CHRONIC ILLNESSES IN RURAL AND REMOTE QUEENSLAND COMMUNITIES USING TWO SAMPLE UNITS

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Abstract. The objective of this study is to report the prevalence rates of chronic diseases using two sampling units: (a) the rural and remote areas of the Queensland Fitzroy and Central West Statistical Divisions and (b) four rural communities within the Queensland Fitzroy Statistical Division. The design was a cross-sectional survey. The setting was rural and remote Queensland. The first sample unit was 641 households stratified and randomly selected from a commercial electronic database of 36,423 telephone numbers. Of these 641 households, 270 agreed to take part. One respondent from each household provided information, including chronic illnesses, for all 697 household members. The second sample unit was all 356 households in four small rural communities. Of these, 223 agreed to provide information regarding 594 household members. The main outcome measures were the age and gender distribution of two sample groups and the prevalence rates of chronic illnesses. The people of the first sample unit had a significantly lower proportion of university or college graduates compared with the people in the second sample unit. There was a lower prevalence rate of asthma among people in the first unit than the rate reported by people in the second unit.

INTRODUCTION

A range of information is required and used to plan health services that meet the needs of a population group. Morbidity and mortality data are fundamental to the planning of health services to be delivered to a target group. In many developed countries, including the USA, UK and Australia, coronary heart disease, stroke and cancer are the leading causes of death (Australian Institute of Health and Welfare, 2002). Patterns of death and disease may be different in a selected population group from the pattern in the general population. For example, young Australian people aged 12-24 have a high risk of death caused by hanging, strangulation, suffocation, vehicle accidents and drug dependence. People living in rural and remote areas in Australia have a shorter life expectancy than people living in metropolitan areas. The death rate for men younger than 65 years (excluding Indigenous people) is 10-20% higher in regional and remote areas than in major cities. For women, the rate is approximately 10% higher. People living away from major cities tend to have a higher death rate due to cardiovascular disease, respiratory disease and injury compared with people living in major cities (Australian Institute of Health and Welfare, 1998).

In Australia, many organizations, including the Australian Bureau of Statistics, the Australian Institute of Health and Welfare, Commonwealth, State and Territory health agencies and the Health Insurance Commission, collect health information and use it for different purposes. Information regarding births, deaths and certain communicable diseases is collected and reported routinely through an established surveillance system. Regular data collection, including a household census, is conducted every five years, so that basic information can be used at local, national and international levels. Special surveys, for example a survey of women's health as a part of a national health survey, are undertaken according to the needs of the Common-

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wealth, State and Territory governments.

It should be noted that the reports of these data are generally based on a large geographical area or a large population size. Health information regarding a small geographical area or a small population group may not be readily available. Confidentiality considerations, cost and the differences in geographical boundaries used by different organizations, are some of the barriers that limit the use of existing data. A small agency requiring information may find that human, financial and other resources may not be available to conduct a survey.

An option used frequently by health professionals who work with a small geographical area or a small population group, is to apply data from a large population group, of which the small population group is a subset. For example, health personnel working with a small farming community may have to use data based on the local shire or health service district. Later they may have to use local knowledge to justify the application to the target group.

Table 1 shows the number of people, population density and percentage of people aged 65 years and older living in different Queensland areas: Brisbane Metropolitan City, Sunshine Coast, Mount Morgan and the combined areas of Fitzroy and Central West (Australian Bureau of Statistics, 2003). Data from two regional cities, Rockhampton and Gladstone, were purposely excluded from Fitzroy and Central West because of the availability of comprehensive health services in those cities is atypical of the area. As expected, the population density in Brisbane and the Sunshine Coast was higher than in the other areas. The Sunshine Coast and Mount Morgan have a relatively higher percentage of people aged 65 or older compared with the other areas. Fitzroy and Central West had the lowest population density. This selected information suggests that there will be a variation in health care needs across the areas. In-depth data are required to further develop and deliver health services to target groups in each geographical area.

This paper has two aims. It will first describe the age and gender distribution and the standardized prevalence rates of chronic diseases reported by people living in two Queensland geographical areas: (a) the large area of Fitzroy and Central West, and (b) a very small area of four communities within that larger area: Wowan, Dululu, Gogango and Goovigen. Fig 1 shows the study locations (Australian Bureau of Statistics, 2000; Division of Geographic Information, 2000). The paper will then compare the standardized rates of chronic diseases in both study areas. Where national data are available, they will be compared with the disease rates in both study areas (Australian Bureau of Statistics, 1995a, b, c).

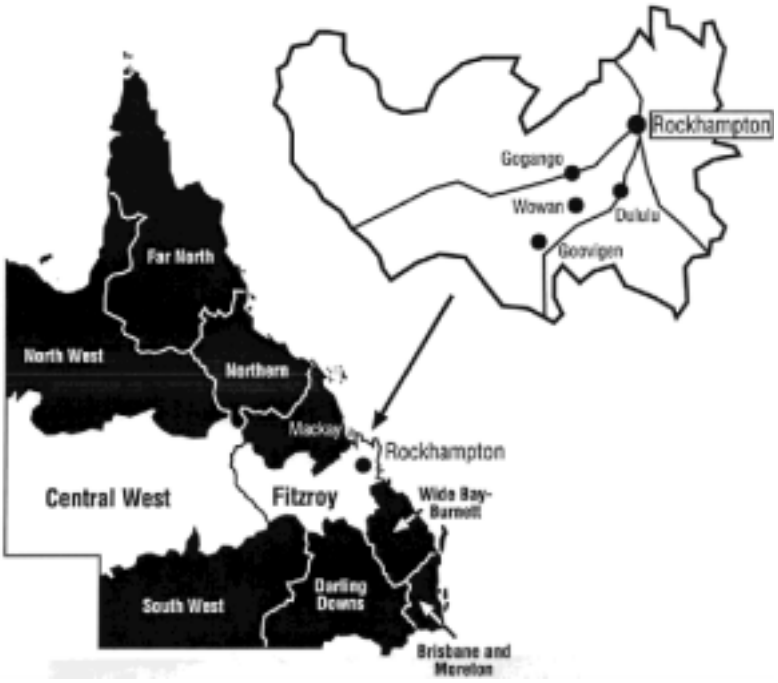
MATERIALS AND METHODS

A cross-sectional survey was used to collect two sets of data. The first data set was collected in 2000 and based on the households in the rural and remote areas of Fitzroy and Central West Queensland. Two regional cities,

Table 1
Selected information on population living in different areas at the 2001 Queensland census.

Area	Total population	Population density/km^2	Proportion of people aged 65 and older
Queensland	3,585,639	2.1	12.36
Brisbane City	873,780	658.6	12.23
Sunshine Coast	187,442	410.0	19.34
Mount Morgan	2,768	5.6	19.29
Fitzroy and Central West[a]	109,451	0.2	10.65

[a]Excluding Rockhampton and Gladstone
Source: Australian Bureau of Statistics (2003).



Sources: Australian Bureau of Statistics (2000); Division of Geographic Information (2000).

Fig 1–Two study geographical areas.

Rockhampton and Gladstone, were excluded from the sampling frame because they have relatively comprehensive health services and are more densely populated than other towns. The households studied were selected randomly from a commercial telephone directory. The details of the sampling method have been reported in Jirojwong and MacLennan (2002). In brief, study towns were classified to one of the following categories: (1) relatively "high" medically resourced areas, with more than one GP or specialist working in a clinic or hospital with limited resources, (2) relatively "moderate" medically resourced areas, with GPs and a local hospital that can care for patients without complications and conduct minor surgery; and (3) "low" medically resourced areas, with nurses working in a hospital or health center with periodic scheduled visits by GPs or specialists. Using a commercial electronic database, listing of all 36,423 telephone numbers, names and addresses were compiled for each of the three areas. A sample size of each area was determined prior to using SPSS version 10.0 to randomly select households (SPSS Inc, 2000). The sampling fractions ranged from 1 in 35 in the "high" resources area, 1 in 13 in the "moderate" resourced area, and 1 in 5 in the "low" resourced area. The larger samples in the last two areas were intentional.

Two studies (Brown *et al*, 1996; Jirojwong and Manderson, 1999) and the results of four focus group interviews among 28 participants in rural Queensland were used as a guide to develop close-ended questions used by both surveys to explore chronic illnesses. It was later tested among five adults to test the wording, sequence of the questions and the overall length of the questionnaire. The results were used to revise the questionnaire.

Four research assistants were trained to conduct telephone interviews. A manual was also developed to be used by the research assistants, It described the purpose of the study and the questions included in the questionnaire. The inter-rater reliability was based on the results of an interview of two adults recorded by all interviewers. The agreement of data among the interviewers ranged between 0.80 and 0.95, which was satisfactory (Nunnally, 1978).

A letter introducing the study was mailed out to each selected household. Each household was later contacted by telephone and an interview was conducted. From the initial randomly selected sample of 641 telephone numbers, 394 (61.5%) households were contacted, 270 (68.5%) participated (193 females, 77 males) and 124 (31.5%) refused. Among the 270 households that participated, information regarding the 697 household members were documented.

In 2002, the second data set was collected in four small Queensland rural communities: Wowan, Dululu, Gogango and Goovigen. Similar steps were used to collect the data. Following four focus group interviews, one question item assessing industrial deafness replaced a

non-specific cause of hearing loss question used in the earlier survey. A letter introducing the study was mailed to all 356 households listed in a telephone directory. Of these, 272 (76.4%) households were contacted, 223 (82.0%) participated (160 females, 63 males) and 124 (31.5%) refused. Of the remaining 84 households (24.6%), nobody was at home when called, up to fourteen times. From the 233 who participated, information was documented regarding 594 household members. The respondent provided information relating to chronic disease experienced by all household members. This study was approved by the Central Queensland University Research Ethics Committee.

Data were analysed descriptively and presented in numbers and percentages. The Pearson χ^2 test was used to assess a relationship between a demographic characteristic and the study area. The SPSS version 10.0 (SPSS Inc, 2000) and True Epistat programs (Gustafson, 1987) were used to analyze the data. A standardized rate was computed using the mid 1995 Australian population estimate as a standard

Table 2
Characteristics by number and percentage of respondents from the two groups: Fitzroy and Central West and Wowan, Dululu, Gogango and Goovigen.

Characteristics of the respondents	Fitzroy and Central West (b) Number (%)	Wowan, Dululu, Gogango and Goovigen (b) Number (%)
Employment status of major income earners		
In paid work (full time or part time)		
Unemployed, students (a)	173 (66.8)	157 (70.8)
Home duties, retired or age pension	4 (1.6)	2 (0.9)
χ^2= 0.67 (d.f. = 1) p = 0.41	76 (29.4)	57 (26.4)
Marital status		
Never married	15 (5.7)	9 (4.1)
Married or de facto relationship	199 (75.3)	161 (76.3)
Separated or divorced	22 (8.3)	17 (8.1)
Widowed	28 (10.6)	24 (11.4)
χ^2= 0.55 (d.f. = 3) p = 0.91		
Highest level of education		
Primary school or lower	45 (17.1)	49 (23.4)
Some secondary school but not obtaining certificate		
Completed secondary School	70 (26.5)	49 (23.3)
Vocational	108 (40.9)	56 (26.7)
University	16 (6.1)	30 (14.3)
χ^2= 18.7 (d.f. = 4) p = 0.0009	25 (9.5)	26 (12.4)
Receiving at least one type of government financial support		
Yes		
No	98 (36.7)	94 (45.6)
χ^2= 3.48 (d.f. = 1) p = 0.06	169 (63.3)	112 (54.4)
Having private health insurance		
Yes		
No	167 (63.3)	129 (61.7)
χ^2= 0.06 (d.f. = 1) p = 0.80	97 (36.7)	80 (38.3)
Having a family car:		
Yes	249 (92.2)	201 (96.2)
No	21 (7.8)	8 (3.8)
χ^2= 2.57 (d.f. = 1) p = 0.10		

(a) Unemployed persons and students were excluded in the chi-square test because there were so few of them.
(b) Total number may be inconsistent because of missing data.

Table 3
Number and standardized rate of reported chronic diseases of two study units: (a) Fitzroy and Central West Queensland (excluding Rockhampton and Gladstone), 2000 and (b) Wowan, Dululu, Gogango and Goovigen, 2002.

Self reported chronic illnesses	Fitzroy and Central West Queensland Number (rate/1,000 population)[a]	Wowan, Dululu, Gogango and Goovigen Number (rate/1,000 population)[a]	Australian National Health Survey, rate/1,000 population[a]
Arthritis	124 (176.33)	130 (171.07)	147.0[b]
Hypertension	86 (127.78)	94 (150.99)	144.0[c]
Cancer	68 (97.94)	44 (70.36)	17.8[d]
Asthma	61 (85.21)	88 (142.01)	110.9[d]
Hearing problem	51 (75.23)	n.a.	n.a.
Industrial deafness	n.a.	64 (106.90)	95.2[d]
Digestive system	45 (64.91)	31 (52.80)	n.a.
Reproductive organs	45 (65.25)	30 (45.70)	10.3[d]
Bladder or kidney	42 (59.12)	38 (67.01)	n.a.
Heart disease	41 (60.49)	39 (65.00)	37.0[c]
Lung problems	28 (40.63)	28 (45.96)	n.a.
Osteoporosis	24 (35.32)	15 (27.56)	13.7[d]
Anemia	23 (33.27)	30 (50.99)	n.a.
Diabetes	18 (26.37)	25 (39.12)	22.4[d]
Stroke	8 (8.89)	7 (12.78)	90.0[c]

Note: [a] Standardized rate using mid 1995 Australian population estimate; [b] Australian Bureau of Statistics (1995a); [c]Australian Bureau of Statistics (1995b); [d] Australian Bureau of Statistics (1995c); n.a. = not available.

population (Australian Bureau of Statistics, 1995c). This standardization is a technique used when comparing estimates for populations that have different structures. Where indicated in the text and tables in this paper, prevalence rates for certain diseases have been age standardized (Hennekens and Buring, 1987). The minimum statistical significance level of 0.05 (α = 0.05) was used as a criterion for rejecting a null hypothesis.

RESULTS

Characteristics of the respondents

The majority of the respondents in both areas were in paid work, either full time or part time. Slightly more than a quarter of the respondents were retirees or receiving an age pension. The percentages of farmers or graziers in the Fitzroy and Central West and the small communities were 42.4% and 54.7%, respectively (data are not included in the table). There was no statistically significant difference relating to employment status. More than 75% in each study group were married or in a de facto relationship. A higher percentage of the respondents in Fitzroy and Central West had completed secondary school compared with the respondents in the small rural communities. A lower percentage of the respondents in Fitzroy and Central West had completed tertiary education compared with the percentage of the respondents in the four rural communities. The level of education which people had completed was significantly different between the two study areas. A lower percentage of the people in Fitzroy and Central West received financial support from the government than the percentage of people in the small areas. This difference was not statistically significant (p=0.06). Slightly more than two-thirds of the respondents in both the study areas had private health insurance. A higher percentage of the respondents in Fitzroy and Central West did not have a family car. Table 2 shows the details of the social and demographic characteristics of the respondents in both study areas.

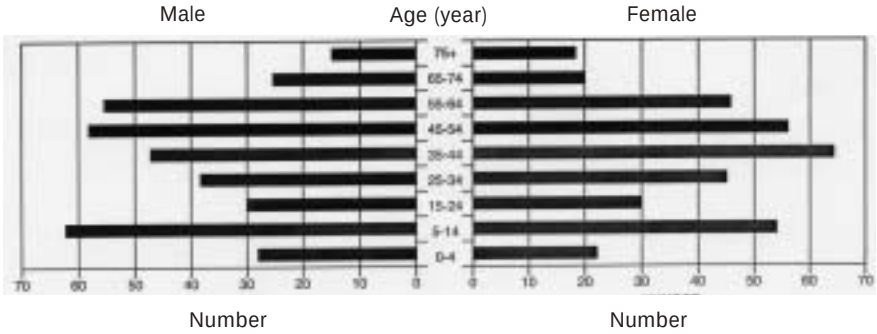


Fig 2–Study population (N=697) categorized by gender and age: Fitzroy and Central West Queensland (excluding Rockhampton and Gladstone), 2000.

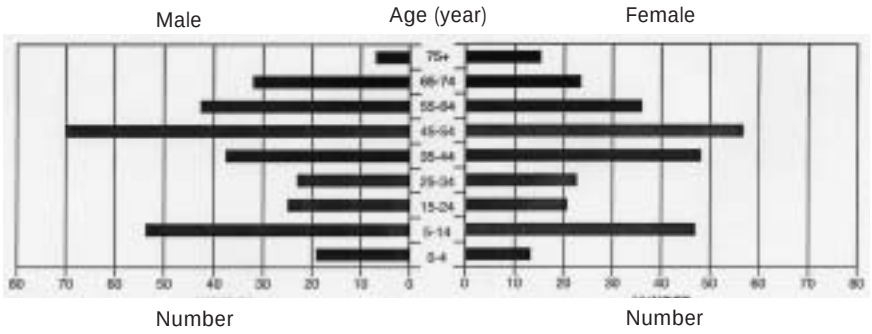


Fig 3–Study population (N=594) categorized by gender and age: Wowan, Dululu, Gogango and Goovigen, 2002.

Age and sex distribution of people in the study groups

The respondents provided information relating to age, sex and chronic illnesses experienced by all household members. Figs 2 and 3 show the age and sex distribution of these household members. Both study areas had a similar pattern of population, age and sex distribution. Compared with other age groups, a relatively high number of children aged 5-14 years were found in both study areas. Both study groups had a high number of people of working age (25-64 years). There were a smaller number of persons aged 65 years or older in both areas. There was a relatively higher number of women 75 years or older than men of the same age group in both areas.

Chronic illnesses

Table 3 shows the number and the standardized rate per 1,000 populations of reported chronic diseases of both sample units. With data available, the standardized rate of chronic diseases based on the 1995 Australian National Health Survey is also shown in the table. The respondents provided information relating to the chronic diseases of all household members. Arthritis, hypertension, cancer, asthma and hearing problems were the five most common chronic diseases among people in Fitzroy and Central West. Arthritis, hypertension, asthma, industrial deafness and cancer were the five most common diseases in the small communities. People in Fitzroy and Central West reported a higher rate of diseases of reproductive organs and a higher rate of osteoporosis than people in the small communities. However, people in Fitzroy and Central West had lower rates of diabetes and anemia than the rates in the smaller communities. People in Fitzroy and Central West had a slightly lower rate of stroke than people in the smaller communities.

Compared with the national data, people in both study areas had lower rates of stroke and arthritis. People in Fitzroy and Central West had a lower rate of diabetes than people in the smaller communities and lower than the Australian population. People in both study areas had a higher rate of osteoporosis, diseases of reproductive organs, heart disease, and cancer compared with the Australian population. Table 3 also shows that people in the smaller communities had a higher rate of asthma than people in Fitzroy and Central West and the Australian population.

DISCUSSION

More than 96% of households in rural and remote areas have listed telephone numbers (Australian Bureau of Statistics, 1998; Wilson *et al*, 1999). A sample drawn from a telephone directory with a high response rate provides a good representation of the population. The response rate to this study was comparable with or higher than many studies that have used the same sampling method (Pérez-Stable *et al*, 1998; Wiecha *et al*, 1998; Rissel *et al*, 1999).

The respondents in both study areas were similar in many aspects, except their educational level. A higher percentage of people in the smaller communities had post-school qualifications. Data from the focus group discussions indicated that compared with properties in Fitzroy and Central West, the majority of the properties in the small communities were managed by the owners with a lower percentage having assistance from laborers who might have a low level of education.

The smaller number of people in the older age group could be because of their moving to larger cities where a range of health services and public facilities, including transportation were available. A decline in the Australian rural economy explained the high rate of recipients of government financial support in the small communities.

People with disabilities requiring a high level of assistance may have moved to a large city where facilities and health services catered to their needs. Further studies are required to explore the causes of high rates of asthma and industrial deafness. These include occupational health-related issues, as many people in agricultural areas are farmers and graziers who are exposed to pollutants, chemicals and dust. These are trigger factors for asthma and can exacerbate its severity. Long-term exposure to loud noises while using machinery needs systematic investigation as to whether it contributes to a high rate of industrial deafness. Early detection of the high risk groups and health promotion activities are required to address such health issues.

Compared with national data, people in rural and remote areas tend to have a high rate of chronic diseases. The results of this study confirm the national report which clearly indicated the health disadvantages of people in rural and remote Australia (Australian Institute of Health and Welfare, 1998, 2002). Appropriate strategies taking into account the social and cultural factors of rural farming communities are required so that disease prevention methods can be adopted by the communities.

The results of this study confirm that it is possible to apply information from an area of large geographical size to a smaller area, but with caution. Conducting an ad hoc survey in a small community requires additional resources. A local health professional may lack the knowledge and skills to conduct such a survey. If required, bringing in professionals could be an option when using resources.

The limitations in this study needed to be outlined. The prevalence of disease rates were based on self-reported information. Validation from other sources, including general practitioner reports or using diagnostic tests, was not practical because of limited resources. The percentage of indigenous people in both sampling units was not assessed nor taken into account when computing the rate. This may influence the comparison of disease rates between various groups as indigenous people usually have poorer health than the general Australian population (Australian Institute of Health and Welfare, 1998, 2002). Comparison of some diseases could not be made because of the differences in a few question items used in the studies. The oversampling of people from the “low” medically

resourced areas could influence the similarity of the study results. The different response rates between two surveys could bias the results.

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