



BASELINE BIOMEDICAL AND SELF-REPORT DATA

MARCH 2005

Janet Grant
Catherine Chittleborough
Eleonora Dal Grande
Anne Taylor

Population Research and Outcome Studies Unit
Department of Health, South Australia

in conjunction with

Department of Medicine
The University of Adelaide

Division of Health Sciences
University of South Australia

Endocrinology Department
The Queen Elizabeth Hospital



The Queen Elizabeth
Hospital



Government
of South Australia

This work is copyright. It may be reproduced and the Population Research and Outcome Studies (PROS) Unit welcomes requests for permission to reproduce in the whole or in part for work, study or training purposes subject to the inclusion of an acknowledgment of the source and not commercial use or sale. PROS will only accept responsibility for data analysis conducted by PROS staff or under PROS supervision.

Published March 2005 by the South Australian Department of Health
Population Research and Outcome Studies Unit
PO Box 287 Rundle Mall 5000
South Australia, Australia

The National Library of Australia Cataloguing-in-Publication entry:

Baseline biomedical and self-report data.

ISBN 0 7308 9392 8.

1. Medical care surveys - South Australia. 2. Health status indicators - South Australia. 3. Chronic diseases - South Australia - Prevention. 4. Cohort analysis. I. Grant, Janet. II. South Australia. Dept. of Health.

614.4294231

In accordance with the Copyright Act 1968 a copy of each book published must be lodged with the National Library and respective deposit libraries in each state.

This document can be found online at:
<http://www.dh.sa.gov.au/pehs/PROS/NWhealth.html>

TABLE OF CONTENTS

EXECUTIVE SUMMARY	5
CHAPTER 1: BACKGROUND AND METHODOLOGY	9
1.1 Background.....	10
1.2 Objectives	11
1.3 Methodology	12
1.4 References	16
CHAPTER 2: PROFILE OF STUDY PARTICIPANTS	17
2.1 Demographic profile of participants.....	18
2.2 Quality of life.....	19
2.3 Health services.....	20
2.4 Chronic Lung Disease (CLD) Index	22
2.5 Skin allergies.....	23
2.6 References	24
CHAPTER 3: DIABETES	25
3.1 Introduction.....	26
3.2 Diabetes	27
3.3 Impaired fasting glucose (IFG)	34
3.4 Previously undiagnosed diabetes	41
3.5 References	48
CHAPTER 4: ASTHMA	49
4.1 Introduction.....	50
4.2 Current asthma	51
4.3 Previously undiagnosed asthma	62
4.4 References	70
CHAPTER 5: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)	71
5.1 Introduction.....	72
5.2 COPD	73
5.3 Previously undiagnosed COPD	83
5.4 References	93

CHAPTER 6: CARDIOVASCULAR DISEASE.....	95
6.1 Introduction.....	96
6.2 Cardiovascular disease.....	97
6.3 References.....	104
CHAPTER 7: RISK FACTORS FOR ILL HEALTH	105
7.1 Introduction.....	106
7.2 Smoking.....	107
7.3 Alcohol consumption.....	113
7.4 Physical activity.....	119
7.5 Body mass index.....	125
7.6 Waist hip ratio.....	134
7.7 Blood Pressure.....	140
7.8 Cholesterol.....	147
7.9 Family history.....	154
7.10 Multiple risk factors.....	155
7.11 References.....	159
CHAPTER 8: MULTIPLE CONDITIONS.....	161
8.1 Introduction.....	162
8.2 Multiple Conditions.....	163
APPENDIX 1: APPROACH LETTER	171
APPENDIX 2: INFORMATION SHEET.....	173
APPENDIX 3: TELEPHONE QUESTIONNAIRE.....	177
APPENDIX 4: QUESTIONNAIRE A	183
APPENDIX 5: CLINIC RUNNING SHEET.....	195
APPENDIX 6: STUDY TEAM	199

EXECUTIVE SUMMARY

Introduction

This report details the findings from both self-reported and biomedical data of the full cohort (n=4060) of the North West Adelaide Health Study. This study is a collaboration between the North Western Adelaide Health Service (The Queen Elizabeth Hospital and Lyell McEwin Health Service campuses), the South Australian Department of Health, The University of Adelaide, and the University of South Australia and provides a comprehensive health assessment of the adult community.

Methodology

The participants in the North West Adelaide Health Study (n=4060) are a representative sample aged 18 years and over of the north west region of Adelaide, randomly selected from the Electronic White Pages.

Biomedical information was obtained from participants at a clinic appointment and self-reported data was collected via a telephone interview and a self-completed questionnaire. The data were weighted to be representative of the north west region of Adelaide.

Results

Profile of participants

Analyses of the total cohort showed that:

- 51.0% were female;
- 38.0% were aged over 50 years;
- 70.6% were born in Australia; and
- 88.3% had visited a general practitioner in the past 12 months.

Chronic conditions

- The prevalence of diabetes was 6.6% and an additional 4.3% had impaired fasting glucose. Of those with diabetes, 15.5% had not been diagnosed by a doctor.
- The prevalence of asthma was 12.3%, and 23.7% of people with asthma had not been diagnosed by a doctor.
- The prevalence of chronic obstructive pulmonary disease (COPD) was 3.5%, and 80% of these had not been previously diagnosed.

- The prevalence of cardiovascular disease, including heart attack, stroke or angina, was 6.2%.
- The quality of life of people with diabetes, asthma, COPD, or cardiovascular disease, was significantly impaired when compared to people without these conditions.
- Having multiple chronic conditions was defined as having three or more of diabetes, asthma, COPD, cardiovascular disease or a mental health illness (including anxiety, depression, stress related problem, any other mental health problem). Approximately two-thirds of participants (67.4%) did not have any of these conditions, and 1.4% had three or more of these conditions.

Risk factors

Analyses of the self-reported and biomedical data showed that:

- 51.6% had a family history of heart disease, 35.4% had a family history of stroke, and 33.1% had a family history of diabetes;
- 28.1% were not doing any physical activity;
- 36.6% were overweight and 28.0% were obese, as measured by body mass index;
- 36.1% had high cholesterol;
- 26.8% had high blood pressure;
- 24.4% were current smokers;
- 16.4% had a high waist hip ratio;
- 6.0% had an intermediate, high or very high alcohol risk; and
- 38.7% had four or more of the above risk factors.

CHAPTER 1: BACKGROUND AND METHODOLOGY

1.1 Background

1.1.1 Introduction

This report details the findings from both self-reported and biomedical data of the full cohort (n=4060) of the North West Adelaide Health Study. The North West Adelaide Health Study is a collaboration between the North Western Adelaide Health Service (The Queen Elizabeth Hospital and Lyell McEwin Health Service campuses), the South Australian Department of Health, The University of Adelaide, and the University of South Australia. The study is one of the first of its kind in Australia to provide a comprehensive health assessment of the adult community.

This study focuses on three of the six conditions identified as National Health Priority Areas, namely asthma¹, diabetes², and cardiovascular disease³ because of the significant burden that they place on the community in terms of health, social, economic and quality of life costs. It also investigates chronic obstructive pulmonary disease (COPD), which includes bronchitis and emphysema, as this adds to the burden of respiratory disease and many risk factors associated with asthma are common to bronchitis and emphysema. The study also investigates risk factors that are common to many chronic conditions, including smoking, alcohol consumption, physical inactivity, overweight and obesity, high blood pressure, high cholesterol and family history of diabetes or cardiovascular disease.

The representative population information on the distribution of these chronic conditions and risk factors in this report can be used to better inform prevention, delay, early detection and care by allowing prioritisation of intervention efforts along the disease continuum (Figure 1.1). People with chronic conditions are not necessarily a homogenous group and may not respond to generic strategies and treatment plans aimed at improving health outcomes. Conceptualisation of the chronic disease continuum identifies segments of the disease group and asserts that each segment has specific needs that will change as they progress along the continuum. It also emphasises that, for greatest impact of interventions, the population should be targeted according to the stage of development along the continuum. One of the strengths of the North West Adelaide Health Study is the segmentation of chronic diseases into the stages of the continuum to facilitate more specific targeting of chronic disease on the basis of the stage of disease development.

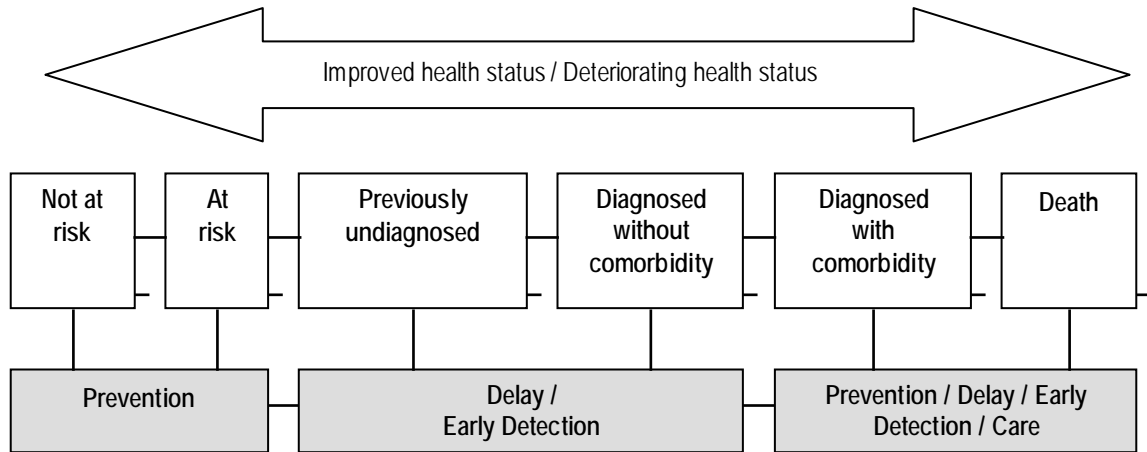


Figure 1.1: Chronic Disease Continuum

1.2 Objectives

The overall aims of the North West Adelaide Health Study are to:

- Assess the measured clinical prevalence of priority health problems and key risk factors and their demographic distributions.
- Segment each of the chronic conditions to investigate the specific health issues and needs of different sub-groups so that more effective policy can be developed and more precise targeting of these diseases can occur.
- Describe the costs of these disease segments to the individual and the health system through linkage with Health Insurance Commission data.
- Following segmentation of the diseases, qualitatively assess the differential understanding, management and contextual difficulties associated with positive and negative health outcomes.
- Track the cohort over time to identify the incidence of new cases of disease and the rate at which complications develop in these and existing cases of disease.
- Track the cohort over time to measure improvements in health status.

This report summaries the main quantitative findings of the study for each of the following diseases or conditions:

- Diabetes (including impaired fasting glucose and previously undiagnosed diabetes);
- Asthma (including previously undiagnosed asthma);
- Chronic Obstructive Pulmonary Disease or COPD (including previously undiagnosed COPD);

- Cardiovascular disease (including heart attack, stroke or angina);
- Risk factors (self-reported and clinically measured):
 - smoking;
 - alcohol consumption;
 - physical activity;
 - body mass index;
 - waist/hip ratio;
 - blood pressure;
 - cholesterol;
 - family history of diabetes, stroke and heart disease;
 - multiple risk factors;
- Multiple chronic conditions (including diabetes, asthma, COPD, mental health and cardiovascular disease).

For each of these diseases or conditions, the report highlights:

- the prevalence;
- the demographic profile of those with the disease or condition;
- an assessment of the role of risk factors;
- an assessment of the quality of life of people with the disease or condition; and
- health service use of those with the disease or condition.

1.3 Methodology

1.3.1 Overview

The sample for the North West Adelaide Health Study (n=4060) was recruited in two phases. Phase 1A (n=2523) was recruited between November 1999 and December 2000 and Phase 1B (n=1537) was recruited between August 2002 and July 2003. Respondents were recruited to the study via a CATI telephone interview, during which they answered questions about their health. Self-reported data was also collected in a self-administered questionnaire that participants completed before they attended the clinic. Biomedical data was collected from participants at their clinic appointment.

1.3.2 Recruitment of sample

All households in the north western area of Adelaide with a telephone connected and the telephone number listed in the Electronic White Pages (EWP) were eligible for selection in the North West Adelaide Health Study. The sample was stratified into the two health regions: western Adelaide and northern Adelaide.

Within each household, the person who had their birthday last, and was 18 years or older, was selected for interview and invited to attend the clinic.

1.3.2.1 Introductory letter

A letter introducing the study and an information brochure was sent to the household of each selected telephone number. The letter and brochure informed people of the purpose of the survey and indicated that they could expect to be contacted by telephone.

1.3.2.2 Pilot testing

Before the main recruitment survey was conducted, the questionnaire was pilot tested (Phase 1A n=100, Phase 1B n=75). The original questionnaire was amended on the basis of the information collected.

1.3.2.3 Data collection

Telephone calls were made on Mondays, Tuesdays and Wednesdays between 4pm and 8pm, on Saturdays between 11am and 3pm, and on Sundays between 2pm and 7pm. On some occasions, calls were made on Mondays, Tuesdays and Wednesdays between 11am and 2pm. Professional interviewers conducted the interviews and were supervised by Harrison Health Research and Population Research and Outcome Studies (PROS) personnel. Disposition codes were supplied to PROS staff daily, or as required, to ensure careful monitoring of survey activities. On contacting the household, the interviewer initially identified themselves and the purpose of the survey.

The QPL (Questionnaire Programming Language) system was used to conduct the interviews. This is a 'freeware' package that provides a way of efficiently and reliably automating survey data by allowing immediate entry of data from the interviewer's questionnaire screen to the computer database. The advantage of this system is that it correctly sequences questions as specific answers are given. In addition, it enforces a range of checks on each response with most questions having a set of pre-determined response categories. The QPL programme also allows open-ended responses to be transcribed exactly by the interviewer.

At least ten call-backs were made to the telephone number selected to interview household members. Different times of the day or evening were scheduled for each call-back. If a person could not be interviewed immediately they were re-scheduled for interview at a time suitable to them. Where a refusal was encountered, another interviewer generally (at the discretion of the supervisor) called later, in an endeavour to obtain the interview(s). Replacement interviews for persons who could not be contacted or interviewed were not permitted.

1.3.3 Information folder

An information folder was sent to all respondents who agreed to attend the clinic. The folder included:

- A letter clarifying the date of the appointment;
- A questionnaire for self-completion;
- An information sheet; and
- A map of the clinic location.

The self-completed questionnaire covered the following issues:

- Demographics
- Risk factors (physical activity, smoking, alcohol use, family history of chronic conditions)
- Chronic conditions (asthma, chronic obstructive pulmonary disease, diabetes, cardiovascular disease, mental health).

Participants were informed of the study website (www.nwadelaidehealthstudy.org) where they could access information and results from the study as they arose. A 1800 telephone number was also available for use by participants if they had any questions.

1.3.4 Clinic appointment

Respondents were given the option of attending a clinic at either The Queen Elizabeth Hospital or the Lyell McEwin Health Service. Appointments were made in the morning from 7:30am and took approximately 45 minutes.

Measurements conducted at the clinic included:

- Blood pressure
- Height and weight
- Waist and hip circumference
- Fasting blood sample (glucose, lipid profile, glycated haemoglobin)
- Lung function tests (spirometry followed by Ventolin inhalation and retesting).
- Skin allergy tests (to rye grass, cat, house dust mite, alternaria, feather, and cockroach).

1.3.5 Response rate

Response and participation rates are shown for each recruitment phase and the total cohort in Table 1.1. The overall response rate was 49.4%.

Table 1.1: Participation and response rate

	Phase 1A		Phase 1B		Total cohort	
	n	%	n	%	n	%
Initial sample	6200		3896		10096	
Sample loss ^a	1249		634		1883	
Eligible sample	4951		3262		8213	
Non-contact and refusals	1461		902		2363	
Completed interview ^b	3490	70.5	2360	72.3	5850	71.2
Refused or did not attend clinic	967		823		1790	
Attended clinic ^c	2523	51.0	1537	47.1	4060	49.4

^a Sample loss of ineligible telephone numbers due to business numbers, not in area, modems/fax numbers, disconnected numbers

^b Participation rate = completed interview / eligible sample

^c Response rate = attended clinic / eligible sample

1.3.6 Data analysis

Raw data were imported from the QPL system and analysed using SPSS Version 11.0. Frequencies were performed to obtain prevalence estimates and 95%

confidence intervals (CI) for each health condition and risk factor. Univariate odds ratios (OR) and 95% CI were calculated to determine the demographic and risk factor variables that best described people with each condition and to determine the differences in health service use between people with and without various health conditions and risk factors. Statistical significance was observed at the conventional $p < 0.05$.

1.3.7 Weighting

The data presented in this report were weighted by region (western and northern health regions), age group, gender, and probability of selection in the household to the Australian Bureau of Statistics 1999 Estimated Residential Population and the 2001 Census. Probability of selection of the adult in the household was calculated from the number of adults in the household and the number of telephone listings in the EWP that reach the household. Weighting was used to correct for the disproportionality of the sample with respect to the population of interest. The weights reflect unequal sample inclusion probabilities and compensate for differential non-response. The data were weighted using the ABS data so that the health estimates calculated would be representative of the adult populations of the north west area of Adelaide. The weighting of the data results in occasional rounding effects for the numbers. In all instances the percentages should be the point of reference rather than the actual numbers of respondents. The percentages presented in this report have been processed on the figures pre-rounding.

1.4 References

1. Commonwealth Department of Health and Aged Care. *National Health Priority Areas. Asthma*. Canberra 1999. Accessed at <http://www.health.gov.au/hsdd/nhpq/asthma/>
2. Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare. *National Health Priority Areas Report: Diabetes Mellitus 1998 – Summary*. AIHW Cat. No. PHE 13. HEALTH and AIHW, Canberra, 1999.
3. Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare. *National Health Priority Areas Report: Cardiovascular Health*. AIHW Cat. No. PHE 9. HEALTH and AIHW, Canberra, 1999.

CHAPTER 2: PROFILE OF STUDY PARTICIPANTS

2.1 Demographic profile of participants

The demographic characteristics of the study participants are listed in Table 2.1.

Table 2.1: Demographic characteristics of study participants

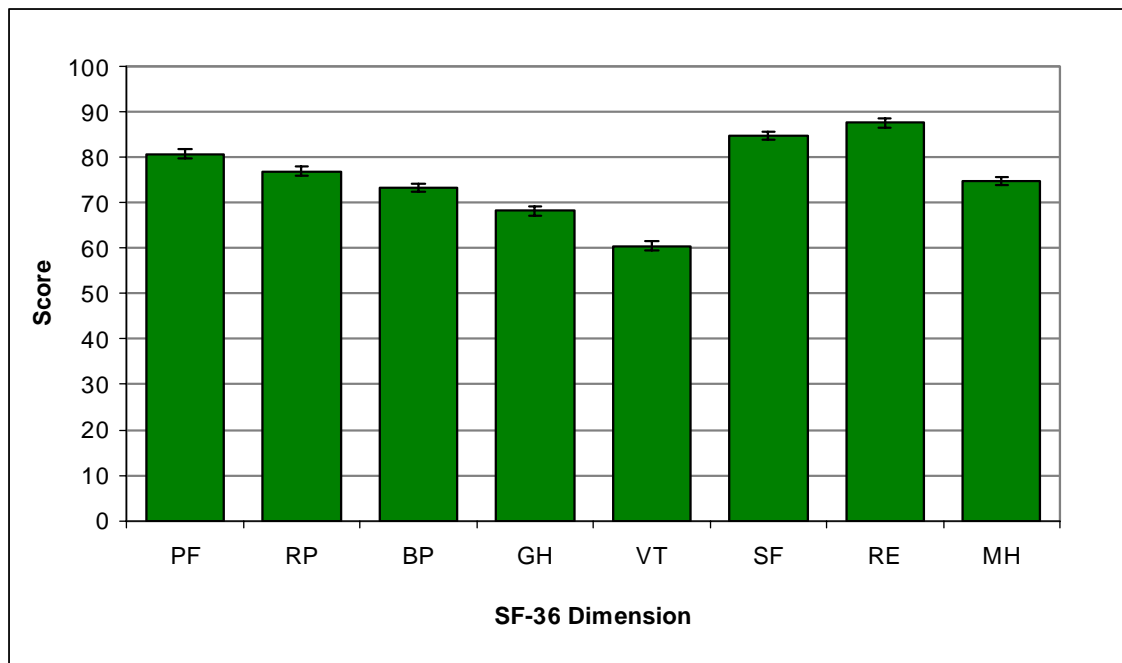
Variable	n	%
Sex		
Male	1988	49.0
Female	2072	51.0
Age group		
18 to 29 years	996	24.5
30 to 39 years	768	18.9
40 to 49 years	755	18.6
50 to 59 years	584	14.4
60 to 69 years	433	10.7
70 years and over	523	12.9
Area of residence		
Western suburbs	1853	45.6
Northern suburbs	2207	54.4
Highest education level obtained		
Secondary	1751	43.1
Trade/Apprenticeship/Cert/Diploma	1641	40.4
Bachelor degree or higher	475	11.7
Not stated	193	4.8
Gross annual household income		
Up to \$20,000	902	22.2
\$20,001-40,000	1008	24.8
\$40,001-60,000	899	22.2
More than \$60,000	992	24.4
Not stated	258	6.4
Aboriginal or Torres Strait Islander origin		
Yes	20	0.5
No	3548	87.4
Not stated	492	12.1
Country of birth		
Australia	2865	70.6
UK or Ireland	645	15.9
Other	524	12.9
Not stated	25	0.6
Marital status		
Married or living with partner	2525	62.2
Separated/Divorced	331	8.1
Widowed	232	5.7
Never married	940	23.1
Not stated	32	0.8

Table 1.1: cont.

Work status		
Full time employed	1537	37.9
Part time/Casual employed	728	17.9
Unemployed	173	4.3
Home duties/Retired	1239	30.5
Student/Other	333	8.2
Not stated	49	1.2
Pensioner Status		
Receive a pension from the Department of Social Security	1286	31.7
Do not receive a pension	2698	66.5
Don't know/Not stated	75	1.8
Total	4060	100.0

2.2 Quality of life

Figure 2.1 shows the overall mean scores of the eight SF-36 dimensions for the study participants. The eight dimensions of the SF-36 are Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH).

**Figure 2.1: SF-36 mean scores for study participants**

2.3 Health services

The proportion of study participants who used various health services in the past 12 months is described in Table 2.2.

Table 2.2: Proportion of study participants who used various health services in South Australia in the last 12 months

	n	%
Use of general practitioner		
No	464	11.4
General practitioner	3584	88.3
Not stated	12	0.3
Use of community health centre		
No	3885	95.7
Community health centre	163	4.0
Not stated	12	0.3
Use of district nurses		
No	3970	97.8
District or community nurse	77	1.9
Not stated	12	0.3
Use of psychologist		
No	3928	96.8
Psychologist	119	2.9
Not stated	12	0.3
Use of psychiatrist		
No	3919	96.5
Psychiatrist	128	3.2
Not stated	12	0.3
Use of day surgery		
No	3588	88.4
Day surgery	459	11.3
Not stated	12	0.3
Use of Accident & Emergency department		
No	3547	87.4
Accident & Emergency	501	12.3
Not stated	12	0.3
Use of hospital clinics (outpatient/specialist/allied health)		
No	3444	84.8
Clinic use	604	14.9
Not stated	12	0.3
Total	4060	100.0

Table 2.2 (cont)

	n	%
Use of eye specialists		
No	3098	76.3
Eye specialists	950	23.4
Not stated	12	0.3
Use of other specialist (not in a hospital)		
No	3362	82.8
Other specialist	685	16.9
Not stated	12	0.3
Use of physiotherapist		
No	3502	86.3
Physiotherapist	546	13.4
Not stated	12	0.3
Use of chiropractor		
No	3519	86.7
Chiropractor	528	13.0
Not stated	12	0.3
Use of alternative therapists		
No	3848	94.8
Alternative therapists	199	4.9
Not stated	12	0.3
Use of podiatrist		
No	3705	91.2
Podiatrist	343	8.4
Not stated	12	0.3
Use of dietician		
No	3952	97.3
Dietician	96	2.4
Not stated	12	0.3
Use of nurse educator		
No	4012	98.8
Nurse educator	36	0.9
Not stated	12	0.3
Use of other health services		
No	3842	94.6
Other health services	206	5.1
Not stated	12	0.3
Total	4060	100.0

2.4 Chronic Lung Disease (CLD) Index

The CLD index is a symptom-based measure of severity for CLD developed by Selim et al¹ and shown to be a valid and reliable instrument for use in Australia². The six-item instrument addresses the frequency and intensity of dyspnea (shortness of breath), frequency and intensity of wheezing, frequency of coughing, and amount of sputum production, and can be summarised into mild, moderate and severe symptoms as shown in Table 2.3.

Table 2.3: CLD Index for severity of symptoms

	n	%
Mild	3618	91.6
Moderate	264	6.7
Severe	66	1.7
Total	3948	100.0

Note: 112 cases missing

Figure 2.2 shows the mean scores of the SF-36 subscales for people with mild, moderate and severe CLD symptoms. People with moderate and severe CLD symptoms were significantly impaired in all aspects of their physical and mental quality of life.

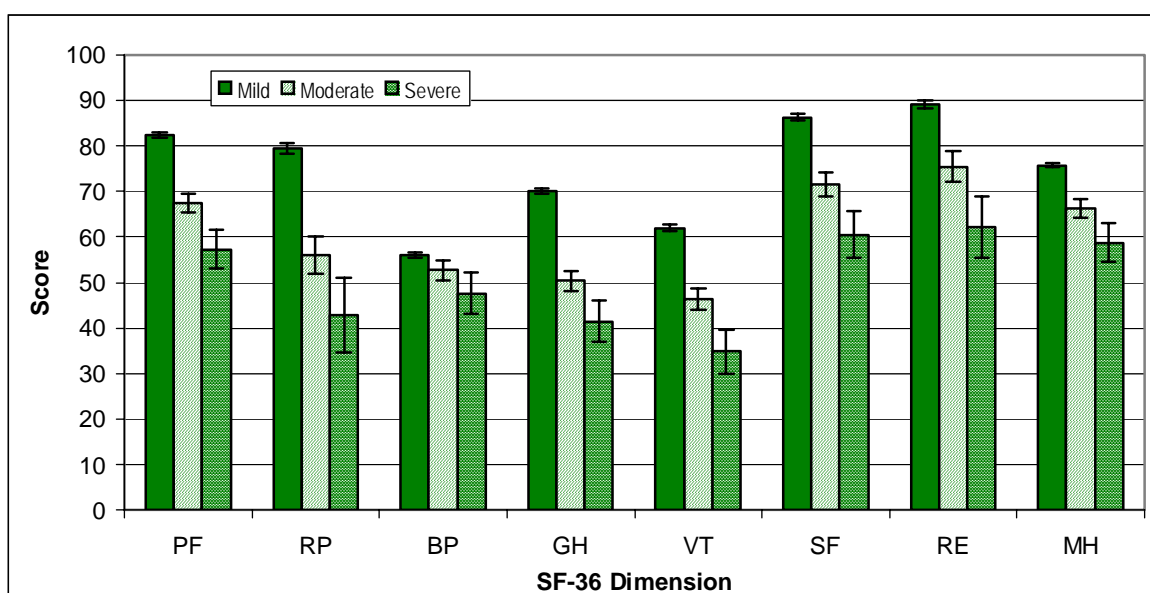


Figure 2.2: SF-36 mean scores for people with mild, moderate and severe CLD symptoms

2.5 Skin allergies

Allergy skin test were performed at the clinic to determine if the respondent reacted to six allergens: rye grass, cat, house dust mite, alternaria (mould), feather and cockroach. This involved putting drops of liquid allergens on the respondent's slightly scratched skin on their forearm. After 15 minutes, the clinic staff measured the diameter (millimetres) of the wheal or bump of the skin.

A successful test required that a person's negative control bump be less than 2 mm in diameter. A person was defined as having an allergic reaction to the selected allergen if:

- the difference between the negative control bump and the allergen bump was more than 2 mm in diameter, and
- the allergen bump on the skin measured 2 mm or more in diameter.

Table 2.4: Proportion of people with allergic reaction to selected allergens

	n	%
Reaction to selected (≥ 2 mm)		
Rye grass	1797	44.3
Cat	1091	26.9
House dust mite	1257	31.0
Alternaria	857	21.1
Feather	446	11.0
Cockroach	939	23.1
No reaction to any	1555	38.3
Reaction to at least one of the allergens	2503	61.7
Not stated	2	0.0
Total	4060	100.0

2.6 References

1. Selim AJ, Xinhua SR, Fincke G, Rogers W, Lee A, Kazis L. A symptom-based measure of the severity of chronic lung disease. *Chest* 1997; 111: 1607-1614.
2. Ruffin RE, Wilson DH, Chittleborough CR, Southcott AM, Smith B, Christopher DJ. Multiple respiratory symptoms predict quality of life in chronic lung disease: A population based study of Australian adults. *Quality of Life Research* 2001; 9: 1031-1039.

CHAPTER 3: DIABETES

3.1 Introduction

This chapter describes people with diabetes, both diagnosed and previously undiagnosed, and those with impaired fasting glucose (IFG) in terms of their demographic, risk factor, quality of life, and health service use characteristics.

Diabetes is recognised as a State and National Health Priority Area because of the significant burden that it places on the community in terms of health, social, economic and emotional costs¹. The National Diabetes Strategy² and the Strategic Plan for Diabetes in South Australia³ identify the need to prevent or delay the progression of diabetes and related complications, improve the quality of life of people with diabetes, and reduce the social and economic impact of diabetes on the community.

The North West Adelaide Health Study population sample can be segmented into biomedical stages along the diabetes continuum. This chapter includes analyses of people across the continuum, from those without diabetes, to those with IFG who are at increased risk of diabetes, those with diabetes who did not previously know it (previously undiagnosed), and those with diagnosed diabetes. Providing an understanding of different segments of the diabetes continuum will enable more effective targeting of policy and strategic interventions to improve health outcomes.

3.2 Diabetes

3.2.1 Definition and prevalence

People with diabetes were defined as those who had a fasting plasma glucose (FPG) level of at least 7.0 mmol/L or those who self-reported having been told by a doctor that they have diabetes. The prevalence of diabetes was found to be 6.6% (95% CI 5.8 – 7.4) (Table 3.1).

Table 3.1: Prevalence of diabetes (includes diagnosed and undiagnosed)

	n	%
No diabetes	3793	93.5
Diabetes	267	6.6
Total	4060	100.0

The prevalence of diabetes and the number of people with diabetes were estimated for the north west region and South Australia overall by applying the age, sex specific rates to the population distribution (Table 3.2).

Table 3.2: Estimated prevalence of diabetes by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	6.8	(5.7 - 8.0)	17,700
Western region	6.7	(5.4 – 7.9)	11,300
South Australia	6.9	(6.0 - 7.7)	79,700

The distribution of FPG is shown in Figure 3.1. The mean fasting plasma glucose level was 5.0 mmol/L (SD=1.3, n=3989).

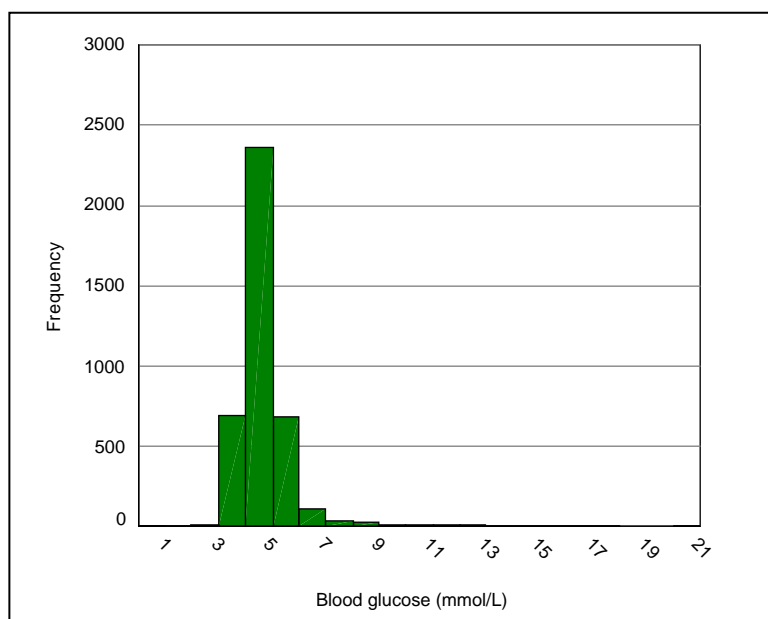


Figure 3.1: Distribution of fasting plasma glucose

In the north west region of Adelaide, the overall prevalence masks differences between the age groups. The prevalence of diabetes in the 50 to 59 and the 60+ year age groups was statistically significantly higher than among people who were younger than 50 years of age. The prevalence of diabetes for males and females by the three age groups is shown in Figure 3.2.

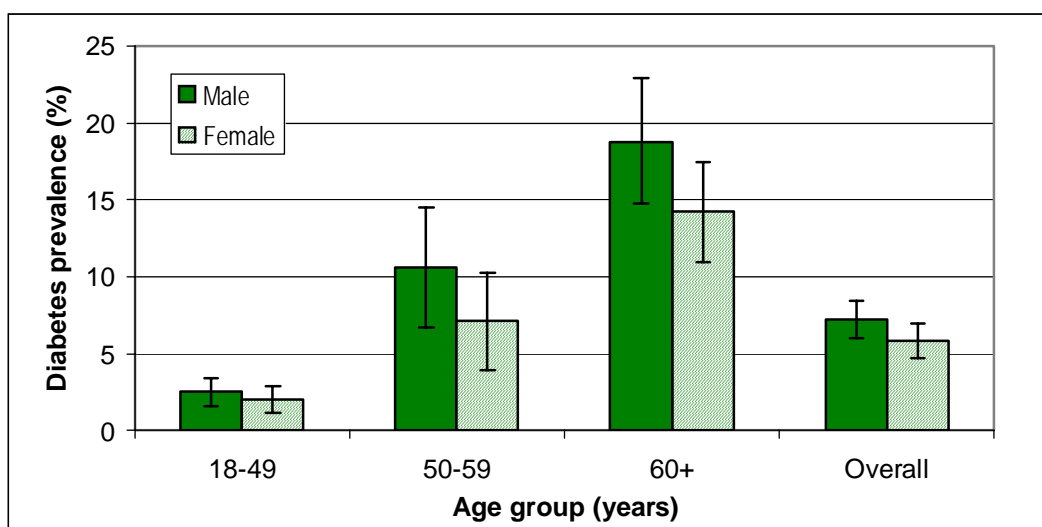


Figure 3.2: Prevalence of diabetes by sex and age group

3.2.2 Demographic profile of people with diabetes

The prevalence of diabetes was statistically significantly higher among people who were 50 years or over, had an income lower than \$20,000, were born outside of Australia, widowed, retired or undertaking home duties, and statistically significantly lower among those who had never been married, or had an education level of bachelor degree or higher (Table 3.3).

Table 3.3: Univariate Odds Ratios for demographic variables associated with diabetes

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	144/1988	7.3	1.00		
Female	122/2072	5.9	0.80	(0.63 - 1.03)	0.09
Age group					
18 to 49 years	57/2519	2.3	1.00		
50 to 59 years	52/584	8.9	4.20	(2.85 - 6.19)	<0.001
60 years and over	157/957	16.4	8.46	(6.19 - 11.57)	<0.001
Area of residence					
Western suburbs	120/1853	6.5	1.00		
Northern suburbs	146/2207	6.6	1.02	(0.80 - 1.31)	0.87
Highest education level obtained					
Secondary	130/1751	7.4	1.00		
Trade/Apprenticeship/Cert/Diploma	107/1641	6.5	0.87	(0.67 - 1.14)	0.32
Bachelor degree or higher	13/475	2.8	0.36	(0.20 - 0.64)	<0.001
Gross annual household income					
Up to \$20,000	119/902	13.2	1.00		
\$20,001-40,000	71/1008	7.1	0.50	(0.37 - 0.68)	<0.001
\$40,001-60,000	28/899	3.1	0.21	(0.14 - 0.32)	<0.001
More than \$60,000	21/992	2.1	0.14	(0.09 - 0.23)	<0.001
Country of birth					
Australia	149/2865	5.2	1.00		
UK or Ireland	67/645	10.4	2.11	(1.56 - 2.85)	<0.001
Other	46/524	8.8	1.77	(1.25 - 2.49)	0.001
Marital status					
Married or living with partner	185/2525	7.3	1.00		
Separated/Divorced	32/331	9.7	1.35	(0.91 - 2.00)	0.14
Widowed	34/232	14.5	2.14	(1.45 - 3.18)	<0.001
Never married	14/940	1.5	0.19	(0.11 - 0.33)	<0.001
Work status					
Full time employed	52/1537	3.4	1.00		
Part time/Casual employed	23/728	3.2	0.93	(0.57 - 1.53)	0.77
Unemployed	6/173	3.3	0.96	(0.40 - 2.32)	0.93
Home duties/Retired	163/1239	13.1	4.29	(3.11 - 5.91)	<0.001
Student/Other	16/333	4.8	1.44	(0.81 - 2.55)	0.21

3.2.3 Self-reported risk factor profile of people with diabetes

Risk factors related to diabetes are presented according to their collection method in the questionnaire (self-reported) or at the clinic appointment (measured).

The prevalence of diabetes was statistically significantly higher among people who were ex-smokers, or had a family history of diabetes, and statistically significantly lower among those who were low risk alcohol drinkers, or physically active (Table 3.4).

Table 3.4: Univariate Odds Ratios for self-reported risk factors associated with diabetes

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	104/1908	5.4	1.00		
Ex-smoker	113/1143	9.9	1.91	(1.45 - 2.52)	<0.001
Current smoker	45/985	4.6	0.83	(0.58 - 1.191)	0.31
Alcohol risk					
Non drinker, no risk	184/2148	8.6	1.00		
Low risk	64/1630	3.9	0.44	(0.33 - 0.58)	<0.001
Intermediate to very high risk	13/244	5.2	0.59	(0.33 - 1.05)	0.07
Family history of diabetes					
No	134/2716	4.9	1.00		
Yes	133/1344	9.9	2.13	(1.66 - 2.73)	<0.001
Family history of heart disease					
No	124/1964	6.3	1.00		
Yes	142/2096	6.8	1.08	(0.84 - 1.38)	0.56
Family history of stroke					
No	164/2624	6.2	1.00		
Yes	103/1436	7.2	1.16	(0.90 - 1.50)	0.25
Physical activity					
Sedentary	82/1037	8.0	1.00		
Physically active	146/2655	5.5	0.67	(0.51 - 0.89)	0.006

3.2.4 Measured risk factor profile of people with diabetes

The prevalence of diabetes was statistically significantly higher among people who were overweight or obese, or had a high waist-hip ratio, high blood pressure, or a high HbA1c level (Table 3.5). HbA1c, or glycosylated haemoglobin, is a measure of the amount of glucose-bound haemoglobin and provides information on long-term glucose control.

Table 3.5: Univariate Odds Ratios for measured risk factors associated with diabetes

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	28/1261	2.3	1.00		
Overweight	85/1485	5.7	2.64	(1.72 - 4.07)	<0.001
Obese	147/1137	12.9	6.37	(4.22 - 9.61)	<0.001
Waist:hip ratio (>1.0 men, >0.85 women)					
No	158/3393	4.6	1.00		
Yes	109/665	16.3	4.00	(3.08 - 5.19)	<0.001
High blood pressure (≥140/90mmHg)					
No	116/2970	3.9	1.00		
Yes	150/1090	13.8	3.93	(3.05 - 5.07)	<0.001
High total cholesterol (≥5.5mmol/L)					
No	178/2551	7.0	1.00		
Yes	85/1441	5.9	0.84	(0.64 - 1.10)	0.14
High HbA1c (>7%)					
No	155/3876	4.0	1.00		
Yes	109/113	97.1	792.56	(262.4 - 2394.0)	<0.001

3.2.5 Co-morbidity profile of people with diabetes

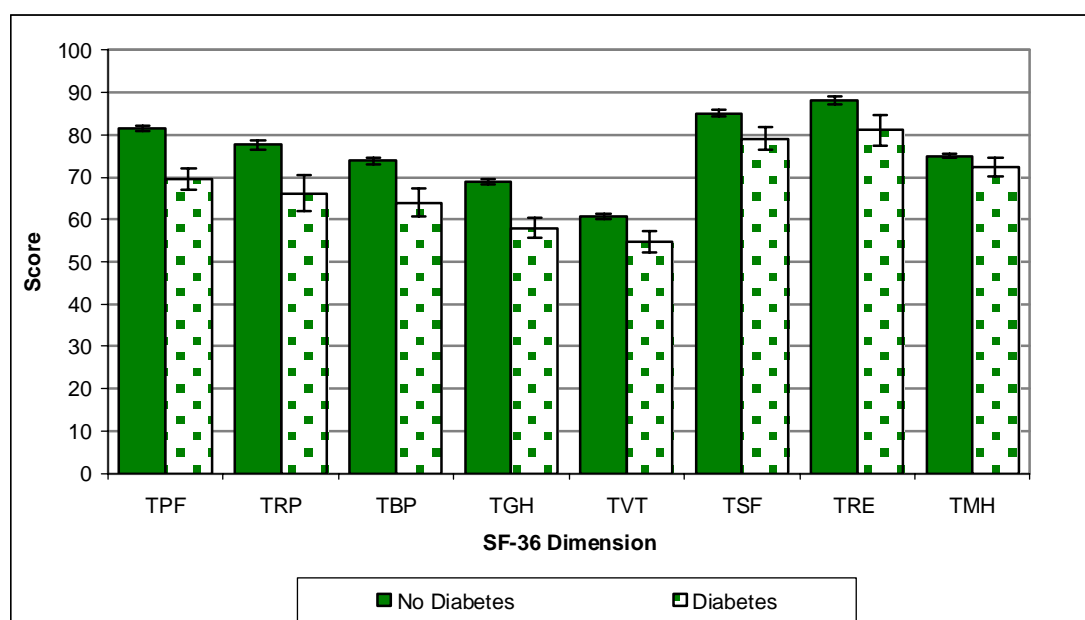
The prevalence of diabetes was statistically significantly higher among people with cardiovascular disease (including heart attack, stroke or angina) or mental health illness (including anxiety, depression, stress related problem, any other mental health problem) (Table 3.6).

Table 3.6: Univariate Odds Ratios for co-morbidities associated with diabetes

Variable	n	%	OR	(95% CI OR)	p value
Cardiovascular disease					
No	200/3806	5.3	1.00		
Yes	66/250	26.5	6.49	(4.74 – 8.89)	<0.001
Mental health disorder					
No	212/3487	6.1	1.00		
Yes	53/548	9.6	1.65	(1.20 - 2.26)	0.002
COPD					
No	245/3878	6.3	1.00		
Yes	14/139	10.2	1.68	(0.96 – 2.95)	0.07
Asthma					
No	226/3560	6.3	1.00		
Yes	41/498	8.2	1.33	(0.94 - 1.88)	0.11

3.2.6 Quality of life profile of people with and without diabetes

Figure 3.3 shows the mean scores of the SF-36 subscales for people with and without diabetes. Quality of life was significantly lower on all SF-36 dimensions for people with diabetes compared to those without diabetes.

**Figure 3.3: SF-36 mean scores for people with and without diabetes**

3.2.7 Health service use of people with and without diabetes

People with diabetes were statistically significantly more likely than people without diabetes to have used day surgery, hospital accident and emergency, hospital clinic, eye specialist or ophthalmologist, other specialist doctor, podiatrist, dietician or nurse educator services, and statistically significantly less likely than people without diabetes to have used chiropractor services, in the last 12 months (Table 3.7). This indicates that people with diabetes are attending appropriate services (eye specialist or ophthalmologist, podiatrist, dietician, nurse educator) although not all people with diabetes are attending these services. For example, 45.0% of people with diabetes did not report seeing an eye specialist or ophthalmologist in the last 12 months. Similarly, only 24.7% of people with diabetes saw a podiatrist and 15.1% saw a dietician in the last 12 months.

Table 3.7: Proportion of people with and without diabetes who used various health services in South Australia in the last 12 months

Variable	No diabetes		Diabetes	
	n	%	n	%
General Practitioner	3341	88.1	243	92.2
Community Health Centre	147	3.9	16	6.0
District Nurses or other Community Nurses	72	1.9	5	2.1
Psychologist/Psychiatrist	201	5.3	16	7.2
Day Surgery	417	11.0	42	15.9 [^]
Hospital – Accident & Emergency Department	451	11.9	50	19.2 [^]
Hospital – Clinic (Outpatient/Specialist/Allied Health)	530	14.0	74	28.2 [^]
Eye Specialist/Ophthalmologist	805	21.2	145	55.0 [^]
Other Specialist Doctor (not in a hospital)	612	16.1	73	27.8 [^]
Physiotherapist	517	13.6	29	11.0
Chiropractor	513	13.5	15	5.7 [∨]
Alternative Therapist eg Naturopath, Osteopath	189	5.0	10	3.9
Podiatrist	278	7.3	65	24.7 [^]
Dietician	56	1.5	40	15.1 [^]
Nurse Educator	13	0.3	23	8.6 [^]
Other Health Service	198	5.2	7	2.8

[^] [∨] Statistically significantly higher or lower than comparison group (p<0.05)

3.3 Impaired fasting glucose (IFG)

3.3.1 Definition and prevalence

People with impaired fasting glucose (IFG) were defined as those who had a fasting plasma glucose (FPG) level of at least 6.1 mmol/L and less than 7.0 mmol/L. The prevalence of IFG was found to be 4.3% (95% CI 3.7 – 5.0) (Table 3.8).

Table 3.8: Prevalence of impaired fasting glucose (IFG)

	n	%
No IFG (Normal glucose levels or diabetes)	3885	95.7
IFG (FPG \geq 6.1 mmol/L and $<$ 7.0 mmol/L)	175	4.3
Total	4060	100.0

The prevalence of IFG and the number of people with IFG were estimated for the Northern and Western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 3.9).

Table 3.9: Estimated prevalence of IFG by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	6.0	(4.9 – 7.1)	15,500
Western region	2.5	(1.7 – 3.3)	4,300
South Australia	4.5	(3.8 – 5.2)	52,300

The prevalence of IFG was statistically significantly higher among males and people aged 50 years or over. The prevalence of IFG for males and females by three age groups is shown in Figure 3.4.

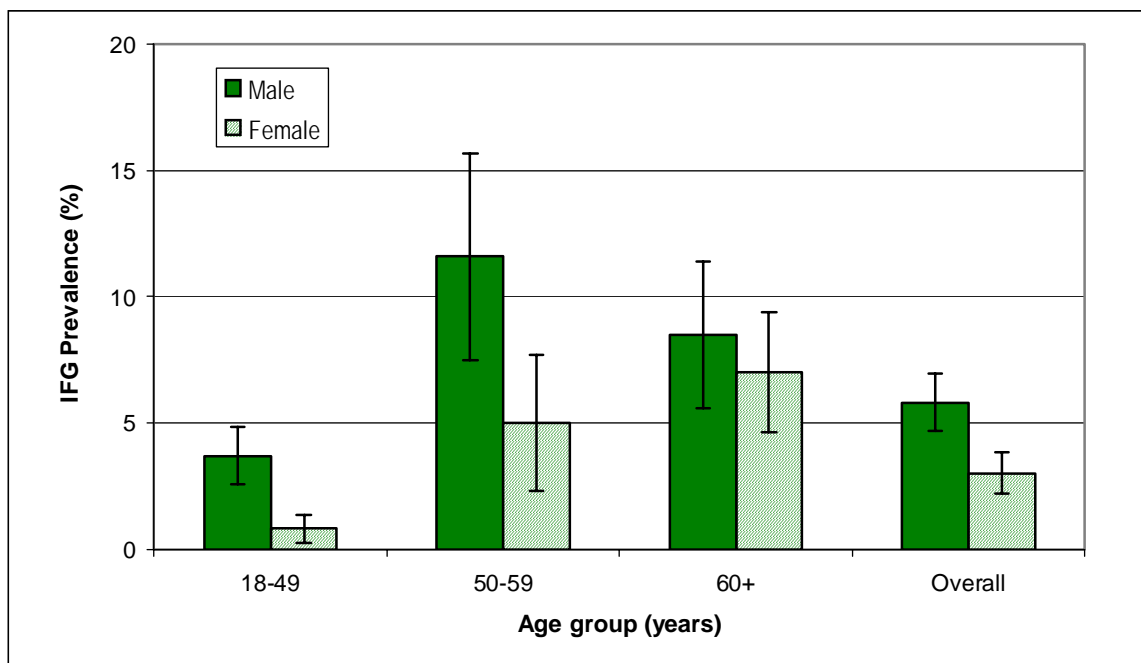


Figure 3.4: Prevalence of IFG by sex and age group

3.3.2 Demographic profile of people with IFG

The prevalence of impaired fasting glucose was statistically significantly higher among those aged 50 years and over, living in the Northern suburbs, born in the United Kingdom or Ireland, widowed, retired or undertaking home duties, and statistically significantly lower among females, those with a household income over \$40,000 per annum, never been married, or part time or casually employed (Table 3.10).

Table 3.10: Univariate Odds Ratios for demographic variables associated with IFG

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	115/1988	5.8	1.00		
Female	61/2072	2.9	0.49	(0.36 - 0.68)	<0.001
Age group					
18 to 49 years	57/2519	2.3	1.00		
50 to 59 years	47/584	8.2	3.80	(2.56 - 5.65)	<0.001
60 years and over	71/957	7.6	3.41	(2.43 - 4.96)	<0.001
Area of residence					
Western suburbs	46/1853	2.6	1.00		
Northern suburbs	130/2207	5.9	2.48	(1.76 - 3.50)	<0.001
Highest education level obtained					
Secondary	74/1751	4.4	1.00		
Trade/Apprenticeship/Cert/Diploma	80/1641	4.9	1.15	(0.83 - 1.59)	0.39
Bachelor degree or higher	11/475	2.3	0.54	(0.28 - 1.02)	0.06
Gross annual household income					
Up to \$20,000	55/902	6.1	1.00		
\$20,001-40,000	52/1008	5.1	0.83	(0.56 - 1.22)	0.34
\$40,001-60,000	30/899	3.4	0.53	(0.34 - 0.84)	0.007
More than \$60,000	25/992	2.5	0.38	(0.24 - 0.62)	<0.001
Not stated	13/258	5.3	0.84	(0.46 - 1.56)	0.59
Country of birth					
Australia	107/2865	3.7	1.00		
UK or Ireland	45/645	7.0	1.90	(1.33 - 2.72)	<0.001
Other	21/524	3.9	1.05	(0.65 - 1.70)	0.84
Marital status					
Married or living with partner	117/2525	4.6	1.00		
Separated/Divorced	20/331	6.0	1.31	(0.80 - 2.14)	0.28
Widowed	19/232	8.0	1.80	(1.08 - 2.99)	0.02
Never married	17/940	1.8	0.38	(0.23 - 0.63)	<0.001
Work status					
Full time employed	64/1537	4.2	1.00		
Part time/Casual employed	8/728	1.1	0.27	(0.13 - 0.55)	<0.001
Unemployed	10/173	5.6	1.36	(0.68 - 2.73)	0.39
Home duties/Retired	78/1239	6.3	1.55	(1.11 - 2.18)	0.01
Student/Other	9/333	2.6	0.62	(0.30 - 1.27)	0.19

3.3.3 Self-reported risk factor profile of people with IFG

The prevalence of IFG was statistically significantly higher among people who were ex-smokers, and statistically significantly lower among low risk alcohol drinkers and those who were physically active (Table 3.11).

Table 3.11: Univariate Odds Ratios for self-reported risk factors associated with IFG

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	69/1908	3.6	1.00		
Ex-smoker	71/1143	6.2	1.76	(1.26 - 2.48)	0.001
Current smoker	34/985	3.5	0.96	(0.63 - 1.43)	0.84
Alcohol risk					
Non drinker, no risk	107/2148	5.0	1.00		
Low risk	52/1630	3.2	0.63	(0.45 - 0.88)	0.007
Intermediate to very high risk	13/244	5.5	1.10	(0.61 - 1.98)	0.75
Family history of diabetes					
No	115/2716	4.2	1.00		
Yes	60/1344	4.5	1.05	(0.77 - 1.45)	0.75
Family history of heart disease					
No	87/1964	4.4	1.00		
Yes	88/2096	4.2	0.94	(0.70 - 1.28)	0.71
Family history of stroke					
No	110/2624	4.2	1.00		
Yes	65/1436	4.6	1.09	(0.80 - 1.50)	0.58
Physical activity					
Sedentary	60/1037	5.8	1.00		
Physically active	88/2655	3.3	0.56	(0.40 - 0.78)	0.001

3.3.4 Measured risk factor profile of people with IFG

People with IFG were statistically significantly more likely than people without IFG to be overweight or obese, and to have a high waist hip ratio, high blood pressure and high cholesterol (Table 3.12).

Table 3.12: Univariate Odds Ratios for measured risk factors associated with IFG

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	27/1392	2.0	1.00		
Overweight	74/1486	5.0	2.60	(1.66 - 4.06)	<0.001
Obese	74/1137	6.5	3.49	(2.23 - 5.44)	<0.001
Waist:hip ratio (>1.0 men, >0.85 women)					
No	126/3393	3.7	1.00		
Yes	50/665	7.5	2.10	(1.50 - 2.95)	<0.001
High blood pressure (≥140/90mmHg)					
No	75/2970	2.5	1.00		
Yes	101/1090	9.2	3.95	(2.91 - 5.38)	<0.001
High total cholesterol (≥5.5mmol/L)					
No	85/2551	3.3	1.00		
Yes	90/1441	6.3	1.94	(1.43 - 2.63)	<0.001

3.3.5 Co-morbidity profile of people with IFG

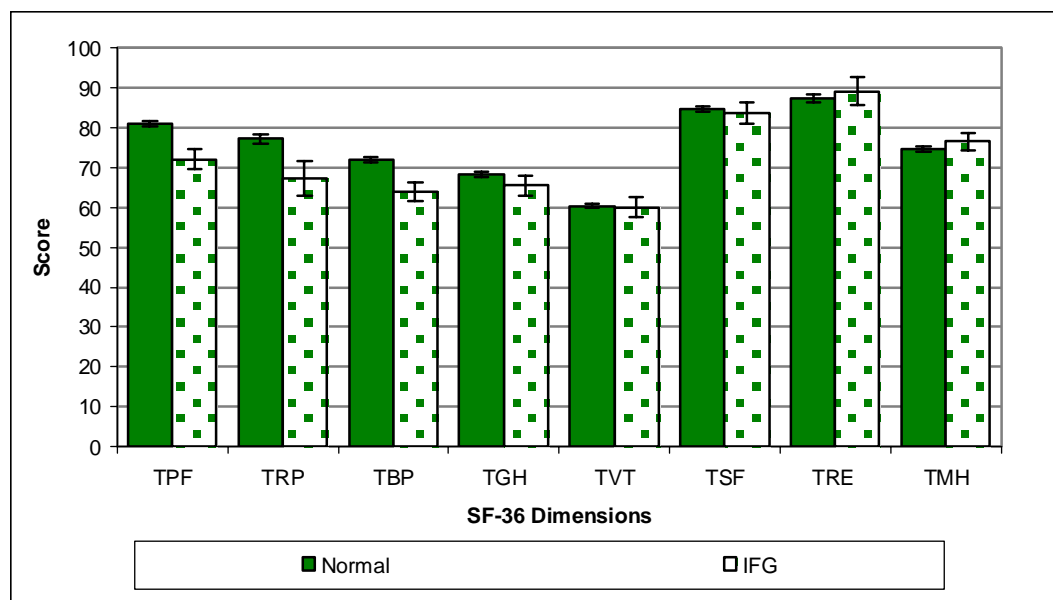
The prevalence of IFG was statistically significantly higher among people with cardiovascular disease (including heart attack, stroke or angina) (Table 3.13).

Table 3.13: Univariate Odds Ratios for co-morbidities associated with IFG

Variable	n	%	OR	(95% CI OR)	p value
Cardiovascular disease					
No	151/3806	4.0	1.00		
Yes	25/250	9.9	2.63	(1.71 – 4.18)	<0.001
Mental health disorder					
No	149/3487	4.3	1.00		
Yes	27/548	4.9	1.15	(0.75 - 1.75)	0.53
COPD					
No	168/3878	4.3	1.00		
Yes	5/139	3.4	0.79	(0.31 – 1.99)	0.61
Asthma					
No	147/3560	4.1	1.00		
Yes	28/498	5.7	1.39	(0.92 - 2.10)	0.12

3.3.6 Quality of life profile of people with and without IFG

Figure 3.5 shows the mean scores of the SF-36 subscales for people with and without IFG. Those with IFG scored significantly worse than those without IFG on the Physical Functioning, Role Physical and Bodily Pain dimensions of the SF-36. There were no other significant differences between those with and without IFG.

**Figure 3.5: SF-36 mean scores for people with and without IFG**

3.3.7 Health service use of people with and without IFG

People with IFG were statistically significantly less likely than people without IFG to have used psychologist or psychiatrist, and alternative therapist services in South Australia in the last 12 months (Table 3.14).

Table 3.14: Proportion of people with and without IFG who used various health services in South Australia in the last 12 months

Variable	No IFG		IFG	
	n	%	n	%
General Practitioner	3429	88.3	155	88.2
Community Health Centre	153	3.9	10	5.8
District Nurses or other Community Nurses	74	1.9	3	1.9
Psychologist/Psychiatrist	220	5.7	6	3.2 [∧]
Day Surgery	445	11.5	14	8.3
Hospital – Accident & Emergency Department	475	12.2	26	14.6
Hospital – Clinic (Outpatient/Specialist/Allied Health)	574	14.8	30	17.2
Eye Specialist/Ophthalmologist	908	23.4	41	23.5
Other Specialist Doctor (not in a hospital)	652	16.8	33	18.6
Physiotherapist	525	13.5	21	12.0
Chiropractor	513	13.2	15	8.6
Alternative Therapist eg Naturopath, Osteopath	197	5.1	2	1.2 [∧]
Podiatrist	330	8.5	12	7.1
Dietician	93	2.4	3	1.9
Nurse Educator	36	0.9	-	-
Other Health Service	197	5.1	9	5.1

[∧] [∧] Statistically significantly higher or lower than comparison group (p<0.05)

3.4 Previously undiagnosed diabetes

3.4.1 Definition and prevalence

People with previously undiagnosed diabetes were defined as having a fasting plasma glucose (FPG) level of at least 7.0 mmol/L but who did not report having been told by a doctor that they had diabetes. The prevalence of previously undiagnosed diabetes was found to be 1.0% (n=41). This means that 15.5% of the participants with diabetes did not know that they had it. For approximately every five or six people with diagnosed diabetes, there was one person with undiagnosed diabetes. The proportion of diagnosed and undiagnosed diabetes is shown in Table 3.15.

Table 3.15: Diagnosed and undiagnosed diabetes

	n	% of Total	% of diabetes	Ratio
Diagnosed diabetes	225	5.6	84.5	5.6
Undiagnosed diabetes	41	1.0	15.5	1.0
No diabetes	3794	93.4		
Total	4060	100.0	100.0	

The prevalence of diagnosed or self-reported diabetes is consistent with estimates obtained from other South Australian population surveys. Self-reported prevalence of diabetes was found to be 6.2% in the 2000 South Australian Health and Wellbeing Survey⁴, 6.0% in the 2000 Health Omnibus Survey, and 5.3% in the 1999 Health Omnibus Survey. The ratio of undiagnosed to diagnosed diabetes varied from that observed in the AusDiab study⁵. This national prevalence study, using the same diagnostic cut-off points but an oral glucose tolerance test rather than a fasting blood test, found a ratio of one undiagnosed case for every diagnosed case of diabetes in both Australia and South Australia.

The prevalence rate of undiagnosed diabetes and number of people with undiagnosed diabetes were estimated for the northern and western regions and South Australia overall (Table 3.16).

Table 3.16: Estimated prevalence of previously undiagnosed diabetes by region.

	%	Estimated (95% CI)	Approximate n
Northern region	1.0	(0.5 - 1.5)	2,600
Western region	1.0	(0.7 - 1.7)	1,700
South Australia	1.0	(0.7 - 1.3)	11,600

Note: Sample sizes were too small to allow age-sex standardisation.

In the north west region of Adelaide, the overall prevalence rate masks differences in the rate by age groups. The prevalence of previously undiagnosed diabetes is statistically significantly higher among people aged 50 years or over, reflecting the increased prevalence of diagnosed diabetes in older age groups. The prevalence of previously undiagnosed diabetes for males and females by three age groups is shown in Figure 3.6.

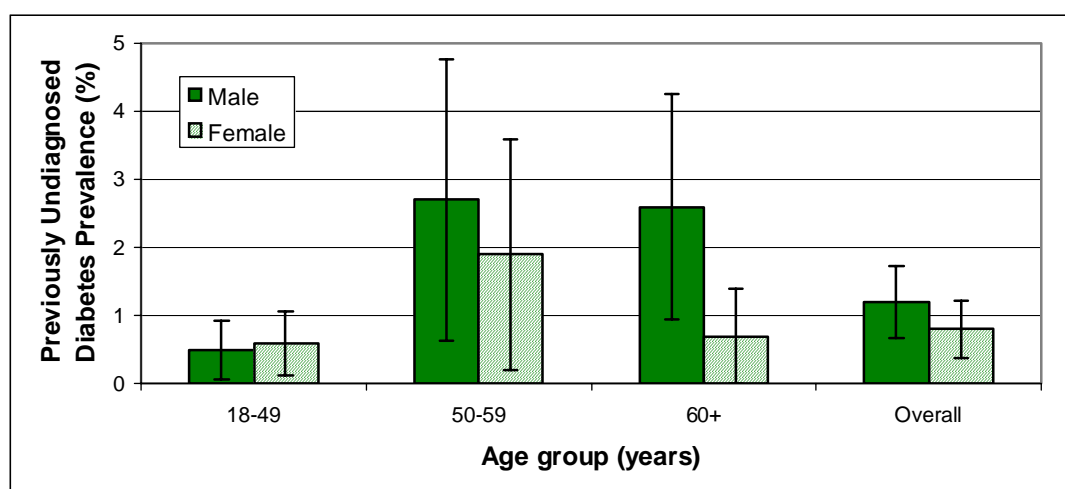


Figure 3.6: Prevalence of previously undiagnosed diabetes by sex and age group

3.4.2 Demographic profile of previously undiagnosed diabetes

The prevalence of previously undiagnosed diabetes was statistically significantly higher among those with an annual income greater than \$60,000, and those with an education level of trade, apprenticeship, certificate or diploma, and statistically significantly lower in those aged 60 years or over, and those who were not employed full time (Table 3.17).

Table 3.17: Univariate Odds Ratios for demographic variables associated with previously undiagnosed diabetes

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	25/144	17.2	1.00		
Female	16/122	13.4	0.74	(0.38 - 1.46)	0.39
Age group					
18 to 49 years	13/57	22.4	1.00		
50 to 59 years	14/52	26.2	1.24	(0.51 - 2.97)	0.64
60 years and over	15/157	9.4	0.36	(0.16 - 0.82)	0.02
Area of residence					
Western suburbs	19/120	15.5	1.00		
Northern suburbs	23/146	15.4	0.99	(0.51 - 1.93)	0.98
Highest education level obtained					
Secondary	14/130	11.0	1.00		
Trade/Apprenticeship/Cert/Diploma	22/120	20.4	2.07	(1.02 - 4.19)	0.04
Bachelor degree or higher	3/17	14.5	1.37	(0.32 - 5.98)	0.67
Gross annual household income					
Up to \$20,000	13/119	10.9	1.00		
\$20,001-40,000	11/71	15.9	1.57	(0.67 - 3.71)	0.30
\$40,001-60,000	7/28	24.9	2.77	(0.99 - 7.76)	0.05
More than \$60,000	7/21	31.4	3.81	(1.28 - 11.35)	0.02
Not stated	4/27	13.3	1.28	(0.36 - 4.50)	0.70
Country of birth					
Australia	27/149	18.1	1.00		
UK or Ireland	9/67	12.8	0.66	(0.29 - 1.50)	0.33
Other	5/46	11.2	0.57	(0.21 - 1.56)	0.27
Marital status					
Married or living with partner	29/185	15.7	1.00		
Separated / Divorced / Widowed / Never married	12/79	15.3	0.97	(0.47 - 2.02)	0.95
Work status					
Full time employed	17/52	31.7	1.00		
Not full time employed	25/208	11.9	0.29	(0.14 - 0.59)	0.001

3.4.3 Self-reported risk factor profile of people with previously undiagnosed diabetes

The prevalence of undiagnosed diabetes was statistically significantly higher among current smokers and low risk alcohol drinkers (Table 3.18).

Table 3.18: Univariate Odds Ratios for self-reported risk factors associated with previously undiagnosed diabetes

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	13/104	12.6	1.00		
Ex-smoker	14/113	12.0	0.94	(0.42 - 2.12)	0.89
Current smoker	14/45	32.1	3.27	(1.40 - 7.67)	0.006
Alcohol risk					
Non drinker, no risk	22/184	11.8	1.00		
Low risk	17/64	26.0	2.63	(1.28 - 5.39)	0.008
Intermediate to very high risk	2/13	18.6	1.71	(0.39 - 7.55)	0.48
Family history of diabetes					
No	24/134	17.8	1.00		
Yes	17/133	13.1	0.69	(0.36 - 1.36)	0.29
Family history of heart disease					
No	23/124	18.2	1.00		
Yes	19/142	13.1	0.68	(0.35 - 1.32)	0.25
Family history of stroke					
No	30/164	18.4	1.00		
Yes	11/103	10.8	0.54	(0.26 - 1.13)	0.10
Physical activity					
Sedentary	17/82	20.0	1.00		
Physically active	20/146	13.9	0.64	(0.31 - 1.31)	0.23

3.4.4 Measured risk factor profile of people with previously undiagnosed diabetes

The prevalence of previously undiagnosed diabetes was statistically significantly higher among people with high cholesterol (Table 3.19).

Table 3.19: Univariate Odds Ratios for measured risk factors associated with previously undiagnosed diabetes

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	2/30	5.1	1.00		
Overweight	12/86	14.0	3.00	(0.54 - 16.75)	0.21
Obese	28/147	18.8	4.29	(0.81 - 22.58)	0.09
Waist:hip ratio (>1.0 men, >0.85 women)					
No	27/158	17.2	1.00		
Yes	14/109	13.0	0.72	(0.36 - 1.44)	0.35
High blood pressure (≥140/90mmHg)					
No	20/116	17.0	1.00		
Yes	21/150	14.3	0.81	(0.42 - 1.57)	0.53
High total cholesterol (≥5.5mmol/L)					
No	16/178	8.9	1.00		
Yes	25/85	29.7	4.32	(2.16 - 8.64)	<0.001
High HbA1c (>7%)					
No	30/149	20.1	1.00		
Yes	11/116	9.9	0.49	0.24 - 1.02	0.06

3.4.5 Co-morbidity profile of people with previously undiagnosed diabetes

The prevalence of previously undiagnosed diabetes was statistically significantly lower among people with cardiovascular disease (including heart attack, stroke or angina) (Table 3.20).

Table 3.20: Univariate Odds Ratios for co-morbidities associated with previously undiagnosed diabetes

Variable	n	%	OR	(95% CI OR)	p value
Cardiovascular disease					
No	37/200	18.4	1.00		
Yes	4/66	6.6	0.31	(0.11 - 0.88)	0.03
Mental health disorder					
No	34/212	16.1	1.00		
Yes	7/53	12.9	0.77	(0.32 - 1.87)	0.57
COPD					
No	41/245	16.7	1.00		
Yes	0/14	-	-	-	-
Asthma					
No	36/226	15.8	1.00		
Yes	6/41	13.4	0.82	(0.31 - 2.16)	0.69

3.4.6 Quality of life profile of people with previously undiagnosed diabetes

Figure 3.7 shows the mean scores of the SF-36 subscales for people with previously undiagnosed and diagnosed diabetes. Those with diagnosed diabetes scored significantly worse than those with previously undiagnosed diabetes on the General Health subscale. There were no other significant differences in quality of life between those diagnosed with diabetes compared to those with undiagnosed diabetes.

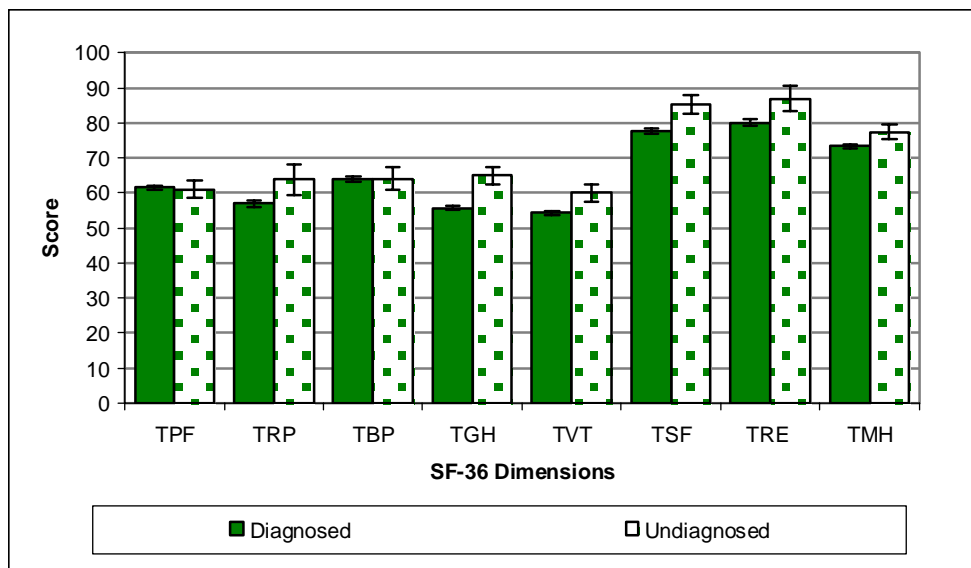


Figure 3.7: SF-36 mean scores for people with diagnosed and previously undiagnosed diabetes

3.4.7 Health service use of people with diagnosed and previously undiagnosed diabetes

People with previously undiagnosed diabetes were statistically significantly less likely than people with diagnosed diabetes to have used general practitioner, eye specialist or ophthalmologist, other specialist doctor, podiatrist, and dietician services in the last 12 months (Table 3.21).

Table 3.21: Proportion of people with diagnosed and previously undiagnosed diabetes who used various health services in South Australia in the last 12 months

Variable	Diagnosed		Previously undiagnosed	
	n	%	n	%
General Practitioner	212	93.9	34	81.3 [∧] _∨
Community Health Centre	13	5.6	3	7.9
District Nurses or other Community Nurses	6	2.6	1	1.3
Psychologist/Psychiatrist	16	7.1	1	1.9
Day Surgery	36	15.9	6	14.7
Hospital – Accident & Emergency Department	44	19.5	7	15.8
Hospital – Clinic (Outpatient/Specialist/Allied Health)	66	29.5	8	19.3
Eye Specialist/Ophthalmologist	142	63.0	4	10.3 [∧] _∨
Other Specialist Doctor (not in a hospital)	68	30.3	5	12.0 [∧] _∨
Physiotherapist	28	12.4	1	2.6
Chiropractor	12	5.2	3	7.9
Alternative Therapist eg Naturopath, Osteopath	9	4.1	1	2.2
Podiatrist	63	27.9	3	7.6 [∧] _∨
Dietician	38	16.9	2	3.7 [∧] _∨
Nurse Educator	23	10.1	-	-
Other Health Service	6	2.5	2	4.3

[∧] _∨ Statistically significantly higher or lower than comparison group (p<0.05)

3.5 References

1. Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare. *National Health Priority Areas Report: Diabetes Mellitus 1998*. AIHW Cat. No. PHE 10. HEALTH and AIHW, Canberra, 1999.
2. Australian Health Ministers' Conference. *National Diabetes Strategy 2000-2004*. Commonwealth Department of Health and Aged Care, Canberra, 1999.
3. South Australian Department of Human Services in partnership with the Diabetes Health Priority Area Advisory Group. *The Strategic Plan for Diabetes in South Australia*. Adelaide, South Australia. 1999.
4. Dal Grande E, Taylor A. *South Australian Health and Wellbeing Survey*. Centre for Population Studies in Epidemiology, South Australian Department of Human Services, Adelaide, December 2000. Unpublished.
5. Dunstan D, Zimmet P, Welborn T, Sicree R, Armstrong, Atkins R, Cameron A, Shaw J, Chadban S. *Diabetes and Associated Disorders in Australia – 2000: The Accelerating Epidemic*. The Australian Diabetes, Obesity and Lifestyle Study (AusDiab) Report. International Diabetes Institute, Melbourne, 2001.

CHAPTER 4: ASTHMA

4.1 Introduction

This chapter describes people with current asthma, both established and newly diagnosed, in terms of their demographic, risk factor, quality of life, and health service use profiles.

Asthma is identified as a National Health Priority Area¹ because of the significant burden that it places on the community in terms of health, social, economic and emotional costs. Over two million Australians have asthma¹, and it is a leading cause of hospitalisation². Asthma affects people of all age groups, and indirectly, all those who care for people with asthma³. The National Asthma Strategy^{4,5} has identified the need for further high quality research to increase the capacity for prevention, delay, early detection and care of those people with established chronic disease. The goals of the strategy include preventing or delaying the progression of asthma, improving quality of life and reducing hospitalisation and complications, reducing the social and economic impact of the condition on the community, and optimising asthma management.

The strength of this study is that it provides a comprehensive understanding of the segmentation of the population on the basis of biomedical data along the asthma continuum. This understanding will enable more effective targeting of policy and strategic interventions to improve health outcomes. This will lead to improved health outcomes for South Australians with asthma.

This chapter includes analyses of people across the continuum, from those without asthma, to those with asthma who did not previously know it (previously undiagnosed), and those with diagnosed or established asthma.

4.2 Current asthma

4.2.1 Definition (self-report and clinical) and prevalence

People with current asthma were defined as those who reported having been told by a doctor that they have asthma, or those who had at least a 15% increase in FEV₁ (forced expiratory volume in one second) from pre-Ventolin to post-Ventolin, or those who had at least a 12% increase in FEV₁ from pre-Ventolin to post-Ventolin if their absolute difference in FEV₁ was greater than 200ml⁶. From this definition, 12.3% (95% CI 11.3 - 13.3) of the clinic attendees had current asthma (Table 4.1).

Table 4.1: Current asthma (clinical assessment and self-reported)

	n	%
No asthma	3560	87.7
Asthma	498	12.3
Total	4058	100.0

Note: 2 missing cases

The prevalence of current asthma and the number of people with current asthma were estimated for South Australia overall and the northern and western regions of North West Adelaide by applying age and sex specific rates from the 2001 Estimated Resident Population to the population distributions (Table 4.2).

Table 4.2: Estimated prevalence of current asthma by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern Adelaide region	12.8	(11.2 – 14.3)	33,200
Western Adelaide region	11.7	(10.1 – 13.3)	19,800
South Australia	12.3	(11.2 – 13.4)	142,700

4.2.2 Alternative definition (self-report and clinical) and prevalence - 1

In an alternative definition, people with current asthma were defined as those who reported having been told by a doctor that they have asthma, or those who had at least a 12% increase in FEV₁ if their absolute difference in FEV₁ was greater than 200ml.

From this definition, 12.0% (95% CI 11.0 – 13.0) of the clinic attendees had current asthma (Table 4.4).

Table 4.3: Current asthma (clinical assessment and self-reported) using alternative definition 1

	n	%
No asthma	3570	88.0
Asthma	488	12.0
Total	4058	100.0

Note: 2 missing cases

4.2.3 Alternative definition (self-report and clinical) and prevalence - 2

In a second alternative definition, people with current asthma were defined as those who reported having been told by a doctor that they have asthma (9.4%), or those who had an increase in FEV₁ (forced expiratory volume in one second) of at least 9% of predicted from pre-Ventolin to post-Ventolin (7.1%). From this definition, 14.7% (95% CI 13.6 – 15.7) of the clinic attendees had current asthma (Table 4.4).

Table 4.4: Current asthma (clinical assessment and self-reported) using alternative definition 2

	n	%
No asthma	3465	85.4
Asthma (including change in FEV ₁ ≥ 9% predicted)	595	14.7
Total	4058	100.0

Note: 2 missing cases

The analyses in the rest of this section use the first definition of asthma.

The prevalence of current asthma, including the 95% confidence intervals, for males and females by age groups is shown in Figure 4.1. There was a statistically significantly higher prevalence of asthma among females than males in the overall and the 18-29 year age groups.

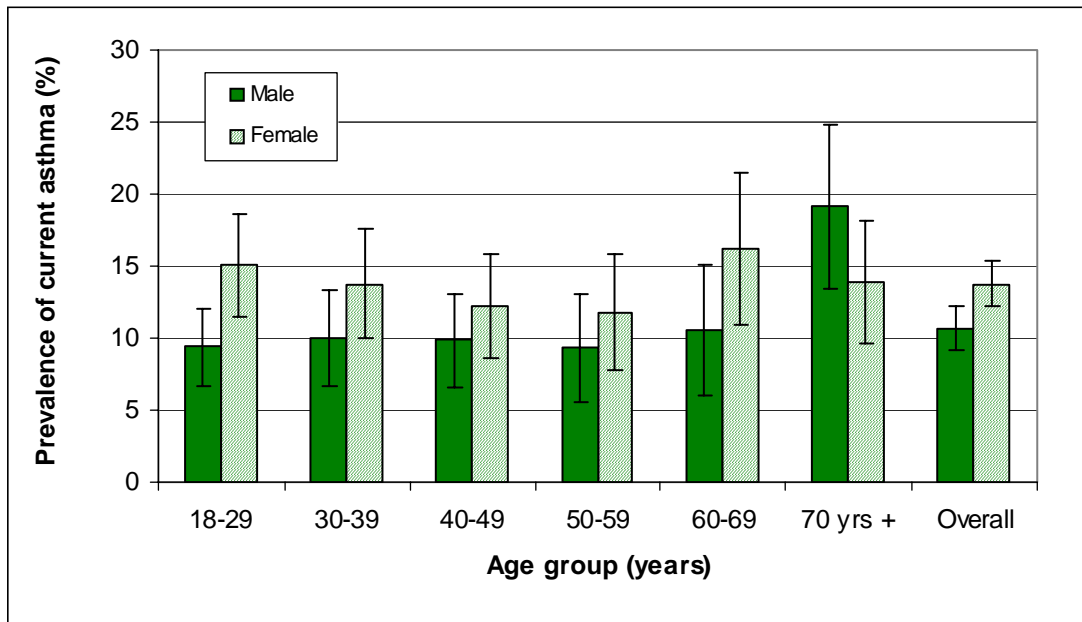


Figure 4.1: Prevalence of current asthma by sex and age group

The distribution of pre-FEV₁ and pre-FVC is shown in Figure 4.2 and Figure 4.3. The mean pre-FEV₁ level was 3.1 L/sec (SD=0.9, n=4038), and the mean pre-FVC level was 3.7 L (SD=1.1, n=4032).

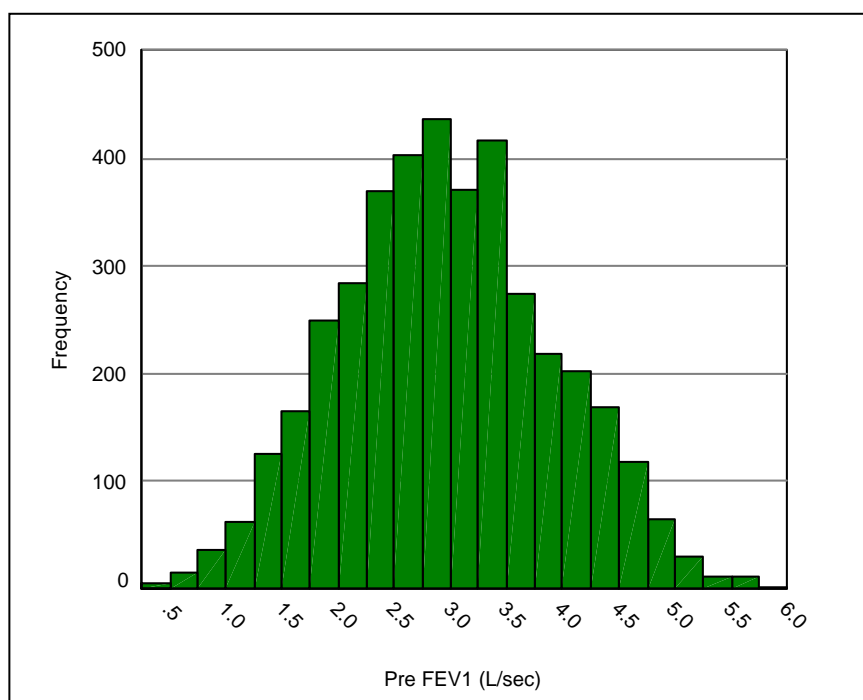


Figure 4.2: Distribution of pre-FEV₁

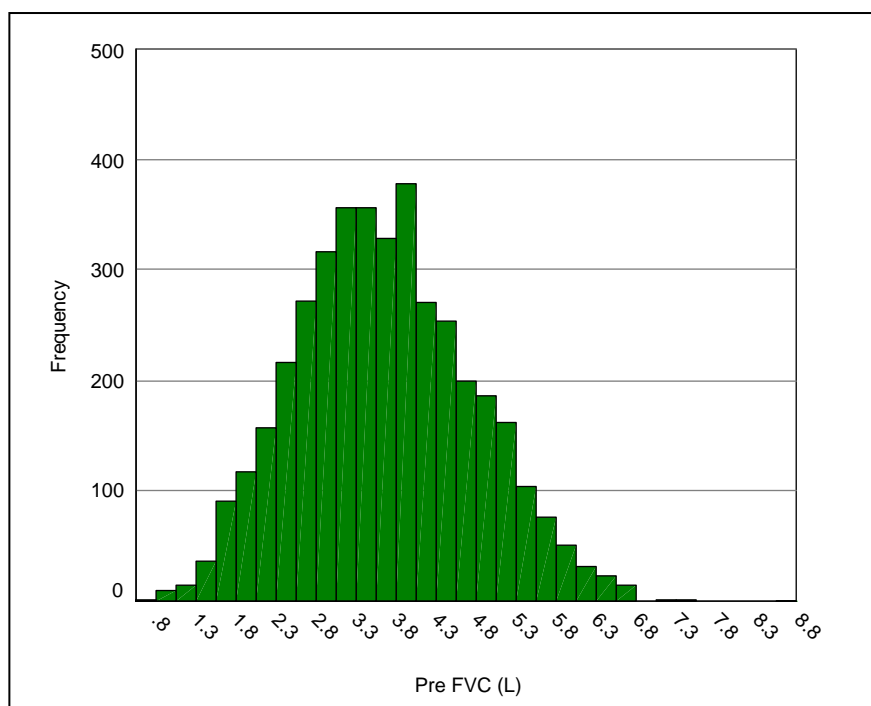


Figure 4.3: Distribution of pre-FVC

4.2.4 Demographic profile of people reporting or diagnosed with current asthma

The prevalence of current asthma was statistically significantly higher in females, people undertaking home duties, retired people, and students or people with 'other' work status, and statistically significantly lower in people with an educational level of bachelor degree or higher, or an income higher than \$40,000 per annum (Table 4.5).

Table 4.5: Univariate Odds Ratios for demographic variables associated with current asthma

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	213/1986	10.7	1.00		
Female	286/2072	13.8	1.33	(1.10 – 1.61)	0.003
Age group					
18 to 29 years	119/994	12.0	1.00		
30 to 39 years	91/768	11.9	0.99	(0.74 - 1.32)	0.94
40 to 49 years	83/755	11.0	0.91	(0.67 - 1.22)	0.52
50 to 59 years	62/584	10.6	0.87	(0.63 - 1.20)	0.40
60 to 69 years	58/433	13.5	1.14	(0.82 - 1.60)	0.43
70 years and over	84/523	16.1	1.41	(1.04 - 1.91)	0.25
Area of residence					
Western suburbs	217/1851	11.7	1.00		
Northern suburbs	282/2207	12.8	1.11	(0.91 - 1.33)	0.30
Highest education level obtained					
Secondary	231/1751	13.2	1.00		
Trade/Apprenticeship/Cert/Diploma	194/1641	11.8	0.88	(0.72 - 1.08)	0.22
Bachelor degree or higher	43/475	9.1	0.66	(0.47 - 0.93)	0.02
Gross annual household income					
Up to \$20,000	140/902	15.5	1.00		
\$20,001- 40,000	133/1008	13.2	0.83	(0.64 - 1.07)	0.15
\$40,001- 60,000	94/899	10.4	0.64	(0.48 - 0.84)	0.001
\$60,001 and over	101/992	10.2	0.62	(0.47 - 0.82)	0.001
Not stated	31/256	12.0	0.74	(0.49 - 1.13)	0.16
Country of birth					
Australia	364/2865	12.7	1.00		
UK or Ireland	80/645	12.3	0.97	(0.75 - 1.25)	0.80
Other	53/524	10.0	0.77	(0.56 - 1.04)	0.09
Marital status					
Married or living with partner	321/2525	12.7	1.00		
Separated/Divorced	38/331	11.5	0.89	(0.63 - 1.28)	0.54
Widowed	33/232	14.0	1.12	(0.80 – 1.65)	0.57
Never married	102/940	10.8	0.83	(0.66 - 1.06)	0.13

Table 4.5: cont

Variable	n	%	OR	(95% CI OR)	p value
Work status					
Full time employed	152/1503	10.1	1.00		
Part time/Casual employed	87/724	12.0	1.21	(0.92 - 1.61)	0.17
Unemployed	18/173	10.6	1.05	(0.63 - 1.75)	0.86
Home duties/Retired	183/1229	14.9	1.55	(1.23 - 1.95)	<0.001
Student/Other	56/381	14.6	1.52	(1.09 - 2.11)	0.01

4.2.5 Self-reported risk factor profile of people reporting or diagnosed with current asthma

The prevalence of current asthma was statistically significantly higher among ex-smokers, those classified as low alcohol risk drinkers or intermediate to very high risk drinkers, those with a family history of diabetes or heart disease (Table 4.6).

Table 4.6: Univariate Odds Ratios for self-reported risk factor variables associated with current asthma

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	211/1908	11.1	1.00		
Ex-smoker	169/1143	14.7	1.39	(1.12 - 1.73)	0.003
Light smoker	54/506	10.7	0.96	(0.70 - 1.32)	0.79
Moderate smoker	42/287	14.7	1.38	(0.97 - 1.97)	0.08
Heavy smoker	22/192	11.5	1.04	(0.65 - 1.66)	0.86
Alcohol risk					
Non drinker, no risk	228/2148	10.6	1.00		
Low risk	234/1630	14.4	1.42	(1.17 - 1.72)	<0.001
Intermediate to very high risk	36/244	14.9	1.48	(1.01 - 2.16)	0.04
Family history of diabetes					
No	310/2714	11.4	1.00		
Yes	188/1344	14.0	1.26	(1.04 - 1.53)	0.02
Family history of heart disease					
No	207/1962	10.6	1.00		
Yes	291/2096	13.9	1.37	(1.13 - 1.66)	0.001
Family history of stroke					
No	313/2622	11.9	1.00		
Yes	185/1436	12.9	1.09	(0.90 - 1.33)	0.36
Physical activity					
Sedentary	120/1037	11.6	1.00		
Physically active	327/2655	12.3	1.07	(0.86 - 1.34)	0.55

The risk factors listed in Table 4.6 and Table 4.7 are general health risk factors and are not necessarily determinants of asthma. Causal relationships between these risk factors and asthma are not implied.

4.2.6 Measured risk factor profile of people reporting or diagnosed with current asthma

The prevalence of current asthma was statistically significantly higher among those with a high waist-hip ratio, high blood pressure, or an allergy to rye grass, cat, house dust mites, alternaria (mould), feather and cockroach, and statistically significantly lower among those with a high total blood cholesterol (Table 4.7).

Table 4.7: Univariate Odds Ratios for measured risk factor variables associated with current asthma

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	148/1267	11.7	1.00		
Underweight	18/177	10.1	0.85	(0.51 - 1.43)	0.54
Overweight	182/1482	12.3	1.06	(0.84 - 1.33)	0.65
Obese	149/1131	13.2	1.15	(0.90 - 1.47)	0.26
Waist:hip ratio (>1.0 men, >0.85 women)					
No	388/3391	11.4	1.00		
Yes	110/665	16.6	1.54	(1.22 - 1.93)	<0.001
High blood pressure (≥140/90mmHg)					
No	346/2968	11.7	1.00		
Yes	152/1090	14.0	1.23	(1.00 - 1.51)	0.05
High total cholesterol (≥5.5mmol/L)					
No	337/2549	13.2	1.00		
Yes	154/1441	10.7	0.79	(0.64 - 0.96)	0.02
Reaction to rye grass					
No	216/2260	9.6	1.00		
Yes	282/1797	15.7	1.76	(1.46 - 2.13)	<0.001
Reaction to cat					
No	302/2967	10.2	1.00		
Yes	196/1091	18.0	1.93	(1.59 - 2.35)	<0.001
Reaction to house dust mites					
No	272/2800	9.7	1.00		
Yes	226/1257	18.0	2.04	(1.68 - 2.47)	<0.001

Table 4.7: cont.

Variable	n	%	OR	(95% CI OR)	p value
Reaction to alternaria (mould)					
No	315/3201	9.8	1.00		
Yes	184/857	21.4	2.50	(2.04 - 3.05)	<0.001
Reaction to feather					
No	408/3611	11.3	1.00		
Yes	91/446	20.3	2.00	(1.56 – 2.58)	<0.001
Reaction to cockroach					
No	366/3118	11.7	1.00		
Yes	133/939	14.1	1.24	(1.00 - 1.53)	0.05
Reaction to at least one of the six allergens					
No	141/1554	9.1	1.00		
Yes	357/2503	14.3	1.66	(1.35 - 2.04)	<0.001

4.2.7 Co-morbidity profile of people with current asthma

The prevalence of current asthma was statistically significantly higher among those with cardiovascular disease (including heart attack, stroke or angina) (Table 4.8).

Table 4.8: Univariate Odds Ratios for co-morbidities associated with current asthma

Variable	n	%	OR	(95% CI OR)	p value
Cardiovascular disease					
No	445/3804	11.7	1.00		
Yes	53/250	21.2	2.03	(1.48 – 2.79)	<0.001
Mental health disorder					
No	423/3485	12.1	1.00		
Yes	73/548	13.3	1.12	(0.85 - 1.46)	0.43
Diabetes					
No	457/3789	12.1	1.00		
Yes	41/263	15.6	1.35	(0.95 - 1.91)	0.09

4.2.8 Quality of life profile of people with and without current asthma

Figure 4.4 shows the mean scores of the SF-36 subscales for people with current asthma compared to those without asthma. Those with current asthma scored significantly worse than those without asthma on the subscales of Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality and Social Functioning.

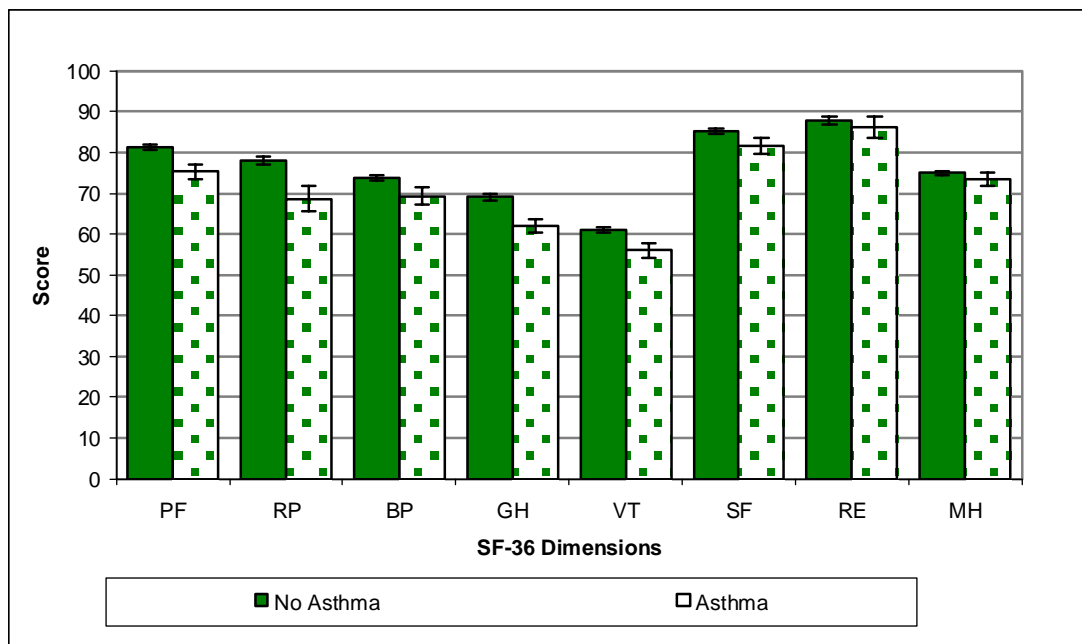


Figure 4.4: Mean SF-36 scores controlled for age and sex for people with and without current asthma

4.2.9 Health service use of people with and without current asthma

Table 4.9 shows the health service use of people with and without current asthma in South Australia in the last 12 months. People with current asthma were statistically significantly more likely to have used general practitioner, day surgery, hospital accident and emergency department, hospital clinic, and eye specialist/ophthalmologist health services than people without asthma in the last 12 months in South Australia.

Table 4.9: Proportion of people with and without current asthma who used various health services in South Australia in the last 12 months

Variable	No Asthma		Current Asthma	
	n	%	n	%
General Practitioner	3125	87.8	459	92.1 [^]
Community Health Centre	141	4.0	21	4.3
District Nurses or other Community Nurses	71	2.0	6	1.2
Psychologist/Psychiatrist	193	5.4	25	5.1
Day Surgery	381	10.7	78	15.6 [^]
Hospital – Accident & Emergency Department	420	11.8	81	16.2 [^]
Hospital – Clinic (Outpatient/Specialist/Allied Health)	502	14.1	102	20.5 [^]
Eye Specialist/Ophthalmologist	795	22.3	155	31.0 [^]
Other Specialist Doctor (not in a hospital)	594	16.7	91	18.2
Physiotherapist	478	13.4	68	13.6
Chiropractor	462	13.0	67	13.3
Alternative Therapist eg Naturopath, Osteopath	167	4.7	32	6.4
Podiatrist	286	8.0	57	11.4 [^]
Dietician	81	2.3	15	3.1
Nurse Educator	29	0.8	6	1.3
Other Health Service	179	5.0	27	5.4

[^] ^v Statistically significantly higher or lower than no asthma group (p<0.05)

4.2.10 Chronic Lung Disease (CLD) Index

Statistical analyses (Table 4.10) were conducted to determine how the Chronic Lung Disease (CLD) Index⁷ was related to asthma. People with asthma were statistically significantly more likely than people without asthma to score as moderate or severe on the CLD index.

Table 4.10: Univariate Odds Ratios for the CLD

Variable	n	%	OR	(95% CI OR)	p value
CLD Index for severity of chronic lung disease					
Mild	355/3618	9.8	1.00		
Moderate	96/264	36.6	5.29	(4.03 – 6.96)	< 0.001
Severe	35/66	52.9	10.29	(6.28 - 16.87)	< 0.001

4.3 Previously undiagnosed asthma

4.3.1 Definition and prevalence

People with previously undiagnosed asthma were defined as having at least a 15% increase in FEV₁ from pre-Ventolin to post-Ventolin, or at least a 12% increase in FEV₁ from pre-Ventolin to post-Ventolin with an absolute difference in FEV₁ greater than 200ml and who did not report a previous diagnosis of asthma. The prevalence of previously undiagnosed asthma was 2.9% (95% CI 2.42 – 3.46). Of the people who had current asthma (n=498), 23.7% did not know they had current asthma prior to participating in the study (Table 1.9). For approximately every three people diagnosed with current asthma, one person had current asthma but did not know it.

Table 4.11: Undiagnosed current asthma (clinical assessment and self-reported)

	n	% of Total	% of Current Asthma	Ratio
Diagnosed asthma	380	9.4	76.3	3.2
Undiagnosed asthma	118	2.9	23.7	1.0
No current asthma	3560	87.7		
Total	4058	100.0	100.0	

Note: 2 missing cases

The prevalence of previously diagnosed, self-reported current asthma (9.4%) is lower than estimates obtained from other South Australian population surveys. In the South Australian Health and Wellbeing Survey (n=2545)⁸, the prevalence of current asthma was 12.7%. In the 2000 Health Omnibus Survey (n=3027), the prevalence of current asthma was 11.6%.

The prevalence of undiagnosed asthma and the number of people with undiagnosed asthma were estimated for South Australia overall and the northern and western regions of Adelaide by applying age and sex specific rates to the estimated population distribution (Table 4.12).

Table 4.12: Estimated prevalence of undiagnosed asthma by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern Adelaide region	2.6	(1.9 – 3.4)	6,900
Western Adelaide region	3.3	(2.4 – 4.2)	5,600
South Australia	3.0	(2.4 – 3.6)	34,700

The prevalence of undiagnosed current asthma for males and females by age groups is shown in Figure 4.5. There was no statistically significant difference in the prevalence of undiagnosed asthma between males and females in each age group or in the overall age group.

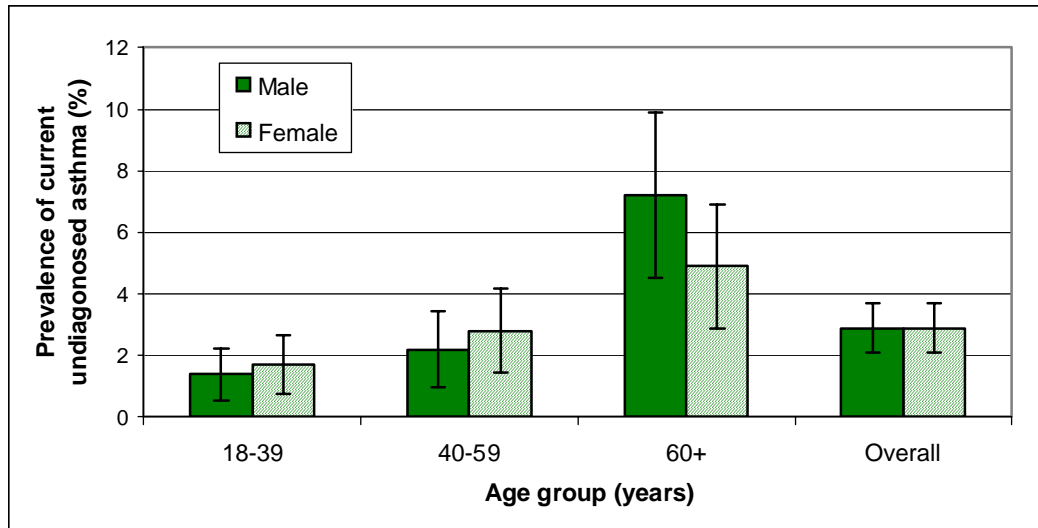


Figure 4.5: Prevalence of undiagnosed asthma by sex and age group

4.3.2 Demographic profile of previously undiagnosed asthma

The prevalence of previously undiagnosed asthma was statistically significantly higher among people aged over 50 years, born outside of Australia, widowed, retired or undertaking home duties, and statistically significantly lower among people who live in the Northern suburbs, had an annual income above \$40,000, or had never been married (Table 4.13).

Table 4.13: Univariate Odds Ratios for demographic variables associated with undiagnosed asthma

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	58/213	27.3	1.00		
Female	60/286	21.0	0.71	(0.47 - 1.08)	0.11
Age group					
18 to 29 years	13/119	11.1	1.00		
30 to 39 years	15/91	15.9	1.51	(0.68 - 3.36)	0.31
40 to 49 years	14/83	16.6	1.59	(0.70 - 3.57)	0.27
50 to 59 years	20/62	32.3	3.80	(1.74 - 8.30)	0.001
60 to 69 years	19/58	32.5	3.83	(1.74 - 8.45)	0.001
70 years and over	37/84	44.4	6.36	(3.12 - 12.99)	<0.001
Area of residence					
Western suburbs	61/217	28.1	1.00		
Northern suburbs	57/282	20.3	0.65	(0.43 - 0.99)	0.05
Highest education level obtained					
Secondary	56/231	24.1	1.00		
Trade/Apprenticeship/Cert/Diploma	49/194	25.5	1.08	(0.70 - 1.68)	0.73
Bachelor degree or higher	9/43	20.2	0.80	(0.36 - 1.78)	0.58
Gross annual household income					
Up to \$20,000	43/140	30.5	1.00		
\$20,001- 40,000	38/133	28.3	0.90	(0.53 - 1.51)	0.68
\$40,001- 60,000	17/94	17.7	0.49	(0.26 - 0.93)	0.03
\$60,001 and over	19/101	18.4	0.51	(0.28 - 0.95)	0.04
Country of birth					
Australia	70/364	19.3	1.00		
UK or Ireland	26/80	32.8	2.04	(1.20 - 3.49)	0.009
Other	22/53	41.8	3.01	(1.64 - 5.52)	<0.001
Marital status					
Married or living with partner	80/321	24.9	1.00		
Separated/Divorced	10/38	25.8	1.05	(0.49 - 2.27)	0.90
Widowed	14/33	44.3	2.40	(1.15 - 5.02)	0.02
Never married	14/102	13.8	0.48	(0.26 - 0.90)	0.02
Work status					
Full time employed	28/154	17.9	1.00		
Part time/Casual employed	25/87	28.5	1.83	(0.98 - 3.41)	0.06
Unemployed	3/18	15.8	0.86	(0.23 - 3.23)	0.80
Home duties/Retired	59/184	31.9	2.15	(1.28 - 3.59)	0.004
Student/Other	4/52	6.8	0.34	(0.11 - 1.07)	0.06

4.3.3 Self-reported risk factor profile of people with previously undiagnosed asthma

There were no statistically significant differences for any of the self-reported risk factors among people with previously undiagnosed asthma compared to people with diagnosed asthma (Table 4.14).

Table 4.14: Univariate Odds Ratios for self-reported risk factor variables associated with previously undiagnosed asthma

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	48/211	22.6	1.00		
Ex-smoker	42/169	25.1	1.15	(0.71 – 1.84)	0.57
Light smoker	12/54	22.4	0.99	(0.48 – 2.02)	0.97
Moderate smoker	10/42	23.0	1.02	(0.47 – 2.23)	0.96
Heavy smoker	6/22	28.2	1.34	(0.50 – 3.59)	0.56
Alcohol risk					
Non drinker, no risk	55/228	24.2	1.00		
Low risk	55/234	23.6	0.97	(0.63 – 1.49)	0.90
Intermediate to very high risk	8/36	21.3	0.85	(0.36 – 1.99)	0.70
Family history of diabetes					
No	82/310	26.6	1.00		
Yes	36/188	19.0	0.65	(0.42 – 1.01)	0.06
Family history of heart disease					
No	56/207	27.1	1.00		
Yes	62/291	21.2	0.72	(0.48 – 1.10)	0.13
Family history of stroke					
No	74/313	23.5	1.00		
Yes	45/185	24.0	1.03	(0.67 – 1.57)	0.90
Physical activity					
Sedentary	34/120	28.6	1.00		
Physically active	70/327	21.5	0.68	(0.42 – 1.10)	0.12

The risk factors listed in Table 4.14 and Table 4.15 are general health risk factors not necessarily determinants of undiagnosed asthma. Causal relationships between those risk factors and undiagnosed asthma are not implied.

4.3.4 Measured risk factor profile of people with previously undiagnosed asthma

The prevalence of previously undiagnosed asthma was statistically significantly higher among people who had high blood pressure, and statistically significantly lower among people with an allergy to rye grass, cat, house dust mites, alternaria (mould), feather or cockroach (Table 4.15).

Table 4.15: Univariate Odds Ratios for measured risk factor variables associated with previously undiagnosed asthma

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	33/157	21.3	1.00		
Underweight	2/5	42.2	2.70	(0.43 – 16.94)	0.29
Overweight	51/182	27.5	1.40	(0.85 – 2.317)	0.19
Obese	32/150	21.1	0.99	(0.57 – 1.71)	0.97
Waist:hip ratio (>1.0 men, >0.85 women)					
No	92/388	23.6	1.00		
Yes	26/110	23.9	1.01	(0.62 – 1.67)	0.96
High blood pressure (≥140/90mmHg)					
No	72/346	20.7	1.00		
Yes	46/152	30.4	1.68	(1.09 – 2.58)	0.02
High total cholesterol (≥5.5mmol/L)					
No	83/337	24.6	1.00		
Yes	35/154	22.8	0.90	(0.58 - 1.42)	0.66
Reaction to rye grass					
No	70/216	32.5	1.00		
Yes	48/282	17.0	0.43	(0.28 - 0.65)	<0.001
Reaction to cat					
No	87/302	28.8	1.00		
Yes	31/196	15.8	0.46	(0.29 – 0.73)	0.001
Reaction to house dust mites					
No	90/272	32.9	1.00		
Yes	28/226	12.6	0.29	(0.18 - 0.47)	<0.001
Reaction to alternaria (mould)					
No	92/315	29.1	1.00		
Yes	27/184	14.5	0.41	(0.26 - 0.67)	<0.001
Reaction to feather					
No	105/408	25.8	1.00		
Yes	13/91	14.4	0.48	(0.26 – 0.91)	0.02

Table 4.15: cont.

Variable	n	%	OR	(95% CI OR)	p value
Reaction to cockroach					
No	100/366	27.2	1.00		
Yes	19/133	14.0	0.44	(0.25 – 0.75)	0.003
Reaction to at least one of the six allergens					
No	52/141	37.0	1.00		
Yes	66/357	18.4	0.38	(0.25 - 0.890)	<0.001

4.3.5 Co-morbidity profile of people with previously undiagnosed asthma

The prevalence of previously undiagnosed asthma was statistically significantly higher among those with cardiovascular disease (including heart attack, stroke or angina) (Table 4.16).

Table 4.16: Univariate Odds Ratios for co-morbidities associated with current asthma

Variable	n	%	OR	(95% CI OR)	p value
Cardiovascular disease					
No	95/445	21.4	1.00		
Yes	23/53	42.9	2.75	(1.53 - 4.97)	0.001
Mental health disorder					
No	104/423	24.7	1.00		
Yes	14/73	18.9	0.71	(0.38 - 1.33)	0.29
Diabetes					
No	110/457	24.0	1.00		
Yes	8/41	20.4	0.81	(0.37 - 1.79)	0.61

4.3.6 Quality of life profile of people with previously undiagnosed asthma

Figure 4.6 shows the mean of the SF-36 subscales for people with previously undiagnosed asthma and diagnosed asthma. Those with previously undiagnosed asthma scored significantly better than those with previously diagnosed asthma on the SF-36 dimensions of Physical Functioning and General Health.

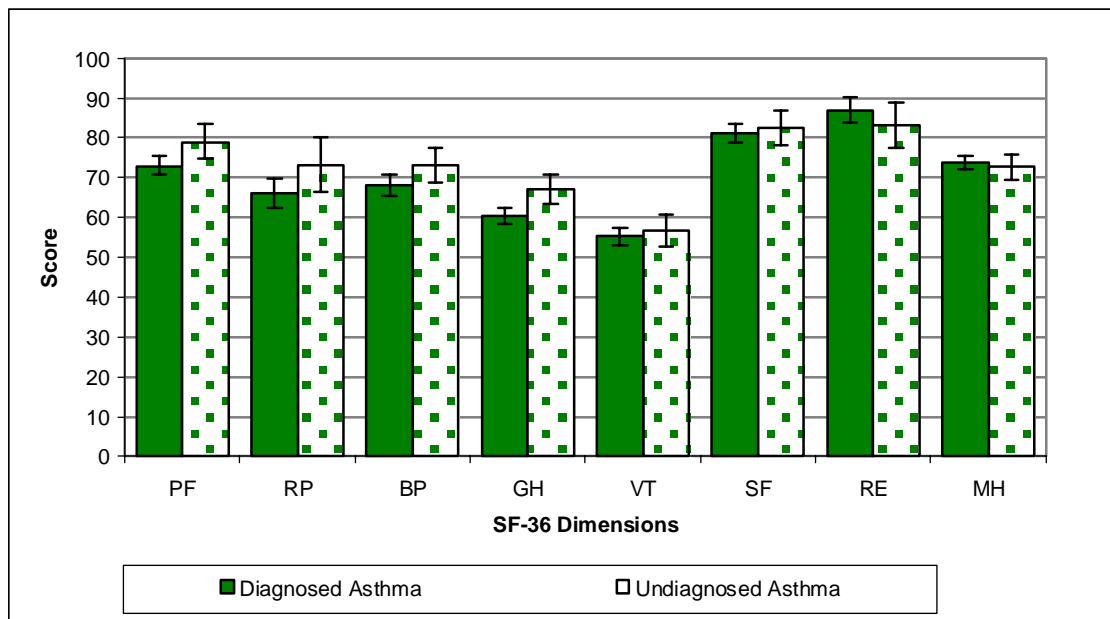


Figure 4.6: Mean SF-36 scores controlled for age and sex for people who reported current asthma and previously undiagnosed asthma

4.3.7 Health service use of people with previously undiagnosed asthma

Table 4.17 shows the health service use in South Australia in the last twelve months of people with previously diagnosed asthma and people who were previously undiagnosed with asthma. People with previously undiagnosed asthma were statistically significantly less likely than people with previously diagnosed asthma to have used general practitioner, hospital accident and emergency department, chiropractor, alternative therapist and other health services.

Table 4.17: Proportion of people with diagnosed and previously undiagnosed asthma who used various health services in South Australia in the last 12 months

Variable	Diagnosed/self-reported asthma		Undiagnosed current asthma	
	n	%	n	%
General Practitioner	355	93.4	104	87.9 [∧]
Community Health Centre	17	4.5	4	3.6
District Nurses or other Community Nurses	5	1.3	1	1.1
Psychologist/Psychiatrist	20	5.4	5	4.1
Day Surgery	53	13.9	25	21.1
Hospital – Accident & Emergency Department	73	19.1	8	6.8 [∧]
Hospital – Clinic (Outpatient/Specialist/Allied Health)	83	21.7	19	16.5
Eye Specialist/Ophthalmologist	123	32.4	32	26.8
Other Specialist Doctor (not in a hospital)	72	19.0	19	15.8
Physiotherapist	52	13.8	15	13.1
Chiropractor	59	15.4	8	6.6 [∧]
Alternative Therapist eg Naturopath, Osteopath	30	7.9	2	1.5 [∧]
Podiatrist	46	12.0	11	9.4
Dietician	13	3.4	3	2.2
Nurse Educator	5	1.4	1	0.9
Other Health Service	26	6.7	1	1.2 [∧]

[∧] [∨] Statistically significantly higher or lower than diagnosed asthma group (p<0.05)

4.3.8 Chronic Lung Disease (CLD) Index

Statistical analyses (Table 4.18) were conducted to determine how the Chronic Lung Disease (CLD) Index was related to asthma. People with previously undiagnosed asthma were statistically significantly less likely than people with diagnosed asthma to score as moderate on the CLD Index.

Table 4.18: Univariate Odds Ratios for the CLD index associated with previously undiagnosed asthma

Variable	n	%	OR	(95% CI OR)	p value
CLD Index for severity of chronic lung disease					
Mild	93/355	26.2	1.00		
Moderate	14/96	15.0	0.50	(0.27 – 0.91)	0.02
Severe	7/35	19.3	0.68	(0.28 - 1.61)	0.38

4.4 References

1. Commonwealth Department of Health and Aged Care. *National Health Priority Areas. Asthma*. Canberra 1999. Accessed at <http://www.health.gov.au/hsdd/nhpq/asthma/>
2. Australian Institute of Health and Welfare. *Australia's Health 1998: the sixth biennial health report of the Australian Institute of Health and Welfare*. Canberra. AIHW. 1998.
3. National Asthma Campaign. *National Asthma Strategy Goals and Targets*. 1994. Australia.
4. National Asthma Campaign. *National Asthma Strategy: Strategies and Implementation*. 1996. Australia.
5. Commonwealth Department of Health and Aged Care. *National Asthma Action Plan*. Draft. Canberra, 1999.
6. Adams RJ, Wilson DH, Appleton S, Taylor A, Dal Grande E, Chittleborough CR, Ruffin RE. Underdiagnosed asthma in South Australia. *Thorax* 2003; 58: 846-850.
7. Selim AJ, Xinhua SR, Fincke G, Rogers W, Lee A, Kazis L. A symptom-based measure of the severity of chronic lung disease. *Chest* 1997; 111: 1607-1614.
8. Dal Grande E, Taylor A, Wilson D. *South Australian Health and Wellbeing Survey. December 2000*. Centre for Population Studies in Epidemiology, South Australian Department of Human Services, Adelaide, 2002.

CHAPTER 5: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

5.1 Introduction

This chapter describes people with chronic obstructive pulmonary disease (COPD), which includes bronchitis and emphysema, both established and newly diagnosed, in terms of their demographic, risk factor, quality of life, and health service use.

COPD is a serious health problem in Australia, being the fourth leading cause of death and accounting for 5.0% of total deaths¹. COPD and asthma are the third and ninth leading causes of overall disease burden in Australia, accounting for 6.3% of the total burden in terms of disability-adjusted life years (DALYs)². Chronic lung disease (COPD and asthma) accounts for the majority of the burden of chronic respiratory diseases, being responsible for 88% of chronic respiratory disease DALYs.

A strength of this study is that it provides a comprehensive understanding of segmentation of the population on the basis of biomedical data along the COPD continuum. This understanding will enable more effective targeting of policy and strategic interventions to improve health outcomes. This will lead to improved health outcomes for South Australians with chronic disease.

This chapter includes analyses of people across the continuum, from those without COPD, to those with COPD who did not previously know it (previously undiagnosed), and those with diagnosed COPD.

5.2 COPD

5.2.1 Definitions and prevalence

People with COPD were defined as those with a measured FEV₁:FVC ratio less than the result of the formula $(87.21 - (0.18 \times \text{age}) * 0.882)$ for males, and $(89.10 - (0.19 \times \text{age}) * 0.893)$ for females^{3,4}. In this formula, 0.882 and 0.893 represent one minus two standard deviations from the predicted mean for males and females, respectively. According to this definition, 3.5% (95% CI 2.9 – 4.0) of participants had COPD.

Table 5.1: COPD (Clinical assessment)

	n	%
No COPD	3878	96.5
COPD	139	3.5
Total	4017	100.0

Note: 43 cases had insufficient FEV₁ or FVC results and were excluded

The prevalence of COPD and number of people with COPD were estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 5.2). These are estimates only, and the true prevalence may vary by region because of other factors, such as smoking prevalence, that may also vary among regions.

Table 5.2: Estimated prevalence of COPD by region, age-sex adjusted to the 2001 Estimated Residential Population

	%	Estimated (95% CI)	Approximate n
Northern region	3.5	(2.6 – 4.3)	9000
Western region	3.6	(2.6 – 4.5)	6000
South Australia	3.6	(2.9 – 4.2)	41500

In the north west region of Adelaide, the prevalence of COPD for males and females by age groups is shown in Figure 5.1.

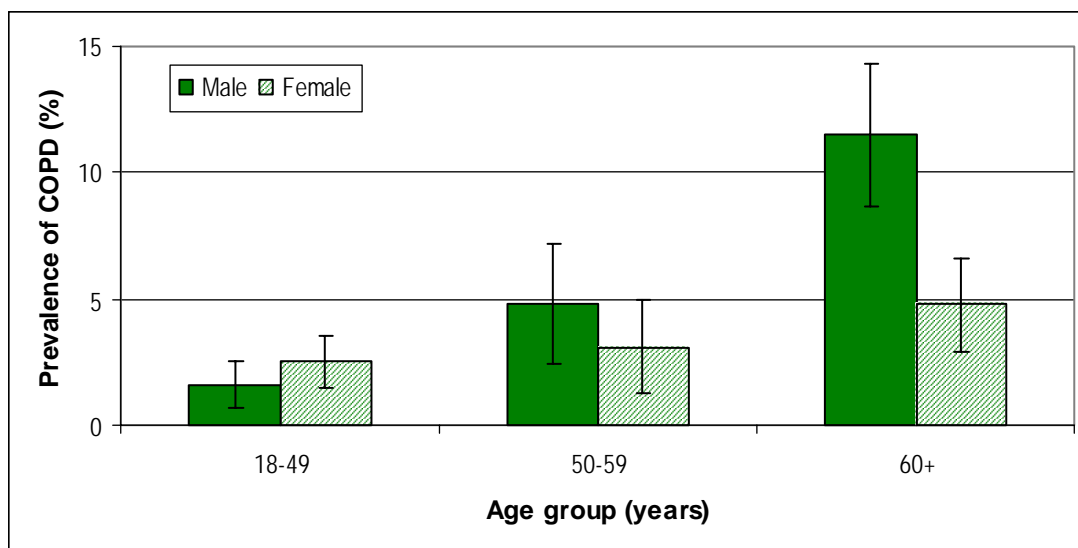


Figure 5.1: Prevalence of COPD by sex and age group

5.2.2 Demographic profile of people diagnosed with and without COPD

The prevalence of COPD was statistically significantly higher among those aged 50 years or over, born in the UK or Ireland, widowed, and undertaking home duties or retired, and statistically significantly lower among those who had undertaken post-secondary education, had a household income of more than \$20,000 per annum, and who had never been married.

Table 5.3: Univariate Odds Ratios for demographic variables associated with COPD

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	78/1971	3.9	1.00		
Female	61/2046	3.0	0.76	(0.54 – 1.06)	0.11
Age group					
18 to 49 years	47/2495	1.9	1.00		
50 to 59 years	22/581	3.7	2.03	(1.21 – 3.41)	0.007
60 years and over	71/940	7.5	4.29	(2.94 – 6.26)	<0.001
Area of residence					
Western suburbs	65/1832	3.5	1.00		
Northern suburbs	74/2185	3.4	0.96	(0.68 – 1.35)	0.82
Highest education level obtained					
Secondary	78/1727	4.5	1.00		
Post-secondary	56/2099	2.7	0.58	(0.41 – 0.82)	0.002
Gross annual household income					
Up to \$20,000	57/885	6.5	1.00		
\$20,001- 40,000	41/996	4.2	0.63	(0.42 – 0.95)	0.03
\$40,001- 60,000	20/896	2.2	0.33	(0.20 – 0.56)	<0.001
\$60,001 and over	13/987	1.3	0.19	(0.11 – 0.36)	<0.001
Country of birth					
Australia	91/2840	3.2	1.00		
UK or Ireland	32/635	5.1	1.60	(1.06 – 2.42)	0.03
Other	15/518	3.0	0.92	(0.53 – 1.60)	0.77
Marital status					
Married or living with partner	95/2504	3.8	1.00		
Separated/Divorced	15/325	4.7	1.24	(0.71 – 2.15)	0.46
Widowed	16/227	6.9	1.87	(1.08 – 3.25)	0.03
Never married	11/931	1.2	0.31	(0.17 – 0.58)	<0.001
Work status					
Full time employed	26/1527	1.7	1.00		
Part time/Casual employed	17/720	2.4	1.41	(0.77 – 2.61)	0.27
Unemployed	5/170	2.8	1.62	(0.60 – 4.37)	0.35
Home duties/Retired	85/1223	7.0	4.26	(2.74 – 6.65)	<0.001
Student/Other	5/331	1.4	0.83	(0.31 – 2.21)	0.70

5.2.3 Self-reported risk factor profile of people diagnosed with COPD

The prevalence of COPD was statistically significantly higher among people who were ex-smokers, or light to heavy smokers, and statistically significantly lower among those who were physically active (Table 5.4).

Table 5.4: Univariate Odds Ratios for self-reported risk factors associated with COPD

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	36/1888	1.9	1.00		
Ex-smoker	61/1134	5.4	2.92	(1.92 – 4.43)	< 0.001
Light smoker	18/501	3.6	1.94	(1.09 – 3.43)	0.02
Moderate smoker	13/281	4.8	2.58	(1.36 – 4.88)	0.004
Heavy smoker	10/192	5.3	2.86	(1.40 – 5.83)	0.004
Alcohol risk					
Non drinker, no risk	78/2124	3.7	1.00		
Low risk	52/1614	3.2	0.87	(1.92 – 4.43)	0.99
Intermediate to very high risk	9/244	3.7	1.00	(0.49 – 2.01)	1.00
Family history of diabetes					
No	98/2690	3.6	1.00		
Yes	41/1327	3.1	0.84	(0.58 – 1.22)	0.36
Family history of heart disease					
No	64/1944	3.3	1.00		
Yes	75/2073	3.6	1.09	(0.78 – 1.53)	0.61
Family history of stroke					
No	96/2600	3.7	1.00		
Yes	43/1417	3.0	0.81	(0.56 – 1.16)	0.25
Physical activity					
Sedentary	55/1028	5.3	1.00		
Physically active	67/2626	2.6	0.47	(0.33 – 0.68)	< 0.001

The risk factors listed in Table 5.4 and Table 5.5 are general health risk factors not necessarily determinants of COPD. Causal relationships between those risk factors and COPD are not implied.

5.2.4 Measured risk factor profile of people diagnosed with COPD

The prevalence of COPD was statistically significantly higher among people who had high blood pressure, and statistically significantly lower among those who were obese (Table 5.5).

Table 5.5: Univariate Odds Ratios for measured risk factors associated with COPD

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	52/1371	3.8	1.00		
Overweight	62/1475	4.2	1.10	(0.76 – 1.60)	0.62
Obese	22/1127	1.9	0.50	(0.30 – 0.82)	0.007
Waist:hip ratio (>1.0 men, >0.85 women)					
No	113/3359	3.4	1.00		
Yes	26/657	3.9	1.16	(0.75 – 1.80)	0.50
High blood pressure (≥140/90mmHg)					
No	74/2937	2.5	1.00		
Yes	65/1080	6.0	2.46	(1.75 – 3.46)	<0.001
High total cholesterol (≥5.5mmol/L)					
No	92/2525	3.6	1.00		
Yes	46/1424	3.2	0.89	(0.62 – 1.28)	0.53
Reaction to rye grass					
No	79/2234	3.6	1.00		
Yes	60/1782	3.3	0.94	(0.67 – 1.33)	0.73
Reaction to cat					
No	94/2935	3.2	1.00		
Yes	45/1082	4.1	1.30	(0.91 – 1.87)	0.16
Reaction to house dust mites					
No	92/2770	3.3	1.00		
Yes	47/1247	3.8	1.13	(0.79 – 1.62)	0.49
Reaction to alternaria (mould)					
No	107/3162	3.4	1.00		
Yes	32/854	3.8	1.13	(0.76 – 1.69)	0.55
Reaction to feather					
No	120/3573	3.4	1.00		
Yes	19/444	4.2	1.27	(0.77 – 2.08)	0.35
Reaction to cockroach					
No	113/3082	3.7	1.00		
Yes	26/935	2.8	0.76	(0.49 – 1.17)	0.21
Reaction to at least one of the six allergens					
No	58/1534	3.8	1.00		
Yes	81/2482	3.3	0.85	(0.60 – 1.20)	0.36

5.2.5 Co-morbidity profile of people with COPD

The prevalence of COPD was statistically significantly higher among people with cardiovascular disease (heart attack, stroke, angina) (Table 5.6).

Table 5.6: Univariate Odds Ratios for co-morbidities associated with COPD

Variable	n	%	OR	(95% CI OR)	p value
Diabetes					
No	125/3757	3.3	1.00		
Yes	14/260	5.5	1.68	(0.96 – 2.95)	0.07
Cardiovascular disease					
No	119/3766	3.2	1.00		
Yes	19/247	7.8	2.60	(1.58 – 4.29)	<0.001
Mental health disorder					
No	124/3449	3.6	1.00		
Yes	14/544	2.6	0.73	(0.42 – 1.27)	0.26

5.2.6 Quality of life profile of people with and without COPD

Figure 5.2 shows the mean scores of the SF-36 subscales for people with and without COPD. Those with COPD scored statistically significantly lower on the Physical Functioning, Role Physical, General Health and Vitality dimensions of the SF-36.

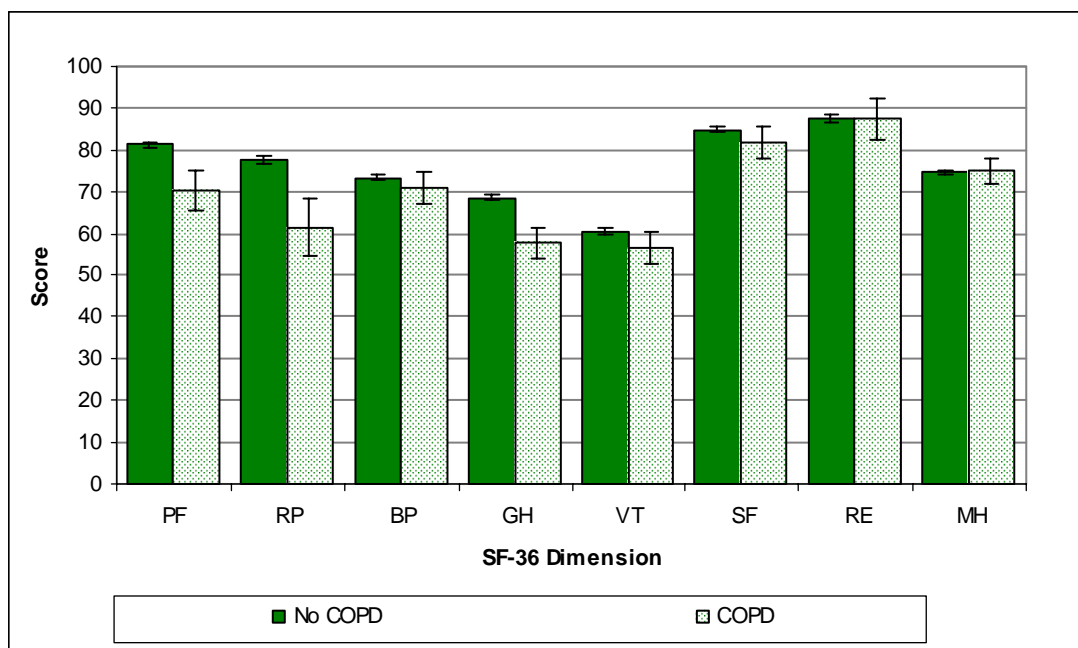


Figure 5.2: SF-36 mean scores for people with and without COPD

5.2.7 Health service use of people with and without COPD

Statistical analyses were conducted to determine which health services in South Australia were more likely to be used in the last 12 months by people with COPD (Table 5.7). People with COPD were statistically significantly less likely than people without COPD to have seen a general practitioner, used a hospital accident and emergency department, day surgery, or podiatrist services in South Australia in the last 12 months.

Table 5.7: Proportion of people with and without COPD who used various health services used in South Australia in the last 12 months

Variable	No COPD		COPD	
	n	%	n	%
General Practitioner	3423	88.3	127	91.2
Community Health Centre	154	4.0	7	5.3
District Nurses or other Community Nurses	73	1.9	3	2.2
Psychologist/Psychiatrist	210	5.4	6	4.3
Day Surgery	429	11.1	24	17.5 [^]
Hospital – Accident & Emergency Department	470	12.1	24	17.3
Hospital – Clinic (Outpatient/Specialist/Allied Health)	561	14.5	34	24.6 [^]
Eye Specialist/Ophthalmologist	889	22.9	49	34.9 [^]
Other Specialist Doctor (not in a hospital)	659	17.0	22	16.1
Physiotherapist	529	13.6	10	7.0 [∨]
Chiropractor	513	13.2	9	6.8 [∨]
Alternative Therapist eg Naturopath, Osteopath	192	5.0	4	2.8
Podiatrist	325	8.4	15	11.0
Dietician	88	2.3	5	3.4
Nurse Educator	31	0.8	4	2.9
Other Health Service	200	5.1	3	2.3

[^] [∨] Statistically significantly higher or lower than comparison group (p<0.05)

5.2.8 Chronic Lung Disease (CLD) Index

Statistical analyses (Table 5.8) were conducted to determine how the Chronic Lung Disease (CLD) Index⁵ was related to COPD. Those with COPD were statistically significantly more likely to score as moderate or severe on the CLD Index.

Table 5.8: Univariate Odds Ratios for the CLD Index

Variable	n	%	OR	(95% CI OR)	p value
CLD Index for severity of chronic lung disease					
Mild	94/3581	2.6	1.00		
Moderate	29/262	11.0	4.58	(2.96 – 7.10)	< 0.001
Severe	15/64	23.2	11.25	(6.08 – 20.79)	< 0.001

5.3 Previously undiagnosed COPD

5.3.1 Definition and prevalence

People with previously undiagnosed COPD were defined as having COPD according to the clinical results of the FEV₁:FVC using the Quanjer et al (1993)³ criteria, defined in 5.2.1 , but who did not report having been told by a doctor that they had COPD (chronic bronchitis or emphysema).

The prevalence of previously undiagnosed COPD was found to be 2.8% (95% CI 2.3 – 3.3) of participants. Of the people who had COPD, 80.0% did not know they had it prior to participating in the study. For every person with diagnosed COPD, there were approximately four people with undiagnosed COPD. The proportion of diagnosed and undiagnosed COPD is shown in Table 5.9.

Table 5.9: Undiagnosed COPD (clinical assessment & self-reported)

	n	% of Total	% of COPD	Ratio
Diagnosed COPD	28	0.7	20.0	1.0
Undiagnosed COPD	111	2.8	80.0	4.0
No COPD	3878	96.5		
Total	4017	100.0	100.0	

Note: 43 cases had incomplete FEV₁ or FVC results and were excluded.

The prevalence rate of undiagnosed COPD and number of people with undiagnosed COPD were estimated for the regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 5.10).

Table 5.10: Estimated prevalence of previously undiagnosed COPD by region, age-sex adjusted to the 2001 Estimated Residential Population

	%	Estimated (95% CI)	Approximate n
Northern region	2.8	(2.1 – 3.6)	7300
Western region	2.8	(1.9 – 3.6)	4700
South Australia	2.8	(2.3 – 3.4)	32900

In the north west region of Adelaide, the prevalence of undiagnosed COPD for males and females by age groups is shown in Figure 5.3.

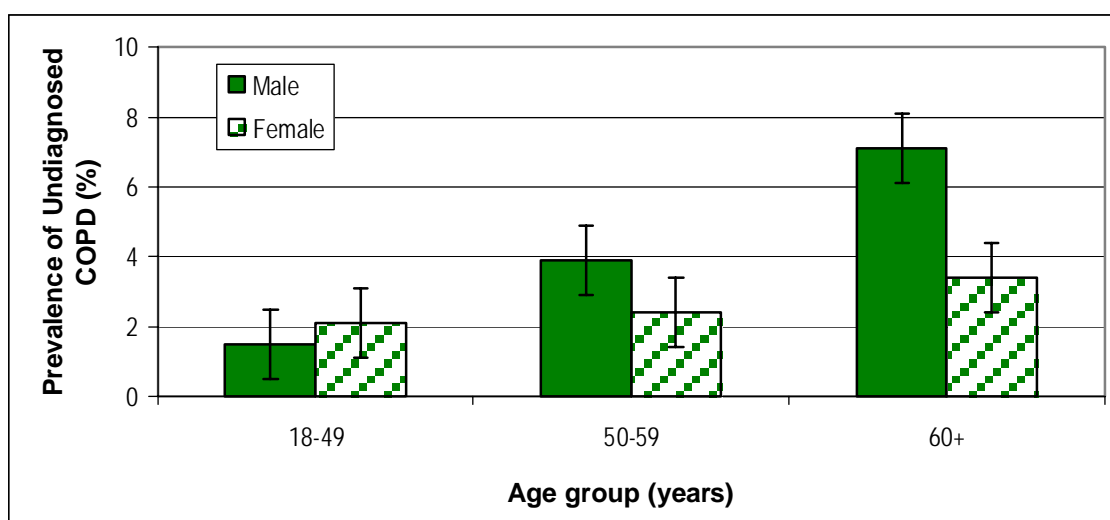


Figure 5.3: Prevalence of undiagnosed COPD by sex and age group

5.3.2 Demographic profile of people with previously undiagnosed COPD

The prevalence of previously undiagnosed COPD was statistically significantly higher among those with a household income between \$20,001 and \$40,000 per annum, and statistically significantly lower among those aged 60 years and over (Table 5.11).

Table 5.11: Univariate Odds Ratios for demographic variables associated with previously undiagnosed COPD

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	60/78	77.6	1.00		
Female	51/61	82.9	1.40	(0.60 – 3.27)	0.44
Age group					
18 to 49 years	45/47	96.9	1.00		
50 to 59 years	18/22	84.1	0.17	(0.02 – 1.28)	0.09
60 years and over	48/71	67.6	0.07	(0.01 – 0.38)	0.002
Area of residence					
Western suburbs	51/65	78.2	1.00		
Northern suburbs	61/74	81.5	1.23	(0.53 – 2.82)	0.63
Highest education level obtained					
Secondary	64/78	81.1	1.00		
Post-secondary	44/56	78.5	0.85	(0.37 – 2.00)	0.72
Gross annual household income					
Up to \$20,000	41/57	70.9	1.00		
\$20,001- 40,000	37/41	88.6	3.21	(1.05 – 9.80)	0.04
\$40,001- 60,000	16/20	82.0	1.87	(0.52 – 6.69)	0.34
\$60,001 and over	11/13	85.0	2.32	(0.46 – 11.83)	0.31
Country of birth					
Australia	73/91	80.3	1.00		
UK or Ireland	24/32	75.8	0.77	(0.30 – 2.00)	0.59
Other	13/15	86.2	1.53	(0.33 – 7.13)	0.59
Marital status					
Married or living with partner	76/95	79.1	1.00		
Separated/Divorced	13/15	85.8	1.59	(0.35 – 7.30)	0.55
Widowed	13/16	80.5	1.09	(0.28 – 4.16)	0.90
Never married	9/11	80.3	1.08	(0.23 – 5.01)	0.93
Work status					
Full time employed	23/26	86.9	1.00		
Part time/Casual employed	16/17	91.8	1.69	(0.22 – 13.14)	0.62
Unemployed/Student/Other	9/9	95.4	3.13	(0.12 – 81.40)	0.49
Home duties/Retired	62/85	73.5	0.42	(0.12 – 1.43)	0.16

5.3.3 Self-reported risk factor profile of people with previously undiagnosed COPD

There were no statistically significant differences between those with previously undiagnosed COPD and those with diagnosed COPD for any of the self-reported risk factors (Table 5.12).

Table 5.12: Univariate Odds Ratios for self-reported risk factors variables associated with previously undiagnosed COPD

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	31/36	86.0	1.00		
Ex-smoker	41/61	67.8	0.34	(0.12 – 1.02)	0.05
Light smoker	17/18	91.2	1.70	(0.26 – 11.03)	0.58
Moderate smoker	13/13	95.3	3.31	(0.22 – 48.94)	0.38
Heavy smoker	9/10	91.1	1.66	(0.16 – 17.52)	0.67
Alcohol risk					
Non drinker, no risk	60/78	77.2	1.00		
Low risk	44/52	85.5	1.74	(0.68 – 4.43)	0.25
Intermediate to very high risk	6/9	72.4	0.78	(0.16 – 3.70)	0.75
Family history of diabetes					
No	78/98	79.4	1.00		
Yes	33/41	81.2	1.12	(0.45 – 2.83)	0.81
Family history of heart disease					
No	50/64	77.8	1.00		
Yes	61/75	81.8	1.28	(0.56 – 2.93)	0.56
Family history of stroke					
No	76/96	78.9	1.00		
Yes	35/43	82.4	1.25	(0.49 – 3.16)	0.64
Physical activity					
Sedentary	45/55	83.0	1.00		
Physically active	54/67	80.6	0.85	(0.34 – 2.16)	0.74

The risk factors listed in Table 5.12 and Table 5.13 are general health risk factors not necessarily determinants of undiagnosed COPD. Causal relationships between those risk factors and undiagnosed COPD are not implied.

5.3.4 Measured risk factor profile of people with previously undiagnosed COPD

There were no statistically significant differences between those with previously undiagnosed COPD and those with diagnosed COPD for any of the biomedically measured risk factors (Table 5.13).

Table 5.13: Univariate Odds Ratios for measured risk factors variables associated with previously undiagnosed COPD

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	42/52	80.4	1.00		
Overweight	49/62	80.2	0.99	(0.39 – 2.50)	0.98
Obese	17/22	79.8	0.95	(0.28 – 3.37)	0.95
Waist:hip ratio (>1.0 men, >0.85 women)					
No	92/113	81.2	1.00		
Yes	19/26	74.4	0.67	(0.25 – 1.83)	0.44
High blood pressure (≥140/90mmHg)					
No	62/74	84.0	1.00		
Yes	49/65	75.3	0.58	(0.25 – 1.34)	0.20
High total cholesterol (≥5.5mmol/L)					
No	76/92	82.9	1.00		
Yes	35/46	75.9	0.65	(0.27 – 1.55)	0.33
Reaction to rye grass					
No	61/79	76.9	1.00		
Yes	50/60	84.0	1.58	(0.66 – 3.75)	0.30
Reaction to cat					
No	73/94	77.3	1.00		
Yes	38/45	85.5	1.73	(0.66 – 4.53)	0.26
Reaction to house dust mites					
No	72/92	78.1	1.00		
Yes	39/47	83.5	1.42	(0.57 – 3.55)	0.46
Reaction to alternaria (mould)					
No	86/107	80.8	1.00		
Yes	25/32	77.0	0.79	(0.31 – 2.05)	0.63
Reaction to feather					
No	99/120	82.1	1.00		
Yes	12/19	66.2	0.43	(0.15 – 1.24)	0.12
Reaction to cockroach					
No	91/113	80.4	1.00		
Yes	20/26	78.1	0.87	(0.31 – 2.45)	0.79
Reaction to at least one of the six allergens					
No	43/58	74.4	1.00		
Yes	68/81	84.0	1.80	(0.78 – 4.16)	0.17

5.3.5 Co-morbidity profile of people with COPD

The prevalence of previously undiagnosed COPD was statistically significantly lower among people with a mental health illness (anxiety, depression, stress related disorder, other) (Table 5.6).

Table 5.14: Univariate Odds Ratios for co-morbidities associated with COPD

Variable	n	%	OR	(95% CI OR)	p value
Diabetes					
No	99/125	79.4	1.00		
Yes	12/14	84.8	1.45	(0.32 – 6.56)	0.63
Cardiovascular disease					
No	97/119	81.3	1.00		
Yes	14/19	71.0	0.56	(0.19 – 1.67)	0.30
Mental health disorder					
No	98/124	79.0	1.00		
Yes	13/14	87.5	1.86	(0.37 – 9.42)	0.45

5.3.6 Quality of life profile of people with previously undiagnosed COPD

Figure 5.4 shows the mean scores of the SF-36 subscales for people who reported having confirmed COPD compared to those who did not report COPD but were diagnosed with COPD. People with previously undiagnosed COPD scored statistically significantly higher than those with diagnosed COPD on the Physical Functioning, Role Physical, General Health, and Vitality dimensions of the SF-36.

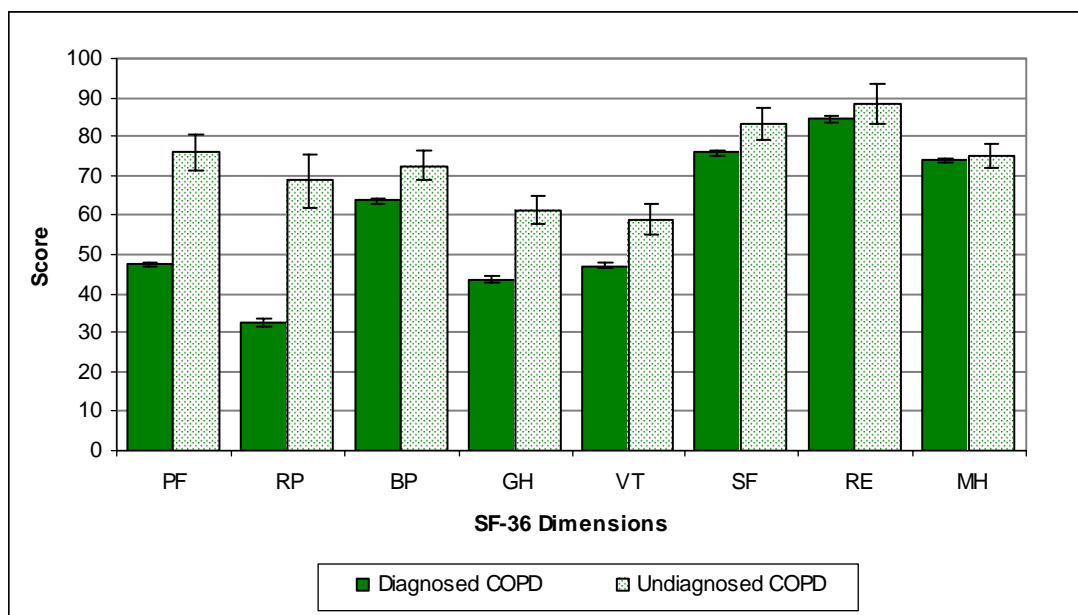


Figure 5.4: SF-36 mean scores for people with diagnosed COPD compared to previously undiagnosed COPD

5.3.7 Health service use of people with previously undiagnosed COPD

Statistical analyses were conducted to determine which health services were more likely to be used by people with previously undiagnosed COPD (Table 5.15). There were no statistically significant differences in health service use between those undiagnosed and those diagnosed with COPD.

Table 5.15: Proportion of people with diagnosed and previously undiagnosed COPD who used various health services in South Australia in the last 12 months

Variable	Diagnosed/self-reported COPD		Undiagnosed COPD	
	n	%	n	%
General Practitioner	26	91.7	101	91.1
Community Health Centre	1	2.3	7	6.0
District Nurses or other Community Nurses	0	0.0	3	2.4
Psychologist/Psychiatrist	1	4.3	5	4.4
Day Surgery	5	19.3	19	17.1
Hospital - Accident & Emergency Department	4	13.6	20	18.2
Hospital – Clinic (Outpatient/Specialist/Allied Health	9	32.0	25	22.8
Eye Specialist/Ophthalmologist	12	41.7	37	33.2
Other Specialist Doctor (not in a hospital)	8	27.5	15	13.3
Physiotherapist	0	0.0	9	8.3
Chiropractor	3	9.0	7	6.2
Alternative Therapist eg Naturopath, Osteopath	0	0.0	4	3.5
Podiatrist	3	9.7	13	11.3
Dietician	0	0.0	5	4.3
Nurse Educator	1	3.9	3	2.7
Other Health Service	0	0.0	3	2.9

^ v Statistically significantly higher or lower than comparison group (p<0.05)

5.3.8 Chronic Lung Disease (CLD) Index

Statistical analyses were conducted to determine how the CLD Index⁵ was related to undiagnosed COPD. People with previously undiagnosed COPD were statistically significantly less likely than people with diagnosed COPD to score as moderate or severe on the CLD index.

Table 5.16: Univariate Odds Ratios for the CLD Index and medication use associated with previously undiagnosed COPD

Variable	n	%	OR	(95% CI OR)	p value
CLD Index for severity of chronic lung disease					
Mild	86/94	91.8	1.00		
Moderate	16/29	55.1	0.11	(0.04 – 0.31)	<0.001
Severe	8/15	51.1	0.09	(0.03 – 0.33)	<0.001

5.4 References

1. Australian Bureau of Statistics. *Causes of death, Australia*. Canberra. ABS. 1997. (Catalogue No. 3303.0).
2. Mathers C, Vos T, Stevenson C. *The Burden of Disease and Injury in Australia*. Australian Institute of Health and Welfare, Canberra, 1999.
3. Quanjer GJ, Tammeling JE, Cotes OF, Pederson RP, Yernault J-C. Lung volumes and forced ventilatory flows. *European Respiratory Journal* 1993; 6 (Suppl. 16): 5-40.
4. Siafakas NM, Vermeire P, Pride NB, Paoletti P, Gibson J, Howard P, Yernault JC, Decramer M, Higenbottam T, Postma DS, Rees J. Optimal assessment and management of chronic obstructive pulmonary disease (COPD). *European Respiratory Journal* 1995; 8: 1398-1420.
5. Selim AJ, Xinhua SR, Fincke G, Rogers W, Lee A, Kazis L. A symptom-based measure of the severity of chronic lung disease. *Chest* 1997; 111: 1607-1614.

CHAPTER 6: CARDIOVASCULAR DISEASE

6.1 Introduction

This chapter describes people with cardiovascular disease in terms of their demographic, risk factor, quality of life, and health service use characteristics. Cardiovascular disease is recognised as a State and National Health Priority Area because of the significant burden that it places on the community in terms of health, social, economic and emotional costs¹. Coronary heart disease and stroke are the leading causes of death in Australia² but these conditions are potentially preventable. A National Strategy for Heart, Stroke and Vascular Health in Australia has been established to improve the cardiovascular health of Australians².

6.2 Cardiovascular disease

6.2.1 Definition and prevalence

People with cardiovascular disease were defined as those who self-reported having been told by a doctor that they have had a heart attack and/or stroke and/or angina. The prevalence of cardiovascular disease was found to be 6.2% (95% CI 5.5 – 6.9).

Table 6.1: Prevalence of cardiovascular disease

	n	%
No	3806	93.8
Cardiovascular disease	250	6.2
Total	4055	100.0

Missing: 5 cases

The prevalence of cardiovascular disease and the number of people with cardiovascular disease were estimated for the north-west region and South Australia overall by applying the age, sex specific rates to the population distribution (Table 6.2).

Table 6.2: Estimated prevalence of cardiovascular disease by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	5.9	(4.8 - 7.0)	15,343
Western region	7.0	(5.7 – 8.2)	11,756
South Australia	6.6	(5.8 - 7.4)	76,471

In the north-west region of Adelaide, the overall prevalence masks differences between the age groups. The prevalence of cardiovascular disease in the 55 to 64 and the 65+ year age groups is statistically significantly higher than among people who are younger than 55 years of age. The prevalence of cardiovascular disease for males and females by the three age groups is shown in Figure 6.1.

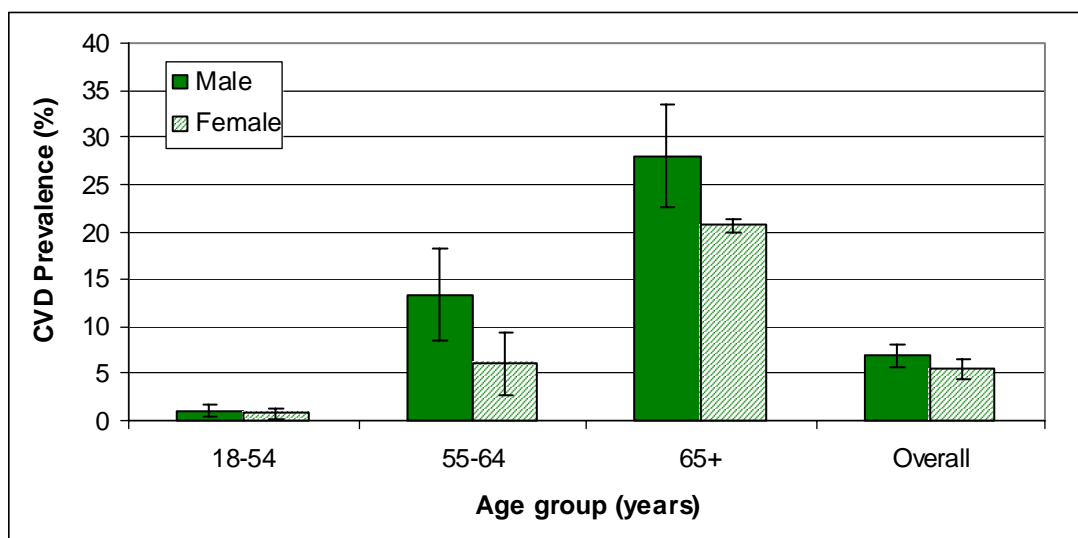


Figure 6.1: Prevalence of cardiovascular disease by sex and age group

6.2.2 Demographic profile of people with cardiovascular disease

The prevalence of cardiovascular disease was statistically significantly higher among people who were 50 years or over, were born in the United Kingdom and Ireland, widowed, undertaking home duties or retired, and statistically significantly lower among those who had an income higher than \$20,000, never been married, had an education level of trade/apprenticeship/certificate/diploma or higher (Table 6.3).

Table 6.3: Univariate Odds Ratios for demographic variables associated with cardiovascular disease

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	137/1987	6.9	1.00		
Female	113/2069	5.5	0.79	(0.60 - 1.01)	0.06
Age group					
18 to 49 years	16/2517	0.6	1.00		
50 to 59 years	36/584	6.2	11.7	(6.30 – 21.8)	<0.001
60 years and over	199/955	20.9	46.5	(27.0 – 80.1)	<0.001
Area of residence					
Western suburbs	125/1849	6.8	1.00		
Northern suburbs	125/2207	5.7	0.83	(0.64 - 1.07)	0.15
Highest education level obtained					
Secondary	134/1750	7.7	1.00		
Trade/Apprenticeship/Cert/Diploma	98/1638	6.0	0.76	(0.68 - 1.15)	0.05
Bachelor degree or higher	6/474	1.2	0.15	(0.06 - 0.34)	<0.001
Gross annual household income					
Up to \$20,000	144/900	16.0	1.00		
\$20,001-40,000	53/1007	5.3	0.29	(0.21 - 0.41)	<0.001
\$40,001-60,000	12/899	1.3	0.07	(0.04 - 0.13)	<0.001
More than \$60,000	12/992	1.2	0.06	(0.03 - 0.12)	<0.001
Country of birth					
Australia	148/2861	5.2	1.00		
UK or Ireland	70/645	10.8	2.22	(1.64 - 2.99)	<0.001
Other	32/524	6.2	1.20	(0.81 – 1.78)	0.36
Marital status					
Married or living with partner	163/2525	6.5	1.00		
Separated/Divorced	21/329	6.5	1.00	(0.63 - 1.60)	1.00
Widowed	56/232	24.3	4.66	(3.32 – 6.54)	<0.001
Never married	7/938	0.8	0.11	(0.05 - 0.24)	<0.001
Work status					
Full time employed	16/1536	1.1	1.00		
Part time/Casual employed	14/726	1.9	1.77	(0.86 – 3.66)	0.12
Unemployed	4/173	2.2	2.08	(0.67 – 6.44)	0.20
Home duties/Retired	203/1238	16.4	18.27	(10.96- 30.44)	<0.001
Student/Other	12/333	3.7	3.62	(1.71 – 7.64)	0.001

6.2.3 Self-reported risk factor profile of people with cardiovascular disease

The prevalence of cardiovascular disease was statistically significantly higher among people who were ex-smokers, or had a family history of cardiovascular disease or stroke, and statistically significantly lower among those who were low risk alcohol or intermediate to very high risk drinkers (Table 6.4).

Table 6.4: Univariate Odds Ratios for self-reported risk factors associated with cardiovascular disease

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	95/1906	5.0	1.00		
Ex-smoker	119/1141	10.4	2.22	(1.68 - 2.94)	<0.001
Current smoker	35/985	3.5	0.70	(0.47 - 1.05)	0.08
Alcohol risk					
Non drinker, no risk	172/2147	8.0	1.00		
Low risk	69/1628	4.2	0.51	(0.38 - 0.68)	<0.001
Intermediate to very high risk	5/244	1.9	0.22	(0.09 - 0.56)	0.002
Family history of diabetes					
No	166/2714	6.1	1.00		
Yes	84/1342	6.2	1.02	(0.78 - 1.34)	0.89
Family history of heart disease					
No	98/1963	5.0	1.00		
Yes	151/2093	7.2	1.48	(1.14 - 1.92)	0.003
Family history of stroke					
No	132/2620	5.0	1.00		
Yes	118/1436	8.2	1.70	(1.31 - 2.19)	<0.001
Physical activity					
Sedentary	69/1036	6.7	1.00		
Physically active	134/2652	5.0	0.74	(0.55 - 1.00)	0.05

6.2.4 Measured risk factor profile of people with cardiovascular disease

The prevalence of cardiovascular disease was statistically significantly higher among people who were overweight or obese, or those who had a high waist-hip ratio, high blood pressure, or a high HbA1c level, and statistically lower among people who had a high total cholesterol (Table 6.5). HbA1c, or glycosylated haemoglobin, is a measure of the amount of glucose-bound haemoglobin and provides information on long-term glucose control.

Table 6.5: Univariate Odds Ratios for measured risk factors associated with cardiovascular disease

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	41/1261	3.2	1.00		
Overweight	108/1483	7.3	2.34	(1.62 – 3.37)	<0.001
Obese	94/1135	8.2	2.68	(1.84 – 3.90)	<0.001
Waist:hip ratio (>1.0 men, >0.85 women)					
No	160/3390	4.7	1.00		
Yes	89/664	13.4	3.11	(2.37 – 4.09)	<0.001
High blood pressure (≥140/90mmHg)					
No	99/2967	3.3	1.00		
Yes	151/1089	13.8	4.64	(3.56 – 6.04)	<0.001
High total cholesterol (≥5.5mmol/L)					
No	176/2548	6.9	1.00		
Yes	68/1440	4.7	0.67	(0.50 – 0.89)	0.006
High HbA1c (>7%)					
No	210/3872	5.4	1.00		
Yes	34/113	30.4	7.61	(4.97 – 11.64)	<0.001

6.2.5 Co-morbidity profile of people with cardiovascular disease

The prevalence of cardiovascular disease was statistically significantly higher among people with diabetes or asthma (Table 6.6).

Table 6.6: Univariate Odds Ratios for co-morbidities associated with cardiovascular disease

Variable	n	%	OR	(95% CI OR)	p value
Diabetes					
No	184/3789	4.8	1.00		
Yes	66/267	24.8	6.49	(4.74 – 8.89)	<0.001
Mental health disorder					
No	205/3486	5.9	1.00		
Yes	41/548	7.5	1.30	(0.92 – 1.84)	0.14
COPD					
No	228/3875	5.9	1.00		
Yes	19/138	14.0	2.60	(1.58 – 4.29)	<0.001
Asthma					
No	197/3556	5.5	1.00		
Yes	53/498	10.6	2.037	(1.48 – 2.79)	<0.001

6.2.6 Quality of life profile of people with and without cardiovascular disease

Figure 6.2 shows the mean scores of the SF-36 subscales for people with and without cardiovascular disease. Quality of life was significantly lower for those with cardiovascular disease on all SF-36 dimensions except Mental Health.

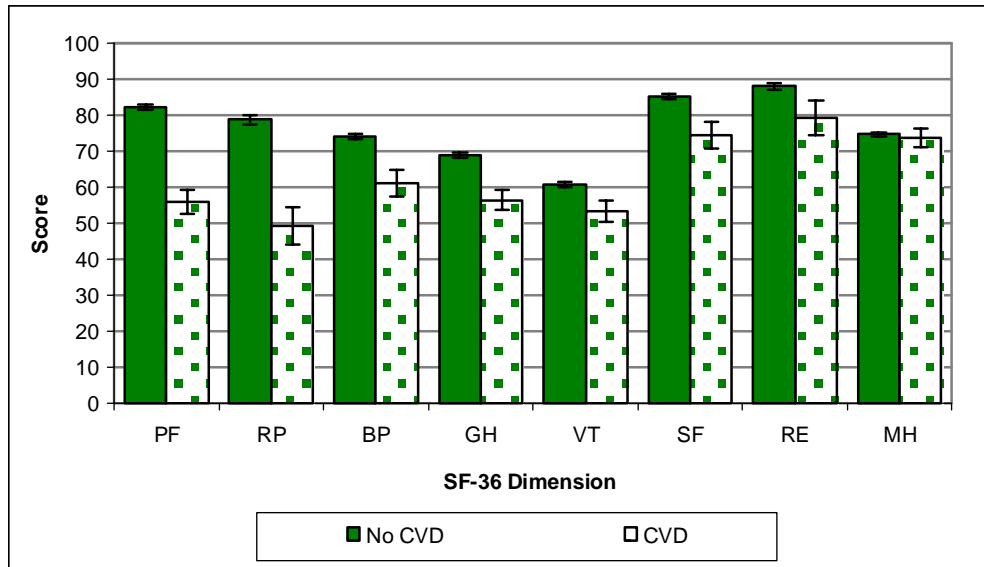


Figure 6.2: Mean SF-36 scores for people with and without cardiovascular disease

6.2.7 Health service use of people with and without cardiovascular disease

People with cardiovascular disease were statistically significantly more likely than people without cardiovascular disease to have used a general practitioner, day surgery, hospital accident and emergency, hospital clinic, eye specialist or ophthalmologist, other specialist doctor, podiatrist, dietician or nurse educator services, and statistically significantly less likely than people without cardiovascular disease to have used chiropractor services and other health services, in the last 12 months (Table 6.7).

Table 6.7: Proportion of people with and without cardiovascular disease who used various health services in South Australia in the last 12 months

Variable	No cardiovascular disease		Cardiovascular disease	
	n	%	n	%
General Practitioner	3347	87.9	233	93.1 [^]
Community Health Centre	151	4.0	12	4.7
District Nurses or other Community Nurses	68	1.8	8	3.3
Psychologist/Psychiatrist	209	5.5	9	3.6
Day Surgery	418	11.0	41	16.6 [^]
Hospital – Accident & Emergency Department	451	11.8	50	20.0 [^]
Hospital – Clinic (Outpatient/Specialist/Allied Health)	529	13.9	73	29.3 [^]
Eye Specialist/Ophthalmologist	829	21.8	120	48.0 [^]
Other Specialist Doctor (not in a hospital)	606	15.9	78	31.2 [^]
Physiotherapist	518	13.6	25	10.1
Chiropractor	509	13.4	17	6.8 ^v
Alternative Therapist eg Naturopath, Osteopath	191	5.0	7	2.8
Podiatrist	285	7.5	57	23.0 [^]
Dietician	81	2.1	15	5.9 [^]
Nurse Educator	26	0.7	10	3.9 [^]
Other Health Service	202	5.3	3	1.4

[^] ^v Statistically significantly higher or lower than comparison group of no cardiovascular disease (p<0.05)

6.3 References

1. Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare. National Health Priority Areas Report: Cardiovascular Health 1998. AIHW Cat. No. PHE 9. HEALTH and AIHW, Canberra, 1999.
2. Australian Institute of Health and Welfare. Heart, stroke and vascular diseases – Australian facts 2004. AIHW Cat No. CVD 27. Canberra, 2004.

CHAPTER 7: RISK FACTORS FOR ILL HEALTH

7.1 Introduction

This chapter describes people with risk factors associated with chronic disease in terms of their demographic, quality of life, comorbidity, and health service use characteristics.

Chronic disease places a significant burden on the community in terms of health, social, economic and emotional costs. The risk factors described here increase the likelihood of developing chronic disease. An understanding of these risk factors assists in reducing the social and economic impact of chronic disease on the community.

The risk factors reported in this chapter are current smoking, intermediate to very high alcohol risk, no or insufficient physical activity, overweight or obesity, high waist hip ratio, high blood pressure, and high cholesterol.

7.2 Smoking

7.2.1 Prevalence

Smoking prevalence was calculated using data obtained from the questionnaire. The information was divided into non-smokers, ex-smokers and current smokers. The prevalence of smoking is shown in Table 7.1. Overall, 24.4% (95% CI 23.1 – 25.8) of study participants were current smokers.

Table 7.1: Smoking prevalence

	n	%
Non-smoker	1908	47.3
Ex-smoker	1143	28.3
Current smoker	985	24.4
Total	4036	100.0

Note: 24 cases missing

The level of smoking among current smokers can be further broken down into the level of smoking status based on the number of cigarettes smoked per day (Table 7.2). Light smokers were classified as smoking 1 to 14 cigarettes per day, moderate smokers 15 to 24 cigarettes per day, and heavy smokers 25 cigarettes or more per day.

Table 7.2: Level of smoking status

	n	%
Non-smoker	1908	47.3
Ex-smoker	1143	28.3
Light smoker	506	12.5
Moderate smoker	287	7.1
Heavy smoker	192	4.8
Total	4036	100.0

Note: 24 cases missing

The prevalence of current smoking and the number of current smokers were estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.3).

Table 7.3: Estimated prevalence of current smoking by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	26.0	(24.0 – 28.0)	67,500
Western region	21.5	(19.5 – 23.6)	36,400
South Australia	23.7	(22.3 – 25.1)	274,700

7.2.2 Demographic profile of current smoking

Statistical analyses (Table 7.4) were conducted to determine which demographic characteristics best described current smokers. The prevalence of current smoking was statistically significantly higher among those living in the northern suburbs, those with a household income between \$20,001 and \$60,000 per annum, those who were separated, divorced or never married, and those with part-time or casual employment, or unemployed, and statistically significantly lower among females, those 30 years of age and over, those who had an educational level of bachelor degree or higher, those born outside Australia, those who were widowed, and those who were undertaking home duties or retired.

Table 7.4: Univariate Odds Ratios for demographic variables associated with those classified as current smokers

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	542/1980	27.4	1.00		
Female	443/2055	21.6	0.73	(0.63 – 0.84)	<0.001
Age group					
18 to 29 years	354/989	35.7	1.00		
30 to 39 years	236/766	30.8	0.80	(0.66 – 0.98)	0.03
40 to 49 years	211/751	28.0	0.70	(0.57 – 0.87)	<0.001
50 to 59 years	106/581	18.2	0.40	(0.31 – 0.52)	<0.001
60 to 69 years	41/429	9.6	0.19	(0.13 – 0.27)	<0.001
70 years and over	37/520	7.2	0.14	(0.09 – 0.20)	<0.001
Area of residence					
Western suburbs	404/1838	22.0	1.00		
Northern suburbs	581/2198	26.4	1.28	(1.11 – 1.49)	0.001
Highest education level obtained					
Secondary	433/1746	24.8	1.00		
Trade/Apprenticeship/ Cert/Diploma	446/1638	27.3	1.14	(0.97 – 1.33)	0.11
Bachelor degree or higher	66/475	14.0	0.49	(0.37 – 0.66)	<0.001
Gross annual household income					
Up to \$20,000	190/899	21.2	1.00		
\$20,001-40,000	287/1008	28.5	1.49	(1.20 – 1.85)	<0.001
\$40,001-60,000	243/899	27.1	1.39	(1.11 – 1.74)	0.004
More than \$60,000	198/991	20.0	0.93	(0.74 – 1.18)	0.53
Not stated	66/239	27.7	1.43	(1.03 – 1.98)	0.03
Country of birth					
Australia	752/2859	26.3	1.00		
UK or Ireland	124/645	19.3	0.67	(0.54 – 0.83)	<0.001
Other	105/520	20.2	0.71	(0.56 – 0.89)	0.003
Marital status					
Married or living with partner	510/2519	20.2	1.00		
Separated/Divorced	101/326	30.9	1.74	(1.34 – 2.25)	<0.001
Widowed	23/231	10.0	0.44	(0.27 – 0.69)	<0.001
Never married	345/940	36.7	2.29	(1.94 – 2.71)	<0.001
Work status					
Full time employed	419/1535	27.3	1.00		
Part time/Casual employed	233/727	32.9	1.25	(1.03 – 1.52)	0.02
Unemployed	89/173	51.1	2.78	(2.01 – 3.89)	<0.001
Home duties / retired	160/1231	13.0	0.40	(0.32 – 0.49)	<0.001
Student / other	75/333	22.6	0.78	(0.58 – 1.04)	0.09

7.2.3 Co-morbidity profile of current smokers

The prevalence of current smoking was statistically significantly higher among people with COPD or a mental health condition (including anxiety, depression, stress related problem, any other mental health problem), and statistically significantly lower among those with diabetes or cardiovascular disease (including heart attack, stroke, angina).

Table 7.5: Univariate Odds Ratios for co-morbidity variables associated with those classified as current smokers

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	940/3775	24.9	1.00		
Yes	45/261	17.3	0.63	(0.45- 0.88)	0.007
Asthma					
No	867/3538	24.5	1.00		
Yes	118/498	23.7	0.96	(0.76 – 1.20)	0.7
COPD					
No	932/3856	24.2	1.00		
Yes	42/139	30.1	1.35	(0.93 – 1.96)	<0.11
Cardiovascular disease					
No	950/3783	25.1	1.00		
Yes	35/248	14.1	0.49	(0.33 – 0.72)	<0.001
Mental health condition					
No	792/3472	22.8	1.00		
Yes	187/539	34.6	1.79	(1.47 – 2.19)	<0.001

7.2.4 Quality of life profile of current smokers

Figure 7.1 shows the mean scores of the SF-36 subscales for people who did not smoke, were ex smokers and for people who were current smokers. Current smokers had statistically significantly lower quality of life scores across all SF-36 dimensions.

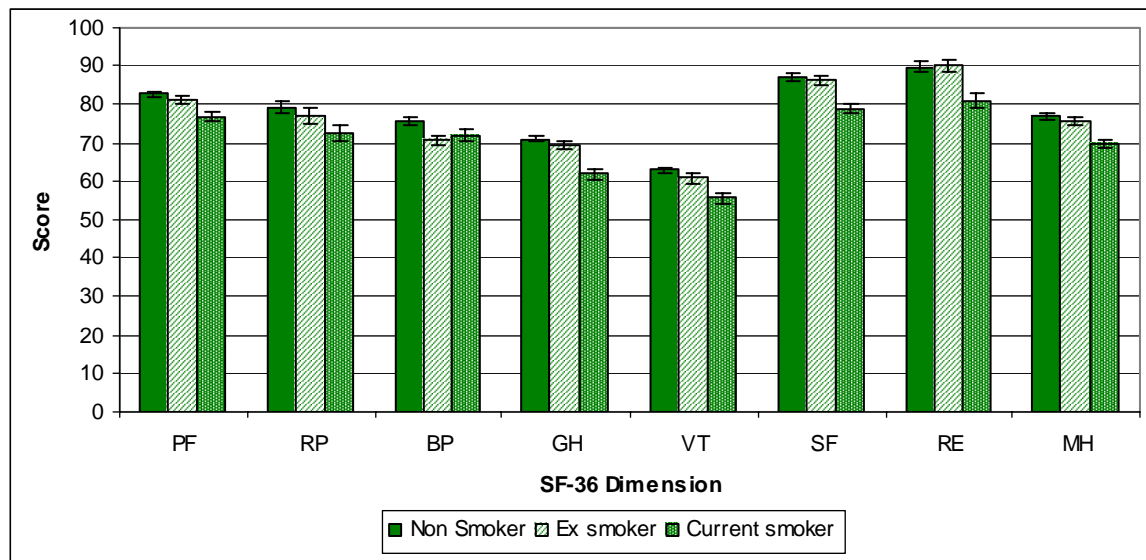


Figure 7.1: SF-36 mean scores for people who did not smoke, ex smokers and current smokers

7.2.5 Health service use of current smokers

People who were current smokers were statistically significantly more likely than people who were not current smokers to have used psychologist/psychiatrist services in the last 12 months, and less likely to have visited a general practitioner, used district nurses or other community nurses, day surgery, eye specialist/ophthalmologist, other specialist doctor (not in a hospital) (Table 7.6).

Table 7.6: Proportion of people who do and do not smoke who used various health services in South Australia in the last 12 months

Variable	Non and Ex-smokers		Current smoker		
	n	%	n	%	
General Practitioner	2724	89.3	850	86.3	∨
Community Health Centre	112	3.7	50	5.1	
District Nurses or other Community Nurses	70	2.3	6	0.6	∨
Psychologist/Psychiatrist	140	4.6	78	7.9	^
Day Surgery	370	12.1	90	9.1	∨
Hospital – Accident & Emergency Department	361	11.8	138	14.0	
Hospital – Clinic (Outpatient/Specialist/Allied Health)	473	15.5	129	13.1	
Eye Specialist/Ophthalmologist	770	25.2	177	18.0	∨
Other Specialist Doctor (not in a hospital)	566	18.6	118	11.9	∨
Physiotherapist	425	13.9	120	12.2	
Chiropractor	384	12.6	143	14.5	
Alternative Therapist eg. Naturopath, Osteopath	149	4.9	49	5.0	
Podiatrist	302	9.9	39	4.0	
Dietician	70	2.3	26	2.7	
Nurse Educator	29	1.0	6	0.6	
Other Health Service	163	5.3	43	4.3	

^ ∨ Statistically significantly higher or lower than comparison group (p<0.05)

7.3 Alcohol consumption

7.3.1 Definition and prevalence

Prevalence of alcohol consumption was calculated using data obtained from the questionnaire. To ascertain their personal alcohol risk, respondents were asked the number of standard drinks they usually have on a weekly and daily basis. Alcohol risk was then calculated using this information to categorise respondents into non-drinkers, no risk drinkers, low risk drinkers, intermediate risk drinkers, high risk drinkers and very high risk drinkers. The information was divided into non drinkers, no alcohol risk; low alcohol risk; intermediate to very high alcohol risk.

These questions, and the classification formulae that allocated the responses into risk categories, were taken from the 1989 National Heart Foundation Risk Factor Prevalence study¹. The categories of risk have been defined as follows:

Table 7.7: Categories of Risk Levels

Frequency of drinking	Number of drinks					
	1-2	3-4	5-8	9-12	13-20	>20
Less than once a week	B	B	B	C	D	E
1 or 2 days	B	B	B	C	D	E
3 or 4 days	B	B	C	D	E	F
5 or 6 days	B	C	D	E	F	F
Every day	B	C	D	E	F	F

The risk factor levels have been defined as follows:

Table 7.8: Alcohol risk levels

Category	Description	Risk	
		Men	Women
A	Non-drinkers	None	None
B	Average daily intake of less than 3 drinks	None	Low
C	Average daily intake of 4 drinks or 9-12 drinks in any day	Low	Intermediate
D	Average daily intake of 5-8 drinks or occasional excess	Intermediate	High
E	Average daily intake of 9-12 drinks or frequent or great occasional excessive intake	High	Very high
F	Average daily intake of over 12 drinks	Very high	Very high

The prevalence of alcohol consumption by risk level is shown in Table 7.9. Overall, 6.0% (95% CI 5.3 – 6.8) of study participants had an intermediate to very high alcohol risk.

Table 7.9: Alcohol consumption

	n	%
Non drinkers, no risk	2148	53.4
Low alcohol risk	1630	40.5
Intermediate alcohol risk	206	5.1
High to very high alcohol risk	38	0.9
Total	4023	100.0

Note: 37 cases missing

The prevalence of intermediate to very high alcohol risk was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.10).

Table 7.10: Estimated prevalence of intermediate to very high alcohol risk by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	7.0	(5.9 – 8.2)	18,300
Western region	5.2	(4.1 – 6.3)	8,700
South Australia	6.0	(5.2 – 6.8)	69,100

7.3.2 Demographic profile of people with intermediate to very high alcohol risk

The prevalence of intermediate to very high alcohol risk was statistically significantly higher among those who live in the northern region, had an income between \$20,000 and \$60,000, were separated or divorced or never married, and reported work status as unemployed, and statistically significantly lower among females, those aged 30-39 years or 50 years and over, had an education level of bachelor degree or higher, were born outside Australia, the United Kingdom or Ireland, and reported work status as home duties or retired (Table 7.11).

Table 7.11: Univariate Odds Ratios for demographic variables associated with those classified as having an intermediate to very high alcohol risk

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	145/1974	7.3	1.00		
Female	99/2048	4.8	0.64	(0.49 – 0.83)	0.001
Age group					
18 to 29 years	91/985	9.2	1.00		
30 to 39 years	37/767	4.8	0.50	(0.33 – 0.75)	<0.001
40 to 49 years	51/749	6.9	0.72	(0.50 – 1.04)	0.08
50 to 59 years	29/576	5.0	0.52	(0.33 – 0.82)	0.004
60 to 69 years	20/431	4.6	0.48	(0.28 – 0.80)	0.004
70 years and over	17/515	3.3	0.34	(0.19 – 0.58)	<0.001
Area of residence					
Western suburbs	95/1837	5.2	1.00		
Northern suburbs	149/2186	6.8	1.34	(1.02 – 1.76)	0.04
Highest education level obtained					
Secondary	120/1739	6.9	1.00		
Trade/Apprenticeship/Cert/Diploma	99/1638	6.0	0.87	(0.65 – 1.15)	0.4
Bachelor degree or higher	14/474	3.0	0.41	(0.22 – 0.74)	0.002
Gross annual household income					
Up to \$20,000	38/891	4.2	1.00		
\$20,001-40,000	74/1003	7.4	1.79	(1.18 – 2.73)	0.006
\$40,001-60,000	60/899	6.7	1.61	(1.04 – 2.49)	0.03
More than \$60,000	58/991	5.8	1.39	(0.90 – 2.17)	0.2
Not stated	14/239	5.9	1.40	(0.71 – 2.72)	0.4
Country of birth					
Australia	198/2846	7.0	1.00		
UK or Ireland	31/644	4.8	0.68	(0.45 – 1.01)	0.06
Other	11/521	2.1	0.29	(0.15 – 0.53)	<0.001
Marital status					
Married or living with partner	117/2512	4.6	1.00		
Separated/Divorced	24/326	7.4	1.63	(1.00 – 2.62)	0.05
Widowed	5/230	2.2	0.45	(0.16 – 1.17)	0.1
Never married	96/935	10.2	2.34	(1.75 – 3.13)	<0.001
Work status					
Full time employed	97/1532	6.3	1.00		
Part time/Casual employed	55/720	7.6	1.22	(0.86 – 1.75)	0.3
Unemployed	19/173	10.8	1.81	(1.04 – 3.13)	0.03
Home duties/Retired	43/1228	3.5	0.54	(0.37 – 0.79)	0.001
Student/Other	20/333	6.1	0.95	(0.56 – 1.60)	0.9

7.3.3 Co-morbidity profile of people with intermediate to very high alcohol risk

The prevalence of intermediate to very high alcohol risk was statistically significantly lower among people with cardiovascular disease (including heart attack, stroke, angina).

Table 7.12: Univariate Odds Ratios for co-morbidity variables associated with those classified as having an intermediate to very high alcohol risk

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	231/3764	6.1	1.00		
Yes	13/259	4.9	0.81	(0.44 – 1.47)	0.6
Asthma					
No	208/3525	5.9	1.00		
Yes	36/498	7.3	1.24	(0.85 – 1.82)	0.3
COPD					
No	235/3843	6.1	1.00		
Yes	9/139	6.4	1.05	(0.53 – 2.10)	0.88
Cardiovascular disease					
No	239/3772	6.3	1.00		
Yes	5/246	1.9	0.31	(0.11 – 0.78)	0.009
Mental health condition					
No	208/3460	6.0	1.00		
Yes	34/538	6.4	1.05	(0.71 – 1.56)	0.9

7.3.4 Quality of life profile of people classified as having an intermediate to very high alcohol risk

Figure 7.2 shows the mean SF-36 scores for people classified as having an intermediate to very high alcohol risk and for those who were non-drinkers, or who had no or a low alcohol risk. Quality of life was similar for both groups, however those classified as having an intermediate to very high alcohol risk scored significantly lower on the General Health dimension.

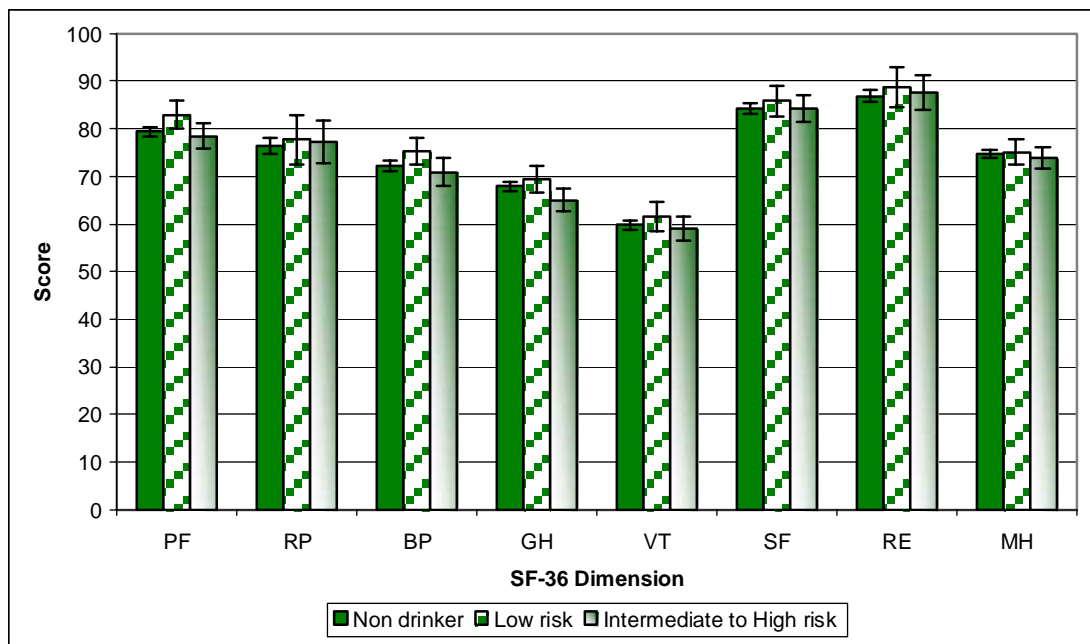


Figure 7.2: SF-36 standard scores for people classified as having an intermediate to very high alcohol risk, and those who are non-drinkers, have no or a low alcohol risk compared to the general South Australian population

7.3.5 Health service use of people classified as having an intermediate to very high alcohol risk

Statistical analyses were conducted to determine which health services in South Australia were more likely to be used in the last 12 months by people classified as having an intermediate to very high alcohol risk (Table 7.13). People classified as having an intermediate to very high alcohol risk were statistically significantly more likely to have used hospital accident and emergency department services and statistically significantly less likely to have used a hospital outpatient/specialist/allied health services in South Australia in the last 12 months.

Table 7.13: Proportion of people classified as having an intermediate to very high alcohol risk, and non-drinkers and those classified as having no or a low alcohol risk who used various health services used in South Australia in the last 12 months

Variable	Non-drinkers, no or low alcohol risk		Intermediate to very high alcohol risk	
	n	%	n	%
General Practitioner	3338	88.3	223	91.5
Community Health Centre	154	4.1	8	3.3
District Nurses or other Community Nurses	74	2.0	3	1.3
Psychologist/Psychiatrist	208	5.5	10	4.2
Day Surgery	429	11.4	27	11.3
Hospital – Accident & Emergency Department	454	12.0	40	16.6
Hospital – Clinic (Outpatient/Specialist/Allied Health)	575	15.2	22	8.9
Eye Specialist/Ophthalmologist	895	23.7	50	20.4
Other Specialist Doctor (not in a hospital)	648	17.1	35	14.4
Physiotherapist	520	13.8	24	10.0
Chiropractor	492	13.0	30	12.3
Alternative Therapist eg. Naturopath, Osteopath	192	5.1	8	3.1
Podiatrist	326	8.6	14	5.9
Dietician	93	2.5	2	0.8
Nurse Educator	36	0.9	0	0.0
Other Health Service	190	5.0	15	6.1

^ v Statistically significantly higher or lower than comparison group (p<0.05)

7.4 Physical activity

7.4.1 Definition and prevalence

Prevalence of physical activity was calculated using data obtained from the self-reported questionnaire. The level of physical activity is a description of relative overall exercise level, and indicates the quality of the activities undertaken in terms of maintaining heart, lung and muscle fitness. The level is based on a score derived from the number of times an activity has been undertaken, the average time per session and the intensity of the physical activity.

The prevalence of low, medium and high levels of physical activity is shown in Table 7.15. Overall, 28.1% (95% CI 26.7 – 29.6) of study participants were not undertaking any physical activity, and 71.9% (95% CI 70.5 – 73.4) were undertaking some physical activity (Table 7.15).

Table 7.14: Prevalence of physical activity by low, moderate and high levels

	n	%
Sedentary	1037	28.1
Low level of physical activity	1346	36.5
Moderate level of physical activity	891	24.1
High level of physical activity	417	11.3
Total	3691	100.0

Note: 369 cases missing

Table 7.15: Prevalence of physical activity

	n	%
Sedentary	1037	28.1
Undertaking some activity (low/medium/high)	2655	71.9
Total	3691	100.0

Note: 369 cases missing

The prevalence of sufficient physical activity was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.16).

Table 7.16: Estimated prevalence of those undertaking physical activity by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	69.7	(67.5 – 71.9)	181,000
Western region	74.1	(71.8 – 76.4)	125,300
South Australia	71.6	(70.0 – 73.2)	830,600

7.4.2 Demographic profile of people undertaking physical activity

The prevalence of physical activity was statistically significantly higher among those with a post-secondary qualification, those with a household income of more than \$40,000 per annum, who had never been married, and who were a student or ‘other’, and statistically significantly lower among females, those aged 30 years and over, those living in the western suburbs of Adelaide, those born outside of Australia, and those undertaking home duties or retired (Table 7.17).

Table 7.17: Univariate Odds Ratios for demographic variables associated with undertaking physical activity

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	1349/1812	74.5	1.00		
Female	1305/1879	69.5	0.78	(0.68 – 0.90)	0.001
Age group					
18 to 29 years	734/917	80.0	1.00		
30 to 39 years	501/710	70.6	0.60	(0.48 – 0.75)	<0.001
40 to 49 years	491/704	69.8	0.58	(0.46 – 0.72)	<0.001
50 to 59 years	364/536	67.9	0.53	(0.41 – 0.67)	<0.001
60 to 69 years	265/377	70.5	0.60	(0.45 – 0.78)	<0.001
70 years and over	300/448	66.8	0.50	(0.39 – 0.65)	<0.001
Area of residence					
Western suburbs	1267/1706	74.3	1.00		
Northern suburbs	1388/1985	69.9	0.81	(0.70 – 0.93)	0.003
Highest education level obtained					
Secondary	1045/1578	66.2	1.00		
Trade/Apprenticeship/Cert/Diploma	1099/1508	72.8	1.37	(1.17 – 1.60)	<0.001
Bachelor degree or higher	405/460	88.1	3.76	(2.79 – 5.08)	<0.001
Gross annual household income					
Up to \$20,000	530/794	66.7	1.00		
\$20,001-40,000	622/922	67.4	1.03	(0.84 – 1.26)	0.75
\$40,001-60,000	620/847	73.2	1.36	(1.10 – 1.69)	0.004
More than \$60,000	765/932	82.1	2.30	(1.84 – 2.87)	<0.001
Country of birth					
Australia	1934/2610	74.1	1.00		
UK or Ireland	394/586	67.3	0.72	(0.59 – 0.87)	0.001
Other	320/486	65.7	0.67	(0.54 – 0.82)	<0.001
Marital status					
Married or living with partner	1622/2323	69.9	1.00		
Separated/Divorced	203/295	68.8	0.95	(0.73 – 1.24)	0.72
Widowed	122/191	63.7	0.76	(0.56 – 1.03)	0.08
Never married	696/869	80.1	1.73	(1.44 – 2.09)	<0.001
Work status					
Full time employed	1056/1444	73.1	1.00		
Part time/Casual employed	505/678	74.5	1.07	(0.87 – 1.32)	0.51
Unemployed	106/148	71.2	0.91	(0.63 – 1.32)	0.62
Home duties/Retired	729/1086	67.1	0.75	(0.63 – 0.89)	0.001
Student/Other	240/305	78.9	1.38	(1.02 – 1.86)	0.04

7.4.3 Co-morbidity profile of people who undertake physical activity

The prevalence of physical activity was statistically significantly lower among those who had diabetes or COPD.

Table 7.18: Univariate Odds Ratios for co-morbidity variables associated with undertaking physical activity

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	2509/3463	72.4	1.00		
Yes	146/228	63.9	0.67	(0.51 – 0.89)	0.006
Asthma					
No	2327/3244	71.8	1.00		
Yes	327/448	73.1	1.07	(0.86 – 1.34)	0.55
COPD					
No	2559/3532	72.4	1.00		
Yes	67/122	55.2	0.47	(0.33 – 0.68)	<0.001
Cardiovascular disease					
No	2518/3485	72.3	1.00		
Yes	134/203	65.9	0.74	(0.55 – 1.00)	0.05
Mental health condition					
No	2293/3185	72.0	1.00		
Yes	345/485	71.2	0.96	(0.78 – 1.19)	0.73

7.4.4 Quality of life profile of people who do not perform sufficient physical activity

Figure 7.3 shows the mean scores for each of the SF-36 dimensions for people who were sedentary and who were physically active. Quality of life was statistically significantly higher for were physically active compared to those who were sedentary on all dimensions of the SF-36.

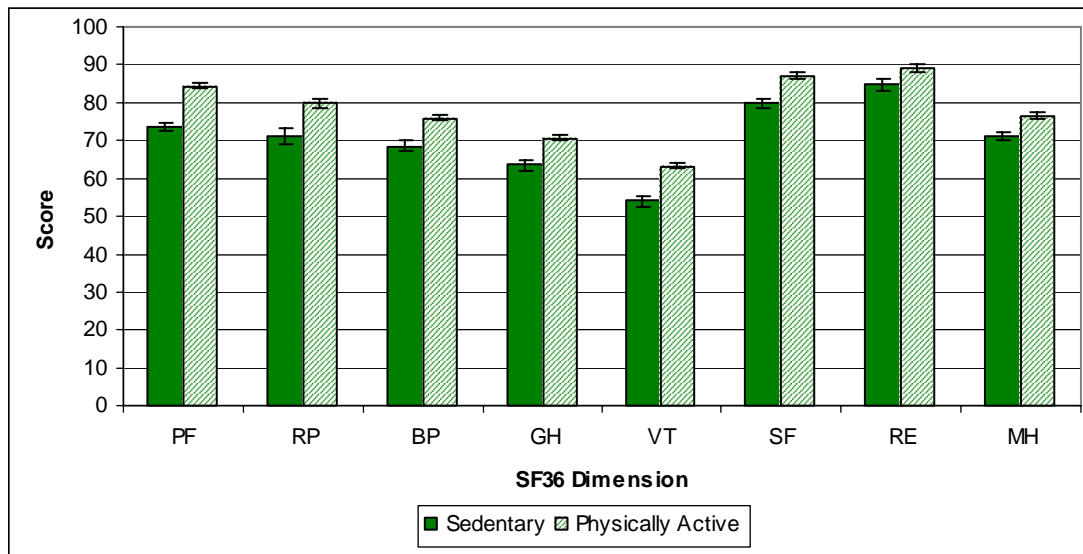


Figure 7.3: SF-36 scores for people who did and did not perform sufficient physical activity

7.4.5 Health service use of people who do not perform sufficient physical activity

People who were physically active were statistically significantly more likely to have used physiotherapist or alternative therapist services in the last 12 months (Table 7.19).

Table 7.19: Proportion of people who are and who are not physically active who used various health services in South Australia in the last 12 months

Variable	Sedentary		Physically Active	
	n	%	n	%
General Practitioner	936	90.3	2368	89.2
Community Health Centre	43	4.2	103	3.9
District Nurses or other Community Nurses	20	1.9	52	2.0
Psychologist/Psychiatrist	55	5.3	143	5.4
Day Surgery	126	12.2	297	11.2
Hospital – Accident & Emergency Department	130	12.6	326	12.3
Hospital – Clinic (Outpatient/Specialist/Allied Health)	152	14.6	397	15.0
Eye Specialist/Ophthalmologist	256	24.7	615	23.2
Other Specialist Doctor (not in a hospital)	183	17.7	445	16.8
Physiotherapist	122	11.8	393	14.8 [^]
Chiropractor	130	12.5	357	13.4
Alternative Therapist eg. Naturopath, Osteopath	38	3.7	151	5.7 [^]
Podiatrist	75	7.2	226	8.5
Dietician	24	2.3	65	2.4
Nurse Educator	7	0.7	24	0.9
Other Health Service	45	4.3	149	5.6

[^] v Statistically significantly higher or lower than comparison group (p<0.05)

7.5 Body mass index

7.5.1 Definition and prevalence

Body mass index (BMI) was calculated using height and weight measurements. Measurements were taken in the clinic using calibrated instruments and standard methods. The formula for calculation of BMI is as follows ¹:

$$\text{weight (kg) / height (m)}^2$$

The criteria for classifying BMI are as follows:

Table 7.20: BMI Criteria

Descriptive term	BMI
Underweight	<18.50
Normal weight	18.50 to < 25.00
Overweight	25.00 to < 30.00
Obese	30.00 +

The prevalence of overweight and obesity according to body mass index are shown in Table 7.21. Overall, 36.6% (95% CI 35.1 – 38.1) of study participants were overweight, and 28.0% (95% CI 26.6 – 29.4) of study participants were obese.

Table 7.21: Prevalence of overweight and obesity according to body mass index

	n	%
Underweight	175	4.3
Normal	1261	31.0
Overweight	1485	36.6
Obese	1137	28.0
Total	4058	100.0

Note: 2 cases missing

In comparison, the prevalence estimates of overweight and obesity (self-reported height and weight) obtained from South Australian population surveys ³ (n=9265) were lower, with 34.8% of respondents classified as overweight and 18.4% classified as obese. In addition, the population survey determined 2.8% of the respondents were classified as underweight and 44.0% had acceptable weight.

The prevalence of obesity was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.22).

Table 7.22: Estimated prevalence of obesity by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	31.8	(29.7 – 33.9)	82,600
Western region	23.7	(21.6 – 25.9)	40,100
South Australia	28.3	(26.8 – 29.8)	327,900

The distribution of BMI, height and weight are shown in Figure 7.4 to Figure 7.6. The mean BMI was 28 kg/m² (SD=6, n=4058), the mean height was 168 cm (SD=10, n=4057), and the mean weight was 78 kg (SD=17, n=4057).

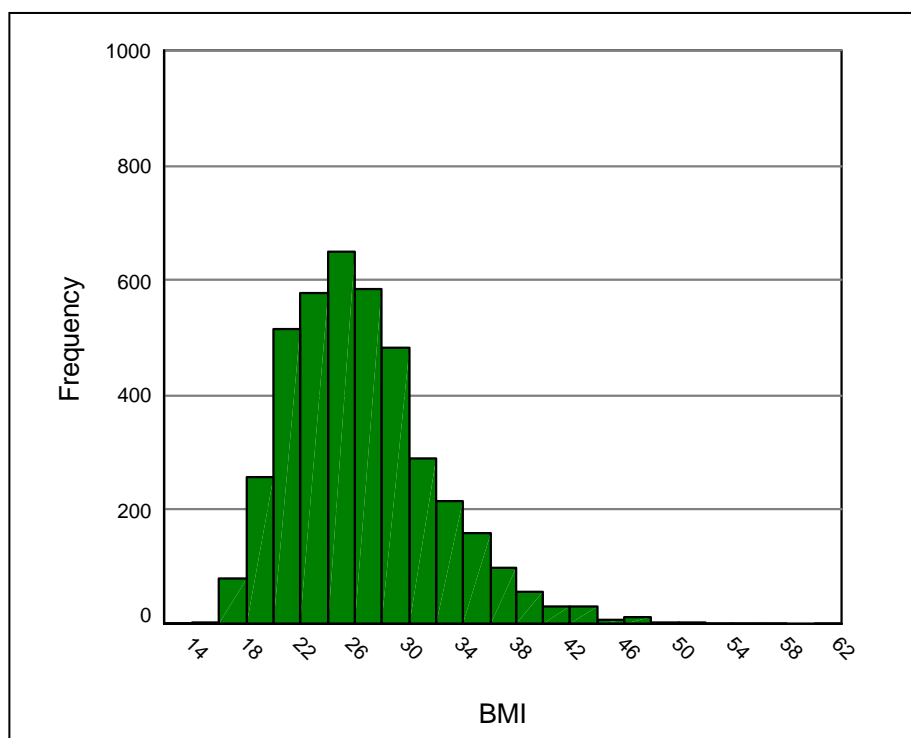


Figure 7.4: Distribution of BMI

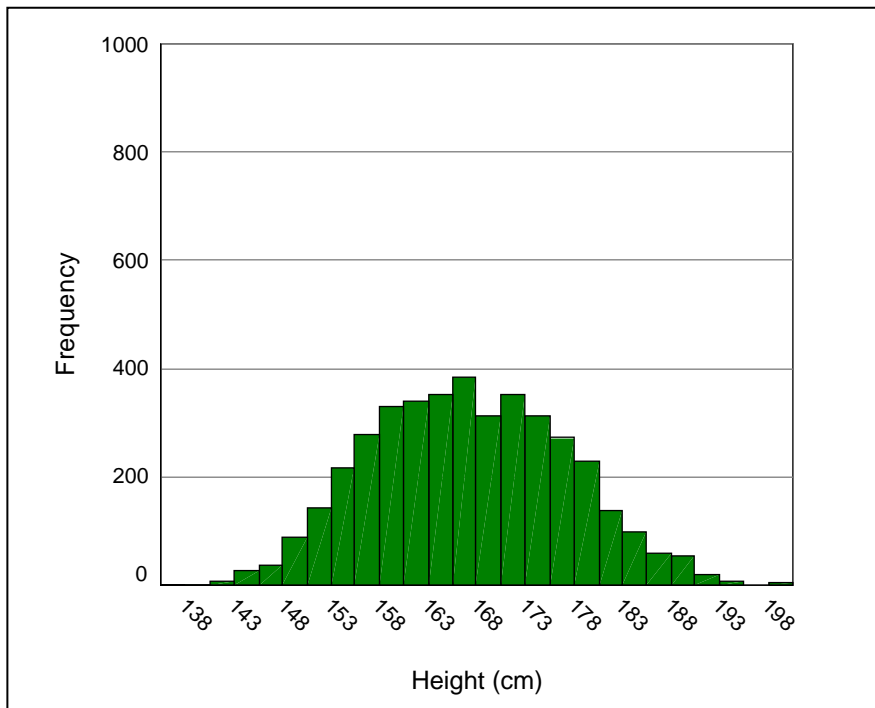


Figure 7.5: Distribution of Height

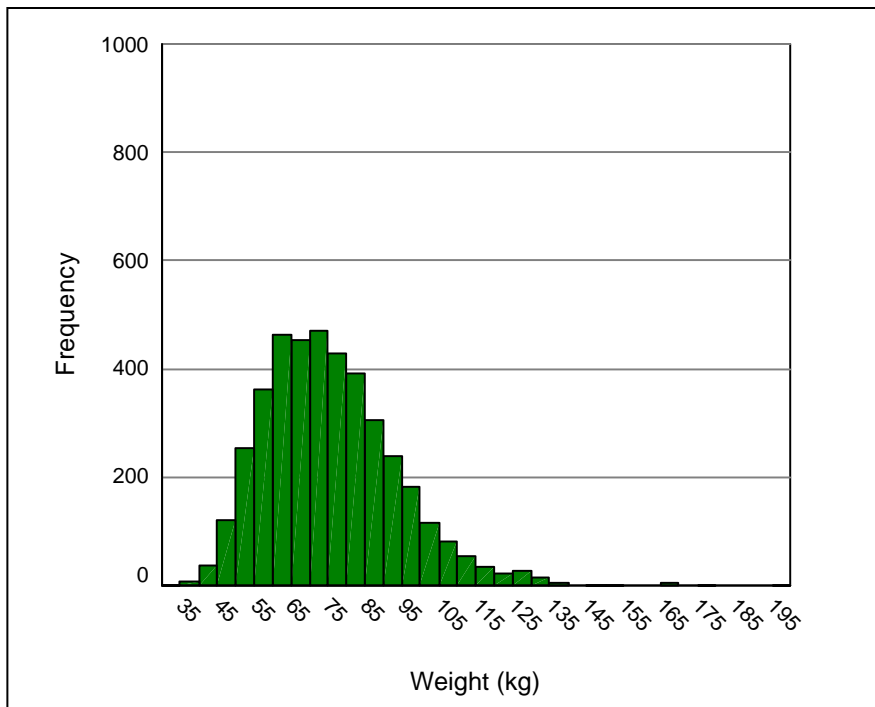


Figure 7.6: Distribution of Weight

7.5.2 Demographic profile of people who are overweight and obese according to body mass index

The prevalence of overweight was statistically significantly higher among those aged 30 years or older, born in the United Kingdom or Ireland, and statistically significantly lower among females, those who had never been married, and those undertaking home duties or retired (Table 7.23).

Table 7.23: Univariate Odds Ratios for demographic variables associated with those classified as overweight

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	867/1988	43.6	1.00		
Female	618/2070	29.8	0.55	(0.48 – 0.63)	<0.001
Age group					
18 to 29 years	257/996	25.8	1.00		
30 to 39 years	255/768	33.2	1.44	(1.17 – 1.76)	0.001
40 to 49 years	296/755	39.2	1.85	(1.51 – 2.27)	<0.001
50 to 59 years	235/584	40.3	1.94	(1.56 – 2.42)	<0.001
60 to 69 years	208/433	48.0	2.66	(2.10 – 3.37)	<0.001
70 years and over	234/523	44.7	2.33	(1.86 – 2.91)	<0.001
Area of residence					
Western suburbs	699/1853	37.7	1.00		
Northern suburbs	786/2207	35.6	0.91	(0.80 – 1.04)	0.17
Highest education level obtained					
Secondary	628/1751	35.9	1.00		
Trade/Apprenticeship/Cert/Diploma	629/1641	38.3	1.11	(0.97 – 1.28)	0.13
Bachelor degree or higher	165/475	34.8	0.96	(0.77 – 1.28)	0.69
Gross annual household income					
Up to \$20,000	336/902	37.2	1.00		
\$20,001-40,000	375/1008	37.1	1.00	(0.83 – 1.20)	1.00
\$40,001-60,000	319/899	35.5	0.93	(0.77 – 1.13)	0.45
More than \$60,000	354/992	35.7	0.94	(0.78 – 1.13)	0.49
Not stated	102/258	39.6	1.11	(0.83 – 1.47)	0.48
Country of birth					
Australia	1003/2865	35.0	1.00		
UK or Ireland	278/645	43.1	1.41	(1.18 – 1.67)	<0.001
Other	197/524	37.5	1.11	(0.92 – 1.35)	0.28
Marital status					
Married or living with partner	1007/2525	39.9	1.00		
Separated/Divorced	127/331	38.4	0.97	(0.73 – 1.30)	0.86
Widowed	92/232	39.7	0.89	(0.64 – 1.23)	0.48
Never married	243/940	25.9	0.37	(0.31 – 0.44)	<0.001

Table 7.23: cont.

Variable	n	%	OR	(95% CI)	p value
Work status					
Full time employed	626/1537	40.7	1.00		
Part time/Casual employed	210/728	28.8	0.94	(0.74 – 1.19)	0.61
Unemployed	51/173	29.5	0.99	(0.75 – 1.31)	0.96
Home duties/Retired	483/1239	38.9	0.53	(0.45 – 0.62)	<0.001
Student/Other	96/333	28.8	1.48	(0.74 – 2.95)	0.27

The prevalence of obesity was statistically significantly higher among females, those 30 years of age or over, living in the northern region of Adelaide, and those who reported work status as home duties or retired, and statistically significantly lower among those who had an education level of bachelor degree or higher, an income between \$20,001 and \$40,000 or greater than \$60,000, were born in Asia or other country, and had never been married (Table 7.24).

Table 7.24: Univariate Odds Ratios for demographic variables associated with those classified as obese

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	516/1988	26.0	1.00		
Female	621/2072	30.0	1.22	1.06 – 1.40	0.004
Age group					
18 to 29 years	185/996	18.6	1.00		
30 to 39 years	192/768	25.0	1.47	1.17 – 1.84	0.001
40 to 49 years	251/755	33.2	2.18	1.75 – 2.72	<0.001
50 to 59 years	220/584	37.7	2.65	2.11 – 3.35	<0.001
60 to 69 years	148/433	34.1	2.26	1.75 – 2.92	<0.001
70 years and over	141/523	26.9	1.61	1.25 – 2.07	<0.001
Area of residence					
Western suburbs	437/1853	23.6	1.00		
Northern suburbs	700/2207	31.7	1.51	1.31 – 1.73	<0.001
Highest education level obtained					
Secondary	527/1751	30.1	1.00		
Trade/Apprenticeship/Cert/Diploma	453/1641	27.6	0.89	0.76 – 1.03	0.11
Bachelor degree or higher	106/475	27.6	0.67	0.53 – 0.85	0.001

Table 7.24: cont.

Variable	n	%	OR	(95% CI)	p value
Gross household income					
Up to \$20,000	300/902	33.3	1.00		
\$20,001-40,000	269/1008	26.7	0.73	0.60 – 0.89	0.002
\$40,001-60,000	264/899	29.4	0.84	0.68 – 1.02	0.08
More than \$60,000	226/992	22.7	0.59	0.48 – 0.72	<0.001
Not stated	78/258	30.2	0.87	0.64 – 1.17	0.36
Country of birth					
Australia	801/2865	28.0	1.00		
UK or Ireland	183/645	28.3	1.02	0.84 – 1.23	0.86
Other	142/524	27.2	0.96	0.78 – 1.18	0.70
Marital status					
Married or living with partner	779/2525	30.9	1.00		
Separated/Divorced	103/331	31.3	1.02	0.80 – 1.31	0.87
Widowed	63/232	27.3	0.84	0.62 – 1.14	0.26
Never married	181/940	19.3	0.54	0.45 – 0.64	<0.001
Work status					
Full time employed	399/1537	26.0	1.00		
Part time/Casual employed	178/728	24.4	0.92	0.75 – 1.13	0.43
Unemployed	51/173	29.5	1.19	0.84 – 1.69	0.32
Home duties/Retired	414/1239	33.4	1.43	1.21 – 1.69	<0.001
Student/Other	79/333	23.8	0.89	0.68 – 1.18	0.42

7.5.3 Co-morbidity profile of people who are obese

The prevalence of obesity was statistically significantly higher among people with diabetes or cardiovascular disease (including heart attack, stroke, angina), and statistically significantly lower among those with COPD.

Table 7.25: Univariate Odds Ratios for co-morbidity variables associated with obesity

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	987/3791	26.0	1.00		
Yes	144/263	54.9	3.45	(2.68 – 4.45)	<0.001
Asthma					
No	987/3560	27.7	1.00		
Yes	150/498	30.1	1.13	(0.92 – 1.39)	0.24
COPD					
No	2518/3878	64.9	1.00		
Yes	83/139	59.69	0.81	(0.57 – 1.14)	0.23
Cardiovascular disease					
No	1042/3806	27.4	1.00		
Yes	94/250	37.4	1.59	(1.22 – 2.07)	0.001
Mental health condition					
No	962/3487	27.6	1.00		
Yes	171/548	31.2	1.19	(0.98 – 1.45)	0.08

7.5.4 Quality of life profile of people who are overweight or obese

Figure 7.7 shows the mean scores of the SF-36 subscales for people who were overweight or obese. People who were overweight or obese scored statistically significantly lower on all except the Social Functioning and Role Emotional dimensions of the SF-36.

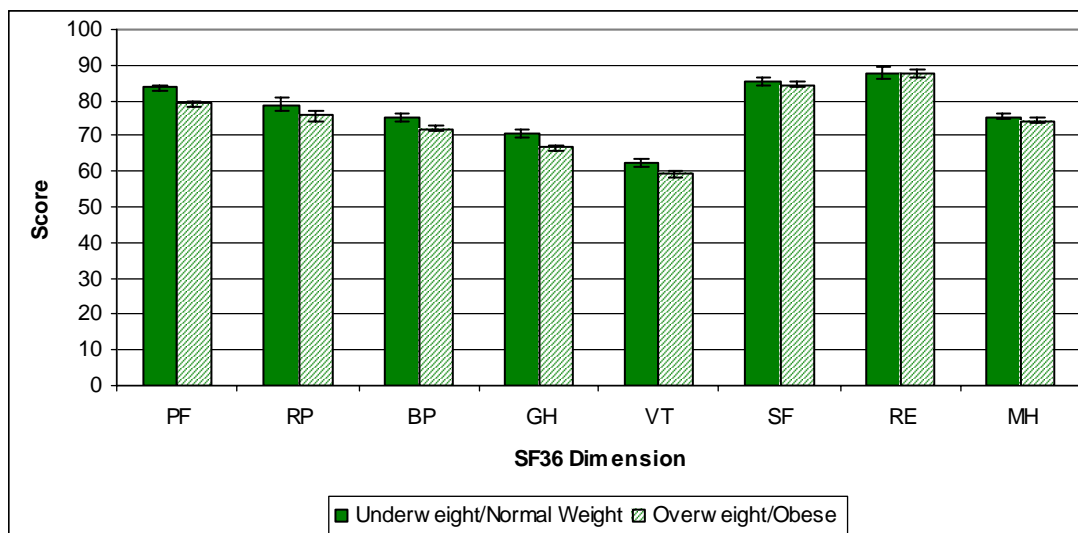


Figure 7.7: SF-36 mean scores for people who are overweight or obese compared to those who are underweight or of normal weight

7.5.5 Health service use of people who are overweight or obese

People who were overweight were statistically significantly more likely than people who were of acceptable weight to have used general practitioner, eye specialist or ophthalmologist, other specialist doctor, and dietician services in the last 12 months, and statistically significantly less likely to have used alternative therapist services (Table 7.26).

People who were obese were statistically significantly more likely than people who were of acceptable weight to have used general practitioner, day surgery, hospital outpatient/specialist/allied health, eye specialist or ophthalmologist, other specialist doctor, and dietician services in the last 12 months, and statistically significantly less likely to have used alternative therapist services (Table 7.26).

Table 7.26: Proportion of people who were overweight or obese who used various health services in South Australia in the last 12 months

Variable	Acceptable		Overweight		Obese	
	n	%	n	%	n	%
General Practitioner	1095	86.9	1329	89.5	1018	89.6
Community Health Centre	41	3.3	68	4.6	43	3.8
District Nurses or other Community Nurses	28	2.2	25	1.7	20	1.7
Psychologist/Psychiatrist	58	4.6	89	6.0	62	5.4
Day Surgery	122	9.7	179	12.0	146	12.9
Hospital – Accident & Emergency Department	149	11.8	161	10.8	162	14.3
Hospital – Clinic (Outpatient/ Specialist/Allied Health)	170	13.5	214	14.4	199	17.5
Eye Specialist/Ophthalmologist	261	20.7	375	25.3	287	25.2
Other Specialist Doctor (not in a hospital)	182	14.5	259	17.5	222	19.5
Physiotherapist	179	14.2	214	14.4	134	11.8
Chiropractor	163	13.0	209	14.1	130	11.5
Alternative Therapist eg. Naturopath, Osteopath	78	6.2	56	3.8	49	4.3
Podiatrist	92	7.3	136	9.1	106	9.3
Dietician	12	1.0	30	2.0	50	4.4
Nurse Educator	7	0.6	15	1.0	10	0.9
Other Health Service	76	6.0	69	4.6	52	4.6

^ v Statistically significantly higher or lower than comparison group (p<0.05)

7.6 Waist hip ratio

7.6.1 Definition and prevalence

Waist hip ratio was calculated from measurements undertaken in the clinic of waist and hip circumference using a standard measuring tape. People were defined as having a high waist hip ratio, an indication of android obesity, if their waist hip ratio (WHR) was greater than 1.0 for men and greater than 0.85 for women⁴. Whereas BMI is a summary of overall height and weight, or total adiposity, WHR provides a measure of fat distribution. An android or centralised pattern of fat distribution, where excess body fat is distributed in the abdominal region rather than on the hips and thighs, plays an important role in determining risk of cardiovascular disease and diabetes, particularly in men^{4,8}.

The prevalence of high waist hip ratio is shown in Table 7.27.

Table 7.27: Prevalence of high waist hip ratio

	n	%
Waist hip ratio less than or equal to 1.0 in men and 0.85 in women	3393	83.6
Waist hip ratio greater than 1.0 in men and 0.85 in women	665	16.4
Total	4058	100.0

Note: 2 cases missing

The prevalence of obesity by either BMI or high waist hip ratio is shown in Table 7.28.

Table 7.28: Prevalence of obesity by BMI or high waist hip ratio

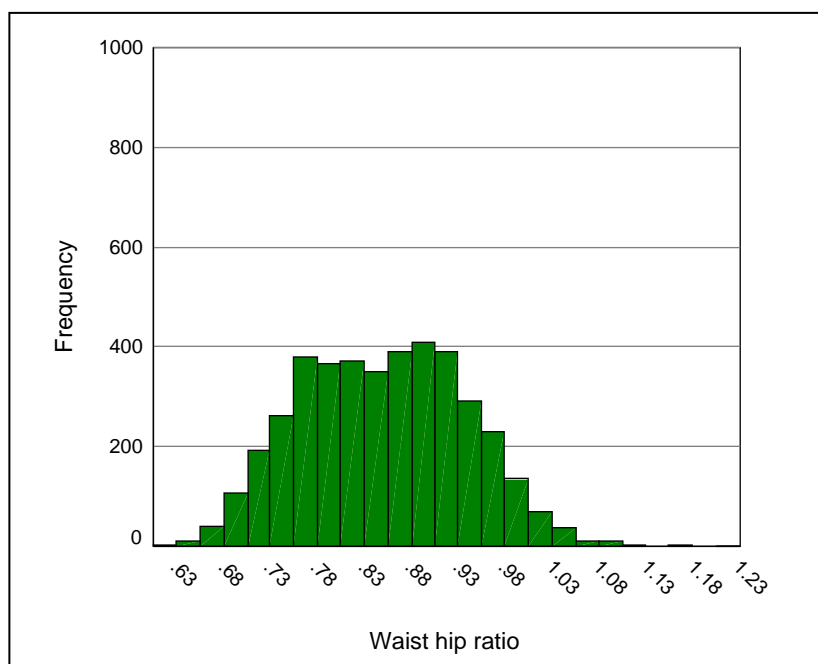
	n	%
Not obese	2640	65.0
Obese according to BMI or waist hip ratio	1420	35.0
Total	4060	100.0

The prevalence of high waist hip ratio was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.29).

Table 7.29: Estimated prevalence of high waist hip ratio by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	16.6	(15.3 – 17.9)	43,100
Western region	16.2	(14.4 – 18.0)	27,400
South Australia	16.4	(15.1 – 17.7)	190,200

The distribution of waist hip ratio is shown in Figure 7.8. The mean waist hip ratio was 0.86 (SD=0.09, n=4057).

**Figure 7.8: Distribution of Waist Hip Ratio**

7.6.2 Demographic profile of people with a high waist hip ratio

The prevalence of high waist hip ratio was statistically significantly higher among females, those aged 30 years or over, born in the United Kingdom or Ireland, separated, divorced or widowed, and had a work status of part time or casual employment, undertaking home duties, retired or a student, and statistically significantly lower among those who were born in Asia or other country, never married, had undertaken post-secondary education, and had an income over \$20,000 (Table 7.30).

Table 7.30: Univariate Odds Ratios for demographic variables associated with high waist hip ratio

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	153/1988	7.7	1.00		
Female	513/2070	24.8	3.95	(3.24 – 4.81)	<0.001
Age group					
18 to 29 years	46/996	4.6	1.00		
30 to 39 years	64/768	8.3	1.88	(1.25 – 2.83)	0.002
40 to 49 years	132/754	17.6	4.38	(3.05 – 6.32)	<0.001
50 to 59 years	130/584	22.3	5.91	(4.09 – 8.56)	<0.001
60 to 69 years	118/433	27.3	7.74	(5.30 – 11.32)	<0.001
70 years and over	175/523	33.4	10.39	(7.24 – 14.93)	<0.001
Highest education level obtained					
Secondary	372/1751	21.2	1.00		
Trade/Apprenticeship/Cert/Diploma	220/1640	13.4	0.57	(0.48 – 0.69)	<0.001
Bachelor degree or higher	42/474	8.9	0.36	(0.25 – 0.51)	<0.001
Gross annual household income					
Up to \$20,000	245/901	27.2	1.00		
\$20,001-40,000	169/1008	16.7	0.54	(0.43 – 0.68)	<0.001
\$40,001-60,000	110/899	12.2	0.37	(0.29 – 0.48)	<0.001
More than \$60,000	90/992	9.1	0.27	(0.20 – 0.35)	<0.001
Not stated	52/258	20.0	0.68	(0.48 – 0.96)	0.03
Country of birth					
Australia	431/2864	15.0	1.00		
UK or Ireland	138/645	21.4	1.53	(1.23 – 1.91)	<0.001
Other	91/524	17.3	1.18	(0.92 – 1.52)	0.18
Marital status					
Married or living with partner	443/2524	17.5	1.00		
Separated/Divorced	69/331	21.0	1.24	(0.92 – 1.67)	0.02
Widowed	90/232	38.8	2.98	(2.22 – 3.99)	<0.001
Never married	59/940	6.3	0.31	(0.23 – 0.42)	<0.001
Work status					
Full time employed	142/1536	9.3	1.00		
Part time/Casual employed	99/728	13.5	1.55	(1.16 – 2.05)	0.002
Unemployed	18/173	10.2	1.13	(0.65 – 1.95)	0.1
Home duties/Retired	357/1239	28.8	3.97	(3.20 – 4.94)	<0.001
Student/Other	38/333	11.4	1.26	(0.85 – 1.88)	0.3

7.6.3 Co-morbidity profile of people with a high waist hip ratio

The prevalence of high waist hip ratio was statistically significantly higher among those with diabetes, asthma, cardiovascular disease (including heart attack, stroke, angina), or mental health illness (including anxiety, depression, stress related condition, other), and statistically significantly lower among those with COPD.

Table 7.31: Univariate Odds Ratios for co-morbidity variables associated with those classified as having high waist hip ratio

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	558/3790	14.7	1.00		
Yes	108/263	41.0	4.04	(3.08 – 5.29)	<0.001
Asthma					
No	555/3558	15.6	1.00		
Yes	110/498	22.1	1.53	(1.21 – 1.94)	<0.001
COPD					
No	631/3877	16.3	1.00		
Yes	26/139	18.5	1.16	(0.75 – 1.80)	0.50
Cardiovascular disease					
No	575/3805	15.1	1.00		
Yes	89/249	35.7	3.12	(2.35 – 4.15)	<0.001
Mental health condition					
No	537/3485	15.4	1.00		
Yes	126/548	22.9	1.64	(1.31 – 2.05)	<0.001

7.6.4 Quality of life profile of people with a high waist hip ratio

Figure 7.9 shows the mean scores of the SF-36 subscales for people with a high waist hip ratio. People with a high waist hip ratio scored statistically significantly lower on all dimensions of the SF-36.

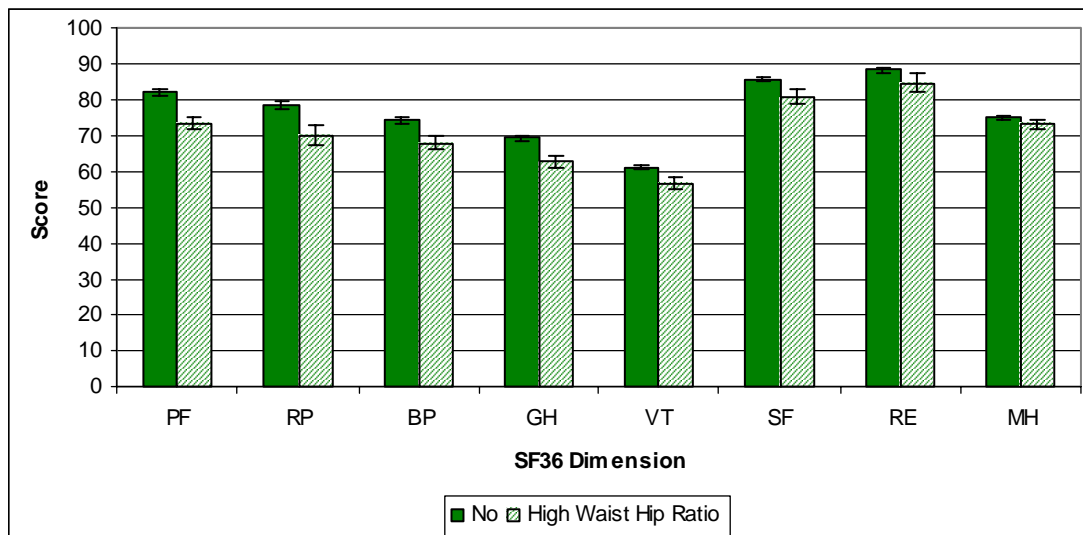


Figure 7.9: SF-36 mean scores for people with and without a high waist hip ratio

7.6.5 Health service use of people with a high waist hip ratio

People with a high waist hip ratio were statistically significantly more likely than people with a normal or low waist hip ratio to have used general practitioner, day surgery, hospital accident and emergency, hospital clinic, eye specialist or ophthalmologist, other specialist doctor, podiatrist, dietician and nurse educator services in the last 12 months (Table 7.32).

Table 7.32: Proportion of people with and without a high waist hip ratio who used various health services in South Australia in the last 12 months

Variable	Normal/low waist hip ratio		High waist hip ratio		
	n	%	n	%	
General Practitioner	2977	88.0	605	91.0	^
Community Health Centre	127	3.8	36	5.4	
District Nurses or other Community Nurses	65	1.9	13	1.9	
Psychologist/Psychiatrist	183	5.4	36	5.4	
Day Surgery	362	10.7	97	14.6	^
Hospital – Accident & Emergency Department	397	11.7	104	15.6	^
Hospital – Clinic (Outpatient/Specialist/Allied Health)	467	13.8	137	20.6	^
Eye Specialist/Ophthalmologist	741	21.9	208	31.2	^
Other Specialist Doctor (not in a hospital)	555	16.4	131	19.6	^
Physiotherapist	446	13.2	100	15.0	
Chiropractor	453	13.4	75	11.3	
Alternative Therapist eg. Naturopath, Osteopath	168	5.0	31	4.7	
Podiatrist	236	7.0	107	16.1	^
Dietician	68	2.0	28	4.1	
Nurse Educator	22	0.7	13	2.0	^
Other Health Service	181	5.4	24	3.7	^

^ v Statistically significantly higher or lower than comparison group (p<0.05)

7.7 Blood Pressure

7.7.1 Definition and prevalence

Blood pressure was measured in the clinic using a standard, calibrated blood pressure sphygmomanometer. Two blood pressure measurements were recorded, five to ten minutes apart, while the participant was relaxed and seated. The average of these two recorded measures was used in the analyses.

High blood pressure was defined as systolic blood pressure greater than or equal to 140mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg^{1,5}. The prevalence of hypertension according to clinical assessment is shown in Table 7.33. Overall, 26.8% (95% CI 25.5 – 28.2) of study participants had high blood pressure.

Table 7.33: Hypertension (high blood pressure)

	n	%
Normal	2970	73.2
High blood pressure (mmHg)	1090	26.8
Total	4060	100.0

In comparison, the prevalence estimates of self-reported high blood pressure obtained from South Australian population surveys³ (n=9265) were lower, with 24.4% of respondents reporting that they were ever told they have high blood pressure and 8.4% reporting a high blood pressure reading within the last 12 months.

The prevalence of high blood pressure was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.34).

Table 7.34: Estimated prevalence of high blood pressure by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	27.2	(25.2 – 29.2)	70,600
Western region	26.4	(24.2 – 28.6)	44,700
South Australia	26.8	(25.3 – 28.3)	310,700

The distribution of systolic and diastolic blood pressure are shown in Figure 7.10 and Figure 7.11. The mean systolic blood pressure was 126 mmHg (SD=18, n=4057), and the mean diastolic blood pressure was 80 mmHg (SD=10, n= 4057).

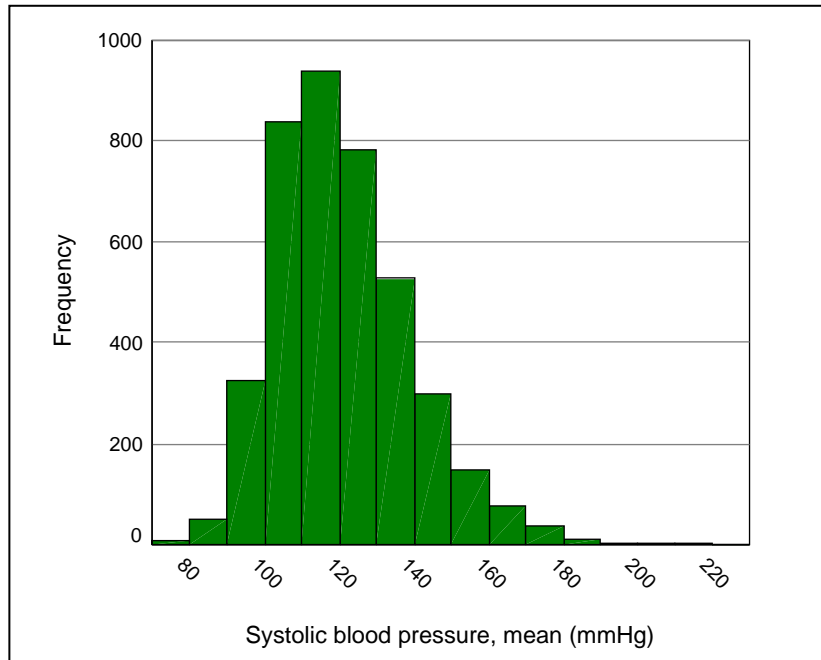


Figure 7.10: Distribution of systolic blood pressure

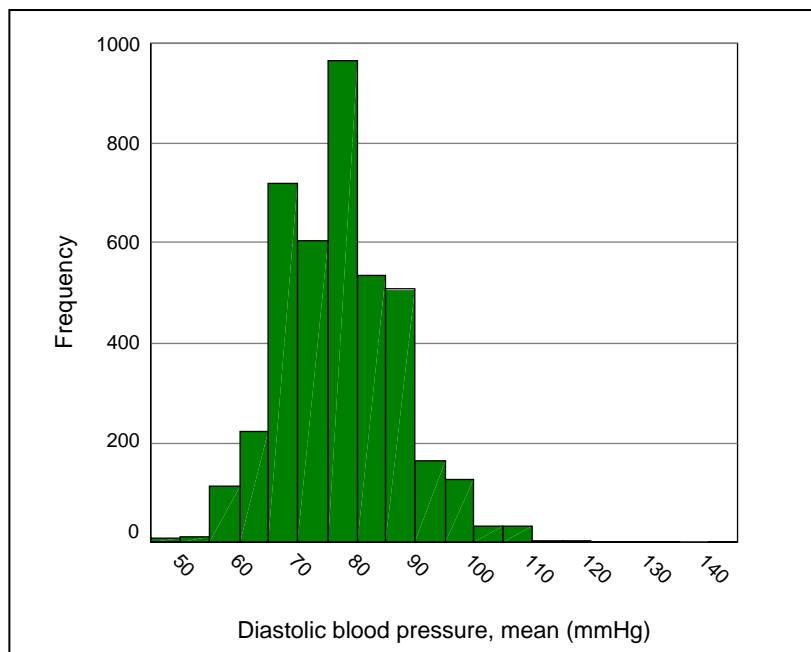


Figure 7.11: Distribution of diastolic blood pressure

7.7.2 Demographic profile of people with and without high blood pressure

The prevalence of high blood pressure was statistically significantly higher among those who were male, in the older age groups, living in the northern suburbs, had a household income of \$20,000 or less per annum, were widowed, born outside Australia, and retired or undertaking home duties. The prevalence was statistically significantly lower among those who had never been married, had an income greater than \$20,000, or had achieved an educational level of trade, apprenticeship, certificate or diploma or bachelor degree or higher (Table 7.35).

Table 7.35: Univariate Odds Ratios for demographic variables associated with high blood pressure

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	586/1988	29.5	1.00		
Female	504/2072	24.3	0.77	0.67 – 0.88	<0.001
Age group					
18 to 29 years	67/996	6.7	1.00		
30 to 39 years	88/768	11.4	1.79	1.28 – 2.50	0.001
40 to 49 years	170/755	22.5	4.03	2.98 – 5.45	<0.001
50 to 59 years	214/584	36.6	8.03	5.95 – 10.84	<0.001
60 to 69 years	210/433	48.4	13.05	9.56 – 17.82	<0.001
70 years and over	342/523	65.4	26.33	19.38 – 35.78	<0.001
Area of residence					
Western suburbs	490/1853	26.4	1.00		
Northern suburbs	600/2207	27.2	1.04	0.90 – 1.20	0.59
Highest education level obtained					
Secondary	544/1751	31.1	1.00		
Trade/Apprenticeship/ Cert/Diploma	444/1641	27.1	0.83	0.71 – 0.96	0.11
Bachelor degree or higher	54/475	11.4	0.28	0.21 – 0.38	<0.001
Gross annual household income					
Up to \$20,000	383/902	42.5	1.00		
\$20,001-40,000	285/1008	28.3	0.54	0.44 – 0.65	<0.001
\$40,001-60,000	172/899	19.1	0.32	0.26 – 0.40	<0.001
More than \$60,000	160/992	16.1	0.26	0.21 – 0.32	<0.001
Not stated	89/258	34.5	0.72	0.54 – 0.96	0.026
Country of birth					
Australia	695/2865	24.3	1.00		
UK or Ireland	223/645	34.6	1.65	1.37 – 1.98	<0.001
Other	158/524	30.2	1.34	1.09 – 1.65	0.005
Marital status					
Married or living with partner	750/2525	29.7	1.00		
Separated/Divorced	91/331	27.5	0.89	0.69 – 1.16	0.39
Widowed	136/232	58.6	3.36	2.55 – 4.43	<0.001
Never married	100/940	10.6	0.28	0.23 – 0.35	<0.001
Work status					
Full time employed	295/1537	19.2	1.00		
Part time/Casual employed	118/728	16.2	0.82	0.65 – 1.03	0.09
Unemployed	23/173	13.3	0.65	0.41 – 1.02	0.06
Home duties/retired	580/1239	46.8	3.70	3.12 – 4.38	<0.001
Student/other	54/333	16.3	0.82	0.60 – 1.13	0.23

7.7.3 Co-morbidity profile of people with and without high blood pressure

The prevalence of high blood pressure was statistically significantly higher among people with diabetes or cardiovascular disease (including heart attack, stroke, angina), and statistically significantly among those with COPD.

Table 7.36: Univariate Odds Ratios for co-morbidity variables associated with those classified as having high blood pressure

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	937/3791	24.7	1.00		
Yes	149/263	56.4	3.95	(3.04 – 5.13)	<0.001
Asthma					
No	938/3560	26.3	1.00		
Yes	152/498	30.5	1.23	(1.00 – 1.51)	0.06
COPD					
No	1015/3878	26.2	1.00		
Yes	65/139	46.6	2.46	(1.75 – 3.46)	<0.001
Cardiovascular disease					
No	938/3806	24.6	1.00		
Yes	151/250	60.3	4.66	(3.55 – 6.13)	<0.001
Mental health condition					
No	946/3487	27.1	1.00		
Yes	135/548	24.6	0.88	(0.71 – 1.09)	0.2

7.7.4 Quality of life profile of people with high blood pressure

Figure 7.12 shows the mean scores of the SF-36 subscales for people who did and did not have high blood pressure. People with high blood pressure scored statistically significantly lower on Physical Functioning and General Health than people without high blood pressure.

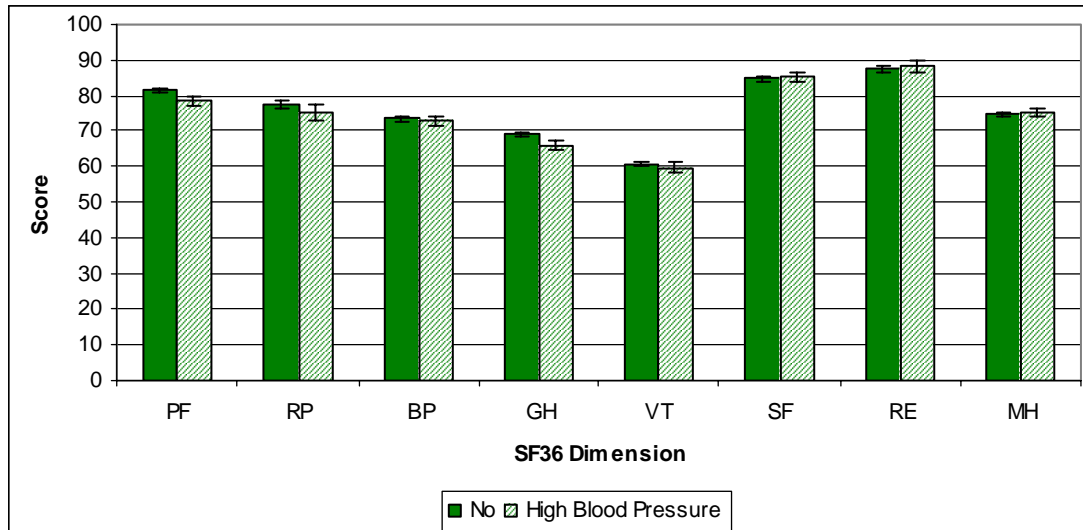


Figure 7.12: SF-36 mean scores for people who did and did not have high blood pressure

7.7.5 Health service use of people with high blood pressure

People who had high blood pressure were statistically significantly more likely than people who did not have high blood pressure to have used general practitioner, community health centre, day surgery, hospital clinic or outpatients, eye specialist/ophthalmologist, other specialist doctor, podiatrist, dietician, and nurse educator services in the last 12 months, and less likely to have used psychologist or psychiatrist, hospital accident & emergency, physiotherapist, chiropractor, alternative therapist services, or other services (Table 7.37).

Table 7.37: Proportion of people who do and do not have high blood pressure who used various health services in South Australia in the last 12 months

Variable	Normal/low blood pressure		High blood pressure	
	n	%	n	%
General Practitioner	2605	87.7	979	89.8 [^]
Community Health Centre	104	3.5	59	5.4 [^]
District Nurses or other Community Nurses	62	2.1	15	1.4
Psychologist/Psychiatrist	180	6.1	38	3.5 ^v
Day Surgery	315	10.6	144	13.2 [^]
Hospital – Accident & Emergency Department	387	13.0	114	10.4 ^v
Hospital – Clinic (Outpatient/Specialist/Allied Health)	410	13.8	194	17.8 [^]
Eye Specialist/Ophthalmologist	614	20.7	336	30.8 [^]
Other Specialist Doctor (not in a hospital)	477	16.1	208	19.1 [^]
Physiotherapist	423	14.2	123	11.3 ^v
Chiropractor	411	13.85	117	10.7 ^v
Alternative Therapist eg. Naturopath, Osteopath	168	5.7	31	2.9 ^v
Podiatrist	193	6.5	150	13.8 [^]
Dietician	68	2.3	28	2.5 [^]
Nurse Educator	20	0.7	15	1.4 [^]
Other Health Service	170	5.7	36	3.3 ^v

[^] ^v Statistically significantly higher or lower than comparison group (p<0.05)

7.8 Cholesterol

7.8.1 Definition and prevalence

Cholesterol levels were assessed with a fasted blood sample. The two components making up the definition of high cholesterol are the total blood cholesterol (TBC) being greater than or equal to 5.5 mmol/L ⁶ or the ratio of low density lipids (LDL) to high density lipids (HDL) being greater than 5 ⁷.

The prevalence of high cholesterol according to clinical assessment using the definition of total blood cholesterol greater than or equal to 5.5 mmol/L is shown in Table 7.38.

Table 7.38: High total cholesterol \geq 5.5 mmol/L (Clinical assessment)

	n	%
No	2551	63.9
Yes	1441	36.1
Total	3992	100.0

Note: 68 cases missing

The prevalence of high cholesterol according to clinical assessment using the definition of the ratio of LDL:HDL greater than 5 is shown in Table 7.39.

Table 7.39: High cholesterol LDL:HDL $>$ 5 (Clinical assessment)

	n	%
No	3847	98.2
Yes	71	1.8
Total	3918	100.0

Note: 142 cases missing

The prevalence of high cholesterol according to both definitions is shown in Table 7.40.

Table 7.40: The prevalence of high cholesterol levels according to both definitions

	n	%
No	2528	63.6
Yes (total cholesterol \geq 5.5 mmol/L only)	1374	34.6
Yes (LDL:HDL $>$ 5 only)	5	0.1
Yes (total cholesterol \geq 5.5 mmol/L and LDL:HDL $>$ 5)	67	1.7
Total	3974	100.0

Note: 86 cases missing

Thus the overall prevalence of high cholesterol according to both definitions is presented below (Table 7.41). Overall, 36.7% (95% CI 34.9 – 38.7) of study participants had high cholesterol.

Table 7.41: Overall prevalence of high cholesterol

	n	%
No	2528	63.6
Yes (total cholesterol \geq 5.5 mmol/L; LDL:HDL $>$ 5; or both)	1446	36.4
Total	3974	100.0

Note: 86 cases missing

In comparison, the prevalence estimates of self-reported high cholesterol obtained from South Australian population surveys³ (n=9265) were lower, with 22.7% of respondents reporting that they were ever told they have high cholesterol and 6.8% reporting a high cholesterol reading within the last 12 months.

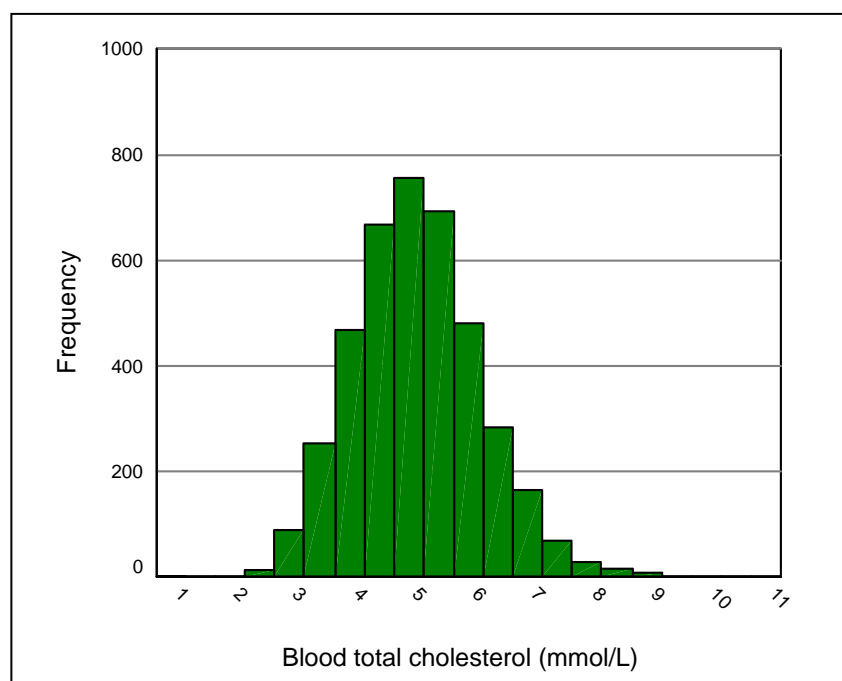
Total blood cholesterol levels above 5.5 mmol/L are an indication of an increased risk of developing coronary heart disease⁶, therefore the total blood cholesterol definition detailed in Table 7.38 was used for further analysis.

The prevalence of high cholesterol was estimated for the northern and western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 7.42).

Table 7.42: Estimated prevalence of high cholesterol by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	35.7	(33.5 – 37.9)	92,700
Western region	35.3	(32.9 – 37.7)	59,700
South Australia	35.5	(33.9 – 37.1)	411,600

The distribution of total cholesterol is shown in Figure 7.13. The mean total cholesterol level was 5.0 mmol/L (SD=1.1, n=3992).

**Figure 7.13: Distribution of total cholesterol**

7.8.2 Demographic profile of people with and without high cholesterol

The prevalence of high cholesterol was statistically significantly higher among people who were 30 years or over, born in the UK or Ireland, and those undertaking home duties or be retired, and statistically significantly lower among those who were a student, in part-time or casual employment, had a household income over \$60,000 per annum, had a bachelor degree or higher, and those who had never been married (Table 7.43).

Table 7.43: Univariate Odds Ratios for demographic variables associated with high cholesterol

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	682/1955	34.9	1.00		
Female	759/2036	37.3	1.11	0.97 – 1.27	0.1
Age group					
18 to 29 years	187/960	19.5	1.00		
30 to 39 years	239/754	31.7	1.92	1.53 – 2.41	<0.001
40 to 49 years	315/751	41.9	2.99	2.39 – 3.73	<0.001
50 to 59 years	295/581	50.8	4.26	3.37 – 5.39	<0.001
60 to 69 years	195/429	45.3	3.43	2.66 – 4.43	<0.001
70 years and over	210/516	40.7	2.84	3.22 – 3.62	<0.001
Area of residence					
Western suburbs	654/1830	35.7	1.00		
Northern suburbs	787/2162	36.4	1.03	0.90 – 1.18	0.7
Highest education level obtained					
Secondary	658/1725	38.1	1.00		
Trade/Apprenticeship/Cert/Diploma	587/1618	36.3	0.92	0.80 – 1.07	0.3
Bachelor degree or higher	149/467	31.9	0.76	0.61 – 0.95	0.02
Gross annual household income					
Up to \$20,000	967/2492	38.8	1.00		
\$20,001-40,000	138/329	41.8	1.02	0.84 – 1.23	0.9
\$40,001-60,000	102/229	44.4	0.91	0.74 – 1.10	0.3
More than \$60,000	222/915	24.2	0.77	0.64 – 0.94	0.009
Not stated	991/2819	35.1	0.94	0.69 – 1.26	
Country of birth					
Australia	248/634	39.2	1.00		
UK or Ireland	137/332	41.3	1.19	1.02 – 1.65	0.03
Other	188/518	36.2	1.05	0.86 – 1.27	0.65
Marital status					
Married or living with partner	382/992	38.5	1.00		
Separated/Divorced	314/880	35.7	1.14	0.90 – 1.45	0.3
Widowed	316/982	32.2	1.27	0.95 – 1.68	0.1
Never married	92/252	36.5	0.50	0.42 – 0.60	<0.001
Work status					
Full time employed	547/1513	36.2	1.00		
Part time/Casual employed	219/717	30.5	0.78	0.64 – 0.94	0.01
Unemployed	55/169	32.7	0.85	0.60 – 1.21	0.4
Home duties/Retired	504/1228	41.0	1.23	1.05 – 1.44	0.01
Student/Other	85/323	26.3	0.63	0.48 – 0.83	0.001

7.8.3 Co-morbidity profile of people with and without high cholesterol

The prevalence of high cholesterol was statistically significantly higher among people with asthma or cardiovascular disease (including heart attack, stroke, angina) (Table 7.44).

Table 7.44: Univariate Odds Ratios for co-morbidity variables associated with those classified as having high cholesterol

Variable	n	%	OR	(95% CI)	p value
Diabetes					
No	1361/3714	36.6	1.00		
Yes	84/259	32.4	0.83	(0.63 – 1.09)	0.2
Asthma					
No	1291/3485	37.0	1.00		
Yes	155/487	31.7	0.79	(0.64 – 0.98)	0.03
COPD					
No	1378/3812	36.2	1.00		
Yes	46/138	33.5	0.89	(0.62 – 1.28)	0.53
Cardiovascular disease					
No	1377/3727	36.9	1.00		
Yes	68/243	27.9	0.66	(0.49 – 0.89)	0.006
Mental health condition					
No	1224/3423	35.7	1.00		
Yes	211/526	40.2	1.21	1.00 – 1.46	0.05

7.8.4 Quality of life profile of people with high cholesterol

Figure 7.14 shows the mean scores of the SF-36 subscales for people with and without high cholesterol. There were no statistically significant differences observed between people with normal cholesterol and people with high cholesterol in the north west region of Adelaide.

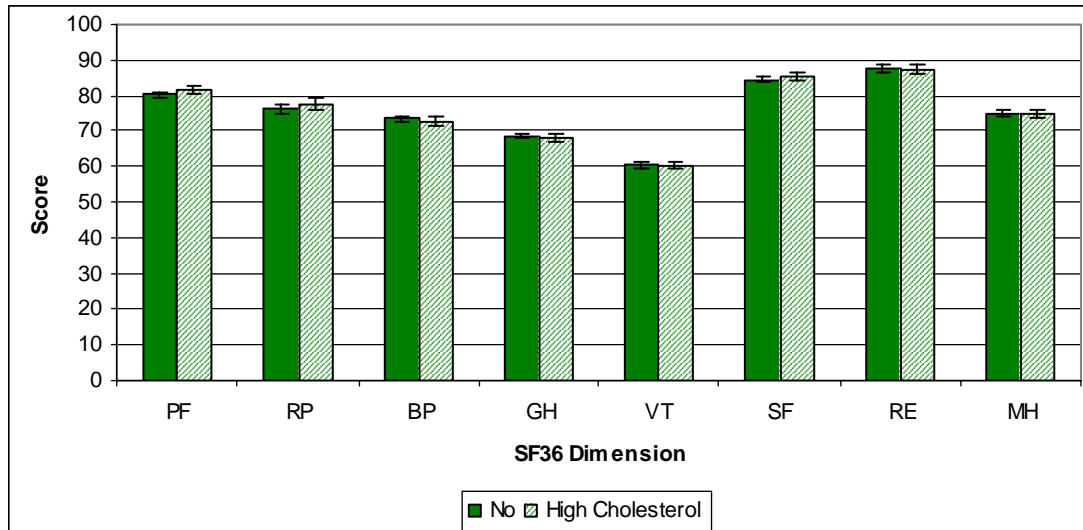


Figure 7.14: SF-36 mean scores for people with high cholesterol compared to those with normal cholesterol levels

7.8.5 Health service use of people with high cholesterol

Statistical analyses were conducted to determine which health services in South Australia were more likely to be used in the last 12 months by people with high cholesterol (Table 7.45). There were no statistically significant differences between those with and without high cholesterol in terms of health service use over the past 12 months.

Table 7.45: Proportion of people with high cholesterol who used various health services used in South Australia in the last 12 months

Variable	Normal cholesterol		High cholesterol	
	n	%	n	%
General Practitioner	2248	88.1	1279	88.8
Community Health Centre	94	3.7	69	4.8
District Nurses or other Community Nurses	43	1.7	35	2.4
Psychologist/Psychiatrist	134	5.3	81	5.6
Day Surgery	287	11.3	171	11.9
Hospital – Accident & Emergency Department	332	13.0	161	11.2
Hospital – Clinic (Outpatient/Specialist/Allied Health)	383	15.0	215	14.9
Eye Specialist/Ophthalmologist	592	23.2	342	23.7
Other Specialist Doctor (not in a hospital)	426	16.7	252	17.5
Physiotherapist	366	14.3	177	12.3
Chiropractor	341	13.4	184	12.8
Alternative Therapist eg. Naturopath, Osteopath	130	5.1	65	4.5
Podiatrist	215	8.4	123	8.6
Dietician	65	2.6	29	2.0
Nurse Educator	23	0.9	13	0.9
Other Health Service	140	5.5	61	4.2

7.9 Family history

7.9.1 Definition and prevalence

To ascertain whether there was a family history of diabetes, heart disease or stroke, clinic attendees were asked in the questionnaire if any of their first degree relatives (mother, father, sister, brother, grandmother, grandfather or other) has or has ever had diabetes, heart disease (eg heart disease or heart failure) or a stroke.

The prevalence of a family history of diabetes, heart disease and stroke is shown in Table 7.46.

Table 7.46: Family history of diabetes, heart disease and stroke in a first degree relative

	n	%
Diabetes		
No family history	2716	66.9
Family history	1344	33.1
Heart disease		
No family history	1964	48.4
Family history	2096	51.6
Stroke		
No family history	2624	64.6
Family history	1436	35.4
At least one familial risk factor		
No	1068	26.3
Yes	2992	73.7
Total	4060	100.0

7.10 Multiple risk factors

Examining the number of risk factors is important because the likelihood of developing chronic disease increases with increasing number of risk factors. Multiple risk factors were derived by accumulating the ten risk factors that were measured or self-reported in the study. The risk factors were current smoking status, intermediate to very high alcohol risk, no or insufficient physical activity, overweight and obesity, high waist hip ratio, family history of heart disease, diabetes and stroke, high blood pressure, and high cholesterol. There were no participants with all ten risk factors.

The proportion of people who had zero to nine risk factors is shown in Figure 7.15. Just fewer than 40% of the people living in the northern and western suburbs of Adelaide had at least four risk factors.

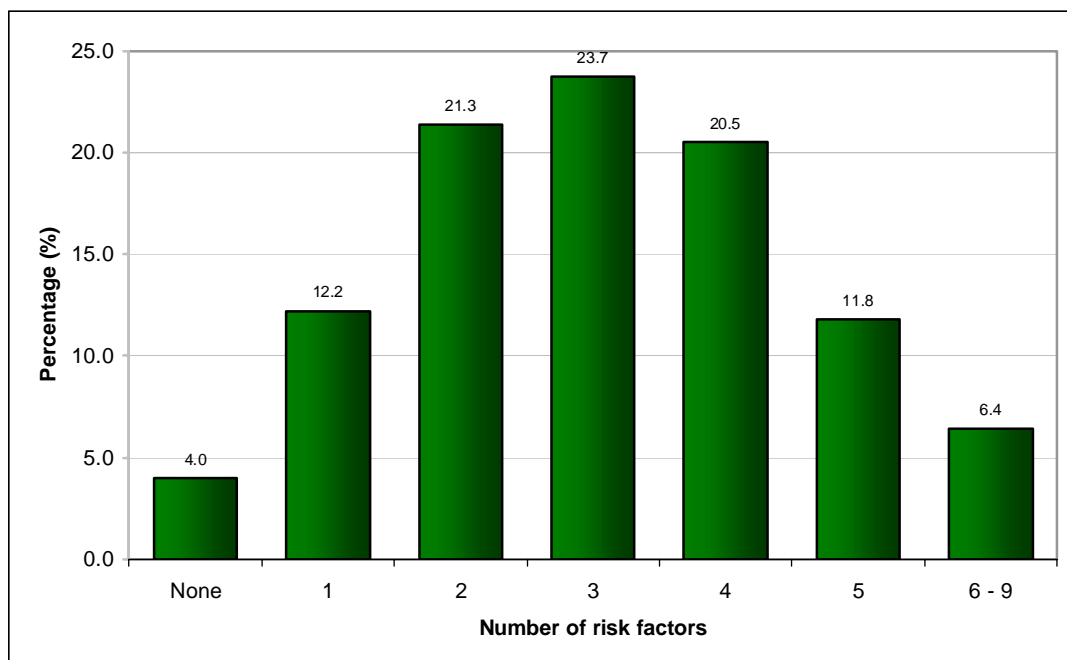


Figure 7.15: Number of risk factors for development of chronic diseases

7.10.1 Demographic profile of people with four or more risk factors

The prevalence of four or more risk factors was statistically significantly higher among people who were female, 30 years or over, living in the northern suburbs, born in the UK or Ireland, separated, divorced or widowed, and those retired or

undertaking home duties. The prevalence was statistically significantly lower among those who had an educational level higher than secondary school, an annual household income of more than \$20,000, were never married, or were a student or 'other' (Table 7.47).

Table 7.47: Univariate Odds Ratios for demographic variables associated with four or more risk factors

Variable	n	%	OR	(95% CI)	p value
Sex					
Male	715/1988	35.9	1.00		
Female	860/2072	41.5	1.27	(1.12 – 1.44)	<0.001
Age group					
18 to 29 years	227/996	22.8	1.00		
30 to 39 years	220/768	28.6	1.35	(1.08 – 1.69)	0.007
40 to 49 years	319/755	42.3	2.48	(2.01 – 3.07)	<0.001
50 to 59 years	305/584	52.2	3.70	(2.95 – 4.64)	<0.001
60 to 69 years	219/433	50.5	3.45	(2.70 – 4.42)	<0.001
70 years and over	285/523	54.4	4.03	(3.19 – 5.08)	<0.001
Area of residence					
Western suburbs	675/1853	36.4	1.00		
Northern suburbs	899/2207	40.7	1.20	(1.05 – 1.36)	0.006
Highest education level obtained					
Secondary	774/1751	44.2	1.00		
Trade/Apprenticeship/Cert/Diploma	639/1641	38.9	0.80	(0.70 – 0.93)	0.002
Bachelor degree or higher	104/475	21.9	0.35	(0.28 – 0.48)	<0.001
Gross annual household income					
Up to \$20,000	424/902	47.0	1.00		
\$20,001-40,000	425/1008	42.1	0.82	(0.68 – 0.99)	0.04
\$40,001-60,000	311/899	34.5	0.59	(0.49 – 0.72)	<0.001
More than \$60,000	301/992	30.4	0.49	(0.41 – 0.60)	<0.001
Not stated	114/258	44.2	0.90	(0.67 – 1.20)	0.5
Country of birth					
Australia	1100/2865	38.4	1.00		
UK or Ireland	280/645	43.4	1.23	(1.04 – 1.47)	0.02
Other	184/524	35.2	0.87	(0.726 – 1.06)	0.17
Marital status					
Married or living with partner	1007/2525	39.9	1.00		
Separated/Divorced	156/331	47.1	1.33	(1.05 – 1.69)	0.02
Widowed	142/232	61.2	2.38	(1.79 – 3.17)	<0.001
Never married	263/940	16.7	0.59	(0.50 – 0.69)	<0.001
Work status					
Full time employed	550/1537	35.7	1.00		
Part time/Casual employed	239/728	32.8	0.88	(0.73 – 1.06)	0.2
Unemployed	64/173	37.0	1.06	(0.75 – 1.48)	0.8
Home duties/Retired	605/1239	48.8	1.71	(1.47 – 2.00)	<0.001
Student/Other	93/333	27.9	0.70	(0.53 – 0.91)	0.008

7.10.2 Quality of life profile of people with multiple risk factors

Figure 7.16 shows the mean scores of the SF-36 dimensions for people with multiple risk factors. For all dimensions, quality of life was statistically significantly lower for people with more than 3 risk factors.

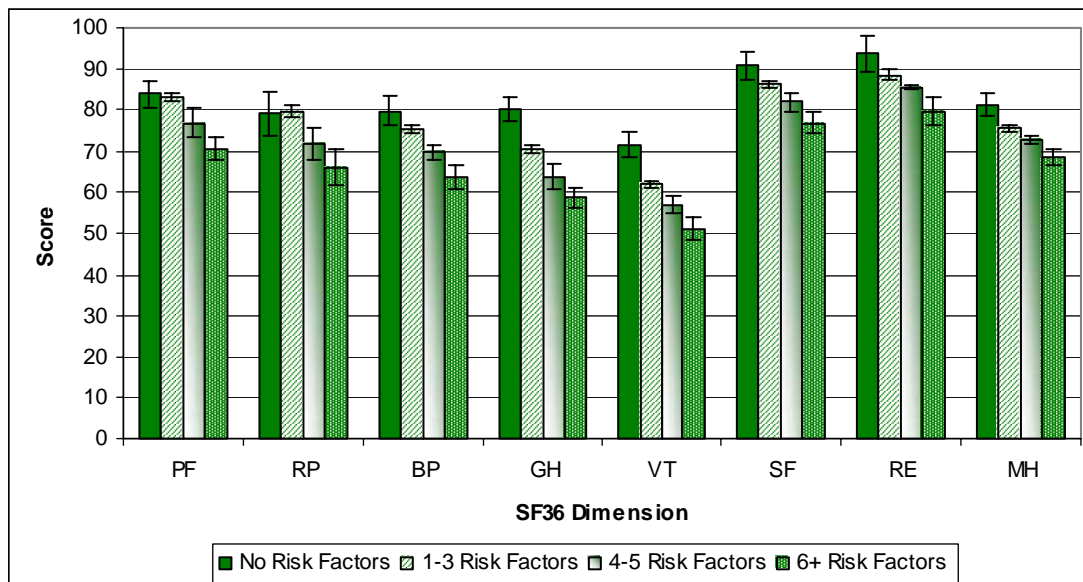


Figure 7.16: SF-36 mean scores for people with no, one to three, four to five and six to nine risk factors compared to the general South Australian population

7.10.3 Health service use of people with four or more risk factors

Statistical analyses were conducted to determine which health services in South Australia were more likely to be used in the last 12 months by four or more risk factors (Table 7.48). People with four or more risk factors were statistically significantly more likely than people with three or less risk factors, to have used general practitioner, community health centres, hospital outpatient clinic, eye specialist or ophthalmologist, other specialist doctor (not in a hospital), podiatrist and dietician services, and less likely to have used alternative therapist or other services in South Australia in the last 12 months.

Table 7.48: Proportion of people with four or more risk factors who used various health services used in South Australia in the last 12 months

Variable	No risk factors or one to three risk factors		Four or more risk factors	
	n	%	n	%
General Practitioner	2159	86.8	1425	90.5 [^]
Community Health Centre	79	3.2	84	5.3 [^]
District Nurses or other Community Nurses	50	2.0	27	1.7
Psychologist/Psychiatrist	125	5.0	93	5.9
Day Surgery	261	10.5	198	12.6 [^]
Hospital – Accident & Emergency Department	302	12.1	199	12.6
Hospital – Clinic (Outpatient/Specialist/Allied Health)	319	12.8	285	18.1 [^]
Eye Specialist/Ophthalmologist	536	21.6	413	26.3 [^]
Other Specialist Doctor (not in a hospital)	393	15.8	292	18.6 [^]
Physiotherapist	347	14.0	198	12.6
Chiropractor	322	12.9	206	13.1
Alternative Therapist eg. Naturopath, Osteopath	140	5.6	59	3.8 [∨]
Podiatrist	169	6.8	174	11.0 [^]
Dietician	52	2.1	44	2.8
Nurse Educator	22	0.9	14	0.9
Other Health Service	146	5.9	60	3.8 [∨]

[^] [∨] Statistically significantly higher or lower than comparison group (p<0.05)

7.11 References

1. National Heart Foundation of Australia. *Risk Factor Prevalence Study. Survey No. 3 - 1989*. 1989.
2. Armstrong T, Bauman A, Davies J. *Physical activity patterns of Australian adults. Results of the 1999 National Physical Activity Survey*. Canberra. AIHW. 2000.
3. South Australian Monitoring and Surveillance System, July 2003 – March 2004. Population Research and Outcome Studies Unit, South Australian Department of Human Services. 2001.
4. Australian Centre for Diabetes Strategies. *National Evidence Based Guidelines for the Management of Type 2 Diabetes Mellitus. Revised Draft*. Prepared by the Australian Centre for Diabetes Strategies, Prince of Wales Hospital, Sydney, for the Diabetes Australia Guideline Development Consortium. 2000.
5. Chalmers J et al. *Guidelines for the management of hypertension*. WHO-ISH Hypertension Guidelines Committee. World Health Organisation. Geneva. 1999. Accessed at http://www.who.int/ncd/cvd/ht_guide [30/8/01].
6. Australian Institute of Health and Welfare and National Stroke Foundation of Australia. *Heart, Stroke and Vascular Diseases Australian Facts 2001*. Canberra. AIHW. 2001.
7. Simons L. Triglyceride levels and the risk of coronary artery disease: a view from Australia. *American Journal of Cardiology* 1992; 70: 14H – 18H.

CHAPTER 8: MULTIPLE CONDITIONS

8.1 Introduction

This chapter describes people with multiple conditions, defined as having three or more of the following chronic conditions:

- Diabetes;
- Asthma;
- Chronic Obstructive Pulmonary Disease (COPD);
- Cardiovascular Disease; and
- Mental Health Illness.

These conditions are described in terms of their demographic, risk factor, quality of life, and health service use characteristics.

8.2 Multiple Conditions

8.2.1 Definition and prevalence

People with multiple conditions were defined as those with three or more chronic conditions. The conditions included in this definition were:

- Diabetes (fasting plasma glucose (FPG) level of at least 7.0 mmol/L, includes self-report);
- Asthma (15% increase in FEV₁ (forced expiratory volume in one second) from pre-Ventolin to post-Ventolin, or 12% increase in FEV₁ from pre-Ventolin to post-Ventolin if their absolute difference in FEV₁ was greater than 200ml, includes self-report);
- Mental health illness (including anxiety, depression, stress related problem, any other mental health problem);
- Cardiovascular disease (including self-reported heart attack, stroke or angina); and
- COPD (measured FEV₁:FVC ratio less than the result of the formula $(87.21 - (0.18 \times \text{age}))$ for males, and $(89.10 - (0.19 \times \text{age}))$ for females).

The prevalence of multiple conditions was found to be 1.4% (95% CI 1.1 – 1.8) (Table 8.1).

Table 8.1: Prevalence of Multiple Conditions

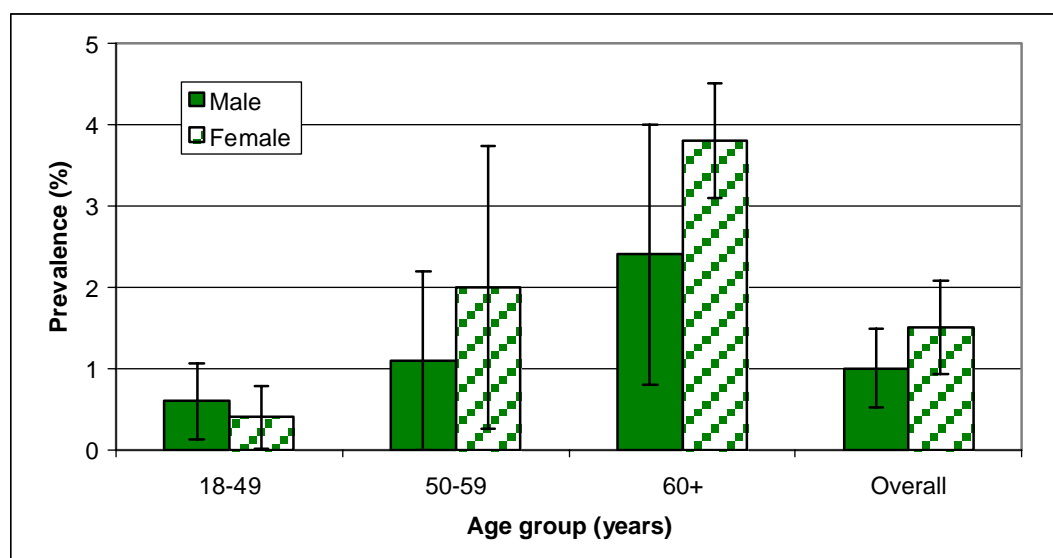
	n	%
No condition	2737	67.4
One condition	1012	24.9
Two conditions	253	6.2
Three to five conditions	58	1.4
Total	4060	100.0

The prevalence of multiple conditions and the number of people with multiple conditions were estimated for the Northern and Western regions and South Australia overall by applying the age, sex specific rates to the population distribution (Table 8.2).

Table 8.2: Estimated prevalence of three or more conditions by region, age-sex adjusted to the 2001 Estimated Resident Population

	%	Estimated (95% CI)	Approximate n
Northern region	1.5	(0.9 – 2.1)	3900
Western region	1.4	(0.8 – 2.0)	2400
South Australia	1.5	(1.1 – 1.9)	17100

In the north west region of Adelaide, the overall prevalence masks differences between the age groups. The prevalence of multiple conditions in the 50 to 59 and the 60+ year age groups is statistically significantly higher than among people who are younger than 50 years of age. Furthermore, the prevalence of multiple conditions in the 60+ year age group is significantly higher than the 50-59 year age group. The prevalence of multiple conditions for males and females by the three age groups is shown in Figure 8.1.

**Figure 8.1: Prevalence of multiple conditions (3+) by sex and age group**

8.2.2 Demographic profile of people with multiple conditions

The prevalence of multiple conditions was statistically significantly higher among those who were 50 years and over, born in the United Kingdom or Ireland, and who were not full time employed, and statistically significantly lower among those with a post-secondary qualification, and a gross annual household income greater than \$40,000 (Table 8.3).

Table 8.3: Univariate Odds Ratios for demographic variables associated with multiple conditions

Variable	n	%	OR	(95% CI OR)	p value
Sex					
Male	26/1988	1.3	1.00		
Female	32/2072	1.6	1.19	(0.71 – 2.00)	0.52
Age group					
18 to 49 years	12/2519	0.5	1.00		
50 to 59 years	10/584	1.7	3.72	(1.58 – 8.74)	0.003
60 years and over	37/957	3.9	8.70	(4.47 – 16.90)	<0.001
Area of residence					
Western suburbs	25/1853	1.4	1.00		
Northern suburbs	33/2207	1.5	1.10	(0.65 – 1.86)	0.71
Highest education level obtained					
Secondary	40/1751	2.3	1.00		
Post-secondary qualification	14/2116	0.7	0.29	(0.16 – 0.53)	<0.001
Gross annual household income					
Up to \$40,000	41/902	2.1	1.00		
\$40,001 and over	9/1008	0.5	0.21	(0.10 – 0.44)	<0.001
Country of birth					
Australia	35/2865	1.2	1.00		
UK or Ireland	16/645	2.5	2.06	(1.13 – 3.75)	0.02
Other	8/524	1.4	1.18	(0.54 – 2.62)	0.68
Marital status					
Married or living with partner	39/2525	1.6	1.00		
Separated/Divorced/Widowed/ Never married	18/1502	1.2	0.78	(0.45 – 1.37)	0.39
Work status					
Full time employed	6/1537	0.4	1.00		
Not full time employed	52/2473	2.1	5.20	(2.27 – 11.90)	<0.001

8.2.3 Self-reported risk factor profile of people with multiple conditions

The prevalence of multiple conditions was statistically significantly higher among ex-smokers, and those with a family history of diabetes, and statistically significantly lower among those engaged in physical activity (Table 8.4).

Table 8.4: Univariate Odds Ratios for self-reported risk factors associated with multiple conditions

Variable	n	%	OR	(95% CI OR)	p value
Smoking status					
Non smoker	21/1908	1.1	1.00		
Ex-smoker	26/1143	2.2	2.08	(1.16 – 3.73)	0.01
Current smoker	10/985	1.0	0.92	(0.43 – 1.97)	0.83
Alcohol risk					
Non drinker, no risk	31/2148	1.4	1.00		
Low risk	25/1630	1.6	1.09	(0.64 – 1.85)	0.76
Intermediate to very high risk	0/244	0.0	-	-	-
Family history of diabetes					
No	28/2716	1.0	1.00		
Yes	30/1344	2.2	2.19	(1.30 – 3.67)	0.003
Family history of heart disease					
No	22/1964	1.1	1.00		
Yes	36/2096	1.7	1.55	(0.91 – 2.64)	0.11
Family history of stroke					
No	33/2624	1.3	1.00		
Yes	25/1436	1.7	1.38	(0.82 – 2.33)	0.22
Physical activity					
Sedentary	20/1037	1.9	1.00		
Physically active	26/2655	1.0	0.52	(0.29 – 0.94)	0.03

8.2.4 Measured risk factor profile of people with multiple conditions

The prevalence of multiple conditions was statistically significantly higher among those who were obese, those with a high waist-hip ratio, and those with high blood pressure (Table 8.5).

Table 8.5: Univariate Odds Ratios for measured risk factors associated with multiple conditions

Variable	n	%	OR	(95% CI OR)	p value
Body Mass Index					
Acceptable	12/1392	3.8	1.00		
Overweight	19/1486	0.8	1.52	(0.72 – 3.18)	0.27
Obese	27/1137	1.2	2.89	(1.44 – 5.79)	0.003
Waist:hip ratio (>1.0 men, >0.85 women)					
No	29/3393	0.9	1.00		
Yes	29/665	4.4	5.26	(3.13 – 8.86)	<0.001
High blood pressure (≥140/90mmHg)					
No	25/2970	0.9	1.00		
Yes	33/1090	3.0	3.59	(2.13 – 6.06)	<0.001
High total cholesterol (≥5.5mmol/L)					
No	41/2551	1.6	1.00		
Yes	17/1441	1.1	0.72	(0.40 – 1.28)	0.26
Reaction to rye grass					
No	34/2262	1.5	1.00		
Yes	24/1797	1.3	0.88	(0.52 – 1.48)	0.62
Reaction to cat					
No	40/2968	1.3	1.00		
Yes	18/1091	1.7	1.26	(0.72 – 2.20)	0.41
Reaction to house dust mites					
No	45/2802	1.6	1.00		
Yes	13/1257	1.7	0.64	(0.35 – 1.19)	0.16
Reaction to alternaria (mould)					
No	49/3203	1.5	1.00		
Yes	10/857	1.1	0.73	(0.36 – 1.47)	0.38
Reaction to feather					
No	49/3613	1.4	1.00		
Yes	9/446	2.1	1.58	(0.78 – 3.19)	0.20
Reaction to cockroach					
No	49/3120	1.6	1.00		
Yes	10/939	1.0	0.67	(0.33 – 1.33)	0.25
Reaction to at least one of the six allergens					
No	27/1555	1.7	1.00		
Yes	31/2503	1.3	0.72	(0.43 – 1.22)	0.22

8.2.5 Quality of life profile of people with multiple conditions

Figure 8.2 shows the mean scores of the SF-36 subscales for people with one, two, and three or more chronic conditions (including diabetes, cardiovascular disease, asthma, COPD and mental health illness).

Quality of life was significantly lower on all SF-36 subscales for people with one condition compared to those with no condition, and compared to those with one condition, those with two conditions scored significantly lower on all subscales. Those with three or more conditions scored significantly lower on all subscales compared to those with one condition, and compared to those with two conditions, those with three or more conditions scored significantly lower on all subscales except for Role-Physical and Bodily Pain.

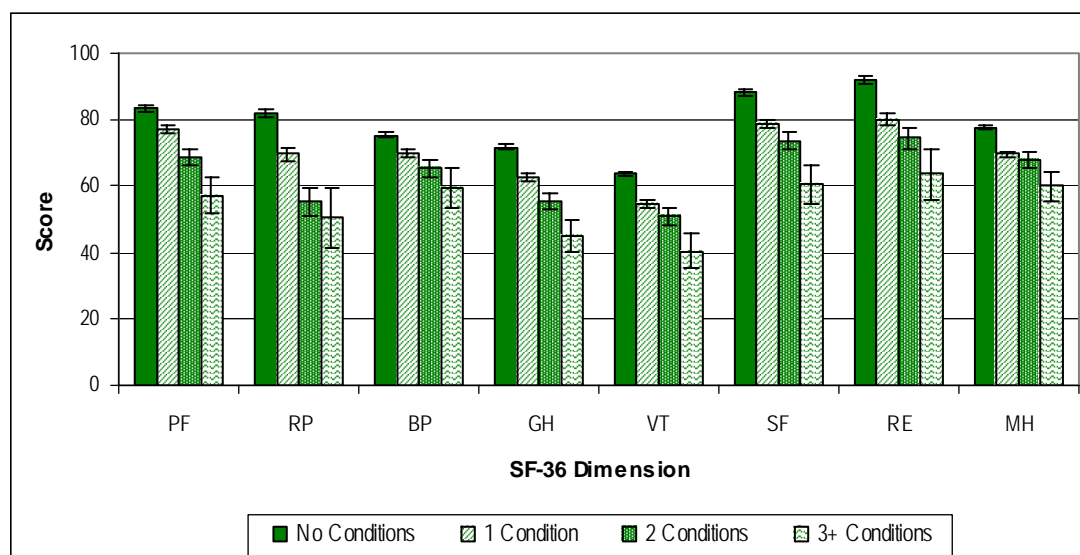


Figure 8.2: SF-36 mean scores for people with multiple conditions

8.2.6 Health service use of people with and without multiple conditions

People with three or more conditions were statistically significantly more likely than people with less than three conditions to have used psychologist or psychiatrist, hospital clinic, eye specialist or ophthalmologist, other specialist doctor, podiatrist, dietician or nurse educator services in the last 12 months (Table 8.6).

Table 8.6: Proportion of people with less than three conditions and with three or more conditions who used various health services in South Australia in the last 12 months

Variable	<3 Conditions		3+ Conditions	
	n	%	n	%
General Practitioner	3528	88.2	56	95.2
Community Health Centre	160	4.0	2	4.0
District Nurses or other Community Nurses	76	1.9	2	2.7
Psychologist/Psychiatrist	209	5.2	10	16.4 ^
Day Surgery	448	11.2	11	19.7 ^
Hospital – Accident & Emergency Department	488	12.2	13	22.9 ^
Hospital – Clinic (Outpatient/Specialist/Allied Health)	587	14.7	17	29.7 ^
Eye Specialist/Ophthalmologist	912	22.8	37	63.8 ^
Other Specialist Doctor (not in a hospital)	671	16.8	15	25.1
Physiotherapist	538	13.4	8	13.6
Chiropractor	521	13.0	7	12.2
Alternative Therapist eg Naturopath, Osteopath	196	4.9	3	5.8
Podiatrist	321	8.0	22	36.9 ^
Dietician	85	2.1	11	18.4 ^
Nurse Educator	31	0.8	4	7.1 ^
Other Health Service	206	5.1	-	-

^ v Statistically significantly higher or lower than comparison group (p<0.05)

APPENDIX 1: APPROACH LETTER

Dear Householder

North West Adelaide Health Study

Your household will shortly receive a telephone call from the North Western Adelaide Health Service inviting a member of your household to be involved in a study that aims to improve the health of your community.

Participants in the study will represent their community and are required from all adult age groups and levels of health. Your household has been selected at random from the telephone book. When your house is called, the person who was last to have a birthday and is aged 18 years or older will be invited to participate in a confidential interview and health examination. There will be no cost to participants and involvement is voluntary.

The benefits to you and your community are many and are explained in the enclosed brochure. The assistance of people such as yourself is invaluable and the information obtained will help us in ensuring the health of the community can be maintained and improved. We will keep all participants informed of the results of their health assessment.

If you have any questions please call the Program Coordinator, Anne Taylor, on 1 800 635 352.

I hope you will take this opportunity to contribute to important knowledge that will help the North West region lead the way in community health care for Australia.

Yours sincerely



Dr Richard Ruffin
Professor of Medicine
The University of Adelaide
North Western Adelaide Health Service

APPENDIX 2: INFORMATION SHEET

What if I have any questions?

For more information, or if you would like to discuss the study with one of the people involved, you can contact:

Janet Grant - Study Co-ordinator

(tel) 8226 6054

or

Sandy Pickering - Clinic Co-ordinator

(tel) 8222 7866

If you wish to speak with someone not involved in the study, please contact Mr Paul Miller, Secretary of the Ethics of TQEH Human Research Committee, on (tel) 8222 6841.

Key researchers

- **Professor Richard Ruffin** - Department of Medicine, The University of Adelaide
- **Dr Patrick Phillips** - Endocrine and Diabetes Service, North Western Adelaide Health Service
- **Professor Julianne Cheek** - Division of Health Sciences, University of South Australia
- **Assoc Prof David Wilson** - Department of Medicine, The University of Adelaide
- **Ms Anne Taylor** - Centre for Population Studies in Epidemiology, South Australian Department of Human Services



PARTICIPANT INFORMATION SHEET

Please read this information sheet

which tells you about the study.

What is the study about?

We have invited you to take part in a study to determine the health status of people in the North West area of Adelaide. Your involvement in the study is very important, even if you experience good health, because you are part of a random sample of South Australians living in your community. The study will provide information to help us understand the health of people living in your community so we can provide and improve appropriate health treatment and prevention programs.

What happens during the study?

The study will involve:

- 1) Filling out a questionnaire.
- 2) Attending the Queen Elizabeth Hospital or Lyell McEwin Health Service clinic for a range of free checks that include blood pressure, height, weight, breathing tests, and allergy tests.
- 3) Having a fasting blood test at the clinic or at your nearest IMVS collection centre. A fasting blood test means not having anything to eat (only drinking water) from 12 midnight the night before you have your test. If you choose to have your blood test at IMVS, you will be given a referral form at your clinic appointment to take with you.
- 4) You will be given information about your measurements taken at the clinic. If you wish, information about your health will also be sent to your general practitioner.
- 5) Monitoring of your health at some time in the future (eg. 3 years).

The clinic appointment will take approximately 30 to 40 minutes.

For some people, the study may also involve:

- 1) Attending the clinic for further clarification.
- 2) Filling out an additional questionnaire.

At some stage over the period of the study a few people may also be selected to take part in an interview with a research officer to provide us with information about how health and various conditions affect people in their daily lives.

How does the study work?

Taking part in the study is voluntary and you can withdraw at any stage. At the clinic you will be asked to give your written consent to take part before beginning the study.

How can I benefit if I take part?

This study may make no immediate difference to your health. However, it is hoped that as a result of this study we will have a better understanding of how health problems develop, and how health and illness affects people's lives so that we can improve treatment and prevention programs.

What if I don't want to take part?

Everyone's participation in the study is very important to us, even those people who are healthy. However, if you decide you do not want to take part in the study, the care and attention that you get at the North Western Adelaide Health Service (The Queen Elizabeth Hospital and Lyell McEwin Health Service) or at your general practitioner will not change.

What happens with information from the study?

All records will remain confidential and no information that may lead to the identification of any individual will be released. The data will be analysed and the results may be published in a medical journal, but there would be no way of identifying you as a participant.

Finally

Your involvement in this study also means a considerable contribution to your community. The study team thanks you for this contribution and will do everything they can to make the study as trouble free as possible for you.

APPENDIX 3: TELEPHONE QUESTIONNAIRE

**Stage 1 – NWAH Study
CATI/QPL Recruitment
Questionnaire**

A. INTRODUCTION

Good My name is I am phoning on behalf of the North West Adelaide Health Study at the Queen Elizabeth Hospital. We are conducting this study on a number of health issues with people living in the northern and western suburbs of Adelaide.

Could I please speak with the person in the household, aged 18 and over, who was the last to have a birthday.

Either

- a) Repeat introduction – go to A1
- b) If required person not available ask for a suitable time to call back. Record first name and make appointment (End)
- c) If required person incapable/ deaf/ ill/disabled
 - 1) note reason
 - 2) Go to E2
- d) Continue if correct person on line

A1 We recently sent your household a letter from the Professor of Medicine about the health study. Did you receive the letter identifying the benefits of the study?

(Single Response)

- 1. Yes [] Go to B.
- 2. No []
- 3. Don't know []

The letter explained that one person from your household would be asked to be involved in a major health study being conducted by the Department of Medicine at the Queen Elizabeth Hospital. The letter also explained the benefits of being involved in the study.

[IF REFUSAL AT ANY STAGE GO TO SECTION E]

A2 Would you like me to post the letter to you?

(Single Response)

- 1. Yes [] Go to A3
- 2. No [] Go to B.

A3 Could you please give me your name and address so that I can post you the letter?

- 1. Name _____
- 2. Address _____

- Postcode 5 _ _ _

A4 Correct postcode?

Postcodes for North West region
5007 – 5025, 5031 – 5033, 5037 & 5040, 5088 - 5093, 5095 - 5098, 5106 - 5117, 5120 - 5121, 5125 - 5127
5035, 5037, 5038, 5082, 5094, 5118 and in these suburbs
Ashford, Camden Park, Cavan, Dry Creek, Gawler, Gawler East, Gawler South, Gawler West, Glandore, Keswick, Keswick Terminal, Kurralta Park, Netley, North Plympton, Ovingham, Plympton, Plympton North, Willaston

(Single Response)

- 1. Yes [] Go to D.
- 2. No [] Go to C.

B. POSTCODE

As the study will only relate to certain groups of people, could you please tell me

B1 What is your Postcode?

(Single Response. If postcode is not known enter 5999)

5 _ _ _

Sequence Guide: If B1 < 5999 Go to B3

B2 What suburb do you live in?

(Single Response. Enter suburb)

B3 Correct postcode?

Postcodes for North West region

5007 – 5025, 5031 – 5033, 5037 & 5040,
5088 - 5093, 5095 - 5098, 5106 - 5117,
5120 - 5121, 5125 - 5127

5035, 5037, 5038, 5082, 5094, 5118 and
in these suburbs

Ashford, Camden Park, Cavan, Dry Creek,
Gawler, Gawler East, Gawler South,
Gawler West, Glandore, Keswick, Keswick
Terminal, Kurralta Park, Netley, North
Plympton, Ovingham, Plympton, Plympton
North, Willaston

(Single Response)

1. Yes Go to D.
2. No

C. TERMINATE

It is important that we speak to somebody who lives in the North West area of Adelaide. Unfortunately, that excludes you from the study – thank you very much for your time.

D. RECRUITMENT

D1 As was mentioned in the letter, we are asking selected people to be involved in this very important study. This includes a health assessment. This will tell us more about people in the region and will also benefit the individuals who participate. The study involves attending The Queen Elizabeth Hospital or the Lyell McEwin Health Service clinic for a health assessment and a fasting blood test.

D2 This study will benefit you and your community. All efforts will be made to make your involvement as convenient as possible for you. Would you have any objection to taking part in this very important study?

(Single Response)

1. No objection Go to D6
2. Yes, have objection
3. Depends
4. Don't know

D3 Could I ask your reason for not wanting to be involved?

(Single Response)

1. Too old
2. Too sick
3. No health problem
4. Too busy
5. Don't want to participate
6. Other (specify)
7. No Go to E1

D4 Try to convert. Successful?

(Single Response)

1. Yes Go to D6
2. No (but a maybe) Go to E2
3. No – definite Go to E2

D5 (to be left blank)

D13 Sequence guide: go to Section F.

D6 I now need to make an appointment for you to attend The Queen Elizabeth Hospital or the Lyell McEwin Health Service clinic. This appointment will take about 40 minutes at a time between 7.30 and 11.30am. We will require you to have a fasting blood test.

D7 Sequence guide: address previously taken? (If A2=1).

(Single Response)

1. Yes Go to D8
2. No Go to D10

D8 We will send out detailed information about the study to the address you previously gave me.

D9 Sequence guide: Go to D11

D10 Could I have your name and address so we can send you more detailed information about the study?

1. Name _____
2. Address _____

Postcode 5 _ _ _

D11 Is this the best phone number to contact you, or is there another number (eg. work, mobile) that might be more appropriate?

(Multiple Response)

1. This is best number
2. Other number _____
Details _____
3. Other number _____
Details _____

D12 Can I just confirm this phone number?

1. Number _____

E. REFUSAL DEMOGRAPHICS

E1 Could we just ask why you do not want this household to be included in the study?

(Single Response)

1. Too busy
2. Worried, who you are
3. Don't like surveys
4. Invasion of privacy
5. Other (specify)
6. Refused

E2 We need to know some information about the people who are not included in the study. What age group are/is you/that person (the person with the next birthday) in?

(Read options, Single Response, code an approximate category if refused)

1. 18-24 years
2. 25-29 years
3. 30-34 years
4. 35-39 years
5. 40-44 years
6. 45-49 years
7. 50-54 years
8. 55-59 years
9. 60-64 years
10. 65-69 years
11. 70-74 years
12. 75 years or over
13. Other - Specify

E3 Gender (or Gender)

(Single Response)

1. Male
2. Female

E4 Is this the person randomly selected (ie last birthday)?

(Single Response)

1. Yes
2. Definitely not Go to H4
3. Unknown Go to H4

F. HEALTH CONDITIONS

F1 I would like to ask you a few questions about your health. Have you ever been told by a doctor that you have any of the following conditions?

(Read Options. Multiple Response)

1. **Diabetes** [] *medication
2. **Asthma** [] *medication
3. **Bronchitis** []
4. **Emphysema** []
5. **Heart attack** []
6. **Stroke** []
7. **Angina** []
8. **None** []

G. RISK FACTORS

G1 Do you currently smoke?

(Single Response)

1. Yes [] Go to 0
2. No []
3. Occasionally []

G2 Have you ever smoked regularly (that is, at least once a day)?

(Single Response)

1. Yes []
2. No []

G3 to G8 not included in Phase 1A

G3 Have you ever been told by a doctor or nurse that you have high cholesterol?

(Single Response)

1. Yes []
2. No [] Go to G5
3. Don't know [] Go to G5
4. Never measured [] Go to G5

G4 Do you still have high cholesterol?

(Single Response)

1. Yes []
2. No []
3. Don't know []

G5 Have you ever been told by a doctor or nurse that you have high blood pressure?

(Single Response)

1. Yes []
2. No [] Go to G7
3. Don't know [] Go to G7
4. Never measured [] Go to G7

G6 Do you still have high blood pressure?

(Single Response)

1. Yes []
2. No []
3. Don't know []

G7 What is your height without shoes?

(Single Response)

1. Centimetres _____
2. Feet: inches _____
3. Don't know []

G8 What is your weight? (undressed in the morning)

(Single Response)

1. Kilograms []
2. Stones: pounds []
3. Don't know []

F. HEALTH CONDITIONS

F2 In the last 12 months have you been told by a doctor that you have any of the following conditions?

(Read Options. Multiple Response)

1. **Anxiety** []
2. **Depression** []
3. **A stress related problem** []
4. **Any other mental health problem** []
5. **None** []

Sequence guide : If not recruited (refusal demographics collected E3 = 1 or 2 Go to H3

H. DEMOGRAPHICS

Now to finish with some general questions.

H1 How old are you?

(Single Response. Enter 999 if not stated)

H2 Voice (ask if unsure)

(Single Response)

1. Male []
2. Female []

H3 What kind of work have you done for most of your life?

(Single Response)

1. Specify _____

H4 Including yourself how many people aged 18 and over live in this household?

(Single Response. Enter number of people 18 years and over)

[]

H5 How many children under 18 years live in your household?

(Single Response. Enter number of people under 18 years. Enter 0 if none)

[]

H6 That concludes the interview. On behalf of the North West Adelaide Health Study, thank you very much for your time.

(Interviewer note any other comments about the interview)

H7 Date of interview

H8 Day of week interview undertaken

APPENDIX 4: QUESTIONNAIRE A



QUESTIONNAIRE A

Stage 1

Please read the following instructions before answering the questions.

1. Please complete all the questions as per instructions by placing a tick in the box that most closely corresponds to your answer.
2. Your answers will remain strictly confidential. Results of the study may be published in a medical journal but no information that may lead to the identification of any individual will be released.
3. This questionnaire should take approximately 15 minutes to complete.
4. If you have any problems, please contact the clinic coordinator on (tel) 8222 7866.
5. When you have completed the questionnaire, please bring it with you to your appointment at The Queen Elizabeth Hospital or the Lyell McEwin Health Service.

A. GENERAL HEALTH AND WELL BEING

These first questions ask for your views about your health, how you feel and how well you are able to do your usual activities. Please answer each question.

A1 In general would you say your health is:
(tick one box only)

- 1 Excellent
- 2 Very good
- 3 Good
- 4 Fair
- 5 Poor

A2 Compared to one year ago, how would you rate your health in general now?
(tick one box only)

- 1 Much better now than one year ago
- 2 Somewhat better now than one year ago
- 3 About the same as one year ago
- 4 Somewhat worse now than one year ago
- 5 Much worse now than one year ago

The next questions relate to activities you might do during a typical day. Please tell us if your health now limits you a lot, limits you a little or does not limit you at all in these activities.

A3 Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports? (tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A4 Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf? (tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A5 Lifting or carrying groceries?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A6 Climbing several flights of stairs?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all (if No... go to A8)

A7 Climbing one flight of stairs?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A8 Bending, kneeling or stooping?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A9 Walking more than one kilometre?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all (if No... go to A12)

A10 Walking half a kilometre?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all (if No... go to A12)

A11 Walking 100 metres? (tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

A12 Bathing or dressing yourself?
(tick one box only)

- 1 Yes, limited a lot
- 2 Yes, limited a little
- 3 No, not limited at all

The following four questions ask you about your physical health and your daily activities.

During the last four weeks have you

A13 Had to cut down on the amount of time you spent on work or other activities as a result of your physical health?

(tick one box only)

- 1 Yes
 2 No

A14 Accomplished less than you would like as a result of your physical health?

(tick one box only)

- 1 Yes
 2 No

A15 Been limited in the kind of work or other activities as a result of your physical health?

(tick one box only)

- 1 Yes
 2 No

A16 Had difficulty performing the work or other activities as a result of your physical health (for example, it took extra effort)? (tick one box only)

- 1 Yes
 2 No

The following three questions ask you about your emotions and your daily activities.

During the past four weeks have you

A17 Had to cut down on the amount of time you spent on work or other activities as a result of any emotional problems such as feeling depressed or anxious?

(tick one box only)

- 1 Yes
 2 No

A18 Accomplished less than you would like as a result of any emotional problems?

(tick one box only)

- 1 Yes
 2 No

A19 Had to not do work or other activities as carefully as usual as a result of any emotional problems? (tick one box only)

- 1 Yes
 2 No

A20 During the past four weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups? Has it interfered: (tick one box only)

- 1 Not at all
 2 Slightly
 3 Moderately
 4 Quite a bit
 5 Extremely

A21 How much bodily pain have you had during the past four weeks?

(tick one box only)

- 1 None (if None...go to A23)> PTO
 2 Very mild
 3 Mild
 4 Moderate
 5 Severe
 6 Very severe

A22 During the past four weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(tick one box only)

- 1 Not at all
 2 A little bit
 3 Moderately
 4 Quite a bit
 5 Extremely

These questions are about how you feel and how things have been with you during the past four weeks. For each question please give the one answer that comes closest to the way you have been feeling.

How much during the past four weeks:

A23 Did you feel full of life? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A24 Have you been a very nervous person? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A25 Have you felt so down in the dumps that nothing could cheer you up? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A26 Have you felt calm and peaceful? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A27 Did you have a lot of energy? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A28 Have you felt down? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A29 Did you feel worn out? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A30 Have you been a happy person? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A31 Did you feel tired? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

A32 During the past four weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc)? (tick one box only)

- 1 All the time
- 2 Most of the time
- 3 A good bit of the time
- 4 Some of the time
- 5 A little of the time
- 6 None of the time

How true or false is each of the following statements for you?

A33 "I seem to get sick a little easier than other people." (tick one box only)

- 1 Definitely true
- 2 Mostly true
- 3 Don't know
- 4 Mostly false
- 5 Definitely false

A34 "I am as healthy as anybody I know." (tick one box only)

- 1 Definitely true
- 2 Mostly true
- 3 Don't know
- 4 Mostly false
- 5 Definitely false

A35 "I expect my health to get worse." (tick one box only)

- 1 Definitely true
- 2 Mostly true
- 3 Don't know
- 4 Mostly false
- 5 Definitely false

A36 "My health is excellent." (tick one box only)

- 1 Definitely true
- 2 Mostly true
- 3 Don't know
- 4 Mostly false
- 5 Definitely false

B. EXERCISE

The next questions are about exercise you may do for sport, recreation or fitness.

B1 In the last two weeks, did you do any walking for sport, recreation or fitness? (tick one box only)

- 1 Yes
- 2 No (If no...go to B4)

B2 How many times did you do any walking for exercise in the last two weeks?

- 1 Enter number of times _____
- 99 Don't know

B3 What was the total amount of time you spent walking in the last two weeks?

- 1 Enter number of hours _____
- 2 Enter number of minutes _____

B4 In the last 2 weeks, (apart from walking) did you do any exercise which caused a moderate increase in your heart rate or breathing? (tick one box only)

- 1 Yes
- 2 No (If no...go to B7)

B5 How many times did you do any moderate exercise in the last two weeks?

- 1 Enter number of times _____
- 99 Don't know

B6 What was the total amount of time you spent doing moderate exercise in the last two weeks?

- 1 Enter number of hours _____
- 2 Enter number of minutes _____

B7 In the last 2 weeks, did you do any other exercise which caused a large increase in your heart rate or breathing, that is, vigorous exercise? (tick one box only)

- 1 Yes
- 2 No (If no...go to C1) → PTO

B8 How many times did you do any vigorous exercise in the last two weeks?

- 1 Enter number of times _____
 99 Don't know

B9 What was the total amount of time you spent doing vigorous exercise in the last two weeks?

- 1 Enter number of hours _____
2 Enter number of minutes _____

C. HEALTH CARE UTILISATION

C1 How many times in the last 12 months have you used these health services in South Australia?

(Enter number of times for each service used. If unsure, approximate number will do.)

- 1 General practitioner _____
2 Community health centre _____
3 District nurses or other community nurses _____
4 Psychologist _____
5 Psychiatrist _____
6 Day surgery _____
7 Hospital – Accident & Emergency Department _____
8 Hospital – Clinic (outpatient/ specialist/allied health) _____
9 Eye specialist/ ophthalmologist _____
10 Other specialist doctor (not in a hospital) _____
11 Physiotherapist _____
12 Chiropractor _____
13 Alternative therapist (eg. naturopath, osteopath) _____
14 Podiatrist _____
15 Dietician _____
16 Nurse educator _____
17 Other *(please specify)*

D. FAMILY HISTORY

D1 Do, or did, any of your relatives have diabetes? (Blood/first degree relations only) (tick all that apply)

- 1 Mother
 2 Father
 3 Sister
 4 Brother
 5 Grandmother
 6 Grandfather
 7 Other *(please specify)* _____)
 8 No
 9 Don't know

D2 Do, or did, any of your relatives have heart disease, for example, heart attack or heart failure? (Blood/first degree relations only) (tick all that apply)

- 1 Mother
 2 Father
 3 Sister
 4 Brother
 5 Grandmother
 6 Grandfather
 7 Other *(please specify)* _____
 8 No
 9 Don't know

D3 Have any of your relatives ever had a stroke? (Blood/first degree relations only) (tick all that apply)

- 1 Mother
 2 Father
 3 Sister
 4 Brother
 5 Grandmother
 6 Grandfather
 7 Other *(please specify)* _____
 8 No
 9 Don't know

E. DIABETES AND HIGH BLOOD SUGAR

E1 Have you ever been told by a doctor that you have diabetes? *(tick one box only)*

- 1 Yes *(If male... go to E4)*
(If female ... go to E2)
- 2 No *(If no... go to E3)*

For women who said "yes" to question e1:

E2 Were you pregnant when you were first told you had diabetes? *(tick one box only)*

- 1 Yes
- 2 No

E3 Have you ever been told by a doctor that you have high blood sugar or a touch of sugar? *(tick one box only)*

- 1 Yes
- 2 No

E4 Have you got diabetes or high blood sugar now? *(tick one box only)*

- 1 Yes
- 2 No *(If no... go to F1)* → next column

E5 Other than gestational diabetes, what type of diabetes were you told you had? *(tick one box only)*

- 1 Type 1 – Insulin dependent – Juvenile onset
- 2 Type 2 – Non-insulin dependent – Mature onset
- 3 Don't know
- 4 Other *(please specify)* _____

E6 not included in Phase 1A

E6 Other than gestational diabetes, when were you first told you had diabetes or high blood sugar? *(tick one box only)*

- 1 Within the last twelve months
- 2 1 to 2 years ago
- 3 3 to 5 years ago
- 4 6 to 10 years ago
- 5 More than 10 years ago
- 6 Don't know

F. ASTHMA

F1 Have you ever had asthma? *(tick one box only)*

- 1 Yes
- 2 No *(If no... go to F4)*

F2 Was your asthma confirmed by a doctor? *(tick one box only)*

- 1 Yes
- 2 No *(If no... go to F4)*
- 3 Don't know *(If don't know... go to F4)*

F3 Do you still have asthma? *(tick one box only)*

- 1 Yes
- 2 No
- 3 Don't know

F3A and F3B not included in Phase 1A

F3A When were you first told you had asthma? *(tick one box only)*

- 1 Within the last twelve months
- 2 1 to 2 years ago
- 3 3 to 5 years ago
- 4 6 to 10 years ago
- 5 More than 10 years ago
- 6 Don't know

F3B How do you rate your asthma severity? *(tick one box only)*

- 1 Not a problem
- 2 Mild
- 3 Moderate
- 4 Severe

BRONCHITIS

F4 Have you ever had bronchitis? *(tick one box only)*

- 1 Yes
- 2 No *(If no... go to F7)* → PTO
- 3 Don't know *(If don't know... go to F7)* → PTO

F5 Was your bronchitis ever confirmed by a doctor? (tick one box only)

- 1 Yes
- 2 No (If no... go to F7)
- 3 Don't know (If don't know... go to F7)

F6 How often do you have bronchitis? (tick one box only)

- 1 Less than once a year
- 2 Once a year
- 3 More often than once a year

F6A not included in Phase 1A

F6A When were you first told you had bronchitis? (tick one box only)

- 1 Within the last twelve months
- 2 1 to 2 years ago
- 3 3 to 5 years ago
- 4 6 to 10 years ago
- 5 More than 10 years ago
- 6 Don't know

EMPHYSEMA

F7 Have you ever had emphysema? (tick one box only)

- 1 Yes
- 2 No (If no... go to G1) → next column
- 3 Don't know (If don't know... go to G1)
- next column

F8 Was your emphysema ever confirmed by a doctor? (tick one box only)

- 1 Yes
- 2 No

F8A not included in Phase 1A

F8A When were you first told you had emphysema? (tick one box only)

- 1 Within the last twelve months
- 2 1 to 2 years ago
- 3 3 to 5 years ago
- 4 6 to 10 years ago
- 5 More than 10 years ago

G. LUNG FUNCTION

The next series of questions relate to your lung function over the past three months.

G1 In the past three months, during a typical day, have any of these made you short of breath? (tick one box only)

- 1 No activity: such as at rest, while sitting or lying down
- 2 Light activity: such as walking on level ground, shopping, washing or standing
- 3 Moderate activity: such as walking up a gradual hill, climbing less than three flights of stairs or carrying a light load on level ground
- 4 Vigorous activities: such as running, walking up a steep hill, climbing three or more flights of stairs or carrying a moderate load on level ground
- 5 Other
- 6 None (If none... go to G3)

G2 In the past three months, how often were you short of breath? (tick one box only)

- 1 Occasionally
- 2 Most days
- 3 All of the time

G3 In the past three months, did any of these make you wheeze? (tick one box only)

- 1 No activity: such as at rest, while sitting or lying down
- 2 Light activity: such as walking on level ground, shopping, washing or standing
- 3 Moderate activity: such as walking up a gradual hill, climbing less than three flights of stairs or carrying a light load on level ground
- 4 Vigorous activities: such as running, walking up a steep hill, climbing three or more flights of stairs or carrying a moderate load on level ground
- 5 Other
- 6 None (If none... go to G5) → PTO

G4 In the past three months, how often did you wheeze? (tick one box only)

- 1 Occasionally
- 2 Most days
- 3 Always
- 4 Other (please specify) _____

G5 In the past three months, how often did you cough? (tick one box only)

- 1 Never (If never...go to H1)
- 2 Occasionally or only during a cold or flu
- 3 Most days
- 4 Every day

G6 In the past three months when you coughed, how much sputum or phlegm did you produce? (tick one box only)

- 1 None
- 2 Just a little
- 3 Several tablespoons a day
- 4 A coffee cup or more a day

H. ALCOHOL

H1 How often do you usually drink alcohol? (tick one box only)

- 1 I don't drink alcohol (go to H1) → next column
- 2 Less than once a week
- 3 On 1 or 2 days a week
- 4 On 3 or 4 days a week
- 5 On 5 or 6 days a week
- 6 Every day

H2 A Standard Drink is equivalent to a schooner of full strength beer, a glass of wine or a nip of spirits. On a day when you drink alcohol, how many drinks do you usually have? (tick one box only)

- 1 1 or 2 drinks
- 2 3 or 4 drinks
- 3 5 or 8 drinks
- 4 9 or 12 drinks
- 5 13 or 20 drinks
- 6 More than 20 drinks

I. SMOKING

I1 Do you currently smoke? (tick one box only)

- 1 Yes
- 2 No (If no...go to I3)
- 3 Occasionally (If occasionally...go to I3)

I2 How many cigarettes do you usually smoke a day?

- 1 Enter number of cigarettes _____ (go to 0)
- 2 Less than one (go to 0)
- 3 Only smoke cigars or pipes (go to 0)

I3 Have you ever smoked regularly (that is, at least once a day)? (tick one box only)

- 1 Yes
- 2 No (If no...go to 8.2.6 K.) → PTO

I4 How many cigarettes did you usually smoke a day?

- 1 Enter number of cigarettes _____
- 2 Less than one
- 3 Only smoke cigars or pipes

I5 How old were you when you last gave up smoking?

- 1 Enter age _____
- 2 Can't remember

I6 not included in Phase 1A

I6 At what age did you first start smoking daily?

- 1 Enter age _____
- 2 Can't remember

K. DEMOGRAPHICS

K1 How old were you when you left school? (*tick one box only*)

- 1 Enter age _____
- 2 Can't remember
- 3 Still at school (*If still at school...go to K4*)

K2 Since leaving school have you obtained a trade qualification, certificate, diploma or any other qualification? (*tick one box only*)

- 1 Yes
- 2 No (*If no...go to K4*)
- 3 Don't know

K3 What is your highest qualification? (*tick one box only*)

- 1 Bachelor degree or higher
- 2 Trade / Apprenticeship
- 3 Certificate / Diploma
- 4 Other (*please specify*) _____
- 5 Don't know

K4 What is the approximate annual gross income of your household? (that is, for all people in the household before tax is taken out) (*tick one box only*)

- 1 Up to \$12,000
- 2 \$12,001 - \$20,000
- 3 \$20,001 - \$30,000
- 4 \$30,001 - \$40,000
- 5 \$40,001 - \$50,000
- 6 \$50,001 - \$60,000
- 7 \$60,001 - \$80,000
- 8 More than \$80,000

K5 What is your country of birth?

(*tick one box only*)

- 1 Australia (*If Australia...go to K7*)
- 2 Austria
- 3 Bosnia-Herzegovina
- 4 Canada
- 5 China
- 6 Croatia
- 7 France
- 8 Germany
- 9 Greece
- 10 Holland / Netherlands
- 11 Hong Kong
- 12 Iran
- 13 Italy
- 14 Japan
- 15 Malaysia
- 16 New Zealand
- 17 Philippines
- 18 Poland
- 19 Slovenia
- 20 Spain
- 21 U.K. and Ireland
- 22 USA
- 23 Vietnam
- 24 Former Yugoslav Republic of Macedonia
- 25 Former Yugoslav Republics of Serbia & Montenegro
- 26 Other (*please specify*) _____

K6 What year did you arrive in Australia?

- 1 Enter year _____ (*Go to K8*) → PTO
- 99 Don't know (*Go to K8*) → PTO

K7 Are you of Aboriginal or Torres Strait Islander origin? (For persons of both Aboriginal and Torres Strait Islander origin, tick both 'Yes' boxes)

- 1 No
- 2 Yes, Aboriginal
- 3 Yes, Torres Strait Islander

K8 What is your marital status?

(tick one box only)

- 1 Married or living with a partner
- 2 Separated / Divorced
- 3 Widowed
- 4 Never married

K9 What is your work status?

(tick one box only)

- 1 Full time employed
- 2 Part time / casual employment
- 3 Unemployed
- 4 Home duties
- 5 Retired
- 6 Student
- 7 Other *(please specify)* _____

K10 Do you receive a pension or benefit from the Department of Social Security? (this does not include family allowance)

(tick one box only)

- 1 Yes
- 2 No
- 3 Don't know

K11 How old are you?

1 Enter age (years) _____

K12 What is your postcode?

1 Enter postcode 5 _ _ _ _

*That concludes the survey.
Thank you very much for your time.*

*Please make sure that you have answered all the questions.
You can return this questionnaire when you attend your clinic appointment.*

If you have any problems or questions in completing this questionnaire, please telephone Sandy, the Clinic Co-ordinator, on 8222 7866.

APPENDIX 5: CLINIC RUNNING SHEET

RUNNING SHEET FOR CLINICAL PROCEDURES

PARTICIPANT INFORMATION

Appointment date	/ /	Study ID Number	
Appointment time		Date of birth	/ /
Clinic location	1 TQEH <input type="checkbox"/>	Age	
	2 Lyell McEwin <input type="checkbox"/>		
Blood location	1 IMVS <input type="checkbox"/>	Gender	1 Male <input type="checkbox"/>
	2 Clinic <input type="checkbox"/>		2 Female <input type="checkbox"/>

ADMINISTRATIVE INFORMATION

1	Explained procedure to participants (blood pressure 2x, body measurements, skin prick, lung function, blood	<input type="checkbox"/>
2	Participant has read and signed consent forms	<input type="checkbox"/>
3	Questionnaire A has been completed	<input type="checkbox"/>
4	Has participant fasted?	1 Yes <input type="checkbox"/> 2 No <input type="checkbox"/>
6	Name and address of General Practitioner and/or Medical Practice	
7	Name, address and telephone for secondary contact (someone who does not live with you, but will always know where you are if we are having difficulty contacting you	
8	Explained follow up of participant in 2-3 years time	<input type="checkbox"/>

Study ID Number	<input type="text"/>	Date of birth	<input type="text"/> / <input type="text"/> / <input type="text"/>
11a	Weight (kg) <input type="text"/>	11b	Height (cm) <input type="text"/>
11c	Waist (cm) <input type="text"/> 1 st	<input type="text"/> 2 nd	<input type="text"/> 3 rd
11d	Hip (cm) <input type="text"/> 1 st	<input type="text"/> 2 nd	<input type="text"/> 3 rd
12	Is the participant currently on medication for hypertension? ^{**1}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
12a	Did the participant take this medication in the last 24 hours? ^{**}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
13	Blood pressure (mmHg)	1 st <input type="text"/> Systolic	<input type="text"/> Diastolic
		2 nd <input type="text"/> Systolic	<input type="text"/> Diastolic

BLOOD

13a	Is the participant currently on cholesterol/lipid lowering medication? ^{**}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
13b	Did the participant take this medication in the last 24 hours? ^{**}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
14a	Total triglycerides (mmol/L) <input type="text"/>	14e	Total chol/HDL ratio <input type="text"/>
14b	Total cholesterol (mmol/L) <input type="text"/>	14f	Glucose (mmol/L) <input type="text"/>
14c	HDL cholesterol (mmol/L) <input type="text"/>	14g	Glycated haemoglobin <input type="text"/>
14d	LDL cholesterol (mmol/L) <input type="text"/>		

15a	Is the participant currently on antihistamine medication? ^{**2}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
15c	Did the participant take this medication in the last 24 hours? ^{**}	<input type="checkbox"/> Yes	<input type="checkbox"/> No

SKIN TESTS

	Time	<input type="text"/>	
<i>(measured perpendicular across wheal/bump after 15 minutes)</i>			
16a	Saline (mm) <input type="text"/>	16e	Alternaria (mm) <input type="text"/>
16b	Rye grass (mm) <input type="text"/>	16f	Feather (mm) <input type="text"/>
16c	Cat (mm) <input type="text"/>	16g	Cockroach (mm) <input type="text"/>
16d	HDM (mm) <input type="text"/>	16h	+ve control (mm) <input type="text"/>

17a	Has the participant used a bronchodilator (eg Ventolin) in the last 24 hours? ^{**3}	<input type="checkbox"/> Yes	<input type="checkbox"/> No
18a	Has the participant taken any other respiratory medication in the last 24 hrs? ^{**4}	<input type="checkbox"/> Yes	<input type="checkbox"/> No

	Pre	Post	SPIROMETRY	
1	<input type="text"/>	<input type="text"/>	19a	Pre FEV1 (L/sec) <input type="text"/> % pred <input type="text"/>
	<input type="text"/>	<input type="text"/>	19b	Pre FVC (L) <input type="text"/> % pred <input type="text"/>
	<input type="text"/>	<input type="text"/>	19c	Pre PEF <input type="text"/> % pred <input type="text"/>
Administered 4 puffs of Ventolin at : (Time) <input type="text"/>				
3	<input type="text"/>	<input type="text"/>	21a	Post FEV1 (L/sec) <input type="text"/> % pred <input type="text"/>
	<input type="text"/>	<input type="text"/>	21b	Post FVC (L) <input type="text"/> % pred <input type="text"/>
4	<input type="text"/>	<input type="text"/>	21c	Post PEF <input type="text"/> % pred <input type="text"/>
	<input type="text"/>	<input type="text"/>	22	Reversibility <input type="text"/>

^{**} only asked in Phase 1B (2002/03)

¹ Phase 1A only – Has participant taken any medication for hypertension?	³ Phase 1A only – Has participant taken any Ventolin? If yes, how many puffs? If yes, date and time of last dose.
² Phase 1A only – Is participant taking any antihistamines?	⁴ Phase 1A only – If yes, please list.

APPENDIX 6: STUDY TEAM

STUDY TEAM

CHIEF INVESTIGATORS

Professor Richard Ruffin – Department of Medicine, The University of Adelaide
Ms Anne Taylor – Population Research & Outcome Studies Unit, SA Department of Health
Dr Patrick Phillips – Endocrine and Diabetes Service, The Queen Elizabeth Hospital
Professor Julianne Cheek – Division of Health Sciences, University of South Australia
Assoc Professor David Wilson – Health Observatory, Department of Medicine, The University of Adelaide
Dr Robert Adams – Department of Medicine, The University of Adelaide

CO-INVESTIGATORS/COLLABORATORS

Dr Nicholas Potts – Department of Psychiatry, The University of Adelaide
Dr Peter Zalewski – Department of Medicine, The University of Adelaide
Dr Kay Price - Division of Health Sciences, University of South Australia

ANALYSIS TEAM

Population Research & Outcome Studies Unit, SA Department of Health

Ms Eleonora Dal Grande – Senior Epidemiologist
Ms Catherine Chittleborough – Senior Epidemiologist
Ms Tiffany Gill – Senior Epidemiologist
Ms Janet Grant – Epidemiologist & Study Co-ordinator
Ms Katherine Baldock – Epidemiological Research Officer
Ms Bernadette Hurst – Epidemiological Research Officer
Ms Lynda Caudle – Epidemiological Research Officer

Ms Sarah Appleton – Research Officer, Department of Medicine, The University of Adelaide
Ms Candice Oster – Research Assistant, Division of Health Sciences, University of South Australia.

CLINIC TEAM

Ms Ingerid Meagher – Clinic Coordinator (Phase 1A)
Ms Sandy Pickering – Clinic Coordinator (Phase 1B)

Ms Else Jansen	Ms Megan Taylor
Ms Ruth Battersby	Ms Nardina Labiszewski
Ms Amanda O'Grady	Ms Janet Brown
Ms Angelique Scardigno	Ms Larissa Kovalenko
Ms Jacqueline Middleton	Ms Annie Brindley
Ms Jane Barnett	

RECRUITING TEAM

Ms Jan Dibble
Ms Shirley Ogilvy
Ms Brenda Webb
Ms Kay Smith
Ms Lynne Parry
Ms Dianne Hart

ADMINISTRATIVE SUPPORT

Population Research & Outcome Studies Unit, SA Department of Human Services

Ms Jacqueline Hickling – Project Officer
Ms Jean Paynter – Project Officer

CONTACT DETAILS

Ms Anne Taylor – Manager, Population Research & Outcome Studies Unit, SA Department of Health

☎ (08) 8226 6323

☎ (08) 8226 6244

✉ Anne.Taylor@health.sa.gov.au

📍 Level 8 / CitiCentre Building PO Box 287 (11 Hindmarsh Square) Adelaide SA 5000

🌐 <http://www.nwadelaidehealthstudy.org> and <http://www.dh.sa.gov.au/pehs/PROS.html>