

# Strategies for the study of the ageing of the workforce using census data

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by

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## **Abstract**

This paper analyses data from the 1% 2001 Census Household Sample (which is free and easily accessed) to explore the possibilities of using 2006 census data to examine the ageing of the workforce in specific occupations and industries. While studies such as the *Defence Personnel Environment Scan 2020* have relied on published data, this work will demonstrate the potential use of analysis of census data.

The main example used here will be health professionals. As shown by the 2006 report on the health workforce by the Productivity Commission, Australia is experiencing major problems with an expanding demand for health services as the population ages and the increasing burden of chronic disease, combine with shortages of health professionals.

Existing studies of this group have not made full use of the 2001 census data. The 1% sample shows quite clearly that the ageing of the baby boomers is being paralleled by the ageing of health professionals, raising the question of who will care for the baby boomer generation. The 1% sample allows the comparison of the age-sex distribution of health professionals in metropolitan and non-metropolitan areas, as well as providing indicators of population movement, birthplace, citizenship, language and hours worked.

Analysis of the 1% sample is restricted because of the broad categories provided and the relatively small numbers. Use of the full census will allow specific occupations to be studied by geographical area and a variety of other variables. For ages over 50, analysis by single year of age will give insights into withdrawal from the workforce and moves into part-time work. We will also suggest other data that can be used to supplement the 2006 census analysis.

## **Strategies for the study of the ageing of the workforce using census data**

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This paper analyses data from the 1% 2001 Census Household Sample file (which is free and easily accessed as an SPSS file on CD). Under an agreement which runs from 1999-2007 the Australian Bureau of Statistics has made such Confidentialised Unit Record Files (CURFs) available to Australian universities for non-commercial projects.

Apart from testing the usefulness of the 1% sample data, we also explore the possibilities of using 2006 census data to examine the ageing of the workforce in specific occupations and industries. From 2002 to 2011 the proportion of the Australian population aged 45-64 will rise by 77% (or 1,029,000 persons) while the proportion aged 25-34 will rise by a mere 5% (or 88,000 persons)(ABS 2003a). Appropriately the first of the baby boomers (born in July 1946) will hit 60 this month (Salt 2004:154). For some unskilled occupations such as labourers the 'retirement spike' due to the baby boomers leaving the workforce has already occurred (Windsor 2005: 10).

Since the idea for this analysis began with a presentation on 'Ageing and the Health Workforce' given to the Australian Association of Gerontology's Rural Conference held in Tamworth earlier this year, the health workforce is used as an illustration of one group particularly affected by ageing. As shown by the recent report on the health workforce by the Productivity Commission (2005), Australia is experiencing major problems as its population ages, with an expanding demand for health services and an increasing burden of chronic disease, combined with shortages of health professionals. Specialized Reports on the workforce of particular industries, and of particular occupations are useful resources, but are not available for all industries. The Department of Employment and Workforce Relations (DEWR) has 20 years of information on skills shortages in trades occupations but this is based on demand data (vacancies) not on information on supply which could be available from census data (Department of Education Science and Technology 2002: 4).

It is hard to escape the conclusion that the nexus between training and the demands for particular skills is weak. This paper suggests that more use could be made of census data to anticipate such shortages. The problems are regularly reflected in recent newspaper headlines. For example in 2004, the Federal Treasurer is reported to have said that 'every parrot in every pet shop is talking about the skills shortage' (Maiden and Lewis 2004). The easy solution is often seen as immigration, rather than training Australian replacements, as evidenced by Macnamara's (2006) discussion of a looming shortage of academics, where the solution is 'to enlist more foreign PhD students as the next generation of academics.'

As with the labour force in general the shortages in the health workforce have attracted a number of headlines, such as:

'Midwife shortage critical, says AMA.' (Cronin, 2006).

'GPs a scarce resource in aged care.' Creswell, (2006)

'No quick end to GP shortage.' *Canberra Times*, editorial 2006

There is a vast range of data available about medical professionals. The Australian Institute of Health and Welfare (AIHW) has some 50 publications on aspects of the health labour force even down to that riveting title: *The Dental Prosthetist Labour Force in Australia*. HealthWIZ hosted by the Department of Health and Ageing is the National Social Health Database which includes a database on general practitioners as well as seven data sets from the 2001 census (plus time series data from earlier censuses). It is thus possible to examine demand versus supply at a very localized level.

The ABS document *Uses of Census Information* explains to the public why the 2006 Census asks about 'jobs and work', and gives just one example, 'Information about peoples' occupations can be used to know how many health professionals work in country areas'. It will certainly do this, but there already are annual data based on registrations published in the AIHW Medical Labour Force Series. Data include geographic location, age and sex profiles and hours worked. There is also the invaluable information that 40% of medical practitioners report practicing in a second work location and that for 10% of these dual location workers their second practice was actually located in a different region type from that of their main practice. A detailed breakdown of this data shows that such second practices make a significant contribution to the medical servicing of remote and very remote regions (AIHW 2005a: Tables 10 and A1). Patients travel to the cities but city practitioners also travel to remote areas and AIHW has data on the working hours they spend there for all medical practitioners. However, much less is known about non-professionals in the health workforce and here census data might well fill a gap.

Except in Western Australia, which has a three-year rotation, nurses have to re-register each year. This means that up-to-date registration data can be used to compile detailed figures on Australia's 273,000 nurses, such as age-cohort data on how many nurses are employed in nursing and in what roles; or how many are on extended leave; looking for work as nurses or in other occupations both in Australia and overseas (AIHWb 2003: Table 2). This goes beyond Preston's (2001:10) use of 1996 Census data to graph age against practicing registered nurses as a percentage of all those with professional nursing qualifications. Because so many nurses work part time it is vital to have data on the hours worked in order to be able to calculate full-time equivalents. Between 2001 and 2003 nursing availability per capita increased after years of decline – not so much because there were more nurses but because nurses worked longer hours.

Reviews such as the *National Review of Nursing Education* (DEST 2002) and the *Senate Community Affairs Committee Inquiry into Nursing* (SCAC 2002) yield yet more information. There are also medical and nursing journals that publish labour force studies. Not all professions and very few trades are so well served in this way, so that census data can help fill the gap.

State surveys of the nursing workforce can be very sophisticated. For example, the *Report of the Queensland Ministerial Taskforce on Nursing Recruitment and Retention* 1999 was able to demonstrate that nurses were ageing (a) because older nurses were less likely to retire than they had been and (b) because prospective nurses were older than

they had formerly been at the commencement of their training and stayed in training longer to take up specialized courses. The result was a shortage of nurses under 30. The Taskforce also showed that on average 20% of nurses changed jobs in any given year with younger nurses and those in remote areas having much higher turnover rates. Queensland is now trialing a web-based online survey for the collection of nursing and midwifery labour force data. The aim is to have real time reporting of the nursing labour force

## **Teachers**

Teachers are another professional group with an interest in the availability of data on skills shortages. Understandably, they are less interested in data which demonstrates an over-supply of trained teachers, although the ongoing House of Representatives Inquiry into Teacher Education has been told that there is a waiting list of over 10,000 teachers seeking work in New South Wales alone (About the House 2006). In order to examine whether there is an excess of teachers in which 'Teacher waiting list tops 10,000 (About the House 2006) or a 'Teacher shortage reaching crisis point' (Australian Education Union 2003) data is needed on the overall supply of persons holding teaching qualifications. The 2001 Census provides data on teaching qualifications held (primary and secondary) but most authors discussing this issue use the data on occupations, not on training, and therefore miss those who had teaching qualifications but were not teaching at the time of the census. Australian Social Trends, 2003 (ABS 2003b: 6-7) includes information as to the 18% of people aged 15-64 years with a teaching qualification who were not in the labour force in 2002, but does not reference where these data for a non-census year came from. It also states that, of those with teaching qualification who were employed in 2002, 35% were employed in occupations other than teaching or teaching related occupations. Because the 2001 Census did not ask those currently in training what they were training to do, Census data cannot be used to examine how many potential teachers, or plumbers, are in the pipeline. Without this caveat as to people still in full-time training, the users of census data on the ageing of the workforce who display pretty graphs showing very few under 25s is misleading. It is also misleading to assume that the demand for teachers will remain constant irrespective of the number of children. There is most likely to be a relationship between the ageing of the population and the numbers of children entering school. Census data combined with vacancy data could be used to test the theory that unemployed teachers and married women with teaching qualifications who have left the labour force are often found in locations, such as the New South Wales North Coast, where there are few teaching vacancies. Barbara Preston (2001) wrote a classic paper on 'Policy and politics in teacher and nurse supply and demand projections' which showed how crucial projecting separation rates (plausibly ranging between 3.5% to 4.5% per year) is in the determination of supply, and how hard this is to do when more teachers may leave the profession to change occupations, or to emigrate rather than to retire from the labour force. The Australian National Training Authority (2003) has provided data for a wide range of occupations projecting average annual retirement and turnover rates for 2002-2011, for school teachers the retirement rate is 2.8% versus a turnover rate of 3.7% but for university and vocational teachers the rates are 3.4% retirement versus 3.7% turnover.

## **Tradespersons**

From the above, it could be concluded that the 2006 Census will shed little additional light on health and teaching professionals. The same cannot be said for all professions or for tradespersons.

Tradespersons are reasonably well covered, mostly by the National Centre for Vocational Education Research (NCVER), when they are in training but tend to drop out of sight after that. The 1% sample with only 14 categories does not provide enough detailed information about post-school qualifications. There is also the problem that 'most skilled occupations have a significant proportion of workers who do not have formal qualifications' (DEST 2002: 1)

Non-census data about tradespersons does not come from professional registration bodies but from training providers and employers through surveys and the administrative collection of data including the registration of apprenticeships and traineeships. The ABS publication *Australian Social Trends 2000* includes a useful history of the provision of data on trades, apprenticeships and traineeships. The Australian Government Business Surveys' Register, which is maintained by the Statistical Clearing House, provides information on business surveys carried out by the Australian Government. A quick search reveals that there appear to be some 16 surveys over three years which have requested data on apprentices from employers. Labour force surveys also request information from employees themselves for example through the yearly Survey of Education and Work (SEW) and the four yearly Survey of Education and Training (SET).

Taking hairdressing as an example of one of the national top 20 most common Training Packages, the ABS Transition from Education to Work Survey data shows 8,900 apprentice hairdressers (81% female) and NCVER apprenticeships and traineeships data shows 9,600 hairdressing apprentices and trainees (90% female). The age data suggest that older trainees understandably appear to prefer the shorter traineeships to four year apprenticeships. The SEW data only give total numbers from 1995 when there were about 6,100 hairdressing apprentices. For some reason, the SEW number fell dramatically from 12,200 in 2003 to 8,500 in 2004 before climbing again to 10,200 in 2005. Annual figures for apprentices in other industries also fluctuate wildly.

There is said to be a shortage of hairdressers and hairdressers appear on the DIMA Occupations in Demand List which influences the availability of immigration visas. However, given that the average salon employs no more than five persons, the question of how to define the demand for hairdressers is a complex one especially since a 'suitable employer' sponsor is defined by DIMA as one who has employed at least 10 full-time employees for the past two years. An industry study of training needs suggests that technological changes mean that medium priced hairdressers are disappearing from the market and that the increasing trend for hairdressers to visit clients in their homes allows for significant unrecorded economic activity (Ryan and Watson 2003:51-55). Possibly the confidential nature of the census would encourage reporting of such informal employment.

The census includes questions on post-school qualifications which can be used in great detail but rarely are. Remarkably, the Job Outlook Database of the Department of Employment and Workplace Relations [www.jobsearch.gov.au/joboutlook](http://www.jobsearch.gov.au/joboutlook) describing some 400 occupations uses much less accurate survey estimates rather than the actual census counts. The National Centre for Education and Training Statistics (NCETS) is now established at the ABS and is busily engaged in trying to secure greater standardization of education statistics. One issue is the shifting boundaries between education and training which mean that whether apprenticeships are classified as educational qualifications varies with the context or even the individual. Working towards developing a single skills and qualifications profile, NCETS found over 100 potential indicators of skills and qualifications that they have now narrowed down to 25 for further discussion later this year. There is the *Dictionary of Standards for Education and Training Statistics* written in 2004 by Fiona Mackie yet this is not compatible with 2001 census data because it only gives 10 birthplace categories, one of which is Scotland (Mackie 2004).

### **Using the 1% Sample**

This paper is largely concerned with census analysis that can be done by researchers themselves using one dataset at no cost, and with the flexibility to experiment rather than relying on costly special tabulations prepared by the Australian Bureau of Statistics. The census has a range of variables relevant to labour force status and occupation, including age, sex, birthplace, citizenship, industry, geographical location, language, educational attainment, post-school qualifications and income. Using more than one dataset involves not only more effort but also introduces problems of comparability between datasets. Searching the ABS Website with Google for the term 'comparability' demonstrates that the ABS treats this problem extremely seriously.

A major advantage of the full census is the large numbers that permit analysis of small areas. Analysis of the 1% sample is restricted because of the broad categories provided and the relatively small numbers. Although a dataset with more than 188,013 individuals may seem adequate, persons aged under 15 and over 64 are normally excluded from analysis of the labour force. For the 2001 sample, this means one third (59,134 cases) are excluded. A 1% sample is larger than the Monthly Labour Force Survey which has a sampling fraction of 0.45% (ABS 2006:23) but not always so much larger as to make up in size for the lack of timeliness.

Furthermore, even with 128,879 cases, the size of cells is quickly eroded, initially because analysis of the workforce generally requires age and sex as controls. Collapsed categories provide a further problem. If we take ancestry as an example, then the 200 or more ancestries originally coded appear are reduced to 24 for the 1% sample. Age is shown in single years up to and including age 24, but in five-year groups thereafter. With the growing interest in retirement there is a case to be made for data by single years from 55 to 64 for tables relating to the workforce.

In comparison, one product from the 1996 Census of South Africa was a 10% sample. The data included age in single years and a three-digit code for occupation. This meant that, for example, 'Life science and health professionals' could be sub-divided into five categories. The 2001 Census of South African also produced a 10% sample of unit records, which provided data on 3.7 million persons (Statistics South Africa 2003). For the 2006 Australian Census there is to be a 5% Longitudinal Statistical Data Set but this is not to be linked to data from the 2001 Census and it is not clear when the 5% data set will be made available. For South Africa Amoateng et al (2004) were able to look at the 1996 labour force status of females aged 24 years by educational attainment. A similar exercise with the Australian 1% sample yielded a 3 x 7 table where only 5 of the 21 cells had more than 50 cases, presenting the possibility of relatively large sampling errors, and limiting the study of sub-groups such as the unemployed.

However, with the 1% sample we can analyze basic dichotomies by age such as the proportions that are still at school, as shown in Table 1.

Table 1. Percent of Males and Females aged 15-19 still at school, Australia 2001.

Age	Males %	Females %	Base number for %	
			Males	Females
15	60.6	62.2	1410	1235
16	53.3	54.5	1420	1322
17	37.2	42.3	1348	1342
18	12.2	14.1	1356	1266
19	2.7	4.6	1379	1324

**Source:** 1% 2001 Census Household Sample file

Use of the full census or a 5% sample allows specific occupations to be studied by smaller geographical areas and a variety of other variables. For ages over 50, analysis by single year of age will give insights into withdrawal from the workforce and moves into part-time work. We will also suggest other data that can be used to supplement the 2006 census analysis.

### **Ways of measuring change using census data**

Using more than one dataset involves not only more effort but also introduces problems of comparability between datasets. Lack of comparability increases where more than one type of data is used, for example where administrative statistics are combined or compared with census statistics.

With two or more censuses, cohorts can be compared. With a census interval of five years, this would usually involve taking a five-year age group in one census (e.g. 50-4 in

2001) and assuming the cohort's progression into the next age group (55-59) in 2006. This can become quite sophisticated, for example allowance can be made for persons who have arrived from overseas, or changed residence in the last one or five years. This analysis could also be combined with Arrivals and Departures data.

Schofield and Beard (2005) 'examine the effect of demographic change on employment patterns for general practitioners, medical specialists and nurses' using 'previously unpublished' Australian census data for 1986, 1991, 1996, and 2001. This research was published about four years after the 2001 census but refers to the anticipated 'retirement among ageing clinicians' resulting in shortages within the next five years.

With only one dataset a synthetic cohort can be created. This involves the assumption that, say, persons aged 25-29 will behave like persons aged 30-34 when they reach that age. This is the sort of assumption made in the calculation of the Total Fertility Rate, which assumes constant age-specific rates. Table 1 might form part of a synthetic cohort. Looking at single years at the ages when people are leaving the labour force might well also provide insights.

In his Presidential Address to the American Population Association, Rindfuss (1991), characterised the young adult years (ages 18 to 32) as a *demographically dense* period of life. By this, he meant the multiple roles and events such as marriage, fertility, leaving school, unemployment, mortality, and migration that occur during this period of life. By extension age 55 is also a demographically dense period. As shown in Figure 1, the labour force participation rates fall rapidly. Other possible changes include moving from full-time to part-time work, or from paid work to voluntary activities, as well as migration involving undertaking a sea change or a move to the country.

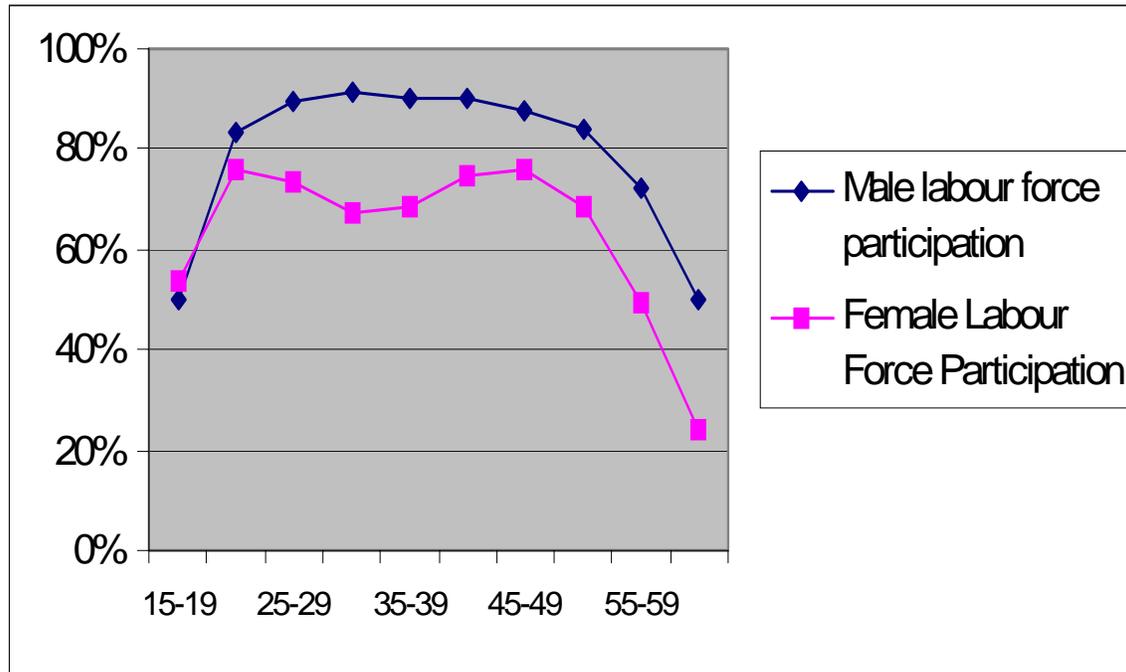
Another way of measuring change is to use retrospective questions, as is done for migration in the 2001 census, the core questions being 'Where did the person live one year ago' and 'Where did the person live five year ago'. Given the importance that the ageing of the workforce will assume by 2011, a question on previous occupation would have considerable merit. In fact, if we recollect correctly, some countries used to pick up some information on retirees by asking a usual occupation question combined with the economic activity questions.

### **Labour force participation**

Figure 1 shows one of the typical patterns of labour force participation, with male participation around 90% in the prime ages 25-44, and the two-peak pattern for females with a dip around the childbearing/rearing years. This gap between males and females could be explored further, for example by looking full- and part-time employment, family type, or marital status. The Figure also suggests that retaining people in the workforce after age 50 is more important than encouraging younger women to return to work.

Existing studies of this group have not made full use of the 2001 census data. The 1% sample shows quite clearly that the ageing of the baby boomers and Generation X is being paralleled by the ageing of health professionals, raising the question of who will care for the baby boomer generation.

Figure 1. Labour Force Participation Rates, Australia 2001.



Source: 1% Census Household Sample file.

The labour force can be divided into those employed and unemployed and the employed can be divided again by hours worked, so the gap between males and females can be estimated. Table 2 focuses on women aged 30-34 years since Figure 1 shows that they have relatively low participation.

Table 2. Labour Force Status of Women aged 30-34

Labour force status	All %	With health qualifications %
Worked: 40 or more hours	22.9	25.6
: 25-39 hours	17.3	18.2
: 1-24 hours	17.6	25.9
: 0 hours	3.4	5.8
: Hours Not Stated	1.5	1.7
Unemployed looking for full-time work	2.4	1.7
Unemployed looking for part-time work	2.0	.8
<i>In Labour Force</i>	<i>67.1</i>	<i>79.7</i>
<u>Not in labour force</u>	32.9	20.3
<i>Total</i>	<i>100.0</i>	<i>100.0</i>
n	6947	532

**Source:** 1% 2001 Census Household Sample file

### **Entering an Occupation**

The problem with skills shortages begins when birth cohorts are smaller than in previous years. This can mean that when this birth cohort become teenagers there are not enough potential replacements for the cohort that is retiring. Table 1 has 13,402 cases aged 15-19 whereas the 40-44 age group in the sample has 14,290. As observed by Salt (2004:154), the baby boomers (born 1946-1961) are outnumbered by Generation X (born 1961-1976) who also outnumber those born between 1976 and 1991.

Health and Community Services has a largely female and middle-aged workforce which can be contrasted with the Australian Defence Forces workforce which is predominantly male and youthful. One difference between the reports on the health workforce (Productivity Commission 2005) and defence personnel is that the latter has much more demography. (Schindlmayr and Ong 2001: Chapter 5) recognize that the Australian Defence Force is competing with other recruiters for young people aged 15-24 years, and that by 2013 the numbers in this age group will start to decline. Schindlmayr and Ong (2001:1-2) noted the lack of a central database within Defence that records and monitors the demographic characteristics of Defence personnel, or of civilians within Defence. This is important since Defence conduct their own census of their personnel and reservists every four years.

Although the 1% sample census tells us about educational attainment (highest level of schooling: at school, coded as passed Year 10, 11 or 12) it does not provide any detail about the subjects studied. For example, not everyone who has completed year 12 has enough maths to study engineering. For data on subjects studied it would be necessary to go to State Education Departments.

Table 3. Males and Females aged 17 and 18 by Labour Force Status

Labour Force Status	Age 17		Age 18	
	Males	Females	Males	Females
Employed	39.3	42.5	53.1	56.1
Unemployed:				
Seeking full-time work	4.2	4.3	8.9	5.8
Seeking part-time work	3.6	3.9	4.4	5.4
In Labour Force				
Not in Labour Force	47.6	46.1	29.1	27.6
Not stated etc.	5.4	3.0	4.6	5.1
Total	100.00	100.00	100.00	100.00
n	1348	1342	1356	1266

**Source:** 1% 2001 Census Household Sample file

**Notes:** differences due to rounding

This Table demonstrates the differences in labour force participation by age and by sex. In particular, the proportion of males who are unemployed rises from 7.6% at age 17 to 13.3% at age 18, whereas for females the rise is less, from 8.2% to 11.2%.

### **Employment and qualifications**

One interesting area for exploration is the extent to which people with qualifications are not in the occupation for which they are qualified, for example those with midwifery qualifications who have left the nursing profession. For law graduates, one estimate is that 'six years after graduating only 25 percent of graduates remain in legal practice.' (Toomey 2006). DEST (2002: Attachment 2) used data from the 1996 Census to show that trades workers who were not using their skills were often working in higher skilled occupations than their qualifications would suggest. However this depends on the trade, 79% of trade qualified cooks had stayed in the kitchen with many becoming chefs. For those with engineering, automotive, building and construction and rural trades qualifications only 40% were working at their original trade at the same level, 15% had moved on to a higher level in the same trade but 45% had left that trade altogether,

Table 4 is confined to persons aged 20 and over because very few persons aged under 20 have health qualifications. Since some health qualifications take many years of study the numbers rise quite rapidly after age 25. Working in another industry does not necessarily mean that their training has been wasted; this could be partially tested by looking at their current occupation. An interesting feature is that the percentage working in Health and

Community Services falls off noticeably in the age group 55-9 whereas the percentage in other industries remains fairly constant.

Table 4. Persons with Health Qualifications by Industry

Age Group	Industry			N =
	Health and Community Services	Other	Not Working	
20-4	62.4	26.6	11.0	282
25-9	63.0	22.4	14.6	522
30-4	59.6	21.6	18.8	690
35-9	62.8	20.5	16.7	796
40-4	64.9	20.9	14.2	858
45-9	62.8	22.1	15.2	712
50-4	64.1	20.5	15.3	580
55-9	48.2	20.1	31.7	398
60-4	32.5	18.2	49.4	314

**Source:** 1% 2001 Census Household Sample file

Data on birthplace and language proficiency could provide some pointers as to the reasons people working outside the health industry are not using their health qualifications. Since data are available on the year the qualification was obtained this could be cross-tabulated against year of arrival.

## Industry and Occupation

The mean age is a useful statistic: it is more convenient than looking at the age distribution if we are looking at a large number of occupations, but enables the selection of specific occupations that may merit further study. Average age is sometimes presented for individual occupations, rather than looking at a range of occupations. The 1% sample enables us to compare the mean age of employed persons in 18 broad categories.

Table 5. Mean age of employed persons by industry

Industry of employment	% Male	Mean age in years	n =
Agriculture, Forestry and Fisheries	70	43	3,030
Mining	86	40	712
Manufacturing	73	40	9,959
Electricity, Gas and Water Supply	80	42	641
Construction	87	39	5,551
Wholesale Trade	68	39	4,329
Retail Trade	48	34	12,022
Accommodation, Cafes, Restaurants	43	34	4,110
Transport and Storage	73	42	3,513
Communication Services	67	39	1,476
Finance and Insurance	43	37	3,054
Property and Business Services	54	39	9,090
Government Administration & Defence	55	40	3,574
Education	31	42	5,585
Health & Community Services	21	41	8,018
Cultural and Recreational Services	53	36	2,003
Personal and Other Services	51	38	3,050

**Source:** 1% 2001 Census Household Sample file

There is a difference of nine years between the average age of workers in Agriculture, Forestry and Fisheries, where 10% of the workers are 65 and over, and those in Retail and in hospitality (Accommodation, Cafes and Restaurants). Transport and Storage, with 2%, has the next highest proportion aged 65 and over. There was not much difference in the averages for males and females within most industries, exceptions being Gas, Electricity, and Water and Transport and Storage where males were respectively six years and five years older. With the full census data averages could be calculated for specific occupations.

The Department of Employment and Workplace Relations (DEWR 2006) publishes 'Facts about mature age employment' for each industry. Each text refers to a 2001

statement by Access Economics that 'If the workforce participation of Australians aged 55 to 70 increased by 10 percentage points, this would largely cancel out any negative effects of an ageing population.' Yet the pie charts that follow showing the broad age distributions for the industry, appear to ignore workers aged 65 and above (DEWR 2006). For Agriculture, Forestry and Fisheries they have either been excluded altogether or are merged with the age 55-64 category. In any event, they should be shown separately, particularly as there is now no statutory retirement age in Australia..

These broad categories hide sub-category differences, and for example the ageing of University staff has been of concern for many years (see Santow and Bracher 1983). At an even more detailed level Hugo ((2004) shows that the median age of age of University staff in 2000 was 47 years, which reinforces the finding of Jones et. al.(1999) that the modal age group for academic staff in 1998 was 45-49 years.

As shown in Table 5, Health and Community Services is a highly feminized industry, and this is reflected in the age-sex distribution of health professionals shown in Figure 2. Not only are health professionals in short supply but the women are ageing fast, and retiring early. The Figure shows very few working after age 60, and a concentration of women aged in their 40s. By now many of these will be in their 50s. The falling away of women aged in their late 50s can be attributed to various factors including government superannuation rules, and women leaving the workforce because their husbands have retired.

Figure 2. Health professionals by age and sex.



Source: 1% 2001 Census Household Sample file

The average age of employed nurses in 1999 was 42 years (AIHW). Partly due to changes in training practices, the proportion of nurses aged under 25 years was 23% in the 1986 census and 4% in 1999. Between 1993 and 1999 the proportion of nurses working in residential age care fell by 16%.

Karmel and Li (2002) noted the different demands for nurses from the acute care, nursing home and community care sectors, with the employment of registered nurses falling by 8% and enrolled nurses by 47% between 1993-1999. But they do not have data on nursing and personal carers and have to assume 'that some of the work of nurses has been undertaken by this group.' Their supply model is as follows:

'The number of nurses this year depends on the number last year, the number of new graduates entering nursing, the number of immigrant nurses entering nursing, the number of already qualified nurses returning to nursing less the number exiting from nursing.'

This model does not allow for the fact that the nursing supply depends on both the number of nurses available and the number of hours which they work.

AIHW (2003 Table A.4) provide a table using 2001 Census data on persons employed in health industries by occupation which shows, for example, that only 30% of those who work in nursing homes are health professionals. The 2001 Census shows people from 105 occupations working in the health industry.

### **Geographical differences**

The potential to look at small area data is a well-known advantage of census over survey data. For example, the census can be used to calculate the ratios of health personnel in a small area with its population, or, as in Table 6 to relate the ageing of the population to the aging of the workforce. This doesn't work too well with the 1% sample because of the small numbers. Furthermore, as discussed above for health professionals, we really need to look at where they work rather than where they live.

Table 6. (a) Population aged 65+ and (b) Health and Community Services industry workers aged 50+ for selected geographical areas.

Geographic Area	(a) Area population		(b) Health and Community Services workers	
	Total*	% aged 65+	Number*	Aged 50+
North West Sydney	5557	7.7	238	19.3
Lower North Sydney	4980	13.3	232	34.0
Inner Eastern Melbourne	5562	15.3	268	34.7
Outer Eastern Melbourne	3690	9.7	159	26.4
Western Adelaide, Eastern Adelaide	4115	17.6	203	34.5
Tasmania	4504	12.5	87	25.5
Northern Territory	1894	4.5	76	25.0
Australian Capital Territory	3014	8.7	117	27.4
Australia	188013	12.5	8062	22.6

**Source:** 1% 2001 Census Household Sample file

**Note:** sample numbers and base for percentages.

## **Conclusion**

Our topic has focused on examining the ageing of the workforce using census data. It is therefore vital to concentrate upon areas where census data has something unique or rare to offer. There are clearly two areas of potential focus here: detailed geographical breakdowns and detailed occupational, industrial and qualifications breakdowns. It also needs to be kept in mind that for crucial age groups at the beginning (17-29) and end (55-69) of the working life-cycle, data for single years of age will often be very useful in elucidating trends. Our original topic was data for health professionals and what we have come to see is that, because these people have to register themselves and because both federal and state governments have a strong interest in tracking their numbers and geographical distribution, registration data are often to be preferred for research on these

professionals. However, census data are still needed for estimating demand for their services when defined as the numbers of their potential clients categorized by age and sex. Demand data which will be available from the 2006 Census will also include the Need for Assistance Indicator.

There is a certain elitism in most detailed workforce supply and demand studies which tend to focus on the professions. For example, information on the less skilled areas of the community services workforce is much less extensive than that for the professionals (Vaughan 2006). Data on plumbers is much more difficult to come by than data for physiotherapists. This elite focus will have increasing practical significance as the debate over the need for semi-skilled and even unskilled migrants intensifies.

According to the ABS list of 2005 CURF Research Activities dated May 2006, the 1% sample is one of the less popular CURFs. In writing this paper we developed the impression that surprisingly little use has been made of the full 2001 Census data, perhaps because of the charging policy. One frustration is that whilst the ABS is certainly catering with an increasing wealth of data and level of finesse for those who want small area data, it appears to be neglecting those who need finer detail on non-geographical variables such as occupation or educational qualifications at the Australia wide or State and Territory level. Another source of frustration is simply trying to find out what is available. If we have ignored significant sources of data we apologize in advance. It would be good to have rapid access to a compact census data set for Australia as a whole and for the States and Territories quite separate from the large data sets provided for those requiring detailed locational breakdowns. In our experience we have found that the New Zealand Statistics Website is much more user friendly than that of the Australian Bureau of Statistics. It took 10 minutes to find and download occupation by birthplace for the whole country from the New Zealand site, ABS informs clients that this tabulation has still not been run and would have to be paid for. Researchers need to be able to experiment with a range of cross-tabulations to be able to judge whether, for example, low participation rates by women from certain birthplace groups could have an influence on the ageing of the workforce. We acknowledge that ABS staff are very helpful and evidently learn from experience and that data availability for local areas has vastly improved.

Increasingly labour mobility involves change of occupation as much as of location. If the census is to be used to study the workforce seriously then census questions for 2011 measuring changes in occupation should be considered. Failing this, more use should be made of single year age data combined with occupation and other variables.

In this paper we have not dealt with policy issues arising from the ageing of the workforce. Rather we have considered how researchers could use available census data to address these issues. For the 2006 Census we feel that researchers will benefit from being given access to datasets that include as many cases as possible and as much detail as possible (not always including detailed geographical breakdowns).

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