Australian Government
Australian Institute of Health and Welfare

Social distribution of health risks and health outcomes

preliminary analysis of the National Health Survey 2007–08

INFORMATION PAPER

Australian Government
Australian Institute of Health and Welfare

Authoritative information and statistics to promote better health and wellbeing

Social distribution of health risks and health outcomes

Preliminary analysis of the National Health Survey 2007–08

Information Paper

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Please note that there is the potential for minor revisions of data in this report. Please check the online version at <www.aihw.gov.au> for any amendments.

This information paper is a preliminary analysis and a work progress. As such, it is not intended to be definitive but to inform future work.

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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ASGC	Australian Standard Geographical Classification
BMI	body mass index
AIHW	Australian Institute of Health and Welfare
mL	millilitre
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Symbols

–	nil or rounded to zero
n.a.	not available

Summary

Using data from the 2007–08 National Health Survey (NHS), the effect of social factors on four measures of health status (self-reported health status; cancer; heart, stroke and vascular diseases; and Type 2 diabetes) and three health risk factors (smoking, alcohol consumption and body weight) is examined. Two different statistical methods (univariate and multivariate analysis) were used to examine associations between social factors and the selected diseases and risk factors.

Where people are born, grow, live, work and age affects their health status (Marmot 2004). This paper is an initial exploration to investigate the association between selected social factors and health status. Despite the data limitations, it shows some statistical associations between selected socioeconomic characteristics (social factors) and health conditions and health risk factors.

The social factors investigated were post-school qualification, equivalised household income (income adjusted for the size of the household), occupation category, remoteness and language spoken at home. The effect of sex and age on health status was also investigated.

Using the NHS data, it was found that:

- ***Household income***: A health status contrast was observed between the highest and lowest income households, with Australian adults from the lowest income households less likely to report having excellent or very good health than adults from high-income households.
- ***Post-school qualifications***: People having a bachelor degree or higher qualification were less likely to report smoking and risky alcohol consumption than those without this level of education.
- ***Occupation***: Managers/professionals were less likely to smoke but more likely to engage in risky alcohol consumption than people who were unemployed or not in the labour force.
- ***Remoteness***: There was little significant effect of geographical location for any of the health status or health risk factor variables, except for unhealthy body weight and self-reported health status. People living in *Inner regional* areas were more likely to report excellent or very good health status than people living in *Major cities*. People living outside of *Major cities* were more likely to report unhealthy body weight than people living in *Major cities*.
- ***Language spoken at home***: People who spoke mainly English at home had a higher prevalence of heart, stroke and vascular diseases and a lower prevalence of Type 2 diabetes than people who spoke another language at home. People who spoke mainly English at home were more likely than those who didn't to smoke, consume risky levels of alcohol and have an unhealthy body weight.

Based on this analysis, increasing age was the strongest predictor for the selected measures of health status and the health risk factors. There are observed social gradients for many health factors and health risk factors, although most are influenced by other factors, such as age. These findings will inform future work and more detailed analysis using additional data sources.

1 Introduction

This working paper uses data from the 2007–08 National Health Survey (NHS) to investigate the association between selected socioeconomic factors (social factors) and health status. It examines the distribution of four measures of health (self-reported health status; cancer; heart, stroke and vascular diseases; and Type 2 diabetes) and three health risk factors (smoking, alcohol consumption and body weight) by different social factors. The scope of the analysis is limited given the exploratory purpose of this paper and the availability of the data. It is not a definitive report on social factors of health status. The findings will inform future work and more detailed analysis using additional data sources and appropriate methodologies.

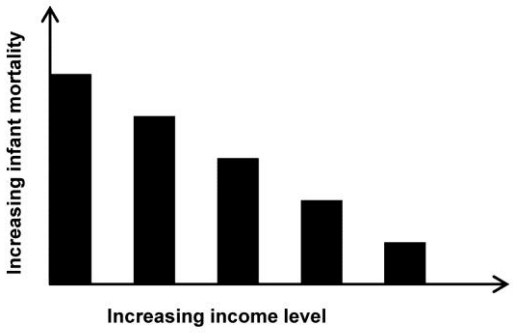
The social factors of health are the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are, in turn, shaped by a wider set of forces: economics, social policies and politics. It has been argued that while medical care can prolong survival and improve prognosis for diseases, it is the social and economic conditions that make people ill and in need of medical care in the first place that are more important determinants of the health of the population. Improving the health of populations, in genuine and lasting ways, ultimately depends on understanding the causes of social and economic inequities and addressing them (Wilkinson & Marmot 2003)

Socioeconomic position is an important determinant for health outcomes (Marmot 2004). The social gradient in health within a country is primarily a gradient of relative income or social status, rather than a reflection of absolute material living standards (CSDH 2008) (Box 1). This means that people in relatively disadvantaged areas in a prosperous country can experience poorer health than their counterparts who live in affluent areas.

However, not all social factors influence health in a stepwise, linear fashion; some variables may exert a threshold effect. For example, people on very low incomes may have insufficient money to pay for dental care and so have poor dental health, but after a certain income level people can afford dental care. Additional increases in income may result in further improvements in dental health.

Box 1: What do we mean by social gradient?

A social gradient is when there is a stepwise change in health status from the lowest end of the socioeconomic spectrum to the highest. For example, a social gradient in infant mortality (based on income level) might look like this, where infant mortality decreases as income level increases.



The structure of social relationships also influences the health status of populations (Wilkinson 2005). Factors such as a sense of isolation, deprivation or loss of control, are also important determinants of health.

Social factors have a direct impact on health, and are the best predictors of individual and population health. Further, these determinants interact to produce health (Mikkonen & Raphael 2010). The opportunity for health starts long before the need for medical care—in homes, schools and jobs (Lowe 2010).

In Australia, numerous studies have reported evidence of socioeconomic inequalities in the prevalence of chronic diseases and their associated risk factors (Glover et al. 2004); in avoidable mortality by socioeconomic status (Korda et al. 2007); in all-cause mortality by occupation categories (Turrell et al. 2007); and in differential health outcomes in rural and metropolitan areas (Dixon & Welch 2000).

2 Data and measurement

2.1 Data source

This paper uses data from the most recent National Health Survey (the 2007–08 NHS) conducted by the Australian Bureau of Statistics (ABS). About 20,800 people from all states and territories and across all age groups were included in the sample, with one adult (aged 18 or more) and one child (where applicable) sampled for each household. The survey collected information on the health status of the population, including health-related aspects of lifestyle and health risk factors, the use of health services, and other actions people had recently taken for their health (ABS 2009b).

The list of variables and the measurement categories are in Table 2.1. Of the potential 21 variables, 11 were selected for this working paper analysis.

2.2 Data limitations

The health conditions and risk factors analysed were self-reported by respondents to the 2007–08 NHS. Self-reported information on medical conditions could be biased or fraught with recall error and should be interpreted with caution. As a result, if a respondent reported a condition that was not current and not long term (had not lasted and was not expected to last 6 months or more), these conditions were excluded from the analysis.

The variables used in the models are not exhaustive, and in some cases are correlated. An example of this correlation is occupation and equivalised household income—a respondent in a managerial occupation is likely to report a high household income. If additional data items were available, or if a different data set was analysed, it is likely that the results could vary from the results reported here.

The paper's main purpose is to undertake a preliminary analysis assessing the distribution of certain health status variables and health risk factors by selected social factors.

Further testing is recommended to validate the estimates of this model.

Table 2.1: Potential variables and measurements, reported in the 2007–08 NHS

Survey variable	Measurement categories
Personal characteristics	
Gender	Male, female
Age groups	0–14[(a)], 15–24, 25–44, 45–54, 55–64, 65+
Post-school qualification	Bachelor degree or higher, diploma, certificate, no non-school qualification
English skills[(a)]	English only, very well/well, not well/not at all
Social marital status[(a)]	Married (including defacto), unmarried
Health risk factors	
Type of milk consumed[(a)]	Whole milk, reduced fat, does not drink milk
Number of vegetable serves (daily)[(a)]	2=<, 3-4, 5+, does not eat vegetables at all
Number of fruit serves (daily)[(a)]	2=<, 3-4, 5+, does not eat fruit at all
Smoking status	Current smoker, ex-smoker, never smoked
Alcohol consumption	High risk, risky, low risk, never drank (including consumed more than a week ago)
Exercise level[(a)]	High, moderate, low, sedentary (includes no exercise at all)
Measured body mass index	Underweight (<18.5), healthy/normal weight (18.5–24), overweight (25–≤30), obese (≥30)
Employment and occupational characteristics	
Employment status[(a)]	Employed, unemployed, not in the labour force
Occupation	Managers/professionals, technicians/tradespersons, clerical/administration, personal services/sales, machine operators/drivers/labourers, no occupation (not in the labour force, unemployed)
Physiological and medical conditions	
Grouped 10 Kessler's score[(a)]	Low, moderate, high/very high distress level
Long-term medical conditions	Ever told has condition, still current and long-term; Ever told has condition, still current but not long-term; Ever told has condition, not current; Not known if ever told, but condition current and long-term; Never told, not current or long-term
Household and area level characteristics	
Equivalised household income	Quintiles
Main language spoken at home	English, other
ASGC remoteness categories	*Major cities*, *Inner regional*, Other areas
State or territory of residence[(a)]	NSW, Vic, Qld, WA, SA, Tas, ACT, NT
Private health insurance	
Insurance status[(a)]	Insured, uninsured

(a) Variables not used in the present analysis.

2.3 Variables, definitions and measurements

The 2007–08 NHS collected personal, family, health and area level characteristics (Table 2.1). The variables selected for inclusion in this preliminary analysis are described below.

2.3.1 Individual level variables

The following variables were selected: sex, age, post-school qualifications, employment status, and occupation of current job. Post-school qualifications were further categorised into four levels:

- bachelor degree or higher
- diploma (all types)
- certificates
- no post-school qualification.

Occupation was further categorised into six groups:

- managers and professionals
- technicians and tradespersons
- clerical and administration
- personal services and sales
- machine operators, drivers and labourers
- no occupation (unemployed or not in the labour force).

2.3.2 Household characteristics

The survey collected information on household income and the main language spoken in the house. The income was presented in quintiles of equivalised income, which standardises the income by adjusting for household size and age structure. The first quintile contains households earning an income in the lowest 20% of all households; the fifth contains households earning an income in the top 20%.

2.3.3 Area level characteristics

The geographic regions in this report are based on the ABS Australian Standard Geographic Classification Remoteness Structure, which is based on the Accessibility/Remoteness Index of Australia. Each respondent was classified to this structure, which in full includes the categories of:

- *Major cities* of Australia
- *Inner regional* Australia
- *Outer regional* Australia
- *Remote* Australia
- *Very remote* Australia.

The 2007–08 NHS only had three categories available for analysis: *Major cities*, *Inner regional* and Other areas (which include the combination of *Outer regional* and *Remote* Australia). People living in *Very remote* Australia were not in scope for this survey.

2.3.4 Health status variables

Four health variables have been analysed in the report: self-assessed health status and three long-term medical conditions.

In the survey, respondents were asked to state their health status either as 'Excellent', 'Very good', 'Good', 'Fair', or 'Poor'. In this paper, 'Excellent' and 'Very good' are grouped together as a measure of better overall health status.

The three long-term medical conditions in this analysis are:

- cancer, all types
- heart, stroke and vascular diseases, including angina, other ischaemic heart diseases, cerebrovascular diseases, oedema and heart failure, and diseases of arteries, arterioles and capillaries
- Type 2 diabetes mellitus.

The survey defines a long-term medical condition as 'a medical condition (illness, injury or disability) which has lasted at least six months, or which the respondent expects to last for six months or more' (ABS 2009a).

2.3.5 Health risk factors

The survey collected self-reported information on tobacco smoking status and alcohol consumption, and measured body mass index (BMI).

Smoking status has been grouped into three categories:

- never smoked
- ex-smoker
- current smoker.

For the multivariate analysis in Section 3.4, current smoker and ex-smoker were grouped to form the 'ever smoked' category.

The level of long-term risk of harm from alcohol consumption is based on the 3-day average daily consumption of alcohol by people aged 15 and over. These results are grouped into four categories, three of which are relative risk-levels as defined by the National Health and Medical Research Council (NHMRC) in 2001 (Table 2.2):

- never drank, including people who never consumed alcohol or did not drink alcohol in the week before interview
- low-risk consumption
- risky consumption
- high-risk consumption.

Table 2.2: Alcohol risk level, by sex 2001

	Consumption per day (mL)	
Alcohol risk level	**Males**	**Females**
Low risk	≤50	≤25
Risky	>50 and ≤ 75	>25 and ≤50
High risk	>75	>50

Note: One standard drink contains 12.5 mLs of alcohol.

New alcohol consumption guidelines were released in February 2009. However, these have not been analysed in this paper as the 2007–08 NHS unit record data on alcohol consumption are coded to the 2001 guidelines. The AIHW does not have access to the raw consumption data to recode to the 2009 risk categories.

For the multivariate analysis in Section 3.4, risky and high-risk consumption were grouped to form the 'risky alcohol consumption' category.

BMI is based on measured height and weight data, and calculated by dividing the respondent's weight in kilograms by the square of their height in metres (kg/m^2). There are four categories:

- underweight, BMI <18.5
- normal, BMI ≥18.5 and <25
- overweight, BMI ≥25 and <30
- obese, BMI ≥30.

For the multivariate analysis in Section 3.4, underweight, overweight and obese were grouped to form the 'unhealthy body weight' category.

3 Results

This working paper presents univariate and multivariate statistics on correlates of health. Univariate means that the health status variable is assessed by one factor only. For example, univariate statistics allows us to make assess whether 'women have better health than men'. Here, the health status deals with one predictor variable, sex only. Multivariate statistics enable assessment of whether the health status variable is influenced by more than one factor. For example, multivariate statistics allow us to assess whether there is an effect of age on back pain, once the influence of other predictor variables is considered. It is possible for the univariate statistics to show, for example, differences in prevalence of back pain by age, but multivariate statistics may show no association between age and back pain once the effect of other variables in the model are controlled for.

The predictor variables in these analyses include personal characteristics (sex and age), health risk factors (smoking, drinking and obesity) and social factors of health (education, occupation, income, place of residency, and language spoken in the home). Four measures of health are used: self-reported health status and three long-term conditions (cancer; heart, stroke and vascular diseases; and Type 2 diabetes).

3.1 Descriptive statistics: health status

Descriptive statistics (such as mean or proportion) are univariate statistics and therefore only consider the association of one variable at a time. Relying solely on univariate statistics to explain the effect of social and demographic factors on health status can be misleading if there are multiple factors that affect health status. This is explained further in the multivariate analyses in sections 3.2 and 3.4.

This section looks at the univariate analysis of the four health status variables by sex, age, and the five social factors.

3.1.1 Self-reported health status

The proportion of Australians aged 15 or over reporting their health status as excellent or very good was 56% in 2007–08 (Table 3.1). The prevalence of excellent or very good health status decreased with increasing age—from 67% among those aged 15–24 to 36% among those aged 65 or over (Figure 3.1). Females reported a higher rate of excellent or very good health (57%) than males (55%).

The following social factors were associated with a gradient of increasing rates of excellent or very good self-reported health status:

- post-school qualification— the lowest rate was among people with no post-school qualification (31%) and the highest among people with a bachelor degree or higher (68%).
- equivalised household income— the lowest rate was among people in households with the lowest incomes (36%) and the highest among people in households with the highest incomes (67%) (Figure 3.2).

Remoteness was associated with a reverse gradient. The rate of excellent or very good self-reported health status decreased as remoteness increased, from 57% among people living in *Major cities* to 52% among people living in Other areas (Table 3.1).

Two other social factors were associated with higher rates of excellent or very good self-reported health status, although a clear gradient was not apparent. Higher rates were reported among:

- people in manager/professional (67%) or clerical/administration occupations (67%) compared with people who did not have an occupation (42%)
- people in households where English was mainly spoken at home (56%) compared with people in households where a language other than English was spoken (51%) (Table 3.1).

3.1.2 Cancer

The proportion of Australians aged 15 and over reporting any long-term cancer was 2% in 2007–08 (Table 3.1). The prevalence of cancer increased with increasing age—from less than 1% among people aged 15–24 to 6% among people aged 65 or over (Figure 3.3). Males and females were similarly likely to report cancer (2%).

Equivalised household income was associated with a gradient of decreasing rates of cancer—from 4% among people in households with the lowest incomes to 2% among people in households with the highest incomes (Figure 3.4).

Four other social factors were associated with lower cancer prevalence, although a clear gradient was not apparent. Four other social factors were associated with lower cancer prevalence, although a clear gradient was not apparent. Lower cancer prevalence was reported in:

- people with a diploma (2%) or a bachelor degree or higher (2%) compared with people with a certificate (3%)
- people in technical or trades occupations (1%) compared with people who were unemployed or not in the labour force (3%) (Table 3.1)
- people living in *Major cities* (2%) compared with people living in *Inner regional* areas (3%)
- people in households where a language other than English was spoken at home (1%), compared with people in households where English was mainly spoken (2%).

3.1.3 Heart, stroke and vascular diseases

The proportion of Australians aged 15 and over reporting heart, stroke and vascular diseases was 6% in 2007–08 (Table 3.1). The prevalence of heart, stroke and vascular diseases increased with increasing age—from less than 1% among people aged 15–24 to 24% among people aged 65 or over (Figure 3.3). Males were slightly more likely to report heart, stroke and vascular diseases (7%) than females (6%).

All social factors were associated with lower rates of heart, stroke and vascular diseases, although a clear gradient was not apparent for any. Lower rates were reported in:

- people with a diploma (4%) or bachelor degree or higher (4%) compared with people with no post-school qualification (8%)
- people living in households with the second-highest incomes (3%) and highest incomes (3%) compared with people living in households with the lowest incomes (17%) (Figure 3.4)

- people working in technical/trades (2%) or personal services/sales (2%) occupations compared with people who were unemployed or not in the labour force (14%)
- people living in *Major cities* (6%) compared with people living in *Inner regional* areas (8%)
- people in households where a language other than English was spoken at home (5%) compared with people in households where English was mainly spoken (7%).

3.1.4 Type 2 diabetes

The proportion of Australians aged 15 and over reporting Type 2 diabetes was 4% in 2007–08 (Table 3.1). This proportion increased with age—from less than 1% among people aged 25–34 to 13% among people aged 65 or over (Figure 3.3). Males were slightly more likely to report Type 2 diabetes (5%) than females (4%).

Remoteness was associated with a gradient of increasing rates of Type 2 diabetes—from 4% among people living in *Major cities* to 5% among people living in Other areas.

Two social factors were associated with a gradient of decreasing rates of Type 2 diabetes:

- post-school qualifications—the highest rates were among people with no post-school qualifications (5%) and the lowest among people with a bachelor degree or higher (3%)
- equivalised household income—the highest rates were among people living in households with the lowest incomes (10%) and the lowest among people living in households with the highest income (2%) (Figure 3.4).

Two social factors were associated with Type 2 diabetes, although no clear gradient was apparent:

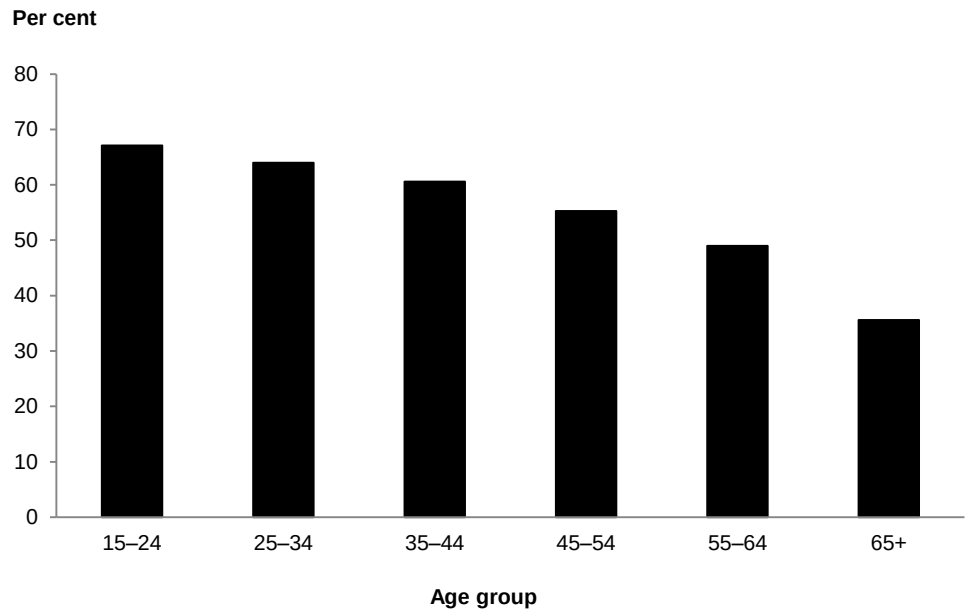
- occupation, the lowest rates were among people in technical/trades (2%), personal services/sales (2%) and clerical/administrative (2%) occupations, and the highest among people who were unemployed or not in the labour force (9%).
- language spoken at home—the lowest rates were among people in households where English was mainly spoken (4%) and the highest among people in households where a language other than English was mainly spoken at home (7%).

Table 3.1: Social correlates of health, 2007–08

Variables	'Excellent' or 'Very good' self-reported health status	Cancer (all types)	Heart, stroke and vascular diseases	Type 2 diabetes
		Per cent		
Sex				
Male	54.8	2.4	7.1	5.1
Female	56.8	2.0	5.8	3.6
Age				
15–24	67.1	0.3	0.5	—
25–34	64.0	0.4	0.7	0.3
35–44	60.6	1.3	1.6	1.5
45–54	55.3	2.0	4.4	4.0
55–64	49.0	4.2	10.4	9.3
65+	35.6	5.7	23.6	12.8
Post-school qualification				
Bachelor degree or higher	67.7	1.9	4.0	2.6
Diploma	63.0	1.6	3.9	2.7
Certificate	52.8	2.6	6.1	4.1
No post-school qualification	51.4	2.2	8.0	5.4
Equivalised household income (quintile)				
5th (highest)	67.0	1.6	3.1	2.3
4th	62.3	1.6	2.9	2.6
3rd	56.9	2.1	4.9	3.5
2nd	50.5	3.2	8.3	5.6
1st (lowest)	35.8	3.5	16.6	9.6
Occupation				
Manager/Professionals	67.0	1.8	2.6	2.4
Technicians/Trades	60.3	0.9	1.6	1.5
Clerical/Admin	66.7	2.2	3.8	1.9
Personal services/Sales	64.1	1.2	1.9	1.8
Machine operators/Drivers/Labourers	52.3	1.3	3.3	2.8
Not in the labour force/unemployed	42.3	3.4	13.7	8.5
Remoteness categories				
Major cities	57.0	2.0	5.7	4.0
Inner regional areas	54.0	2.9	8.2	5.0
Other areas	51.6	2.2	7.4	5.3
Main language spoken at home				
English	56.4	2.3	6.6	4.1
Other	51.1	1.3	5.2	6.8
All	**55.8**	**2.2**	**6.4**	**4.3**

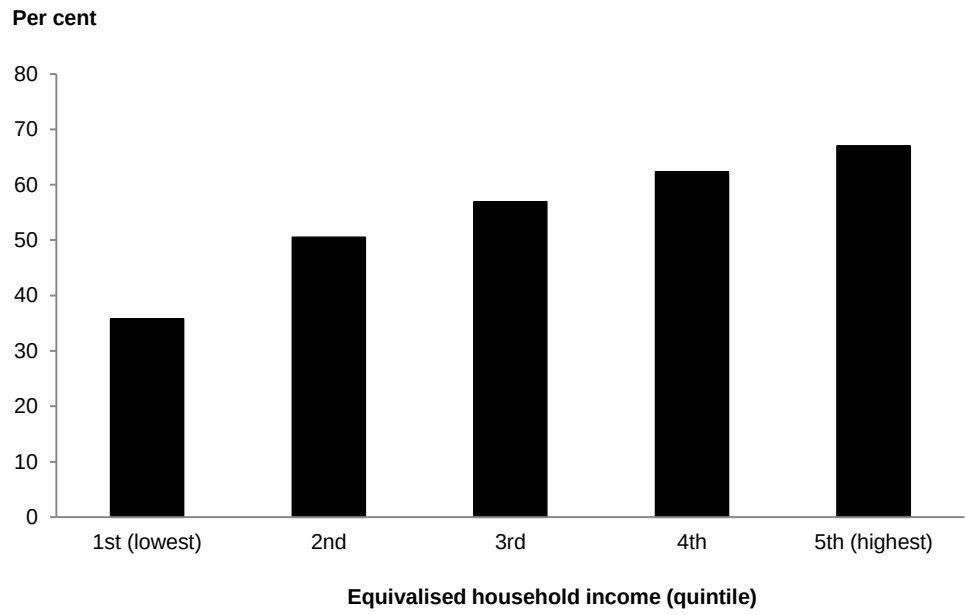
— nil

Source: AIHW analysis of 2007–08 NHS.



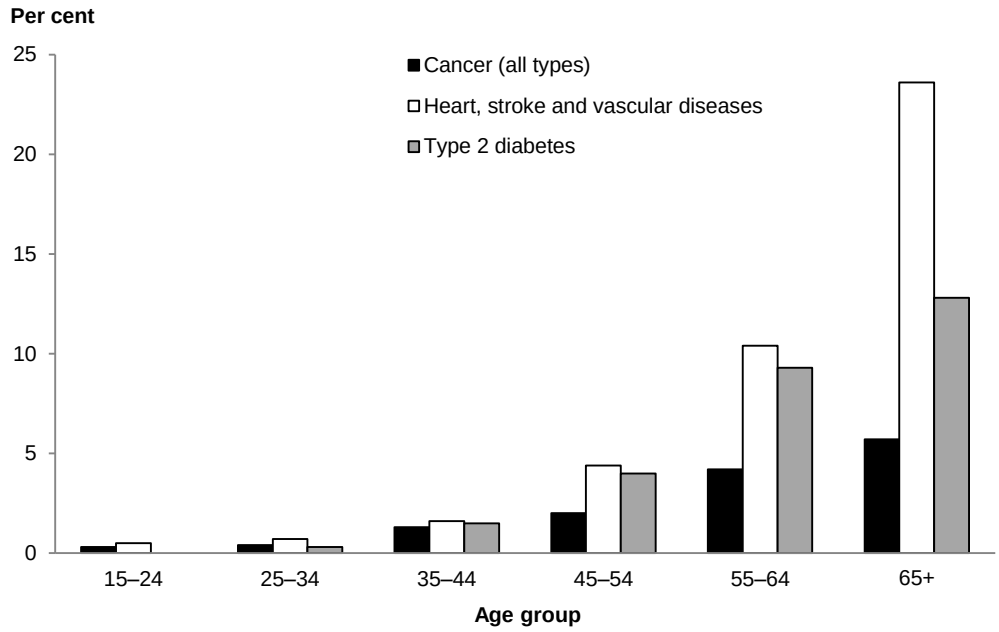
Source: AIHW analysis of 2007–08 NHS.

Figure 3.1: Prevalence of excellent or very good health status by age group, 2007–08



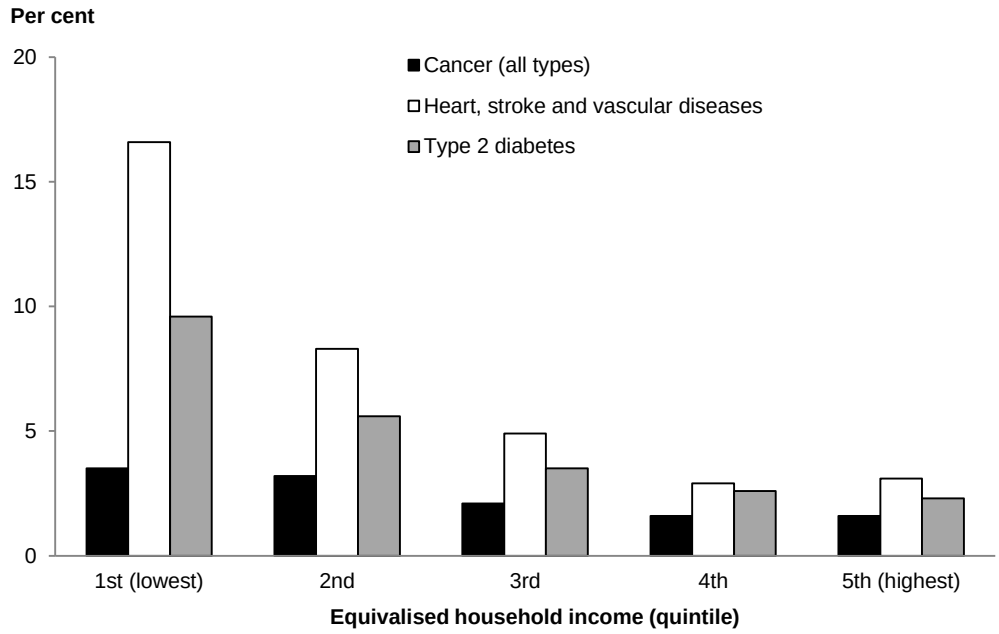
Source: AIHW analysis of 2007–08 NHS.

Figure 3.2: Prevalence of excellent or very good health status by household income, 2007–08



Source: AIHW analysis of 2007–08 NHS.

Figure 3.3: Prevalence of selected long-term conditions by age group, 2007–08



Source: AIHW analysis of 2007–08 NHS.

Figure 3.4: Prevalence of selected long-term conditions by household income, 2007–08

3.2 Multivariate analysis: health status

Odds ratios can be used to describe the relative likelihood of reporting one level of health status for one population group compared with another. For example, the odds ratio can be used to assess the relative likelihood of reporting excellent or very good health status among females compared with males.

Logistic regression is the statistical method used to derive odd ratios. This method can also be used to assess the relative likelihood of reporting certain levels of health status for multiple variables (multivariate analysis), such as sex, age and the five social factors reported here. For a multivariate analysis of self-assessed health status comparing females with males, an odds ratio of 1.0 indicates that, with all other factors in the analysis being equal, females are equally as likely to report excellent or very good health status as males. If the odds ratio is higher than 1.0, females are more likely to report excellent or very good health status than males, while an odds ratio of less than 1.0 indicates that females are less likely to report excellent or very good health status than males.

This section looks at the multivariate analysis for each of the four health status variables with sex, age and the five social factors.

3.2.1 Self-reported health status

In 2007–08, the likelihood of reporting excellent or very good health status was 20% higher for females than males (Table 3.2). As age increased, the likelihood of reporting excellent or very good health status decreased—people aged 35–44 and people aged 65 and over were 24% and 53% less likely, respectively, to report excellent or very good health, than people aged 15–24. There was no significant difference with people aged 25–34.

Specific levels of occupation and remoteness showed an increased likelihood of reporting excellent or very good health status. The results indicated that:

- all occupation groups had a higher likelihood of reporting excellent or very good health status than people who were unemployed or not in the labour force, ranging from 37% higher for machine operators/drivers/labourers to 81% higher for clerical/administrative occupations.
- people living in *Inner regional* areas were 25% more likely to report excellent or very good health status than people living in *Major cities*.

Some levels of post-school qualification and household income showed a decreased likelihood of reporting excellent or very good health status. The results indicated that:

- people with a certificate and people without any post-school qualification were each 27% less likely to report excellent or very good health status than people with a bachelor degree or higher
- people in households with the lowest incomes were 42% less likely to report excellent or very good health status than people living in households with the highest income.

Language spoken at home was not associated with reporting excellent or very good health status.

3.2.2 Cancer

In 2007–08, age was the only significant factor associated with reporting cancer as a long-term condition (Table 3.2). As age increased, the likelihood of reporting cancer as a long-

term condition increased—it was 11 times and 42 times as likely for people aged 35–44 and 65 and over to report having cancer as people aged 15–24. There was no significant difference for people aged 25–34.

With sex, age and all social factors being equal, there was no association between the social factors and the prevalence of cancer in this analysis.

Some caution is required in interpreting these results. While there are specific cancer types that are related to lifestyle (such as lung cancer and melanoma skin cancer), limitations of the survey sample size meant that there were not enough cases of these specific cancer types to analyse the results separately. If this analysis was performed on data for specific cancer types, the results are likely to show different associations.

3.2.3 Heart, stroke and vascular diseases

In 2007–08, the likelihood of reporting heart, stroke and vascular diseases by females was 32% lower than males (Table 3.2). Age was also associated with heart, stroke and vascular diseases—people aged 55–64 and 65 and over were 6.5 and 10.9 times as likely, respectively, to report having heart, stroke and vascular diseases than people aged 15–24.

One level of equivalised household income and language spoken at home were associated with an increased likelihood of reporting heart, stroke and vascular diseases. People in the first income quintile were 61% more likely to report having these long-term conditions than those in the fifth income quintile. People in households where English was mainly spoken at home were 85% more likely to report these long-term condition than people in households where languages other than English were spoken.

In terms of occupation, technicians/trades people, machine operators/drivers/labourers and managerial/professional occupations were 61%, 54% and 48% less likely, respectively, to report heart, stroke and vascular diseases than people who were unemployed or not in the labour force.

Post-school qualification and remoteness were not significantly associated with heart, stroke and vascular diseases.

3.2.4 Type 2 diabetes

In 2007–08, the likelihood of reporting Type 2 diabetes was 58% lower for females than males (Table 3.2). Age was associated with an increased likelihood of reporting Type 2 diabetes, ranging from 7 times higher among people aged 35–44, to 68 times higher among people aged 65 and over, compared with people aged 15–24.

Specific levels of occupation and language spoken at home were associated with a decreased likelihood of reporting Type 2 diabetes. Specifically:

- technicians/trades people were 60% less likely to report having Type 2 diabetes than people who were unemployed or not in the labour force
- people living in households where English was the main language spoken were 49% less likely to report having Type 2 diabetes than people living in households mainly speaking other languages .

Post-school qualification, equivalised household income and remoteness were not significantly associated with reporting the prevalence of Type 2 diabetes.

Table 3.2: Correlates of health, odds ratios from logistic regression, 2007–08

Variables	'Excellent' or 'Very good' self-reported health status	Cancer (all types)	Heart, stroke and vascular diseases	Type 2 diabetes
		Odds ratio		
Sex (male as base)				
Female	*1.20	0.84	*0.68	*0.42
Age (15–24 as base)				
25–34	0.85	3.73	0.86	n.a.
35–44	*0.76	*10.71	0.92	*6.63
45–54	*0.67	*16.27	3.71	*28.99
55–64	*0.55	*37.61	*6.51	*48.73
65+	*0.47	*42.47	*10.88	*68.39
Post-school qualification (bachelor or higher as base)				
Diploma	1.02	0.77	0.73	0.59
Certificate	*0.73	1.47	1.07	0.95
No post-school qualification	*0.73	1.02	0.96	1.08
Equivalised household income (5th quintile as base)				
4th	0.86	0.94	0.90	0.98
3rd	0.87	0.80	0.98	1.05
2nd	0.83	1.42	0.97	0.94
1st (lowest)	*0.58	1.26	*1.61	1.19
Occupation (Not in the labour force/unemployed as base)				
Manager/professionals	*1.71	1.08	*0.52	0.63
Technicians/trades	*1.68	0.81	*0.39	*0.40
Clerical/administration	*1.81	1.78	0.80	0.78
Personal services/sales	*1.73	1.57	0.67	1.07
Machine operators/drivers/labourers	*1.37	1.37	*0.46	0.57
Remoteness categories (*Major cities* as base)				
Inner regional areas	*1.25	1.12	1.02	0.90
Other areas	1.07	0.70	0.99	1.03
Main language spoken at home (other as base)				
English	1.21	1.73	*1.85	*0.51

n.a. not applicable.

* Statistically significant at p<0.05

Source: AIHW analysis of 2007–08 NHS.

3.3 Descriptive statistics: health risk factors

This section looks at the results of the univariate analyses of the three health risk variables by sex, age and the five social factors.

3.3.1 Smoking

In 2007–08, nearly half (49%) of all people aged 15 or over had ever smoked tobacco (current or ex-smokers) (Table 3.3). The rate of smoking was lowest among people aged 15–24 (28%) and highest among people aged 55–64 (56%). Males were more likely to have ever smoked (55%) than females (42%).

Remoteness was associated with a gradient of increasing smoking prevalence—from 47% among people living in *Major cities* to 57% among people living in Other areas.

Four other social factors were associated with higher rates of smoking, although a clear gradient was not apparent. Higher rates were reported found in:

- people with a certificate qualification (58%) compared with people with a bachelor degree or higher (37%)
- people living in households with the lowest incomes (54%) compared with people living in households with the second-highest incomes (46%)
- people in technical/trades or machine operator/driver/labourer occupations (58%) compared with people in managerial/professional or personal services/sales occupations (44%)
- people in households where English was mainly spoken (51%) compared with people in households where a language other than English was mainly spoken at home (32%).

3.3.2 Alcohol consumption

In 2007–08, nearly one-third (32%) of people aged 15 or over consumed alcohol at risky levels (risky or high risk) (Table 3.3). The rate of risky alcohol consumption was lowest among people aged 65 and over (16%) and highest among people aged 25–34 (39%). Males were slightly more likely to drink at risky levels (33%) than females (32%).

Equivalised household income was associated with a gradient of decreasing risky alcohol consumption—from 45% among people living in households with the highest incomes to 19% among people living in households with the lowest incomes.

Remoteness was associated with a reverse gradient, of increasing risky alcohol consumption—from 31% among people living in *Major cities* to 35% among people living in Other areas.

Three other social factors were associated with risky alcohol consumption, although a clear gradient was not apparent. Higher rates were reported by:

- people with a diploma qualification (37%) compared with people with no post-school qualification (30%)
- people in technical/trades occupations (44%) compared with people who were unemployed or not in the labour force (20%)
- people in households where English was mainly spoken (35%) compared with people in households where a language other than English was mainly spoken at home (10%).

3.3.3 Body mass index

In 2007–08, 6 in 10 (63%) people aged 15 or over had a BMI in the unhealthy range (underweight, overweight or obese) (Table 3.3). The prevalence of unhealthy body weight increased with age—from 43% among people aged 15–24 to 72% among people aged 55–64 and 65 or over.

All five social factors were associated with higher rates of unhealthy body weight, although a clear gradient was not apparent. Higher rates of unhealthy weight were reported by:

- people with a certificate (68%) compared with people with a bachelor degree or higher (56%)
- people living in households with the lowest incomes (70%) compared with people living in households with the second-highest incomes (61%)
- people in machine operator/driver/labourer occupations (67%) or not in the labour force or not employed (67%) compared with people in personal services/sales occupations (57%)
- people living in *Inner regional* areas (70%) compared with people living in *Major cities* (61%)
- people in households where English was mainly spoken (64%) compared with people in households where a language other than English was mainly spoken at home (54%).

Table 3.3: Correlates of health risk factors, 2007–08

Variables	Tobacco smoking[(a)]	Risky alcohol consumption[(b)]	Unhealthy body weight[(c)]
		Per cent	
Sex			
Male	55.0	32.6	68.9
Female	42.3	31.7	57.4
Age			
15–24	28.1	35.4	42.7
25–34	52.3	39.1	56.3
35–44	51.7	35.3	64.2
45–54	54.5	35.0	68.9
55–64	56.0	29.3	72.1
65+	49.9	16.3	71.9
Post-school qualification			
Bachelor degree or higher	37.3	31.2	56.0
Diploma	50.4	36.6	58.7
Certificate	57.5	36.0	67.7
No post-school qualification	48.2	29.7	65.1
Equivalised household income (quintile)			
5th (highest)	49.4	44.7	63.7
4th	45.7	38.8	61.0
3rd	48.8	30.4	65.2
2nd	49.5	24.8	65.3
1st (lowest)	54.3	18.8	69.6
Occupation			
Manager/professionals	44.0	37.5	61.4
Technicians/trades	57.6	43.9	62.9
Clerical/administration	47.8	37.8	59.0
Personal services/sales	44.4	37.9	57.2
Machine operators/drivers/labourers	57.5	36.7	67.3
Not in the labour force/unemployed	47.8	20.0	66.6
Remoteness categories			
Major cities	46.5	31.2	60.5
Inner regional areas	51.2	34.0	69.5
Other areas	56.9	35.1	67.4
Main language spoken at home			
English	50.5	34.8	64.3
Other	31.7	9.6	53.7
All	**48.6**	**32.2**	**63.2**

n.a. not applicable.

(a) People who ever smoked tobacco, including current smokers and ex-smokers.

(b) People who consume alcohol at risky and high-risk levels.

(c) People with a measured BMI of 25 or more.

Source: AIHW analysis of 2007–08 NHS.

3.4 Multivariate analysis: health risk factors

This section looks at the multivariate analysis of the three health risk factor variables by sex, age, and the five social factors.

3.4.1 Smoking

In 2007–08, females (44%) were less likely to report having ever smoked (current or ex-smoker status) than males (Table 3.4). Age was significantly associated with smoking: all other factors being equal, people aged 65 or over were twice as likely to report ever smoking, and people aged 55–64 were nearly 3 times as likely to report ever smoking as people aged 15–24.

Some levels of the social factors were associated with an increased likelihood of reporting smoking. The results showed that:

- people with a certificate, no post-school qualification or a diploma were 84%, 68% and 66% more likely to report smoking, respectively, than people with a bachelor degree or higher
- people living in households with the lowest incomes were 46% more likely to report smoking than people living in households with the highest incomes
- people households where English was mainly spoken were 57% more likely to report smoking than people in households where the main language spoken at home was not English.

Some levels of social factors were associated with a decreased likelihood of reporting of smoking. The results showed that:

- people living in households with the second-highest incomes were 18% less likely to report smoking than those living in households with the highest incomes
- people in managerial/professional occupations were 23% less likely to report smoking than people who were unemployed or not in the labour force.

In the multivariate analysis, remoteness was not associated with smoking.

3.4.2 Alcohol consumption

In 2007–08, females were 26%more likely to report risky (risky or high-risk) levels of alcohol consumption than males (Table 3.4). As age increased the likelihood of reporting risky alcohol consumption decreased—those aged 25–34 were 45% less likely to report risky alcohol consumption than people aged 15–24. For people aged 65 or over this figure was 76%.

As equivalised household income decreased, the likelihood of reporting risky alcohol consumption decreased—people living in households with the second-highest incomes and people living in households with the lowest incomes were 23% and 61% less likely, respectively, to report risky alcohol consumption than people living in households with the highest incomes.

Some levels of the social factors were associated with an increased likelihood of reporting risky alcohol consumption. The results showed that:

- people with a certificate or no post-school qualification were 22% more likely, and those with a diploma 26% more likely, than people with a bachelor degree or higher to report risky alcohol consumption
- people in machine operator/driver/labourer occupations, managerial/professional occupations and technician/trades people were 31%, 33% and 40% more likely, respectively, to report risky alcohol consumption than people who were unemployed or not in the labour force
- people in households where English was mainly spoken were nearly 5 times as likely to report risky alcohol consumption than people in households where English was not the main language spoken at home.

In the multivariate analysis, remoteness was not associated with risky alcohol consumption.

3.4.3 Body mass index

In 2007–08, the females were 43% less likely to have an unhealthy body weight (underweight, overweight or obese) than males (Table 3.4). As age increased the likelihood of having an unhealthy body weight increased—people aged 25–34 were 74% more likely to have an unhealthy body weight than people aged 15–24. People aged 55–64 and 65 and over were more than 3 times as likely to have an unhealthy body weight as people aged 15–24. Some levels of the social factors were associated with an increased likelihood of having an unhealthy body weight. The results showed that:

- people with a certificate were 55% more likely and people with no post-school qualification were 43% more likely to have an unhealthy body weight than people having a bachelor degree or higher
- people living in *Inner regional* areas were 33% more likely and those living in other areas were 23% more likely to have an unhealthy body weight than people living in *Major cities*
- people in households where English was mainly spoken were 30% more likely to have an unhealthy body weight than people in households where English was not the main language spoken at home.

In the multivariate analysis, equivalised household income and occupation were not associated with unhealthy body weight.

Table 3.4: Correlates of health risk factors, odds ratios from logistic regression, 2007–08

Variables	Tobacco smoking[a]	Risky alcohol consumption[b]	Unhealthy body weight[c]
		Odds ratio	
Sex (male as base)			
Female	*0.56	*1.26	*0.57
Age (15–24 as base)			
25–34	*2.47	*0.55	*1.74
35–44	*2.31	*0.51	*2.44
45–54	*2.60	*0.43	*2.62
55–64	*2.82	*0.39	*3.39
65+	*2.06	*0.24	*3.07
Post-school qualification (bachelor or higher as base)			
Diploma	*1.66	*1.26	1.14
Certificate	*1.84	*1.22	*1.55
No post-school qualification	*1.68	*1.22	*1.43
Equivalised household income (5th quintile as base)			
4th	*0.82	*0.77	0.92
3rd	1.04	*0.53	0.99
2nd	1.12	*0.49	0.90
1st (lowest)	*1.46	*0.39	1.03
Occupation (Not in the labour force/unemployed as base)			
Manager/professionals	*0.77	*1.33	0.99
Technicians/trades	0.97	*1.40	0.87
Clerical/administration	0.81	1.12	0.95
Personal services/sales	0.99	1.11	1.12
Machine operators/drivers/labourers	1.15	*1.31	1.04
Remoteness categories (*Major cities* as base)			
Inner regional areas	1.03	1.13	*1.33
Other areas	1.18	0.96	*1.23
Main language spoken at home (other as base)			
English	*1.57	*4.55	*1.30

* Statistically significant at $p<0.05$

Source: AIHW analysis of 2007–08 NHS.

4 Conclusions

This paper presents the findings from a preliminary analysis of the social distribution of health status and health risk factor variables, using the 2007–08 NHS. A summary of the significant associations between the social factors and health status and health risk factor variables identified by this analysis is presented below.

Sex

Compared with males, females were more likely to report excellent or very good health status. Females also had a lower prevalence of cancer; heart, stroke and vascular diseases; Type 2 diabetes; smoking; risky alcohol consumption; and unhealthy body weight than males.

Age

Age was the most significant predictor of health status. An age gradient was apparent for health status—as age increased the proportion of people reporting excellent or very good health decreased. The prevalence of cancer; heart, stroke and vascular diseases; and Type 2 diabetes also increased with age. The prevalence of unhealthy body weight increased with age to 55–64 years; the proportion of people aged 65 and over having an unhealthy body weight was lower than for people aged 55–64.

Post-school qualification

Health status and the prevalence of Type 2 diabetes were associated with education—better health status was more frequently reported with increasing levels of education and the prevalence of diabetes declined with increasing levels of education. When adjusting for sex, age and social factors, having a certificate qualification or no post-school qualification was more commonly associated with unhealthy body weight, risky alcohol consumption and tobacco smoking than having a bachelor degree or higher qualifications.

Household income

A gradient for equivalised household income (income adjusted for the size of the household) was observed for self-reported health status, cancer, Type 2 diabetes and risky alcohol consumption. As the level of income increased, more people reported excellent or very good health status and fewer people reported having cancer and diabetes; however, more people reported drinking risky levels of alcohol. When adjusting for sex, age and social factors, household income was a significant predictor of some health conditions and risk factors, most notably risky alcohol consumption. A contrast was observed between the highest and lowest income groups for self-reported health status—adults in the lowest income households were less likely to report excellent or very good health than their high-income counterparts.

Occupation

The was no clear occupation gradient for any of the health status or health risk factor variables. When adjusting for sex, age and social factors, all occupations groups were more likely to report excellent or very good health than people who were unemployed or not in the labour force. Some levels of occupation were associated with smoking; risky alcohol consumption; heart, stroke and vascular diseases; and Type 2 diabetes, but there were no clear patterns.

Remoteness

Levels of remoteness were consistently related to self-reported health status, the prevalence of Type 2 diabetes, smoking and risky alcohol consumption. As the level of remoteness increased, fewer people reported excellent or very good health status and more people reported having Type 2 diabetes, smoking and consuming risky levels of alcohol. However, when adjusting for sex, age and social factors, unhealthy body weight was associated with all levels of remoteness.

Language spoken at home

People who spoke a language other than English at home were less likely to report excellent or very good health status. They also had lower prevalence of cancer and heart, stroke and vascular diseases, but a higher prevalence of Type 2 diabetes than people who spoke only English at home. They were less likely to report the risk factors assessed here than those who spoke mainly English. When adjusting for age, sex and social factors, the relationship between language spoke at home and the prevalence of each of heart, stroke and vascular diseases, Type 2 diabetes, tobacco smoking, risky alcohol consumption and unhealthy body weight remained.

4.1 Limitations of the study

The findings of this preliminary analysis should be interpreted with caution.

Due to sample size constraints, the analysis is based on aggregated medical conditions, such as all cancers and all heart, stroke and vascular diseases. Aggregated analysis may mask any subtle difference that exists between the social factors and specific diseases, such as bowel cancer or ischaemic heart disease. To obtain large enough sample sizes of people with selected long-term conditions, such as bowel cancer or ischaemic heart disease, condition-specific surveys may be necessary. Although disease registers and hospital records are potential sources of data, these data sets do not contain detailed personal characteristics and social factors necessary for this analysis.

The survey design, which was based on a household survey, excluded hospitals and medical care facilities and in doing so could have introduced a sample selection bias, for healthier respondents. Also, there is a recall and reporting bias for those conditions and health risk factors that were self-reported.

4.2 Further analysis

Despite the data limitations, this paper shows some statistical associations between selected socioeconomic characteristics (social factors) and health conditions and health risk factors. It highlights the need for further analyses where fewer independent variables are included in the model that adjusts for highly correlated variables. For example, older persons are more likely to report lower household earnings, and it can therefore be argued that only one of these variables needs to be included in the model.

Similar analyses could be conducted on different data sets—such as mortality data, cancer registries, diabetes registries or hospital admissions data—to see if the associations between social factors and health conditions shown in this exploratory analysis are replicated.

In-depth and expanded analyses using different sets of predictor variables from different data sources are necessary to make more definite statements about the impact of social factors on health.

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Where people are born, grow, live, work and age affects their health status. This paper explores the association between selected social and health risk factors on Australians' health. It shows that people with higher household incomes and higher education qualifications are more likely to report better health and less likely to report smoking, and people living outside major cities are more likely to report being an unhealthy weight.

Social distribution of health risks and health outcomes: preliminary analysis of the National Health Survey 2007–08

AIHW