

Te Rau Hinengaro: The New Zealand Mental Health Survey

Chapter 12: Methods

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12.1 Background

Te Rau Hinengaro: The New Zealand Mental Health Survey was initiated by the Mental Health Research and Development Strategy Steering Committee. The policy reasons for such a study and the history of such studies in New Zealand and elsewhere are described in chapter 1. Chapters 9 and 10 outline reasons for particular concern about the mental health of Māori and Pacific peoples. These concerns arose from routinely collected data on the use of mental health services. Such data cannot provide evidence on community prevalence or unmet need for treatment. Therefore, a community survey was required. The consequent focus on ethnicity affected the design of the survey, the conduct of the survey, the membership of the research team, the support available to the research team, and the structure of this report.

The design was set up to provide adequately precise estimates for Māori and Pacific people. Oversampling was used to double the number of Māori and quadruple the number of Pacific people.

As described in chapter 9, after initial consultation with Māori mental health workers and others, Māori had three levels of participation and input: in the research team, through the Kaitiaki Group and as participants. To encourage participation by Māori, numerous promotional activities were arranged. Māori print, radio and television media were contacted, which led to several interviews to enlist Māori participation and to promote the study within Māori communities. Profiles and photos of the Māori research team were also given to potential participants as additional information.

Similarly, a Pacific research team was set up within the main research team for the survey, with a Pacific reference group to provide guidance. Promotional activities aimed specifically at Pacific communities were also carried out.

Consumer participation and input occurred throughout the survey. Jim Burdett of Mind and Body was appointed to the Management Group to provide advice and comments from a consumer perspective. Representatives of consumer groups were present at a major meeting in 2004 to plan this report, and others were present at the first major meeting to present key preliminary findings. In addition a draft report was sent to Lina Samu for comment, as the chairs of regional consumer networks had nominated her to read it on their behalf.

12.2 Objectives

The four main objectives of Te Rau Hinengaro: The New Zealand Mental Health Survey (see 1.5) were, for the total New Zealand, Māori and Pacific populations living in New Zealand, to:

- describe the one-month, 12-month and lifetime prevalence rates of major mental disorders among those aged 16 and over living in private households, overall and by sociodemographic correlates
- describe patterns of and barriers to health service use for people with mental disorder
- describe the level of disability associated with mental disorder
- provide baseline data and calibrate brief instruments measuring mental disorders and psychological distress to inform the use of these instruments in future national health surveys.

12.3 Ethical approval

The Auckland Y Ethics Committee was the lead ethics committee for this national survey. Ethics review and approval was obtained from all 14 regional ethics committees that considered health research proposals in New Zealand at that time.

All households and participants received a small brochure about the study and those who requested it were provided with a more extensive information booklet, both approved by the Ethics Committees to ensure that adequate information was provided and that access to clinical backup was in place.

The brochure given to everyone listed under the heading ‘Further enquiries’ the National Research Bureau telephone number, the Mental Health Research and Development website, and health and disability advocates throughout the country.

Under the heading ‘If I need to talk or get support’ the brochure contained the following section.

If you feel after you’ve done the survey that you need support or help with your thoughts or feelings, your call will be welcomed by professional health workers at this number 0800... There is no toll cost and no cost for the help, and you can call at any time of night or day.

You may already have a service or person you talk to and feel confident with. For example, a Helpline, your general practitioner, a counsellor or a friend. If you prefer to call such a person instead, feel free to do so.

The 0800 number was answered by a triage service that could refer acute cases to appropriate services nearby. A psychiatrist from the research team was also available on call. A clinical psychologist from the research team also responded to some participants who made contact.

Section 12 of the information booklet contained a list of regional contacts for groups for support, information and advocacy for people with mental illness. It also provided contacts for family, whānau and friends involved with or caring about someone with a mental illness.

12.4 The interview

The interview used in Te Rau Hinengaro was based on version 15 of the World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) (<http://www.hcp.med.harvard.edu/wmhcid/>). This has been referred to as the WMH-CIDI (Kessler and Ustun 2004), but version 20 has now become the official WHO CIDI 3.0.

Large-scale epidemiological studies cannot use mental health professionals to carry out all interviews because of the expense and the lack of such professionals for this work. One solution has been to develop fully structured psychiatric diagnostic interviews that can be administered by trained lay interviewers. The first such interview was the Diagnostic Interview Schedule (DIS) (Robins et al 1981), which was developed for the Epidemiologic Catchment Area Study (ECA) (see 1.7.1) in the United States (US) (Robins and Regier 1991) to produce diagnoses based on the definitions and criteria of the then current American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* version three (DSM-III) (see 1.10.1).

Other structured interviews were developed subsequently. The most widely used has been the WHO CIDI (Robins et al 1988), which is called a composite interview because it extended the DIS so that diagnoses could be produced according to both DSM and WHO International Classification of Disease (ICD) definitions and criteria.

The CIDI 3.0 is a revised and expanded version of the 1990 WHO CIDI (Kessler and Ustun 2004). One important revision has been the introduction of questions for each disorder on interference with life (see 12.12.2), which enables participants to be categorised into levels of severity (see 12.12.3). Previous interview schedules were criticised for detecting disorders that met diagnostic criteria, but which, for many people, had little impact on their lives. Hence, it was argued, these interviews produced high prevalences and low proportions accessing services. Also, since no country could

afford specialist mental healthcare for about 20% of its population each year, it was important to ascertain what proportion of those with serious or moderate disorder accessed services.

The full CIDI 3.0 has an introductory screening and lifetime review section. There are 22 diagnostic sections: mood (two sections); anxiety disorders (seven sections); substance use disorders (two sections); childhood disorders (four sections); and other disorders (seven sections). In addition there are four sections on functioning and physical comorbidity, two on treatment and six on sociodemographics. There are sections everyone enters or is potentially screened into and then there are sections in the long form of the interview that are administered to only a subset of participants. The interview can be viewed at <http://www.hcp.med.harvard.edu/wmhcid/>, but cannot be used without training. Completion of training ensures the interview is administered correctly, and is required before access to diagnostic algorithms is provided. In general population samples the complete CIDI 3.0 takes about two hours to administer, with widely varying times depending on how many diagnostic sections a participant is screened into (Kessler and Ustun 2004). Even within a section participants are screened out as soon as it is clear they could not reach criteria for a diagnosis. This enables a large number of diagnoses to be covered.

As the interview is complex and lengthy for some participants, in some WMH Survey Initiative countries (see 1.7.5), participants were paid for completing the interview. This option was not available in New Zealand. To reduce the burden on participants, the interview was shortened by deleting childhood disorders and several other disorders that were not part of the core set of disorders from the CIDI 3.0. Trials of various versions were carried out in the pilot study for the New Zealand survey (Oakley Browne et al 2000). The remaining sections are shown in Figure 12.1. Two sections for Māori were added, one on Māori health services and one on additional demographics and cultural knowledge and participation (see 12.4.3).

Diagnostic sections from the CIDI 3.0 were used with little modification apart from minor wording changes such as ‘insects’ in place of ‘bugs’. Non-trivial changes were made in only two diagnostic sections.

- In the anorexia section women whose lowest weight after age 12 occurred before menarche were asked a set of symptom questions otherwise skipped for women who had not experienced a period of three months of amenorrhea (this affected fewer than 10 women).

- In the drug section participants who had used marijuana and other drugs were first asked each symptom question in relation to drugs. If they reported a symptom they were then asked if they experienced it for marijuana. This followed the pattern used in the Australian National Survey of Mental Health and Well-being (see 1.7.4) (Teesson et al 2000), except that the Australian interview asked separately about all types of drugs used.

12.4.1 Diagnoses in the New Zealand interview

Although both DSM-IV and ICD-10 diagnoses can be made from the CIDI 3.0, this report uses only DSM-IV diagnoses as they are the ones clinicians use in practice.

Diagnoses are reported with organic exclusions, as specified in DSM-IV. An organic exclusion means that in the judgment of a psychiatrist the symptoms experienced were the result of an organic cause. If a participant reported that symptoms were always due to a physical cause they were asked to describe this, and this open text response was coded. One psychiatrist carried out all the coding for the New Zealand survey. Three other psychiatrists, one each from the main ethnic groups (Māori, Pacific and Other), discussed coding and also coded around 50 cases from their own ethnic group.

It is important to note that the psychosis section was merely a screening section and not a diagnostic one. Previous clinical reassessment has shown a considerable amount of over-diagnosis with this section (Kendler et al 1996). Clinicians within the research team who looked at the text responses in this section of the interview agreed it was an almost impossible task from that evidence alone to determine positively that a reported symptom was a symptom of psychosis, although many reported experiences were clearly not psychotic. Therefore, no results from that section are included in this report. Nonetheless the relationship between responses to psychosis symptom questions, reports of diagnosis, medication, service use and other diagnoses will be investigated subsequently.

The WMH algorithms were used to produce diagnoses. There have been some refinements of these algorithms, particularly for bipolar disorder, as clinical re-appraisal indicated that bipolar I disorder was over-diagnosed with the previous algorithm. A broad definition of bipolar disorder is used now that includes three subgroups: a stricter definition of bipolar I; bipolar II; and mania or hypomania not classified as bipolar I or bipolar II. The versions of the algorithms used for this report were those current in January 2006, which differ slightly from those used in previous publications (Demyttenaere et al 2004; Kessler et al 2005b; Kessler et al 2005c; Wang et al 2005a, 2005b). A minor modification was required for agoraphobia for New Zealand because separation anxiety was not assessed. The marijuana abuse and dependence algorithms

were written in New Zealand using the WMH drug abuse and dependence algorithms as models.

Hierarchy in diagnoses

Within DSM-IV diagnoses can be made with or without hierarchy restrictions. When hierarchy rules are applied, a person is excluded from a diagnosis, even though they have sufficient symptoms to meet criteria, because they have another disorder that is thought to account for those symptoms. Throughout this report hierarchy rules are applied, just as they are in clinical practice. The only exceptions are clearly noted; for example, as in substance use disorder. The relevant hierarchy rules are given below for the diagnoses covered in this report.

- *Major depressive disorder*: no mania or hypomania is permitted.
- *Dysthymia*: no major depressive episode is permitted in the first two years as otherwise the diagnosis is more one of major depression with partial remission. Also, no mania or hypomania is permitted.
- *Generalised anxiety disorder*: this must not occur exclusively within a mood disorder. In addition, if both post-traumatic stress disorder (PTSD) and generalised anxiety disorder (GAD) occur within the past 12 months and PTSD duration is longer than GAD duration, then GAD is not diagnosed.
- *Bulimia*: this must not occur exclusively within periods of anorexia.
- *Alcohol and drug abuse*: in DSM-IV abuse is diagnosed only in the absence of dependence, but throughout this report abuse includes those with and without dependence in order to show the prevalence of abuse behaviour. This is consistent with publications from the WMH Survey Initiative project (Kessler et al 2005c). In the version of the interview used in New Zealand participants did not reach the abuse section unless they reported some problems in the screener, and they did not reach the dependence section unless they reported at least one symptom of abuse. This is likely to have resulted in some underestimation of the prevalence of dependence. These 'skips' were found in the versions used at many WMH sites (Demyttenaere et al 2004).

Because separation anxiety was not included in the New Zealand interview it could not be used as an exclusion criterion for agoraphobia. Therefore, some of what is reported as agoraphobia might be separation anxiety. Comparison of prevalences from six countries with and without the separation anxiety exclusion showed little effect on prevalence (personal communication, 29 July 2004, Data Coordinating Center, WMH Survey Initiative, Harvard Medical School, Harvard University).

List of diagnoses

The following list contains all the diagnoses included this report. There are three major groups of disorders (anxiety, mood and substance use disorders) plus eating disorders.

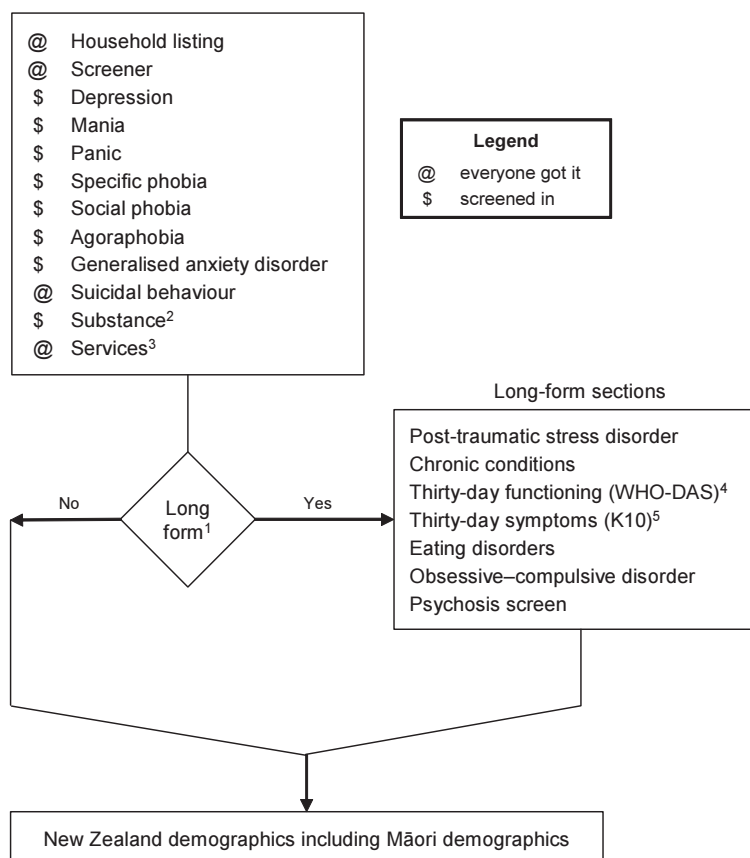
- *Anxiety disorders*: panic disorder, agoraphobia without panic, specific phobia, social phobia, GAD, PTSD and obsessive–compulsive disorder.
- *Mood disorders*: major depressive disorder, dysthymia and bipolar disorder.
- *Substance use disorders*: alcohol abuse, alcohol dependence, drug abuse, drug dependence, marijuana abuse, and marijuana dependence (marijuana diagnoses are included within drug diagnoses).
- *Eating disorders*: bulimia and anorexia.

The term ‘any diagnosis’ refers to the disorders listed above and counts of diagnosis are based on this list. However, as in DSM-IV, alcohol abuse in someone with dependence is seen as part of that dependence, so dependence plus abuse is counted as only one disorder. Similarly, drug dependence plus abuse is counted as only one disorder.

12.4.2 Long and short forms of the interview

Figure 12.1 shows the sections everyone was given or screened into and those additional sections included in the long form of the interview that were asked of only a subsample of participants.

Alcohol consumption was asked about using either the CIDI 3.0 questions or the Alcohol Use Disorders Identification Test (AUDIT). Drinkers (12 drinks in a year ever) were randomly assigned to these two alternatives with a 50:50 chance of either. Similarly for the Kessler 10-Item Scale (K10), participants were randomly assigned to respond about the past month or the worst month in the past 12 months.

Figure 12.1: New Zealand interview: long form and short form logic and sections¹

- 1 Long-form subsample: participants who had ever met certain criteria for depression, mania or the anxiety disorders in the first part of the interview, or who had ever had a suicide plan or suicide attempt, or who had ever been hospitalised for psychiatric problems all went on to the long-form sections. Others were randomly selected in, with the probability of selection increasing with the number of eligibles in the household. There were two sets of selection probabilities: participants with some evidence of psychiatric problems had selection rates of 27%–100%, whereas those with no evidence had selection rates of 9%–45%.
- 2 All entered section. Fifty percent did CIDI 3.0 consumption questions and 50% did the Alcohol Use Disorders Identification Test (AUDIT). Screened into symptom questions.
- 3 Plus Māori Health Services.
- 4 WHO-DAS = World Health Organization's Disability Assessment Scale II.
- 5 K10 = Kessler 10-item scale. Fifty percent did K10 for the worst month in the past 12 months and 50% did K10 for the past month.

12.4.3 New Zealand demographics and Māori sections

The New Zealand demographics questions were a subset of those in the CIDI 3.0 with some additions or modifications to conform to standard New Zealand questions for ethnicity, unemployment and educational achievement.

Two sections specifically for Māori were added. One asked Māori who had ever sought help for emotional problems or problems with alcohol or drugs about their use of Māori services. The other section asked additional demographic and cultural information of everyone who reported being of Māori descent.

12.5 Survey

12.5.1 Target population

The target population for the survey was defined as the usually resident, non-institutionalised population of New Zealand aged 16 years and over, residing in permanent private dwellings.

Excluded from the survey were:

- people living in temporary private residences
- people living in non-private dwellings
- long-term residents of rest homes, hospitals and psychiatric institutions
- inmates of penal institutions
- people living on offshore islands other than Waiheke Island.

The interview was available only in English. Formal interpreters were used in only a very few interviews, although friends or family helped with 1.5% and interviewers helped with 3.2% (unweighted percentages). Pacific people required more assistance to interpret questions (6.0% required some help from friends or family and 11.2% required some help from interviewers). Therefore, apart from Pacific people, the target population was effectively English speaking.

12.5.2 Sampling frame

Participants were selected through a multi-stage area probability sample of the population living in permanent private dwellings in the North Island and South Island of New Zealand plus Waiheke Island. This region covers 99.99% of the New Zealand population. Small area data collected by Statistics New Zealand from the 2001 New Zealand Census of Population and Dwellings (2001 Census) were used to select the sample. These small areas are called meshblocks and were originally set up to contain about 40–70 dwellings. However, subsequent changes have resulted in considerable variability in the number of dwellings in a meshblock.

12.5.3 Sample design

The survey was required to produce at least 12,000 interviews, with 2,500 interviews with people of Māori ethnicity and 2,500 with people of Pacific ethnicity, based on total response. ('Total response' means people listing more than one ethnicity would be counted for each ethnicity they mentioned, so the total response count for Pacific, for instance, would be the total number reporting Pacific ethnicity regardless of what else they might also report.)

These proposed sample sizes required doubling the number of Māori and quadrupling the number of Pacific people in the sample from what would be expected without measures to oversample these two ethnic groups.

It was a major challenge to try to meet these sample size requirements within the funds available without the oversampling becoming counterproductive. It is relatively easy to increase sample sizes for subgroups, particularly if they mostly live in certain areas, but this may result in a sample with less precision than if no oversampling had been carried out (Gray 2003; Kalsbeek 2003; Wells 2003, 2005).

Strategies for oversampling Māori and Pacific people

Two mechanisms were used to oversample Māori and Pacific people: targeting and screening.

Pacific people were targeted by having a High Pacific stratum consisting of meshblocks with 55% or more Pacific people at the 2001 Census (this is the total response; that is, the percentage reporting Pacific ethnicity regardless of what other ethnicities they also reported). These meshblocks had on average a 34.2% probability of selection in contrast to a 3.1% probability of selection for meshblocks in the General stratum (the actual selection was with probability proportional to meshblock size at the 2001 Census).

Pacific and Māori were screened for in the General stratum. There were three samples within the General stratum: the main sample, for which everyone was eligible; the Māori and Pacific (M&P) sample, for which only Māori and Pacific people were eligible; and the Pacific-only sample, for which only Pacific people were eligible.

Targeting saves money, but at the cost of precision; whereas screening preserves precision, but entails costs for door-knocking to establish eligibility. The response rate section (12.8) shows the extent to which this design required interviewers to screen households and the yield from such screening.

Strata

As defined above there were two strata: a High Pacific stratum and a General stratum.

Sample selection: primary sampling unit

Census meshblocks were the primary sampling units. Within each stratum meshblocks were sorted in order of District Health Boards (DHBs) before systematic selection with probability proportional to size (PPS) (Kish 1965). This produced implicit stratification by DHB.

The number of meshblocks selected was 150 out of 439 in the High Pacific stratum and 1,170 out of 37,926 in the General stratum. Note that there was no clustering above the census meshblock level.

Sample selection: secondary sampling unit

A dwelling was the secondary sampling unit. Within each meshblock all dwellings were enumerated. Under PPS sampling a set number of dwellings were to be approached, although this was altered appropriately if the number of dwellings had changed since the last census in 2001.

The number of dwellings to be approached depended on the stratum and on the sample within the General stratum (main, M&P, Pacific only). The expected numbers were:

- High Pacific stratum 12 dwellings
- General stratum:
 - main sample (all eligible) 11 dwellings
 - M&P sample (Māori, Pacific) 16 dwellings
 - Pacific-only sample 30 dwellings on average.

As screening for the Pacific-only sample took place in all dwellings in the General stratum that had not been allocated to the main sample or the M&P sample, the number approached for that screening depended on the size of the meshblock. Small meshblocks caused problems for this design. In each General stratum meshblock at least one dwelling was always approached for the M&P sample. (For Pacific people, the Pacific and the M&P samples were combined using Horvitz-Thompson weights (Cochran 1977; Horvitz and Thompson 1952), by summing the probability of selection through each sample, so it was not necessary to reserve one dwelling per meshblock for the Pacific-only sample.)

Sample selection: participant sampling

The final stage of sampling involved selecting one participant within a dwelling. All people aged 16 years and over who lived at that dwelling were listed from oldest to youngest, then one was selected using a Kish grid (Kish 1965) modified to accommodate up to eight eligibles.

Ethnicity was not asked about when the listing of residents was obtained in the High Pacific stratum or for main sample households in the General stratum, as it was irrelevant for selection. For M&P and Pacific-only sample dwellings there was a preliminary listing of residents, then the interviewer asked, ‘Can you tell me which ethnic group or groups [X] identifies as?’. The response categories given were Māori, Pacific, Asian and Other (Asians were listed separately because this had been found to work best in fieldwork. For all other purposes Asians were included with Others as they were not oversampled). A list of eligible residents was then entered into a Kish grid. The interview had a question about ethnicity very early on, ‘Looking at showcard 1, which ethnic group or groups do you belong to?’. A longer list of ethnic groups was given, exactly as in the 2001 Census. If the participant did not report the ethnicities screened for, the interview was terminated, the household listing was revisited and another household member was selected if anyone was eligible.

Replicates

The sample meshblocks were originally randomly assigned to five replicates to be run in sequence, with only minor exceptions for outlying areas. However, with repeated call-backs to improve the response rates, there was considerable temporal overlap between interviews from each replicate. Nonetheless, the initial replicates provided a way to obtain unbiased estimates of the response rate early on, which would not have been possible with a roll-out across the country such as from north to south.

12.6 Fieldwork

The research team carried out the initial pilot study in South Auckland and Horowhenua to test versions of the interview for length and acceptability (Oakley Browne et al 2000). The final version of the New Zealand interview was based on this work.

The National Research Bureau (NRB) carried out a field test and the main survey.

12.6.1 Consent

Verbal and written consent were obtained from each participant. (The consent form is in Appendix D and other background information is available from the Mental Health Research and Development Strategy website (<http://www.mhrds.govt.nz>), the main content of which is listed in Appendix E.)

12.6.2 Data collection

NRB staff administered the interview. Over 120 professional survey interviewers and a team of 27 experienced regional supervisors participated in the data collection. NRB interviewers completed a course in general interviewer training before working on any survey and had refresher courses periodically. Each interviewer who worked on the survey received three days of study-specific training.

The staff of the Institute of Social Research, University of Michigan, provided the interview training course material. They have provided training for all other sites involved in the WMH Survey Initiative. Additional material relating to cultural empathy and to safety was developed in New Zealand.

Institute of Social Research staff and members of the research team monitored the training of the NRB staff. Each interviewer was required to complete a test that involved administering a series of practice interviews designed to take different pathways through the questionnaire, thereby giving them practice with the different sets of questions before beginning work in the field.

The survey was carried out using a laptop computer assisted personal interview (CAPI).

12.6.3 Quality control for data collection

Rigorous field quality control procedures, following those prescribed for the WMH Survey Initiative, were used in the survey. These included the following.

- Interviewers were assigned meshblocks and were given a start position within the meshblock and instructions on how to space main sample households in which all ethnic groups were eligible. Interviewers were instructed on how to alter this spacing if the number of households enumerated differed from that from the 2001 Census. In the General stratum they were to sample the first 16 households not in the main sample to screen for Māori or Pacific people. All other households in this stratum were to be screened for Pacific people only. Therefore, in the General stratum all households had to be approached. Supervisors checked that these procedures were followed. Supervisors and interviewers had detailed maps of each meshblock showing each property.

- Participants were selected within households using a standardised method that minimises interviewer non-random selection of easy-to-recruit household members, namely using a Kish grid (see ‘Sample selection: participant sampling’ in 12.5.3).
- The CAPI program controlled skip logic and used a built-in clock to record speed of data entry, making it difficult for interviewers to truncate interviews by skipping sections or to fabricate interviews. Furthermore, if this did occur, it could be detected, something not possible with pencil and paper interviews.
- Completed CAPI interviews were sent to NRB’s website weekly to allow immediate quality control checks. If problems were detected, interviewers were instructed to re-contact the participant to obtain missing data or to resolve inconsistent responses.
- Supervisors contacted a random 10% of interviewed households to confirm selection procedures and length of interview. Enumeration of the sample areas was checked against census counts.
- Computerised tracking of interview-level response rate, average interview length, capture of Māori and Pacific participants, and capture of male participants was used to pinpoint interviewers with aberrant patterns for remedial retraining. Interviewers who persisted in low performance or who were found to make conscious errors were exited from the survey and their cases re-interviewed.
- Interviewers were paid by the hour and the kilometre, rather than by interview, to avoid financial incentives to focus on easy-to-recruit participants.

12.6.4 Timing of survey

The period of fieldwork was between October 2003 and December 2004. In the last three months of 2003 the number of interviews was just building up whereas in that period in 2004 only hard-to-reach participants were still being contacted. The seasonal breakdown was 24% of interviews in summer, 32% in autumn, 23% in winter and 22% in spring.

12.7 Data cleaning and editing

The Blaise software (<http://blaise.sourceforge.net/>) used for the interview had many internal checks for inconsistency and wild codes. NRB also developed its own set of additional checks. There were several cycles of data cleaning as the interviews came in. After a round of cleaning by NRB, a data set was sent to the WMH Survey Initiative Data Coordinating Center at Harvard University, where it was run through cleaning programs and any problems were reported back to NRB. Occasionally these cleaning checks required re-contact with participants. Data sets were returned to Harvard University until the final complete data set met all requirements.

For most questions with ‘other’ responses, NRB staff recoded the text provided. Usually such responses were readily fitted into existing categories. Questions with text responses requiring clinical expertise to code were coded by a psychiatrist (see 12.4.1).

12.7.1 Imputation

Little item non-response occurred. Of the sociodemographic correlates used throughout this report, only household income required statistical imputation. No data were missing for age, sex, ethnicity, urbanicity or region.

For education, fewer than 10 participants gave incomplete education responses, and education was imputed for these participants by inspecting responses on age, sex, age of first employment and current or last employment, country of birth, and age of entry to New Zealand.

NZDep2001 was missing for two meshblocks. The value was imputed from other meshblocks in the same area unit.

Of the participants, 1.8% refused to report household income and 11.2% said they did not know it (weighted percentages). Household income was more likely to be missing for participants who were not married or were not living with a partner, those who lived in households with more people aged 16 years and over, those who were young, and those who were female. The WMH Survey Initiative analysis team at Harvard University used linear regression with weights to impute household income with a large set of dummy variables derived from age, sex, education, marital status, employment status, the current or last job held, time since last worked, the number in the household, and the New Zealand Index of Deprivation 2001 (NZDep2001; see 12.12.1).

There were very few data missing on age of onset for disorders. This was because the interview asked first for an exact age; if that was not available it asked about when onset occurred, and if the participant could still not answer, it asked a series of questions as required such as, ‘Was it before you started school?’ and ‘Was it before you were a teenager?’. The WMH Survey Initiative analysis team at Harvard University imputed any missing values by a variant of hot deck imputation.

There were also few missing data on recency. However, there were some discrepancies between onset or recency and time of first treatment. If the first treatment was reported at an earlier age than the onset of disorder then the age of first treatment was set to the age of onset. If the time of first treatment was reported after the end of the disorder then the time until treatment was still calculated in the usual way from onset until time of treatment. These ways of resolving inconsistencies include all those who did report reaching treatment. Had they been treated as missing the percentage reaching treatment in the first year or ever would have been underestimated.

12.8 Response rate

The response rate was 73.3%.

The response rate was calculated from the following four aggregated categories:

1. eligible interviewed (completed whole interview even if some item non-response)
2. eligible non-responding
3. known ineligible
4. unknown eligibility (mostly no contact or refusal to provide a household listing, so eligibility could not be determined).

$$\text{Response rate} = \frac{\text{number of eligibles interviewed} \times 100}{\left(\begin{array}{c} \text{number of eligibles} \\ \text{interviewed} \end{array} \right) + \left(\begin{array}{c} \text{number of eligibles} \\ \text{non-responding} \end{array} \right) + \left(\begin{array}{c} \text{estimated number of} \\ \text{eligibles from the unknowns} \end{array} \right)}$$

The estimated number of unknowns was calculated for each of the four design cells separately (the High Pacific stratum and the three General stratum cells: main sample, M&P screened sample, and the Pacific-only screened sample) then summed.

$$\left(\begin{array}{c} \text{estimated} \\ \text{number of} \\ \text{eligibles} \end{array} \right) = \left(\begin{array}{c} \text{number of} \\ \text{unknown} \\ \text{eligibility} \end{array} \right) \times \frac{\left(\begin{array}{c} \text{number known} \\ \text{to be eligible} \end{array} \right)}{\left(\begin{array}{c} \text{number known} \\ \text{to be eligible} \end{array} \right) + \left(\begin{array}{c} \text{number known} \\ \text{to be ineligible} \end{array} \right)}$$

All these calculations used unweighted counts. The response rate calculated this way is a measure of the success of the field operation. Because the probability of selection differed across participants, the unweighted response rate may differ from that calculated using weights that take account of selection probabilities.

All reports of door-to-door area surveys treat dwellings known to be vacant as ineligible. Because of ethnic screening, in this survey many dwellings did not contain anyone eligible on those grounds. There were also 155 dwellings not screened that were judged not eligible for a variety of reasons. There were 276 dwellings where language difficulties prevented an interview with the selected participants and 450 where the selected participant was too infirm. In keeping with the WMH Survey Initiative rules for response rates, those with inadequate English language skills or who were infirm were also included as ineligible. If they were included as eligible the response rate would be 70.2%, but this is an unfair measure of fieldwork as interviewers cannot interview those without adequate English language skills and should not interview those too infirm to be interviewed.

A total of 75,340 dwellings were approached for this survey. Overall 5.5% were found to be vacant. Because of screening many dwellings were approached but were found to be ineligible. Of the 17,076 dwellings approached for the M&P screened sample in the general stratum, after a household listing was obtained 13,552 were found to have no one of the appropriate ethnicity (79%). Of the Pacific-only sample 41,924 dwellings were approached and 37,022 had no Pacific inhabitants (88%). These numbers show something of the fieldwork costs associated with doubling the number of Māori and quadrupling the number of Pacific people from that which would have been obtained without oversampling (see 12.5.3).

12.9 Sample weights

Four steps were taken to create weights for each participant in the whole sample. For the subsample of participants who had the long form of the interview there were an additional two weighting steps involving selection into the long form and repeated post-stratification (see Figure 12.1, which shows the short and long pathways through the interview).

The four steps required to weight everyone in the sample involved:

- calculation of the probability of selection of a participant (one per dwelling)
- adjustment for oversampling of Māori and Pacific people through screening
- adjustment for non-response
- post-stratification.

The additional calculations involved in the calculation of weights to use with the long form subsample were:

- the probability of selection into the long form
- post-stratification of the long-form sample.

At all stages weights were the inverse of probabilities of selection.

However, for ease of checking analyses, the weights used for most analyses had been normalised to either the total sample size or the size of the subsample who did the long form of the interview, as appropriate.

These procedures for calculating weights were discussed with Professor Steve Heeringa, a survey statistician from the Institute of Social Research, University of Michigan, who is part of the WMH research team, and with members of the WMH Survey Initiative Data Coordinating Center at Harvard University.

12.9.1 Probability of selection of participant (one per dwelling)

The initial calculation of the probability of selection of a participant (P_0) and the consequent weight ($W_0 = 1/P_0$) ignored oversampling, except for Pacific participants selected through screening in the general stratum.

P_0 was calculated as the probability of selecting a particular meshblock multiplied by the probability of selection for that sample within a meshblock divided by the number of eligibles in the dwelling. For example, in the High Pacific stratum 150 meshblocks (out of 439) were selected from this stratum, which contained 13,797 households in all. Meshblocks were selected with probability proportional to size at the 2001 Census, so for a meshblock with 30 households at the last census:

$$\text{probability of selection of this meshblock} = \frac{150 \times 30}{13,797} = 0.33$$

If there were still 30 dwellings at enumeration, then the standard 12 dwellings per meshblock for this stratum would be approached. If there were two people eligible in a dwelling and one was selected, then:

$$\text{probability of selection of this participant} = \left(\frac{150 \times 30}{13,797} \right) \left(\frac{12}{30} \right) \left(\frac{1}{2} \right) = 0.065$$

The same procedure was carried out separately for the main sample in the General stratum and for Māori without Pacific ethnicity in the sample screened for Māori or Pacific people, the M&P sample (see 12.5.3).

For Pacific people in the M&P sample or in the Pacific-only sample the probability of selection was summed across both samples using a Horvitz-Thompson type weight, which summed the probability of selection through each of these two samples (Cochran 1977; Horvitz and Thompson 1952). For example, for a Pacific person obtained through screening from a meshblock with 60 dwellings, of which 11 were approached for the main sample, 16 for the M&P sample and 33 for the Pacific-only sample, who lived in a dwelling with two other Pacific people and one Māori with no Pacific ethnicity, then:

probability of selection of this Pacific participant from a screened dwelling =

$$\left(\frac{1,170 \times 60}{1,353,807} \right) \left[\left(\frac{16}{60} \right) \left(\frac{1}{4} \right) + \left(\frac{33}{60} \right) \left(\frac{1}{3} \right) \right] = 0.013$$

In the General stratum some extremely high weights arose from very small meshblocks or meshblocks small enough that only one dwelling was screened. Twenty came from the main sample and 12 from the screened sample. These extreme weights were trimmed to the remaining highest weight within the sample they came from and all weights in that sample were rescaled to the same total previously obtained. These rescaled weights are W_1 .

12.9.2 Adjustment for oversampling of Māori and Pacific people through screening

The second major stage of weighting involved adjusting for the oversampling of Māori and Pacific people through screening in the General stratum. For the W_1 weights the main sample and the screened sample were treated as if they were two separate surveys. The sum of main sample Māori W_1 weights estimated the total Māori population in that stratum. The sum of the screen sample Māori W_1 weights also estimated the same total, so that the sum across both samples estimated twice the population. Therefore, it was necessary to adjust the weights for oversampling, so the sum across both samples provided only one estimate of the population. To do this the W_1 weights in each sample were multiplied by the proportion of the total yield of Māori in the General stratum that came from that sample. Fifty-six percent of Māori participants in the General stratum came from the screened sample, so their W_1 weights were multiplied by 0.56 to produce a W_2 weight, whereas those from the main sample had their W_1 weights multiplied by 0.44.

The same procedure was applied for Pacific participants with adjustment multipliers of 0.78 for those from the screened sample and 0.22 for those from the main sample.

For the Other group, $W_2 = W_1$ as there was no oversampling to adjust for. Note that Asians who were not oversampled were included in Others (see ‘Sample selection: participant sampling’ in 12.5.3).

This ‘yield’ method was required because ethnicity was not known for all residents aged 16 years and over in dwellings in the main sample (see ‘Sample selection: participant sampling’ in 12.5.3). Ethnicity was not asked about when a household listing was obtained from these dwellings, although it was obtained from each participant. The Horvitz-Thompson method could not be applied because the number eligible for the M&P sample and Pacific-only sample was not known for main sample dwellings, so it was not possible to calculate the combined probability of selection for an individual across these three samples. Analysis of ethnic household composition in the screened samples showed that Māori and Pacific people live with each other and with other ethnicities too often for the number eligible for the main sample to be used as the number eligible under the two types of screening. The ‘yield’ method was used in the Christchurch Psychiatric Epidemiology Study (Wells et al 1989a). It is likely that Horvitz-Thompson weights would have been slightly more efficient statistically (Wells 1998), but these could have been used only if interviewers had asked about the ethnicity of everyone aged 16 years and over in the 11,500 dwellings contacted in the main sample.

12.9.3 Adjustment for non-response

Two component response rates were calculated: the probability of obtaining a household listing and the probability of obtaining a complete interview from a household given a listing for the household. For administrative purposes the response from a household was coded into one of 13 categories. These were grouped into four classes:

- eligible interviewed (A)
- eligible non-responding (B)
- known ineligible (C)
- unknown eligibility (D).

Household listing response rate

The outcome for a household listing was modelled using logistic regression, with the outcome as the number of successful listings ($A + B + C$) out of all households approached ($A + B + C + D$).

Interview response rate among known eligibles

The outcome for a household listing was modelled using logistic regression, with the outcome as the number of interviews (A) out of all listings obtained with someone known to be eligible (A + B).

Covariates for non-response modelling

Apart from the four design cells, all the variables that might predict the response rates were at meshblock level. The following variables were considered:

- region (18 areas)
- region grouped (North, Midland, Central and South)
- urbanicity (main urban, secondary urban, minor urban and rural areas)
- occupied dwellings count at the 2001 Census
- mean usually resident population per dwelling
- mean usually resident adult population (aged 15 and over) per dwelling
- percentage of usually resident population of Māori ethnicity
- percentage of usually resident adult population of Māori ethnicity
- percentage of usually resident population of Pacific ethnicity
- percentage of usually resident adult population of Pacific ethnicity
- NZDep2001 (deciles and quintiles)
- percentage of usually resident population who were female
- age, median and mean
- percentage married, derived from the usually resident population aged 15 and over
- percentage never married, derived from the usually resident population aged 15 and over
- percentage not in the labour force, derived from the usually resident population aged 15 and over.

Modelling non-response

It was decided to model the response rates of the four design cells separately. The High Pacific stratum was known to contain only areas with high levels of deprivation. Within the General stratum the number of meshblocks varied slightly in each sample (main, M&P, Pacific only) as some meshblocks did not have any eligibles in screened households. Only a few of the covariates were related to response rates at either stage.

Adjustment after modelling

After modelling non-response the W_3 weights so created were the W_2 weights divided by the probability of a household listing and the probability of an interview as estimated in the models. This compensated for non-response.

12.9.4 Post-stratification for the whole sample

For the 2001 Census, Statistics New Zealand decided to report ‘total response’, which is the number reporting any given ethnicity regardless of what other ethnicities they may have reported. This avoids allocating priority rules of the sort used previously where, for example, any mention of Māori led to a person being listed as Māori. However, it is not possible to post-stratify without having a list of mutually exclusive categories. There are seven possible combinations of Māori, Pacific and Other, allowing for one, two or all three of these groups, with small numbers in some combinations, making it not possible to use with age and sex for our sample. Therefore, prioritised ethnicity was required for post-stratification.

We obtained a customised table with prioritised ethnicity from the 2001 Census for the population aged 16 years and over in permanent private dwellings plus absentees usually resident in such dwellings in New Zealand but not at home on census night. Substitute forms are included in the census for people known to exist who did not fill out a census night form (4% of those aged 16 and over). Age and sex are imputed for these forms but not ethnicity. Therefore, within each age and sex group those with ethnicity ‘not elsewhere specified’ (4% of total) were distributed across the three prioritised ethnic groups used in this report (Māori, Pacific and Other) in proportion to the observed distribution in that age and sex group. The age groups used were 16–24 years, 10-year age bands up to age 64, and 65 years and over. The sum of weights in each age, sex and ethnicity cell was adjusted to match that in the table derived from the 2001 Census. For example, if the census table had 50,000 people in a cell and the sample sum of W_3 weights was 52,000, then each W_3 weight in that cell would be multiplied by $50,000/52,000$ to produce a W_4 weight. Because of population growth since 2001 the sample sum of weights in a cell was often larger than the population size given in the census table.

12.9.5 Probability of selection into long form

Participants who had ever met certain criteria for depression, mania or the anxiety disorders in the first part of the interview, or who had ever had a suicide plan or attempt, or who had ever been hospitalised for psychiatric problems all went on to the long form sections (see Figure 12.1). Those with some problems and those without any problems reported in these early sections were selected into the long form, with probability inversely proportional to household size. These probabilities were higher for those with some problems than for those with no problems. W_5 weights were W_4 weights divided by the probability of selection into the long form. W_5 weights were calculated only for the long-form subsample.

12.9.6 Post-stratification for the long-form sample

To produce W_6 weights, the long-form subsample was also post-stratified to the same 2001 Census table used for the whole sample. This post-stratification means both the whole sample and the long-form subsample provide estimates for the same target population, with W_4 weights being used in analyses of the whole sample and W_6 weights being used for analyses of the long-form subsample.

12.10 Statistical analysis

Data manipulation and exploratory analyses were carried out using the SAS 9.1.3 software, and all analyses involving standard errors, confidence intervals and significance tests were carried out using SUDAAN 9.0.1 software to take account of the complex sample design, including weighting.

12.10.1 Estimation of standard errors and confidence intervals

For analyses in SUDAAN primary sampling units were treated as being sampled with replacement. This was appropriate for the general stratum as the probability of selection of meshblocks was low (3.1%), but not for the high Pacific stratum in which about a third of meshblocks were selected (34.2%). The effect will be conservative, as the finite population correction factor is not used, leading to slightly higher standard errors.

Taylor series linearisation (Shah 1998) was used to approximate the variance of estimates, with two strata and meshblocks as primary sampling units.

For prevalences or proportions with less than 30 events in the numerator, confidence intervals were calculated according to a method by Korn and Graubard (Korn and Graubard 1998, 1999). This method has been shown to yields results similar to those using an exchangeable bootstrap for the 1999 New Zealand Gaming Survey, which had a design more like that used for our survey than the standard survey design in the US,

which has 50–100 large primary sampling units (Gray and Haslett 2004). Our practice contrasts with a policy of not reporting any prevalences with high relative error (Ministry of Health 2004b). Because confidence intervals are provided, the precision or otherwise of estimates is apparent. Our practice was chosen to provide estimates of low prevalences that otherwise have to be inferred from the absence of estimates. However, results are not reported for any prevalence or proportion for which the denominator was less than 30.

12.10.2 Adjustment

Throughout the report, prevalences and proportions are reported for correlates considered one at a time. However, for ethnicity comparisons a series of analyses has been carried out. First unadjusted results are presented for the three ethnic groups, then they are adjusted for age and sex, and finally they are adjusted for age, sex, educational qualification and equivalised household income (see 12.12.1).

The results for ethnic comparisons are reported in tables as predictive margins (Graubard and Korn 1999; Korn and Graubard 1999), which are also called predicted marginals (eg, in SUDAAN). These have been more commonly known as adjusted percentages (Lee 1981) if obtained from logistic regression. These are a form of direct adjustment. With predictive margins a model is fitted to the data, then, using the model parameters, the probability of an outcome is calculated for everyone in the sample, by first assigning them all to one level of the predictor of interest, then assigning them to another level and so on for all levels. For instance, everyone would be assigned to be Māori but their other covariate values remain the same, then everyone is assigned to be Pacific and so on. This way each group has the same covariate distribution because the whole sample is used for each assignment.

The use of predictive margins enables adjustment for any set of covariates for which data have been collected, not just for age, or age within males and age within females. The presentation of results as adjusted percentages rather than odds ratios or relative risks also has some advantages by using measures understood by a wider range of readers, by showing actual magnitudes of each outcome in each group, and by avoiding what is sometimes an arbitrary decision about which group is the reference group (Korn and Graubard 1999).

In several other tables results have also been adjusted using predicted marginals (eg, Tables 2.3 and 6.4). For Tables 5.7–5.9 two sets of models were used for adjustment. The adjusted prevalence reported for a disorder (total: males and females combined) is the predicted marginal from a model with that disorder (yes/no), age and sex. However, for males and females within a disorder the adjusted prevalences presented are two of

the predicted marginals from a four-way classification variable formed from that disorder (yes/no) and sex, in a model with that variable and age. The consequence is that in these three tables all adjusted prevalences are standardised to the weighted age distribution of the sample, which is the age distribution from the 2001 Census (see 12.9.4 and 12.9.6).

In comparing results from this survey with those from national health surveys it should be noted that different populations have been used for age standardisation, although the distributions are not very different. The 2002/03 New Zealand Health Survey (Ministry of Health 2004b) standardised to the latest WHO world age distribution (Ahmad et al 2000). The 1996/97 New Zealand Health Survey standardised to the 1996 usually resident population (Haslett and Statistics New Zealand c1999; Minister of Health 1999).

12.10.3 Survival analysis

Survival analysis was used for onset of disorder and for time to treatment. At the time of interview most people had not developed a disorder and many who had experienced disorder had not made treatment contact. However, they might subsequently develop a disorder or reach treatment. The technical term for these people is that their outcome was censored, in that it is not known if or when they would experience the event of interest. On a timeline it is as if a censor had blotted out all time after the time of the interview. Survival analysis is the only technique to correctly take account of censoring. In this interview participants reported age of onset in whole years so discrete time analyses were carried out with one-year intervals.

Note that in analysis of time to treatment, if someone reported that their disorder had ended but that they had not made treatment contact then they contributed to the analysis only the time from onset to recency; namely, the duration of the disorder.

One way of presenting survival results is to report hazards or hazard ratios. For a particular point in time, for those who have not yet experienced the event of interest, the risk of onset at that time is called the hazard. Comparison of groups produces hazard ratios. Proportional hazard models were used for Table 4.3. Hazard functions for the onset of suicidal behaviours are shown in Figure 7.1.

The percentage who will ever develop a disorder or who will reach treatment is estimated from the survival estimate for the oldest age or the longest duration. The median onset age or the median time to treatment is obtained by recalibrating the onset curve to be 100% at the largest observed value (Elandt-Johnson and Johnson 1980). Other percentiles of the onset curves are calculated similarly.

12.11 Participants

The numbers of participants, unweighted percentages and weighted percentages in each age and sex group, for each prioritised ethnic group, are shown in Table 12.1 for the whole sample and in Table 12.2 for the subsample interviewed with the long form of the interview. Table 12.3 shows the demographic characteristics for each ethnic group for the whole sample.

Table 12.1 shows numbers for prioritised ethnicity; namely Māori, Pacific people who were not also Māori, and Other. In the whole sample 138 listed both Māori and Pacific ethnicity, so there were 2,374 who listed Pacific ethnicity (this is what Statistics New Zealand calls ‘total response’), although only 2,236 were counted as Pacific under prioritised rules.

Table 12.1: Unweighted and weighted age distributions, by sex within each prioritised ethnic group for the whole sample

Sex	Age group (years)	Māori	Pacific	Other	Total
		Number			
Male	16–24	175	173	365	713
	25–44	520	459	1,252	2,231
	45–64	288	272	1,193	1,753
	65 and over	65	95	777	937
	All ages 16+	1,048	999	3,587	5,634
Female	16–24	239	208	375	822
	25–44	770	688	1,615	3,073
	45–64	415	264	1,477	2,156
	65 and over	123	77	1,107	1,307
	All ages 16+	1,547	1,237	4,574	7,358
Male and female	All ages 16+	2,595	2,236	8,161	12,992
		Unweighted percentage within each ethnic group %			
Male	16–24	16.7	17.3	10.2	12.7
	25–44	49.6	45.9	34.9	39.6
	45–64	27.5	27.2	33.3	31.1
	65 and over	6.2	9.5	21.7	16.6
	All ages 16+	100.0	100.0	100.0	100.0
Female	16–24	15.4	16.8	8.2	11.2
	25–44	49.8	55.6	35.3	41.8
	45–64	26.8	21.3	32.3	29.3
	65 and over	8.0	6.2	24.2	17.8
	All ages 16+	100.0	100.0	100.0	100.0
% of sample	All ages 16+	20.0	17.2	62.8	100.0
		Weighted percentage within each ethnic group¹ %			
Male	16–24	25.2	24.8	14.7	16.3
	25–44	46.3	47.2	38.0	39.3
	45–64	23.1	22.7	31.7	30.4
	65 and over	5.4	5.2	15.6	14.0
	All ages 16+	100.0	100.0	100.0	100.0
Female	16–24	23.8	24.3	13.4	15.1
	25–44	48.7	47.9	38.4	40.0
	45–64	21.7	21.5	30.2	28.9
	65 and over	5.7	6.4	17.9	16.0
	All ages 16+	100.0	100.0	100.0	100.0
		Percentage of population aged 16 and over %			
	All ages 16+	11.2	4.5	84.3	100.0

1 The 2001 Census ethnicity distribution, see 12.9.4.

Age distributions were inspected at each stage of weighting. About half the increase in the percentage in the youngest age group occurred through taking account of the probability of selection, presumably because they lived with more other adults, and about half because of post-stratification, indicating more difficulty in reaching this age group. The decrease for the oldest age group occurred with post-stratification.

Table 12.2: Unweighted age distributions, by sex within each prioritised ethnic group for the subsample who received the long form of the interview

Sex	Age group (years)	Māori	Pacific	Other	Total
		Number			
Male	16–24	115	112	220	447
	25–44	311	264	678	1,253
	45–64	154	154	634	942
	65 and over	30	42	302	374
	All ages 16 +	610	572	1,834	3,016
Female	16–24	165	157	258	580
	25–44	543	424	995	1,962
	45–64	267	149	908	1,324
	65 and over	58	37	458	553
	All ages 16+	1,033	767	2,619	4,419
Male and female	All ages 16+	1,643	1,339	4,453	7,435
		Unweighted percentage within each ethnic group %			
Male	16–24	18.9	19.6	12.0	14.8
	25–44	51.0	46.2	37.0	41.5
	45–64	25.2	26.9	34.6	31.2
	65 and over	4.9	7.3	16.5	12.4
	All ages 16+	100.0	100.0	100.0	100.0
Female	16–24	16.0	20.5	9.9	13.1
	25–44	52.6	55.3	38.0	44.4
	45–64	25.8	19.4	34.7	30.0
	65 and over	5.6	4.8	17.5	12.5
	All ages 16+	100.0	100.0	100.0	100.0

Because both the whole sample and the long-form subsample were post-stratified to the 2001 Census, the weighted age, sex and ethnicity distribution is the same for both samples and is reported only in Table 12.1.

Table 12.3: Weighted sociodemographic distributions within each prioritised ethnic group for the whole sample

Correlate	Māori %	Pacific %	Other %	Total %
Individual characteristics				
Sex				
Male	46.6	47.3	48.2	48.0
Female	53.4	52.7	51.8	52.0
Age group (years)				
16–24	24.5	24.5	14.1	15.7
25–44	47.6	47.6	38.2	39.7
45–64	22.4	22.1	31.0	29.6
65 and over	5.6	5.8	16.8	15.0
Educational qualifications				
None	31.9	24.2	16.5	18.5
School or post-school only	41.5	47.2	35.9	37.0
Both school and post-school	26.7	28.6	47.6	44.4
Household income ¹				
Under half of median	26.9	20.7	21.2	21.8
Half median to median	25.6	28.3	20.4	21.3
Median to one and a half times median	24.3	27.1	23.5	23.8
One and a half times median and over	23.1	23.9	34.9	33.1
Equivalent household income ¹				
Under half of median	31.8	32.6	17.7	20.0
Half median to median	32.2	39.5	27.6	28.7
Median to one and a half times median	19.9	16.6	25.7	24.6
One and a half times median and over	16.1	11.2	28.9	26.7
Area characteristics				
NZDep2001 deciles ¹				
9 and 10 most deprived	43.7	59.7	12.4	18.0
7 and 8	21.3	18.9	18.7	19.0
5 and 6	15.7	10.5	23.6	22.1
3 and 4	11.3	6.4	21.0	19.3
1 and 2 least deprived	8.0	4.4	24.4	21.7
Urbanicity ¹				
Main	66.8	94.9	72.7	73.1
Secondary	7.6	2.4	6.4	6.3
Minor	14.0	1.7	7.5	8.0
Other (rural)	11.6	1.0	13.3	12.6
Region ¹				
North	34.0	74.4	33.7	35.5
Midland	34.4	5.4	18.3	19.5
Central	18.5	14.6	20.5	20.0
South	13.1	5.6	27.6	25.0

¹ Sociodemographic correlates are defined in 12.12.1.

Compared with the Other group, Māori and Pacific people were more likely to be young and less likely to have educational qualifications. They also tended to have lower household incomes and this was much more marked for equivalised household income, which takes account of the number of people in the household. There were 43.7% of Māori and 59.7% of Pacific people living in the most deprived quintile (NZDep2001 deciles 9 and 10) compared with only 12.4% of the Other group. Pacific people were found almost exclusively in the main centres, predominantly in the North region. Compared with the Other group, Māori were more likely to live in the Midland region and less likely to live in the South region.

12.12 Definitions of key terms

12.12.1 Sociodemographic correlates

Ethnicity

Prioritised ethnicity is used throughout the report except in chapter 10, the chapter about Pacific people. The 2001 Census ethnicity question was used in the interview (see Appendix B). It asks about which ethnic group or groups the participant belongs to. This allows multiple responses. The prioritisation rule is that anyone mentioning Māori is classified as Māori, then anyone mentioning any of the Pacific Island groups but not Māori is classified into the Pacific ethnic group and the remainder are classified into the Other category. In much of chapter 10 everyone who mentioned Pacific ethnicity is included (this is known as classification by total response). There were 138 participants who reported both Māori and Pacific ethnicities (see 12.11).

Educational qualifications

Education was asked about using the two 2001 Census education questions about school qualifications and post-school qualifications. Those with no qualifications were asked for their age at the end of their last complete year at school. A three-level grouping is used throughout the report: no qualification; school or post-school qualification only; and both school and post-school qualifications. Combining those with only school qualifications and those with only post-school qualifications was a way of producing a category of people with usually no more than 13 years of education and a qualification. It accommodated the pattern in older generations to leave school without a qualification, but to complete some kind of trade training. Fewer than 10 participants had missing data on education and these were imputed by consideration of other variables such as age and employment (see 12.7.1).

Equivalised household income

Household income was asked about in one question. Because of the 13.0% non-response on this question imputation was carried out (see 12.7.1). A modification of the revised Jensen equivalence scale (Jensen 1988) was used to take account of the number of children. In this survey the age of individual children was not known, just the number aged under 16. Therefore, an average age of eight years was assumed.

HI = household income

E = the equivalence adjustment

EHI = equivalised household income

a = the number of adults in the household (aged 16 years and over)

c = the number of children in the household (under 16 years)

$$E = \frac{(a + c * (0.460697 * 8.0) * 0.0283848)^{0.621488}}{2^{0.621488}}$$

Note that E equals 1 for a household with two adults and no children, which is the reference household. The more adults and the more children there are, the larger E is.

$$EHI = \frac{HI}{E}$$

New Zealand Index of Deprivation 2001

NZDep2001 is a small area index of deprivation provided by Statistics New Zealand for each 2001 Census meshblock. This index has also been provided from the 1991 Census and the 1996 Census (Crampton and Davis 1998; Salmond et al 1998). It is based on census data on the percentage of people lacking a telephone, receiving means-tested benefits, being unemployed, having a low income, having no access to a car, being in a single-parent family, lacking qualifications, renting, and having inadequate living space for a household. It is most commonly reported in deciles, with decile 10 being the most deprived.

Because of variability within a meshblock, NZDep2001 may not be a good measure of deprivation for an individual. This is why throughout this report individual measures are used predominantly, but NZDep2001 is also used in some analyses to enable comparison with results from routinely collected data. National standard health and mental health service use data sets (MHINC) (see <http://www.nzhis.govt.nz>) have been able to use only NZDep2001 or earlier versions, as income and education data are not routinely available for individuals, whereas NZDep data can be obtained from residential addresses.

Urbanicity

The standard Statistics New Zealand definitions were used for urbanicity (Statistics New Zealand 2006). These are:

- main urban areas (a minimum population of 30,000)
- secondary urban areas (a population of 10,000 to 29,999)
- minor urban areas (a population of 1,000 to 9,999)
- other (rural centres and rural areas).

Regions

The four major regions are based on District Health Boards and are (Mental Health Commission 2002b):

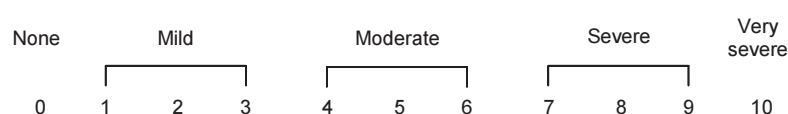
- North: Northland, Waitemata, Auckland and Counties–Manukau
- Midland: Waikato, Bay of Plenty, Tairāwhiti (Gisborne), Lakes and Taranaki
- Central: Hawke’s Bay, Midcentral (Manawatu), Whanganui, Wairarapa, Hutt, Capital & Coast
- South: Nelson–Marlborough, Canterbury, West Coast, South Canterbury, Otago, and Southland.

12.12.2 Interference with life

Participants who were likely to reach criteria for a disorder and who reported symptoms in the past 12 months were assessed using the WMH Survey Initiative version of the Sheehan Disability Scales (Demyttenaere et al 2001; Leon et al 1997) at the end of that diagnostic section. The questions assessed interference with life resulting from each disorder by asking:

Think about the month or longer in the past 12 when your [XXX] was most severe. Using the 0 to 10 scale where 0 means *no* interference and 10 means *very severe* interference, what number describes how much your [XXX] interfered with each of the following activities during that time?

- Your home responsibilities, like cleaning, shopping and taking care of the house, flat or apartment
- Your ability to work or study
- Your ability to form and maintain *close* relationships with other people
- Your social life



The words used for disorder [XXX] were lay terms such as sadness or fear, not psychiatric terms.

For each activity non-applicable responses were treated as missing. The mean interference with life was calculated across all activities with non-missing responses.

Sheehan Scales were not included for substance use disorders in the version of the WMH CIDI interview used for the New Zealand interview although they have since been added. Participants with alcohol dependence and symptoms in the past 12 months were asked five questions about how much they had experienced consequences of drinking. The response options were ‘a lot’, ‘some’, ‘a little’ and ‘not at all’. The same questions were asked about consequences of drug use for those with 12-month drug dependence symptoms. The questions were:

- How much has your physical health been harmed by your use of [XXX]?
- How much has your family been hurt by your use of [XXX]?
- How much have you done impulsive things that you regretted later because of using [XXX]?
- How much have you failed to do what was expected of you because of your use of [XXX]?
- How much have you been unhappy because of using [XXX]?

12.12.3 Severity

A composite severity measure was developed for the WMH Survey Initiative to classify people with 12-month prevalence of any disorder (cases) as mild, moderate or severe (Demyttenaere et al 2004). In New Zealand the same set of definitions was used except for substance dependence.

For substance dependence the WMH definition of ‘serious’ required at least one symptom in the past 12 months and the presence of physiological symptoms ever. In the US National Comorbidity Survey Replication (NCS-R), Kessler and colleagues (2005c) used a definition that required substantial impairment in the past 12 months before substance dependence was classified as serious; otherwise substance dependence was classified as moderate. Substantial impairment was defined as at least two areas in which a participant experienced consequences of substance use ‘a lot’ (see 12.12.2).

Using the NCS-R definition instead of the WMH definition reduced the percentage of New Zealand participants with substance dependence in the past 12 months who were classified with serious dependence from 90.4% to 25.7%. This strongly supports the contention that physiological symptoms can have occurred at some time without substance dependence symptoms necessarily having a major impact in the past 12 months.

In the definitions below for severity in the past 12 months, disorders had to have occurred in that period. Impairment in the Sheehan Disability Scales was for the worst month in the past 12 months (see 12.12.2).

- *Serious disorder*: Twelve-month bipolar I disorder, 12-month substance dependence with substantial impairment, a suicide attempt in the past 12 months and a DSM-IV CIDI 3.0 12-month disorder; at least two areas of severe role impairment due to a 12-month psychiatric disorder in the disorder-specific Sheehan Disability Scales, or a combination of other criteria found in the NCS-R (Kessler et al 2005c) to predict a global assessment of functioning (APA 2000) of 50 or less in conjunction with a DSM-IV CIDI 3.0 disorder (12-month disorder and 51 or more days out of role in the past 12 months, and no more than one Sheehan domain with a maximum score less than 7 for work or social domains or less than 8 for home and personal relationship domains).
- *Moderate disorder*: Cases not classified as severe were classified as moderate if they reported at least moderate interference in any Sheehan Disability Scales domain or if they had substance dependence without substantial impairment.
- *Mild disorder*: Everyone else with any 12-month diagnosis, not classified as serious or moderate, was classified as mild.

Inevitably such classifications are to some degree arbitrary but they can be extremely useful. In the WMH surveys (Demyttenaere et al 2004) and in New Zealand these three categories of serious, moderate and mild disorder have been partially validated by the maximum days out of role (Table 2.2) and relate strongly to treatment contact (Tables 2.2 and 8.1).