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Age-Related Changes Relevant to Health in Women: Design, Recruitment, and Retention Strategies for the Longitudinal Assessment of Women (LAW) Study

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ABSTRACT

Objectives: **The primary aim was to assess the age-related changes that occur in older women. This paper describes the study rationale and methods, recruitment, and retention strategies.**

Methods: **The Longitudinal Assessment of Women (LAW) Study was a longitudinal, observational, and multidisciplinary evaluation of a population-based cohort of urban-living women, aged between 40 and 80 years at recruitment and randomly invited from a district in Brisbane (a city in Australia) via the electoral roll. Five hundred eleven women were recruited and stratified into four age groups (40–49, 50–59, 60–69, 70–79 years) and were assessed on three or four occasions each year, using interviews and diagnostic instruments (echocardiography, applination tonometry, dual-energy x-ray absorptiometry [DEXA]) Retention strategies included flexibility, accessibility, personalized attention, and feedback.**

Results: **From a sample frame of 1598 names, there were 1082 respondents, of whom 511 (47%) were successfully recruited from those eligible to participate. Recruitment was quickest for the oldest age group, 70–79 years, and slowest for the age group 40–49 years; all age groups achieved their required quota. A scheduling program was developed to minimize the number of visits and maximize the use of allocated time. The largest dropout was seen in year 1 of the study, with very few thereafter. Of the 9 deaths, cancer was the cause in 7. The retention rate after 5 years was 95.5%.**

Conclusions: **The design of the present study, with careful attention to coordination and a personal approach, facilitated the completion of a 5-year study, enabling a collection of a set of wide-ranging data from almost all the women recruited. The information thus collected will form the basis of cross-linking analysis of the risk factors associated with health problems in aging women.**

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INTRODUCTION

In Australia, the proportion of women over the age of 65 years has increased from 4% in 1901 to 13.9% in 2002 and is expected to reach approximately 28.5% by 2051.[1] This significant demographic shift has wide-ranging implications for Australian society and, in particular, for the provision and delivery of healthcare services. For example, it has been reported that 39.3% of the Australian healthcare budget was spent on women aged >65 years in 2000–2001, a disproportionate amount relative to the percentage of the population represented.[2]

Previous large, longitudinal studies conducted in Australia and overseas have relied primarily on self-report and survey data (e.g., the Australian Longitudinal Study of Women's' Health)[3] or have focused on a specific period of a woman's life (e.g., the Melbourne Mid-Life Project and the Study of Women's Health Across the Nation [SWAN]).[4,5] Unlike the observational arm of the Women's Health Initiative study (WHI),[6] in which inclusion was restricted to postmenopausal women, the present study was open to premenopausal, perimenopausal, and postmenopausal women. Moreover, the study, known as the Longitudinal Assessment of Women (LAW), was conceived and designed to improve our understanding of the aging experience of women in a comprehensive way by measuring psychosocial and pathophysiological parameters relevant to health during the menopause transition and beyond.

Based on the hypothesis that the psychosocial and pathophysiological changes occurring with age can predict clinical disease, the primary aim of the study was to describe these changes over 5 years, with plans to extend beyond this period. In this paper, we report the rationale behind the planning, recruitment, and retention of the sample.

MATERIALS AND METHODS

Design

The LAW Study was designed as an observational and longitudinal assessment over 5 years, using direct measurement of changes in a population-based cohort of urban women. To ensure adequate representation of older women, a stratified randomized sample of subjects was recruited from the electoral roll in the North Brisbane Health District in the city of Brisbane, an area considered to be the fastest growing region of Australia. In addition to collection of key sociodemographic characteristics, areas considered relevant to health were evaluated: cognitive functioning, cardiovascular function, body composition and bone density, balance and postural stability, nutrition, endocrine function, and skin. A further five subprojects were developed during the course of the study: sexuality, oral health, pelvic floor assessment, everyday memory, and anxiety/self-esteem. The coordinated nature of the data collection across the various areas allowed for the identification of cross-system factors that could influence the health status, both cross-sectionally and longitudinally.

Each participant was given a unique ID number at recruitment; all data obtained from the various projects were related to this ID number and stored. This system allowed deidentification for privacy reasons. A schedule of participants' visits to the Centre minimized the number of visits required per year and maximized the amount of testing per visit.

The projects were chosen after discussion and consultation by the LAW Study team on the basis that they provided testing of functions important to health. The data collection format and storage system were standardized to allow easy and detailed cross-linking of information obtained from different projects. For example, the parameters of heart function measured by echocardiography in the cardiovascular project could be correlated with distribution of abdominal fat measured by dual-energy x-ray absorptiometry (DEXA) in the body composition project by uniform formatting of data.

Sampling strategy and power analysis

The total sample size of 500 was based on ensuring that all component projects would be adequately powered. Both cross-sectional and longitudinal research questions were considered. For longitudinal comparisons, assuming at least 100 participants per age stratum had complete longitudinal data, effect sizes of ≥ 0.35 standard deviations (SD) within an age stratum and ≥ 0.23 over pooled age groups would be able to be detected with 90% power for continuous outcomes. The sample size was large enough to detect small ef-

fect sizes in the overall sample and moderate effect sizes in the age stratum-specific analyses. For example, for continuous outcomes, with 125 participants per age stratum and assuming (1) equal numbers in any two comparison groups and (2) 90% power, effect sizes of 0.50 SD would be able to be detected with 80% power. In pooled analyses across all age groups, allowing a 15% sample size margin for the need to adjust for confounding variables, effect sizes of ≥0.31 would be detectable with 90% power. For categorical outcomes with 50% prevalence assumed in one comparison group, differences of 27% in the other comparison group would be detected with 90% power (i.e., about a halving). In pooled analyses across all age groups, differences of ≥15% would be detected with 90% power.

Sample frame

Eligible women were restricted to the geographic area of North Brisbane, defined as all suburbs north of the Brisbane River, as participants were required to attend a number of assessments over a 5-year period. An initial random sample of 15,145 women aged 40–80 years was drawn from the Queensland Electoral Roll of February 2000, so as to avoid multiple expensive requests to access the full electoral roll. This formed an initial sampling base from which age-stratified random samples of women in the age groups 40–49 years, 50–59 years, 60–69 years, and 70–79 years were then recruited. Eligibility was restricted to women who were ambulatory or able to be transported and those available and willing to undergo the comprehensive clinical assessments and to provide informed consent.

Recruitment

Recruitment commenced in July 2000 and continued until April 2001. A sample of 1598 names was selected from the initial sample base of 15,145, and these women were contacted by mail and invited to participate in the study. A second letter was sent 2 months later to those women who had not responded to the initial invitation.

Ethical approval of the study design was obtained from the ethics committees of the Royal Brisbane and Women's Hospital and the University of Queensland, and all participants provided written informed consent prior to commencement of the study. Restrictions imposed by the ethics committees meant that assistance in transport to the assessment center was the only permitted incentive to participation.

Retention strategies

A strategy was developed that would make continued participation in the study as easy, convenient, and pleasant as possible for the women recruited. This strategy was designed to meet four key criteria: flexibility, accessibility, personalized attention, and feedback.

Flexibility

Each participant was briefed on the number of projects planned for the following 12 months and invited to indicate her availability and preferred time of attendance. As far as possible, the schedule of appointments was responsive to the stated preferences of the women, and from the outset, we assured them that we would be prepared to vary appointments in response to changing circumstances (such as change of employment or the need to care for a sick relative).

Throughout the year, participants' availability was constantly monitored and updated. The appointment schedule was always regarded as flexible: we were sometimes asked to change appointments at very short notice and accommodated these requests wherever possible. We operated on the principle that "the customer is always right," especially when, for example, some women had unexpected travel commitments, some moved out of the area, or some experienced illness or had unexpected domestic responsibilities.

For those who had moved away (including some interstate moves), we arranged to schedule all their appointments for the year within a short period—typically a few days—whenever they were able to visit Brisbane. Similarly, school and university teachers were offered appointments during vacation time if it was difficult for them to attend during term. Many mothers of school-age children, by contrast, requested that all their appointments be scheduled within school hours. Throughout the project, the emphasis was on meeting participants' needs and adapting to their requirements.

Accessibility

The sample was confined to the northern suburbs of Brisbane, which were within easy reach

of the Centre by public transport. When women were unable or unwilling to use public transport and chose to drive their own cars, we paid for their parking in the hospital car park. For those who could neither use public transport nor drive themselves, either we provided taxi vouchers, or where they had health problems requiring assistance, we arranged nonurgent ambulance transport.

In some cases, a staff member would personally collect a woman from her home and drive her to the Centre, for example, in the case of an elderly, visually impaired woman who lived alone and was nervous about taxi or ambulance transport. We also secured the cooperation of indigenous health services to assist with the transport of elderly indigenous women and to escort them into the Centre.

When required, a staff member would meet the women as they arrived at the front door of the hospital, arrange wheelchairs as needed, and assist them to the research Centre. This service was especially appreciated by elderly, disabled, or anxious women who seemed likely to withdraw from the study if such support were not available.

During the course of the study, some participants became too ill to attend the Centre in person. In such cases, we maintained contact via their primary care physician, who was asked to complete a detailed annual health summary. In some cases, one of the Centre's research nurses conducted house calls to collect essential data (e.g., blood pressure and blood samples) or to assist with the completion of questionnaires.

In cases where women had relocated overseas (e.g., to Canada, England, and Hong Kong) or interstate, contact was maintained via the exchange of personal e-mails and an annual health summary from their local primary care physician.

To simplify accessibility, the entire study was conducted at a single site within the women's health research unit in the Royal Brisbane and Women's Hospital. Only echocardiography and the oral health project were off-site, and the potential difficulties created by this complication were minimized by close cooperation between a dedicated staff member of the cardiology unit and one from the school of dentistry, respectively, who personally telephoned each participant to arrange appointments and give directions.

The Betty Byrne Henderson Women's Health Research Centre is on level 6 of a large and busy teaching hospital. Recognizing that finding us might be a daunting experience for novice participants, we employed the simple, light-hearted, but effective strategy of placing multicolored balloons on the front door of the Centre for the first 2 years of the study. When we mailed out their appointment schedule (usually covering two appointments), we included detailed instructions about how to find the Centre—and the suggestion that they should look out for the balloons!

Personalized attention

One of the aims of our retention strategy was to make the experience of coming to the Centre as unlike a conventional medical appointment as possible and to reassure each participant that her contribution to the study was both important and unique. We were keen to demonstrate, in every possible way, sensitivity to the individual needs of each woman in terms of such things as travel arrangements, dietary needs, and home- or work-related issues.

The small waiting room in the Centre was dedicated to the LAW study participants, including any people who accompanied them to their appointments (e.g., spouse, partner, other family member, carer, or friend). Tea and coffee-making facilities and sandwiches were provided, particularly for those who had been fasting. Special consideration was given for those on gluten-free diets or diabetics; the research nurse arranged 6.45 AM appointments to accommodate diabetic women who were fasting. A variety of current magazines was supplied. At Easter, we supplied chocolate eggs; at Christmas, fruitcake. The overall atmosphere was highly informal, warm, welcoming, and nonthreatening. As some visits could take up to 3 hours, it was essential to create a pleasant, relaxed environment during the time between projects.

The stability of the research team was a big factor in our ability to provide a personalized service. Women felt relaxed with familiar people who recognized them, and this contributed to a general sense of comfort and emotional security among the participants, especially when they might otherwise have felt vulnerable providing detailed and often intimate information about their lives. Over the 5 years, the women developed close empathy with the same physician and

research nurse who conducted their annual assessment. When topics came up that touched on unresolved personal issues, immediate, sympathetic, and nonjudgmental attention was given to these issues, for example, when recall of child sex abuse occurred in the context of the sexuality study. Similarly, care was taken to be sensitive to issues of privacy and confidentiality when assessing participants' height, weight, anthropometric measurements, and blood and urine testing while gowned, and when completing questionnaires.

At the initial appointment and annually thereafter, details of secondary contacts were obtained, as were updates of all personal contact information, including phone and e-mail addresses. Appointment times were sent by mail 1 month prior to each visit, requesting phone confirmation. If confirmation was not received, follow-up phone calls were made 1 week before the scheduled visit. All missed appointments were rigorously pursued to ensure all participants completed each project. A monthly audit of all projects monitored any missed appointments and identified any women who may have become ill or who, because of changed work commitments, had to reschedule her remaining appointments for the year.

In cases where it was learned that a participant had been hospitalized for any reason, one of the research nurses made a personal visit. In cases where a participant died, the staff of the Centre would send a condolence card to the family.

The participants got to know each other during their visits to the Centre, and in some cases, personal friendships ensued. Some participants volunteered to drive others from the same area to their appointments, and in such cases, we rearranged appointments to coordinate their visits.

Any participant who indicated a desire to withdraw from the study was contacted by the clinical director of the Centre for an informal discussion of any circumstances that might have given rise to this request. In some cases, women were clearly under pressure from competing responsibilities, and a brief break from the study was proposed. In other cases, women had been distressed by their participation in a particular project, for example, elderly women made anxious by their participation in a cognitive function project. In most cases, discussion of the issue and reassurance about the value of each participant's contribution led to a decision to continue. Participants were encouraged to appreciate the significance of the project and their part in it.

Feedback

Throughout the 5 years of the study, women were kept informed of its progress and of selected findings. All phone or e-mail queries from the women were followed up within 24 hours. Each call or message was documented in the central administrative office of the Centre, where staff members could regularly check and follow-up all messages.

Although this was not an intervention study, participants were advised in writing about any abnormal results and given a letter to take to their primary care physician. At the annual assessment visit, they were provided with oral feedback on request (with care not to make any judgmental remarks or to divulge any information that might have an impact on the observational nature of the study, for example, weight loss or lowering of cholesterol levels).

A quarterly newsletter was sent to all participants, including those who had moved interstate or overseas, which provided summaries of the various projects being carried out that year and information about the subprojects that were evolving during the course of the study. We also published articles on nutrition, exercise, menopause, and other issues relevant to women's health, always including a seasonal recipe and an appropriate cartoon. Some of the LAW women contributed inspirational articles about themselves or their travels. One of the more intrepid 50-year-olds wrote about her experiences climbing Mount Kilimanjaro and trekking in Patagonia. The newsletter became a prompt for the women about the projects, and, indeed, if they had not yet been called in for their first appointment of the year, they would often call to see if we had overlooked them. The last newsletter of the year included details of the projects for the following year, the number of visits proposed, and the time likely to be involved in completing each visit. We requested those who might wish to finish all their projects early in the year to advise us before the appointment matrix was finalized.

A public forum for the participants and their families was held each year in the hospital auditorium, where the investigators presented pre-

liminary results of their projects and then formed a panel to respond to questions from the audience. This became a popular and successful event: approximately one third of the cohort attended and clearly enjoyed meeting other women in the study and comparing their reactions to the many investigations performed. Morning tea and subsidized parking were provided.

Annual individual assessment, including sociodemographic factors, medical history, physical examination, and blood tests

All participating women were scheduled to attend an annual assessment at which updated sociodemographic information and comprehensive clinical data were obtained. This included a complete medical and sexual history, menopause status, use of hormone therapy, physical (including pelvic) examination, and anthropometric measurements.

A blood sample was collected from each woman to establish the following data: full blood examination, electrolytes, liver and renal function tests, reproductive and other hormone levels, and biochemical markers of disease and metabolism. Blood samples were frozen and stored at −80°C for future genetic analysis. The participants also completed the General Health Questionnaire and Greene Climacteric Scale and validated bladder, bowel, and sexual function questionnaires.

The data from all tests were stored on a centralized, customized database and made available for cross-correlation between projects.

Partial participants

Sixteen of the 511 participants were characterized as "partial," in the sense that at some point during the third or later years of the study, they were no longer able to attend at our Centre but agreed to allow us to obtain data on them via their primary care providers. This was possible because all participants had consented to our contact with their treating physician from the beginning of the study. Eleven women were in the 70–80-years age group: some became too frail or ill to travel or were diagnosed with early dementia. Two in the 50–60-years age group moved overseas, 2 in the 40–50-years age group moved interstate, and 1 in the 60–70-years age group moved away from Brisbane and became too ill to travel.

A standardized *pro forma* was sent to the primary care physician of each partial participant toward the end of each study year. Data collected included any changes in their living arrangements or circumstances (change of address, be-

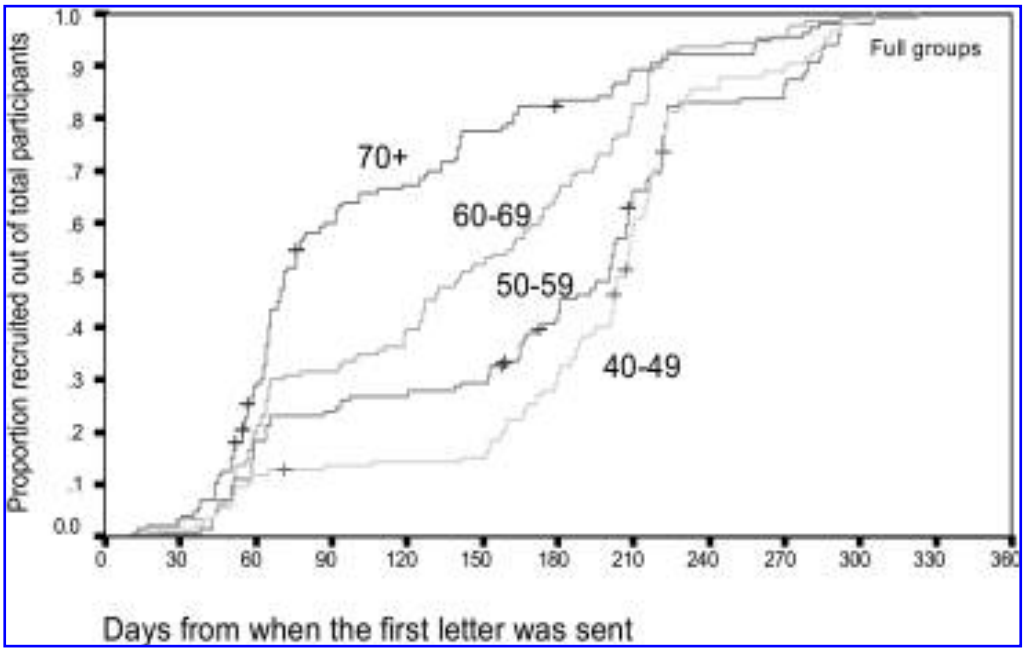

FIG. 1. Time taken to complete recruitment in the four age groups.

Table 1. Retention, Withdrawal, and Deaths in Cohort over 5 Years

	Year of study					
	1	*2*	*3*	*4*	*5*	*Total (%)*
No. of women at commencement of year	511	499	497	490	489	
Withdrawal	10	1	2	1	0	14 (2.7%)
Died	2	1	5	0	1	9 (1.8%)
% remaining in study	—	97.7	97.2	95.9	95.5	

reavement, nursing home or other care), reasons for their inability to attend the research Centre, marital status, current medical status, any hospitalizations, recent and current medication, and any change in medication.

RESULTS

Recruitment and retention of participants

Of the 1598 women initially invited to participate in the study, 1082 (68%) responded. Of those respondents, 436 women declined to participate, and 67 were excluded because of age, living outside the required area, or inability to fully participate. The final sample, therefore, comprised 511 women equally distributed across the age strata. This represented 32% of those originally contacted and 47% of those who responded. The consent rate decreased significantly with advancing age: 42% in the 40–49-year group consented compared with 40% in the 50–59-year group, 36% in the 60–69-year group, and 19% in the 70–79-year group ($p < 0.001$).

Comparison of the final LAW cohort with those who did not respond or did not consent to the study (using information available from the electoral roll) indicated that the study participants were generally younger (mean age 59.8 years, SD 10.9 years) than those who refused or did not respond (mean age 64.7 years, SD 12.2 years, $p = 0.0001$). There were also relatively fewer of our participants engaged in home duties or retired (29.5%) than those who refused or did not respond (70.5%).

Figure 1 shows the time taken to complete recruitment in the age groups. The last participant entered the study 320 days from the time when the first letter was sent. Recruitment was quickest for the oldest age group, 70–79 years, and slowest for the youngest age group, 40–49 years, but all age groups achieved their required quota. Of the 511 women initially recruited into the study, 489 remained in year 5 (a retention rate of 95.5%) (Table 1). Fourteen women (2.7%) withdrew from the study. There were 16 women who were unable to attend for the whole 5 years, but their general practitioners were able to provide a health summary every year; they were considered partial participants because some data were still collected. Almost all cases of partial participation were due to health or geographical problems or both.

Retention rates would differ among projects, as some data from partial participants could be incorporated into the analysis and some could not. For example, cross-sectional data were available on prevalence of certain conditions associated with aging (e.g., osteoporosis, cardiovascular disease, postural instability, and cognitive impairment), but data from these 16 women could not contribute to a complete longitudinal analysis over a 5-year period. Retention rates for individual projects were also minimally influenced by the decision of a few women to participate in some projects but not others at various stages of the study.

During the 5-year study, there were 9 deaths, 7 caused by cancer of several organs, and 2 caused by myocardial infarct.

Planning and coordination

Each project was supervised by a member of the LAW Study team. The organization of the multidisciplinary team and the testing required are shown in Figure 2.

An annual schedule of assessments and visits across the planned projects was prepared for each participant. The complexity and magnitude of the task are illustrated by the fact that there were 9388 visits to be accommodated within the matrix. The system was developed to allow each participant

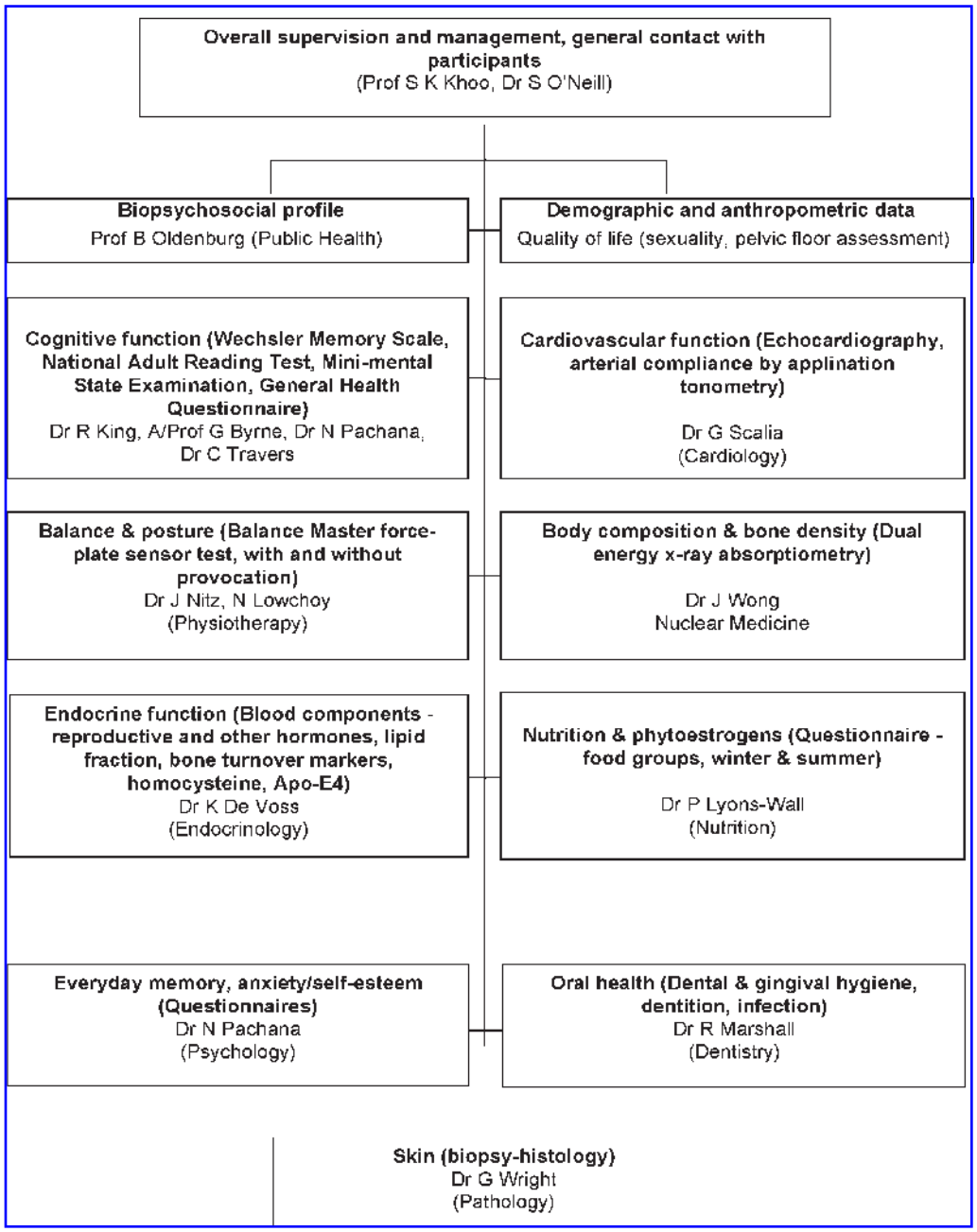

FIG. 2. Organization of multidisciplinary team and testing required for each project.

to make three or four visits per year and the study team to assess four or five participants per day.

Table 2 shows, as an example, the matrix of visits for 500 participants identified as numbers 1–500 in year 1 using four visits to undertake testing in the following projects: cardiovascular (echocardiography, arterial compliance), cognition (interview), nutrition (interview), balance and postural stability (Balance Master measurement), bone/body composition (DEXA for bone mineral density, fat/lean mass distribution), and general history/physical examination including sociodemography. Assessment for all participants was successfully completed using this matrix.

DISCUSSION

The LAW Study was ambitious in two aspects: first, it attempted to evaluate wide-ranging functions in the same participants and required par-

TABLE 2. LAW STUDY: MATRIX SCHEDULE OF VISITS AND TESTING IN YEAR 1

	January	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*
Visit One												
CVS A[a] Annually, 45-min per person 8 AM–1 PM 60-min break	Each project processes: 4 women/day 12/week 50/month	351–400	401–450	451–500	1–50	51–100	101–150	151–200	201–250	251–300	301–350	
CVS B Annually, 45-min pp 8 AM–1 PM 60-min break		351–400	401–450	451–500	1–50	51–100	101–150	151–200	201–250	251–300	301–350	
Visit Two												
Cognition 1, 5 60-min pp 8 AM–1 PM 60-min break		451–500	1–50	51–100	101–150	151–200	201–250	251–300	301–350	351–400	401–450	
Nutrition A Annually 60-min pp 8 AM–1 PM 60-min break		451–500	1–50	51–100	101–150	151–200	201–250	251–300	301–350	351–400	401–450	
Visit Three												
Nutrition B Annually 60-min pp 8 AM–1 PM 60-min break		151–200	201–250	251–300	301–350	351–400	401–450	451–500	1–50	51–100	101–150	
Physiotherapy 1, 3, 5 60-min pp 8 AM–1 PM 60-min break		151–200	201–250	251–300	301–350	351–400	401–450	451–500	1–50	51–100	101–150	
Visit Four												
Physical Annually (SKIN 1, 5)	90-minute session	51–100	101–50	151–200	201–250	251–300	301–350	351–400	401–450	451–500	1–50	

(*continued*)

Table 2. LAW Study: Matrix Schedule of Visits and Testing in Year 1 (Cont'd)

	January	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*
45-min pp DEM & HAEM Annually 45-min 8 AM–1 PM 60-min break Body comp 1, 3, 5 45-min pp		51–100	101–50	151–200	201–250	251–300	301–350	351–400	401–450	451–500	1–50	

[a]CVS A, cardiovascular (echocardiography); CVS B, arterial compliance; DEM & HAEM, demography/blood sample; bodycomp, body composition (DEXA); Nutrition appears twice (A,B) because each woman was assessed twice—once for winter diet and once for summer.

ticipants to undergo a number of assessments each year, and second, it planned to retain participants in the study for at least the first 5 years, and if funding becomes available, for 10 years. Given the cost of the methodology and personnel, the available funding would not permit a large sample for study, and on power analysis, at least 500 participants were considered necessary, provided the drop-out rate could be reduced to <10%. For a sample of 500, there was sufficient power for analysis of intermediate changes and measurable surrogate markers of disease but not for common disease outcomes. Our circumstances did not permit sampling drawn from a population registry nor multistep and age-stratified recruitment strategies.[7] We chose not to use a multicenter design because we were restricted by the requirement for specially trained staff to use the one-only available equipment. For the study to succeed, we needed to maintain a high retention rate throughout the 5 years; thus, we resorted to a range of strategies to retain our cohort.

The multidisciplinary design allowed for the data collected from one project to be readily compared with data from other projects. This feature of the study allowed for a range of clinical and public health issues to be addressed. Although a wealth of data has been collected on each participant, allowing longitudinal and cross-sectional questions to be addressed, some limitations are imposed by the relatively small number of participants in each age cohort. For instance, the incidence of major health outcomes, such as cardiovascular and cancer-related mortality, osteoporotic fractures, and Alzheimer's dementia, is restricted by the sample size. More prevalent surrogate markers of disease, such as abnormalities in echocardiography, formal measures of cognitive function, such blood markers of disease as lipids, homocysteine, bone density measurements, and bone turnover markers were used to address these questions.

We realize that the whole population could not be easily represented by the study design but tried to achieve at least a randomized sample from an urban area by using the electoral roll of a defined region of Brisbane, making selection and entry into the study minimally restrictive. Approximately half of eligible invitees were recruited to participate in the study, which may be considered a satisfactory response considering that the unsolicited invitation was sent to a random sample of women. It appears from the sociodemographic and lifestyle characteristics of the cohort that this sample may represent women who were more interested in their health than the population at large. It is also acknowledged that the results of this study may not apply to women who belonged to minority ethnic groups, as these women were underrepresented in the sample. However, there were many similarities with the general Australian female population in terms of sociodemographic and lifestyle characteristics[8] and occurrence of the common cancers.[9] We believe the cohort represented urban Australian women of predominantly Caucasian origin. Interestingly, little change in lifestyle characteristics as a proportion of the cohort (body mass, physical activity, and alcohol intake) was found in the cohort over 5 years of study, but significant individual changes were observed in some of the characteristics in certain age groups.

As with all longitudinal studies, an important consideration has been the retention of participants over the duration of the study in order to allow the primary hypothesis to be tested with adequate statistical power and minimal participation bias. We have demonstrated the ability to retain women in the study with a cumulative retention rate of 95.5% after 5 years. This was achieved through the implementation of strategies that have previously proven effective in retaining women in similar research studies.[10,11] We believe that a personalized approach to our participants was an important factor. We gave our participants individual attention, timely provision of feedback, and flexible appointment arrangements. These women showed loyalty to the study despite the multiple annual assessments having placed considerable time demands on them. This retention rate compares favorably with the retention rates reported for other longitudinal studies, such as the Melbourne Mid-Life Project (89% after 7 years),[12] and the SWAN study (82% at 3 years).[13,14] Both studies, however, required participants to attend only one visit annually, whereas our requirement was up to four visits per year.

There is a need to understand more precisely the health concerns facing older women in our population, especially when demographic trends are shifting to managing the consequences of aging. The LAW Study provides a detailed profile of urban Brisbane women as they face the health problems associated with aging. By bringing to-

gether such diverse factors as socioeconomic status, education, diet, lifestyle, sexuality, cognitive ability, balance and postural stability, cardiac and hormonal function, the results of this study may provide a basis for the development of more timely and effective interventions.

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