINI) and personality assessment. Appendix D for module questionnaire.</td>
<td>The MINI scores to determine psychological status (depression).</td>
</tr>
<tr>
<td>7. Lifestyle Questionnaire</td>
<td>CHALICE food and beverage diary (FBD) including a Home food inventory (HFI), How you eat and what you eat questionnaire, and a four day food diary. Refer to Appendix E for module questionnaire.</td>
<td>How you eat and what you eat questionnaire – question on frequency of breakfast consumption.</td>
</tr>
</tbody>
</table>

The components of Modules one, two, five and seven that are relevant to this thesis are described in greater detail below.
4.2.3.1 The Medical Outcomes Study 36-Item Short Form (SF-36v2) questionnaire (vitality and general health scores)

The SF-36v2 questionnaire is one of four pre-assessment questionnaires that CHALICE participants complete prior to attending the four to six hour clinical interview. The SF-36v2 questionnaire is a validated questionnaire commonly used to assess self-reported functional health and well-being in relation to the following eight domains of health; physical functioning; role-physical; bodily pain; general health; vitality; social functioning; role-emotional and mental health (35). The SF-36v2 provides scores for each of the eight health domains, and psychometrically-based physical component summary and mental component summary scores. The questionnaire has been shown to be a valid and reliable tool for measuring vitality and general health in a middle aged population both in NZ and internationally (7, 19)

The SF-36v2 questionnaire contains eleven questions of which five are comprised of multiple questions, totalling thirty-six questions (35). Each question has a standard 5-point response scale. For questions relating to vitality, the scale ranges from (1 = all of the time, 2 = most of the time, 3 = some of the time, 4 = a little of the time and 5 = none of the time) to questions nine A,E,G and I within the SF-36 questionnaire. For questions relating to general health, the participant response scale ranges from (1 = excellent, 2 = very good, 3 = good, 4 = fair and 5 = poor) to question one, and (1 = definitely true, 2 = mostly true, 3 = don’t know, 4 = mostly false and 5 = definitely false) to question eleven within the SF-36v2 questionnaire.
Raw data from the SF-36v2 questionnaire was used to calculate individual vitality and general health scores expressed on a 0-100 scale. These scores were determined by a participant response scale to relevant to the vitality and general health questions within the SF-36v2 questionnaire. The raw data scores were entered into Statistical Package for the Social Sciences (SPSS) version 17 (IBM, 2011). The calculated norm-based T scores were then loaded into Progeny 7 (Progeny Software, LLC www.progenygenetics.com). Refer to Appendix B (Questions 1, 9 and 11) for the relevant questions on vitality and general health.

4.2.3.2 Module One – Physical Measurements

Weight and body composition were measured using electrical bio-impedance (Tanita type TBF-300 Japan) with 0.0 kg entered for clothes and standard male or female setting chosen. The foot to foot bio-impedance analyser passes a small electrical current through the lower body, calculates the fat free mass, and extrapolates this to the rest of the body to determine overall fat free mass. Height was measured using a tape measure fixed to the wall. Participants were asked to remove their shoes and stand as straight as possible against the wall. The tape measure was then lowered to the top of their head to obtain the measurement. Height was measured to the nearest cm.

4.2.3.2.1 BMI kg/m²

BMI was calculated using the formula BMI= weight (kg)/height (m)². WHO cut-offs were used to identify those who were overweight or obese (1). The cut-off was set at 30 kg/m² (obese), not 25 kg/m² (overweight).
4.2.3.3 Module Two – Personal Health History Questionnaires

The demographics section consisted of questions from the 2006/2007 Health Survey (7) and an education question adapted from the 2005 British Social Attitudes Survey (36). The data collected included sex, date of birth, ethnicity, marital/relationship status, sexuality, education, income support and employment, personal income and household income, and questions required to calculate their standard of living (ELSI_{SF}) score.

4.2.3.3.1 Ethnicity

Participants had the option to choose from the following ethnic groups: NZ European; Maori; Samoan; Cook Islander; Tongan; Niuean; Chinese; Indian and Ethnicity Other. If participants identified with more than one ethnic group, the research assistant recorded this. Most participants belonged to the NZ European and Maori ethnicities or both. For this reason, ethnicity was recoded to a dichotomous variable, coded as whether participants identified themselves as Maori or Non-Maori. Those who identified with both NZ European and Maori ethnic groups were included in the final total.

4.2.3.3.2 Household Economic Living Standard Index Sort Form (ELSI_{SF}):

ELSI_{SF} (Appendix C) has been used in other NZ studies (32) and was used as a direct measure for living standards (37). Economic standard of living refers to the material wellbeing that is reflected in a person’s consumption and personal possessions. Standard of living accounts for home ownership, social participation, economising,
self-rated standard of living, satisfaction with standard of living and adequacy of income (37).

The ELSI\textsubscript{SF} score is calculated as a continuous score ranging from 0 to 31. It is divided into seven categories representing standards of living (severe hardship, significant hardship, some hardship, fairly comfortable, comfortable, good and very good). Due to insufficient numbers of participants in the lower score categories, those with scores from 0 to 24 (hardship and comfortable categories) were categorised as having a low standard of living and participants with scores from 25+ (good and very good categories) were categorised as having a high standard of living.

4.2.3.3.3 Smoking

Participants were asked about their smoking status, smoking frequency, amount of cigarettes typically smoked and duration of smoking. Refer to Appendix C for the complete list of questions on smoking frequency. The answers of the questions were analysed in combination and each individual’s current smoking status was considered.

A non-smoker is a person who has never smoked or has given up smoking and not smoked for the last twelve months. Smoking frequency was dichotomized into two groups: non-smokers (coded as 0) and current smokers (coded as 1). Those who gave answers 2, 3, 4 or 5 to question two were counted as smokers, and those who answered age 50 or 51 to question three were counted as smokers. Those who answered 1 to
question two were considered non-smokers if they answered no to question one, or answered 49 or an age less than 49 to question three.

4.2.3.4 Alcohol

Questions on alcohol consumption were adapted from the Alcohol Use Disorders Identification test (AUDIT). This is a validated tool and is widely used in primary care settings as a diagnostic tool for hazardous drinking behaviour (38).

The questions used in CHALICE included whether the participant consumed alcohol, their frequency of drinking and amount usually consumed. See Appendix C for the complete list of questions from the AUDIT questionnaire.

Non-drinkers were classified as having no alcohol in the last 12 months and infrequent drinkers have less than one to two drinks per month.

Those who answered no or 0 to question one were classified as non-drinkers. Drinks per month were calculated for those who answered 1 to question two. Drinks per week were calculated for those who answered 2, 3 or 4 to question two by multiplying the drinking frequency with the amount of drinks consumed.
Five categories of ‘drinks per day’ were formed: 0 = no drinks, 1 = infrequent/occasional drinking (used for those who have < 1 – 2 drinks per month), 2 = < 1 drink/day, 3 = 1 – 2 drinks/day, 4 = > 2 – ≤ 4 drinks/day and 5 = > 4 – ≤ 8 drinks/day.

Primary analyses showed that the distribution of alcohol scores was skewed to the left with the majority of participants scoring < 8 and 17 participants failing to report their alcohol scores. Data for alcohol were dichotomized as: alcohol score < 8 (less than 8 drinks per week) and alcohol score > 8 (more than 8 drinks per week). For the purposes of this thesis, only those with scores > 8 were included in the final analyses and those failing to report their scores were excluded from analyses altogether.

4.2.3.4 Module Five – Mental Health

Participants were asked questions based on the Mini-international Neuropsychiatric Interview (MINI) (39). The MINI is a validated, structured diagnostic psychiatric interview typically used to assess psychiatric disorders for use in settings including epidemiological studies.

4.2.3.4.1 Depression

In CHALICE, the MINI was used to assess whether participants are experiencing a ‘current depressive episode’. See Appendix D for the complete list of questions and instructions from the MINI.
Based on the MINI questionnaire, if participants responded ‘yes’ to any three statements after indicating a low mood over the past two weeks, they were diagnosed as likely to be experiencing a current depressive episode at the time of the assessment (39). Depression was categorised into two groups: current depressive episode (coded as 1) and not depressed (coded as 0).

4.2.3.5 Module Seven – Lifestyle Questionnaires

Module seven contains a home food inventory (HFI), the how you eat and what you eat questionnaire and a four day food and beverage diary (FBD). For the purposes of this thesis, only data from part two of the FBD: How you eat and what you eat questionnaire was relevant and included in more detail.

Interviewers gave participants both verbal and written instructions of how to complete the FBD at the end of their clinical interview. The FBD was completed in the participants’ own time and returned to CHALICE by post.

4.2.3.5.1 How you eat and what you eat questionnaire (breakfast consumption)

In this section, participants were asked several questions regarding their eating behaviours. The data from one question only was included in this thesis. Participants were asked “How often do you usually have breakfast (more than a glass of milk or fruit juice)?” Participants could respond using the following options: a. I never have breakfast, b. 1 to 3 days a week, c. 4 to 6 days a week and d. Every day (Appendix E).
Due to insufficient numbers of participants in the lower score categories, data were recoded to produce a dichotomous variable. Those who answered ‘yes’ to option a., b., or c., were combined to create a category of non-daily breakfast consumers (NBC coded as 0) and participants who answered d. were categorised as daily breakfast consumers (DBC coded as 1).

4.2.4 Participant Follow-up

Two weeks after the initial interview, the CHALICE interviewers telephoned participants to remind them to complete and send back the HFI and FBD. Once these questionnaires were returned, they were checked for completeness by a trained nutritionist. If further information was required, interviewers would contact the participants by telephone or email to acquire further clarification. For example, further clarification was sought if the reported quantities of foods consumed were not clear, or when the nutritionists were not familiar with a certain food product.

4.3 Data Analysis

4.3.1 Data Entry

Each participant was allocated a study number upon entry to the study to ensure participant anonymity. Raw data were kept in locked cabinets within the University of Otago CHALICE office.
All raw data (except FBD) were entered into a study wide custom built database Progeny 7 (Progeny Software, LLC www.progenygenetics.com). Data entry accuracy was confirmed by the study database technician by checking the data entered against the questionnaire answers, and screening for data anomalies.

4.4 Statistical Methods – Statistical package R Studio

Statistical analyses were performed using R Studio version 0.97.551 (R Studio, inc, 2009-2012). Means and standard deviations were calculated to describe each continuous variable and frequencies and percentages were calculated to describe each categorical variable. A Pearson Chi-squared test was used to investigate differences between males and females.

Two linear regression models were used to investigate possible relationships between vitality and general health scores and breakfast consumption. The first model was adjusted for sex only. As Maori, ELSIf, smoking, alcohol consumption depression and BMI have all been found to be associated with breakfast consumption and/or vitality and general health, model 2 included these variables, as well as sex. Statistical significance was assumed at the $p < 0.05$ level.

Analyses were also conducted in males and females separately, using the same two regression models with sex removed. Beta co-efficients, Confidence intervals and $p$-values were produced for each variable included in the linear models. Statistical significance was assumed at the $p < 0.05$ level.
5.0 Results

Results are shown for the 235 CHALICE participants out of the first 300 recruited who had completed data for all variables of interest.

5.1 Response rate

Figure 5-1 outlines the CHALICE recruitment process for the first 300 participants, with numbers of non-Maori and Maori shown at each step. As of June 20\textsuperscript{th} 2013, invitation letters have been sent to 672 people of whom 300 have completed all seven modules on the interview day. Two hundred thirty-five (78.3\%) of these 300 participants also completed and returned the FBD and all other variables of interest.
Figure 5-1: Participant response rate (adapted from (34) et al.)
5.2 Sample characteristics

Table 5-1 shows the participants’ mean scores for each outcome variable (vitality and general health), BMI and standard of living (ELSI$_{SF}$). The mean vitality and general health scores were above average for participants of both sexes with the exception of general health scores for males which were just below average. Men and women had mean BMI scores between the overweight and obesity cut-offs (1). Thirty percent of participants were obese with mean BMI scores $> 30$ kg/m$^2$. One hundred and forty-seven (62.6%) participants had a good or very good standard of living as indicated by ELSI$_{SF}$ scores 25 or higher.

Table 5-1: Sample characteristics

<table>
<thead>
<tr>
<th>SF-36v2 health domains$^{a}$</th>
<th>Females ($n=124$) Mean(SD)</th>
<th>Males ($n=111$) Mean(SD)</th>
<th>All ($n=235$) Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitality</td>
<td>50.6(9.3)</td>
<td>51.7(9.0)</td>
<td>51.1(9.2)</td>
</tr>
<tr>
<td>General health</td>
<td>51.3(9.6)</td>
<td>49.9(8.5)</td>
<td>50.6(9.1)</td>
</tr>
<tr>
<td>Body composition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m$^2$)</td>
<td>28.4(7.2)</td>
<td>27.5(4.4)</td>
<td>28.0(6.0)</td>
</tr>
<tr>
<td>Standard of living$^{b}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELSI$_{SF}$</td>
<td>24.4(5.2)</td>
<td>25.2(4.6)</td>
<td>24.7(4.9)</td>
</tr>
</tbody>
</table>

$^{a}$Vitality and general health scores are based on a 0-100 scale.

$^{b}$ELSI$_{SF}$ scores are categorised as 0-24 (hardship and comfortable) and 25+ (good and very good).
Table 5-2 shows participants’ categorisation of breakfast consumption. The majority of participants (73.6%) consumed breakfast every day, 75% of females and 72% of males. A Pearson’s Chi-squared test with Yates’ continuity correction for differences between men and women and breakfast consumption indicated no significant difference (X-squared = 0.13 and \( p = 0.72 \)).

Table: 5-2: Participant categorisation of breakfast consumption

<table>
<thead>
<tr>
<th>Categories 1-4</th>
<th>Females</th>
<th>Males</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n=124 (%))</td>
<td>( n=111 (%))</td>
<td>( n=235 (%))</td>
</tr>
<tr>
<td>1. I never have breakfast</td>
<td>7(5.6)</td>
<td>6(5.4)</td>
<td>13(5.5)</td>
</tr>
<tr>
<td>2. 1 to 3 days a week</td>
<td>15(8.6)</td>
<td>9(8.1)</td>
<td>24(10.0)</td>
</tr>
<tr>
<td>3. 4 to 6 days a week</td>
<td>9(7.2)</td>
<td>16(14.4)</td>
<td>25(10.6)</td>
</tr>
<tr>
<td>4. Every day</td>
<td>93(75.0)</td>
<td>80(72.0)</td>
<td>173(73.6)</td>
</tr>
</tbody>
</table>

Table 5-3 shows socio-demographic characteristics of participants for the 235 CHALICE participants with ELSIsf, MINI and breakfast frequency data. The sample was predominantly NZ European with 15.7% identifying as Maori. The majority of participants (78.3%) had an alcohol score less than 8 (< 8 standard alcoholic beverages per week) and were non-smokers (87.7%). Results showed 27.7% of participants were currently experiencing a depressive episode with a higher proportion of women (31.5%) than men (23.4%) in this category, respectively.
Table 5-3: Participant categorisation for variables of interest

<table>
<thead>
<tr>
<th></th>
<th>Females n=124 (%)</th>
<th>Males n=111 (%)</th>
<th>All n=235 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnicity</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Maori</td>
<td>118(95.2)</td>
<td>101(91.0)</td>
<td>225(95.7)</td>
</tr>
<tr>
<td>Maori</td>
<td>20(16.0)</td>
<td>17(15.3)</td>
<td>37(15.7)</td>
</tr>
<tr>
<td><strong>ELSI&lt;sup&gt;f&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.24</td>
<td>47(37.9)</td>
<td>41(36.9)</td>
<td>88(37.5)</td>
</tr>
<tr>
<td>25+</td>
<td>77(62.1)</td>
<td>70(63.0)</td>
<td>147(62.6)</td>
</tr>
<tr>
<td><strong>Alcohol score</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol score &lt; 8</td>
<td>102(82.3)</td>
<td>82(73.9)</td>
<td>184(78.3)</td>
</tr>
<tr>
<td>Alcohol scores &gt; 8</td>
<td>14(11.3)</td>
<td>20(18.0)</td>
<td>34(14.5)</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smokers</td>
<td>16(12.9)</td>
<td>13 (11.7)</td>
<td>29(12.3)</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>108(87.1)</td>
<td>98(88.2)</td>
<td>206(87.7)</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>39(31.5)</td>
<td>26(23.4)</td>
<td>65(27.7)</td>
</tr>
<tr>
<td>No</td>
<td>85(68.5)</td>
<td>85(76.6)</td>
<td>170(72.3)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Ethnicity does not add up to 235 (100%) because 31 participants identified as Maori and NZ European, 4 participants identified as NZ European and Other, 18 participants identified as Other only, 1 participant identified as Samoan and NZ European, 1 participant identified as a Cook Islander and NZ European, 2 participants identified as Chinese and Maori, 2 participants identified as Chinese and NZ European and 1 participant was of Indian and NZ European ethnicity.

<sup>b</sup> Alcohol score represents the number of drinks per week.

Table 5-4 shows the characteristics of NBC and DBC separately for males and females. Female NBC had the lowest vitality scores (56.3%) compared to male NBC (48.8%) with scores ranging from 25 to 75%. Male DBC had the highest vitality scores (65%) of all participants. General health scores were highest for females with 58% of
NBC and 68.8% of DBC scoring between 50 and 75%. More men and women in the DBC categories had a good or very good standard of living compared to men and women in the NBC categories as indicated by the ELSI scores. The majority of men and women in both breakfast categories consumed less than 8 standard alcoholic drinks per week, while those who consumed more than 8 alcoholic drinks per week was highest for male NBC (32.2%). Smoking was most prevalent in female and male NBC, and those currently experiencing a depressive episode was greatest for females in both NBC (48.4%) and DBC (25.8%) breakfast categories, respectively.
Table 5-4: Characteristics of non-daily breakfast consumers (NBC) and daily breakfast consumers (DBC)

<table>
<thead>
<tr>
<th>Breakfast consumers</th>
<th>Variables</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NBC n=31 (%)</td>
<td>DBC n=93 (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NBC n=31(%)</td>
<td>DBC n=80(%)</td>
</tr>
<tr>
<td>SF-36v2 vitality scores (0-100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBC</td>
<td>0-25</td>
<td>0(0)</td>
<td>0(0)</td>
</tr>
<tr>
<td></td>
<td>25-50</td>
<td>18(56.3)</td>
<td>15(48.8)</td>
</tr>
<tr>
<td></td>
<td>50-75</td>
<td>13(41.9)</td>
<td>16(51.6)</td>
</tr>
<tr>
<td>DBC</td>
<td>0-25</td>
<td>1(1.0)</td>
<td>1(1.3)</td>
</tr>
<tr>
<td></td>
<td>25-50</td>
<td>35(37.6)</td>
<td>27(33.8)</td>
</tr>
<tr>
<td></td>
<td>50-75</td>
<td>57(61.3)</td>
<td>52(65.0)</td>
</tr>
<tr>
<td>SF-36v2 general health scores (0-100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBC</td>
<td>0-25</td>
<td>1(3.2)</td>
<td>0(0)</td>
</tr>
<tr>
<td></td>
<td>25-50</td>
<td>12(38.7)</td>
<td>16(51.6)</td>
</tr>
<tr>
<td></td>
<td>50-75</td>
<td>18(58.0)</td>
<td>15(48.3)</td>
</tr>
<tr>
<td>DBC</td>
<td>0-25</td>
<td>0(0)</td>
<td>0(0)</td>
</tr>
<tr>
<td></td>
<td>25-50</td>
<td>29(31.2)</td>
<td>33(41.3)</td>
</tr>
<tr>
<td></td>
<td>50-75</td>
<td>64(68.8)</td>
<td>47(58.8)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBC</td>
<td>Maori</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>DBC</td>
<td>Maori</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>NBC</td>
<td>Non-Maori</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>DBC</td>
<td>Non-Maori</td>
<td>93</td>
<td>78</td>
</tr>
</tbody>
</table>
Table 5-4 continued

| Breakfast consumers | Variables | Females | | Males | |
|---------------------|-----------|---------|---------------------------|---------------------------|
|                     |           | NBC n=31 (%) | DBC n=93 (%) | NBC n=31 (%) | DBC n=80 (%) |
| Obesity (BMI kg/m²)ᵃ | BMI kg/m² < 30 | 23(74.2) | 21(65.6) | |
|                     | BMI kg/m² > 30 | 8(25.8) | 10(32.3) | |
| DBC                 | BMI kg/m² < 30 | 60(64.5) | 63(78.8) | |
|                     | BMI kg/m² > 30 | 33(35.5) | 17(21.3) | |
| Standard of living (ELSIᵃ) | 0.24 | 14(45.2) | 9(29.0) | |
|                     | 25+ | 17(54.8) | 22(70.9) | |
| DBC                 | 0.24 | 33(35.5) | 32(40.0) | |
|                     | 25+ | 60(64.5) | 48(60.0) | |
| Alcohol scoreᵇ     | Alcohol scores < 8 | 22(74.2) | 21(67.7) | |
|                     | Alcohol scores > 8 | 9(29.0) | 10(32.3) | |
| DBC                 | Alcohol score < 8 | 88(94.6) | 70(87.5) | |
|                     | Alcohol scores > 8 | 5(5.4) | 10(12.5) | |
| Smoking             | Non-smokers | 20(64.5) | 25(80.6) | |
|                     | Current smokers | 9(29.0) | 6(19.4) | |
| DBC                 | Non-smokers | 88(94.6) | 73(91.3) | |
|                     | Current smokers | 5(5.4) | 7(8.8) | |

48
Table 5-4 continued

<table>
<thead>
<tr>
<th>Breakfast consumers</th>
<th>Variables</th>
<th>Females</th>
<th></th>
<th>Males</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NBC n=31 (%)</td>
<td>DBC n=93 (%)</td>
<td>NBC n=31 (%)</td>
<td>DBC n=80 (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NBC</td>
<td>DBC</td>
<td>NBC</td>
<td>DBC</td>
</tr>
<tr>
<td></td>
<td><strong>Depression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBC</td>
<td>Not depressed</td>
<td>16(61.6)</td>
<td>22(71.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current depressive episode</td>
<td>15(38.4)</td>
<td>9(29.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBC</td>
<td>Not depressed</td>
<td>69(74.2)</td>
<td>63(78.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current depressive episode</td>
<td>24(25.8)</td>
<td>17(21.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The WHO obesity cut-off was used for BMI classification (1).*

*Alcohol score is dichotomised as those who consume < 8 and > 8 standard alcoholic drinks per week.

5.3 Multiple regression analyses

For all multiple regression analyses, regression co-efficients are presented as the expected change in vitality or general health between low and high groups for each variable, except BMI which is per 1kg/m² increase. The same regression co-efficients are used for analyses in models 1 and 2 for both vitality and general health scores.

5.3.1 SF-36v2 vitality scores and breakfast consumption

Table 5-5 shows significant associations between breakfast consumption and vitality scores for all participants (in model 1) \( p < 0.01 \) CI 0.86, 6.14. Consuming breakfast everyday was associated with an increase of 3.50% in vitality scores. No significant associations were observed when data from males and females were analysed.
separately. Results from model 2 (Table 5-5) show no significant associations between breakfast consumption and vitality scores adjusted for Maori, sex, ELSIf, alcohol, smoking, depression or BMI for all participants and for males and females, separately. For all subjects, associations were seen for ELSIf (β 2.56 CI 0.21, 4.91), BMI (β -0.23 CI -0.42, -0.04) and depression (β -5.01 CI -7.51, -2.51).

For males, depression had the only significant effect on vitality scores (p < 0.01 CI -10.49, -2.81) - that being a male experiencing a current depressive episode was associated with a 6.65% lower vitality score.

For females, significant associations were seen for ELSIf and smoking (p < 0.01) and BMI (p < 0.05). A good or very good standard of living was associated with a 4.42% increase in vitality (CI 1.23, 7.61); whereas those women who were current smokers had on average a 7.77% lower vitality score (CI -12.79, -2.75). A 1kg/m² increase in BMI was associated with a 0.21% decrease in vitality scores for women (CI -0.43, -0.00). No significant associations were found for the other regression co-efficients.

5.3.2 SF-36v2 general health scores and breakfast consumption

Table 5-6 shows no significant associations between breakfast consumption and general health scores in models 1 and 2 for all subject, or males and females separately. For all subjects, significant associations were seen for ELSIf (β 3.38 CI 1.17, 5.58), depression (β -5.60 CI -7.95, -3.26) and BMI (β -0.47 CI -0.64, -0.29).
For males, alcohol, BMI ($p < 0.05$) and depression ($p < 0.001$) had significant effects on general health. Consuming more than 8 standard alcoholic beverages per week was associated with a 4.42% lower general health score (CI -8.47, -0.36), and for every 1kg/m$^2$ increase in BMI a 0.38% decrease in general health scores was observed (CI -0.75, -0.02). Being a male experiencing a current depressive episode was associated with a 7.44% lower general health score (CI -10.86, -4.02).

For females, significant associations with general health were shown for smoking and depression ($p < 0.05$) and for ELSIs and BMI ($p < 0.01$). Current smokers had a 5.70% decrease in general health scores (CI -10.63, -0.77); and those experiencing a current depressive episode scored 4.23% lower in general health (CI -7.52, -0.93). A good or very good standard of living was associated with a 4.54% increase in general health scores (CI 1.42, 7.70); whereas a 1kg/m$^2$ increase in BMI was associated with a 0.46% decrease in general health (CI -0.68, -0.26). No significant associations were observed for the other regression co-efficients.
Table 5-5: Relationships between breakfast consumption and vitality

<table>
<thead>
<tr>
<th></th>
<th>All subjects</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>CI</td>
<td>β</td>
<td>CI</td>
</tr>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>3.50</td>
<td>0.86, 6.14**</td>
<td>3.68</td>
<td>-0.04, 7.41</td>
</tr>
<tr>
<td>Sex</td>
<td>1.27</td>
<td>-1.06, 3.60</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>2.03</td>
<td>-0.66, 4.71</td>
<td>3.28</td>
<td>-0.54, 7.11</td>
</tr>
<tr>
<td>Maori</td>
<td>2.97</td>
<td>-0.13, 6.07</td>
<td>3.81</td>
<td>-0.95, 8.57</td>
</tr>
<tr>
<td>Sex</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ELSISF</td>
<td>2.56</td>
<td>0.21, 4.91*</td>
<td>1.48</td>
<td>-2.05, 5.02</td>
</tr>
<tr>
<td>Alcohol</td>
<td>-1.13</td>
<td>-4.42, 2.16</td>
<td>-3.24</td>
<td>-7.78, 1.31</td>
</tr>
<tr>
<td>Smoking</td>
<td>-3.16</td>
<td>-6.83, 0.51</td>
<td>1.97</td>
<td>-3.81, 7.75</td>
</tr>
<tr>
<td>Depression</td>
<td>-5.01</td>
<td>-7.51, -2.51***</td>
<td>-6.65</td>
<td>-10.49, -2.81***</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.23</td>
<td>-0.42, -0.04*</td>
<td>-0.10</td>
<td>-0.51, 0.31</td>
</tr>
</tbody>
</table>

*p <0.05, **p<0.01, ***p<0.001

Model 1 includes data for DBC and sex only. Model 2 includes data for DBC, Maori, sex, standard of living (ELSISF), the consumption of > 9 alcoholic beverages per week, current smokers, those experiencing a ‘current depressive episode’ and BMI. Data is included for all participants and for males and females separately. B values represent how each variable affects participants’ SF-36v2 vitality scores (expressed as a percentage).
Table 5-6: Relationships between breakfast consumption and general health

<table>
<thead>
<tr>
<th></th>
<th>All subjects</th>
<th>Males only</th>
<th>Females only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>2.50</td>
<td>2.62</td>
<td>2.39</td>
</tr>
<tr>
<td>CI</td>
<td>-0.14, 5.15</td>
<td>-0.91, 6.16</td>
<td>-1.56, 6.34</td>
</tr>
<tr>
<td>Sex</td>
<td>-1.35</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CI</td>
<td>-3.68, 0.99</td>
<td>-</td>
<td>-3</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>0.61</td>
<td>1.25</td>
<td>-0.94</td>
</tr>
<tr>
<td>CI</td>
<td>-1.91, 3.13</td>
<td>-2.16, 4.67</td>
<td>-4.78, 2.90</td>
</tr>
<tr>
<td>Maori</td>
<td>2.42</td>
<td>1.82</td>
<td>2.81</td>
</tr>
<tr>
<td>CI</td>
<td>-0.49, 5.33</td>
<td>-2.23, 6.25</td>
<td>-1.36, 7.00</td>
</tr>
<tr>
<td>Sex</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ELSISF</td>
<td>3.38</td>
<td>2.60</td>
<td>4.54</td>
</tr>
<tr>
<td>CI</td>
<td>1.17, 5.58**</td>
<td>-0.55, 5.75</td>
<td>1.42, 7.70**</td>
</tr>
<tr>
<td>Alcohol</td>
<td>-3.00</td>
<td>-4.42</td>
<td>-2.30</td>
</tr>
<tr>
<td>CI</td>
<td>-6.09, 0.09</td>
<td>-8.47, -0.36*</td>
<td>-7.27, 2.66</td>
</tr>
<tr>
<td>Smoking</td>
<td>-1.95</td>
<td>1.55</td>
<td>-5.70</td>
</tr>
<tr>
<td>CI</td>
<td>-5.39, 1.50</td>
<td>-3.61, 6.70</td>
<td>-10.63, -0.77*</td>
</tr>
<tr>
<td>Depression</td>
<td>-5.60</td>
<td>-7.44</td>
<td>-4.23</td>
</tr>
<tr>
<td>CI</td>
<td>-7.95, -3.26***</td>
<td>-10.86, -4.02***</td>
<td>-7.52, -0.93*</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.47</td>
<td>-0.38</td>
<td>-0.46</td>
</tr>
<tr>
<td>CI</td>
<td>-0.64, -0.29***</td>
<td>-0.75, -0.02*</td>
<td>-0.68, -0.26***</td>
</tr>
</tbody>
</table>

*p <0.05, **p<0.01, ***p<0.001

Model 1 includes data for DBC and sex only. Model 2 includes data for DBC, Maori, sex, standard of living (ELSISF), the consumption of > 9 alcoholic beverages per week, current smokers, those experiencing a ‘current depressive episode’ and BMI. Data is included for all participants and for males and females separately.

**B** values represent how each variable affects participants’ SF-36v2 general health scores (expressed as a percentage).
6.0 Discussion

6.1 Summary of main findings

Daily breakfast consumption was not associated significantly with having a higher vitality or general health score. Vitality scores increased by 3.5% for those who consumed breakfast daily when adjusting for sex only, but this effect disappeared after adjustment for the other variables of interest. As a similar, albeit non-significant, effect size was seen in men only, which suggests that this association between daily breakfast consumption and vitality scores may occur primarily in men. Given the small numbers in the sample, we cannot determine if this is a true non-significant association or that we lacked power to detect a significant effect.

Several lifestyle factors were associated with vitality and general health. Standard of living (ELSIsf), depression and BMI were consistently associated with the vitality and general health scores of all subjects. When data from men and women were analysed separately, depression was found to be the leading factor associated with decreased vitality and general health scores for men; whereas smoking was the greatest contributor to decreased vitality and general health for women. Interestingly, smoking had an inverse effect on the vitality and general health scores of men; however this association was not significant.

This study also showed that DBC were less likely to smoke, to drink alcohol, to be experiencing a current depressive episode and/or to have a BMI greater than 30 kg/m$^2$. 

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The hypothesis is rejected for daily breakfast consumption on both vitality and general health scores, but accepted for healthier lifestyle choices made by daily breakfast consumers.

6.2 Vitality and general health scores and breakfast consumption

In this study, 74.6% of participants were found to consume breakfast every day - a slightly higher proportion of females (75%) than males (72%). These statistics were slightly higher than those reported in the New Zealand Adult Nutrition Survey 2008/09 (3), where only 60.4% of males and 66.6% of females aged 31-50 years consumed breakfast daily. Yet, these were considerably lower than the 82% of Americans adults aged 25-74 years who reported eating breakfast in the 2002 NHANES cohort (2). In addition to this, SF-36v2 questionnaire results showed CHALICE participants scored substantially lower in their vitality and general health than did a national sample of 45-54 year olds in the previous New Zealand Health Survey 2006/07 (7). In this previous NZ Survey (7), vitality and general health were ranked as the lowest scoring health domains (out of a possible eight domains) assessed by the SF-36v2 questionnaire.

An inverse relationship between breakfast skipping and quality of life has been shown in a large Taiwanese cohort of 15 340 adults (19). Although effect sizes were not reported, Huang et al showed that those who did not consume breakfast everyday had significantly lower SF-36v2 scores in general health, vitality, social functioning, emotional role and mental health. As an association that almost approached significance was observed for vitality in men, the sample size included in this study
may be too small to see a significant association. However associations may be observed over time when the full 1000 study participants have been recruited to CHALICE.

As depression is associated with compromised functioning, quality of life (40) and disturbed appetite (41), it was not surprising to find that depression was also a major contributor to the decrease in vitality and general health scores for men, and the decreased general health for women in this study. The results from a longitudinal, community-based study of 425 midlife American women (16), found that depression had a negative effect on SF-36v2 scores of social-functioning, role-emotional, role-physical and bodily pain. These findings by Joffe et al reiterate how depression can impact health independent of breakfast consumption. However, the findings from two previous observational studies of middle-aged populations in Wales (14, 15) show that those who consumed breakfast cereal everyday were less depressed, had less emotional distress and had better reports on mental and physical health compared to those who consumed foods other than cereal at breakfast and to non-breakfast consumers. Although relationships are difficult to disentangle due to multiple factors that lead to depression, the daily consumption of a breakfast cereal may be an important part of maintaining a positive well-being in middle-age. Further research is required to elucidate the mechanisms underlying the association between daily breakfast cereal consumption on mental health and well-being.

Standard of living (ELSI\textsubscript{SF}) was associated with a higher level of vitality and general health scores for all subjects, especially women. Women with a higher standard of
living had a 4.42% higher vitality and a 4.54% higher general health score compared to those in the lower standard of living category. These results were in line with those previously reported in the New Zealand Living Standards and Health Survey that also used the ELSI_{SF} to assess standard of living (32). Although this particular Survey did not categorise results by age or sex, findings showed (32) adults living in the least deprived neighbourhoods (NZDep2006 quintile 1 or 2) were more likely to self-rate their health as excellent or very good than adults living in the most deprived neighbourhoods. Moreover, a higher SES has been associated with the increased availability of food in the household (3) and with a higher level of education which leads to healthier dietary choices as shown in a large cross-sectional study of Danish adults (33). The results in the present study that a higher standard of living is associated with a higher perceived vitality and general health for middle-aged women, builds on the evidence and highlights the importance that health promotion be targeted towards lower ELSI_{SF} and SES populations to achieve improved health and well-being in New Zealand.

A higher BMI was associated with lower vitality and general health scores for women, but not with vitality in men. Of particular interest was the finding that for every 1kg/m^2 increase in BMI, there was an almost half a percent decrease in general health for women. In NZ (between the years 1997 – 2009), obesity prevalence increased from 17.0% in males and 20.6% in females, to 27.7% and 27.8%, respectively (3). This is of concern, as obesity (a BMI > 30kg/m^2) is a major risk factor for many chronic diseases (42), many of which are prevented through lifestyle modification such as a healthy, balanced diet (1). Using data from 4 consecutive NHANES waves, Kant et al (22) showed adults who consumed breakfast regularly also consumed a lower energy dense
diet over the course of a day and had a lower BMI compared to those who did not consume breakfast. Similarly, Huang et al (19) saw the rates of obesity decrease as the frequency of breakfast consumption increased in a large cohort of Taiwanese adults. The results from this present study that DBC had a lower prevalence of obesity than NBC, and that a higher BMI was associated with lower levels of perceived vitality and health, build on the reports of these two previous authors. This contributes to the understanding of how regular breakfast consumption (as part of a healthy lifestyle) may influence health outcomes (and potential chronic disease risk) through the maintenance of a healthy BMI.

Considering the associations between BMI and health in this present study (especially in women), it would be of great interest to explore whether or not breakfast was associated with the reduction in any chronic disease risk of CHALICE participants at the 5 year follow-up period. For instance, a recent study by Mekary et al (43) used data from the Nurses’ Health Study to examine prospective associations between regular breakfast consumption, eating frequency and type 2 diabetes risk in 46 289 older women. After 6 years, these findings showed that irregular breakfast consumers had a 39% higher risk of type 2 diabetes compared to those who consumed breakfast daily, which was only partially attenuated by BMI. Furthermore, regular breakfast consumers had a lower BMI and healthier lifestyle habits such as less alcohol consumption, less smoking and more physical activity compared to irregular breakfast consumers, which also mirrored the present study’s findings.
Daily breakfast consumers in this present study smoked less, drank less alcohol, were less depressed and had lower BMIs than their non-breakfast eating counterparts. These findings align with several large observational studies (14, 15, 19, 43) indicating that those who consume breakfast regularly have healthier lifestyle habits than non-breakfast consumers. Taken together, skipping breakfast may not be a ‘cause’ of poor health per se, but evidence supports that it can be regarded as a health-compromising behaviour associated with a poorer health status.

The nutrient content of foods consumed at breakfast was not investigated as this was outside the scope of this thesis. However, there have been numerous studies to show associations with specific breakfast types on improved diet quality (20, 21, 26), better micro and macronutrient compositions (23-25) and a more favourable daily energy intake (22). There is a need to assess which breakfast foods contribute to greater health so that appropriate nutritional guidelines for breakfast consumption may be implemented to the public.

6.3 Strengths and limitations

The current study had several limitations. First, breakfast consumption was self-reported and subject to a subjective interpretation of what constitutes breakfast, although more than a glass of milk or juice was specified. Second, physical activity (a strong marker for vitality and health) could not be included in the statistical analyses because physical activity data from CHALICE participants had not yet been cleaned by the relevant CHALICE researchers. Third, the final study sample size (n=235) was
small and may have contributed to a lack of power in statistical analyses. Finally, residual confounding is a concern in observational studies because breakfast consumers tend to have a healthy lifestyle and diet. Although known and suspected risk factors that affect well-being were controlled for, it is impossible to control for all unknown confounders, which is an issue for all research of this type.

Despite these limitations, this study had its strengths. Firstly, there are many strengths of the overall CHALICE design. Use of the electoral roll to recruit participants provides a wide participant pool and allows identification of those identifying as Maori, but the Canterbury population may not be representative of the NZ population. Second, this study was the first of its kind in a middle-aged Cantabrians population to assess the relationship of breakfast consumption on vitality and general health. In addition, data were collected using many validated assessment tools, and a wide variety of potential confounders were controlled for in the multivariate analyses models. Finally, a limitation of this study is its cross-sectional design. However, it describes initial CHALICE data and future research will expand on this and provide new longitudinal information as it becomes available. The current study has demonstrated areas of interest to highlight and direct future study.

6.4 Future research

Further studies are needed to assess specific breakfast foods and nutrients, and the change in breakfast consumption patterns in relation to quality of life and well-being in a middle-aged population. Using more solid end-points such as chronic disease to assess the effect of breakfast on health would also be beneficial. Moreover, a study
with a larger sample size would increase the power of the analyses, and subsequently, the overall results.

6.5 Conclusion

In summary, the perceived vitality and/or general health of this middle-aged population were not increased by consuming a daily breakfast. However, those who consumed breakfast everyday were found to live a healthier lifestyle than non-consumers. Given the robust evidence that show the impacts of breakfast consumption on health, it is interesting that relatively little is known about the causal mechanisms of how breakfast consumption affects health. Further research is required to extend our current knowledge by conducting research that will translate into appropriate information for future policy and nutritional practice.
7.0 Application to dietetic practice

The present study highlights the continued importance of promoting daily breakfast consumption for nutrition and health intervention, because although 70 percent of New Zealanders consume breakfast daily, this is continuing to decrease over time (7). It also shows that advice to consume a regular breakfast as part of a healthy diet should be provided concurrently with advice to make healthy lifestyle choices overall.
8.0 References


20. Deshmukh-Taskar PR, Radcliffe JD, Liu Y, Nicklas TA. Do breakfast skipping and breakfast type affect energy intake, nutrient intake, nutrient adequacy, and diet quality in


9.0 Appendices

Appendix A – Ethics and Maori consent

14 June 2010

Professor Peter Joyce
Department of Psychological Medicine
Christchurch School of Medicine & Health Sciences
P O Box 4345
Christchurch

Attn: Janet Spittlehouse

Dear Professor Joyce,

URA/10/03/021 Canterbury Health, Ageing and Life Course Study
Investigators Prof P Joyce, Mr C Lacey, A/Prof V Cameron, Prof S Chambers, Dr R Gearry, Dr H Jamieson, Prof M Kennedy

This study was given ethical approval by the Upper South A Regional Ethics Committee on 14 June 2010.

Approved Documents
• Protocol version 2.1 dated 18.05.10
• Information sheet and Consent form version 2.1 dated 12.05.10
• CHALICE Yearly health questionnaire version 1.0 dated 02.06.10

This approval is valid until 31 August 2016, provided that Annual Progress Reports are submitted (see below).

Access to ACC
For the purposes of section 32 of the Accident Compensation Act 2001, the Committee is satisfied that this study is not being conducted principally for the benefit of the manufacturer or distributor of the medicine or item in respect of which the trial is being carried out. Participants injured as a result of treatment received in this trial will therefore be eligible to be considered for compensation in respect of those injuries under the ACC scheme.

Amendments and Protocol Deviations
All significant amendments to this proposal must receive prior approval from the Committee. Significant amendments include (but are not limited to) changes to:

- the researcher responsible for the conduct of the study at a study site
- the addition of an extra study site
- the design or duration of the study
- the method of recruitment
- information sheets and informed consent procedures.

Significant deviations from the approved protocol must be reported to the Committee as soon as possible.

**Annual Progress Reports and Final Reports**

The first Annual Progress Report for this study is due to the Committee by 30 June 2011. The Annual Report Form that should be used is available at www.ethicscommittees.health.govt.nz. Please note that if you do not provide a progress report by this date, ethical approval may be withdrawn.

A Final Report is also required at the conclusion of the study. The Final Report Form is also available at www.ethicscommittees.health.govt.nz.

**Requirements for the Reporting of Serious Adverse Events (SAEs)**

For the purposes of the individual reporting of SAEs occurring in this study, the Committee is satisfied that the study’s monitoring arrangements are appropriate.

SAEs occurring in this study must be individually reported to the Committee within 7-15 days only where they:

- are *unexpected* because they are not outlined in the investigator’s brochure, and
- are not defined study end-points (e.g. death or hospitalisation), and
- occur in patients located in New Zealand, and
- if the study involves blinding, result in a decision to break the study code.

There is no requirement for the individual reporting to ethics committees of SAEs that do not meet all of these criteria. However, if your study is overseen by a data monitoring committee, copies of its letters of recommendation to the Principal Investigator should be forwarded to the Committee as soon as possible.

Please see www.ethicscommittees.health.govt.nz for more information on the reporting of SAEs, and to download the SAE Report Form.

We wish you all the best with your study.

Yours sincerely
Professor Peter Joyce  
Department of Psychological Medicine  
University of Otago, Christchurch  

Tena koe, Peter  

Thank you for meeting with me at the University of Otago, Christchurch on Monday 21 July, to discuss your research study titled:  

**CHALICE - Canterbury Healthy Ageing Life Course Study**  

I note that your research is a large long term study in which recruitment will be by random electoral role sampling over 2,500 fifty year olds.  

You also mentioned that the sample will include over-sampling of Maori to obtain up to at least 500 fifty year olds.  

We also discussed the relevance of the research in regard to improving Maori health status and referred to *Decades of Disparity II: Socioeconomic mortality trends in New Zealand 1981 - 1999*, March 2005. The other reference that is available is *Hauora Maori Standards of Health: A study of the years 1970-1991* by Eru Pomare, Maori Health Research Unit, Wellington School of Medicine. Both provide Maori specific information on a range of health issues. The recent publication *Tatua Kahukura*, Ministry of Health, 2006, is an update relating to the socio economic determinants of health, health status and service utilisation of the Maori population.  

The Canterbury District Health Board also has a Maori Health plan which could be relevant.  

Your suggestion to work alongside Maori to discuss questions, method and tradition was important. Manawhenua ki Waitaha, chaired by Dr Matea Gillies, would be a group to consider. Representation on the Committee comes from the seven Runanga that resides within the Canterbury District Health Board boundaries. Manawhenua ki Waitaha also has a Memorandum of Understanding with the CDHB. The members meet monthly at Te Waipounamu House and the Secretary is Ali Mitchell, email ali.mitchell@ngaitahu.iwi.nz.  

There is a need to acknowledge the issues pertaining to ethnicity. Your study will involve a number of Maori participants. As such it was acknowledged there is a need to consider how the ethnicity data will be collected. Findings from this study may contribute to the development of future research hypotheses or projects. The research
proposal included the Census 2006 ethnicity question. In acknowledging Maori will be participants, it is my assumption that policies and procedures have been developed with regard to the collection, access, storage and disposal of Maori data for this project.

You mentioned that Dr Lacy will be an investigator. It would be advantageous for him to meet with Manawhenua ki Waitaha for the same reasons I have mentioned previously.

It is a requirement of the ethics approval process that a final report be submitted when the research is complete. A copy of the report should be provided to me at that time as findings from this project may contribute to the development of future research hypotheses or projects. It is therefore important that appropriate Maori organisations, Maori health professionals and Maori researchers are aware of your findings. The Research Office of the University of Otago, Christchurch and in particular myself as the Research Manager of Maori health would be willing to assist in the dissemination of your findings once your project has reached a successful conclusion.

My suggestions do not necessarily relate to ethical issues with the research, including methodology. Other committees may also provide feedback in these areas. I hope this letter will suffice in terms of the application. Please contact me should you need any other information that may not have been included in the letter relevant to our conversation.

I wish you well in your research.

Kia manawanui

e noho ra

Elizabeth Cunningham
Research Manager - Maori
Appendix B – Medical Outcome 36-Item Study Short Form Questionnaire

CHALICE
Canterbury Health, Ageing and Lifecourse Study

<table>
<thead>
<tr>
<th>Date of Assessment</th>
<th>Participant Study Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewer's Name</td>
<td>Interviewer's Number</td>
</tr>
</tbody>
</table>

Thank you for agreeing to take part in the Chalice study. We really appreciate you giving up your time to help complete this important research project. Please will you take a few minutes to read over and answer the following questions?

HEALTH STATUS (SF-36v2)

For each of the following questions, please select the one response that best describes your answer. Please enter the date that you are completing this questionnaire: ____/____/___

1. In general, would you say that your health is:
   1. Excellent
   2. Very good
   3. Good
   4. Fair
   5. Poor

2. Compared to one year ago, how would you rate your health in general now?
   1. Much better now than one year ago
   2. Somewhat better now than one year ago
   3. About the same as one year ago
   4. Somewhat worse now than one year ago
   5. Much worse now than one year ago

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

<table>
<thead>
<tr>
<th>(a) Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
or playing golf.
(c) Lifting or carrying groceries.
(d) Climbing several flights of stairs.
(e) Climbing one flight of stairs.
(f) Bending, kneeling or stooping.
(g) Walking more than a kilometre.
(h) Walking half a kilometre.
(i) Walking 100 metres.
(j) Bathing, showering or dressing yourself

<table>
<thead>
<tr>
<th></th>
<th>1 All of the time</th>
<th>2 Most of the time</th>
<th>3 Some of the time</th>
<th>4 A little of the time</th>
<th>5 None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Cut down on the amount of time you spent on work or other activities.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(b) Accomplished less than you would like.</td>
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<tr>
<td>(c) Were limited in the kind of work or other activities.</td>
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<tr>
<td>(d) Had difficulty performing the work or other activities (for example, it took extra effort).</td>
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</tbody>
</table>

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities, as a result of your physical health?

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?
During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

1. Not at all
2. A little bit
3. Moderately
4. Quite a bit
5. Extremely

How much bodily pain have you had during the past 4 weeks?

1. No bodily pain
2. Very mild
3. Mild
4. Moderate
5. Severe
6. Very severe

During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

1. Not at all
2. A little bit
3. Moderately
4. Quite a bit
5. Extremely

(c) Did work or activities less carefully than usual.
9. These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks**

<table>
<thead>
<tr>
<th>(a) Did you feel full of life?</th>
<th>1 All of the time</th>
<th>2 Most of the time</th>
<th>3 Some of the time</th>
<th>4 A little of the time</th>
<th>5 None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Have you been very nervous?</td>
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<td>(c) Have you felt so down in the dumps that nothing could cheer you up?</td>
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<tr>
<td>(d) Have you felt calm and peaceful?</td>
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<tr>
<td>(e) Did you have a lot of energy?</td>
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<td>(f) Have you felt downhearted and depressed?</td>
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<tr>
<td>(g) Did you feel worn out?</td>
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<tr>
<td>(h) Have you been happy?</td>
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<tr>
<td>(i) Did you feel tired?</td>
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</table>

10. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting friends, relatives, etc)?

1. All of the time
2. Most of the time
3. Some of the time
4. A little of the time
5. None of the time
11. How TRUE or FALSE is each of the following statements for you?

<table>
<thead>
<tr>
<th>Statement</th>
<th>1: Definitely true</th>
<th>2: Mostly true</th>
<th>3: Don’t know</th>
<th>4: Mostly false</th>
<th>5: Definitely false</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) I seem to get sick a little easier than other people</td>
<td></td>
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<tr>
<td>(b) I am as healthy as anybody I know</td>
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<td></td>
<td></td>
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<tr>
<td>(c) I expect my health to get worse</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>(d) My health is excellent</td>
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</tbody>
</table>
Appendix C – Demographics, ELSI$_{SF}$, Smoking and Alcohol

Module 2 Questionnaire
Personal Health History

<table>
<thead>
<tr>
<th>Date of Assessment</th>
<th>Participant Study Number</th>
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</thead>
<tbody>
<tr>
<td>Interviewer’s Name</td>
<td>Interviewer’s Number</td>
</tr>
</tbody>
</table>

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1. DEMOGRAPHICS

First, I am going to ask you some general questions about you and your household. Then we will go on to talk about your health.

1.01 You are male/female…? [Circle one]
   1 Male
   2 Female

Date of birth

1.02 Firstly, what is your date of birth? [Record]
   ☐ Enter eight digit date (e.g. 4 March 1946 = 04031946).

______/_____/___________
99 Refused

Ethnicity

[Showcard 1.03a]
1.03a Which ethnic group or groups do you belong to? Call the number or numbers of the ones that apply to you from Card 1.03a. [record all mentioned]

1 New Zealand European
2 Māori
3 Samoan
4 Cook Island Māori
5 Tongan
6 Niuean
7 Chinese
8 Indian
9 Other, such as Dutch, Japanese, Tokelauan
98 Don’t know

GO TO 1.05a

1.03b What other ethnicity or ethnicities do you belong to? [Record]

____________________________________________________________________

98 Don’t remember
99 Refused

GO TO 1.03a

1.04a Are you descended from Māori? That is did you have a Māori ancestor? [Circle one]

1 Yes
0 No
98 Don’t remember
99 Refused

GO TO 1.05a

1.04b What are your iwi affiliatations? [Record all]

GO TO 1.03a

98 Don’t remember
99 Refused
1.05a Which country were you born in? [Circle one]

1 New Zealand  
2 Australia  
3 England  
4 Scotland  
5 China (People’s Republic of)  
6 South Africa  
7 Samoa  
8 Cook Islands  
77 Other [specify the present name of the country] ____________________  
98 Don’t know  
99 Refused

1.05b In what year did you arrive to live in New Zealand? [Record 4 digit year]

______________________  
98 Don’t remember  
99 Refused

1.06 How long have you lived in Canterbury? [Record years and months]

Years__________ Months ____________  
98 Don’t remember  
99 Refused

Marital/Relationship Status

[Showcard 1.07a]

1.07a Looking at Card 1.07a, which one of these statements is true about your CURRENT relationship status?

1 I am married (or living together for 1 year or more)  
2 Separated  
3 Divorced  
4 Widowed  
5 Never married  
98 Don’t know  
99 Refused

1.07b Are you currently in a relationship? How long (in years) have you been in your current relationship?

__________

1.08 How long (in years) is/was the longest intimate relationship you’ve had in your life?

__________

Sexuality

[Showcard 1.09]

1.09 Looking at Card 1.09, which of the following best describes yourself?

1 Heterosexual (“straight”)  
2 Gay  
3 Lesbian  
4 Bisexual  
5 Transsexual  
6 Can’t choose  
98 Don’t know  
99 Refused
Education

[Showcard 1.10]
1.10 What is your highest qualification? Please do not count incomplete qualifications or qualifications that take less than 3 months of full-time study to get. Please tell us your highest qualification, shown on Card 1.10. [Record one]

1 No qualification
2 Secondary school qualifications
3 Post secondary certificate, diploma, or trade diploma
4 University degree
5 Other [specify] ______________________________________
98 Don’t know
99 Refused

Income support and employment

[Showcard 1.11]
1.11 Looking at Card 1.11, are you currently receiving any of these types of income support? [Circle yes or no and, if yes, circle all mentioned]

1 Yes
0 No
98 Don’t know/unsure
99 Refused

1 NZ Superannuation
2 Working for Families (Family Support, In Work Payment, Family Tax Credit)
3 Unemployment benefit
4 Domestic purposes benefit
5 Sickness benefit
6 Invalid’s benefit
7 Student allowance
8 Disability allowance
9 ACC (as income support, not reimbursement for health services)
10 Other government benefits (independent youth benefit, war pension, etc)
98 Don’t know
99 Refused

1.12 In the past 12 months, have you been out of paid work at any time for more than one month? Please do not include time out of paid work which was from your own choice, such as being a homemaker, caregiver, or full-time student.

1 Yes
0 No
98 Don’t know/unsure
99 Refused

1.13 What is your trained trade or profession? [Record]

________________________________________________________________________
Which of the statements on Card 1.14a best describes your current work situation. Please also say if you are self employed. [Circle one]

1. Working in paid employment. [Tick if self employed □ ]
2. Not in paid work, and looking for a job
3. Not in paid work, and not looking for a job (for any reason, such as being retired, a homemaker, caregiver, or full-time student).

Specify reason not working and not looking for a job:
___________________________________________________

4. Other Specify ________________________________________________

98 Don’t know 99 Refused

How many hours a week do you usually work? [Record hours]

__________

98 Don’t know
99 Refused

What is your current occupation? (What is your job called? What kind of work do you do?) [Record]

_____________________________________________

Looking at Card 1.15, in the last 4 weeks, which of these have you done, without pay? [Circle yes or no and, if yes, circle all mentioned]

1. Household work, cooking, repairs, gardening, etc, for my own household
2. Looked after a child who is a member of my household
3. Looked after a member of my household who is ill or has a disability
4. Looked after a child (who does NOT live in my household)
5. Helped someone who is ill or has a disability (who does NOT live in my household)
6. Other voluntary work for or through any organisation, group or marae
7. Studied for 20 hours or more per week at school or any other place
8. Studied for less than 20 hours per week at school or any other place
98 Don’t know
99 Refused
Income

[Showcard 1.16]
1.16 Looking at Card 1.16, what is the total income that you yourself got from all sources, before tax or anything was taken out of it, in the last 12 months? [Record one]

1 Less than $5,000
2 $5,001 - $10,000
3 $10,001 - $15,000
4 $15,001 - $20,000
5 $20,001 - $25,000
6 $25,001 - $30,000
7 $30,001 - $40,000
8 $40,001 - $50,000
9 $50,001 - $60,000
10 $60,001 - $70,000
11 $70,001 - $80,000
12 $80,001 - $100,000
13 $100,001 - $120,000
14 $120,001 - $150,000
15 $150,001 or more
98 Don’t know  99 Refused

Household income

[Showcard 1.16]
1.17 Still looking at Card 1.16, what is the total income that your household got from all sources, before tax or anything was taken out of it, in the last 12 months? [Record one]

1 Less than $5,000
2 $5,001 - $10,000
3 $10,001 - $15,000
4 $15,001 - $20,000
5 $20,001 - $25,000
6 $25,001 - $30,000
7 $30,001 - $40,000
8 $40,001 - $50,000
9 $50,001 - $60,000
10 $60,001 - $70,000
11 $70,001 - $80,000
12 $80,001 - $100,000
13 $100,001 - $120,000
14 $120,001 - $150,000
15 $150,001 or more
98 Don’t know  99 Refused

ELSI (Economic Living Standard Index)

[Showcard 1.18]
1.18 I’m now going to ask you some questions about things you may or may not have access to in your household. Looking at card 1.18 for the answer, do you have……

If respondent asks: “Does this include a cellphone?”: Access to a telephone in the household is the key concept, for example, if there is a cellphone and no landline then ‘Yes’, but only if cellphone is in the house whenever the respondent is home and they can make a phone call on it.
| (a) Telephone (see note above) |  |  |  |  |
| (b) Washing machine |  |  |  |  |
| (c) Heating available in all main rooms |  |  |  |  |
| (d) A good pair of shoes |  |  |  |  |
| (e) A best outfit for special occasions |  |  |  |  |
| (f) Personal computer |  |  |  |  |
| (g) Home contents insurance |  |  |  |  |
| (h) Enough room for family to stay the night |  |  |  |  |

**[Showcard 1.18]**

1.19 **Still looking at Card 1.18 for the answer, do you do the following activities?**

<table>
<thead>
<tr>
<th></th>
<th>1 Yes</th>
<th>2 No (don’t want it)</th>
<th>3 No (due to the cost)</th>
<th>4 No (other reason)</th>
<th>Refused (R) Don’t know (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Give presents to family and friends on birthdays</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(b) Visit the hairdresser at least once every 3 months</td>
<td></td>
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<tr>
<td>(c) Have holidays away from home every year</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(d) Have a holiday overseas at least once every 3 years</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>(e) Have a night out at least once a fortnight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Have family or friends over for a meal at least once a month</td>
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</tbody>
</table>

**[Showcard 1.20]**

1.20 **Now I’m going to ask you about some things some people do to help keep costs down. Looking at Card 1.20, in the last 12 months, have you done any of these things not at all, a little, or a lot?**

<table>
<thead>
<tr>
<th></th>
<th>1 Not at all</th>
<th>2 A little</th>
<th>3 A lot</th>
<th>Refused (R) Don’t know (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Gone without fresh fruit and vegetables to keep costs down</td>
<td></td>
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<tr>
<td>(b) Continued wearing clothing that was worn out because you couldn’t afford a replacement</td>
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<tr>
<td>(c) Put off buying clothes for as long as possible to help keep down costs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(d) Stayed in bed longer to save on heating costs</td>
<td></td>
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<tr>
<td>(e) Postponed or put off visits to the doctor to help keep down costs</td>
<td></td>
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<tr>
<td>(f) NOT picked up a prescription to help keep down costs</td>
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<tr>
<td>(g) Spent less on hobbies than you would like to help keep down costs</td>
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<tr>
<td>(h) Gone without or cut back on trips to the shops or other local places to help keep down costs</td>
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</tbody>
</table>

The next questions are about your material standard of living – the things that money can buy. Your material standard of living does NOT include your capacity to enjoy life. You should NOT take your health into account for these questions.

**[Showcard 1.21]**

1.21 **Looking at Card 1.21, generally, how would you rate your material standard of living? Would you say that it is high, fairly high, medium, fairly low or low? [Circle one]**
Looking at Card 1.22, generally, how satisfied are you with your material standard of living? Would you say you were very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied or very dissatisfied? [Circle one]

1 Very satisfied
2 Satisfied
3 Neither satisfied nor dissatisfied
4 Dissatisfied
5 Very dissatisfied
98 Don’t know
99 Refused

Looking at Card 1.23, how well does your (and your partner’s combined) total income meet your everyday needs for such things as accommodation, food, clothing and other necessities? Would you say you have not enough money, just enough money, enough money, or more than enough money? [Circle one]

1 Not enough
2 Just enough
3 Enough
4 More than enough
98 Don’t know
99 Refused

By total income we mean all the money respondent has access to for everyday necessities

Home Ownership

Who owns your home? [Circle one]

1 You own or partly own your house or flat (with or without a mortgage)
2 Family members
3 A family trust
4 A private landlord
5 A local authority or city council
6 Housing New Zealand
77 Other [specify] ___________________________
98 Don’t know .R Refused

Medical Insurance

Are you covered by any health or medical insurance scheme? [Circle one]

1 Yes
0 No
98 Don’t know 99 Refused
2. CHRONIC CONDITIONS

The next section of this survey is about chronic health conditions you may have. A chronic condition is a physical or mental illness that has lasted, or is expected to last, for more than six months. The symptoms may come and go or be present all the time.

First, I would like to know about any medications you are taking.

**Current Medication**

2.01 What are your current medications/prescriptions for yourself? Please include all medications such as Inhalers, aerosol, injections, tablets and ‘over the counter medication’ etc.

- Please copy from the packet or bottle the drug name, dose and number taken per day.

<table>
<thead>
<tr>
<th>2.01a Drug Name - Prescription drugs from a Dr</th>
<th>2.01b Dose</th>
<th>2.01c Number/day</th>
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</table>

<table>
<thead>
<tr>
<th>2.01d Drug Name – Non-prescription drugs</th>
<th>2.01e Dose</th>
<th>2.01f Number/day</th>
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<tbody>
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</table>

2.01g Have you had any adverse reactions to drugs? [Circle one]

1 Yes [specify]____________________________________________________

0 No
98 Don’t know
99 Refused
2.02 Have you ever been told by a doctor that you have or have had [Circle all mentioned]

1 Heart disease including:  [Showcard 2.03a]
   (a) Heart attack
   (b) Angina
   (c) Heart failure
   (d) Inadequate pumping of the heart
   (e) Build-up of fluid in the legs or lungs
   (f) Problems with heart rhythm (atrial fibrillation, supraventricular tachycardia (SVT), ventricular tachycardia (VT), ectopic beat)
   (g) Problems with heart valves (leaky or blocked)
   (h) Intermittent claudication (vascular spasm in the legs)
   (i) Clot in the leg (venous thrombosis)
   (j) Other e.g. Left Ventricular Hypertrophy (LVH), thickening of the heart muscle
   Specify: ____________________________________

2 Stroke  [Showcard 2.10a]

3 Diabetes  [Showcard 2.11a]

4 Allergies  [Showcard 2.12a]

5 Asthma  [Showcard 2.13a]

6 Chronic bronchitis or emphysema (COPD)  [Showcard 2.14a]

7 Arthritis (including gout, lupus and psoriatic arthritis)  [Showcard 2.15a]

8 High blood pressure  [Showcard 2.16a]

9 High cholesterol  [Showcard 2.17a]

10 Cancer  [Showcard 2.18a]

If none of the above GO TO 2.19a Page 21
Remember to complete the “ACCESS TO SERVICES” questionnaire for participants who have diagnosed heart disease, diabetes, COPD, high blood pressure or high cholesterol and they have seen their GP about this condition in the last 12 months. If a participant has more than one of these conditions, ask them which has been most significant in the last 12 months and use this condition to answer the access to services questionnaire. You only need to complete one per participant.

**Heart disease**

The first few questions are about heart disease. Please do not include high blood pressure or high blood cholesterol here, as I will ask you about those later.

2.03a **Have you ever been told by a doctor that you have had a heart attack?** [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.04a

2.03b **Have you ever been admitted to hospital with a heart attack?** [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.04a

2.03c **How old were you when you were first admitted to hospital with a heart attack?** [Record age]

_________

98 Don’t know

99 Refused

2.03d **In the past 12 months, have you been admitted to hospital with a heart attack?** [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

2.04a **Have you ever been told by a doctor that you have angina?** (interviewer probe – angina is typically chest pain when you walk or do exercise) [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.05a

2.04b **How old were you when you were told by a doctor that you had angina?** [Record age]

_________

98 Don’t know

99 Refused

2.05a **Have you ever been told by a doctor that you have heart failure?** That is inadequate heart pumping, or a build-up of fluid in the lungs or legs. [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.06
2.05b How old were you when you were told by a doctor that you had heart failure? [Record age]
   If from birth record 0
   [ ] 98 Don’t know
   [ ] 99 Refused

2.06 Have you ever been told by a doctor that you have any other heart disease? Please include problems with heart rhythm (atrial fibrillation, supraventricular tachycardia (SVT), ventricular tachycardia (VT), ectopic beat), heart valves (eg leaky or blocked valve), intermittent claudication (cramping and/or pain in the legs, usually when walking. Sometimes called vascular spasm in the legs), clot in the leg (venous thrombosis) and LVH or thickening of the heart muscle but not high blood pressure or high cholesterol. [Circle one]
   If the respondent has a leaking or blocked heart valve please ask “which valve” and record below.
   [ ] 1 Yes [specify] _________________________________________________________
   [ ] 0 No
   [ ] 98 Don’t know
   [ ] 99 Refused

2.07 Have you been to a GP about your heart disease in the past 12 months?
   [ ] 1 Yes
   [ ] 0 No
   [ ] 98 Don’t know
   [ ] 99 Refused

[Showcard 2.08]
2.08 Looking at Card 2.08, what treatments do you now have for your heart condition(s)?
   [ ] Circle yes or no and, if yes, circle all mentioned
   [ ] Probe “Any others?” until no other treatment mentioned
   [ ] 1 Yes
   [ ] 0 No
   [ ] 98 Don’t know
   [ ] 99 Refused

   1 Medicines, tablets or pills (including spray under the tongue or patches on the skin)
   2 Diet
   3 Exercise
   4 Other [specify] _________________________________________________________

2.09a Have you ever had bypass surgery or angioplasty (sometimes called a stent) for your heart condition(s)? [Circle one]
   [ ] 1 Yes
   [ ] 0 No
   [ ] 98 Don’t know
   [ ] 99 Refused

[Go to 2.10a]

2.09b How old were you when you had bypass surgery or angioplasty? [Record age]
   [ ] 98 Don’t know
   [ ] 99 Refused
Stroke

2.10a Have you ever been told by a doctor that you have had a stroke? Please do not include “mini-stroke” or transient ischaemic attack. [Circle one]

☑ A stroke is a definite event that has left permanent neurological damage (eg lost vision or feeling etc.)

1 Yes
0 No
98 Don’t know
99 Refused

2.10b How old were you when you were first told by a doctor that you had had a stroke? [Record age or circle appropriate answer]

____________________
98 Don’t know
99 Refused

2.10c Have you had a stroke during the past 12 months? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

[Showcard 2.10d]

2.10d What treatments do you now have for your stroke? [Circle yes or no and, if yes, circle all mentioned]

☑ Probe “Any others?” until no other treatment mentioned

1 Yes
0 No
98 Don’t know
99 Refused

1 Medicines, tablets or pills
2 Diet
3 Exercise or rehabilitation (include speech therapy, occupational therapy, physiotherapy)
4 Other [specify] __________________________

Diabetes

2.11a Have you ever been told by a doctor that you have diabetes? <IF RESPONDENT IS FEMALE, ADD…> Please do not include diabetes during pregnancy. [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

2.11b Is that type I or type II?

1 Type I
2 Type II
98 Don’t know
99 Refused
2.11c How old were you when you were first told by a doctor that you had diabetes?  
[Record age or circle appropriate answer]  
[D] If from birth record 0  
98 Don’t know 99 Refused

2.11d Have you been to a GP about your diabetes in the past 12 months?  
1 Yes  0 No  
98 Don’t know 99 Refused

2.11e What treatments do you now have for your diabetes?  
[Circle yes or no and, if yes, circle all mentioned]  
[D] Probe “Any others?” until no other treatment mentioned  
1 Yes  0 No  
98 Don’t know 99 Refused

1 Medicines, injections, tablets or pills  
2 Diet  
3 Exercise  
4 Other [specify]_________________________

2.11f In the past 12 months have you had a “Get Checked” free annual diabetes check with your GP or nurse? [Circle one]  
1 Yes  0 No  
98 Don’t know 99 Refused

Allergies

2.12a Have you ever been told by a doctor that you have allergies? [Circle one]  
1 Yes  0 No  
98 Don’t know 99 Refused

[Showcard 2.12b]  
2.12b Looking at Card 2.12b, what substances are you allergic to? [Multiple answers allowed]  
1 Pollen  
2 Mould  
3 Dust mites  
4 Animals  
5 Chemicals  
6 Shellfish  
7 Peanuts  
8 Gluten  
9 Fish  
10 Eggs  
11 Not identified  
12 Other [specify]__________________________________
2.12c In the last 12 months, have you had problems with allergies? [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.12e

[Showcard 2.12b]

2.12d Looking again at card 1.12b, which allergies have affected you in the last 12 months? (If respondent answers more than one kind, say: Which affects you most?) [Circle all allergies mentioned and underline the ‘most’]

1 Pollen  
2 Mould  
3 Dust mites  
4 Animals  
5 Chemicals  
6 Shellfish  
7 Peanuts  
8 Gluten  
9 Fish  
10 Eggs  
11 Not identified  
12 Other [specify]____________________________

98 Don’t know  
99 Refused

[Showcard 2.12e]

2.12e What treatments do you now have for allergies?  
[Circle yes or no and, if yes, circle all mentioned]  
Probe “Any others?” until no other treatment mentioned

1 Yes  
0 No  
98 Don’t know  
99 Refused

1 Medicines, tablets or pills  
2 Avoidance  
3 Nasal steroids  
4 Immunotherapy  
5 Other [specify]____________________________

Asthma

2.13a Have you ever been told by a doctor that you have asthma? [Circle one]

1 Yes  
0 No  
98 Don’t know  
99 Refused

GO TO 2.14a

2.13b How old were you when you were first told by a doctor that you had asthma?  
[Record age]

If from birth record 0

98 Don’t know
In the last 12 months, how many asthma attacks have you had? [Circle one]

1 None
2 1-5
3 6-10
4 11-15
5 More than 15
98 Don’t know
99 Refused

In the last 12 months, have you been woken by an attack or shortness of breath at any time? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

What treatments do you now have for asthma? [Circle yes or no and, if yes, circle all mentioned]

☑ Probe “Any others?” until no other treatment mentioned

1 Yes
0 No
98 Don’t know
99 Refused

Inhalers, aerosol, or tablets
2 Other [specify]____________________________

COPD (Chronic obstructive pulmonary disease)

Have you ever been told by a doctor that you have chronic bronchitis or emphysema? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

How old were you when you were told by a doctor that you had this condition? [Record age]

________________________
98 Don’t know
99 Refused

Have you been to a GP about your chronic bronchitis or emphysema in the past 12 months?

1 Yes
0 No
98 Don’t know
99 Refused
What treatments do you now have for this condition?

[Circle yes or no and, if yes, circle all mentioned]

Probe “Any others?” until no other treatment mentioned

1 Yes
0 No
98 Don’t know
99 Refused

1 Inhalers, aerosol, or tablets
2 Physiotherapy
3 Oxygen
4 Other [specify]____________________________

Arthritis

Have you ever been told by a doctor you have arthritis? Please include gout, lupus and psoriatic arthritis. [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

What kind of arthritis was that? One answer only (If respondent answers more than one kind, say: Which affects you most?) [Circle one only]

1 Rheumatoid
2 Osteoarthritis
77 Other [specify]____________________________
98 Don’t know
99 Refused

Looking at Card 2.15c, which joints were affected first? [Circle one]

1 Small joints like fingers or hands
2 Large joints like knees or hips
98 Don’t know
99 Refused

How old were you when you were first told by a doctor that you had arthritis?

[Record age] If from birth record 0

98 Don’t know
99 Refused

What treatments do you now have for arthritis?

[Circle yes or no and, if yes, circle all mentioned]

Probe “Any others?” until no other treatment mentioned

1 Yes
0 No
98 Don’t know
99 Refused
2.15f Have you ever had an operation or surgery because of your arthritis. Please don’t include joint replacement surgery? [Circle one]

1 Yes
0 No
98 Don’t know 99 Refused

2.15g Have you ever had joint replacement surgery because of your arthritis? [Circle one]

0 No
1 Hip
2 Knee
77 Other [specify]____________________________
98 Don’t know
99 Refused

High Blood Pressure

2.16a Have you ever been told by a doctor that you have high blood pressure? [Circle one]

1 Yes
0 No
98 Don’t know 99 Refused

2.16b How old were you when you were told that you have high blood pressure? [Record in years]

98 Don’t know
99 Refused

2.16c Have you been to a GP about your high blood pressure in the last past 12 months?

1 Yes
0 No
98 Don’t know 99 Refused

2.16d What treatments do you now have for your high blood pressure?

[Circle yes or no and, if yes, circle all mentioned]

1 Yes
0 No
98 Don’t know 99 Refused

1 Medicines, tablets or pills
2 Diet
3 Exercise
4 Other ______________________________
Cholesterol

2.17a Have you ever been told by a doctor that you have high cholesterol levels in your blood? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

GO TO 2.18a

2.17b How old were you when you were told that you have high cholesterol levels in your blood? [Record in years]

_______________
98 Don’t know
99 Refused

2.17c Have you been to a GP about your high cholesterol in the last past 12 months?

1 Yes
0 No
98 Don’t know
99 Refused

GO TO THE QUESTIONNAIRE ABOUT ACCESS TO SERVICES

[Showcard 2.16d]
2.17d What treatments do you now have for high cholesterol? [Circle yes or no and, if yes, circle all mentioned]

1 Yes
0 No
98 Don’t know
99 Refused

1 Medicines, tablets or pills
2 Diet
3 Exercise
4 Other __________________________________________
Cancer

2.18a Have you ever been told by a doctor that you have cancer? [Circle one]

1 Yes
2 No
98 Don’t know
99 Refused

[Showcard 2.18b]

2.18b Now looking at Showcard 2.18b what kind or kinds of cancer were you diagnosed with? [Tick all mentioned in 2.18b column below] ² For each Cancer mentioned, ask 2.18c.

2.18c How old were you when you were first told by a doctor that you had this kind of cancer? [Record age in 2.18c column below]

<table>
<thead>
<tr>
<th>Kind of cancer</th>
<th>2.18b Tick if yes</th>
<th>2.18c Age diagnosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lung</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Bowel/rectal/colon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Cervical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Breast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Prostate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Melanoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Skin cancer (not melanoma)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Bladder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Bone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Brain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Gallbladder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Hodgkin’s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Kidney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Leukaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Lip, mouth, pharynx, throat (oesophageal, laryngeal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Liver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Ovarian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Non-Hodgkin’s lymphoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 Stomach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Testicular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 Pancreatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 Thyroid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23a Other [specify]</td>
<td>[Record up to two ‘Other’]</td>
<td></td>
</tr>
<tr>
<td>23b Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 Don’t know</td>
<td>99 Refused</td>
<td></td>
</tr>
</tbody>
</table>

[Showcard 2.18d]

2.18d What treatments do you now have for cancer? [Circle yes or no and, if yes, circle all mentioned]

² Probe “Any others?” until no other treatment mentioned

1 Yes
0 No
98 Don’t know
99 Refused
Other long-term conditions

[Showcard 2.19a]
2.19a Have you ever been told by a doctor that you have any other long term condition that we have not discussed already, such as those listed on Card 2.19a? Please include any condition that has lasted, or is expected to last, six months or more, and remember, a long-term condition may come and go or be present all the time. [Multiple answers allowed]

For each long-term condition mentioned in 2.19a ask 2.19b.

2.19b How old were you when you were first told by a doctor that you had [insert condition]? [Record age in 2.19b column below]

<table>
<thead>
<tr>
<th>Other physical conditions</th>
<th>2.19a Tick if yes</th>
<th>2.19b Age diagnosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 None</td>
<td>GO TO 2.20a</td>
<td></td>
</tr>
<tr>
<td>1 Epilepsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Migraine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Stomach ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Irritable bowel syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Gall bladder problems/gall stones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Endometriosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Prostate problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Thyroid conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Eczema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Inflammatory Bowel Disease (Ulcerative Colitis, Crohn’s etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Chronic Kidney Disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12a Other long term physical health conditions [specify] [Record up to six ‘Other’]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12e</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 Don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>99 Refused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.20a Have you ever been knocked out or knocked unconscious?

1 Yes
0 No
98 Don’t know
99 Refused
GO TO 2.21a
2.20b Did you have to stay overnight or longer for observation in hospital because of being knocked out?

1 Yes
0 No
98 Don’t know
99 Refused

Infections and immunisations

[Showcard 2.21a]
2.21a Have you ever been told by a doctor that you have any of the following conditions. These conditions may come and go or be present all the time. [Multiple answers allowed]

For each condition mentioned in 2.21a ask 2.21b.

2.21b How old were you when you were first told by a doctor that you had [insert condition]? [Record age in 2.21b column below]

<table>
<thead>
<tr>
<th>Infection condition</th>
<th>2.21a Tick if yes</th>
<th>2.21b Age diagnosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 None <strong>GO TO 2.22a</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Chicken Pox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Shingles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Rheumatic fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Pneumonia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Treatment for urinary tract infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Hepatitis B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Hepatitis C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 HIV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Septicaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Cellulitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 Don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>99 Refused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Showcard 2.22a]
2.22a Have you ever had any of the following immunisations. [Multiple answers allowed]

For each condition mentioned in 2.22a ask 2.22b.

2.22b How old were you when you had [insert immunisation]? [Record age of most recent immunisation in 2.22b column below]

<table>
<thead>
<tr>
<th>Immunisation</th>
<th>2.22a Tick if yes</th>
<th>2.22b Age of most recent immunisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 None <strong>GO TO 2.23</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Influenza (flu)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Hepatitis B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Pneumococcal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 Don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>99 Refused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
[Showcard 2.23]

2.23 Looking at show card 2.23, in the last 12 months have you had either of these conditions? [Circle one]

1 Acute gastroenteritis (vomiting/diarrhoea)
2 Influenza (flu)
3 Both
4 Neither
98 Don’t know
99 Refused

Digestive Disease

[Showcard 2.24]

2.24 In the last 3 months, how often have you noticed blood in your stools?

1 Never or rarely
2 Sometimes (about 25% of the time)
3 Often (about 50% of the time)
4 Most of the time (about 75% of the time)
5 Always (100% of the time)
98 Don’t know
99 Refused

[Showcard 2.24]

2.25 In the last 3 months, how often have you noticed black stools (not due to medication such as iron supplements or charcoal tablets)?

1 Never or rarely
2 Sometimes (about 25% of the time)
3 Often (about 50% of the time)
4 Most of the time (about 75% of the time)
5 Always (100% of the time)
98 Don’t know
99 Refused

[Showcard 2.24]

2.26 In the last 3 months, how often have you vomited blood?

1 Never or rarely
2 Sometimes (about 25% of the time)
3 Often (about 50% of the time)
4 Most of the time (about 75% of the time)
5 Always (100% of the time)
98 Don’t know
99 Refused

2.27 In the last 5 years, have you been told by your doctor that you are anaemic (a low blood count or low iron)? (If female, not due to your menstrual period.)

1 Yes
0 No
98 Don’t know
99 Refused

[Showcard 2.24]

2.28 In the last 3 months, have you unintentionally lost over 4.5 kilograms (10 pounds)?

1 Yes
0 No
98 Don’t know 99 Refused
2.29 Have you had a recent major change in bowel movements (change in frequency or consistency)?

1 Yes
0 No
98 Don’t know
99 Refused

Sleep Patterns

[Showcard 2.30]
2.30 To what degree do you feel you are a “morning person” or a “night person”?

1 Definitely a morning person (energetic in the morning and tired at night)
2 To some degree a morning person
3 To some degree a night person
4 Definitely a night person (tired in the morning and energetic at night)
98 Don’t know
99 Refused

The next three questions ask about events outside of your control that may lead to an interruption of your sleep.

[Showcard 2.31a]
2.31a Looking at card 2.31a in the last 12 months has your sleep been regularly interrupted by any of these events, so that you were awake for at least 20 minutes? [Circle all mentioned]

0 None
1 Night shift work
2 Traffic noise from nearby roadways
3 Crying babies
4 Barking dogs
5 Snoring partner
6 An undiagnosed health problem [specify] 
7 Job requirements, e.g., being “on call”
8 Noisy neighbours
9 Other [specify] 
98 Don’t know
99 Refused

2.31b For how long IN TOTAL has your sleep been interrupted by these events? [record months and years]

Years _______ Months _______

98 Don’t know
99 Refused

[Showcard 2.32]
2.32 In the last 6 months, have you had any problems falling asleep?

1 Never
2 Seldom
3 Sometimes
4 Usually
5 Always
98 Don’t know
99 Refused
[Showcard 2.32]
2.33 In the last 6 months, have you felt sleepy during work or freetime?

1 Never
2 Seldom
3 Sometimes
4 Usually
5 Always
98 Don’t know 99 Refused

[Showcard 2.34]
2.34 In the last 6 months, how do you think you have slept on the whole?

1 Very good
2 Pretty good
3 Neither good nor bad
4 Pretty bad
5 Very bad
98 Don’t know
99 Refused

[Showcard 2.35]
2.35 In the last 6 months, have you been waking up too early and not being able to sleep again?

1 Never
2 Seldom
3 Sometimes
4 Usually
5 Always
98 Don’t know
99 Refused

[Showcard 2.35]
2.36 In the last 6 months, have you had a feeling of not having had enough sleep on wakening?

1 Never
2 Seldom
3 Sometimes
4 Usually
5 Always
98 Don’t know
99 Refused

[Showcard 2.35]
2.37a In the last 6 months, have you had disturbed or uneasy sleep (not due to environmental factors)?

1 Never
2 Seldom
3 Sometimes
4 Usually
5 Always
98 Don’t know 99 Refused

2.37b For how long in the last 6 months have you had disturbed sleep? [Record time in months]

Months
98 Don’t know 99 Refused
3. HEALTH SERVICE UTILISATION

3.01 **In the last 12 months, have you seen your GP about your own health?**
   1 Yes
   0 No
   98 Don’t know
   99 Refused

3.02 **How many times have you seen your GP about your own health in the past 12 months?**
   [Record number of times]

3.03 **Over the last 12 months have you had carried out any of the following shown on Card 3.03?**
   [Circle all mentioned]

   0 None of the below
   1 Weight measurement
   2 Blood sample
   3 Urine sample
   4 Blood pressure measurement
   5 Cholesterol test
   6 Diabetes test
   98 Don’t know
   99 Refused

**Medical Specialists**

The next few questions are about medical specialists, such as those listed on Card 3.04. By medical specialist I mean the kind of doctor that people go to for a particular health condition, problem or service, not a GP. You may have seen the medical specialist as an outpatient in a hospital or at their private rooms or clinic. Please **do not** include medical specialists you may have seen as an inpatient at a **public** hospital.

[Showcard 3.04]

3.04 **In the last twelve months, have you seen any medical specialists listed on Card 3.04 about your own health?** [Circle and/or record all mentioned]
   1 Yes
   0 No
   98 Don’t know
   99 Refused

3.05 **How many times have you seen each of those specialists in the past 12 months?** [Record number of times in 3.05 column below]
<table>
<thead>
<tr>
<th>3.04 Medical specialists</th>
<th>3.04 Tick if yes</th>
<th>3.05 Number of times seen in past 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 General physician (not a General Practitioner)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Dermatologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Neurologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Cardiologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Haematologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Endocrinologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Respiratory physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Gastroenterologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Oncologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 General surgeon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Orthopaedic surgeon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Ophthalmologist (Eye specialist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Ear, nose and throat specialist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Urologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Obstetrician or Gynaecologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Geriatrician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Psychiatrist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Infectious disease physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 Immunologist (Allergy specialist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Other [specify]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Showcard 3.06]

3.06 Looking at Card 3.06, the last time you saw a medical specialist about your own health, where was this? Please do not include inpatient visits to a public hospital. [Circle one only]

1 Public hospital as an outpatient
2 Private hospital
3 Specialist’s private rooms or clinic
4 Other [please specify] ________________________________
98 Don’t know
99 Refused

[Showcard 3.07]

3.07 Thinking about health care generally do any of these things stop you from getting health care?

0 None
1 Costs of Doctor visits
2 Costs of prescriptions
3 Transport to Health Services
4 Not being able to get to an appointment when I need to
5 Family commitments
6 The service provided by Health Services
7 I have had a bad experience(s) and do not wish to go back
8 Other [please specify] ________________________________
98 Don’t know
99 Refused

[Showcard 3.08]
3.08 **What helps you to get health care/services?**

0 None  
1 Whanau/Family  
2 Relationship with Doctor  
3 Relationship with Pharmacist  
4 Close proximity of services  
5 Maori Health Providers  
6 Getting good service  
7 Health promotion material  
8 Other [please specify]  
98 Don’t know  
99 Refused

**Complementary or alternative health care workers**

The next set of questions are about complementary or alternative health care workers. This includes Māori or Pacific traditional healers, and traditional healers from other cultures. **Please do not include any health care worker that we have already talked about.**

[Showcard 3.09]

3.09 **In the last twelve months, have you seen any of the complementary or alternative health care workers on Card 3.09 about your own health?** Please mention those you have seen.

1 Yes  
0 No  
98 Don’t know  
99 Refused

3.10 **How many times have you seen each of those health care workers in the past 12 months?** [Record in 3.10 column below]

<table>
<thead>
<tr>
<th>3.09 Complementary or Alternative health care workers</th>
<th>3.09 Tick if yes</th>
<th>3.10 Number of times seen in past 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Massage therapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Homeopath or naturopath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Acupuncturist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Traditional Chinese medicine practitioner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Herbalist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Aromatherapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Spiritual healer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Māori traditional healer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Pacific traditional healer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10a Other [specify] [Record up to two ‘Other’] Please do not include Chiropractor and Osteopath.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10b Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Showcard 3.11]
3.11 Now please look at Card 3.11, the last time you saw a complementary or alternative health care worker about your own health, what was it for? [Circle all mentioned]

1 A long-term illness, chronic condition or disability
2 A short-term illness or temporary condition
3 An injury or poisoning
4 Mental or emotional health
5 Physical well-being / to feel good
6 Contraception or family planning
7 Something else [please specify] _________________________________
98 Don’t know
99 Refused

3.12 The last time you saw an alternative or complementary health care worker, did you also see a GP about the same condition? [Circle one]

1 Yes
2 No
98 Don’t know
99 Refused

Secondary Health Care Services (Hospital Use)

The last few questions in this section are about your use of hospitals over the past 12 months. I’ll begin by asking you about public hospitals, that’s where you don’t have to pay, and then move on to private hospitals, where you, your insurance, or a government agency like ACC would pay.

3.13a In the last 12 months, have you yourself used a service at, or been admitted to, a public hospital as a patient? This could have been for a physical or a mental health condition. [Circle one]

1 Yes
2 No
98 Don’t know
99 Refused

[Showcard 3.13b]

3.13b Looking at Card 3.13b, in the last 12 months, at a public hospital, which of the following happened? [Circle all mentioned]

1 You yourself used Emergency Department
2 You yourself used an outpatients department, that is, a ward or clinic or specialist where you went as an outpatient
3 You were admitted for day treatment, that is, day surgery or medical care for which you had to stay in hospital for more than 3 hours but not overnight
4 You were admitted as an inpatient, that is, stayed as a patient overnight
5 Other
98 Don’t know
99 Refused

3.14a In the last 12 months, have you yourself used a service at, or been admitted to, a private hospital? [Circle one]

1 Yes
2 No
98 Don’t know
99 Refused

[Showcard 3.14b]
3.14b In the last 12 months, at a private hospital, which of the following happened? [Read out and circle all mentioned]

1 You were admitted as an inpatient, that is, stayed as a patient overnight
2 You were admitted for day treatment, that is, day surgery or medical care for which you had to stay in hospital for more than 3 hours but not overnight
3 Other
98 Don’t know
99 Refused
4. RISK AND PROTECTIVE FACTORS

The next section is about medical, biological and lifestyle factors that can influence your health.

Screening programmes

Female respondents to be asked following questions

MALE RESPONDENTS GO TO 4.04

The next few questions are about your periods and two cancer screening programmes run by the Ministry of Health: the National Cervical Screening programme and BreastScreen Aotearoa.

4.01a In the last 12 months, have your periods been. [Circle one]

1 Regular
2 Irregular
3 None
98 Don’t know
99 Refused

GO TO 4.02

4.01b How old were you when your periods stopped? [Record in years]

98 Don’t know
99 Refused

4.01c Why did your periods stop?

1 Natural menopause
2 Surgical (hysterectomy - your uterus or womb is removed)

3 Other [specify] ________________________________

98 Don’t know
99 Refused

4.02 In the last 2 years, have you had a mammogram? A mammogram is a breast x-ray that helps to check for early signs of breast cancer. [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

4.03a In the last 3 years, have you had a cervical smear to check for cervical cancer? A cervical smear is a screening test where cells are taken from the cervix. It is not a swab or check for sexually transmitted infections. [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

GO TO 4.05a

4.03b How about in the last 5 years, have you had a cervical smear? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

GO TO 4.05a

Prostate cancer testing
Male respondents only

The next question is about testing for prostate cancer.

4.04 In the past 12 months, have you had a PSA (prostate-specific antigen) blood test for prostate cancer?

1 Yes
2 No
98 Don’t know
99 Refused

Environmental Conditions

The next few questions are about environmental conditions. By environmental conditions we mean factors in your surroundings that may influence your health and well-being.

[Showcard 4.05a]
4.05a Looking at Card 4.05a, have you ever worked or lived in an area in which you were exposed to environmental conditions such as these mentioned?

1 Yes
2 No
98 Don’t know
99 Refused

[Showcard 4.05b]
4.05b Looking at Card 4.05a, which environmental condition or conditions did you experience for 6 months or more and how many years were you exposed for? [circle all mentioned]

<table>
<thead>
<tr>
<th>Environmental Condition</th>
<th>4.05a Tick if yes</th>
<th>4.05b How many years exposed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Outdoor air pollution (e.g., exhaust, pollutants, particulate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Indoor air pollution (e.g., tobacco, mould, dust)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Water pollution (e.g., contaminated drinking water, PCBs, dioxin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Hazardous waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Heavy metals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Pesticides, insecticides, herbicides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Odours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Noise pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Radiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Pollution of rivers and ocean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Other [specify]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98 Don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>99 Refused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tobacco
Now, some questions on smoking tobacco.

4.06a Have you ever smoked a total of more than 100 cigarettes in your whole life? [Circle one]

1 Yes
0 No
98 Don’t know
99 Refused

GO TO 4.07

4.06b How old were you when you started smoking regularly? [Record in years]

98 Don’t know
99 Refused

4.06c How often do you now smoke? [Circle one only]

Read answer options. If more than one frequency given, code the highest one.

1 You don’t smoke now
2 Less often than once a month
3 At least once a month
4 At least once a week
5 At least once a day
98 Don’t know
99 Refused

GO TO 4.06e

4.06d How old were you when you stopped smoking regularly (daily)? [Record in years]

98 Don’t know
99 Refused

4.06e From when you started smoking regularly to now/when you stopped, did you ever give up smoking for 6 months or more?

1 Yes, once
2 Yes, twice
3 Yes, three times or more
4 No
98 Don’t know
99 Refused

GO TO 4.06g

4.06f In total, taking into consideration all the times you stopped, how long did you give up smoking for? [Record in years]

Round up (or down) to the nearest year.

98 Don’t know
99 Refused

[Showcard 4.06g]

4.06g Which of these products do you/have you smoke/d the most? [Circle one]

1 Tailor-made cigarettes (that is, manufactured cigarettes in a packet)
2 Roll your owns using loose tobacco
3 Both tailor-mades and roll your owns
4 Pipes
5 Cigars
98 Don’t know/unsure
99 Refused
4.06b On average, over all your years of smoking, how many cigarettes do/did you smoke a day? [Circle one]

If respondent is unable to suggest an average, ask for the typical number of cigarettes smoked in a week and divide by 7.

1  Less than 1 per day
2  1-5 per day
3  6-10 per day
4  11-15 per day
5  16-20 per day
6  21-25 per day
7  26-30 per day
8  31 or more a day
98  Don’t know/unsure
99  Refused

[Showcard 4.06i]

4.06i Are you seriously considering quitting within the next 6 months? Please answer from Card 4.06i. [Circle one only] IF not applicable circle here: N/A

1  No, I have no intention of quitting
2  Yes, I am thinking of quitting
3  Yes, I am thinking of quitting within the next 30 days
4  Yes, I have managed to stop smoking for at least a day now
98  Don’t know/unsure
99  Refused

Alcohol

I will now ask you some questions about your use of alcoholic drinks. Many New Zealanders enjoy alcohol. However, sometimes it can affect our health.

4.07a Have you had a drink containing alcohol in the last year? [Circle one]

1  Yes
2  No
98  Don’t know
99  Refused

4.07b How often do you have a drink containing alcohol? [Circle one]

Don’t prompt answer. Wait and code

1  1 Monthly or less
2  2 Up to 4 times a month
3  3 Up to 3 times a week
4  4 4 or more times a week
98  Don’t know
99  Refused

4.07c How many drinks containing alcohol do you have on a typical day when you are drinking? [Circle one]

Take average and round to nearest whole number if necessary e.g. if respondent says 4 or 5, average is 4.5, round to nearest whole number = 5, that is code 3

0  1 1 or 2
1  2 3 or 4
2  3 5 or 6
3  4 7 to 9
4  5 10 or more
98  Don’t know
99  Refused

[Showcard 4.07d]
For the next series of questions please refer to Card 4.07d.

4.07d Looking at Card 4.07d, how often do you have six or more drinks on one occasion? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07d]

4.07e How often during the last year have you found that you were not able to stop drinking once you had started? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07d]

4.07f How often during the last year have you failed to do what was normally expected from you because of drinking? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07d]

4.07g How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07d]

4.07h How often during the last year have you had a feeling of guilt or remorse after drinking? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07d]
4.07i How often during the last year have you been unable to remember what happened the night before because you had been drinking? [Circle one]

0 1 Never
1 2 Less than monthly
2 3 Monthly
3 4 Weekly
4 5 Daily or almost daily
98 Don’t know
99 Refused

[Showcard 4.07j]

4.07j Now please look at card 4.07j, have you or someone else been injured as a result of your drinking? [Circle one]

2 1 Yes, but not in the last year
4 2 Yes, during the last year
0 3 No
98 Don’t know
99 Refused

[Showcard 4.07j]

4.07k Again referring to card 4.07j, has a relative or friend, or a doctor or other health worker, been concerned about your drinking or suggested you cut down? [Circle one]

2 1 Yes, but not in the last year
4 2 Yes, during the last year
0 3 No
98 Don’t know
99 Refused

Total Audit Score:______

THIS CONCLUDES MODULE 2

Interviewer observations
please comment here if, for example, the respondent had language or cognitive difficulties or if they had assistance from a friend or family member.
Appendix D – Mini-International Neuropsychiatric Interview
(depression)

CHALICE
Canterbury Health, Ageing and Lifecourse Study

Module 5 Interview

A. MAJOR DEPRESSIVE EPISODE (CURRENT)

(\ MEANS: GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

A.1 Have you been consistently depressed or down, most of the day, nearly every day, for the past two weeks?  
0 1

A.2 In the past two weeks, have you been less interested in most things or less able to enjoy the things you used to enjoy most of the time?  
0 1

\ IS A1 OR A2 CODED YES?

0 1

A.3 Over the past two weeks, when you felt depressed or uninterested:

a) Was your appetite decreased or increased nearly every day? Did your weight decrease or increase without trying intentionally (i.e., by ±5% of body weight or ±8 lbs. or ±3.5 kgs., for a 160lb./70kg. Person in a month)?  
IF YES TO EITHER, CODE YES
0 1
b) Did you have trouble sleeping nearly every night (difficulty falling asleep, waking up in the middle of the night, early morning wakening or sleeping excessively)?
0 1

c) Did you talk or move more slowly than normal or were your fidgety, restless or having trouble sitting still almost every day?
0 1

d) Did you feel tired or without energy almost every day?
0 1

e) Did you feel worthless or guilty almost every day?
0 1

f) Did you have difficulty concentrating or making decisions almost every day?
0 1

g) Did you repeatedly consider hurting yourself, feel suicidal, or wish that you were dead?
0 1

ARE 3 OR MORE A3 ANSWERS CODED 1? (OR 4 A3 ANSWERS IF A1 OR A2 ARE CODED 0)?

IF PATIENT HAS CURRENT MAJOR DEPRESSIVE EPISODE THEN LIFETIME MAJOR DEPRESSIVE EPISODE (ON PAGE 6) MUST BE CODED 1.

CHECK FOR THE WORST EPISODE ON PAGE 6 (LIFETIME MAJOR DEPRESSION) AND CODE ACCORDINGLY.
Appendix E – How you eat and what you eat (breakfast frequency)

Part 2: How you eat and what you eat

1. How often do you usually have breakfast (more than a glass of milk or fruit juice)? (Please mark one box).
   - a. I never have breakfast [ ]
   - b. 1 to 3 days a week [ ]
   - c. 4 to 6 days a week [ ]
   - d. Every day [ ]

2. How often do you usually have lunch (more than a drink or snack)? (Please mark one box).
   - a. I never have lunch [ ]
   - b. 1 to 3 days a week [ ]
   - c. 4 to 6 days a week [ ]
   - d. Every day [ ]

3. For your main meal in the evening how often do you usually eat? (Please mark one box on each line).
   - a. At a restaurant/cafe [ ]
   - b. Takeaway food [ ]
   - c. ready meals from a deli or supermarket (fresh or frozen) [ ]
   - d. food that is prepared and cooked at home [ ]

4. When you drink between meals what do you usually drink? (Please mark all boxes that apply).
   - a. Sweetened drinks (e.g. cola, fruit juice, fruit drinks, cordials) [ ]
   - b. Sugar free drinks (e.g. diet cola, sugar free cordials and fruit drinks) [ ]
   - c. Milky drinks (e.g milk shake, hot chocolate, milo, ovaltine, flavoured milk) [ ]
   - d. Water (tap, bottled, still or sparkling) [ ]
   - e. Tea or coffee [ ]