# women's
## health
### a u s t r a l i a

**The Australian Longitudinal Study on Women's Health**

**Report 15**

*The* UNIVERSITY *of* NEWCASTLE
AUSTRALIA

in association with

THE UNIVERSITY OF QUEENSLAND

**10 December 2000**

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**EXECUTIVE SUMMARY**

1.  The main surveys are proceeding as planned. This year saw Survey 2 of the young cohort conducted. These women are now aged 22 to 27, an age group which is characterised by extremely high levels of mobility and change. Women in this age group move often, may change their names, and may not appear in telephone and electoral listings. Extensive efforts have gone into attempting to locate young women who have changed their address since last contacted. Staff at the University of Newcastle have used contacts provided by the women at Survey 1, and electronic white pages and electoral rolls, to search for new details and have made approximately 13,000 phone calls in an effort to trace as many of these young women as possible. Over 3,900 additional surveys have been sent to new contact addresses, including about 100 overseas. An additional $70,000, over and above the normal costs of the survey and the salaries of permanent office staff, was expended on surveys, phone calls, and additional part-time staff in order to maximise response rates. All these efforts have resulted in a response rate of 68.9%. which compares favourably with retention rates of other community-wide surveys targeting this age group. It is notable that the withdrawal rate is very low – less than 1% have withdrawn their consent – and the majority of non-respondents have simply not been found despite enormous efforts to locate them. Analysis of Survey 1 data for those who returned Survey 2 quickly, those who returned it after some prompting, and those who did not return it at all indicate no demographic biases, and no differences in physical and mental health scores. This suggests that the sample, although reduced in size, continues to be representative of young Australian women.

2.  The WHA Indigenous Women's Cohort Project involves a process of collaborative research development with community members, in order to identify their concerns and develop research strategies which will be both acceptable and effective. To date, staff have worked successfully with four indigenous communities. The next stage of the project, currently under way, involves talking with members of the Office of Aboriginal and Torres Strait Islander Health (OATSIH), in order to reach consensus about the next step in this research.

3.  The Filipina cohort has been successfully wound up, with a letter and card of thanks sent to every respondent. Analysis of an in-depth study of mental health conducted at the request of this cohort is currently underway.

4.  Planning for Survey 3 of the main mid-age cohort, to be conducted in 2001, has continued. A draft survey has been piloted with 300 women in the Bathurst and Illawarra areas. Revisions made on the basis of these women's responses have generally involved the clarification of some questions and the expansion of response options, and the re-ordering of items in order to reduce missing data. The final survey is currently under consideration by the University of Newcastle Human Research Ethics Committee. We have also begun preliminary preparation for Survey 3 of the older cohort, to be conducted in 2002. There has been some discussion of the appropriateness of mailed surveys for this age group – 75 to 81 years in 2002 – and a preliminary phone survey of 100 participants is currently being conducted, in order to explore the acceptability of this and alternative approaches.

5.  Research output has benefited from continuing successful collaboration among researchers and with postgraduate students. Projects in progress over the past six months have involved additional substudies of all three cohorts, as well as subsidiary analyses of existing data. These smaller projects reflect the need for a biopsychosocial perspective in understanding women's health needs and in developing policy and service provision. The interactions among health behaviours, such as alcohol consumption or use of medications; symptoms, such as menstrual difficulties or urinary leakage; life circumstances, such as family caregiving;

diagnoses; and perceived health make it clear that women's health must be seen in the context of their social and family lives. The research demonstrates the need for integration at the policy level in order to provide appropriate services to women throughout Australia.

The young cohort have been the target of a collaborative substudy focusing on alcohol abuse and its correlates; another substudy of the young cohort, focusing on the aspirations of high- and low-socioeconomic status women, is at the development stage. There are seven substudies of the mid-age cohort currently in progress. One examining heart disease, menopause and HRT, and another two, on depression and on help-seeking for psychological distress, are nearing completion. A fourth which focuses on weight gain during menopause is at the analysis stage; a fifth, on menstrual symptoms, is in the data-collection phase; and the sixth and seventh substudies, both targeting women who have experienced abuse, are in the planning stages. Subgroups of older women have participated in a survey examining sleep difficulties and use of sleeping medications, while additional longitudinal analyses have focused on their changing health and well-being. Subsidiary analysis of the experiences of mid-age and older caregivers has been completed and the work has been accepted for publication; subsidiary analyses of the experiences of menopausal transition are in progress. A further substudy, involving all three cohorts and dealing with urinary incontinence and its treatment, is currently being completed. Other projects include work on menstrual blood loss, iron deficiency and well-being, and on the adequacy of young vegetarians' diets.

6.    In the past 6 months, a total of 16 papers have been published or accepted for publication in peer-reviewed scientific journals. Researchers have presented 11 papers at major conferences and 20 seminars to professional groups.

7.    The team statisticians have focused in the past six months on two main issues: analysis of longitudinal data, and methods for the imputation of missing data. These are both at the cutting edge of statistical theory, and researchers are developing and comparing techniques for dealing with these aspects of survey analysis which will become increasingly important as the project continues. Work on measurement has also progressed, with work on the validation of the WHA Stress Scale, the elder abuse screening instrument, and the Australian Nutrition Screening Initiative.

8.    Work to maintain and improve data quality continues. Considerable effort has been put into the logical imputation of missing and contradictory data, particularly self-reports of menopausal status and reported physical activity. Survey 1 data, with some revisions to correct errors and impute missing data where logically defensible, are in the process of being revised and corrected. Updated Survey 1 databases will be archived in the Social Science Data Archive at the Australian National University during 2001. Survey 2 data for the mid-age and older cohorts, together with an expanded data dictionary, will be archived in December 2000.

# 1 COLLABORATIVE RESEARCH ACTIVITIES

## 1.1 MEETINGS BETWEEN AND WITHIN THE UNIVERSITIES OF NEWCASTLE AND QUEENSLAND

The relocations described in Report 14 (June 2000) brought inevitable changes in the management of the main survey and in the relationships between "main survey" and "special cohorts" research teams. Frequent formal and minuted meetings, both face to face and by teleconference, and close informal contact on a daily basis, have enabled the research teams to maintain coherence and consolidation, and have strengthened the links between the two.

The ten Investigators on the main survey, now located at the University of Newcastle, the University of Queensland, the University of New England, and RMIT University, held teleconferences on 16 June, 4 August, and 25 September. Minutes of these formal meetings appear in Appendix 1.1.

General meetings of Investigators, Associate Investigators and project staff were also held at the University of Newcastle on 4 July, 1 August, 29 August, and 24 October, and minutes of these meetings appear in Appendix 1.2.

Face-to-face meetings between special cohort researchers and those main study researchers located at the University of Queensland were held on 21 June, 20 July, 24 August, 28 September, and 26 October and notes on these meetings appear in Appendix 1.3.

## 1.2 SUMMARY OF COLLABORATIVE RESEARCH ACTIVITIES BETWEEN AND WITHIN UNIVERSITIES OF NEWCASTLE AND QUEENSLAND, AND WITH OTHER COLLABORATING INSTITUTIONS

Research output has benefited from continuing successful collaboration among researchers and postgraduate students. Projects in progress over the past six months have involved additional substudies of all three cohorts, as well as subsidiary analyses of existing data. These smaller projects reflect the need for a biopsychosocial perspective in understanding women's health needs and in developing policy and service provision. The interactions among health behaviours, such as alcohol consumption or use of medications; symptoms, such as menstrual difficulties or urinary leakage; life circumstances, such as family caregiving; diagnoses; and perceived health make it clear that women's health must be seen in the context of their social and family lives. The research demonstrates the need for integration at the policy level in order to provide appropriate services to women throughout Australia.

The young cohort have been the target of a collaborative sub-study focusing on alcohol abuse and its correlates; another substudy of the young cohort, focusing on the aspirations of high- and low-socioeconomic status women, is at the development stage. There are seven substudies of the mid-age cohort currently in progress. One examining heart disease, menopause and HRT, and another two, on depression and on help-seeking for psychological distress, are nearing completion. A fourth which focuses on weight gain during menopause is at the analysis stage; a fifth, on menstrual symptoms, is in the data-collection phase; and the sixth and seventh substudies, both targeting women who have experienced abuse, are in the planning stages. Subgroups of older women have participated in a survey examining sleep difficulties and use of sleeping medications, while additional longitudinal analyses have focused on their changing health and well-being. Subsidiary

analysis of the experiences of mid-age and older caregivers has been completed and the work has been accepted for publication; subsidiary analyses of the experiences of menopausal transition are in progress. A further substudy, involving all three cohorts and dealing with urinary incontinence and its treatment, is currently being completed. Other projects include work on menstrual blood loss, iron deficiency and well-being, and on the adequacy of young vegetarians' diets.

### 1.2.1   Projects completed by WHA investigators

**Project:**                     Family caregiving among mid-aged and older women
**WHA Investigator**:    Professor Christina Lee

This project explored the physical health, health behaviour, and emotional well-being of women in the mid-age and older cohorts who provided family-based care for family members. Survey 1 data were analysed quantitatively and qualitatively. Of 13,888 mid-age women, 1,775 reported family caregiving and 185 provided comments about their experiences. Quantitative analyses showed that caregivers experienced more financial difficulties; poorer physical and psychological health; higher levels of stress; and higher use of health care services. Content analysis of comments supported these findings, and in addition identified emerging themes including difficulties with travel, perceived inadequacies in health and welfare systems, a sense of exploitation, and fear for the future. Of the older cohort, 10% (1,235) identified themselves as caregivers and 168 made comments about their caregiving experiences. Unlike the mid-age women, the older cohort showed no differences in physical health between caregivers and others. They were, however, significantly more likely to have low levels of emotional well-being and to feel stressed, rushed and pressured. Qualitative analysis suggested that the older women were more likely to have internalised the "ethic of care", with fewer comments indicating any sense of exploitation or of inadequacy of support systems. The differences between mid-age and older women have implications for family caregiving in the future: the older women's acceptance of caregiving as their responsibility means that they absorb a major burden which would otherwise have to be funded publicly. It seems that the mid-age women experience the burden of caregiving in a much more negative way, and this may mean that these women will be less willing, or less able, to continue with caregiving as they age. The public implications of such a trend, in combination with increased deinstitutionalisation of the frail and infirm, and increasing longevity, present significant challenges for governments, communities, and individuals.

**Project:**                     Incontinence In Australian women: Following up participants in the
                                     Australian Longitudinal Study On Women's Health
**WHA Investigators:**   Professor Wendy Brown
**Collaborators:**           Ms Yvette Miller (Dept of Human Movement Studies, University of
                                     Queensland); Ms Pauline Chiarelli (Faculty of Medicine and Health
                                     Sciences, University of Newcastle)
**Funding source:**         Department of Health and Aged Care

In the 1996 surveys, 13% of young women (18-23 years), 36% of mid-age women (45-50) and 35% of older women (70-75) reported leaking urine. Of those women who reported leaking urine at Survey 1, the majority had not sought help for the problem.

The objectives of this substudy were to:

1       measure type and severity of urinary leakage;
2       investigate the association between these factors and age-related life events and conditions;

3       establish the determinants of help-seeking behaviour, treatments suggested by health care professionals (for those who sought help), and satisfaction with treatment outcomes among women in each age group who reported leaking urine at Survey 1.

Five hundred participants were randomly selected from women in each of the young (21-26 years), mid-age (48-53 years) and older (72-79 years) cohorts who reported leaking urine in Survey 1. Details about leaking urine (frequency, severity, situations), and associated factors (pregnancy, childbirth, Body Mass Index), perceived changes in leakage over time, and help-seeking behaviour were requested via a self-report mailed survey.

Response rates were 50%, 83%, and 80% in the young, mid-age and older women respectively. Most respondents had leaked urine in the last month (78%, 94%, and 91% of young, mid-age and older women respectively), and the majority of these were cases of incontinence of 'mixed' types. Incontinence severity tended to increase with age and weight. However, there was no significant relationship between severity and number of births, forceps deliveries, or the number of large (>4000 grams) babies delivered.

Only 20%, 57%, and 54% of young, mid-age, and older women respectively had sought help or advice about managing urinary incontinence. The most common reasons for not seeking help were that the women felt they could manage the problem themselves, or did not consider it to be a problem. Fear of surgery was also a frequently reported reason for not seeking help among mid-age and older women. Among those who did seek help, satisfaction was generally high. More than half of the women who did pelvic floor exercises were satisfied with the results. Satisfaction levels were lowest for those who had undergone surgery.

Strategies are needed to encourage women who experience urinary incontinence to seek help. Health care professionals should be aware of the possibility of early onset incontinence, the progression of urinary incontinence, and treatment options which are effective and enable women to avoid surgery.

### 1.2.2   Projects in progress by WHA  investigators

**Project:**              Menopausal symptoms and help seeking
**WHA Investigators:**  Professor Wendy Brown, Dr Gita Mishra & Professor Annette Dobson

The objective was to measure changes in symptoms experienced by six groups of women in different stages of the menopause transition.

The study, involved 8,623 mid-aged women who participated in Survey 1 in 1996 and Survey 2 in 1999, and who had not had a hysterectomy. Women were categorised into one of six menopause groups according to their menopausal status at Surveys 1 and 2.

At Survey 1, the most commonly reported symptoms were headaches, back pain, stiff joints, tiredness and sleeping difficulty. Peri-menopausal women were more likely than pre-menopausal or post-menopausal women to report these symptoms. Hot flushes and night sweats were more common among post-menopausal women. Compared with pre-menopausal women, those who were in the early stages of menopause were about 30% more likely to report tiredness, stiff joints, sleeping difficulties and hot flushes at Survey 2 than those who remained peri-menopausal throughout the two-year period. Women who remained peri-menopausal were also about 30% more likely to report back pain and leaking urine. Compared with pre-menopausal women, odds ratios for

night sweats increased for women in consecutive stages of the menopause transition and remained high in the post-menopausal women.

With the exception of night sweats, changes in self reported physical and menstrual symptoms were most marked in early menopause, and among women who remained peri-menopausal during the two-year period.

**Project:**            Ethnicity and menopausal symptoms in mid-age women
**WHA Investigators:**  Professor Christina Lee and Dr Gita Mishra

Cross-cultural research suggests that women in different countries report different experiences during menopause, and a recent US study has shown that African, Asian, Hispanic and White American women report different levels and types of symptoms. There is considerable debate about whether these observed differences result from physiological, possibly genetically based, differences during the menopausal transition, or are better understood as reflections of differing cultural views of menopause and ageing. This analysis of Survey 1 and Survey 2 data for the mid-age group was conducted to explore the effect of country of birth on the menopausal transition. Of 8,236 women who had not had a hysterectomy and for whom complete data were available, 6,278 (76%) were Australian-born, 1,134 (14%) from other English-speaking countries, 512 (6%) from non-English speaking European countries, 191 (2.3%) from Asian countries, and 121 (1.5%) from other countries. Analysis and report writing are currently under way. Preliminary analysis suggests that women from Asian countries go through menopause more quickly and at a somewhat younger age, but that there are no differences between these groups in SF-36 or menopause-related symptoms.

**Project:**            Quality and accessibility of health care for women in Australia with diabetes
**WHA Investigators:**  Dr Anne Young, Dr Amanda Patterson & Dr Julie Byles
**Assoc Investigator:** Dr Julia Lowe

The aims of this project are:

- to report on prevalence of diabetes; risk factors for diabetes (such as inactivity, overweight and obesity); and the health, functional status and access to health care services for women with and without diabetes, by analysing data obtained from Surveys 1 and 2 of the WHA project; and
- to examine the use of general practitioner and specialist services, out of pocket costs and use of best practice guidelines for HbA1c, lipids, microalbuminuria and retinal screening for women with diabetes, using Medicare/Department of Veterans' Affairs data.

This project uses a multidisciplinary approach to examine the quality and accessibility of diabetes-related health care for women in Australia and will contribute towards the evaluation of the goals of the National Diabetes Strategy. The objective is to use data from Surveys 1 and 2 for the young, mid-age and older cohorts of women to provide information about the health and well-being of women with and without diabetes in Australia. Women who reported having been diagnosed with diabetes prior to the first survey in 1996 will be followed prospectively to determine their health outcomes. The longitudinal data allow the new cases of diabetes to be studied as a special group of interest.

| Project: | The role of psychosocial factors in the onset of Type 2 Diabetes. |
| --- | --- |
| WHA Investigators: | Associate Professor Justin Kenardy, Dr Amanda Patterson & Dr Anne Young |
| Assoc Investigator: | Dr Julia Lowe |
| Collaborator: | Mr Esben Strodl |

There is some evidence that psychosocial stress is a risk factor for Type 2 Diabetes. The Women's Health Australia dataset allows examination of the relative contributions of psychosocial factors such as perceived stress, life events, social support and depression to the onset of diabetes. The study will examine the data from Surveys 1 and 2 in order to contrast women who have developed type 2 diabetes over the course of the study, and those who had diabetes throughout the study, and those who never had Type 2 Diabetes. The study allows for statistical adjustment for physical activity, diet, weight, use of health services, and education.

### 1.2.3  Completed projects by postgraduate students (since June 2000)

| Project: | Stability of groups of correlated variables identified by exploratory factor and cluster analysis. |
| --- | --- |
| Degree: | Masters of Medical Statistics |
| Candidate: | Ms Jennifer R. Powers (Research Centre for Gender  and Health (RCGH), University of Newcastle) |
| Supervisor: | Professor Annette Dobson |

Many health studies, particularly complex studies such as Women's Health Australia (WHA), collect data on a large number of variables. The WHA project aims to examine the relationships between biological, psychological, social and lifestyle factors and women's physical health, emotional well-being, and their use of and satisfaction with health care services. As the questions came from a wide range of sources, such as validated scales and modifications of existing measures, intercorrelations between variables are likely and analyses may be complicated by the problem of multicollinearity.

This study used different types of cluster analyses and exploratory factor analyses with several data sets to identify stable groups of correlated variables so that the problems of multicollinearity could be avoided in future analyses. In 1996, Survey 1 was completed by 14,100 mid-age women. The survey included 100 questions, which consisted of 298 items, covering demographic and social characteristics, symptoms and conditions, use of and satisfaction with health services, and so on. Some items were excluded, leaving 266 items in the final analyses.

Five analyses (cluster analysis with three different linkages and factor analysis with two different rotations) were used on each of three different samples. Factors and clusters identified in the fifteen analyses were examined by eye to extract common groups of items. These fell into the following broad categories – perceived physical and mental health (5 groups, 40 items), health service use (2 groups, 15 items), gynaecological health (3 groups, 19 items), lifestyle (4 groups, 25 items) and demographics (4 groups, 23 items).

The perceived physical and mental health groups mainly related to sub-scales of the Medical Outcomes Study Short-Form General Health Survey (SF-36), which is a self-reported measure of general health status or quality of life. Group one mainly consisted of physical role and bodily pain, and back pain and joint pain were included in some analyses. Feeling stressed about one's own health joined with the five general health items in the second group. Group three identified seven of the ten physical functioning items and excluding the more severe limitations to physical

functioning. The mental health sub-scales and two non-SF-36 items (tiredness, and feeling sad and lonely) made up the final two groups.

In the health service use category, one group related to satisfaction with the most recent visit to a general practitioner (GP). The second group included being admitted to hospital, having a major illness or surgery in the last year and consultations with GP, hospital and specialist doctors. Gynaecological health consisted of one group relating to menstruation and another about the detection and treatment of breast cancer.

Four groups came under the lifestyle heading. One included items on BMI and self-assessment of weight. Two groups related to tobacco and alcohol consumption. The final group concerned general satisfaction with life and social support. Under the heading of demographics, items in one group were related to Australian born/English speaking and items in another related to being married. In the third group, higher qualifications were associated with more professional occupations. The fourth group included items about work, feeling rushed and available time.

The consistent identification of 18 groups of correlated items from these fifteen analyses provides evidence that the factors and clusters in these groups do actually exist. The main reasons for the consistent combination of items into groups are understandable. Firstly, some groups of items were originally assembled as a scale, for example satisfaction with the most recent GP visit. Secondly, other groups of items related to a specific topic e.g. menopause, mammography and breast surgery. However a series of items about ways of coping with stress did not form a group. Instead they loaded with other items about the activity concerned e.g. tobacco consumption and smoking to reduce stress were in one group, while weight, dieting and eating to reduce stress were in another.

The usefulness of this type of analysis is firstly to identify potential multicollinearity in a large group of variables. Groups of correlated variables are identified so that the number of variables can be reduced by selecting variables or creating scores or indices that combine data from variables in the same group. The new relatively uncorrelated variables can then be used in further analyses.

Secondly, the results can be used to investigate redundancy. Thirdly, the correlation between variables can be used to impute missing values. In conclusion, a combination of factor and cluster analyses seems a useful tool for assessing multicollinearity.

|  |  |
|---|---|
| **Project:** | Depression Study: Emotions and Health |
| **Masters candidate:** | Ms Barbara Reen (Centre for Clinical Epidemiology and Biostatistics, University of Newcastle) |
| **Supervisors:** | Dr Carla Treloar, Associate Professor Nick Higginbotham & Ms Sue Outram |
| **Funding source:** | Part funding by Centre for Clinical Epidemiology and Biostatistics |

The experience of emotional distress has been recognised in Australia and world-wide, as imposing a significant health burden on women. Overseas studies have pointed to the importance of economic, cultural and social factors in contributing to these experiences. To gain insight into the complex ways in which these factors affect women's lives, this study moved beyond the written questionnaire to collect more detailed qualitative information using open-ended questions in audio-taped telephone interviews lasting 35 - 60 minutes. Fifteen women from the mid-age group, who had indicated at both Survey 1 and 2 that their lives had been affected by feelings of emotional distress, were interviewed. They were randomly selected from rural and remote areas of Australia.

The interviews were completed in mid-June, transcribed (using pseudonyms to protect the identities of the women), checked for accuracy against the audio recording, then coded into the following categories: the causes of emotional distress (including relationships, grief, traumatic events); relationships with partner, family, friends and health professionals; coping strategies; personal attributes; needs, and personal growth.

The study presents a detailed description of the range of emotions experienced by these women and of the ways in which their emotional experiences affect their lives. The study identifies many of the pressures placed on women living in isolated rural and remote areas and describes the way the women respond emotionally to these pressures. Listening to each woman talking about her own unique experiences, about her relationships, about her strengths and weaknesses, about help-seeking and about ways of coping has helped to identify health and community needs which are not being met adequately and to suggest practical ways of responding to these needs.

### 1.2.4   Student projects in progress

**Project:**            Experiences of mid-aged women in NSW seeking help for psychological distress

**PhD candidate**:       Ms Sue Outram (Faculty of Medicine & Health Sciences, University of Newcastle)

**Supervisor**:          Professor Jill Cockburn

This project aims to identify sociodemographic and health-related variables which were significantly associated with poor mental health among the mid-age women at Survey 1, and then to describe the experiences of help-seeking for psychological distress by focusing on a sample of 400 NSW women with poor mental health scores. This includes an analysis of the way women describe their feelings, the perceived causes of their distress, the type of help sought, and its perceived effectiveness.

In Study 1, cross-sectional data from 14,000 mid-age women were analysed. Women who scored 52 or less on the Mental Health Index (MHI-5) of the SF-36 were classified as having "poor mental health", and logistic regression was used to compare these women with the remainder on a series of relevant sociodemographic and health-related variables. Factors associated with poor mental health were: low level of education; no work outside the home; unemployment or inability to work due to sickness; born in continental Europe; higher numbers of life events; being perimenopausal or having had a hysterectomy; lower satisfaction with friendships; low perceived social support outside the family; feelings of being poorly understood; low levels of physical activity; and smoking 20 or more cigarettes per day.

Study 2 involved semi-structured telephone interviews with 400 women living in NSW who scored 52 or less on the MHI-5. Four of these will receive a further interview to assess their experience in retrospect and to collect further detail for in-depth case studies. When interviewed, the women most commonly identified the main cause of their psychological distress as family worries (74%), followed by physical ill health and work difficulties. Two thirds of the women had talked to a health professional about psychological distress, and as expected the health professional most commonly consulted was the general practitioner (52%), followed by mental health professionals (33%) and complementary therapists (15%). General practitioners generally responded by listening and by prescribing medications. Approximately 70% of women felt that their particular GP had been helpful to some extent, but most were critical of GPs in general. These criticisms focused on a lack of interest and expertise in emotional problems, inappropriate prescription of psychotropic drugs, and lack of a holistic approach to care.

The thesis, which was submitted in November 2000, highlights the strong association between poor mental health and poor socioeconomic conditions, particularly low levels of education and lack of paid employment. This suggests that women who have been able to access opportunities for education and employment in early adulthood may be better able to avoid psychological distress in midlife. Improving educational and employment opportunities for younger women may thus help to prevent poor mental health. Screening and appropriate follow-up treatment may enable GPs to identify women with poor mental health and to provide interventions which improve their quality of life. As the GP is usually the first port of call for women experiencing psychological distress, GPs may also benefit from programmes to improve their skills and confidence in dealing with these problems.

**Project:**          Psychosocial problems of sufferers of intractable angina
**PhD candidate:**     Mr Esben Strodl (School of Psychology, University of Queensland)
**Supervisor:**        Associate Professor Justin Kenardy
**Funding source:**    Australian Postgraduate Research Award, University of Queensland

Analyses were based on the data from Survey 1 and 2 for the older cohort of WHA. Five hundred and three women reported having no heart disease in 1996 but having heart disease in 1999. The first analysis involved examining whether a number of psychological variables measured in 1996 were related to the development of heart disease during the subsequent 3 year period. The psychological variables included the Duke Social Support Index (DSSI), Perceived Stress, Mental Health Index (MHI from the SF-36), time pressure, and whether or not the participants had a partner. It was shown that both Perceived Stress and DSSI significantly predicted the development of heart disease over the 3 year period. However, when entered into a multivariate analysis, only Perceived Stress was a significant predictor. The study also found that there were a number of biological variables that were significant predictors of the development of heart disease (higher BMI, nutrition-related problems, higher alcohol intake, lower physical activity, and hypertension). Perceived Stress was still a significant predictor of heart disease even after controlling for these biological variables. Elderly women with high levels of stress had approximately twice the chance of developing heart disease over a 3 year period compared with women who reported no stress in 1996.

A similar set of analyses was performed using the development of hypertension over the 3 year period as the outcome measure. The results suggest that the MHI in 1996 was a significant predictor of the development of hypertension, even after controlling for a range of biological variables. Thus it is possible that clinical levels of depression or anxiety may be causally involved in the development of hypertension in elderly women.

We also examined whether psychological variables in 1996 could be used to analyse whether those women who developed heart disease would experience chest pain or not in 1999. After controlling for possible confounding from comorbid heartburn/indigestion and panic attacks in 1999, none of the psychological variables could significantly predict the presence of chest pain in women who develop heart disease. Similarly, none of the psychological or biological variables in 1996 could predict whether or not elderly women, without heart disease in 1996, would have heart surgery in the following 3 year period.

The results of this study suggest that although stress may be a significant predictor of the development of heart disease in elderly Australian women, two common manifestations of heart disease (chest pain and heart surgery) are not associated with any of the psychological variables measured in 1996.

**Project:**     Menstrual blood loss, iron deficiency, tiredness and wellbeing in working women
**PhD candidate:**  Ms Allison Schmidt (RCGH, University of Newcastle)
**Supervisors:**   Professor Wendy Brown & Professor Christina Lee
**Funding source:**  ARC Small Grant and University of Newcastle Postgraduate Scholarship

The aim of this study is to conduct research into menstrual blood loss and its correlates in a healthy, employed female population. The research project follows an earlier PhD project by Dr Amanda Patterson which demonstrated that women's serum iron status was not closely related to dietary intake of bioavailable iron and suggested that variations in menstrual blood loss might explain this finding. Direct assessment of menstruation provides an important complement to the self-report data from the main surveys, which suggest that heavy periods and menstrual distress are commonly experienced in both the young and mid-age cohorts.

This project aims to provide population data on normal menstruation, to assess the prevalence of heavy menstrual blood loss (MBL) among working women aged 20-50, and the relationship between MBL and iron status, tiredness, vitality, general well-being and use of sick leave.

Stage I of this project involves the collection of systematic self-report data on menstrual blood loss. Women are provided with standardised menstrual products and asked to complete a pictorial chart of blood loss and product use for one menstrual period, and to complete measures of well-being (SF-36), tiredness, menstrual symptoms, and demographics. A total of 192 women have participated to date. Preliminary results suggest that high MBL is associated with increased reports of tiredness and reduced well-being. Exploration of the relative impact of heaviness of menstrual flow and length of menstrual period on well-being are being undertaken.

Stage II involves the direct assessment of iron intake and loss. Volunteers for this aspect of the project are asked to collect all used menstrual products for one menstrual period, to provide a venous blood sample, and to maintain weighed food records for 12 days, as well as completing self-report data as in Stage I. Extraction of haemoglobin from menstrual products provides a measure of iron lost during menstruation. Arrangements have been made to collaborate with staff of the Department of Obstetrics and Gynaecology at the University of Sydney, who regularly conduct this procedure with clinic patients, to perform these analyses. Test samples have been analysed successfully. Twelve-day weighed food records are sufficient for a reliable assessment of intake of bioavailable iron, and venous blood samples will provide measures of iron status. Seventy women have been recruited so far and data collection is in progress.


**Project:**     Mid-aged women's experience of adult relationship abuse: An evaluation of coping responses
**PhD candidate:**  Ms Glennys Parker (RCGH, University of Newcastle)
**Supervisor:**    Professor Christina Lee
**Funding:**     Postgraduate Research Scholarship in Women's Health, Research Centre for Gender and Health.

Research on violence towards women and its health-related consequences is a relatively young and fragmented field in Australia. In 1999, a substudy of the Women's Health Australia project surveyed mid-aged women who had been abused to identify the nature and scope of gendered abuse in this country. Whilst information from this research is important, significant gaps of understanding remain. In particular, it was felt that insights and observations from the victims' point

of view should be explored. For this reason, the primary focus of this PhD thesis is to develop a framework for understanding women's experiences and the personal meanings of these experiences and to describe the range and effectiveness of coping strategies used by these women. A survey instrument has been mailed to 200 abused women who have already indicated their willingness to take part in further research on the topic. Quantitative and qualitative analyses will be conducted in 2001.

**Project:** Young women, work and inequality: Is it what they want or what they get?
**PhD candidate:** Ms Lisa Milne (Dept of Sociology & Anthropology, University of Newcastle)
**Supervisors:** Dr Deidre Wicks & Dr Gita Mishra
**Funding source*:* ARC Small Grant

This project focuses on the aspirations of young women for work, their ideal job, relationships (including children), and further education, particularly in the context of gender inequality in labour markets. It combines a survey of 1,400 young women with semi-structured telephone interviews with a subgroup of 100 women who were interviewed in depth. The project is currently in the development and piloting stage.

Analysis will examine the extent to which gender inequalities are the result of free choices and preferences, or are conditioned by socio-economic structures and processes that reproduce inequalities over time. This issue is further explored through a classification of women by socio-economic status. In this way, we can analyse the gender dimension of labour market inequality in general as well as the relationship of gender inequality to class inequality in the areas of work, work choice and the ability to combine work and family responsibilities.

Analysis of the two data sets will shed light on debates about women's workforce participation as well as establishing baseline data for future research on the options chosen and available for this group of young women. The information will have significance for policy debates in several areas, including those concerned with worker entitlements, childcare, access to higher education and workforce planning. More particularly, it makes a significant contribution to current debates about women's alleged preference for part-time rather than full-time work.

**Project:** Factors influencing weight change in the menopausal years
**PhD candidate:** Ms Lauren Williams (RCGH, University of Newcastle)
**Supervisors:** Professor Wendy Brown & Dr Anne Young
**Funding source:** ARC Small Grant

This study involves analysis of main survey results and results of a nested cohort study to address the question of why women gain weight in the menopausal years (45-55). The women in the mid-aged cohort who reported their weight at Surveys 1 and 2 (N = 11,306) gained a mean of $1.12 \pm 7.0$ kilograms, from a mean of $68.9 \pm 14.6$ kilograms at Survey 1 in 1996 to $70.0 \pm 15.0$ kilograms at Survey 2 in 1998. More than two thirds (69%) of the cohort had a net weight gain over the two year period. Preliminary analysis suggests that the women who progressed from being premenopausal to post menopausal in that two year period, gained more weight (1.82 kg) than those women who went from being premenopausal to perimenopausal (0.94 kg), or from perimenopausal to postmenopausal (1.02kg).

The extent to which menopause and other factors contribute to weight gain in the mid-aged women is being investigated in a nested cohort study of 1,164 women who experienced a change in menopausal status between 1996 and 1998. 78% of these women completed a questionnaire

containing pre-validated measures of dietary intake, exercise, emotional eating and lifestyle factors which might affect weight in mid-aged women. Preliminary analysis shows that 595 (51%) of these women reported weight gain since completing the Survey 1 three years previously. Only two of these women reported that this weight change was intentional; 14% reported having lost weight, and 35% reported weighing about the same as three years previously. Further analysis of the data will elucidate why some women gained weight, while others lost or maintained weight. Recommendations can then be made for avoiding weight gain at menopause.


**Project:**          A longitudinal study of women with menstrual symptoms, treatments tried, hysterectomy and satisfaction with outcomes
**Masters candidate:** Ms Melissa Graham (School of Health & Human Sciences, La Trobe University)
**Supervisors:**      Dr Helen Keleher & Dr Erica James
**Funding source:**   Internal staff grant, La Trobe University

Hysterectomy is one of the most commonly gynaecological surgical procedures of a non-obstetric nature. Australian statistics indicate that just over one in ten women will undergo a hysterectomy by the age of 40, and around one in five women will undergo a hysterectomy before the age of 50. The appropriateness of hysterectomy to treat non-malignant conditions has been debated in recent years. A variety of procedures, less dramatic than hysterectomy, are available to treat menstrual symptoms successfully. A woman's level of satisfaction is one measure of the successful treatment of symptoms. Other factors such as socio-economic status, social support, geographical location, education, menopause, emotional and sexual consequences, may also influence satisfaction. To investigate these issues, two studies are being conducted. The first is a prospective cohort study which aims to determine women's satisfaction with the outcomes of hysterectomy compared to alternative treatments. The second is a retrospective cohort study which aims to determine women's reasons for electing to have a hysterectomy. Data collection for the prospective study has been completed and analysis has commenced. The follow-up component of the prospective study is due to commence in August 2001. The retrospective study data collection stage has been completed and data entry and analysis is currently under way. The overall response rate for the prospective and retrospective study combined is 82%.


**Projects:**         The physical and psychological health impact of domestic violence on mid-age women in Australia
**PhD candidate:**    Ms Deborah Loxton (School of Health, University of New England)
**Supervisor:**       Associate Professor Margot Schofield
**Funding source:**   Australian Postgraduate Research Award, University of New England Scholarship

Women who had ever experienced domestic violence were found to be less healthy than women who had never experienced domestic violence. The relationship between domestic violence and physical health was mediated by presence of a qualification, income management, social support, life events, smoking and stress. The relationship between domestic violence and psychological health was mediated by presence of a qualification, income management, social support, life events, binge drinking, and stress.

The negative effect of domestic violence on both physical and psychological health appears to be reduced among women who have post-secondary qualifications, who are able to manage on their income, who have social support, who have experienced few life events, who do not "binge drink" (more than five drinks at one time), and who have low levels of perceived stress.

Two articles, one concerning the physical health and the other concerning the psychological health of women who have experienced domestic violence, and the mediators in these relationships, are in the final stages of being written up and will be ready for submission by December 2000.

A qualitative follow-up study is planned for early 2001; the research proposal and ethics applications for this study are currently being developed. It is expected that a pilot study will take place in February, with the major data collection and analysis taking place later in 2001.

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|---|---|
| **Project:** | Psychological predictors of successful ageing in a cohort of Australian women |
| **Masters candidate:** | Ms Nadine Smith (RCGH, University of Newcastle) |
| **Supervisors:** | Professor Christina Lee & Dr Anne Young |
| **Funding source:** | Postgraduate Scholarship for Master of Medical Statistics, RCGH |

Research to improve our understanding of factors which increase well-being in older age is becoming increasingly relevant with increasing life expectancies and decreasing public resources to support the frail elderly.

Psychological literature suggests that given equivalent physical health status and material conditions, individual differences in perceived health and well-being may be affected (perhaps partially determined by) by two intrapersonal factors. These are optimism, the inclination to anticipate the best possible outcome, and health-related hardiness, which is a composite of a sense of control over, commitment to maintain, and tendency to take direct action over one's health. This study aims to use optimism and health-related hardiness measures in combination with measures of physical health, social functioning, and socioeconomic status in the longitudinal older cohort survey of the Women's Health Australia project to predict well-being.  The older cohort of women aged 70 to 75 in 1996 comprises 10,421 women who were surveyed in 1996 and resurveyed in 1999. All data have been collected with a response rate for Surveys 1 and 2 of 88% and analyses are now underway.

### 1.2.5   Other collaborative research activities

| | |
|---|---|
| **Project:** | Alcohol consumption by young Australian women: Patterns, harm, and influence |
| **Collaborators***:* | Dr Helen Jonas (School of Health & Human Sciences, La Trobe University) & Professor Margaret Hamilton (Turning Point Alcohol and Drug Centre Inc, Fitzroy) |
| **WHA Collaborator:** | Professor Wendy Brown |
| **Funding source:** | Victorian Health Promotion Foundation |

Despite concerted community efforts to highlight the risks and reduce the harm associated with heavy drinking, the proportions of young Australian women who drink at hazardous or harmful levels and who binge drink regularly remain high. Most strategies aimed at reducing heavy drinking by young Australian women have failed because relevant information is lacking on the multiple factors that influence young Australian women's drinking patterns, attitudes, behaviours and drinking-associated harm. The aim of this project is to provide such information.

In October 1999, a comprehensive survey was mailed to a sample of 2,400 young Australian women (21-26 years) already participating in the Women's Health Australia project. The young women were asked about:

- their patterns of drinking, and any harm arising from their drinking;
- the cultural and societal influences on their drinking;
- the settings in which they were most likely to consume alcohol;
- the perceived consequences of drinking harmful amounts of alcohol;
- the strategies that they used to monitor/control their alcohol consumption;
- the strategies that they used to minimise potential harm resulting from drinking to intoxication;
- the influences of external organisations on their drinking practices.

Fifty four percent of the young women mailed back their completed questionnaires. The information from all the survey forms is currently being processed, analysed and reported.

This study will provide up-to-date information on issues relevant to young women's drinking, and contribute significantly to the design and delivery of effective education and prevention programs.

**Project:** Sleeping difficulty and sleeping medication use among older women.
**WHA Investigators:** Dr Julie Byles & Dr Gita Mishra
**Collaborators:** Dr Margaret Harris & Associate Professor Kichu Nair
**Funding:** Quality Use of Medicines Evaluation Program, Department of Health and Aged Care

Difficulty sleeping is common in older people and frequently attributed to age related physiological changes. Compared with younger adults, older people have less slow-wave sleep (stage 3-4) and less total sleep time. Older people also have more fragmented sleep, waking more frequently and lying awake for long periods.

Given these patterns, there is widespread acceptance that sleep disturbance is normal for older people and has no pathological significance. However, this assumption is not supported by the small amount of population data that is available. Although sleep disturbances increase with ageing, changes in sleep pattern do not necessarily lead to symptoms of sleep disturbance or complaints of insomnia.

Analysis of Survey 1 data from women aged 70-75 years identified strong statistical relationships between self-reported sleeping difficulty and health-related quality of life, and between use of sleeping medications and quality of life. Approximately 50% of older women in the WHA project reported some degree of difficulty sleeping, and 17% reported often having difficulty sleeping. The adjusted means for the MOS Short Form–36 (SF-36) health survey subscale scores were significantly lower among women with sleeping difficulty and were also significantly lower among the 18% of women who reported using sleeping medication in the 4 weeks prior to study.

However, while these associations are both clinically and statistically significant, it is not clear whether sleeping difficulty reduces quality of life, or whether poor quality of life interferes with sleep, or whether both problems are a result of other associated conditions.

Survey 2 (1999) for the old cohort included the sleep sub-scale of the Nottingham Health Profile (NHP). Scores on this sub-scale ranged from 0-100 and the median score for the cohort was 12.6. Responses to individual items provide more detail on the types of difficulty reported with 42% of women reporting "waking in the early hours", 26% "taking a long time to get to sleep", 21%

"sleeping badly at night", and 11% "lying awake most of the night". Although not part of the sleep sub-scale, an additional NHP item "worry keeping you awake" was included for face validity, and 11% of women reported this was a problem. Thirty-seven percent of women reported "no" to all NHP sleep sub-scale items, 33% reported one item only, 16% reported 2 or 3 items, and 14% reported more than 3 items.

Self-reported sleeping difficulty appeared to be a persistent condition among women in the cohort with a strong association between reported frequency of sleeping difficulty at Survey 1 and reporting difficulty on NHP items at Survey 2. Similarly there was a high level of agreement (88%) between taking sleeping medication within four weeks before Survey 1 and within four weeks before Survey 2, indicating that the use of these medications is a persistent and stable behaviour.

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| **Project:** | Mid-aged women and heart disease: Understanding risks and prevention |
| **Collaborator:** | Dr Marilys Guillemin (Centre for the Study of Health & Society, University of Melbourne) |
| **WHA Collaborator:** | Professor Wendy Brown |
| **Funding source:** | University of Melbourne & Australasian Menopause Society |

This research examines: how mid-age women with diagnosed heart disease understand their condition; the impact of heart disease on their lives; how they perceive their risks of heart disease; and the strategies they employ (if any) to prevent further recurrences of heart disease. This research was initially funded by the Australasian Menopause Society. Since the commencement of the research, the investigators have been successful in attracting a second grant from the Melbourne Research Career Establishment Grant Scheme to extend the research.

To date the following research has completed:

1. Analysis of WHA data for associations between reported cardiovascular disease and recognised biological, social and psychological risk factors in the mid-age cohort (n=319).
2. Questionnaire survey of women from the WHA mid-age cohort who reported to have cardiovascular disease; 94 women out of a possible 189 women responded to the survey (50% response rate). The survey results are currently undergoing analysis.
3. Exploratory in-depth, face to face interviews with 32 women (73% participation rate) from the WHA mid-age cohort in rural and urban Victoria who report to have cardiovascular disease. All the interviews have been completed and are currently undergoing analysis.

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|---|---|
| **Project:** | Vegetarian style eating practices among young Australian women |
| **Collaborators:** | Dr Surinder Baines |
| **WHA Collaborator:** | Professor Christina Lee |

Vegetarian diets have been implicated in conferring health benefits. Vegetarians are usually health conscious individuals. Mortality rates for vegetarians are reported to be lower than those of the general population and studies have shown a lower prevalence of a number of diseases that are common in Western countries, such as obesity, coronary heart disease, hypertension and some cancers. However the health benefits of vegetarianism may not be simply related to diet, but could be explained by a number of lifestyle differences such as limiting or refraining from tobacco and alcohol consumption.

Research by others has shown that vegetarian diets have no advantage over healthy omnivore diets unless they are planned appropriately and can meet all energy and nutritional requirements. Indeed, unbalanced vegetarian diets can have long term detrimental effects to health.

Currently there is an increasing trend towards vegetarianism in the Western world and the dramatic increase in the popularity of meat avoidance in recent years, particularly red meat, has raised concerns about the nutritional adequacy of such diets. For example, it is known that some vegetarian diets can be low in iron and zinc and recent reports note that selenium and calcium content may also be low. Consequently, poorly balanced vegetarian diets could result in general malnutrition and cause anaemia, fatigue and poor wound healing. They could also increase the possibility of developing osteoporosis prematurely. Menstrual dysfunction has also been reported among vegetarian women.

The vegetarians most likely to experience health problems as a result of their dietary practices are in the younger age group, especially women and those individuals who adopt extremely restrictive diets. Concerns have been raised about the nutritional adequacy of such diets, especially for teenage girls who have high nutritional requirements.

Dietary practices relating to meat avoidance and vegetarianism have not been extensively studied and to date there are only fragmentary reports in Australia and overseas about these practices. This study plans to investigate the dietary practices and the impact on health of young Australian women who deliberately limit or avoid the consumption of meat and follow vegetarian style dietary practices. Following a pilot survey with university students, a substudy of 500 participants of the young cohort will be conducted. These will be women who reported meat avoidance or vegetarianism in Survey 2, together with a comparison group who eat all categories of food. The project will assess whether these dietary practices have an impact on perceived physical and mental health, and whether any associated health risk is reflected in the use of health services. In addition the study will determine whether these dietary practices are used primarily to lose weight or for other reasons.

**Project:**          A longitudinal investigation of weight maintenance: Implications for weight gain prevention strategies.
**Collaborator**:    Dr Kylie Ball (Faculty of Health and Behavioural Sciences, Deakin University)
**WHA Collaborators:** Professor Christina Lee, Professor Wendy Brown
**Funding source:**   Deakin University, 2000 Faculty Research Development Grants

This project aims to investigate characteristics of women in the young cohort who maintain their weight over a four-year follow-up period. To date, a casual research assistant has been employed by Deakin University to work on this (and other) projects with Dr Kylie Ball, and preliminary descriptive analyses of Survey 1 data have been conducted with weight-related variables (eg physical activity, dieting). This will provide insight into potential analyses which will be important for investigating weight maintenance longitudinally, when complete Survey 2 data for the young women are available in early 2001.

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| **Project:** | The measurement of socio-economic status of Australian women. |
| **WHA Investigators:** | Dr Gita Mishra, Professor Annette Dobson & Dr Julie Byles |
| **Collaborator**: | Dr Kylie Ball (Faculty of Health and Behavioural Sciences, Deakin University) |
| **Funding source:** | Research Management Committee Project Grant, The University of Newcastle |

Several analyses of age- and gender-specific measures of socio-economic status have been conducted. National Health Survey data, which include both males and females, are being used in order to develop age- and gender-specific measures which will be useful in the conceptualisation of SES within Women's Health Australia. Factor analysis produced consistent results that were interpreted in terms of five conceptually meaningful domains (employment, housing, migration, family unit and education). Age- and gender-specific SES scores based on these factors had stronger associations with physical and mental health, as measured by the component summary scores of SF-36, than either an area-based index or scores derived from data from males aged 40-45 years. The results supported the hypothesis that SES measures composed of social and demographic items exhibit important age- and gender-specific differences which are relevant for health.


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|---|---|
| **Project:** | Women and leisure towards 2000. Does all work and no play make Jill unwell? |
| **Collaborator:** | Associate Professor Peter Brown (Dept of Leisure and Tourism, The University of Newcastle) |
| **WHA Collaborators:** | Professor Wendy Brown, Emeritus Professor Lois Bryson & Dr Penny Warner-Smith |
| **Funding source:** | ARC Small Grant |

This sub-study aims to develop an understanding of the role of leisure in women's lives, and the relationships between leisure, well-being and gender relations. Key questions addressed by the study include: i) How do women divide their time between various types of leisure, including active/passive, structured/unstructured, relational/non-relational leisure? ii) How are leisure patterns and outcomes mediated by age, location (rural, urban, remote), class, and ethnicity? iii) What patterns of leisure are associated with the greatest satisfaction for women and with the most efficacious outcomes for well-being?

A series of 11 focus groups have been completed involving 62 women from the existing 'young' and 'mid-age' WHA cohorts in a mix of 'urban' (Belmont, Dapto), 'rural' (Dubbo, Mittagong) and 'other rural' (West Wyalong) areas. Data are currently being analysed with particular reference to generational and geographical differences between women's leisure patterns and well-being, and the degree to which women use leisure as a form of risk management and stress relief in relation to their health.


| | |
|---|---|
| **Project:** | Time pressure, satisfaction with leisure and health among Australian women |
| **Collaborator:** | Associate Professor Peter Brown (Dept of Leisure and Tourism, The University of Newcastle) |
| **WHA Collaborators:** | Professor Wendy Brown & Ms Jenny Powers |
| **Funding source:** | ARC Small Grant |

Expectations associated with the multiple roles adopted by women over the life-course have contributed to feelings of time pressure and stress for many women. There is also a growing body of evidence that leisure participation contributes to individual health and well-being and may serve to

moderate levels of stress. Exploration of associations between feelings of time pressure, satisfaction levels with the time spent in active/passive leisure, and measures of physical and mental health, may provide insights into the role of leisure in promoting good health, and moderating stress levels associated with increased time pressure for Australian women. Data from Survey 1 were used to explore such associations in the lives of 41,000 Australian women aged 18-23, 45-50 and 70-75 in 1996.  While being rushed/pressured/busy seemed to impact adversely on health, the effects appear to be attenuated in women who are happy with the amount of leisure time available to them.

**Project:**              Content analysis of survey data about the health experiences of rural and remote women: A sub-study of the Women's Health Australia longitudinal study
**Collaborator:**         Dr Helen Keleher (Public Health, La Trobe University, Bendigo)
**WHA Collaborator:**  Professor Christina Lee

This study is a content analysis of 2,500 records, each comprising a response to an open-ended question on the Women's Health Australia 1996 and 1999 surveys for mid-age women. The project will combine qualitative thematic analysis and content analysis techniques. To date, two 10% samples of the data have been analysed to give an indication of categories and themes. These will be used to guide word searches of the whole data set and the results will be set up into files and sub-files. As the search widens, phrase searches can also be used.

The health of rural and remote women as a population group is under-researched. This study presents a very good opportunity to increase understanding of the health experiences of mid-life rural and remote women across Australia from narrative forms of data. It is significant that these women have volunteered their experiences anonymously assuming that someone would read them and take notice of what they are saying. This study is an opportunity to help the WHA study keep faith with the study participants by ensuring that the data are not neglected. This analysis will not only provide insights into the health problems raised by women living in rural and remote areas of Australia, but will also add value to the WHA longitudinal study and its national database on women's health.

## 2.    CONDUCT OF SURVEYS

### 2.1    MAIN COHORTS

#### 2.1.1  Response rates for Mid 2 and Older 2 surveys: Update

One of the problems with longitudinal studies is deciding on an appropriate denominator for the calculation of response rates. At Survey 1 in 1996, some surveys were returned without any contact information and as result these women could not be included in any subsequent surveys. In addition, participants who were too ill or incapable of participating (such as those who had a stroke or dementia), or who had died, were ineligible for further surveys. In theory, the remainder were eligible for follow-up surveys. Survey 2 was sent to all eligible women for whom current contact details were available, excluding women who had withdrawn since Survey 1. Survey 2 occurred in 1998 for the mid-age women and in 1999 for the older women. The responses for mid-age and older women are shown in Table 1.

**Table 1     Response rates for mid-age and older women**

| Number of participants | Mid-age | | Older | |
|---|---|---|---|---|
| Responded at Survey 1 (1996) | 14,100 | | 12,939 | |
| -   Gave no contact information at Survey 1 | 385 | | 507 | |
| -   Died between Survey 1 and 2 | 60 | | 490 | |
| -   Became too ill or incapable | | | 109 | |
| Eligible for Survey 2 | 13,655 | | 11,833 | |
| | **N** | **%** | **N** | **%** |
| Responded at Survey 2 | 12,338 | 90.4 | 10,432 | 88.2 |
| Did not respond at Survey 2 | 212 | 1.6 | 479 | 4.0 |
| Withdrew from study | 152 | 1.1 | 575 | 4.9 |
| No current contact details or overseas | 953 | 7.0 | 347 | 2.9 |

When response rates are calculated as a percentage of those who were sent Survey 2, 92% of 13,417 eligible mid-age women and 91% of 11,505 eligible older women responded.


### 2.1.2   Young Survey 2

Young Survey 2 was developed and piloted during 1999, and conduct of the main survey commenced in March 2000. Reports 13 and 14 describe the earlier stages of the process. Table 2 below outlines the timetable for survey distribution and number of surveys distributed at each stage, while Table 3 shows response rates as at 27 November 2000.

**Table 2     Timetable for Young Survey 2**

| Date | Contact | Items | Number |
|---|---|---|---|
| 21 March 2000 | Mailout 1 | Package mailed including survey, reply-paid envelope, letter of invitation and change of details card | 13,516 mailed |
| 5 April 2000 | Mailout 2 | Thank you/reminder leaflet mailed to all in mailout 1, except deceased, withdrawals and overseas | |
| 8 May 2000 | Mailout 3 | Reminder leaflet to all non-responders | |
| 12 June 2000 – 29 October 2000 | Phone reminder | Reminder phone calls to all non-responders | Total of 11,300 phone calls made to 4395 non-responders (maximum of 6 calls per person) |
| June | Extra mailout* | Complete new package | 675 |
| July | Extra mailout* | Complete new package | 15 |
| August | Extra mailout* | Complete new package | 1938 |
| September | Extra mailout* | Complete new package | 896 |
| October | Extra mailout* | Complete new package | 357 |
| November | Extra mailout* | Complete new package | 100 |

*   *Of these extra mailouts, 181 were first packages sent to participants who had not yet been mailed to. This gave a total of 13,697 participants who were mailed at least one survey package.*

**Table 3    Response rates for Young Survey 2 (as at 27 November 2000)**

|                                                        | N     | %    |
|--------------------------------------------------------|-------|------|
| Complete - Full surveys                                | 9,369 | 68.4 |
|          - Short surveys                               | 66    | 0.5  |
| RTS (Return to sender (still being tracked))           | 400   | 3.0  |
| Newly identified as deceased                           | 6     |      |
| Withdrawal                                             | 135   | 1.0  |
| Will not do survey this time/lost/permanently overseas | 512   | 3.7  |

### 2.1.2.1    Tracking strategies

Because of the well-documented degree of mobility among young people in their 20s,[1] the study team anticipated particular difficulties in tracking the youngest women. High levels of mobility, changes of name, and lower probability of being listed in telephone directories under their own names or appearing in the electoral rolls, were found with the Young Pilot sample. Despite intensive tracking work with that group, the final response rate had only been 62%. Of those who did reply, there was ample evidence of frequent address changes. Figure 1 shows responses to the pilot version of Young Survey 2, to the question, *"how often have you moved house in the past 3 years"* (it is worth emphasising that these responses represent only those who responded and who may be assumed to be less mobile than those who were lost to the survey). Almost 80% of those who could be contacted had moved house at least once in three years.

**Figure 1    Number of times the young pilot participants had moved in the past 3 years**
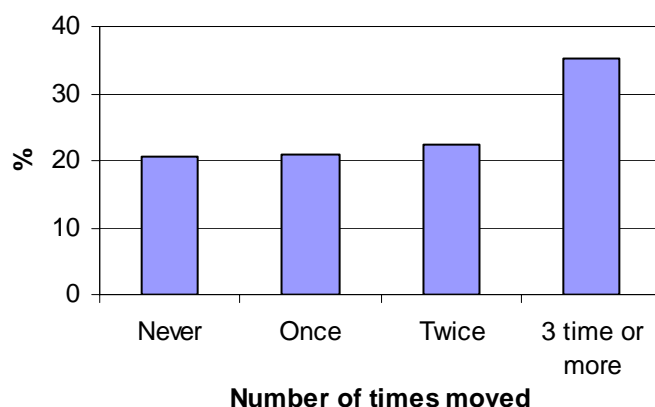


In addition to the permanent staff, a total of eleven part-time and casual research assistants were employed to assist with the task of improving the response rate to Young Survey 2. We employed young women, students and recent graduates in the target age range, in order to match staff with participants. These assistants carried out two main tasks. Firstly, after the main survey, a general thank you/reminder, and a targeted reminder sent to those who had not yet responded, they telephoned whose women who had not responded. Secondly, they attempted to track participants who were identified as lost to the project; these included those whose surveys were returned to sender and those who were unknown at the telephone numbers provided.

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[1]    Jensen Arnett J. Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist, 2000; 55: 469-480.

The part-time staff made over 11,300 telephone calls, to a total of 4,395 women. Telephone calls were largely made on Monday to Thursday evenings between 5 and 9 pm, and on Sunday afternoons between 3 and 8 pm, to maximise the chances that young women would be at home when called. Where possible, messages were left on answering machines or with other members of the household, or specific times to call back were obtained. In order to avoid employment-related problems for participants, work numbers were called only when all attempts to locate the participant at a home number had failed.

For those women who could not be located by telephone, a range of tracking methods were tried: tracking strategies were summarised in Report 14 (June 2000), and included electronic white pages searches, electronic electoral roll searches, and – where the women had provided the details of a friend or family member – tracking through those contacts.

In all cases, when a woman was contacted, she was reminded of the survey, asked whether she would be willing to complete Survey 2, and if necessary was mailed a duplicate survey (the extra mailouts in Table 2 above). All contact details were checked and updated, and where possible the staff obtained work, home and mobile telephone numbers; email address; and the details of a friend or family member who would be likely to know where they were in the future.

A total of 3,981 additional surveys (29% of the original mailout) were mailed as a result of tracking strategies. These included approximately 60 which were sent to overseas addresses. Many women in this age group are working, studying or holidaying abroad with the intention of returning to Australia to live permanently, and it seems important to make whatever efforts are necessary to keep these young women in the cohort. The majority of these young women were located in the UK and Ireland. To decrease the burden of postage costs on these women, arrangements were made for overseas participants to return their completed surveys to a British colleague. A total of twenty-four surveys were returned to Dr Janice Muir at the Department of Psychology, University of Cardiff, Wales, who forwarded them to the study team.

The costs of carrying out this intensive procedure were in addition to the base costs of the survey (including printing and mailing of the survey and reminders, return mail, and the office costs associated with processing completed surveys), and in addition to permanent staff salaries and general office costs. Considerable savings had to be made in other areas in order to achieve the level of response finally obtained.

Table 4 below summarises the response rates to Young Survey 2 on a weekly basis, and shows the total number of hours worked each week by the additional part-time staff, the additional salary cost (including on costs), and an estimate of the costs incurred for additional postage, telephone usage, and office supplies. These costs are in addition to the base costs of the survey summarised above, and do not include the salaries of permanent staff. The table demonstrates that, in total, $70,427.17 was expended (to late October) in addition to the base costs of conducting the survey.

**Table 4     Young Survey 2: Cumulative additional costs and response rates.**

Weekly breakdown of response rates and additional costs incurred. Includes additional part-time
staff and additional office costs; excludes permanent staff salaries, general office costs, and base
costs for survey (printing and  mailing of initial survey, thank you reminder, and targeted second
reminder; return mail costs; office costs associated with logging and other administrative tasks)

| Week | Surveys Received | Cumulative Response | % Rec'd | Cumul-ative % | Additional Staff Hours | Additional Salaries | Estimated additional office costs | Total Additional Cost per Week | Cumulative Additional Cost |
|---|---|---|---|---|---|---|---|---|---|
| up to 24 March | 7 | 7 | 0.052 | 0.052 | 20 | $360.10 | $100.00 | $460.10 | $460.10 |
| 27/3-31/3 | 1142 | 1149 | 8.447 | 8.499 | 20 | $360.10 | $100.00 | $460.10 | $920.20 |
| 3/4-7/4 | 1399 | 2548 | 10.348 | 18.848 | 55 | $990.28 | $100.00 | $1,090.28 | $2,010.48 |
| 10/4-14/4 | 1896 | 4444 | 14.025 | 32.872 | 55 | $990.28 | $100.00 | $1,090.28 | $3,100.75 |
| 17/4-21/4 | 746 | 5190 | 5.518 | 38.390 | 55 | $990.28 | $100.00 | $1,090.28 | $4,191.03 |
| 24/4-28/4 | 475 | 5665 | 3.514 | 41.904 | 55 | $990.28 | $100.00 | $1,090.28 | $5,281.30 |
| 1/5-5/5 | 455 | 6120 | 3.366 | 45.270 | 55 | $990.28 | $100.00 | $1,090.28 | $6,371.58 |
| 8/5-12/5 | 185 | 6305 | 1.368 | 46.638 | 55 | $990.28 | $100.00 | $1,090.28 | $7,461.85 |
| 15/5-19/5 | 141 | 6446 | 1.043 | 47.681 | 55 | $990.28 | $100.00 | $1,090.28 | $8,552.13 |
| 22/5-26/5 | 142 | 6588 | 1.050 | 48.731 | 55 | $990.28 | $100.00 | $1,090.28 | $9,642.40 |
| 29/5-2/6 | 145 | 6733 | 1.073 | 49.804 | 55 | $990.28 | $100.00 | $1,090.28 | $10,732.68 |
| 5/6-9/6 | 86 | 6819 | 0.636 | 50.440 | 55 | $990.28 | $100.00 | $1,090.28 | $11,822.95 |
| 12/6-16/6 | 75 | 6894 | 0.555 | 50.995 | 55 | $990.28 | $600.00 | $1,590.28 | $13,413.23 |
| 19/6-23/6 | 154 | 7048 | 1.139 | 52.134 | 115 | $2,070.58 | $600.00 | $2,670.58 | $16,083.80 |
| 26/6-30/6 | 93 | 7141 | 0.688 | 52.822 | 115 | $2,070.58 | $600.00 | $2,670.58 | $18,754.38 |
| 3/7-7/7 | 73 | 7214 | 0.540 | 53.362 | 134 | $2,412.67 | $600.00 | $3,012.67 | $21,767.05 |
| 10/7-14/7 | 73 | 7287 | 0.540 | 53.902 | 165 | $2,970.83 | $600.00 | $3,570.83 | $25,337.87 |
| 17/7-21/7 | 54 | 7341 | 0.399 | 54.301 | 165 | $2,970.83 | $600.00 | $3,570.83 | $28,908.70 |
| 24/7-28/7 | 43 | 7384 | 0.318 | 54.619 | 165 | $2,970.83 | $600.00 | $3,570.83 | $32,479.52 |
| 31/7-4/8 | 36 | 7420 | 0.266 | 54.886 | 165 | $2,970.83 | $600.00 | $3,570.83 | $36,050.35 |
| 7/8-11/8 | 59 | 7479 | 0.436 | 55.322 | 165 | $2,970.83 | $1,075.00 | $4,045.83 | $40,096.17 |
| 14/8-18/8 | 292 | 7771 | 2.160 | 57.482 | 165 | $2,970.83 | $1,075.00 | $4,045.83 | $44,142.00 |
| 21/8-25/8 | 176 | 7947 | 1.302 | 58.784 | 115 | $2,070.58 | $1,075.00 | $3,145.58 | $47,287.57 |
| 28/8-1/9 | 54 | 8001 | 0.399 | 59.183 | 115 | $2,070.58 | $1,075.00 | $3,145.58 | $50,433.15 |
| 4/9-8/9 | 60 | 8061 | 0.444 | 59.627 | 115 | $2,070.58 | $600.00 | $2,670.58 | $53,103.72 |
| 11/9-15/9 | 97 | 8158 | 0.718 | 60.345 | 115 | $2,070.58 | $900.00 | $2,970.58 | $56,074.30 |
| 18/9-22/9 | 183 | 8341 | 1.354 | 61.698 | 115 | $2,070.58 | $900.00 | $2,970.58 | $59,044.87 |
| 25/9-29/9 | 102 | 8443 | 0.754 | 62.453 | 115 | $2,070.58 | $900.00 | $2,970.58 | $62,015.45 |
| 2/10-6/10 | 69 | 8512 | 0.510 | 62.963 | 115 | $2,070.58 | $800.00 | $2,870.58 | $64,886.02 |
| 9/10-13/10 | 44 | 8556 | 0.325 | 63.289 | 115 | $2,070.58 | $800.00 | $2,870.58 | $67,756.60 |
| 16/10-20/10 | 79 | 8635 | 0.584 | 63.873 | 115 | $2,070.58 | $600.00 | $2,670.58 | $70,427.17 |

**Figure 2    Cumulative response rates  and additional costs incurred for Young 2 survey.**
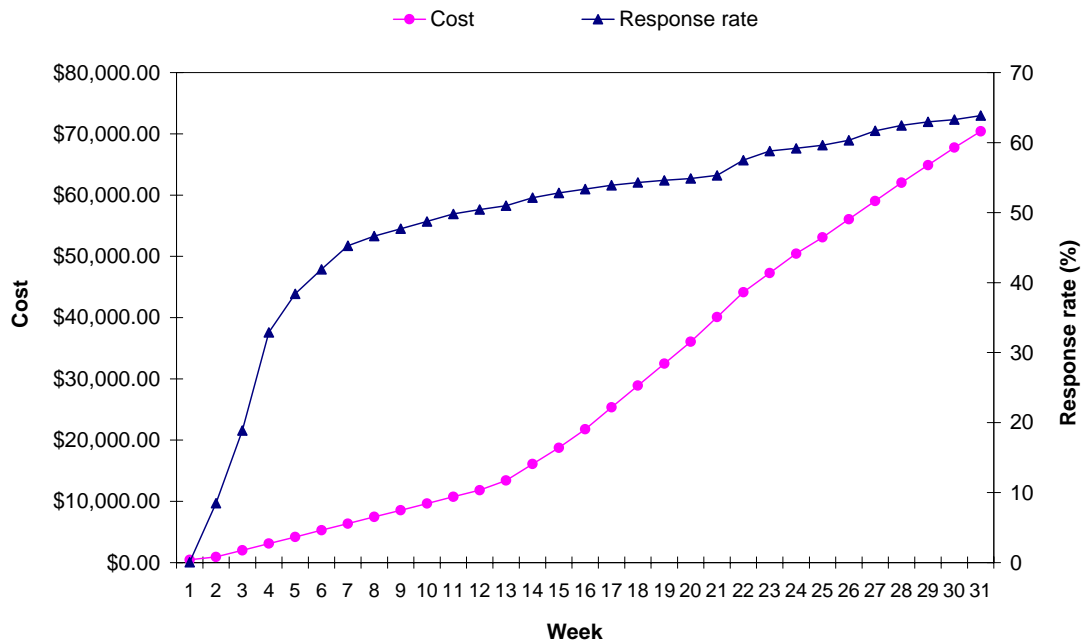


Figure 2 shows graphically the drop-off in response rate across time, and the simultaneous increase in additional costs incurred.

This breakdown of costs and returns demonstrates that, over time, increasing efforts were associated with steady reductions in rates of return. The proportion of women who were easy to find and who were interested in participating became progressively less as the process continued.

Table 5 below supports this analysis of the costs and returns of the different stages of Young Survey 2, taking the slightly different approach of itemising the costs (in addition to permanent staff salaries, equipment, and general office costs) involved in each aspect of the survey. This estimates the entire costs of Young Survey 2 at $171,900 (up to 4 October 2000). From this table, it can be seen that the average total cost per completed survey was $19.30. Those surveys which were returned without any reminders or tracking can be costed at approximately $12.34 per survey (mail out costs plus return survey costs), but those which required telephone reminders, tracking and the postage of duplicate surveys cost as much as $34.87 per survey.

**Table 5    Approximate cost of Young Survey 2 at 4 October 2000.**

| | Cost $ | Approximate cost per returned survey |
|---|---|---|
| **Mail out surveys and reminders** | | |
| Print, pack and post surveys | 44,600 | |
| Print, pack and post reminders | 18,900 | |
| Total surveys returned (N=8,906) | | |
| *Total print, post and pack* | 63,500 | $7.13 |
| | | |
| **Telephone reminders** | | |
| Telephone calls | 3,700 | |
| Salaries of casual staff | 18,000 | |
| Total surveys returned (n=1,205) | | |
| *Total telephone reminders* | 21,700 | $18.01 |
| | | |
| **Tracking participants** | | |
| Telephone calls | 6,800 | |
| Salaries of casual staff | 14,000 | |
| Total surveys returned (N=8,906) | | |
| *Total tracking participants* | 22,800 | $2.56 |
| | | |
| **Extra surveys sent** | | |
| Print, pack and post surveys (n=3,424) | 12,800 | |
| Print, pack and post reminders | 4,600 | |
| Total surveys returned (N=8,906) | | |
| *Total extra surveys* | 17,400 | $1.95 |
| | | |
| **Return surveys, log, edit and scanning** | | |
| Return mail and 1800 calls | 8,400 | |
| Telephone calls for missing data/ interviews | 500 | |
| Data scan long survey | 23,100 | |
| Salaries of casual staff | 14,500 | |
| Total surveys returned (N=8,906) | 46,500 | |
| *Total return surveys and scan* | | $5.22 |
| | | |
| **Costs of Young 2 survey** | 171,900 | |
| (excluding salaries for permanent staff and costs of office supplies, computers, etc) | | |
| *Total cost of return surveys (N=8,906)* | | $19.30 |

### 2.1.2.2    *Comparisons of Survey 1 demographic and health characteristics of respondents and non-respondents to Survey 2.*

Given the very high monetary costs involved in obtaining the more "difficult" of the Young Survey 2 responses, it was important to assess the extent to which tracking difficulty was associated with demographic or health-related biases. This analysis would provide information on the value of continuing with intensive and expensive tracking procedures in subsequent surveys. The following

tables, prepared by Jenny Powers, provide a comparison of characteristics of young women who had not responded (n=4,659) and those who had responded (n=8,906) to Survey 2 by 4 October 2000. Those who had responded were grouped on the basis of reminder strategies: 7,701 responded following the ordinary mail reminders, 919 returned surveys after mail reminders and less than three phone calls; and 286 responded after mail reminders and three or more phone calls.

**Table 6    Area of residence in 1996**

|  | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
|  | mail reminder | | and <3 phone | | and 3+ phone | | | | |
|  | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Urban | 4,247 | 55.2 | 495 | 53.5 | 163 | 57.0 | 2,614 | 56.1 | 7,516 |
| Rural | 3,163 | 41.1 | 388 | 42.2 | 107 | 37.4 | 1,886 | 40.5 | 5,544 |
| Remote | 276 | 3.6 | 35 | 3.8 | 15 | 5.2 | 145 | 3.1 | 471 |
| Missing | 15 | 0.2 | 4 | 0.4 | 1 | 0.4 | 14 | 0.3 | 34 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

**Table 7    State of residence in 1996**

|  | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
|  | mail reminder | | and <3 phone | | and 3+ phone | | | | |
|  | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| NSW | 2,235 | 29.0 | 283 | 30.8 | 94 | 32.9 | 1,450 | 31.1 | 4,062 |
| VIC | 2,138 | 27.8 | 263 | 28.6 | 62 | 21.7 | 1,134 | 24.3 | 3,597 |
| QLD | 1,665 | 21.6 | 202 | 22.0 | 79 | 27.6 | 1,077 | 23.1 | 3,023 |
| SA | 665 | 8.6 | 67 | 7.3 | 13 | 4.6 | 392 | 8.4 | 1,137 |
| WA | 763 | 9.9 | 75 | 8.2 | 30 | 10.5 | 463 | 9.9 | 1,331 |
| TAS | 173 | 2.3 | 18 | 2.0 | 3 | 1.1 | 112 | 2.4 | 306 |
| NT | 6 | 0.1 | 2 | 0.2 | 1 | 0.4 | 6 | 0.1 | 15 |
| ACT | 51 | 0.7 | 8 | 0.9 | 4 | 1.4 | 22 | 0.5 | 85 |
| Missing | 5 | 0.1 | 1 | 0.1 | 0 | 0 | 3 | 0.1 | 9 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

**Table 8    Country of birth**

|  | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
|  | mail reminder | | and <3 phone | | and 3+ phone | | | | |
|  | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Australian born | 6,959 | 90.4 | 848 | 92.3 | 261 | 91.3 | 4,229 | 90.8 | 12,297 |
| Other ESB | 315 | 4.1 | 30 | 3.3 | 12 | 4.2 | 162 | 3.5 | 519 |
| Europe | 82 | 1.1 | 9 | 1.0 | 3 | 1.1 | 50 | 1.1 | 144 |
| Asia | 205 | 2.7 | 20 | 2.2 | 4 | 1.4 | 138 | 3.0 | 367 |
| Other | 76 | 1.0 | 7 | 0.8 | 1 | 0.4 | 44 | 0.9 | 128 |
| Missing | 64 | 0.8 | 5 | 0.5 | 5 | 1.8 | 36 | 0.8 | 110 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

## Table 9    Age in 1996

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| Years | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 452 | 5.9 | 45 | 4.9 | 10 | 3.5 | 271 | 5.8 | 778 |
| 19 | 1,594 | 20.7 | 200 | 21.8 | 53 | 18.5 | 975 | 20.9 | 2,822 |
| 20 | 1,662 | 21.6 | 182 | 19.8 | 62 | 21.7 | 988 | 21.2 | 2,894 |
| 21 | 1,428 | 18.5 | 176 | 19.2 | 57 | 19.9 | 922 | 19.8 | 2,583 |
| 22 | 1,497 | 19.4 | 174 | 18.9 | 67 | 23.4 | 872 | 18.7 | 2,610 |
| 23 | 1,068 | 13.9 | 142 | 15.5 | 37 | 12.9 | 631 | 13.5 | 1,878 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

## Table 10    Marital status in 1996

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Never married | 5,865 | 76.2 | 721 | 78.5 | 224 | 78.3 | 3,548 | 76.2 | 10,358 |
| Defacto | 1,037 | 13.5 | 119 | 13.0 | 39 | 13.6 | 626 | 13.4 | 1,821 |
| Married | 695 | 9.0 | 68 | 7.4 | 18 | 6.3 | 414 | 8.9 | 1,195 |
| Other* | 66 | 0.9 | 7 | 0.8 | 4 | 1.4 | 52 | 1.1 | 129 |
| Missing | 38 | 0.5 | 4 | 0.4 | 1 | 0.4 | 19 | 0.4 | 62 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

*separated/divorced/widowed*

## Table 11    Highest qualification completed in 1996

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Uni/higher degree | 866 | 11.3 | 104 | 11.3 | 36 | 12.6 | 489 | 10.5 | 1,495 |
| Trade/certificate/diploma | 1,376 | 17.9 | 165 | 18.0 | 47 | 16.4 | 863 | 18.5 | 2,451 |
| HSC | 4,129 | 53.6 | 506 | 55.1 | 158 | 55.2 | 2,459 | 52.8 | 7,252 |
| Less than HSC | 1,282 | 16.7 | 143 | 15.6 | 44 | 15.4 | 821 | 17.6 | 2,290 |
| Missing | 48 | 0.6 | 1 | 0.1 | 1 | 0.4 | 27 | 0.6 | 77 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

*HSC = Higher school certificate*

**Table 12    Main employment status in 1996**

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Full time work | 2,411 | 31.3 | 295 | 32.1 | 85 | 29.7 | 1,538 | 33.0 | 4,329 |
| Part time work | 1,522 | 19.8 | 177 | 19.3 | 44 | 15.4 | 894 | 19.2 | 2,637 |
| Studying | 2,361 | 30.7 | 282 | 30.7 | 103 | 36.0 | 1,384 | 29.7 | 4,130 |
| Home duties | 498 | 6.5 | 55 | 6.0 | 21 | 7.3 | 308 | 6.6 | 882 |
| Unemployed | 537 | 7.0 | 65 | 7.1 | 14 | 4.9 | 326 | 7.0 | 942 |
| Other* | 248 | 3.2 | 26 | 2.8 | 12 | 4.2 | 139 | 3.0 | 425 |
| Missing | 124 | 1.6 | 19 | 2.1 | 7 | 2.5 | 70 | 1.5 | 220 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

* voluntary work/unpaid work/unable to work due to sickness or injury/other

**Table 13    Children living in the same house in 1996**

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| None | 6,858 | 89.0 | 835 | 90.9 | 249 | 87.1 | 4,148 | 89.0 | 12,210 |
| One or more | 843 | 11.0 | 84 | 9.1 | 37 | 12.9 | 511 | 11.0 | 1,487 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

**Table 14    Manage on income available in 1996**

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| Impossible | 271 | 3.5 | 32 | 3.5 | 13 | 4.6 | 172 | 3.7 | 488 |
| Always difficult | 1,151 | 15.0 | 147 | 16.0 | 43 | 15.0 | 684 | 14.7 | 2,025 |
| Sometimes difficult | 2,587 | 33.6 | 298 | 32.4 | 88 | 30.8 | 1,505 | 32.3 | 4,478 |
| Not too bad | 2,687 | 34.9 | 325 | 35.4 | 102 | 35.7 | 1,704 | 36.6 | 4,818 |
| It is easy | 978 | 12.7 | 112 | 12.2 | 39 | 13.6 | 577 | 12.4 | 1,706 |
| Missing | 27 | 0.4 | 5 | 0.5 | 1 | 0.4 | 17 | 0.4 | 50 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

**Table 15    SF-36 physical health category in 1996**

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| <25 | 192 | 2.5 | 22 | 2.4 | 8 | 2.8 | 140 | 3.0 | 362 |
| 25 to <50 | 2,663 | 34.6 | 322 | 35.0 | 103 | 36.0 | 1,599 | 34.3 | 4,687 |
| 50 to <75 | 4,672 | 60.7 | 553 | 60.2 | 171 | 59.8 | 2,808 | 60.3 | 8,204 |
| Missing | 174 | 2.3 | 22 | 2.4 | 4 | 1.4 | 112 | 2.4 | 312 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |


**Table 16    SF-36 mental health category in 1996**

| | Respondents to different reminder strategies | | | | | | Non-respondents | | Total |
| | mail reminder | | and <3 phone | | and 3+ phone | | | | |
| | n | % | n | % | n | % | n | % | n |
|---|---|---|---|---|---|---|---|---|---|
| <25 | 98 | 1.3 | 16 | 1.7 | 5 | 1.8 | 55 | 1.2 | 174 |
| 25 to <50 | 3,050 | 39.6 | 352 | 38.3 | 110 | 38.5 | 1,901 | 40.8 | 5,413 |
| 50 to <80 | 4,378 | 56.9 | 529 | 57.6 | 167 | 58.4 | 2,590 | 55.6 | 7,664 |
| Missing | 174 | 2.3 | 22 | 2.4 | 4 | 1.4 | 112 | 2.4 | 312 |
| Total | 7,701 | | 919 | | 286 | | 4,659 | | 13,565 |

From these data it is apparent that there are surprisingly few differences in 1996 socio-demographic and health characteristics between responders and non-responders, and between early, mid and late responders. The distributions of all categories of responders, and non-responders, were similar across urban and rural areas, with over half living in urban areas (Table 6), approximately 90% Australian born (Table 8) and 81% between the ages of 19 and 22 years (Table 9). Three-quarters of young women in each group had never married, 22% lived in a married or de facto relationship (Table 10), 11% had children living with them (Table 13) and 18% found it difficult to manage on available income (Table 14). Almost 30% had post-school qualifications (Table 11) and over half were in full or part-time paid work (Table 12). The health profiles of all groups of responders and non-responders were remarkably similar. Sixty percent of both groups felt their physical health (Table 15) was better than average and 56% to 57% had better than average perceived mental health (Table 16).

Significant differences existed only for State of residence in 1996 (Table 7). For the larger States, the response rate was higher in Victoria, than New South Wales and Queensland. The use of phone contact in addition to the normal mailing strategy tended to reduce the differences in the distribution of respondents and non-respondents across States.

The lack of difference in characteristics of responders and non-responders may be explained by the diverse reasons for lack of response. Some of the non-responders were overseas, others were too busy to complete the survey this time. This may be due to general pressures of life in the young age group, or more specific pressures such as study, caring for young children, or employment.

In summary, this analysis suggests that there are few consistent differences between those who responded immediately, those who responded after some reminding or tracking, and those who did

not respond at all. This finding is somewhat unexpected, as it is generally assumed that people who are slow to respond or who are lost to follow-up will be predominantly from socially isolated or disadvantaged groups: single people living alone; those without paid employment; those of non-English-speaking background; or those with poor levels of education. It appears that the reasons for being difficult to track are highly diverse among this particular cohort of Australian women, and that there is no particular socio-demographic group who are particularly easy or difficult to find. Despite the fact that considerable efforts were made by an extremely hard-working group of staff, and a large amount of additional expenditure was incurred, response rates to the Young 2 survey were notably lower than those achieved for the Mid 2 and Old 2 surveys in 1998 and 1999. Nevertheless, this analysis suggests that there is remarkably little bias in the resultant sample, and suggests that longitudinal analyses of data from the young cohort may be carried out with confidence that the women who remain as active participants are representative of Australian women in their age group.

### 2.1.3  Mid-age Survey 3

#### *2.1.3.1  Survey Development*

Following a workshop in May 2000, a draft survey was developed and circulated to Investigators and project staff. After several iterations, and close scrutiny of response options and layouts, the pilot Mid Survey 3 was finalised in July 2000. Where possible, items in the pilot survey were identical to those used in Mid Survey 2 or Young Survey 2. The main addition was the inclusion of an assessment of nutritional intake.

A strategic decision was made that measures of nutritional intake were important in terms of longitudinal prediction of disease endpoints (particularly cancers, heart disease and diabetes), and on this basis Dr Amanda Patterson reviewed methods for assessing nutritional intake in the context of WHA. Her conclusion was that it was necessary to survey nutritional intake as broadly as possible, rather than focus on a selected few nutrients. The concept of a small and intensive additional survey of a small proportion of the participants, involving direct measures of food intake through weighed records, was considered. However, this was rejected as infeasible. A very large sample is required, firstly because the disease endpoints targeted are relatively uncommon over a short period of years, and secondly because the wide observed variability in intakes both between and within individuals means that a large amount of data is necessary for adequate statistical power. For these reasons, it was decided that a self-report survey of the entire cohort, incorporated into the main survey, was the most practical and effective strategy for assessing nutritional intake.

The Anti-Cancer Council of Victoria has developed a 74-item self-report survey of usual dietary intake,[1] from which estimates of intake of nutritional components can be calculated. Importantly, norms for this scale are derived from Australian food sources, making the scale more valid for this population than equivalent scales developed in other countries.

Table 17 below summarises the content of the pilot version of Mid-Age Survey 3 and gives the source of each item and its relationship to similar items in Mid-Age Survey 2, conducted in 1998, Old Survey 2 (1999) and Young Survey 2 (2000). Copies of the pilot survey and covering letter appear in Appendix 2.1.

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[1]   Ireland P, Jolley D, Giles G, O'Dea K et al.  Development of the Melbourne FFQ: a food frequency questionnaire for use in an Australian prospective study involving an ethnically diverse cohort. *Asia Pacific Journal of Clinical Nutrition* 1994;3:19-31.

**Table 17    Summary of items in Mid Pilot Survey 3, derivation, and relationship to previous surveys for all three age groups.**

| No. | Question description | Source | Notes | Identical to | Similar but not identical to |
|---|---|---|---|---|---|
| 1-11 | SF-36 | Ware JE & Sherbourne CD. The MOS 36-Item Short-Form Health Survey | As in all previous surveys. NB the word 'now' fell off item 2, but option 4 has been replaced | M2 1-11 Y2 14-24 O2 40-50 | |
| 12 a | No. of times consulted a family doctor or a GP | WHA | Response categories have been increased from M2 to reflect actual use indicated by Medicare data, taking ageing and increased use into account, and provide closer comparison with O2 | | M2 12a, Y2 1a-b O2 3 |
| 12 b | No. of times consulted a hospital doctor | WHA | Yes/No only in O2 | | M2 12b |
| 12 c | No. of time consulted a specialist doctor | WHA | As above | | M2 12c Y2 2 a-b |
| 13 a-l | Whether consulted health care professionals | Modified from ABS. 1989-1990 National Health Survey. Summary of results, Australia. Canberra: ABS, 1991; Catalogue No. 4364.0. consultations | Items selected on basis of Anne Young's substudy - high-frequency | | M2 12 d-g Y2 3a-f O2 4 a-i |
| 14 a-b | Consistency of GP visit | WHA "Availability and Use of Health Services Substudy" (AUHS) | | M2 13 a-b Y2 5 a-b | |
| 15 | Cost of last GP visit | WHA | | M2 14 O2 7 | |
| 16 | Serious illness/condition/ disability | WHA | Slight wording change from M2 for improved clarity. | Y2 25 | M2 16 |
| 17 | Health care card | WHA | Not in Mid 1 or 2 | Y2 9 | |
| 18 | DVA coverage | WHA | New | | |
| 19 | Health insurance for hospital cover/ancillary services | WHA - AUHS | Changed from M2: "No, covered by Veterans Affairs" deleted as can still need insurance. Extra question on DVA added. No, services not available deleted as response rate very low in M2 | | M2 18,19 Y2 10,11 O2 10a-b |
| 20 a-q | Access to health care | | As M2 with additional item - waiting time for an appointment - qualitative survey conducted for NSW Health indicated this was a major problem. As Y2, O2 but with  additional items | | M2 17 a-p Y2 8 a-k O2 5 a-g |

| No. | Question description | Source | Notes | Identical to | Similar but not identical to |
|---|---|---|---|---|---|
| 21 | Life isn't worth living | Modified from Beck A, Schuyler D & Herman I. Development of the Suicide Intent Scale. In Beck AT, Resnick HLP & Lettieri D. The prediction of suicide. Bowie PA: Charles Press, 1974. | Not in M1 or 2 | Y2 73 | |
| 22 | Self-harm | Modified from Beck A, Schuyler D & Herman I. Development of the Suicide Intent Scale. In Beck AT, Resnick HLP & Lettieri D. The prediction of suicide. Bowie PA: Charles Press, 1974. | Not in M1 or 2 | Y2 74 | |
| 23 a-b | last had a pap/mammogram | WHA | Revised M2 item for screening status. Y2 only asked about pap | | M2 24 a,b Y2 36 |
| 24 a-b | abnormal pap/mammogram | WHA | Not asked in M2. Y2 asked only about pap | | Y2 37 |
| 25 a-e | screening | | 25c,d not asked in M2 | 25a = M2 25b = M2 | |
| 26 a-b | OCP/HRT | | | M2 26 | |
| 27 a-b | menstrual history | | | M2 27 | |
| 28 | menstrual changes | | | M2 28 | |
| 29 | age periods stopped | | | M2 25e | |
| 30 a-f | infertility | WHA | Not asked in M2 | | Y2 38 |
| 31 | sexual orientation | WHA | Not asked in M2 | Y2 30 | |
| 32 a-l | Medications | | Margot developed this one to cover all main reasons for using Rx and main sources | | Y2 52 O2 14 |
| 33 | Supplements | WHA | Margot developed this | | |
| 34 a-y | Medical History | Modified from ABS 1989-1990 NHS | Question stem changed from M2. Added arthritis, impaired glucose tolerance, CFS, STI. Deleted skin cancer. Additional explanations for some items. | | M2 20 Y2 12 O2 1 |
| 35 a-l | Surgery | WHA | | | M2 21 O2 2 |
| 36 A/B/C a-bb | Symptoms and help seeking | WHA (Survey 1) with revisions | 'Never' option has gone back in. From M2, delete broken bone, skin problems, constipation Added passing urine > 2x per night, poor memory, palpitations. Changed anxiety item | | M2 29 Y2 13 O2 16 |
| 37 a-b | Parents still living | WHA | Does not ask their age at death | | M2 87 |
| 38 a-j | Sources of stress | WHA | Age-specific items | M2 30 | Y2 71 O2 29 a-g |
| 39 a-i | Stress reduction | WHA | Not in M2 | Survey 1 | |

| No. | Question description | Source | Notes | Identical to | Similar but not identical to |
|-----|---------------------|--------|-------|--------------|------------------------------|
| 40-42 | Smoking questions | Australian Institute of Health & Welfare. Standard questions on the use of tobacco among adults. (1998) | | | M2 33-37 Y2 53-58 O2 28 |
| 43 a-k | Depression - CES-D | Andresen EM. Carter WB, Malmgren JA & Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D. *American Journal of Preventive Medicine*, 1994; 10: 77-84. | | M2 31 Y2 72 O2 19 | |
| 44 a-ee | Life events | Modified from Norbeck JS. Modification of life event questionnaire for use with female respondents. *Researching in Nursing & Health*, 1984; 7: 61-71 | Changes from M2: add retirement, spouse retire, you or spouse made redundant. Delete spouse stopping work. | | M2 32 Y2 70 O2 15 |
| 45 a | Height | WHA | | M2 42 | Y2 45b O2 23 |
| 45 b | Weight | WHA | | M2 43 | Y2 45a O2 24 |
| 46 a-b | Weight changes | WHA | Only asks about last 3 years | | M2 49 Y2 46 |
| 47 a-k | Fluid intake | WHA - see notes from Amanda Patterson | Not asked before | | new |
| 48 | Postcode | WHA | | | M2 85 Y2 93 O2 35 |
| 49-66 | Food frequencies | Anti Cancer Council of Victoria Food Frequency Questionnaire. Includes alcohol and replaces previous alcohol items. | | new items | new items |
| 67, 68 a-d | Exercise questions | WHA | | Y2 65, 66 O2 20, 21 | M2 51-52 |
| 69 | Hours spent sitting | WHA - Substudy on weight gain at mid life | Not in M2 | Y2 67 | |
| 70 | Date of birth | WHA | | M2 84 Y2 100 O2 22 | |
| 71 | Time use in past week | WHA but items modified from ABS (1992) Time use survey. | Not in M2 though there are questions about time spent in work (M2 55). As for Y2 75 with additional categories: looking for work, socialising, using a computer. | | Y2 75 |
| 72 a-f | Types of work | WHA | Added run own business from home or from elsewhere | | M2 56 Y2 76 |

| No. | Question description | Source | Notes | Identical to | Similar but not identical to |
|---|---|---|---|---|---|
| 73 a-b | Rushed/pressured time on hands | Modified from Statistics Canada (1985) | | M2 60,61 Y2 81 a-b O2 75a-b | |
| 74 | Provide care to children | WHA | | M2 76 | |
| 75 | Need help | WHA | | M2 77, Y2 26 O2 62 | |
| 76 a-b, 77, 78, 79 | Provide care | WHA | | M2 78-81 O2 70-73 | Y2 80 |
| 80 | Occupation self & partner | ABS. Australian Standard Classification of Occupations Second Edition. 1997. Catalogue No. 1220.0. From the Web page. | Examples changed from ABS. M2 had write-in responses | | Y2 95 |
| 81 a-f | Social support available - MOS SSS | Sherbourne CD & Stewart AL. The MOS Social Support Survey. *Social Science & Medicine*, 1991; 32(6): 705-714. | 6-item short form replaces 19-item version from M2 | Y2 89 a-f | M2 82 |
| 82 a-m | Neighbourhood Satisfaction | | Not in M2 | O2 36 a-m | |
| 83 a-f | Life Control Scale | Bobak M, Pikhart H, Hertzman C, Rose R & Marmot M. Socioeconomic factors, perceived control and self-reported health in Russia. A cross-sectional survey. Social Science Medicine, 1998; 47(2): 269-279. | New. Inserted to measure sense of control over life. Rejected Job Control Scale as over 30% of mid sample do not have jobs. Also c'right and costs over $11,000 for our sample | | |
| 84 a-f | Optimism - approach to life | Modified from Scheier MF, Carver CS, Bridges MW. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery and self-esteem): a reevaluation of the Life Orientation Test. *Journal of Personality & Social Psychology*, 1994; 67(6): 1063-1078. | Not in M2 | Y2 69 O2 39 | |
| 85 | Living arrangements | ABS Census dictionary. 1996 Catalogue No. 2901.0 | M2 had WHA items | Y2 87 | |
| 86 | Marital status | ABS Census dictionary. 1996 Catalogue No. 2901.0 | | Y2 88 | |
| 87 a-b | Income | WHA | | Y2 98 | M2 70 |

| No. | Question description | Source | Notes | Identical to | Similar but not identical to |
|-----|---------------------|--------|-------|--------------|------------------------------|
| 88 | Number dependent on this income | WHA | | M2 71 Y2 99 | |
| 89 | Manage on income | WHA | | M2 72 O2 38 | |
| 90 a-h | Who lives with you? | Modified from ABS (1994) Social, Labour and Demographic Statistics | | Y2 84 | M2 74 O2 31 |
| 91 | Others dependent on income | WHA | New | | |
| 92 a-g | Satisfaction with life | WHA | | | M2 90 Y2 106 |

\*  *Y2 = Survey 2 for the young cohort in 2000*
   *M2 = Survey 2 for the mid-age cohort in 1998*
   *O2 = Survey 2 for the older cohort in 1999*

### 2.1.3.2    *Pilot testing*

Approval for piloting was obtained from the University of Newcastle Human Research Ethics Committee on 28 July 2000, and the pilot survey was mailed to 374 women in the Bathurst and Illawarra areas, who had served as pilot participants for Mid-age Surveys 1 and 2. Tables 18 and 19 summarises the pilot procedure and response rates. The pilot procedures were conducted by Joy Goldsworthy.

**Table 18    Piloting Mid Survey 3: Response rates at each contact stage**

|  | Date | Number sent/phoned | Response rate up to each stage (%) | Cumulative response rate (%) |
|--|------|--------------------|-----------------------------------|------------------------------|
| Package | 18 August 2000 | 374 | 0 | 0 |
| Thank you reminder | 5 September 2000 | 370 | 38.1 | 38.1 |
| Reminder 2 | 3 October 2000 | 100 | 35.4 | 73.5 |
| Phone reminder | 17 October 2000 | 80 | 3.2 | 76.7 |
|  | 27 November 2000 |  | 8.6 | 85.3 |

**Table 19    Piloting Mid Survey 3: Summary of response rates (as at 27 November 2000)**

| Status | Number | % |
|--------|--------|---|
| Packages sent | 374 | |
| Completed | 319 | 85.5 |
| Not this time | 9 | 2.4 |
| Overseas | 3 | 0.8 |
| Ineligible | 1 | 0.3 |
| RTS | 5 | 1.3 |

Pilot survey data were collated, and summary statistics were prepared. On the basis of response rates, missing data, and comments on questionnaire design, minor modifications to the pilot questionnaire were made.

Table 20 summarizes the changes made to wording, and the reasons for those changes. A further change was that the item on date of birth, which is essential in ensuring a match between Surveys 1, 2 and 3, was shifted to a more prominent position in the survey and the questions re-numbered accordingly.

The questionnaire for Survey 3 of the main mid-age cohort has now been finalized. The next steps will be to prepare a cover letter and seek clearance from the University of Newcastle Human Research Ethics Committee, and prepare documents for tendering.

**Table 20  Differences between the pilot (2000) and the main (2001) survey for Mid 3**

| No. In Main | Question Description | Change Made | Reason for  change |
|---|---|---|---|
| 13a-l | Whether they had consulted health care professionals | The question now asks "Have you consulted the following people for YOUR OWN HEALTH in the LAST TWELVE MONTHS?" rather than "In the past 12 months, have you consulted a:" | For comparability between Survey 2 and Survey 3 data |
| 19a-b | Private health insurance | Now asks only for "Yes/No" responses to a) Hospital cover and b) Ancillary services, rather than having 4 different items for the "No" response. | The missing values were quite high (4.6% - 18.5%), plus there was no need to differentiate between the reasons for not having private health insurance. |
| 27a-c | Menstrual history | Item a) "Had a hysterectomy" was added. | Adding this item will improve categorisation of women according to menopausal stage. Women who have had a hysterectomy frequently wrote this in rather than answering the questions on their menstrual bleeding; this should reduce missing data. |
| 40a-j | Stress reduction | Item j) "Yoga, meditation etc" was added | Possible PhD research on coping strategies in mid life |
| 43 | Age stopped smoking | The word "regularly" was changed to "daily". | For comparability with Survey 2 data. |
| 46b | Height | The words "without shoes" was added to the end of the question. | For comparability with Surveys 1 and 2. |
| 48a-b | Postcode | Now asks a) What is your RESIDENTIAL POSTCODE? (where you live) and b) What is the Postcode of your POSTAL ADDRESS? (if different) | To help allocate women to area of residence more accurately. |
| 49a-j | Drinking frequencies | The response options were changed to be identical to the format for question 65. Three of the items were also reordered, and the vertical lines were removed. | All of these changes were done to simplify the layout to make it easier to answer. |
| 64 | Food frequencies | The response options were changed to be identical to the format for question 65, and the vertical lines were removed. | This was done to simplify the layout to make it easier to answer. |
| 65-67 | Alcohol | "If you do NOT drink alcohol, mark here" with a "Go to 68" was added after question 65, and the vertical lines were removed.. | This enabled the non-drinkers to skip questions 66 and 67 to reduce missing values for these (17.9% - 18.2%). Removing the lines also simplified the layout. |
| 70 | Hours spent sitting | The question now asks "How many hours EACH DAY…" rather than "How many hours in total…". | To emphasis that the time frame was for each day, as 6.2% appeared to have answered this question for a full week. |
| 80 | Occupation | The word "now" was capitalised. | 2% responded for all the occupations they or their partner have had, rather than their or their partner's main occupation. |

### 2.1.4 Older Survey 3

The research team has begun exploring strategies for Survey 3 of the older cohort, scheduled for 2002. The women will be aged 76-81 by then and concerns have been expressed as to whether women in this age group should be sent a lengthy mailed survey. The team are concerned not to put too much pressure on elderly women who may be in poor health, and are also concerned about data quality. Increasingly women may have difficulty reading the survey and completing the scannable response forms; if this is a growing problem, it may result in an increased rate of loss to follow-up and a bias towards the retention of healthier women. The possibility of switching to phone interviews for this cohort has been discussed, and a small telephone survey of participants was conducted during November and December of 2000, in order to explore participants' attitudes to written versus phone surveys and related matters.

Women in the older cohort who completed Survey 2 (1998) by mail and independently (no indication that a third party had completed the form on their behalf), were selected on a stratified random basis. A total of 110 women were selected, stratified by their 1998 responses to the single item measuring perceived health: *"In general, would you say your health is: Excellent/Very Good/Good/Fair/Poor"*.

These women were sent a letter, and then telephoned within 14 days. Appendix 2.3 includes a copy of the letter sent to participants, and the telephone protocol that was used. Data collection is expected to be complete by mid-December 2000 and analysis will be carried out early in 2001. While the results of this survey need not necessarily be taken as definitive, and other issues such as expense and practicality must be considered, this information will assist in deciding how to proceed in developing and piloting materials for Older Survey 3 during 2001.

## 2.2 INDIGENOUS COHORTS

The WHA Indigenous Women's Cohort Project investigates health issues among indigenous women, using a community-driven research model. This model involves the researchers undertaking a process of collaborative discussion with community members, in order to identify their concerns and develop research strategies which will be both acceptable and effective. Data collection is then undertaken by members of the indigenous communities, with a concentration on verbal collection methods and on encouraging the participants to define the research and its desired outcomes in their own terms. Report 14 (June 2000) contained detailed descriptions of the work which has been undertaken in three Queensland Deed of Grant in Trust communities (Cherbourg, Hope Vale and Woorabinda) and among indigenous women in urban Toowoomba.

An important principle of this work is that researchers must collaborate with communities in such a way that the community has a strong sense of ownership of the entire research process. In this way, communities will also feel a sense of ownership of the research outcomes and therefore have a commitment to responding to those outcomes in ways which are appropriate for the needs they have identified. In this way, research is most likely to produce changes which are compatible with the community's wants and which are sustainable.

Currently WHA researchers are talking with members of the Office of Aboriginal and Torres Strait Islander Health (OATSIH) in the Department of Health and Aged Care, in order to reach consensus about the future direction of research with indigenous health. A meeting was organised in October but was cancelled for unavoidable personal reasons. The researchers and staff of OATSIH are now working towards a meeting on 13 December 2000. This will also be attended by representatives of a

number of indigenous communities in Queensland, and by Dr Janet Greeley, the chair of the Project Advisory Committee.

## 2.3    FILIPINA COHORT: FINALIZATION

The process for finalization of the Filipina cohort was described in some detail in Report 14 (June 2000). The decision to follow up the findings of the initial work with a qualitative survey of Filipinas' mental health needs, and a description of that survey, are detailed in that Report. A final meeting of the Filipina reference group was held on June 20, 2000.  At this meeting a thank-you card and letter outlining the closure of the cohort was presented to the reference group members who approved the material (see Appendix 2.2). The letter was posted in late June 2000 to all 346 women who participated in the first follow-up survey in 1998.

Dr Sam Thompson has continued a liaison with the Filipina Community Council of Queensland and has assisted them in the process of deciding whether to apply for funds to develop and distribute a booklet providing information on mental health resources in Queensland.
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## 3.    METHODOLOGICAL ISSUES

## 3.1.    SOURCES AND DEVELOPMENT OF INSTRUMENTS

### 3.1.1    WHA stress scales

Measures of levels and sources of stress were developed by WHA staff on the basis of a review of literature and of existing scales. Slightly differing versions of a standard scale were developed for each of the three cohorts at Survey 1. The reliability and validity of the stress scale developed for the young cohort were examined by Ms Sandra Bell and Professor Christina Lee. This section summarises the procedures and findings documented in the manuscript, "Assessing subjective stress in young Australian women: The WHA Stress Scale for Young Women", submitted in July 2000 to the Australian Psychologist.

#### 3.1.1.1    Introduction

A recent meta-analytic review of 119 studies assessing gender differences in stress levels[1] found females to score consistently higher than males. While there is a considerable literature on the conceptualisation and assessment of stress, most stress measures have not been developed specifically for young women and thus may not be entirely appropriate for this group. The WHA Stress Scale for Young Women, developed specifically for use in a population-based survey of women's health, has face validity, but this analysis examines its statistical validity.

In the context of a community survey of young women's health, a stress measure which was specific to young Australian women was needed. Further, it was concluded that a subjective stress appraisal would be most valuable but that respondents should be asked to rate the degree of stress they experienced as a result of a number of specific life domains. In this way it would be possible to explore not only levels of stress and their relationships to life events, measures of physical and emotional health, and health-related behaviours, but also the sources of stress which were most salient. This would provide specific directions for policy and intervention.

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[1] Davis MC, Matthews KA & Twamley EW. Is life more difficult on Mars or Venus? A meta-analytic review of sex differences in major and minor life events. *Annals of Behavioral Medicine*, 1999; 21: 83-97.

The stress scale which appears below was completed by 14,779 members of the young cohort in 1996. The items were developed on the basis of discussions with key informants, including psychologists, sociologists, and young women. A final item, "anything else", provided an opportunity for respondents to specify other life domains that had added to their stress levels in the previous 12 months.

**Table 21    WHA stress scale for young women, as used in Survey 1 of the younger cohort.**

**71    Over the LAST 12 MONTHS, how stressed have you felt about the following areas of your life:**
*(Circle one number on each line)*

| | | Not applicable | Not at all stressed | Somewhat stressed | Moderately stressed | Very stressed | Extremely stressed |
|---|---|---|---|---|---|---|---|
| a | Own health | 1 | 2 | 3 | 4 | 5 | 6 |
| b | Health of other family members | 1 | 2 | 3 | 4 | 5 | 6 |
| c | Work/employment | 1 | 2 | 3 | 4 | 5 | 6 |
| d | Living arrangements | 1 | 2 | 3 | 4 | 5 | 6 |
| e | Study | 1 | 2 | 3 | 4 | 5 | 6 |
| f | Money | 1 | 2 | 3 | 4 | 5 | 6 |
| g | Relationship with parents | 1 | 2 | 3 | 4 | 5 | 6 |
| h | Relationship with partner/spouse | 1 | 2 | 3 | 4 | 5 | 6 |
| i | Relationship with other family members | 1 | 2 | 3 | 4 | 5 | 6 |
| j | Relationship with boyfriends | 1 | 2 | 3 | 4 | 5 | 6 |
| k | Relationship with girlfriends | 1 | 2 | 3 | 4 | 5 | 6 |
| l | Anything else (Please specify on line) _____ | 1 | 2 | 3 | 4 | 5 | 6 |

Items were scored 0, 0, 1, 2, 3, 4, and averaged to give a mean perceived stress score with a possible range of 0 to 4.

### 3.1.1.2 *Descriptive Statistics*

Figure 3 presents descriptive statistics for each item of the stress scale.

**Figure 3    Descriptive statistics for each item of the stress scale**
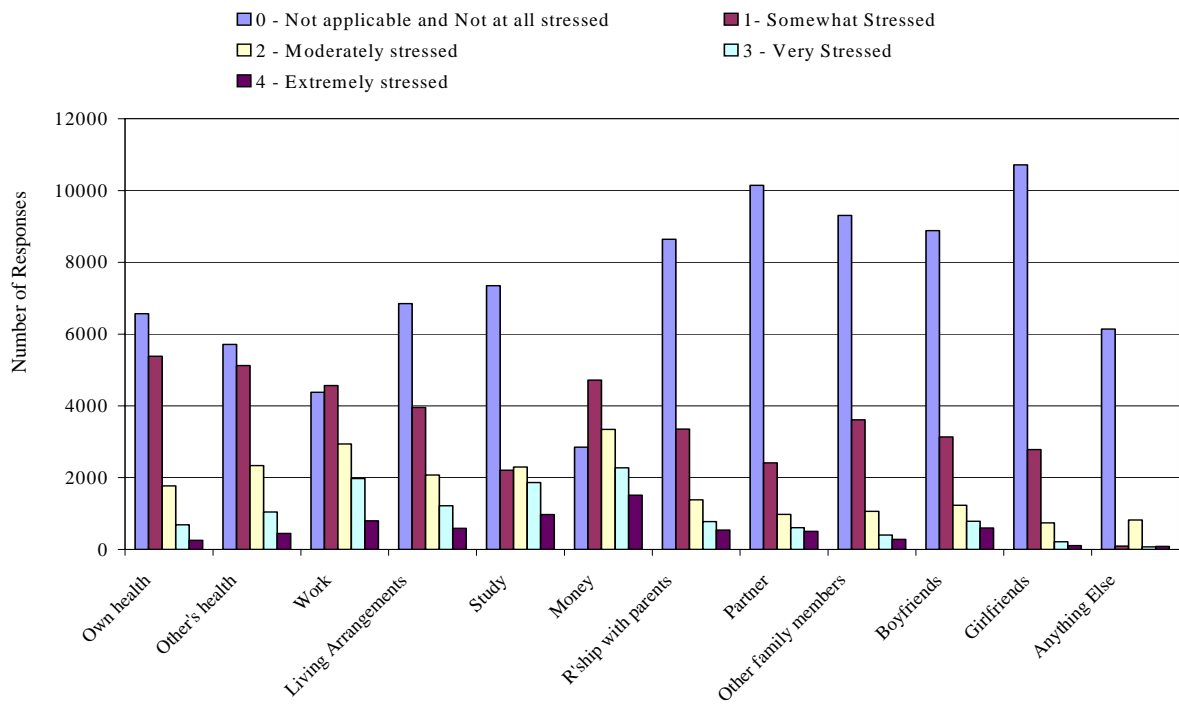


Most items are skewed positively, with the majority of respondents reporting that most areas in their lives were not stressful, or only moderately stressful.  Four items vary noticeably from the general trend of positive skewness.  The items about own health and other family members' health are less positively skewed than other items, while the two items asking about stress related to work and money clearly do not follow the trend of positive skewness.  The modal response for each of these items was "somewhat stressed", and their means were the highest.

The open-ended "anything else" item received 7,210 responses (48.8%), but of these, 6,141 were "not applicable" or "not at all stressed", with only 1,069 (7.3%) reporting any degree of stress from another source.  There were 728 written responses (5% of the sample) to this item, and a content analysis of these comments was undertaken.  The major areas identified in this analysis are shown in Table 22; major areas were defined as those areas that were mentioned by at least 5% of those who responded to this item (0.2% of all respondents).

**Table 22    Major areas from content analysis of open-ended responses**

| Major Areas Mentioned | Examples | No. of Responses |
|---|---|---|
| Lifestyle | "life in general"; "overseas travel"; "city life" | 89 |
| Future | "my future" | 62 |
| Children/ pregnancy | "first pregnancy"; "trying to get pregnant"; "difficult birth"; "having a young baby"; "being a sole parent" | 61 |
| Appearance | "weight"; "being fat"; "getting braces"; "very large breast size" | 59 |
| Transitions | "moving away from family"; "planning wedding"; "end study, find job, settle" | 47 |
| Emotional Health | "depression, low self esteem"; "spiritual issues" | 43 |
| Physical Health | "AIDS test results"; "injury from car accident" | 38 |
| Death/Grief | "suicide of friend"; "husband passed away"; "loss of first child " | 35 |
| Relationships | "stress with friend's problems"; "being bridesmaid for a friend" | 33 |

### 3.1.1.3    Internal reliability

Item-total correlations were calculated for items 1 to 11, and are presented in Table 23. Nine of the eleven items had item-total correlations greater than 0.3, with only stress about other family members' health (0.29), and stress about study (0.24) having item-total correlations under 0.3. Cronbach's alpha was 0.75 for the scale as a whole, using the 14,232 cases with no missing data. The coefficient was also calculated without the "other family members' health" item ($\alpha$=0.74), without the "study" item ($\alpha$=0.75) and then without both ($\alpha$=0.71), but the effects on reliability were small.

**Table 23    Item - total correlations: WHA stress scale for young women**

| Item | Correlation With Total |
|---|---|
| Own Health | 0.39 |
| Other Family Members' Health | 0.29 |
| Work/Employment | 0.37 |
| Living Arrangements | 0.53 |
| Study | 0.24 |
| Money | 0.51 |
| Relationship with Parents | 0.46 |
| Relationship with Partner/Spouse | 0.36 |
| Relationship with Other Family Members | 0.43 |
| Relationships with Boyfriends | 0.39 |
| Relationships with Girlfriends | 0.38 |

A principal factor analysis was then carried out. Table 24 shows the first 5 factors' eigen values and item loadings. Only Factor 1, with an eigen value of 2.4 (explaining 22% of total variance), was considered adequate to be retained. All items loaded positively on Factor 1, with 10 of the 11 item loadings greater than 0.3. A Varimax rotation did not improve item loadings on factors.

**Table 24    WHA stress scale for young women: Eigen values and item loadings**

|  | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|---|---|---|---|---|---|
| **Item loadings** | | | | | |
| Living Arrangements | 0.61 | -0.06 | -0.04 | -0.04 | -0.13 |
| Money | 0.58 | -0.09 | 0.19 | -0.03 | -0.09 |
| Relationship with Parents | 0.55 | -0.15 | -0.27 | -0.02 | -0.04 |
| Relationship with Other Family Members | 0.51 | -0.14 | -0.26 | -0.06 | 0.07 |
| Relationship with Boyfriends | 0.46 | 0.40 | -0.02 | 0.08 | 0.02 |
| Relationship with Partner/Spouse | 0.45 | 0.40 | -0.02 | -0.11 | -0.01 |
| Own Health | 0.44 | -0.07 | 0.18 | -0.03 | 0.10 |
| Work/Employment | 0.44 | -0.08 | 0.24 | -0.04 | -0.03 |
| Relationship with Girlfriends | 0.42 | 0.08 | -0.03 | 0.18 | 0.08 |
| Health of Other Family Members | 0.33 | -0.12 | 0.09 | -0.07 | 0.16 |
| Study | 0.28 | -0.12 | 0.04 | 0.26 | -0.03 |
| **Eigen value** | 2.43 | 0.04 | 0.28 | 0.13 | 0.07 |

### 3.1.1.4    *Convergent validity*

Correlations with Psychological Variables. Mean stress scores were moderately and significantly correlated with the WHA Life Events Checklist for Young Women (r = 0.53); SF-36 mental health scales: mental health (r = -0.50); social functioning (r = -0.47); role-emotional (r = -0.43); and vitality (r = -0.41); and SF-36 mental health summary scale (r = -0.53).

Correlations with Health-Related Variables. Mean stress scores were moderately and significantly correlated with the physical scales of the SF-36: general health (r = -0.37); bodily pain (r = -0.27); role physical (r = -0.23): physical functioning (r = -0.13); SF-36 physical health summary scale (r = -0.18); GP visits (r = 0.21); alcohol consumption (r = 0.12); smoking (r = 0.16); and symptoms (r = 0.42).

### 3.1.1.5    *Discussion*

The WHA Stress Scale for Young Women was designed specifically for young Australian women, because existing scales have been developed in other countries or with less specific samples and thus may be inappropriate for this group. This analysis provides evidence that the WHA Stress Scale for Young Women is internally reliable and unidimensional; validity is also demonstrated by the correlations with mental and physical health measures.

The highest levels of reported stress were found for the items about money and work, whilst the lowest levels were for the items about relationships with girlfriends, other family members and partner/spouse. Contrary to the expectation that young women might be concerned primarily with

romantic and family relationships, this suggests that young Australian women are concerned about financial and occupational security, and about establishing themselves as independent and self-sufficient adults. Such findings have implications for policy and interventions that target young women.

The open-ended item of the scale failed to identify other potential areas of stress clearly lacking from the scale. The fact that only 5% of respondents specified another source of stress suggests that the overwhelming majority felt that all their sources of stress were covered by the scale. Consequently, the open-ended item was removed from this question in the second survey. Further, the two items about relationships with boyfriends and girlfriends were combined into a single item, "relationships with friends". It was felt that there was some confusion over the terms "boyfriends" and "girlfriends", with some respondents interpreting these as referring to romantic partners and others as referring to friends more generally; further, as the respondents would be aged between 22 and 27 at the time of the second survey, it was argued that romantic partnerships might be covered by item h "relationship with partner/spouse".

## 3.2     RELIABILITY AND VALIDITY

### 3.2.1    Elder abuse

The validity of the brief self-report screening measure for elder abuse used in Survey 1 with the older cohort has been examined. The screening instrument was a modification of the Hwalek-Sengstock Elder Abuse Screening Test. Construct validity was examined using factor analysis and correlation with a wide range of socio-demographic, psychological and health related variables. Four factors, each of three items, were identified representing the following domains: 'vulnerability', 'dependence', 'dejection' and 'coercion'. The 'vulnerability' and 'coercion' factors had the highest face validity for abuse and demonstrated moderate to good construct validity. The six items comprising these factors may provide a simple screening tool for elder abuse. A paper describing this work has been submitted to the Journal of Applied Gerontology.

### 3.2.2    Australian Nutrition Screening Index

The WHA study provides an opportunity to examine the performance of the Australian Nutrition Screening Initiative checklist. This section summarises the procedures and findings documented in the manuscript, "Relationships between nutrition checklists and the health and well-being of older Australian women" by Amanda Patterson, Anne Young, Jennifer Powers, Wendy Brown and Julie Byles, submitted in October 2000 to the European Journal of Clinical Nutrition.

#### 3.2.2.1     Introduction

In 1996 an Australian checklist, the Australian Nutrition Screening Initiative (ANSI), was adapted from the American Nutrition Screening Initiative (NSI) checklist by an expert panel who modified the wording and weights of some NSI items to reflect the Australian situation. The NSI and ANSI checklists are being used extensively across the United States and Australia respectively, but there have been no studies comparing the performance of these two scales. There have also been no large, nationally representative studies in Australia to assess eating habits and risk of malnutrition using the ANSI checklist. Calculation of risk scores involves the differential weighting of responses to different items; the weighting system was developed by an expert panel but there is a need for empirical data on its appropriateness. Neither has the usefulness of the ANSI checklist score, compared with its individual items, been investigated.

### 3.2.2.2    Methods

ANSI checklist data are available for the older cohort of the study. The relationships between individual items and various health outcomes measures at Survey 1 (including perceived physical and mental health and health care utilization) were examined for 12,939 women aged 70-75 years. Categories of low, moderate and high nutritional risk for ANSI and NSI, as defined during their development, were applied to the WHA data. To explore and evaluate a simpler approach to calculating a risk score, the unweighted ANSI items were also summed to calculate a total summed item score (TSI). The performance of this unweighted method for scoring the ANSI checklist was assessed.

### 3.2.2.3    Results

The frequency of responses to each of the ANSI items is shown in Table 25. Almost half the women took three or more prescribed medications, more than one third ate alone most of the time, and more than a quarter had changed their diet because of an illness. The NSI and the ANSI identified approximately half the women to be at low nutritional risk. Using a TSI score of zero or one, 46% of women were identified at 'low risk'. However ANSI defined 30% of the women to be at high nutritional risk, compared with 13% using NSI and 12% using a cut-off of four or more for high TSI. Eighty nine percent of women with high TSI were also in the high NSI group. In comparison, approximately 40% of women in the high ANSI group were in the high NSI and TSI groups. For 2.4% of women, checklist scores could not be calculated due to missing data

The most common checklist items for women with 'high risk' ANSI, NSI and TSI scores were: taking three or more medications (71-80%); changing their diet due to illness (54-66%); and eating alone (55-66%).

**Table 25    Prevalence for individual ANSI items, estimated checklist scores for ANSI and NSI, and TSI (sum of unweighted items).**

| Item | Prevalence* (%) |
|---|---|
| Changed diet due to illness | 27 |
| Do not eat at least 3 meals a day | 8 |
| Do not eat fruit or vegetables most days | 3 |
| Do not eat dairy products most days | 13 |
| Have 3 or more alcoholic drinks a day | 6 |
| Do not have 6 to 8 cups of fluid most days | 11 |
| Have teeth, mouth, swallowing problems | 8 |
| Do not have enough money to buy food | 4 |
| Eat alone most of the time | 39 |
| Take 3 or more prescribed medications | 45 |
| Lost 5kg without wanting to | 6 |
| Gained 5kg without wanting to | 10 |
| Not always able to shop, cook, feed myself | 6 |
| **ANSI score (range 0-29)** | |
| 0-3    low risk | 48 |
| 4-5    moderate risk | 23 |
| ≥6     high risk | 30 |
| **NSI score (range 0-21)** | |
| 0-2    low risk | 54 |
| 3-5    moderate risk | 33 |
| ≥6     high risk | 13 |
| **TSI score (range 0-12)** | |
| 0    no items        ⎫ 'low' risk | 17 |
| 1    one item        ⎭ | 29 |
| 2    two items       ⎫ 'moderate' risk | 26 |
| 3    three items     ⎭ | 16 |
| ≥4   four or more items    'high' risk | 12 |

*\* weighted to allow for over-sampling of women living in rural and remote areas*

There were decreases in mean physical and mental health component scores, and increases in number of chronic conditions and health service utilization, with each extra checklist item reported. Women identified as at high risk by NSI had similar physical and mental health component scores, and reported similar rates of underweight and other health outcomes to women with high TSI. All health measures deteriorated as ANSI, NSI and TSI scores increased. However the women in the high NSI and TSI groups appeared to have worse health than those in the high ANSI group (Table 26).

**Table 26**  Mean physical and mental health component scores (PCS and MCS), chronic conditions, health service utilization and weight by categories of nutrition score for ANSI, NSI and TSI.[†]

| | | | PCS (mean) | MCS (mean) | >6 general practitioner visits (%) | >2 chronic conditions (%) | Admitted to hospital (%) | Underweight (BMI<20kg/m$^2$) (%) | Overweight (BMI≥25kg/m$^2$) (%) |
|---|---|---|---|---|---|---|---|---|---|
| **ANSI risk score (range 0-29)** | | | | | | | | | |
| 0-3 | low | (n=6186) | 53 | 52 | 18 | 14 | 16 | 8 | 43 |
| 4-5 | moderate | (n=2818) | 49 | 50 | 37 | 27 | 25 | 7 | 50 |
| ≥6 | high | (n=3626) | 46 | 47 | 51 | 39 | 33 | 10 | 50 |
| | | | | | | | | | |
| **NSI risk score (range 0-21)** | | | | | | | | | |
| 0-2 | low | (n=7028) | 53 | 52 | 21 | 16 | 17 | 8 | 44 |
| 3-5 | moderate | (n=4078) | 48 | 49 | 42 | 33 | 27 | 8 | 50 |
| ≥6 | high | (n=1558) | 45 | 45 | 51 | 39 | 38 | 11 | 48 |
| | | | | | | | | | |
| **TSI risk score (range 0-12)** | | | | | | | | | |
| 0-1 | low | (n=6079) | 53 | 52 | 18 | 14 | 16 | 8 | 43 |
| 2-3 | moderate | (n=5189) | 48 | 49 | 41 | 31 | 26 | 8 | 50 |
| ≥4 | high | (n=1362) | 44 | 45 | 55 | 44 | 41 | 12 | 49 |

[†] *weighted to allow for over-sampling of women living in rural and remote areas*

### 3.2.2.4    *Discussion*

In this study, the recommended cut-points of 6 for NSI and ANSI scores identified 13% and 30% of women to be at high nutritional risk respectively, which would suggest that the changes made to the NSI weightings for the ANSI may be inappropriate. The NSI and ANSI were originally established to increase public awareness of the importance of nutrition in the elderly, but the high proportion of the elderly defined as 'at risk' by the ANSI is a cause for concern. It may result in unnecessary stress for elderly people and place excess burden on the health care system through self-referrals. The unweighted TSI score offers a simpler way to score the ANSI checklist. A score of four or more identifies the majority of the women in the high NSI group and appears to be useful in identifying women with significantly poorer health outcomes.

The results from this cross-sectional study show that women in the high risk groups for ANSI, NSI and TSI were more likely to have poorer levels of physical and mental health and higher health service utilization. Whether this is due to poor nutrition or to underlying medical conditions is not clear. Further, whether women in poor health are more at risk of malnutrition or whether poor nutrition leads to a decline in health is also unclear. These relationships can only be determined by longitudinal studies that include a measure of nutrition.

### 3.2.3   Geographic coding of remoteness

The validity of the geographic coding of remoteness used by WHA has been investigated. This section summarises the work done by Dr Anne Young to improve procedures for coding area of residence.

The study currently supports two measures of where a woman lives:

1.     the address in the *consent* database (a list of current addresses of women who gave consent to participate in the WHA study); and
2.     the postcode in the *survey* database (a list of the postcodes of the women at the time they completed each survey).

The consent database is dynamic and is constantly being updated with changes to name and contact details. The address in the consent database is used for mailouts of surveys and newsletters. The address (locality, state and postcode) in the consent database has been used by the staff at GISCA (Key Centre for Social Applications of Geographic Information Systems, University of Adelaide) to allocate Accessibility/Remoteness Index of Australia (ARIA) scores. This was done for the addresses at Survey 1 for each woman (1996) and for the address at the beginning of 1999. The results were included in the June 2000 report.

On the other hand, the postcode in the survey database is used to add geographic codes such as urban/rural/remote, Rural, Remote and Metropolitan Areas (RRMA) and State to the datasets. There may be discrepancies between the postcode in the consent database and the postcode in the survey database for some women. Further, errors can occur in these databases when a woman writes her postcode incorrectly or the data are entered on the computer incorrectly.

So far there has not been a systematic review of these errors and inconsistencies but rather, they have been detected and fixed in an ad hoc manner as required. Small error rates will not affect the work we have done so far. The major implication is for the study of migration and health. We have two groups of researchers who are examining migration at the moment.

Julie Byles and Gita Mishra are analysing data for the older cohort. Their research question is: How do the experiences and health outcomes of growing older vary for women in different geographic locations (eg. metropolitan, large/small rural towns, rural and remote areas)?

Ann Larson (Director, Combined Universities Centre for Rural Health, Geraldton WA), Martin Bell (Senior Research Fellow, Department of Geographical and Environmental Studies and GISCA, University of Adelaide) and Anne Young (WHA) are interested in the spatial interactions of health and migration in Australia in the mid-aged and older cohorts. Their research questions for both the mid and older age groups are:

- *Is the health status (and health risks) of women who moved between the two surveys different from those who did not move?;*
- *Is the health (and health risks) of women moving to more urban locations different from the health of women moving to more rural/remote locations, controlling for other factors related to migration?;*
- *Does the measure or classification of rurality influence the conclusions of the previous question? Is the relationship between degree of remoteness and health-selective migration linear?;*
- *Is the extent of health-selective migration large enough to influence cross-sectional measures of health differences by place of residence?*
- *For the elderly, are women who died in the period between surveys more likely to have migrated prior to death than the women who survived?*

Ann Larson and Martin Bell have been looking at data quality issues and validation for the mid-age cohort. As reported in June 2000, methodological problems were identified. A comparison of answers to the life events question at Survey 2, "have you moved", with changes in postcode between Surveys 1 and 2 revealed inconsistencies. There were 465 women (4% of women with Survey 2 data) who did not indicate they had moved and yet had different postcodes in 1996 and 1998. These cases were reviewed and it was found that 309 (66%) of the women had an incorrect postcode in one or other of the datasets. A small number of women had answered the question about moving incorrectly and some women used postal addresses that differed from their residential address.

A review of the postcode in the consent database and the survey database for the older cohort revealed similar error rates. However the postcode in the consent database appears to be a more accurate indicator of actual place of residence, and has fewer transcription errors, than the postcode in the survey dataset and should be used for the future coding of urban/rural/remote, RRMA and State categories. Also, the accuracy of the postcode written in the survey may deteriorate as the older cohort age and their handwriting is more difficult to decipher (leading to more data entry errors).

To improve the quality of area of residence coding from now on, the full address at the time of completing each survey will be stored in an address file. This will allow coding of

addresses where the women lived at the time of the survey, even if the consent database is overwritten with a new address at a later date. The postcode keyed from the survey will be validated (keyed twice) and then compared to the address stored in an address file. Discrepancies will be resolved by clerical review.


# 4 MAINTENANCE OF COHORTS


## 4.1 GENERAL PROCEDURES

Cohort maintenance has continued using the same strategies as those outlined in Report 14 (June 2000). A particular issue for 2000 has been maintaining contact with the younger cohort. Procedures for maintaining contact have been outlined in Section 2.1.2.1 above.


## 4.2 AUSTRALIAN ELECTORAL COMMISSION

In 2000, it became possible for the AEC to provide electronic copies of enrolment data to researchers who meet appropriate criteria, under the Commonwealth Electoral Act 1918 and the Privacy Act 1988. In February 2000 the AEC provided WHA with elector data for all female Australians in the 20-29 age group, on condition that the data not be used later than six months after the date of extraction. The electronic version has many advantages over the use of microfiche copies at the local office of the AEC: it is more up-to-date, can be searched by any field, and can be used on site.

In August it was necessary to reapply for use of electronic data. In the interim, the AEC had obtained legal advice that the Commonwealth Electoral Act 1918 allowed only for provision of elector name, address and gender for use in health research, and that decade age ranges should no longer be provided. Thus, for the second six-month period the AEC has provided elector details for all electors in Australia, with gender indicated, for a cost of $583. This has been a considerably more difficult task for AEC staff, because of the size of the databases, and technical problems at the AEC have led to some delays. Information obtained from the electoral roll data is used as part of the comprehensive tracking strategy described in Report 14.


## 4.3 ANALYSIS OF THOSE WOMEN LOST TO FOLLOW-UP

An analysis of Survey 1 differences between those members of the Young cohort who did and did not participate in Survey 2 appears in Section 2.1.2.2.

# 5    DATA LINKAGE

## 5.1    UPDATE ON CONSENTS TO ACCESS MEDICARE AND DEPARTMENT OF VETERANS' AFFAIRS DATA

This study provides the opportunity to link survey data and HIC data for large numbers of women, provided they consent. This section summarises some of the work done by Dr Anne Young using the linked data. These results appear in two papers submitted to the Australian and New Zealand Journal of Public Health. As reported previously, by December 1997 19,700 women had provided consent to record linkage: 37% (n=5,260) of the young women, 59% (n=7,898) of the mid-age women and 53% (n=6,542) of the older women. The women were asked to return this particular consent form only if they consented to linkage. Very few women (less than 3%) actually indicated their non-consent by returning the form with a message of rejection. Characteristics of the women who gave consent for the release of information from HIC and those who did not are shown in Table 27.

Mid-age and older consenters were more likely, and younger consenters less likely, to be married. The consenters in all age groups had higher levels of education and were more likely to have private health insurance, indicating a tendency towards higher socioeconomic status. Similar proportions of consenters and non-consenters in the young and mid-age groups experienced major personal illness and hospitalisation in the previous year. Non-consenters in the mid and older age groups had higher use of GP services and the mortality rate among older women was higher for non-consenters than consenters (non-consenters: 258 deaths, 4.5%; consenters: 131 deaths, 2.0%).

**Table 27    Comparison of consenters and non-consenters using aggregate Health Insurance Commission (HIC) data and Survey 1 data (self-report).**

| Consent | Young | | Mid | | Older | |
|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | Yes | No |
| Number of women | 5,260 | 8,968 | 7,898 | 5,440 | 6,542 | 5,775 |
| Median number of GP visits per year 1995-1996 (HIC) | 4.5 | 4.5 | 3.5 | 4 | 7 | 8 |
| | % | % | % | % | % | % |
| Australian born | 92 | 91 | 78 | 74 | 79 | 76 |
| Married/defacto | 21 | 24 | 84 | 82 | 58 | 55 |
| Urban postcode | 56 | 54 | 37 | 39 | 41 | 41 |
| Post-school education | 69 | 58 | 37 | 27 | 18 | 12 |
| Private health insurance | 41 | 36 | 58 | 52 | 51 | 43 |
| Recent major personal illness | 10 | 9 | 9 | 11 | 13 | 16 |
| Hospitalised in last year | 17 | 19 | 17 | 16 | 22 | 24 |
| Medication for chronic illness | 9 | 7 | 19 | 19 | 38 | 36 |
| > 4 GP visits in previous year (self-reported) | 34 | 34 | 26 | 30 | 50 | 56 |
| Death during 1997-1998 | na | na | na | na | 2.0 | 4.5 |

The consent rate was lower among the younger women and this could be due to several factors. Firstly, the younger women tend to move more often than older women and may not have received the request. Secondly, in focus group discussions, younger women indicated greater concerns about privacy and confidentiality than older women. Younger women were also less trusting of government departments and the security of data. We tried to address these concerns in the brochure that accompanied the request but may not have done so fully. In this study consenters tended to have higher levels of education and, among the older cohort, better health than non-consenters. Further attempts are being made to obtain consent from the remainder of the participants.

There were 509,281 services provided to the consenters through Medicare and the DVA during the two-year period 1995-1996, including 243,186 GP consultations. There was reasonable concordance between the self-reported number of GP visits and the HIC data, although women tended to under-report utilisation, particularly the older cohort (Table 28). For women who reported the highest category of GP utilisation (seven or more visits), the HIC data provide a more detailed measure use of GP services. For example, 25% of older women in this category had 18 or more GP visits, with a maximum of 117 visits. HIC data were also available for the 237 women who did not answer this question in the survey and their number of visits ranged from 0 to 39. Of the 1359 women for whom there were no visits in the HIC database for the 12-month period, 51% reported no visits, 37% reported "1 or 2" visits and only 2% reported "7 or more" visits.

**Table 28**    **Comparison of self-report and Health Insurance Commission (HIC) records for number of general practitioner (GP) visits in the previous year, by age group.**

| Self-reported GP visits | Age group | HIC records | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Min | Q1 | Median | Q3 | Max |
| None | Young | 304 | 1.0 | 0 | 0 | 0 | 1 | 12 |
| | Mid | 616 | 0.9 | 0 | 0 | 0 | 1 | 23 |
| | Older | 196 | 2.0 | 0 | 0 | 0 | 2 | 35 |
| | | | | | | | | |
| 1-2 | Young | 1,668 | 2.8 | 0 | 1 | 2 | 4 | 22 |
| | Mid | 3,019 | 2.5 | 0 | 1 | 2 | 3 | 46 |
| | Older | 1,128 | 3.6 | 0 | 2 | 3 | 4 | 74 |
| | | | | | | | | |
| 3-4 | Young | 1,468 | 4.9 | 0 | 3 | 4 | 6 | 23 |
| | Mid | 2,073 | 4.8 | 0 | 3 | 4 | 6 | 27 |
| | Older | 1,831 | 6.1 | 0 | 4 | 5 | 8 | 53 |
| | | | | | | | | |
| 5-6 | Young | 906 | 7.0 | 0 | 4 | 6 | 9 | 28 |
| | Mid | 1,132 | 7.3 | 0 | 5 | 7 | 9 | 36 |
| | Older | 1,558 | 9.0 | 0 | 6 | 8 | 11 | 48 |
| | | | | | | | | |
| 7 or more | Young | 891 | 10.8 | 0 | 7 | 9 | 13 | 71 |
| | Mid | 975 | 12.5 | 0 | 7 | 11 | 16 | 79 |
| | Older | 1,698 | 14.8 | 0 | 9 | 13 | 18 | 117 |
| | | | | | | | | |
| Missing | Young | 23 | 4.3 | 0 | 2 | 4 | 6 | 13 |
| | Mid | 83 | 3.2 | 0 | 0 | 1 | 5 | 24 |
| | Older | 131 | 8.7 | 0 | 4 | 7 | 12 | 39 |

*Q1 = first quartile, Q3 = third quartile*

Further analysis of the HIC data showed that young women were less likely to consult a 'recognised' GP (vocationally registered or undertaking training) and were likely to see a greater number of different providers than older women (Table 29). The proportion of long GP consultations was highest in the mid-age group (Table 29).

**Table 29   Characteristics of the 243,186 GP consultations in 1995-96, by age group of participants.**

|                                | Young  | Mid    | Older   |
|--------------------------------|--------|--------|---------|
| Number of women                | 5,260  | 7,898  | 6,542   |
| Number of consultations        | 55,024 | 77,680 | 110,482 |
| **Type of practitioner**       | %      | %      | %       |
| Recognised GP/VRGP*            | 88.7   | 92.2   | 94.3    |
| Other                          | 11.3   | 7.8    | 5.7     |
| Total                          | 100    | 100    | 100     |
| **Number of different practitioners seen by each woman** | | | |
| 0                              | 2      | 3      | 1       |
| 1                              | 11     | 21     | 23      |
| 2 to 3                         | 31     | 45     | 48      |
| 4 to 5                         | 26     | 20     | 19      |
| 6 to 7                         | 15     | 7      | 6       |
| 8 or more                      | 16     | 4      | 3       |
| Total                          | 100    | 100    | 100     |
| **Length of consultation**     |        |        |         |
| Brief (Level A)                | 2      | 2      | 3       |
| Standard (Level B)             | 89     | 86     | 87      |
| Long/prolonged (Level C/D)     | 9      | 12     | 10      |
| Total                          | 100    | 100    | 100     |

*\* vocationally registered GP*

There was also a strong relationship between area of residence and out of pocket cost for GP consultations (Table 30). In each age group, the proportion of women who had all their consultations bulk billed is higher in urban areas. The disadvantaged position of women living in rural and remote areas, in terms of out of pocket cost per visit, is evident for all age groups.

**Table 30**  **Mean out of pocket cost per GP attendance 1995-96 for each woman, by age group and area of residence, for women with at least one GP visit**

| | URBAN | | RURAL | | | REMOTE |
|---|---|---|---|---|---|---|
| | **Capital city** | **Other metrop** | **Large rural centre** | **Small rural centre** | **Other rural area** | **Remote centre/ other remote** |
| | % | % | % | % | % | % |
| **Young age** | **(n=2,177)** | **(n=284)** | **(n=673)** | **(n=649)** | **(n=1,172)** | **(n=182)** |
| $0 per visit | 52 | 47 | 37 | 34 | 35 | 30 |
| $0 < per visit ≤ $3 | 22 | 24 | 23 | 25 | 24 | 22 |
| $3 < per visit ≤ $6 | 14 | 14 | 16 | 16 | 18 | 13 |
| $6 < per visit ≤ $9 | 8 | 10 | 13 | 14 | 13 | 20 |
| $9 < per visit ≤ $12 | 4 | 5 | 8 | 8 | 8 | 9 |
| > $12 per visit | 1 | 1 | 2 | 3 | 2 | 6 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| Median number of visits per year | 4.5 | 4 | 4 | 4 | 4 | 4 |
| Median out of pocket cost per visit  ($) | 0.00 | 0.49 | 1.44 | 1.65 | 1.82 | 2.75 |
| **Mid-age** | **(n=2,450)** | **(n=343)** | **(n=1,132)** | **(n=1,143)** | **(n=2,243)** | **(n=325)** |
| $0 per visit | 40 | 32 | 23 | 20 | 24 | 28 |
| $0 < per visit ≤ $3 | 14 | 12 | 11 | 14 | 11 | 9 |
| $3 < per visit ≤ $6 | 15 | 19 | 15 | 15 | 18 | 10 |
| $6 < per visit ≤ $9 | 15 | 16 | 25 | 22 | 24 | 21 |
| $9 < per visit ≤ $12 | 10 | 15 | 20 | 21 | 17 | 21 |
| > $12 per visit | 6 | 7 | 7 | 7 | 6 | 11 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| Median number of visits per year | 4 | 4 | 3.5 | 3.5 | 3.5 | 3.5 |
| Median out of pocket cost per visit  ($) | 2.11 | 4.14 | 6.15 | 6.17 | 5.54 | 6.48 |
| **Older age** | **(n=2,271)** | **(n=362)** | **(n=825)** | **(n=1,025)** | **(n=1,847)** | **(n=134)** |
| $0 per visit | 76 | 80 | 66 | 63 | 60 | 68 |
| $0 < per visit ≤ $3 | 9 | 11 | 13 | 19 | 18 | 13 |
| $3 < per visit ≤ $6 | 4 | 2 | 9 | 8 | 11 | 9 |
| $6 < per visit ≤ $9 | 4 | 4 | 5 | 4 | 7 | 4 |
| > $9 per visit | 6 | 2 | 5 | 5 | 5 | 5 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| Median number of visits per year | 7.5 | 8 | 6.5 | 6.5 | 6.5 | 5.5 |
| Median out of pocket cost per visit  ($) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Medicare and Department of Veterans' Affairs data for the three-year period 1997-1999 have now been received for 22,633 women. A summary of the number of consenters, by age group, is shown in Table 31.

**Table 31   Summary of the number of consenters to the request to access Medicare/DVA data**

|  | Young | Mid | Older | Total |
|---|---|---|---|---|
| Consented in 1997 | 5,260 | 7,898 | 6,542 | 19,700 |
| Late consents in 1998 | 39 | 58 | 126 | 223 |
| New consenters in 1999 | 949 | 994 | 1,005 | 2,948 |
| Total consenters | 6,248 | 8950 | 7,673 | 22,871 |
| Less withdrawals by September 2000 | 27 | 66 | 134 | 227 |
| Total | 6,221 | 8,884 | 7,539 | 22,644 |

There were 11 consent forms rejected by HIC staff (details incomplete) so claims data were extracted for 22,633 women.


# 6      DATA ANALYSIS

## 6.1    PROCEDURES FOR DATA CHECKING AND RELATED QUALITY ASSURANCE ACTIVITIES

Procedures for basic checking of raw data accuracy have not changed. As the project progresses, the emphasis in data quality assurance is shifting towards strategies for recoding and imputing missing values, and towards increasingly detailed documentation of databases through data dictionaries.


### 6.1.1   Missing data and calculation of indices

Procedures for imputing missing values where these can be done through deductive logic developed by Jean Ball, have been described previously. Where appropriate, these values have been recoded in the main databases, and these corrected databases will be archived at the Social Sciences Data Archive in place of the originals in early 2001 (see Section 9.1).

Analytic effort has been put into recoding of two important variables: physical activity status and menopausal category.

### 6.1.1.1 Physical activity

The WHA project has used a number of sets of questions to assess physical activity. The rules detailed here were developed by Anne Russell on the basis of discussions among researchers and staff. They are based on the question format used in the second survey of all 3 age cohorts, that is, the Young 2, Mid 2 and Old 2 surveys (see below) and are believed to take into account all possible responses and combinations of responses.

The purpose of this activity was to specify an agreed set of rules which are to be applied to all sets of physical activity questions of this format which may be used in future surveys. These rules deal with assignment of values to missing data, rationalisation of outliers and the calculation of a physical activity summary variable.

### 6.1.1.2 MID 2 Survey - Physical activity questions

The next three questions are about the amount of physical activity you did **LAST WEEK**.
The types of activity we are interested in are:

**WALKING** (fairly briskly, including walking to and from work);
**MODERATE** leisure-time activities (like golf, social tennis, moderate exercise classes, recreational swimming or cycling, and gardening); and
**VIGOROUS** leisure-time activities (the ones that make you puff and pant, like vigorous aerobics, competitive sport, vigorous cycling, running, swimming etc).

*Please write '0' in the box for each activity you DO NOT do.*

**51  How many *times* did you do each type of activity *LAST WEEK*?**

*Only count the number of times when the activity lasted for 10 minutes or more*

| | |
|---|---|
| Walking (briskly) | ☐☐ times |
| Moderate activity | ☐☐ times |
| Vigorous activity | ☐☐ times |

**52  If you add up all the times you spent in each activity *LAST WEEK*, how much time did you spend *ALTOGETHER* doing each type of activity?**

*Example:*
*Walking 3 times for 30 mins each time = 3 x 30 = 90 mins or 1 hour 30 minutes*

| | | |
|---|---|---|
| Walking (briskly) | ☐☐ hours | ☐☐ mins |
| Moderate activity | ☐☐ hours | ☐☐ mins |
| Vigorous activity | ☐☐ hours | ☐☐ mins |

**53  During the *LAST WEEK*, how much time did you spend *ALTOGETHER* in your *WORK* (paid or unpaid) doing VIGOROUS activity (that is, activity which made you puff or pant such as labouring, farm work, gardening, heavy work around the yard, heavy housework, etc.)?**

**TOTAL TIME** in vigorous work-related activity **last week**  ☐☐ hours  ☐☐ mins

### Coding missing values and zeros

a) Number of times doing leisure activities (Q51-a. walking, b. moderate & c. vigorous)

> If some items in this group have a non-zero response AND
> no items in this group have a response of 'zero'
> THEN code missing values to zero

b) Hours & minutes spent doing leisure activities (Q52-a. walking, b. moderate & c. vigorous).

> If hours spent doing activities is not missing AND
> the corresponding minutes are missing
> THEN code missing values in minutes to 0.
>
> (Similarly, for minutes not missing and hours missing).

c) Total minutes doing leisure activities (Q52-a. walking, b. moderate & c. vigorous) or vigorous paid work (Q53).

Total minutes calculated from separate hour and minute variables.

> If some items in this group have a non-zero response AND
> no items in this group have a response of 'zero'
> THEN code missing values to zero.

Q53 is included in this group because editing of surveys strongly suggested that respondents treated these questions as a single block. Including Q53 in the process of coding to zero here is also consistent with subsequent surveys, in which these 4 items are presented as a block.

d) Cross-referencing values for number of times (Q51) and total minutes (Q52).

> If the number of times is zero AND
> the corresponding total minutes is missing
> THEN code the missing value for total minutes to zero.
>
> Similarly, for zero in q52 and missing in q51.

There was some concern that values coded to zero in parts a) and c) may be re-coded here. However it was decided that since each step was logical that any such re-coding was acceptable.

### *Outliers*

<u>*Number of times (Q51)*</u>

*Principle*
The plausible maxima were set at 21 (3 times a day * 7) for walking and moderate exercise and 14 (2 times a day * 7) for vigorous exercise. Giving a maximum plausible number of times for all 3 activities of 56. These maxima are acknowledged as generous.

*Rule*
If the total of number of times reported for leisure activity (Q51a+ Q51b + Q51c) exceeds 56 THEN reduce the number of times for each activity in the proportion reported, to give a total of 56

OR

If total number of times cannot be calculated (ie. the number of times for 1 or 2 activities is missing)
THEN those values which are reported should be proportionally reduced, to give a total of 56.

*Amount of time (Q52)*

The possibility of assigning a time of 10 minutes when a number of times is reported but the amount is missing was considered and rejected.

The option of setting times to missing if the maximum plausible total was exceeded was also rejected.

*Principle*
The maximum plausible value for all leisure exercise types was set at 8 hours a day (480 minutes a day) on 5 days per week, ie. 40 hours per week. Eight hours on all 7 days was deemed too extreme. This maximum is acknowledged as generous.

*Rule*
If the total of leisure time reported (Q52 hours-a+b+c) exceeds 40
THEN reduce the hours for each activity in the proportion reported, to give a total of 40.

OR

If total leisure time cannot be calculated (ie. the time for 1 or 2 activities is missing)
THEN those values that are reported should be proportionally reduced, to give a total of 40.

*Combinations of Number of times (Q51) and Amount of time (Q52)*

A number of cases of unusual combinations for a particular exercise type of the number of times and the amount of time reported were reviewed.

a) Number of times is zero but amount of time is greater than zero
b) Amount of time is zero but number of times is greater than zero
c) Relatively high values of minutes per time
d) Relatively low values of minutes per time
e) Specific combinations: more than 480 minutes when the number of times reported is 1
f) Specific combinations: number of times greater than 24 and total time less than 240 minutes

No systematic methods for dealing with these extremes were found.

*Calculation of mets.minutes*

Physical activity (PA) can be assessed in terms of energy used, and measured in either kilocalories (kcal) or METS. METS is a unit of resting metabolic rate (RMR) which varies with sex, age, height and weight and is usually taken to be 3.5ml oxygen/kg/minute.

1 MET is defined as RMR, which for an average person is equivalent to 3.5ml oxygen/kg/minute. As each litre of oxygen provides approximately 5 kcal energy/minute, 1 MET is equivalent to 0.0175 kcal/minute.

MET values have been estimated for many activities and "generic" values of 3.5, 4 and 7.5 have been assigned for walking, moderate activity and vigorous activity respectively. The MET values for moderate and vigorous activities are based on published values of actual activities[1] and on the actual activities reported in responses to questions about moderate and vigorous activity in a 1996 NSW physical activity survey[2]. The value of 3.5 for walking is the mean of values for slow, moderate and brisk walking.

A score for PA, in mets.minutes, has been developed from the questions used by WHA[3] and is calculated as

$$\text{METs.minutes} \quad = \quad 3.5 * \text{minutes walking}$$
$$+ 4.0 * \text{minutes moderate activities}$$
$$+ 7.5 * \text{minutes vigorous activities}$$

*Statistical use of the mets.minutes variable*

Many women do not exercise at all, and so have zero mets.minutes of recreational physical activity. There are in fact so many zeros that the variable cannot be used as continuous variable for statistical analyses. Options for analysis are:

a) Create a binary variable that takes the value 0 when mets.minutes is zero and 1 when mets.minutes is positive. That is classifying women as exercisers or non-exercisers. Further analyses of exercisers alone could be undertaken, using mets.minutes as a continuous variable. However, neither the raw or log transformed values were approximately normally distributed and so this approach is also unsuitable.

b) Define ordinal categories of exercise use. This is the recommended method for analysis.

*Categories of PA in relation to health benefit.*

For purposes of categorisation, moderate activity for 30 minutes 5 times per week (150 minutes) has been defined as a 'threshold' for health benefit. So the cut-point for health

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[1]  Ainsworth, BE, Haskel NL, Leon AS et al. Compendium of physical activities: classification of energy costs of human physical activities. *Med Sci Sports Exerc*. 1993; 25(1): 71-80

[2]  Bauman A, Chey T, Brown WJ, and Booth M.  Validity and reproducibility of an Australian self reported generic physical activity questionnaire. *Med Sci Sports Exerc* .1998; S176: 1005

[3]  Brown WJ and Bauman AE. Comparison of estimates of population levels of physical activity using two measures. Submitted to *Australian and New Zealand Journal of Public Health.*

benefit versus no healthy benefit is 150 mins * 4 METs, or 600 mets.minutes. This threshold can be achieved through combinations of walking, moderate and vigorous activities.

The conversion from kcals to mets.minutes is based on the assumption that 1kcal is equivalent to 1 MET for a 60kg person.

Categories commensurate with those used in previous national PA surveys have been assigned in terms of kcal, mets.minutes and minutes of moderate intensity activity per week (see Table 32). Categories for kcal were developed by Bauman, Bellew, Booth et al.[1] and are based on calculations for an 80kg person. The mets.minutes variable is independent of body weight

**Table 32    PA categories**

| PA Categories | kcal/week | mets.minutes /week | Mins of moderate activity/week |
|---|---|---|---|
| Nil/sedentary | 0-<50 | 0-<40 | 0-10 |
| Low | 50-<800 | 40-<600 | 11-150 |
| Moderate | 800-<1600 | 600-<1200 | 151-300 |
| High | >= 1600 | >= 1200 | >300 |

*Limitations for comparison of mets.minutes with the physical activity measure from Survey 1*

Physical activity was measured differently in the Survey 1. Two items (shown below) with 6 response categories were used.

*In a NORMAL week, how many times do you engage in VIGOROUS exercise lasting for 20 minutes or more?* (exercise which makes you breathe harder or puff and pant, such as netball, squash, jogging, aerobics, vigorous swimming, etc.)

*In a NORMAL week, how many times do you engage in LESS VIGOROUS exercise which lasts for 20 minutes or more?* (exercise which does not make you breathe harder or puff and pant, like walking, gardening, swimming and lawn bowls)

Response categories were scaled as Never = 0, Once a week = 1, Two or three times a week = 2.5, Four, five or six times a week = 5, Once every day = 7 and More than once every day = 10.

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[1]    Bauman A, Bellew B, Booth M, Hahn A, Stoker L & Thomas M for the NSW Health Promotion Survey. Towards best practice for the promotion of physical activity in the areas of NSW.  Sydney: New South Wales Health Department, Centre for Disease Prevention and Health.  1996

The recreational physical activity summary variable was calculated as the weighted sum of the category scales for these 2 items, that is

$$5 * \text{vigorous exercise} + 3 * \text{moderate exercise}$$

This variable has no units of measurement and is not comparable in any way with mets.minutes.

### 6.1.1.4 Menopausal status

This section reports on the work conducted by Jenny Powers to improve the quality of assessment of menopausal status. Different definitions of menopausal status published in papers over the last ten years, and the current definitions used in the WHA study, are shown in Table 33.

**Table 33    Definitions of menopausal status**

|  | Definitions | References |
|---|---|---|
| Pre-menopause | Menstruated in the previous 3 months and no change in menstrual frequency in the last 12 months | Guthrie et al, 1999 Avis et al, 1993 |
|  | Menstruated in last 3 and 12 months and no change in frequency in last 12 months | WHA |
|  | No change in menstrual frequency or flow in the prior 12 months | Guthrie et al, 1996 Dennerstein et al, 1993 |
|  | Menstruated in the previous 3 months and no, or isolated, change in regularity of cycle | McKinlay et al, 1992 |
|  | Regular menses in the last 3 months | Avis et al, 1991 |
| Peri-menopause | 3-11 months of amenorrhea  or change in menstrual frequency | Guthrie et al, 1999 WHA |
|  | Change in menstrual frequency or flow | Guthrie et al, 1996 Dennerstein et al, 1993 |
|  | 3-11 months of amenorrhea or increased menstrual irregularity followed by report of more irregularity or amenorrhea at next interview 9 months later | Johannes et al, 1994 McKinlay et al, 1992 |
|  | Menses in last 12 months with periods of amenorrhea and/or changes in regularity or flow | Avis et al, 1993 Avis et al, 1991 |
| Early peri-menopause | Menstruation in the last 3 months and change in menstrual frequency in the last 12 months | Dudley et al, 1998 |
|  | Menstruated in past 3 months and change in cycle regularity at last two interviews (9 months apart) | Johannes et al, 1994 |
| Late peri-menopause | 3-11 months of amenorrhea | Dudley et al, 1998 |
| Post-menopause Natural menopause | No menses in prior 12 months in the absence of hysterectomy and/or bilateral oophorectomy | Guthrie et al, 1999 and 1996 Dennerstein et al, 1993 Avis et al, 1993 Johannes et al, 1994 McKinlay et al, 1992 Avis et al, 1991 WHA |
| Surgical menopause | Hysterectomy and/or bilateral oophorectomy | Dennerstein et al, 1993 Avis et al, 1993 McKinlay et al, 1992 Johannes et al, 1994 Avis et al, 1991 WHA |

Essentially, the definitions of post-menopause are consistent for all studies, and the only inconsistency in pre-menopause is Guthrie's (1996) definition of no change in flow. A more recent study, Dudley et al. (1998) suggests there is no difference between pre-menopause and change in flow only. The definitions used by Guthrie et al. (1999) no longer include flow.

Most differences occur in definitions of peri-menopause. All probably agree that 3-11 months of amenorrhea fits the category of peri-menopause. However, changes in frequency in the last 12 months may be more problematic. Some studies require these changes at two time points others at one. This may be problematic for the WHA study as data are only available at one time point in 1996.

As a general principle early in the WHA project, Guthrie's (1996) definition was adopted so that at least the major Australian studies would be consistent. As Guthrie's (1999) definition excluded flow, our definitions are now consistent with the 1999 definition (Table 34). Table 2 lists the variables used to determine menopause.

**Table 34    WHA questions used to determine menopause at Surveys 1 and 2**

| Survey 1 | Survey 2 | Description of question |
|----------|----------|-------------------------|
| m1q31a | m2q27a | Have you had a period or menstrual bleeding in the last 12 months? |
| m1q31b | m2q27b | Have you had a period or menstrual bleeding in the last 3 months? |
| m1q32 | m2q28 | Compared with 12 months ago, are your periods: less frequent;  about the same;  more frequent;  changeable? |
| m1q16a | m2q21a* | Have you ever had a hysterectomy? |
| m1q16b | m2q21b* | Have you ever had both ovaries removed? |

*m1 = Survey 1 in 1996*
*m2= Survey 2 in 1998*
*\* asked in the last 2 years or more than 2 years ago*

Comparison of data at Survey 1 (1996) and Survey 2 (1998) showed inconsistent menopausal transitions for almost 800 women. Menopausal status could not be defined for 87 women at Survey 1, 166 women at Survey 2 and 4 women at both (see Table 35).

**Table 35    Inconsistent menopausal status at Surveys 1 and 2**

| | Survey 2 | | |
|---|---|---|---|
| **Survey 1** | **Pre-menopausal** | **Peri-menopausal** | **Post-menopausal** |
| Peri-menopausal | 577 | - | - |
| Post-menopausal | 67 | 67 | - |
| Surgical menopause | 21 | 26 | 36 |

*Checking data for inconsistent records*

A sample of 50 was selected from the six categories in Table 3: 15 for row one, 10 for each of the groups in row two and 5 for each of the groups in row three. There were few data entry

errors in any of these records. Most errors were in the surgical menopause group; 6/15 had either had only one ovary removed, had "laser hysterectomy" or gave ambiguous answers about a hysterectomy at Survey 1; 1/15 was incorrectly recorded at Survey 2 and had had a hysterectomy. In the group who were post-menopausal at Survey 1, 2/20 were actually peri-menopausal at the time. In the pre-menopausal group at Survey 2, 2/30 were actually peri-menopausal. These errors will be corrected in the original databases.

### *Recoding of inconsistent and missing menopausal status*

The major inconsistency is change in menopausal status from peri-menopausal to pre-menopausal. This is mainly due to the question on frequency of periods. Most of the women who appeared to have changed from peri- to pre-menopausal had periods in the last three and twelve months at both surveys. However at Survey 1 they were either less or more frequent or changeable over the last 12 months, while at Survey 2 they were about the same frequency as the previous 12 months. These results could be interpreted in two ways. The women were peri-menopausal at both times or they were pre-menopausal at both times. The definition of peri-menopause by McKinlay et al. (1992) requires continued menstrual irregularity nine months after the earlier irregularity. On this basis (and given the results of the sample check) it would make sense to recode Survey 1 to pre-menopause, even though the time between surveys is two years.

Examination of all the data for women who reported a hysterectomy at Survey 1 and not at Survey 2, suggests that many of these women were still menstruating at Survey 1. This suggests that the Survey 1 reports of hysterectomy were incorrect, and menstrual period data were used to re-classify these women.

Questions which may clarify inconsistent menopausal status are shown below.

*Extra questions relating to menopause*

| If you have reached menopause, at what age did your periods completely stop? | m2q25e |
|---|---|
| Have you experienced any of the following events? Going through menopause | |
|     In the last 12 months | m1q37d, m2q32ad |
|     1-2 years ago | m2q32bd |
|     More than 2 years ago | m2q32cd |

The following rules for recoding of menopausal status were developed by Jenny Powers in consultation with other WHA researchers and staff. These are used solely for reassignment of menopausal status where inconsistencies exist between Surveys 1 and 2 and the assignment of menopausal status where it is missing at Survey 1 or 2. The rules make use of all menopausal data at Surveys 1 and 2, however once a third set of data are collected, they may require further revision.

1   Use age when periods stopped and age at Survey 1 (m1age) to determine menopausal status:
    If m2q25e < m1age then post-menopausal at Survey 1 and Survey 2;

If m2q25e = m1age then peri-menopausal at Survey 1 and post-menopausal at Survey 2;
If m2q25e > m1age then peri-menopausal at Survey 1 and Survey 2. This is possibly conservative to allow for some error and variation in age.

2    If hysterectomy at Survey 1 and not at Survey 2, use answers to "*have you had a period in the last 12 and 3 months*" and frequency of periods to recode to pre-, peri-, or post-menopausal at Survey 1.

3    If pre-menopausal at Survey 2 and peri-menopausal at Survey 1, use answers to "*have you had a period in the last 12 and 3 months*" at Survey 1 to recode:
If m2q27a=1 and m2q27b=1 and m2q28=2 and m1q31a=1 and m1q31b=1 then pre-menopausal at Survey 1 and Survey 2.

After recoding, the following inconsistencies still exist (Table 36). Menopausal status for these women can be given a code to indicate inconsistent menopausal status.

**Table 36    Inconsistent menopausal status at Survey 1 and Survey 2 after recoding**

|  | Survey 2 | | |
| --- | --- | --- | --- |
| **Survey 1** | **Pre-menopausal** | **Peri-menopausal** | **Post-menopausal** |
| Peri-menopausal | 75 | - | - |
| Post-menopausal | 64 | 47 | - |
| Surgical menopause | 0 | 0 | 1 |

Menopausal status could still not be defined for 50 women at Survey 1, 126 women at Survey 2 and 3 women at Surveys 1 and 2.

These recodes are consistent with the original definitions used to code menopausal status, with one exception: if frequency of menstrual periods was changeable at Survey 1 and stable at Survey 2, menstrual status was considered pre-menopausal at both time points. This is consistent with the work of Johannes et al. (1994) and McKinlay et al. (1992). Further, if a woman recalls having a hysterectomy or bilateral oophorectomy at Survey 1 and not at Survey 2, it is assumed that the Survey 1 response is incorrect. After making this assumption, menstrual status coding is consistent with original WHA coding and that of Guthrie et al. (1999).

*References*

Guthrie JR, Dennerstein L, Dudley EC. Weight gain and the menopause: a 5-year prospective study. *Climacteric*, 1999; 2: 205-211.

Dudley EC, Hopper JL, Taffe J, Guthrie JR, Burger HG, Dennerstein L. Using longitudinal data to define the perimenopause by menstrual cycle characteristics. *Climacteric*, 1998; 1: 18-25.

Guthrie JR, Dennerstein L, Hopper JL, Burger HG. Hot flushes, menstrual status, and hormone levels in a population-based sample of midlife women. *Obstetrics and Gynecology*, 1996; 88: 437-42.

Johannes CB, Crawford SL, Posner JG, McKinlay SM. Longitudinal patterns and correlates of hormone replacement therapy use in middle-aged women. *American Journal of Epidemiology* 1994; 140: 439-452.

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Avis NE, Kaufert PA, Lock M, McKinlay SM, Vass K. *The evolution of menopausal symptoms*. Chap 2 in Burger HG (ed) Bailliere's Clinical Endocrinology and Metabolism. Volume 7(1). The Menopause, Balliere Tindall: London 1993; 17-32.

McKinlay SM, Brambilla DJ, Posner JG. The normal menopause transition. *Maturitas*, 1992; 14: 103-115.

Avis NE, McKinlay SM. A longitudinal analysis of women's attitudes toward the menopause: results from the Massachussetts Women's Health Study. *Maturitas*, 1991; 13: 65-79.

## 6.2    DATA COLLECTION AND ENTRY, POLICIES FOR DATA ACCESS, DATA BOOKS

Policy and procedures in these areas have not changed and are outlined in Report 13, pp 61 – 62.

## 6.3    USE OF DATA BY OTHER RESEARCHERS

The databases produced by the Australian Longitudinal Study on Women's Health are a valuable national resource and we encourage other researchers to make use of it. To date, most researchers have chosen to work collaboratively with ALSWH Principal Investigators and reports on this collaborative work appear in Sections 1.2 and 9.2 of this report. Table 37 below lists other researchers who are currently using ALSWH data in collaborative projects.

**Table 37    Researchers currently using ALSWH data**

| External Researcher | Location | ALSWH Collaborator | Project Title |
|---|---|---|---|
| Dr Kylie Ball | Deakin University | Professor Christina Lee Professor Wendy Brown | Maintenance of healthy weight among young women |
| Dr Martin Bell, Dr Ann Larson | University of Adelaide Combined Universities Centre for Rural Health, Geraldton | Dr Anne Young | Geographic locality and access to health care services |
| Dr Marilys Guillemin | University of Melbourne | Professor Wendy Brown | Menopause, HRT and heart disease |
| Dr Rafat Hussain | University of New England | Professor Christina Lee A'Prof Margot Schofield | Gynaecological history and well-being in mid-age women |
| Dr Helen Jonas | La Trobe University, Bendigo | Professor Wendy Brown | Young women and alcohol consumption |
| Dr Helen Keleher | La Trobe University, Bendigo | Professor Christina Lee | Rural women's experiences of health care |

We have also provided data analyses to FPA Health (New South Wales) on the access and use of family planning-related services of urban and rural/remote women resident in New South Wales.

## 6.4    AD HOC DATA ANALYSIS FOR THE DEPARTMENT OF HEALTH AND AGED CARE

Where appropriate, the databases may be used to provide summary analyses on an ad hoc basis to staff of any division of DHAC. Staff with an interest in specific variables or age groups are requested to contact the Project Manager, Professor Christina Lee, to discuss their interest and to clarify the nature of the analyses. At the request of Sue McHutchison of the Office for Older Australians, a series of analyses was conducted examining aspects of the health of older women, and a detailed report was prepared. The findings of this report are summarised below.

### 6.4.1    Summary of analyses for Office of Older Australians, September 2000

#### 6.4.1.1    *Comparison of the two surveys (Survey 1, 1996, age 70-75; Survey 2, 1999, age 73-78).*

*SF-36*
Mean and median scores on the SF-36 subscales in 1996 and 1999 showed statistically significant declines in physical health measures and vitality, and statistically significant

improvements in mental health. This is consistent with the cross-sectional findings which show that older women score lower than mid-age or younger women on physical measures, but higher on mental health.

*Medications*
There was a strong tendency for women to be using a larger number of both prescription and non-prescription medications in 1999 than in 1996. Medications for "nerves" and for sleeping difficulty were not commonly used and there was a slight decrease in use between 1996 and 1999. There was also a decrease in reported use of medications for chronic conditions.

*Medical services*
In both 1996 and 1999, the majority of women had consulted a GP at least 5 times in the previous year. Reported GP visits were significantly higher in 1999 than in 1996. For hospital doctors, specialist doctors, allied health professionals and alternative health practitioners, the large amount of missing data on both occasions makes it impossible to draw conclusions regarding overall trends in use.

*Marital status*
Marital status was unchanged for 90% of women, though 700 were widowed between 1996 and 1999.

### 6.4.1.2    Living arrangements and mental health

Those living alone in 1996 had significantly lower scores on the mental health components of the SF-36 and higher stress (1996), and higher scores on CES-D depression (1999). Although these effects were statistically significant, the actual size of the mean differences was very small and would not correspond to a clinically meaningful difference in scale scores. Of those living alone, those living in a flat or unit had significantly lower mental health scores and higher stress than those living in houses, but they did not differ in depression.

### 6.4.1.3    Life events and mental health

A larger number of life events experienced in 1996 was significantly associated with lower mental health and higher stress (1996). Number of life events in 1996 also predicted lower mental health and higher stress in 1999. The differences in the means were large and represent clinically significant differences in mental health.

### 6.4.1.4    Physical activity and mental health

Mental health scores increased, and depression and stress decreased, as physical activity category increased. This effect was found cross-sectionally at 1996 and 1999, and also longitudinally, examining 1996 physical activity and 1999 mental health. The differences in the means were large and represent clinically significant differences in mental health.

### 6.4.1.5    GP consultations

The vast majority of GP consultations (data from HIC unit records) were standard (Level B) consultations carried out in a doctor's surgery.

# 8 DISSEMINATION OF STUDY FINDINGS

## 8.1 COMMUNICATION WITH STUDY PARTICIPANTS

### 8.1.1 Newsletters

The main communication with participants in this period has been the 2000 newsletter, which was mailed in October (see Appendix 8.1). The newsletter contained a number of articles about the progress of the survey and aimed to be entertaining and attractive. Change of contact details cards were included in the mailout, together with fridge magnets showing the Women's Health Australia logo and the Freecall number.

### 8.1.2 Feedback on substudies

A substudy on the experiences of women who reported urinary leakage (see Section 1.2.1) was completed in this six-month period and an information sheet was mailed to all participants (see Appendix 8.2).

## 8.2 DISSEMINATION OF FINDINGS

### 8.2.1 Web Site

Due to changes in the University of Newcastle's Faculty web resources, the web site address has changed to http://www.fec.newcastle.edu.au/wha. This is linked to the previous address. It is updated to give useful and easily accessible information to the general public. There are six main sections: general information about the study; the investigators and staff; current events; publications; information for participants; databooks and feedback. In the past 6 months, the site has had an average of 187 hits per week with a total of 6933 "hits" (as at 24 November 2000).

### 8.2.2 Publications

#### 8.2.2.1 Published

**Schofield M, Mishra G & Dobson A. Risk of multiple prior miscarriages among middle aged women who smoke. In Lu R, Mackay J, Niu S, Peto R (eds), *Tobacco: The Growing Epidemic*. London: Springer, 2000; 241-243.**
We present retrospective self-reported data from the baseline survey of the Australian Longitudinal Study on Women's Health on the relationship between smoking and history of miscarriages among 14 200 women aged 45-49 at the time of the survey. The sampling frame was the database of the national health insurance system. Participants were randomly selected, with over-sampling from rural and remote areas, and are broadly representative of Australian women in this age group. Polychotomous logistic regression analyses were used to test the hypotheses that current smoking status and age at starting to smoke are associated with the number of miscarriages reported. There was a strong positive relationship between smoking status and the number of reported miscarriages. Ex-smokers were 1.25 times more likely to have had two or more miscarriages, light smokers (1-19 cigarettes per day) were

1.39 times more likely, and women who smoked 20 or more per day were 1.78 times more likely compared with women who had never smoked. An inverse relationship was also found between age at starting to smoke and a history of miscarriages. The findings provide strong evidence of a link between smoking and miscarriages and suggest that new initiatives are needed to prevent smoking among women of child-bearing age.

**Schofield M, Mishra G & Dobson A. Risk of early menopause among Australian women who smoke. In Lu R, Mackay J, Niu S, Peto R (eds),** *Tobacco: The Growing Epidemic*. **London: Springer, 2000; 243-246.**

We examined the relationship between smoking status and self-reported natural menopause among 14,200 women aged 45-49 years in the Australian Longitudinal Study on Women's Health. The sampling frame was the database of the national health insurance system. Participants were randomly selected, with over-sampling from rural and remote areas and are broadly representative of Australian women in this age group. Polychotomous logistic regression analyses were used to estimate the association between current smoking status and early menopause and peri-menopausal status after adjustment for potentially confounding factors. Smokers of 1-19 cigarettes per day were 1.48 times more likely to be peri-menopausal, and women who smoked ≥20 per day were 1.74 times more likely to be peri-menopausal in comparison with never smokers. Both groups of smokers were 1.8 times more likely to report post-menopausal status than women who had never smoked. For ex-smokers, the risk for earlier onset of menopause declined rapidly after quitting. The results extend earlier evidence of a link between smoking and early menopause by estimating the effects of quitting and by controlling for a wide range of potential confounders.

**Brown WJ, Lee C, Mishra G, Bauman A. Leisure time physical activity in Australian women: relationship with well-being and symptoms.** *Research Quarterly for Exercise and Sport*, **2000; 71(3): 206-216.**

This paper explores the hypothesis that moderate levels of physical activity are associated with health benefits in terms of well-being and commonly reported symptoms such as tiredness, back pain and constipation. 14,502 young women (18-23 years), 13,609 mid-age women (45-50) and 11,421 older women (70-75), who are participating in the Australian Longitudinal Study on Women's Health, answered questions about vigorous and less vigorous exercise (used to determine a physical activity score), health and well-being (SF-36), symptoms and medical conditions. There were significant associations between PA score and SF-36 scores in each cohort. Odds ratios for reporting a range of symptoms and conditions were lower for women who reported low to moderate activity (eg for young women, OR for constipation = 0.76 (CI 0.65-0.89), for mid-age women, OR for tiredness = 0.70 (0.63-0.78)) than for sedentary women. There was no threshold level of PA at which health benefits appeared to increase significantly. While acknowledging the limitations of cross-sectional data in terms of drawing conclusions about causality, the findings suggest that low to moderate levels of exercise are associated with a range of health benefits for women of all ages. These preliminary findings will be followed up during the course of the longitudinal study.

**Schofield MJ, Minichiello V, Mishra G, Plummer D & Savage J. Sexually transmitted infections and use of sexual health services among young Australian women: Women's Health Australia study.** *International Journal of STD & AIDS*, **2000; 11: 313-323.**
Our objective was to examine associations between self-reported sexually transmitted infections (STI) and socio-demographic, lifestyle, health status, health service use and quality of life factors among young Australian women; and their use of family planning and sexual health clinics and associations with health, demographic and psychosocial factors.

The study sample comprised 14,762 women aged 18-23 years who participated in the mailed baseline survey for the Australian Longitudinal Study on Women's Health, conducted in 1996. The main outcome measures are self report of ever being diagnosed by a doctor with an STI including chlamydia, genital herpes, genital warts or other STI, and use of family planning and sexual health clinics.

The self-reported incidence of STI was 1.7% for chlamydia, 1.1% genital herpes, 3. 1 % genital warts, and 2. 1 % other STIs. There were a large number of demographic, health behaviour, psychosocial and health service use factors significantly and independently associated with reports of having had each STI. Factors independently associated with use of family planning clinic included unemployment, current smoking, having had a Pap Smear less than two years ago, not having ancillary health insurance, having consulted a hospital doctor and having higher stress and life events score. Factors independently associated with use of a sexual health clinic included younger age, lower occupation status, being a current or ex- smoker, being a binge drinker, having had a Pap Smear, having consulted a hospital doctor, having poorer mental health and having higher life events score.

This study reports interesting correlates of having an STI among young Australian women aged 18-23. The longitudinal nature of this study provides the opportunity to explore the long-term health and gynaecological outcomes of having STIs during young adulthood.

**Lee C, Dobson A, Brown W, Adamson L & Goldsworthy J. Tracking participants. Lessons from the Women's Health Australia project. Practice Notes.** *The Australian and New Zealand Journal of Public Health*, **2000; 24(3): 334-336.**
Maintaining contact with participants is essential to the quality of any longitudinal project. A population-based survey of women ranging in age from 18 to (eventually) 95 years raises particular problems for maintaining contact. Young women frequently move location (our 1999 pilot survey showed that 35% of respondents had moved house three or more times in the past three years), and many of them change their surnames when they marry. While the mid-age women move less often, similar problems arise when they divorce or separate. Younger women may not be registered on the electoral roll, and if they are, their addresses there may be out of date. In tracking older women, the main problems occur when they move to a retirement village or nursing home, or to live with a relative; the identification of those who have died is also important. This paper describes strategies used by the research team to keep track of  participants.

**Mishra G, Dobson A & Schofield M. Cigarette smoking, menstrual symptoms and miscarriage among young women.** *The Australian and New Zealand Journal of Public Health*, **2000; 24(4): 413-420.**

Objective: To examine associations between cigarette smoking and menstrual symptoms and miscarriage among young women.

Method: The study sample consists of 14,762 women aged 18-23 years who participated in the mailed baseline survey for the Australian Longitudinal Study on Women's Health, conducted Australia wide in 1996. The main outcome measures are self-reported menstrual symptoms and miscarriages.

Results: Current smokers and ex-smokers had an increased risk of menstrual symptoms and miscarriages compared with women who had never smoked; with the highest risk occurring in heavy smokers (adjusted odds ratios for those smoking $\geq$ 20 cigarettes per day): premenstrual tension 1.43 (95% confidence interval 1.27 to 1.60), irregular periods 1.31 (1.15 to 1.50), heavy periods 1.47 (1.28 to 1.69), severe period pain 1.39 (1.23 to 1.56), one or more miscarriages 4.27 (2.79 to 6.53). The risk of miscarriage for women who smoked compared with those who had never smoked was greater the earlier they started to smoke. The relative risk for most of the menstrual symptoms was the greatest for women who had started to smoke by the age of 13.

Conclusion: This study provides clear evidence that young women who smoke are at a higher risk of a range of menstrual problems and miscarriage than those who have never smoked. The immediacy of this risk (in contrast to the longer term risks of chronic disease) can be used to improve the relevance of anti-smoking campaigns targeted to young women.

**Powers J, Ball J, Adamson L & Dobson A. Effectiveness of the National Death Index for establishing the vital statistics of older women in the Australian Longitudinal Study on Women's Health.** *The Australian and New Zealand Journal of Public Health*, **2000; 24: 526-528.**

Objective: To assess the effectiveness of the National Death Index (NDI) in identifying participants in the oldest cohort of the Australian Longitudinal Study on Women's Health who had died between 1996 and 1998.

Methods: Identifying information for each woman was matched with the NDI using a probabilistic algorithm and clerical review. Differences in full name, date of birth, State of residence and date of last contact were used to assess the probability of a true match.

Results: NDI identified 410 matches of death records for 409 women; 386 were categorised as true matches and 23 were doubtful matches. Responses to the follow-up survey confirmed for six of the doubtful matches that the women had died, 16 were alive and the vital status of one woman remained unconfirmed at 30 June 1998. Twelve deaths, known to have occurred before July 1998, were not identified through NDI. The sensitivity of the NDI for identifying known deaths was 95%. Detailed identifying information, particularly the middle name, was important for accurate identification of the vital status.

Conclusions: Using surname, all given names, gender, date of birth, State of residence and age at last contact as matching variables, the NDI was an effective tool for identifying women who had died.

**Young AF, Dobson AJ & Byles J. Access and equity in the provision of general practitioner services for women in Australia.** *The Australian and New Zealand Journal of Public Health*, 2000; 24: 474-480.

Objective: To assess geographical equity in the availability, accessibility and out of pocket costs of general practitioner (GP) services for women in Australia.

Method: Data on general practice consultations during 1995 and 1996 for women aged 18-23 years (n=5,260), 45-50 years (n=7,898) and 70-75 years (n=6,542) in the Australian Longitudinal Study on Women's Health were obtained from the Health Insurance Commission. A substudy of 4,577 participants provided data on access to health services.

Results: Older women were more likely to have no out of pocket costs for their GP consultations but in all age groups, the proportion was lower in rural areas than in urban areas (older age: 60% rural areas, 76% capital cities; mid-age: 24% rural areas, 40% capital cities; young age: 35% rural areas, 52% capital cities). Among mid-aged women, the median out of pocket cost per consultation ranged from $2.11 in capital cities to $6.48 in remote areas. Women living in rural and remote areas gave lower ratings for the availability, accessibility and affordability of health services than women living in urban areas.

Conclusions: This study has shown a striking gradient in financial and non-financial barriers to health care associated with area of residence.

Implications: The geographical imbalance in the supply and distribution of GP services in Australia has long been recognised but inequities in the affordability of services must also be addressed. Longitudinal survey data and Health Insurance Commission data provide a means to evaluate policies designed to improve access to health services in rural and remote areas.

**Brown WJ & Bauman A. Comparison of estimates of population levels of physical activity using two measures.** *Australian and New Zealand Journal of Public Health*, 2000; 24: 520-525.

Objective: To compare estimates of population levels of 'adequate activity' for health benefit in different population age and sex groups using two different measures - kilocalories and Mets.mins.

Methods: 10,464 mid-age women (47-52 years) from the second survey of the Australian Longitudinal Study on Women's Health (ALSWH, 1998) and 2,500 men and women (18-75 years) from the 1997 *Active Australia* national survey, answered questions about physical activity. Kcals and Mets.mins were calculated from self-reported time spent in walking, moderate and vigorous activity, and self reported body weight. 'Adequate activity' was defined as a minimum of 800 kcals or 600 Mets.mins.

Results: There were differences in the estimates of 'adequate activity' using the two methods among women participants in both surveys, but not among the male participants in the *Active Australia* survey. A significant proportion of the women in both surveys (6.4% of the ALSWH women and 8.5% of the *Active Australia* women, mean weight 60kg) were classified as 'inactive' when the kcals method was used despite reporting levels of activity commensurate with good health. . Fewer than 1% (mean weight 105kg) were classified as 'active' using kcals when reporting lower than recommended levels of activity. Agreement between the two methods was better among men; only 3% were misclassified because of low or very high weight.

Conclusions: The Mets.mins method of estimating 'adequate' activity assesses physical activity independently of body weight and is recommended for use in future population surveys, as it is less likely to under-estimate the prevalence of physical activity in women.

Implications: Women and men aged 45-59, and women aged >60 should be the target of specific health promotion strategies to increase levels of physical activity

**Byles JE, Mishra G & Schofield M. Factors associated with hysterectomy among women in Australia.** *Health and Place: An International Journal*, **2000; 6: 301-308.**

This study was to identify hysterectomy prevalence across urban, rural and remote areas of Australia and across states; to separate these geographic variation from the effect of sociodemographic influences, and also to compare the quality of life of women who have not had hysterectomy. Data were collected from 14,072 women aged 45-49 years participating in the baseline survey of the Australian Longitudinal Study on Women's Health. The estimated prevalence of hysterectomy was 22%. Factors significantly associated with hysterectomy included living in rural or remote area, state of residence, having private health insurance, lower levels of education, being married and having more than two children, having had other gynaecological and non-gynaecological surgical procedures, and more visits to general practitioners. Compared with women who had not had hysterectomy, women who had had hysterectomy had significantly poorer physical and mental health as measured by the SF-36 quality of life profile (adjusted mean PCS = 45.7 vs 49.3, $p < 0.0001$; adjusted mean MCS = 46.9 vs 48.2, $p<0.0001$).

**Patterson AJ, Brown WJ, Powers JR & Roberts DCK. Iron deficiency, general health and fatigue: Results from the Australian Longitudinal Study on Women's Health.** *Quality of Life Research,* **2000; 9: 491-497.**

Associations between self-reported 'low iron', general health and well-being, vitality and tiredness in women, were examined using Physical (PCS) and Mental (MCS) Component Summary and Vitality (VT) scores from the MOS Short-form survey (SF-36). 14762 young (18-23yrs) and 14072 mid-age (45-50yrs) women, randomly selected from the national Health Insurance Commission (Medicare) database, completed a baseline mailed self-report questionnaire and 12328 mid-age women completed a follow-up questionnaire two years later.

Young and mid-age women who reported (ever) having had 'low iron' reported significantly lower mean PCS, MCS and VT scores, and greater prevalence of 'constant tiredness' at baseline than women with no history of iron deficiency [Differences: Young PCS = -2.2, MCS= -4.8, VT= -8.7; Constant tiredness: 67% versus 45%; Mid-age PCS = -1.4, MCS= -3.1, VT= -5.9; Constant tiredness: 63% versus 48%].

After adjusting for number of children, chronic conditions, symptoms and socio-demographic variables, mean PCS, MCS and VT scores for mid-age women at follow-up were significantly lower for women who reported recent iron deficiency (in the last two years) than for women who reported past iron deficiency or no history of iron deficiency [Means: PCS – Recent = 46.6, Past = 47.8, Never = 47.7; MCS – Recent = 45.4, Past = 46.9, Never = 47.4; VT – Recent = 54.8, Past = 57.6, Never = 58.6].

The adjusted mean change in PCS, MCS and VT scores between baseline and follow-up were also significantly lower among mid-age women who reported iron deficiency only in the last two years (i.e. recent iron deficiency) [Mean change: PCS = –3.2; MCS = -2.1; VT = –4.2]. The results suggest that iron deficiency is associated with decreased general health and well-being and increased fatigue.

**Brown WJ, Mishra G, Kenardy J & Dobson AJ. What is a healthy weight for young women?** *International Journal of Obesity***, 2000.**

<u>Objective:</u>  To explore relationships between body mass index (BMI, kg.m$^{-2}$) and indicators of health and well-being in young Australian women.

<u>Design:</u>  Population based longitudinal cohort study – baseline cross-sectional data.

<u>Subjects:</u>  14,779 women aged 18-23 who participated in the baseline survey of the Australian Longitudinal Study on Women's Health in 1996.

<u>Measurements:</u>  Self-reported height, weight, medical conditions, symptoms and SF-36.

<u>Results:</u>  The majority of women (68.2%) had a BMI in the range ≥18.5 – <25; 12% had a BMI <18.5; 14.1% had a BMI in the range ≥25-<30 and 5.7% had a BMI ≥30.  After adjustment for area of residence, age, education, smoking and exercise, women in the highest BMI category (≥30) were more likely to report hypertension, asthma, headaches, back pain, sleeping difficulties, irregular periods, and more visits to their medical practitioner. They were also more likely to have given birth at least once, and less likely to report 'low iron.' Women with low BMI (<18.5) were more likely to report irregular periods and 'low iron'. Mean scores on the SF-36 sub-scales for physical functioning, general health and vitality were highest for women with BMI in the range 18.5 – 25.

<u>Conclusion:</u>  Acknowledging the limits of the cross-sectional nature of the data, the results show that the deleterious effects of overweight can be seen at a comparatively young age, and that BMI <25 is associated with fewer indicators of morbidity in young women.  However, as BMI <18.5 is associated with some health problems, care should be taken when developing strategies to prevent overweight in young women, not to promote weight loss to those who already have a healthy BMI.

**Lee C. Experiences of family caregiving among older Australian women.** *Journal of Health Psychology,* **2000.**

This paper uses quantitative and qualitative methods to examine the effects on family caregiving on physical and emotional wellbeing, finances and leisure among a cohort of Australian women aged 70 to 75. A total of 11,939 women, of whom 10% (N=1,235) identified themselves as caregivers for frail, ill or disabled family members and 168 made open-ended comments about their experiences, was examined. Unlike other surveys with younger respondents, the data failed to demonstrate any differences in physical health between caregivers and others. They were, however, significantly more likely to have low levels of emotional well-being and to feel stressed, rushed and pressured. Qualitative analysis supported the value of the concept of the "ethic of care" in understanding the social and individual forces which propel vulnerable older women into providing family care despite its demonstratively negative effects on their wellbeing.

**Young AF, Dobson AJ & Byles JE. Determinants of general practitioner use among women in Australia.** *Social Science and Medicine,* **2000.**

This study investigates the use of general practitioner services by women in Australia. Although there is a universal health insurance system (Medicare) in Australia, there are variations in access to services and out of pocket costs for services. Survey data from 2,350 mid age (45-50 years) and 2,102 older (70-75 years) women participating in the Australian Longitudinal Study on Women's Health were linked with Medicare data to provide a range of individual and contextual variables hypothesised to explain general practitioner use.

Structural equation modelling showed that physical health was the most powerful explanatory factor of general practitioner use. However, after adjusting for self-reported health, out of pocket cost per consultation was inversely associated with use of services. The out of pocket cost was generally lower for women with low socioeconomic status but cost was also directly related to geographical remoteness. Women living in more remote areas had higher out of pocket costs and poorer access to services. Women who reported better access to care were more likely to be satisfied with their most recent general practice consultation and less likely to be sceptical of the value of medical care. These results show the need for health policies that improve the equitable use of general practitioner services in Australia.

**Ball K & Lee C. Psychological stress, coping and symptoms of disordered eating in a community sample of young Australian women.** *International Journal of Eating Disorders,* **2000.**

A longitudinal study was designed to investigate the relationships between stress, coping, and symptoms of disordered eating in a community sample of young Australian women. Two mail-out surveys were completed six months apart by 415 young women. Strong cross-sectional relationships between the study variables were found. Results of longitudinal analyses, however, demonstrated only tenuous relationships between stress, coping and later symptoms of disordered eating. These results did not support the hypothesis that stress and coping strategies would predict disordered eating over time. Some evidence was found for the reverse relationship between stress and disordered eating; this relationship, however, was not strong. While contrary to generally accepted theoretical models of disordered eating, these findings are consistent with those of the few previous longitudinal studies reported. Theoretical implications of these findings are discussed.

**Hodge A, Patterson A, Brown W, Ireland P & Giles G. The Anti Cancer Council of Victoria FFQ. Relative validity of nutrient intakes compared with diet diaries in young to middle-aged women in a study of iron supplementation.** *The Australian and New Zealand Journal of Public Health***, 2000.**

Objective:  To assess the validity of the Anti Cancer Council of Victoria food frequency questionnaire (ACCVFFQ) relative to 7-day weighed diaries in 63 women of child-bearing age.

Method:  The women completed diet diaries to assess iron intake as part of a study on iron deficiency, providing the opportunity to compare diaries with the ACCVFFQ. Nutrient intakes based on NUTTAB95 were computed independently for the diaries and the FFQs. Nutrient intakes were compared as group means, by correlation and by quintile classification, adjusting for day-to-day variation in intakes, and for energy intake. Individual differences in results were also examined.

Results:  The strongest associations between diary and FFQ results were energy adjusted, log-transformed and adjusted for day-to-day variability in intake. Correlation coefficients ranged from 0.28 for vitamin A to 0.78 for carbohydrate. Mean intakes from diaries and FFQs were within +/- 20% for 21 of 27 nutrients. Poor agreement between FFQs and diaries for retinol intake was due to the inclusion of liver, which is not included in the FFQ, in two diaries.

Conclusion:  The ACCVFFQ performs as well as other FFQs for which validation data are available. The relatively poor measurement of retinol is consistent with other data, and with the limited number of foods in which this nutrient is abundant.

<u>Implications:</u>  The ACCVFFQ is an optically scannable instrument that can be used to assess intake in Australian populations. The availability of such an instrument will facilitate epidemiological studies of diet and disease, an area of current research priority.


### 8.2.3   Conference presentations

**Young AF, Dobson AJ & Byles JE. Statistical modelling of psychosocial theory: can we speak the same language?** *15th Australian Statistical Conference.* **Adelaide, SA, 3-7 July 2000.**
One of the challenges facing statisticians in the 21st century is to improve communication between statistical and non-statistical communities. This is particularly important for the work of multidisciplinary research teams to succeed. The Australian Longitudinal Study on Women's Health began in 1995 and involves academics from a range of disciplines including statistics, psychology, medicine, sociology and nutrition. The Study aims to explore the relationships between biological, psychological, social and lifestyle factors and women's physical health, emotional well-being, and their use of health care services. The Study has 40,000 randomly selected participants. Survey data have been linked with Medicare data for 20,000 of the participants.

The relationships between variables in the Study and the research questions of interest are often more complex than can be modelled by the statistical methods commonly used in epidemiological research. They involve several levels of aggregation, repeated measures and inter-related variables. Structural equation modelling has been used to deal with multiple relationships among variables and to attempt to provide a framework for the analysis of complex theoretical psychosocial models. This paper will present the results of applying such methods to model the use of general practitioner services.


**Young AF, Dobson AJ & Byles JE. Health services research using linked records – who consents and what is the gain?** *15th Australian Statistical Conference.* **Adelaide, SA, 3-7 July 2000.**
A major theme of the Australian Longitudinal Study on Women's Health is women's use of and satisfaction with health services. Survey data provide a rich source of information about demographic, psychological, social and lifestyle factors and women's physical health, emotional well-being and self-reported utilisation of health services. Of more than 40,000 participants in the baseline survey in 1996, about half have consented to linkage of survey results and Medicare claims data. The Medicare claims database contains utilisation data, charges and rebates for services and de-identified data on providers. The linked data enable a wider scope of research questions to be addressed.

Women who gave consent for data linkage tended to have higher levels of education than the non-consenters. Among older women, the consenters were also in better health. The linked data allowed more refined measures of utilisation to be developed and provided the opportunity to describe the characteristics of the very frequent attenders as well as the non-attenders. Several findings, such as the poor access to health services in rural areas and the geographical variation in charges for medical services, can be used to inform health policy and can also be used to monitor changes in policy and practice.

**Lee C, Young AF, Byles JE & Warner-Smith P. Women's Health Australia: Healthy women, healthy families.** *Family futures: issues in research and policy - 7th Australian Institute of Family Studies Conference.* **Sydney, NSW, 24-26 July 2000.**

Women's Health Australia (WHA) is a large-scale longitudinal project which was the initiative of the Commonwealth Department of Health and Aged Care. First funded in 1995, it involves a 20-year longitudinal survey of the health of Australia's women. The purpose of the project is to clarify relationships between women's health and biological, psychological, social, economic and lifestyle factors, with the overall goal of providing information of value to the Department in the formulation of policy and the evaluation of health services.

The project involves three cohorts of women, randomly selected by HIC from the Medicare database, to represent young (aged 18-23 in 1996), mid-age (45-50), and older women (70-75). Over-sampling of women in rural and remote areas allows an examination of geographical variations in health and in access to health care. More than 41,000 women responded to mailed baseline surveys in 1996, and comparisons with 1996 census data suggest that they are reasonably representative of Australian women in these age groups. Over 50% have also agreed to linkage with their Medicare data. Each cohort will be followed up on a three-year rolling basis for twenty years; the middle-aged women were re-surveyed in 1998, with a response rate of 92%; the older women were surveyed in 1999 (91% response), and the young women are currently (May 2000) being surveyed.

Our research strategy allows us to examine the effects of family structure and dynamics on adult women's health and well-being. Following an overview of the project as a whole, this paper presents data on the health and well-being of women who do and do not become mothers, of women who have family caregiving responsibilities, and of women with various relationships to the paid labour force, as well as data which illustrate the impact of widowhood on the lives of older women. Our methods allow us to combine quantitative and qualitative data from a large and representative sample of Australian women to develop a detailed picture of the factors which influence women's lives, and to provide input to policy at State and Commonwealth level. Methodological issues, including measurement, cohort maintenance, dealing with missing data, and strategies for collaboration with research groups who have related interests, will be discussed.

**Warner-Smith P, Mishra GD & Dobson AJ. Marriage, income and women's health.** *Family futures: issues in research and policy - 7th Australian Institute of Family Studies Conference.* **Sydney, NSW, 24-26 July 2000.**

The conventional model for measuring a woman's socioeconomic status (SES) ascribes her social location to the occupation of her husband. The individualistic model locates her according to her own occupational status. Given the well-documented links between SES and health, an analysis using the first model would suggest that the health of a professional woman who is married to a skilled manual worker would more closely resemble that of the working class than the middle class. However, using the second model, the health of the professional woman would be more characteristic of the middle class. In this paper we investigate the proposition that the self-reported health status of married women is associated with both their own SES, as indicated by occupation and income, and that of their partner. Data from the mid-aged cohort of the 1998 follow-up survey of the Australian Longitudinal Study on Women's Health are drawn on to show that the self reported health, both physical and mental, of partnered women in lower income groups is positively associated with their own income as well as that of their partner, but that the effect disappears at higher levels of

income. Associations between low income and poor physical health have been generally well documented, but less research has focused on associations between women's SES and mental health. It is postulated here that mechanisms of control related to autonomy in paid work as well as perceived relative deprivation associated with the distribution of household labour, may be implicated in these findings in regard to mental health.

**Brown W & Bauman AE. Misclassification biases in assessing population levels of physical activity using two measures of energy expenditure.** *International Council of Sport Science and Physical Education and Sports Medicine* **Australia. 2000 Pre-Olympic Congress. Brisbane, QLD, 7-13 September 2000.**

Objective: To determine levels of 'adequate activity' for health benefit in different population groups using the 'traditional' method of estimating energy expenditure using Kilocalories (Kcals), and a newer method of estimating energy expenditure using Mets.mins.

Methods: 10,464 mid-age women (47-52 years) who participated in the second survey of the Australian Longitudinal Study on Women's Health and

2,500 men and women (18-75 years) who participated in the 1997 *Active Australia* national survey, answered questions about physical activity. Kcals and Mets.mins were calculated from self-reported time spent in walking, moderate and vigorous activity, and self reported body weight. 'Adequate activity' was defined as a minimum of 800 Kcals or 600 Mets.mins per week, which is commensurate with current public health guidelines (30 minutes moderate activity on most days of the week).

Results: There were differences in the estimates of 'adequate activity' using the two methods among women participants in both the ALSWH and *Active Australia* surveys, but not among the male participants in the *Active Australia* survey. A significant proportion of the women in both surveys (6.4% of the ALSWH women and 8.5% of the *Active Australia* women, mean weight 60kg) were misclassified as *inactive* when the Kcals method was used despite reporting recommended levels of activity. Fewer than 1% were misclassified as *active* using Kcals when reporting lower than recommended levels of activity (mean weight 105 kg). Agreement between the two methods was better among men; only 3% were misclassified because of low or very high weight.

Conclusions: The METS.mins method of estimating 'adequate' activity assesses physical activity independently of body weight and is recommended for use in future population surveys. This is most important for women, who are more likely to be misclassified as inactive using the Kcals method, because of low body weight.

Implications: When using the Mets.mins method to assess adequate activity, women and men aged 45-59, and women aged >60 have the lowest levels of activity and should be the target of specific health promotion strategies for increasing population levels of physical activity.

**Guillemin M & Brown W. Menopausal women and cardiovascular disease: Understanding risks and prevention.** *Menopause at the Millennium: The New and The Natural. Australasian Menopause Society: 4th Annual Congress*. **Adelaide, South Australia, 5-7 November 2000.**

This study examines how peri menopausal women diagnosed with cardiovascular disease (CVD) in urban and rural Australia understand their illness and its associated risk factors. It explores the use of preventive strategies (if any) that peri-menopausal women employed prior to, and following, diagnosis of CVD. This research is being undertaken in collaboration with the Australian Longitudinal Study on Women's Health survey. The study examines: (1) Associations between reported CVD and recognised biological, social and psychological risk

factors in the mid-age cohort; (2) National questionnaire survey of 230 peri-menopausal women who reported to have CVD; (3) In depth, face to face interviews of 29 mid-age women in rural and urban Victoria who reported to have CVD. Findings from the research indicate that most women in the study group with CVD were misdiagnosed or initially under-diagnosed. Although most women were concerned about the long-term effects of CVD, most women claimed that having CVD had little impact on their everyday lives. Despite many women having a number of serious risk factors for CVD, there were no women who had purposely implemented preventive strategies against CVD prior to, or since, diagnosis. Many women in fact questioned whether CVD could be prevented and believed that CVD was primarily hereditary. Very few women indicated that they were either currently taking HRT or would consider taking HRT for prevention of CVD. This research provides much-needed information about how women understand their risk of cardiovascular disease and their use of preventive strategies during peri-menopause.

**Lee C. Women's Health Australia: Strategies for Maintaining Cohorts in Longitudinal Research.** *The 6th International Congress of Behavioural Medicine: Behavioural Medicine and Public Health in the New Millenium.* **Brisbane, Queensland, 15-18 November 2000.**
Increasingly governments aim to base their health policies in empirical data, and funding agencies are emphasising research which is multidisciplinary, longitudinal, responsive to socioeconomic conditions, and relevant to policy development. This trend provides both opportunities and challenges for public health researchers. This paper outlines the Women's Health Australia (WHA) project and presents key findings which illustrate the difficulties and the value of large-scale longitudinal research.

WHA is a longitudinal survey of the health of Australia's women, currently in its fifth year. The purpose of the project is to clarify relationships between women's health and biological, psychological, social, economic and lifestyle factors, with the overall goal of providing information for the formulation of policy and the evaluation of health services. The project involves three cohorts of women, randomly selected from the Medicare database, to represent young (aged 18-23 in 1996), mid-age (45-50), and older women (70-75). Over-sampling of women in rural and remote areas allows an examination of geographical variations in health and in access to health care. More than 41,000 women responded to mailed baseline surveys in 1996, and comparisons with 1996 census data suggest that they are reasonably representative of Australian women in these age groups. Each cohort will be followed up on a three-year rolling basis for twenty years; the middle-aged women were re-surveyed in 1998, with a response rate of 92%; the older women were surveyed in 1999 (91% response), and the young women in 2000.

This paper presents data on the success of strategies for cohort maintenance, including tracking through telephone books, electoral rolls, and medical records; the value of linkage with the Australian National Death Index; and the differential success of telephone and mailed surveys in different age groups.

Longitudinal data from the younger cohort on the transition to motherhood, from the middle-aged cohort on weight changes during menopause, and from the older cohort on psychological predictors of continued well-being are used to illustrate the importance of a longitudinal work in informing health care policy.

**Miller YD, Brown WJ & Chiarelli P. Urinary incontinence in Australian women: barriers to and outcomes of help-seeking behaviours.** *The 6th International Congress of Behavioural Medicine: Behavioural Medicine and Public Health in the New Millenium.* **Brisbane, Queensland, 15-18 November 2000.**

Among participants in the 1996 baseline survey data of the Australian Longitudinal Study of Women's Health, 13% of young women (18-23 years, N=14,761), 36% of mid-age women (45-50 years, N= 14,070) and 35% of older women (70-75 years, N= 12, 893) reported leaking urine. Lower scores on the physical and mental component summaries of the SF-36 suggest lower quality of life among these women, compared with those who did not report leaking urine. However, less than half of those who reported leaking urine had sought help for the problem.

Further details on the frequency and severity of leaking urine, and on strategies for coping (including protection and avoidance of certain situations) were sought through self-report mailed follow-up surveys. These were sent to 500 randomly selected women in each of the mid and older cohorts who had reported leaking urine 'often' at baseline, and to 500 young women who had reported leaking urine 'sometimes' or 'often.' Experiences of health-care interventions for leaking urine, satisfaction with outcomes, and reasons for not seeking help were also explored.

The response rates to the follow-up surveys were 48%, 83% and 78% in the young, mid-age and older women respectively. Of these respondents, about 80% rated their bladder control as unimproved or worse than in 1996. However, 81% of the young women, 41% of the mid-age women, and 39% of the older women had not sought assistance or advice from a health-care professional. The most common reasons for this were a desire for self-management and not considering urinary leakage to be a 'problem'. Young women who had not sought help were also more likely than women in the other age groups to attribute lack of help-seeking to embarrassment. The findings will be discussed in the context of strategies for increasing women's knowledge of prevention and treatment, and for improving the health and social outcomes of untreated chronic incontinence in women.

**Brown WJ, Dobson AJ & Mishra GD. Changes in health during the menopausal transition.** *The 6th International Congress of Behavioural Medicine: Behavioural Medicine and Public Health in the New Millenium.* **Brisbane, QLD, 15-18 November 2000.**

The Australian Longitudinal Study on Women's Health was established in 1995 and is planned to continue (funding permitting) for 20 years. It aims to explore the social, psychological, biological and environmental factors which promote good health and prevent ill-health for women. The study involves three cohorts of women: young women who were aged 18-23 years at the time of the baseline surveys in 1996 (N=14,762); mid-age women (45-50 at baseline, N=14,072) and older women (70-75 years at baseline, N=12, 767). Both the baseline (1996) and first follow-up survey (1998) for the mid-age women included indicators of morbidity, well-being, stress and stressful life events, and family and social roles, which are pertinent to the study of the menopausal transition.

This paper will present the findings of an analysis of *changes* in health and well-being (SF-36, symptoms, medical diagnoses, health care utilisation and medication use) among groups of mid-age women (including those who are pre-menopausal, peri-menopausal and post menopausal, who are and are not taking HRT) during this two year period. It is hypothesised

that changes in indicators of well-being will vary according to menopause status and HRT use, with those who experience change in their menopausal status between 1996 and 1998 showing significantly greater deterioration than those whose menopausal status remains constant. The effects of factors other than menopause per se, such as BMI (weight, physical activity, dieting), age, health 'risks' (smoking, alcohol, stress and number of life events, and socio-demographic variables (geographic area of residence, marital status, education, occupation, income, home ownership) will be explored in the analyses.


**Ball K & Lee C. Relationships among psychological stress, coping and disordered eating in young women.** *The 6<sup>th</sup> International Congress of Behavioural Medicine: Behavioural Medicine and Public Health in the New Millenium*. **Brisbane, QLD, 15-18 November 2000.**

A longitudinal study was designed to investigate the relationships between stress, coping and disordered eating in young Australian women. Two mail-out surveys, assessing perceived stress levels, coping strategies, body weight dissatisfaction, and disordered eating attitudes and behaviours, were completed six months apart by 415 women, aged 18 to 24. Results of multivariate analyses indicated strong cross-sectional relationships between stress, coping and disordered eating. Results of longitudinal analyses, however, demonstrated only tenuous relationships between the study variables. These results did not support the hypothesis that stress and coping strategies predict disordered eating over time. While contrary to general opinion in the eating disorders literature, these findings are consistent with those of the few previous longitudinal studies reported, and suggest that stress, coping and disordered eating may be closely intertwined, occurring concurrently among young women.


**Patterson AJ, Brown WJ & Roberts DCK. Iron deficiency and morbidity in Australian women: effects on general health and fatigue.** *24<sup>th</sup> Annual Nutrition Society of Australia, Scientific Meeting: Emerging Nutrition – Digesting the Evidence*. **Fremantle, Western Australia. December 3-6, 2000.**

Iron deficiency has been shown to adversely affect physical work performance, immunity, thermoregulation and cognitive functioning. Despite volumes of research on these individual effects, very little is known about how they combine to affect general health and well-being. This study examined the effects of iron deficiency and it's treatment on general health, well-being and fatigue in women participating in a randomised control trial comparing the efficacy of dietary and supplement treatment for iron deficiency.

Forty four iron deficient and 22 iron replete women matched for age and parity completed the SF-36 General Health Questionnaire and the Piper Fatigue Scale (PFS) at baseline (T0). Serum ferritin levels were also measured. The SF-36 includes eight subscales, measuring different dimensions of health, which combine to produce Physical (PCS) and Mental (MCS) Component Summary scores. Iron deficient women were randomly allocated to either a high iron diet (N=22) or supplement treatment (N=22) for 12 weeks. All women were re-tested at the end of the 12 week intervention (T1), and again after a six month non-intervention phase (T2).

Mean PCS scores appeared unaffected by iron deficiency. Mean MCS scores were significantly lower for iron deficient women and improved during treatment in both intervention groups. The greatest improvements were seen in the diet group, despite smaller increases in serum ferritin than in the supplement group. SF-36 Vitality subscale and PFS

results (inversely related to vitality) showed higher fatigue levels for iron deficient women and improvements with increases in serum ferritin.

| | Serum ferritin[1] (μg/L) | PCS[1] | MCS[1] | Vitality[1] | PFS[1] |
|---|---|---|---|---|---|
| Control | | | | | |
| T0 | 49.4 (28.8)[a] | 52.3 (6.1)[a] | 51.7 (7.4)[a] | 60.7 (17.9)[a] | 2.6 (1.8)[a] |
| T1 | 44.5 (26.7) | 53.9 (5.4) | 52.6 (6.3) | 67.3 (15.3) | 2.4 (1.5) |
| T2 | 51.1 (30.8)[x] | 52.1 (8.0)[x] | 53.9 (5.4)[x] | 66.4 (14.7)[x] | 2.1 (1.5)[x] |
| | | | | | |
| Diet | | | * | * | |
| T0 | 8.9 (3.1)[b] | 49.6 (7.1)[a] | 40.2 (11.3)[b] | 38.9 (21.7)[b] | 4.2 (2.1)[b] |
| T1 | 11.0 (5.9)[m] | 50.4 (6.9)[m] | 49.4 (10.5)[m] | 60.7 (19.4)[m] | 3.4 (1.8)[m] |
| T2 | 15.2 (9.5)[y] | 52.3 (7.1)[x] | 50.4 (9.6)[x] | 59.1 (20.4)[x] | 3.4 (2.0)[x] |
| | | | | | |
| Supplement | | | | * | * |
| T0 | 9.0 (3.9)[b] | 51.0 (8.4)[a] | 43.0 (12.1)[b] | 45.7 (19.7)[b] | 4.7 (2.3)[b] |
| T1 | 24.8 (10.0)[n] | 50.9 (7.2)[m] | 46.2 (11.6)[m] | 60.7 (21.3)[m] | 3.2 (2.2)[m] |
| T2 | 24.2 (9.8)[z] | 50.9 (7.3)[x] | 47.8 (12.3)[x] | 57.9 (20.5)[x] | 3.6 (2.2)[y] |

*Significance level $P<0.00625$*

[1]     *Mean (sd)*
\*     *Control, Diet or Supplement group changes significantly over time*
**a,b,c**   *Comparison of Control, Diet and Supplement groups at T0 (different letters = significantly diff.)*
**x,y,z**   *Comparison of Control, Diet and Supplement groups at T2 (different letters = significantly diff.)*
**m,n**   *Comparison of Diet and Supplement groups at T1 (different letters = significantly diff.)*

## 8.2.4    Other presentations

Powers J & Ball J. The usefulness of the National Death Index. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 27 June 2000.

Young AF. Statistical modelling of psychosocial theory: Can we speak the same language? *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 27 June 2000.

Young AF. Health services research using linked records: Who consents and what is the gain? *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 27 June 2000.

Warner-Smith P. Marriage, income and women's health. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 11 July 2000.

Mishra G. Leisure time physical activity in Australian women: Determining the relationship with well-being and symptoms. *Deakin University*, Melbourne. 20 July 2000.

Young AF & Lee C. The Australian Longitudinal Study on Women's Health. *Forum on reproductive health, Australian Institute of Health and Welfare National Perinatal Statistics Unit, Royal Hospital for women*, Randwick, New South Wales. 26 July 2000.

Kable A. Adverse events in 9 common elective surgical procedures. *Seminar for the Research Centre for Gender and  Health*, University of Newcastle, New South Wales. 8 August 2000.

Mishra G. To adjust or not to adjust for baseline scores? *Workshop for Research Centre for Gender and Health*, University of Newcastle, New South Wales. 1 September 2000.

Lee C. Women's Health Australia: Psychological aspects of women's health. *Staff seminar, Department of Psychology*, University of Auckland, New Zealand. 5 September 2000.

Young AF. Older cohort factor analysis. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 19 September 2000.

Powers P. Elder abuse. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 19 September 2000.

Patterson A. Australian Nutrition Screening Initiative. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 19 September 2000.

Patterson A. Relationships between nutrition screening checklists and the health and well being of older Australian women. *Hunter Institute for Ageing and Research*, John Hunter Hospital, Newcastle. 5 October 2000.

Mishra G & Dobson AJ. Multiple Imputation for item non-response: Women's Health Australia dataset. *Workshop for Research Centre for Gender and Health*, University of Newcastle, New South Wales. 6 October 2000.

Smith N. Changes in physical and mental health associated with incontinence. *Seminar for the Research Centre for Gender and Health*, University of Newcastle, New South Wales. 17 October 2000.

Young AF, Dobson AJ & Byles JE. The Australian Longitudinal Study on Women's Health: Insights gained by linkage of survey and Medicare data. *Symposium on record linkage in Western Australia - national and international implications for epidemiological and health service research*, University of Western Australia, Perth. 23 October, 2000.

Young AF. Statistical modelling of psychosocial theory: Can we speak the same language? *Inaugural Forefront Conference, Faculty of Science and Mathematics*, University of Newcastle, New South Wales. 15 November 2000.

Dobson AJ & Mishra G. Analysis of Longitudinal/Repeated Measures Data in Health Studies. *Biostatistics Workshop, School of Population Health*, University of Queensland. Coolangatta, Queensland. 23-24 November 2000.

Williams L. Weight changes in the WHA mid-age cohort. *Seminar for the Research Centre for Gender and  Health*, University of Newcastle, New South Wales. 12 December 2000.

Baines S. Vegetarian style eating practices among young Australian women. *Seminar for the Research Centre for Gender and  Health*, University of Newcastle, New South Wales. 12 December 2000.

### 8.2.5 Conference organization

Under the original terms of the University's contract with DHAC, ALSWH was required to organize a conference. After considering ways of achieving this goal, the Project Advisory Committee agreed that a more appropriate strategy for promoting the exchange of scientific and professional information would be the organization of a number of workshops, seminars and symposia at or in conjunction with existing conferences. ALSWH has strengths in women's health, public health and longitudinal research, and it would be difficult to develop a conference theme and purpose which covered the intersection of these three areas without it becoming too narrow; conversely, one which covered all three areas would be too broad for our aims. Further, it seems important to avoid competition with existing conferences such as the Public Health Association annual meeting.

A number of smaller-scale activities, in conjunction with the conferences of existing societies, would enable ALSWH researchers to discuss aspects of the project in a range of different forums and with different professional and academic groupings. This allows ALSWH expertise to be shared more widely and the expertise of a wider range of others to be accessed; it maintains ALSWH's contacts with various sectors with a concern about women's health, public health and longitudinal research; and it exposes the members of the team to a wide range of scholarly interests and expertise. These activities are in addition to regular participation in existing conferences and involves collaboration with organizing committees to include a specifically ALSWH focussed activity in the structure of a conference.

The following organizational activities have taken place or are in the planning stages:

1. Australian Institute for Family Studies conference, Sydney July 24 – 26 2000. Christina Lee collaborated with Jan Nicholson (QUT) to propose a symposium on longitudinal surveys in family research. This symposium included a paper on ALSWH (Christina Lee); as well as papers from Jan Nicholson (QUT; Millennium Generation Longitudinal Study); Ruth Weston (AIFS, Australian Family Panel Survey); and Jake Najman (UQ; Mater Child & Maternal Health Study).

   In conjunction with this conference, Christina Lee organized a half-day meeting, held on Thursday 27 July 2000 at the University of NSW, to discuss methodological and statistical issues in longitudinal research in public health. This was an informal workshop attended by researchers who are developing new longitudinal surveys, the Australian Family Panel Survey and the Millennium Generation Survey. The workshop focused on practicalities, particularly longitudinal data analysis, response bias, piloting, recruitment and cohort maintenance strategies, missing data and sources of inaccurate data.

2. International Congress of Behavioural Medicine, Brisbane 16 - 18 November 2000. ALSWH has organized an international seminar on longitudinal surveys of women's health, focusing on menopause. This symposium is chaired by Christina Lee and includes papers by Susan Treloar (QIMR, Australian Twin Registry); Phyllis Mansfield (Penn State U, Tremin Trust); Diana Kuh (University College London, MRC Longitudinal Health Survey); and Wendy Brown (WHA, University of Queensland).

   Professors Mansfield and Kuh both manage large longitudinal surveys with a focus on women's health, and both plan to visit Newcastle and Brisbane ALSWH staff while in Australia.

3.  Biostatistics Workshop, Gold Coast, 23 & 24 November. This workshop has been organised by Professor Annette Dobson and colleagues in Brisbane, under the auspices of the Biostatistics Collaboration of Australia, and focuses on the analysis of longitudinal and repeated-measures data in health studies. Annette Dobson and Gail Williams from ALSWH are invited speakers, and several other major international longitudinal health surveys (including the US Nurses' Health study) will also be discussed by their principal statistical investigators.

4.  Australian Women's Health Network 4th Australian Women's Health Conference "Women's Health: Politics, Action and Renewal". 19 - 21 February 2001.

    This is an important conference which played a key role in the establishment of the ALSWH with a focus on political and community action. We have been invited to organize a one-day pre-conference workshop on women's health research, with a focus on forging links between research and policy.

5.  6th National Rural Health Conference 4-7 March 2001, National Convention Centre, Canberra. Christina Lee has arranged with the organisers for WHA to offer a symposium. This consists of four papers: a general overview (Christina Lee); access to health services (Anne Young); young rural women's aspirations for the future (Penny Warner Smith); and use of measures of "belonging" to assess well-being of older rural women.

6.  Public Health Association of Australia 33rd Annual Conference, November 2001. The ALSWH group will submit a proposal to host a workshop or satellite conference on women's health issues in public health. The PHAA conference attracts a multidisciplinary group with wide public health interests; we would need to negotiate with organizers to ensure that our satellite was complementary rather than appearing to be in competition with their aims.


**8.2.6   Media**

| | |
|---|---|
| 3/6/00 | Article in Weekend Australian, "Sick of work" - Lois Bryson |
| 9/6/00 | Article in Brisbane Courier Mail, "Women like the taste of flirting with danger" - Young women and alcohol. |
| 23/6/00 | Article in Griffith Area News, "Young women in spotlight" - Young follow-up. |
| 23/6/00 | Article in Sydney Daily Telegraph, "All women overworked" - Penny Warner-Smith and Lois Bryson. |
| 27/7/00 | ABC Radio 2NC - Christina Lee interview on Family Caregiving |
| 1/8/00 | Article in Brisbane Courier Mail, "Lazy lifestyle weighs heavily on Queenslanders" - Wendy Brown |
| 5/10/00 | Article in Brisbane Courier Mail, "Miscarriage risks rise for young smokers" - Annette Dobson |
| 5/10/00 | ABC National Television News - Annette Dobson interview on Miscarriage and smoking |

The Principal Investigators of the project are frequently contacted by various sectors of media to provide background information on a wide variety of topics. This is happening increasingly. Requests come from journalists seeking basic statistics or general comments on aspects of women's health. While WHA is not always acknowledged directly by these journalists, this does indicate an increasing public awareness of the project.

## 9    ARCHIVING

### 9.1    UPDATE ON ARCHIVING AT SSDA

Data archiving plays an important role in maintaining the integrity of the data sets, protecting against loss of data, and providing a centralised mechanism for the sharing of data. In December 1999, the three Survey 1 data sets were archived with the Social Science Data Archive (SSDA) at the Australian National University. Reports 13 and 14 included a description of the process of archiving. These described the strategy used to allow others to share the majority of the data while maintaining confidentiality with respect to key identifiers, the contents of the data files, and details of the data dictionaries.

The same strategy is being followed for Survey 2 of the mid-age cohort (1998) and Survey 2 of the older cohort (1999). Data have been cleaned and ranges checked. Where appropriate, logical imputation strategies have been used to reduce missing data. The data dictionary has been updated and revised, so that all items in Survey 2 of the mid-age and older cohorts are fully described and referenced, and their relationship with similar or identical items from Survey 1 has been explained. These data will be archived with SSDA in December 2000.

During 2001, the research team will carry out this same procedure with Survey 2 data for the young cohort (collected during 2000). The research team will also make some revisions to the Survey 1 databases. These include the imputation of missing values using the logical strategies described elsewhere in this report (see Section 6.1.1) and the correction of a small proportion of the postcode data which have been shown to be incorrect.

### 9.2    USE OF DATA BY OTHER RESEARCHERS

Data from the main cohorts are available to other researchers either through the Social Science Data Archive at the Australian National University, or by contacting the University of Newcastle researchers directly. To date there have been no requests via the Social Sciences Data Archive to access these data.

The following researchers have requested data directly from the researchers, and have completed Memoranda of Understanding to formalise their use:

- Dr Helen Keleher, School of Health and Human Sciences, La Trobe University, Bendigo. Dr Keleher is collaborating with Professor Christina Lee to conduct qualitative analyses of the health experiences of Australian rural and remote women. She has received an electronic copy of all open-ended comments made by all rural and remote women in each age group in response to Survey 1.

- Dr Rafat Hussain, School of Health, University of New England. Dr Hussain is collaborating with Professor Christina Lee and Associate Professor Margot Schofield to assess differences between mid-age women who have, or have not, had children and those who have, or have not, experienced miscarriage. She has received an electronic copy of the quantitative data from Survey 1 of the mid-age cohort.

- Dr Kylie Ball, School of Health, Deakin University. Dr Ball is collaborating with Professor Christina Lee and Professor Wendy Brown to examine the determinants of maintenance of healthy body weight among young women, and to quantify the relationships between physical activity, diet and the maintenance of healthy weight. She has received an electronic copy of the quantitative data from Survey 1 of the young cohort.

Reports on the progress of these analyses appear in Section 1.2.5 of this report.

## 10    FINANCIAL STATEMENT

Expenditure January- December 2000
DHAC income July 1999 – June 2000
Based on University of Newcastle Financial Reporting System 20/10/00
Accounts 593-1029 and 593-1023

| INCOME | | | EXPENDITURE | | | |
|---|---|---|---|---|---|---|
| Source | Details | Income | Items | Actual Expenditure 1/1/00 – 30/6/00 | Actual Expenditure 1/7/00 – 20/10/00 | Forward Estimate 21/10/00- 31/12/00 |
| DHAC | Contract | 485,000 414,000 | Shared research (UQ) | 70,000 | 73,000 | 0 |
| | Additional funds for UQ | 28,000 | Surveys & data entry | 67,961 | 11,426 | 20,000[b] |
| | Ad hoc analysis/Reports | 50,000 | Newsletters | 0 | 0 | 33,000[b] |
| | | | Data linkage (AEC, HIC) | 0 | 0 | 10,528[a] |
| | | | Computer h'ware, s'ware | 7,667 | 1,373 | 3,000[b] |
| | | | Equipment & maintenance | 5,316 | 470 | 500[b] |
| | | | Postage & freight | 8,273 | 18,875 | 4,000[b] |
| | | | Telephone | 2,531 | 1,636 | 2,500[b] |
| | | | Printing, stationery, office supplies | 2,968 | 6,706 | 3,000[b] |
| | | | General consumables/ Repairs | 1,041 | 790 | 500[b] |
| | | | Travel/ Hospitality | 11,101 | 2,061 | 5,000[b] |
| | | | Salaries | 139,097 | 138,078 | 98,450[a] |
| | | | On-costs | 32,147 | 25,810 | 27,122[a] |
| | | | Annual Report | 5,153 | 0 | 5,000[a] |
| | | | University O'head charge | | 70,340 | 62,100[a] |
| | | | | | | |
| U of N | Research Contribution | 50,000 | Postgraduate scholarships/ fees | 14,001 | 14,602 | 7,000[a] |
| | Research Quantum | 103,000 | Postdoctoral Fellowship | 16,079 | 13,043 | 3,036[a] |
| | | | Project Manager salary | 49,950 | 31,706 | 18,700[a] |
| | | | On costs | 12,833 | 7,698 | 5,200[a] |
| | Research Infrastructure Grant | 11,142 | Student research costs | 5,540 | 1,000 | 3,000[b] |
| | Conference Travel Grants | 5,034 | Replacement photocopier | 10,135 | 0 | 0 |
| | | | Additional conference travel | | | |
| TOTALS | | $1,146,176 | | $461,793 | $418,614 | $311,636 |
| | | | | | | ($46,867) |

[a] firm commitment        [b] figures are estimates

# 11 PROJECT STAFF JULY – DECEMBER 2000

*Summary*. Staffing has been stable over the period of this report, with some turnover among research assistants and students but the situation remaining essentially unchanged throughout 2000.

## 11.1 FULL-TIME STAFF LOCATED AT RESEARCH CENTRE FOR GENDER AND HEALTH

| | |
|---|---|
| Project Manager: | Professor Christina Lee |
| Data Manager: | Ms Jean Ball |
| Statistician: | Dr Anne Young |
| Statistician: | Ms Jenny Powers |
| Postdoctoral Research Fellow: | Dr Amanda Patterson |
| Research Assistants: | Mrs Lyn Adamson |
| | Mrs Joy Goldsworthy |
| Secretary: | Ms Emma Threlfo |

## 11.2 INVESTIGATORS ON THE LONGITUDINAL SURVEY

Professor Annette Dobson, Department of Social and Preventive Medicine, University of Queensland, Study Director

Professor Wendy Brown, School of Human Movement Studies, University of Queensland

Emeritus Professor Lois Bryson, Research Centre for Gender and Health, University of Newcastle, and RMIT University

Dr Julie Byles, Centre for Clinical Epidemiology and Biostatistics, University of Newcastle

Associate Professor Justin Kenardy, School of Psychology, University of Queensland

Dr Gita Mishra, Department of Statistics, University of Newcastle

Associate Professor Margot Schofield, School of Health, University of New England

Dr Penny Warner Smith, Department of Leisure and Tourism, University of Newcastle

Associate Professor Gail Williams, Australian Centre for International and Tropical Health and Nutrition, University of Queensland

Dr Anne Young, Research Centre for Gender and Health, University of Newcastle

## 11.3 ASSOCIATE INVESTIGATORS CURRENTLY WORKING WITH THE MAIN COHORTS

Dr Surinder Baines, Discipline of Nutrition and Dietetics, University of Newcastle

Dr Kylie Ball, School of Health Sciences, Deakin University

Dr Martin Bell, Department of Geography, University of Adelaide

Associate Professor Peter Brown, Department of Leisure and Tourism, University of Newcastle

Ms Pauline Chiarelli, Medicine and Health Sciences, University of Newcastle

Dr Marilys Guillemin, Centre for the Study of Health & Society, University of Melbourne

Dr Margaret Harris, Centre for Clinical Epidemiology and Biostatistics, University of Newcastle

Dr Rafat Hussain, School of Health, University of New England

Dr Helen Jonas, School of Health and Human Sciences, La Trobe University, Bendigo

Dr Helen Keleher, School of Health and Human Sciences, La Trobe University, Bendigo
Dr Ann Larson, Combined Universities Centre for Rural Health, Geraldton
Ms Sue Outram, Faculty of Medicine and Health Sciences, University of Newcastle
Ms Lauren Williams, Discipline of Nutrition and Dietetics, University of Newcastle
Dr Deidre Wicks, Department of Sociology and Anthropology, University of Newcastle


## 11.4    STUDENTS

### 11.4.1  PhD

Ms Julie Brooks, Department of Sociology and Anthropology, University of Newcastle
Ms Pauline Chiarelli, Faculty of Medicine and Health Sciences, University of Newcastle
Ms Emilee Gilbert, School of Sociology, Macquarie University
Ms Deborah Loxton, School of Health, University of New England
Ms Yvette Miller, School of Human Movement Studies, University of Queensland
Ms Lisa Milne, Department of Sociology and Anthropology, University of Newcastle
Ms Glennys Parker, Research Centre for Gender and Health, University of Newcastle
Ms Allison Schmidt, Research Centre for Gender and Health, University of Newcastle
Mr Esben Strodl, School of Psychology, University of Queensland
Ms Lauren Williams, Discipline of Nutrition and Dietetics, University of Newcastle


### 11.4.2  Masters degrees

Ms Barbara Reen, Centre for Clinical Epidemiology and Biostatistics, University of Newcastle
Ms Nadine Smith, Research Centre for Gender and Health, University of Newcastle
Ms Melissa Graham, School of Health and Human Sciences, La Trobe University, Bendigo


## 11.5    PART-TIME AND CASUAL STAFF AT RESEARCH CENTRE FOR GENDER AND HEALTH, JULY-DECEMBER 2000

Ms Jane A'Beckett
Ms Katherine Bell
Mrs Sandra Bell
Ms Kathryn Bowen
Ms Catherine Dorward
Ms Alicia Frost
Ms Renay Grieg
Mrs Vibeke Hansen
Ms Jennifer Helman
Mrs Penny Knight
Ms Kathryn McCabe
Mrs Beverley Parker
Ms Lisa Scobie
Ms Nicole Smith
Ms Kate Warner-Smith

## 11.6    STAFF AT THE UNIVERSITY OF QUEENSLAND

Ms Noela Baigrie, Research Officer, Indigenous Cohorts, Australian Centre for International and Tropical Health and Nutrition

Ms Anne Russell, Senior Project Officer, Department of Social and Preventive Medicine, University of Queensland

Dr Karen Thurecht, Research Assistant, Indigenous Cohorts, Australian Centre for International and Tropical Health and Nutrition