5. METHODS

Introduction

In 2003, the NSW Department of Health, in conjunction with the 17 area health services, completed the second year of the NSW Continuous Health Survey, an ongoing survey of the health of people in NSW using computer-assisted telephone interviewing (CATI). The main aims of the NSW Continuous Health Survey are to provide detailed information on the health of the people of NSW, and to support the planning, implementation, and evaluation of health services and programs in NSW.

Prior to the introduction of the NSW Continuous Health Survey, the Centre for Epidemiology and Research conducted adult health surveys in 1997 and 1998, an older people's health survey in 1999, and a child health survey in 2001.

This section describes the methods used to conduct the *New South Wales Adult Health Survey 2003*, which reports on the health of NSW residents aged 16 years and over.

New South Wales Adult Health Survey 2003

Survey instrument

The survey instrument for the *New South Wales Adult Health Survey 2003* was developed by the Health Survey Program in consultation with key stakeholders, area health services, other government departments, and a range of experts.

The survey instrument included: questions previously used by the Health Survey Program; new questions developed specifically for the *New South Wales Adult Health Survey 2003*; and questions developed specifically for the area health services. All new questions that had previously not been used were submitted to the NSW Department of Health's Ethics Committee for approval prior to their use. New questions were also field-tested prior to inclusion in the survey.

The final survey instrument covered the eight priority areas outlined in *Healthy People 2005: New Directions for Public Health in New South Wales*,[1] and included questions on:

- social determinants of health, including demographics and social capital;
- environmental determinants of health, including environmental tobacco smoke, injury prevention, and environmental risk;
- individual or behavioural determinants of health, including physical activity, body mass index, nutrition, smoking, alcohol consumption, immunisation, and health status;
- major health problems, including asthma, diabetes, oral health, falls, and mental health;
- population groups with special needs, including older people, and rural residents;
- settings including access to, use of, and satisfaction with health services; and health priorities within specific area health services;
- partnerships and infrastructure, including evaluation of campaigns and policies.

The survey instrument was translated into five languages: Arabic, Chinese, Greek, Italian and Vietnamese.

Survey sample

The target population for the *New South Wales Adult Health Survey 2003* was all NSW residents living in households with private telephones. The target sample comprised approximately 1,000 people in each of the 17 area health services (total sample of 17,000).

The sampling frame was developed as follows. Records from the Australia on Disk electronic White Pages were geo-coded using MapInfo mapping software.[2,3] The geo-coded telephone numbers were assigned to statistical local areas and area health services. The proportion of numbers for each telephone prefix by area health service was calculated. All prefixes were expanded with suffixes ranging from 0000 to 9999. The resulting list was then matched back to the electronic phone book. All numbers that matched numbers in the electronic phone book were flagged and the number was assigned to the relevant geo-coded area health service. Unlisted numbers were assigned to the area health service containing the greatest proportion of numbers with that prefix. Numbers were then filtered to eliminate contiguous unused blocks of greater than 10 numbers. The remaining numbers were then checked against the business numbers in the electronic phone book to eliminate business numbers. Finally, numbers were randomly sorted.

When households were contacted, one person was selected using random numbers generated by the CATI system.

Interviews

Interviews were carried out continuously between February and December 2003. Households selected that had addresses in the electronic phone book were sent a letter describing the aims and methods of the survey two weeks prior to initial attempts at telephone contact. A 1800 freecall contact number was provided for potential respondents to verify the authenticity of the survey and to ask any questions regarding the survey. Trained interviewers at the NSW Health Survey Program facility carried out interviews. Up to seven calls were made to

establish initial contact with a household, and five calls were made in order to contact a selected respondent.

Call outcomes and response rates

During the survey, 78,097 telephone numbers were called. The outcome for these telephone numbers is shown in Table 1. Only 26,838 (34.4 per cent) of the numbers called yielded an eligible household. The remaining numbers were not answered (despite seven call backs); or were disconnected; or were business, fax, or interstate numbers.

In total, 15,837 interviews were conducted, with at least 837 interviews in each area health service and 13,088 with people aged 16 years or over. The overall response rate was 67.9 per cent (completed interviews divided by completed interviews and refusals). Response rates varied by area health service, from 57.95 per cent in South Eastern Sydney Area Health Service to 74.9 per cent in New England Area Health Service (Table 2). Most respondents (99 per cent) were interviewed in English. The remaining interviews were conducted in Arabic, Chinese, Greek, Italian, and Vietnamese (Table 3).

Data analysis

For analysis, the survey sample was weighted to adjust for differences in the probabilities of selection among subjects. These differences were due to the varying number of people living in each household and the number of residential telephone connections for the household and the varying sampling fraction in each health area.

'Post-stratification' weights were used to reduce the effect of differing non-response rates among males and females and different age groups on the survey estimates. These weights were adjusted for differences between the age and sex structure of the survey sample and the Australian Bureau of Statistics 2001 mid-year population estimates (excluding people resident in institutions) for each area health service. Further information on the weighting process is provided elsewhere.[4]

Call and interview data were manipulated and analysed using SAS version 8.02.[5] The SURVEYMEANS procedure in SAS version 8.02 was used to analyse the data and calculate point estimates and 95 per cent confidence intervals for the estimates. The procedure calculates standard errors adjusted for the design effect factor or DEFF (the variance for a non-random sample divided by the variance for a simple random sample). It uses the Taylor expansion method to estimate sampling errors of estimators based on the stratified random sample.[5]

The K10+ measure of psychological distress

The K10+ scale was included in the *New South Wales Adult Health Survey 2003*, as a measure of 'psychological distress'.[6,7] The K10 is a 10-item questionnaire intended to yield a global measure of psychological distress. It includes questions about the level of anxiety and depressive symptoms in the most recent four-week period. For each question, there is a five-level response scale based on the amount of time (from none of the time through to all the time) during a four-week period that the person experienced the particular problem.

TABLE 1

OUTCOME OF TELEPHONE CALLS

Outcome	Number of telephone numbers
No Answer after 7 attempts	11360
Not Connected	27902
Business telephone number or fax number	11501
HH not in NSW or holiday house	496
Respondent away for duration of survey	1186
Respondent confused or deaf	1495
Respondent spoke non-translated language	831
Refusal to participate	7489
Complete interview	15837
Total Telephone Numbers called	78097

TABLE 2

COMPLETED INTERVIEWS AND RESPONSE RATES BY HEALTH AREA

Health area	Total respondents	Response rate %
Central Coast	906	68.33
Central Sydney	837	60.30
Far West	904	71.86
Greater Murray	929	73.67
Hunter	993	69.68
Illawarra	904	66.67
Macquarie	962	73.38
Mid-North Coast	1021	71.20
Mid Western	1034	73.65
New England	952	74.90
Northern Rivers	982	70.34
Northern Sydney	933	66.03
South Eastern Sydney	867	57.95
Southern	884	74.47
South West Sydney	922	60.22
Wentworth	900	65.50
Western Sydney	907	60.67
Grand Total	15837	67.89

TABLE 3

COMPLETED INTERVIEWS BY LANGUAGE

Language	Number of respondents
English	15699
Arabic	7
Chinese	94
Italian	0
Greek	2
Vietnamese	35
All	15837

Scoring of the raw questionnaire assigns between one and five points to each symptom, with a value of one indicating that the person experiences the problem 'none of the time' and five indicating 'all of the time'. It follows that the total K10 score for each person ranges from 10 points (that is, all responses are 'none of the time') through to 50 (all responses are 'all of the time').[8,9]

The K10 scores calculated for the *New South Wales Adult Health Survey 2003* are a combination of actual and imputed scores. Where a respondent answered all 10 questions, the K10 score was simply the sum of the individual scores for each question. Where the respondent answered nine questions, the score for the missing question was imputed as the mean score of the nine answered questions.

Indices of geographic remoteness and socioeconomic disadvantage: ARIA and SEIFA

The Accessibility–Remoteness Index for Australia (ARIA) is a measure of the remoteness of a locality based on its accessibility to service centres.[10] It is derived using the road distances from 11,340 populated localities to 201 service centres across Australia. For each locality, the accessibility to services is expressed as a continuous measure from 0 (high accessibility) to 12 (high remoteness) and grouped into five categories: highly accessible, accessible, moderately accessible, remote, and very remote.

The Socio-Economic Indexes for Areas (SEIFA) describe the socioeconomic aspects of geographical areas in Australia, using a number of underlying variables such as family and household characteristics, personal educational qualifications, and occupation.[11]

The SEIFA Index that is used to provide breakdowns of the *New South Wales Adult Health Survey 2003* data is the Index of Relative Socio-Economic Disadvantage. This index is calculated based on attributes such as low income and educational attainment, high unemployment, and people working in unskilled occupations.

SEIFA index values are grouped into five quintiles, with quintile one being the least disadvantaged and quintile five being the most disadvantaged.

Both the ARIA and SEIFA indexes were assigned to the results of the *New South Wales Adult Health Survey 2003*, based on respondents' postcode of residence. Rates for each SEIFA quintile were calculated for several health indicators included in this report, to enable socioeconomic comparisons.

References

1. Public Health Division. *Healthy People 2005: New Directions for Public Health in New South Wales*. Sydney: NSW Department of Health, 2000.
2. Australia on Disk [software]. Sydney: Australia on Disk, 2000.
3. MapInfo [software]. Troy, NY: MapInfo Corporation, 1997.
4. Wiliamson M, Baker D, Jorm L. The NSW Health Survey Program: Overview and methods 1996–2000. Sydney: *N S W Public Health Bull* 2001; 12(S-2).
5. SAS Institute. The SAS System for Windows version 8.2. Cary, NC: SAS Institute Inc., 2001.
6. Kessler R, Mroczec D. *An update of the development of mental health screening scales for the US National Health Interview Survey*. Ann Arbor, MI: Survey Research Centre of the Institute for Social Research, University of Michigan, Memo dated December 22, 1992.
7. Kessler R, Mroczec D. *Final versions of our Non-Specific Psychological Distress Scale*. Ann Arbor MI: Survey Research Centre of the Institute for Social Research, University of Michigan, Memo dated March 10, 1994.
8. Australian Bureau of Statistics. *Information paper: Use of the Kessler Psychological Distress Scale in ABS Health Surveys.* Catalogue no. 4187.0.55.001. Canberra: ABS, 2003.
9. Australian Bureau of Statistics. *1997 National Survey of Mental Health and Wellbeing: Adult component*. Catalogue no. 4326.0. Canberra: ABS, 1998.
10. Commonwealth Department of Health and Aged Care. *Measuring Remoteness: Accessibility–Remoteness Index of Australia. (Revised edition)*, Occasional Paper New Series No. 14. Canberra: CDHAC, 2001.
11. Australian Bureau of Statistics. *1996 Census of Population and Housing: Socio-Economic Indexes for Areas*, Information Paper, Catalogue no. 2039.0. Canberra: ABS, 1998.

MAP OF NSW AREA HEALTH SERVICES

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