

# Victorian Population Health Survey 2011-12 Survey findings





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# Foreword

The Victorian Population Health Survey is an important component of the population health surveillance capacity of Victoria's Department of Health. The department initiated the surveillance program in 1998 and the first survey of adult Victorians was conducted in 2001. This year, for the second time only, the sample size has been expanded to approximately 32,000 participants to allow for the reporting of analysed data at the local government area (LGA) level. The department conducted the first LGA survey in 2008.

The Victorian Population Health Survey is based on core question modules that are critical to informing decisions about public health policies and programs. The findings from the survey fill a significant information gap by providing analysed data that are needed to ensure that public health programs remain relevant and responsive to current and emerging health issues.

Data from the Victorian Population Health Survey are used extensively across the government and non-government sectors of Victoria. The survey provides quality data for a range of indicators of public health importance at state and LGA levels. The survey findings are used to: provide evidence to inform decisions about local priorities for municipal public health and wellbeing plans; inform planning in non-government health organisations; inform planning, reporting and decision-making in the department; and measure trends over time for key health indicators such as diabetes, smoking prevalence and overweight and obesity.

The value of the survey data is increasing over time as it becomes possible to comment on trends for selected survey estimates. As our population ages, the number of people with a chronic disease is expected to rise, greatly affecting the health and wellbeing of the population. The survey findings give us important insights into the determinants of chronic disease and how we might better target public health interventions.

The survey series provides an ongoing source of quality information on the health and wellbeing of our community, and these latest findings from the Victorian Population Health Survey 2011–12 will underpin Victoria's public health efforts into the future.



**Hon David Davis MP**  
**Minister for Health**



# Contents

<b>Introduction</b>	<b>1</b>
<b>Summary of findings</b>	<b>11</b>
<b>1. Methods</b>	<b>13</b>
<b>2. Modifiable health risk factors</b>	<b>21</b>
2.1 Smoking status	27
2.2 Alcohol consumption	49
2.3 Fruit and vegetable consumption	83
2.4 Consumption of sugar-sweetened soft drinks and water	114
2.5 Physical activity	135
2.6 Overweight and obesity	165
2.7 Psychological distress	190
2.8 Hypertension	232
<b>3. Biomedical checks and cancer screening</b>	<b>249</b>
3.1 Visits to a doctor or general practitioner	252
3.2 Biomedical checks	260
3.3 Bowel cancer screening	266
3.4 Bowel cancer detection	292
3.5 Breast cancer screening and detection	294
3.6 Cervical cancer screening	304
<b>4. Oral health</b>	<b>311</b>
<b>5. Self-reported health and selected chronic diseases</b>	<b>359</b>
<b>6. Eye health</b>	<b>405</b>
<b>7. Asthma</b>	<b>445</b>
<b>8. Diabetes</b>	<b>465</b>
<b>9. Mental health</b>	<b>483</b>
<b>10. Social inequalities in health</b>	<b>509</b>
<b>Appendix 1: Summary description of Victorian Health Monitor</b>	<b>537</b>
<b>Appendix 2: Victorian Population Health Survey question items</b>	<b>538</b>

# List of Maps

Map i: Metropolitan local government areas, by Department of Health region	6
Map ii: Rural local government areas, by Department of Health region	8
Map iii: Risk factor profile for Victorian local government areas	12
Map 2.1: Prevalence of current smoking, by LGA, Victoria, 2011–12	37
Map 2.2 Short-term risk of alcohol-related harm in persons, by LGA, Victoria, 2011–12	63
Map 2.3: Proportion of adults not meeting fruit or vegetable guidelines, by LGA, Victoria, 2011–12	107
Map 2.4: Prevalence of daily sugar-sweetened soft drink consumption, by LGA, Victoria, 2011–12	122
Map 2.5: Prevalence of physical inactivity, by LGA, Victoria, 2011–12	143
Map 2.6: Prevalence of obesity in persons, by LGA, Victoria, 2011–12	184
Map 2.7: Prevalence of high or very high levels of psychological distress, by LGA, Victoria, 2011–12	199
Map 2.8: Prevalence of hypertension, by LGA, Victoria, 2011–12	239
Map 4.1: Prevalence of poor self-rated dental health, by LGA, Victoria, 2011–12	327
Map 5.1: Prevalence of self-reported health status, by LGA, Victoria, 2011–12	371

# Introduction

ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMBIACK ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMBIACK ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMBIACK





# Introduction

## About the survey

The Victorian Population Health Survey is an important component of the Department of Health's population health surveillance work. The annual survey series is an ongoing source of quality information on the health of adult Victorians.

The Victorian Population Health Survey has been conducted each year since 2001 and is based on a sample of 7,500 adults aged 18 years or over, who are randomly selected from households from each of the eight Department of Health regions in the state. In 2008 and again in 2011–12, the sample size for the survey was expanded to include the 79 local government areas (LGAs) in the state (Tables i–iii and Maps i–ii).

The aim of the survey is to provide quality, timely indicators of population health that directly apply to evidence-based policy development and strategic planning across the department and the wider community. The survey is based on core question modules to report on trends over time and to inform decisions about public health priorities. The survey findings fill a significant gap in population health data and provide information to ensure that public health programs remain relevant and responsive to current and emerging health issues.

The impact of the use of data from the Victorian Population Health Survey is extensive across the government and non-government sectors of Victoria. The survey provides quality data for a range of indicators of public health importance at a state and LGA level.

## What's new?

- The sample size for the Victorian Population Health Survey was expanded to 33,673 respondents in 2011–12 so information could be analysed and presented at the LGA level.
- Estimates have been age-standardised throughout the report to eliminate the effect that differences in age structure may have on estimates from different population groups.
- Notes to the tables and figures indicate the statistical significance of differences between estimates. Significance has been determined by comparing 95 per cent confidence intervals and testing trends over time using ordinary least squares regression.
- The reliability of estimates has been determined using relative standard errors, and the tables and figures indicate the degree of reliability.

## How to interpret a table

- Time trends tables: estimates are presented for each year in which the survey was run where exactly the same question has been asked each time. Where a question about a health topic has changed over time, the period reported reflects the period from where the question change occurred. Ordinary least squares regression was used to test trends over time.
- Other tables: individual estimates have been compared with the total Victorian estimate. Where subgroups of the population are presented (for example, males and females), the estimates have been compared with the total Victorian estimate for that population subgroup (all Victorian males, all Victorian females). The significance of differences in estimates has been determined by comparing the 95 per cent confidence intervals of the estimates.

Sample table: Smoking status, by LGA, Victoria, 2011–12 (Excerpt from Table 2.7)

	Current smoker			Ex-smoker			Non-smoker		
	%	95%CI		%	95%CI		%	95%CI	
		LL	UL		LL	UL		LL	UL
Darebin (C)	21.9	16.7	28.1	23.2	19.3	27.7	54.4	48.1	60.6
East Gippsland (S)	19.7	14.2	26.7	30.5	25.7	35.8	49.6	43.1	56.2
Frankston (C)	17.4	13.2	22.5	28.4	24.0	33.2	54.0	48.5	59.5
Gannawarra (S)	9.8	6.2	14.9	25.0	20.1	30.5	65.3	58.7	71.4
Glen Eira (C)	9.3	6.4	13.2	29.4	24.1	35.4	61.0	54.8	66.9
<b>Victoria</b>	<b>15.7</b>	<b>14.9</b>	<b>16.5</b>	<b>25.2</b>	<b>24.4</b>	<b>25.9</b>	<b>58.6</b>	<b>57.7</b>	<b>59.6</b>

If the estimate of the LGA is coloured **red**, this indicates that it is (statistically) significantly **HIGHER** than the state estimate.

For example, the proportion of current smokers in the City of Darebin is 21.9 per cent and this is higher than the state estimate, which is 15.7 per cent.

If the estimate of the LGA is coloured **blue**, this indicates that it is (statistically) significantly **LOWER** than the state estimate.

For example, the proportion of current smokers for the City of Glen Eira is 9.3 per cent and this is lower than the state estimate, which is 15.7 per cent.

## How is local government involved in public health?

Encouraging people to lead healthier lives – and creating environments that help them to do so – is challenging. The Victorian Government has long developed policies, programs and resources that encourage preventive health practices across all levels of government, non-government agencies and the private sector. For local government, the *Public Health and Wellbeing Act 2008* specifies the various functions of councils with regard to their role in protecting, improving and promoting public health and wellbeing within the municipality. These include creating an environment which supports the health of members of the local community and strengthens the capacity of the community and individuals to achieve better health. These functions need to be underpinned by quality information on the health status and needs of the local population to support the public health planning process, and policy and program implementation.

The *Victorian Health Priorities Framework 2012–2022*, which sets out the government's aspirations for the future of Victoria's health system, identifies the major challenges facing Victoria's health system, especially the demand on health resources due to population growth, demographic ageing, and the rise of chronic and complex conditions. The framework highlights the need for greater capacity to deliver prevention, primary care and early intervention.

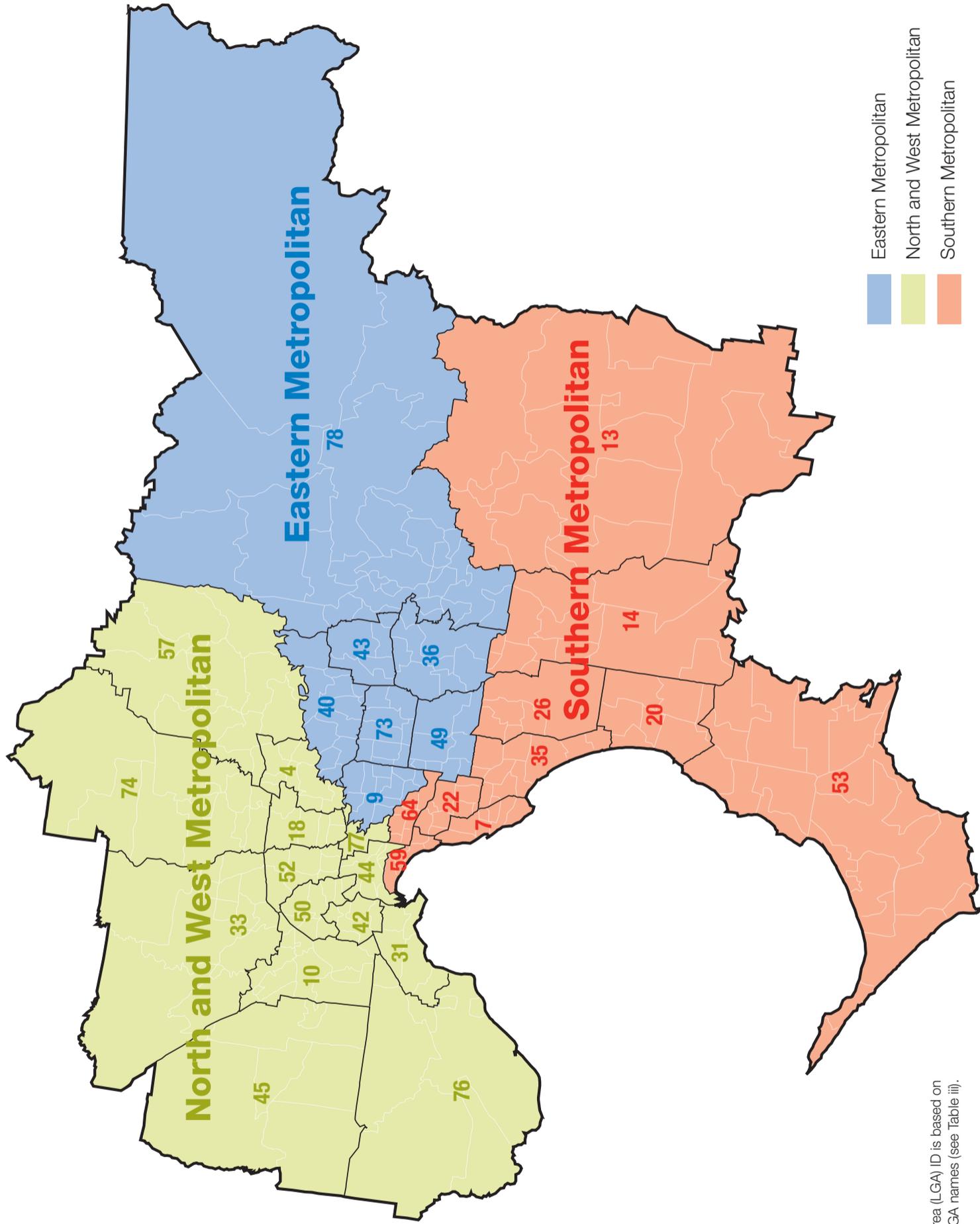
The *Victorian Public Health and Wellbeing Plan 2011–2015* complements the *Health Priorities Framework*. The overall aim of the Plan is to improve the health and wellbeing of Victorians by engaging communities and strengthening systems for health protection, health promotion and preventive healthcare across all sectors and levels of government. The Plan outlines a number of opportunities to further strengthen and expand the role of local government in promoting health and wellbeing, in the context of building a more effective prevention system in Victoria. One of the most significant of these is the *Healthy Together Victoria* initiative which is building new approaches to prevention based on evidence that illustrates how to most effectively mitigate many of the challenges facing the health system, and strengthening collaboration between local government and community partners to maximise the potential of preventive health interventions.

## How can this survey help local government?

Local government is ideally placed to lead local policies, programs and infrastructure development that can influence health through its work in a range of areas including transport, roads, parks, waste, land use, urban planning, recreation, cultural activities and in creating safer public places. The availability of data from this second LGA level Victorian Population Health Survey, providing a breakdown of particular risk factors and conditions across municipalities, can enable councils to confidently plan the steps needed to improve public health and wellbeing in their communities.

# Introduction

Map i: Metropolitan local government areas, by Department of Health region



Note: Local government area (LGA) ID is based on the alphabetical order of LGA names (see Table iii).

Table i: Metropolitan local government areas, by Department of Health region

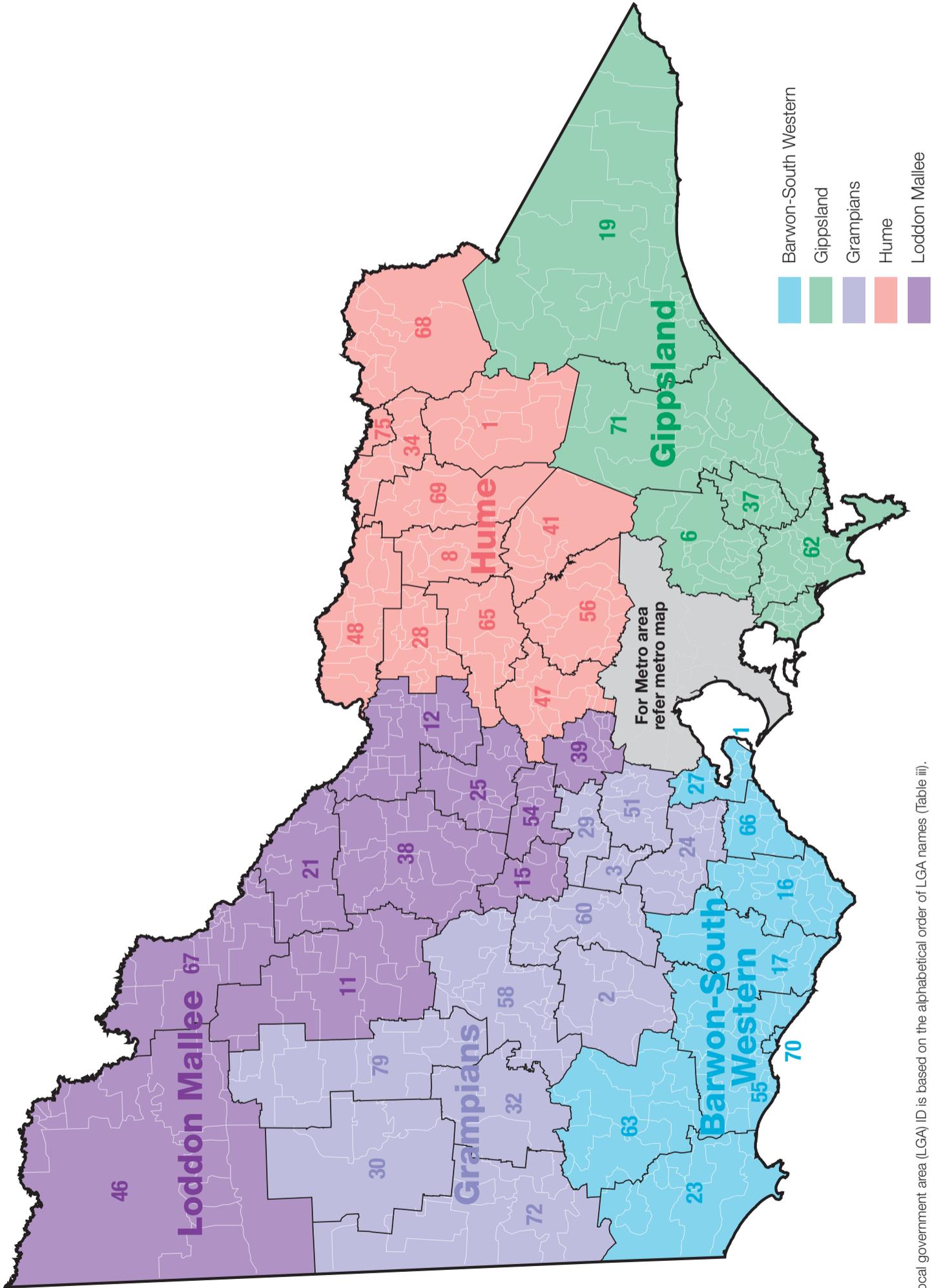
Region	LGA ID number <sup>a</sup>	LGA name
North & West Metropolitan	4	Banyule
	10	Brimbank
	18	Darebin
	31	Hobsons Bay
	33	Hume
	42	Maribyrnong
	44	Melbourne
	45	Melton
	50	Moonee Valley
	52	Moreland
	57	Nillumbik
	74	Whittlesea
	76	Wyndham
77	Yarra	

Region	LGA ID number <sup>a</sup>	LGA name
Southern Metropolitan	7	Bayside
	13	Cardinia
	14	Casey
	20	Frankston
	22	Glen Eira
	26	Greater Dandenong
	35	Kingston
	53	Mornington Peninsula
	59	Port Phillip
	64	Stonnington

Region	LGA ID number <sup>a</sup>	LGA name
Eastern Metropolitan	9	Boroondara
	36	Knox
	40	Manningham
	43	Maroondah
	49	Monash
	73	Whitehorse
	78	Yarra Ranges

a. Local government area (LGA) ID number is based on the alphabetical order of LGA names (see Table iii).

Map ii: Rural local government areas, by Department of Health region



Note: Local government area (LGA) ID is based on the alphabetical order of LGA names (Table iii).

Table ii: Rural local government areas, by Department of Health region

Region	LGA ID number <sup>a</sup>	LGA name
Barwon-South Western	16	Colac Otway
	17	Corangamite
	23	Glenelg
	27	Greater Geelong
	55	Moyne
	61	Queenscliffe
	63	Southern Grampians
	66	Surf Coast
	70	Warrnambool

Region	LGA ID number <sup>a</sup>	LGA name
Grampians	2	Ararat
	3	Ballarat
	24	Golden Plains
	29	Hepburn
	30	Hindmarsh
	32	Horsham
	51	Moorabool
	58	Northern Grampians
	60	Pyrenees
	72	West Wimmera
	79	Yarriambiack

Region	LGA ID number <sup>a</sup>	LGA name
Loddon Mallee	11	Buloke
	12	Campaspe
	15	Central Goldfields
	21	Gannawarra
	25	Greater Bendigo
	38	Loddon
	39	Macedon Ranges
	46	Mildura
	54	Mount Alexander
	67	Swan Hill

Region	LGA ID number <sup>a</sup>	LGA name
Hume	1	Alpine
	8	Benalla
	28	Greater Shepparton
	34	Indigo
	41	Mansfield
	47	Mitchell
	48	Moira
	56	Murrindindi
	65	Strathbogie
	68	Towong
	69	Wangaratta
75	Wodonga	

Region	LGA ID number <sup>a</sup>	LGA name
Gippsland	5	Bass Coast
	6	Baw Baw
	19	East Gippsland
	37	Latrobe
	62	South Gippsland
	71	Wellington

a. Local government area (LGA) ID number is based on the alphabetical order of LGA names (Table iii).

Table iii: Local government area names and Department of Health regions

LGA name	Region	LGA ID no. <sup>a</sup>	LGA name	Region	LGA ID no. <sup>a</sup>
Alpine (S)	Hume	1	Mansfield (S)	Hume	41
Ararat (RC)	Grampians	2	Maribyrnong (C)	North & West Metropolitan	42
Ballarat (C)	Grampians	3	Maroondah (C)	Eastern Metropolitan	43
Banyule (C)	North & West Metropolitan	4	Melbourne (C)	North & West Metropolitan	44
Bass Coast (S)	Gippsland	5	Melton (S)	North & West Metropolitan	45
Baw Baw (S)	Gippsland	6	Mildura (RC)	Loddon Mallee	46
Bayside (C)	Southern Metropolitan	7	Mitchell (S)	Hume	47
Benalla (RC)	Hume	8	Moira (S)	Hume	48
Boroondara (C)	Eastern Metropolitan	9	Monash (C)	Eastern Metropolitan	49
Brimbank (C)	North & West Metropolitan	10	Moonee Valley (C)	North & West Metropolitan	50
Buloke (S)	Loddon Mallee	11	Moorabool (S)	Grampians	51
Campaspe (S)	Loddon Mallee	12	Moreland (C)	North & West Metropolitan	52
Cardinia (S)	Southern Metropolitan	13	Mornington Peninsula (S)	Southern Metropolitan	53
Casey (C)	Southern Metropolitan	14	Mount Alexander (S)	Loddon Mallee	54
Central Goldfields (S)	Loddon Mallee	15	Moyne (S)	Barwon-South Western	55
Colac Otway (S)	Barwon-South Western	16	Murrindindi (S)	Hume	56
Corangamite (S)	Barwon-South Western	17	Nillumbik (S)	North & West Metropolitan	57
Darebin (C)	North & West Metropolitan	18	Northern Grampians (S)	Grampians	58
East Gippsland (S)	Gippsland	19	Port Phillip (C)	Southern Metropolitan	59
Frankston (C)	Southern Metropolitan	20	Pyrenees (S)	Grampians	60
Gannawarra (S)	Loddon Mallee	21	Queenscliffe (B)	Barwon-South Western	61
Glen Eira (C)	Southern Metropolitan	22	South Gippsland (S)	Gippsland	62
Glenelg (S)	Barwon-South Western	23	Southern Grampians (S)	Barwon-South Western	63
Golden Plains (S)	Grampians	24	Stonnington (C)	Southern Metropolitan	64
Greater Bendigo (C)	Loddon Mallee	25	Strathbogie (S)	Hume	65
Greater Dandenong (C)	Southern Metropolitan	26	Surf Coast (S)	Barwon-South Western	66
Greater Geelong (C)	Barwon-South Western	27	Swan Hill (RC)	Loddon Mallee	67
Greater Shepparton (C)	Hume	28	Towong (S)	Hume	68
Hepburn (S)	Grampians	29	Wangaratta (RC)	Hume	69
Hindmarsh (S)	Grampians	30	Warrnambool (C)	Barwon-South Western	70
Hobsons Bay (C)	North & West Metropolitan	31	Wellington (S)	Gippsland	71
Horsham (RC)	Grampians	32	West Wimmera (S)	Grampians	72
Hume (C)	North & West Metropolitan	33	Whitehorse (C)	Eastern Metropolitan	73
Indigo (S)	Hume	34	Whittlesea (C)	North & West Metropolitan	74
Kingston (C)	Southern Metropolitan	35	Wodonga (RC)	Hume	75
Knox (C)	Eastern Metropolitan	36	Wyndham (C)	North & West Metropolitan	76
Latrobe (C)	Gippsland	37	Yarra (C)	North & West Metropolitan	77
Loddon (S)	Loddon Mallee	38	Yarra Ranges (S)	Eastern Metropolitan	78
Macedon Ranges (S)	Loddon Mallee	39	Yarriambiack (S)	Grampians	79
Manningham (C)	Eastern Metropolitan	40			

Metropolitan and rural regions are identified by colour as follows: metropolitan/rural.

a. Local government area (LGA) ID number is based on the alphabetical order of LGA names.

B = Borough; C = City; S = Shire; RC = Rural City.

## Summary of findings

### Fruit intake

Less than half (45.5 per cent) of all persons surveyed met the recommended minimum daily intake levels for fruit (three or more serves for those aged 18 years and two or more serves for those aged 19 years or over).

### Vegetable intake

Less than one in 10 adults (7.2 per cent) in 2011–12 met the recommended minimum daily intake for vegetables (four or more serves for those aged 18 years and five or more serves for those aged 19 years or over).

### Sugar-sweetened drinks

More than one in five Victorian adults (22.6 per cent) reported consuming sugar-sweetened or diet soft drinks on a daily basis.

### Alcohol intake

The proportion of males and females drinking alcohol at levels for short-term risk of harm did not vary significantly over the period from 2003 to 2011–12. In 2011–12 approximately 12.7 per cent of males and 5.6 per cent of females reported drinking alcohol weekly at levels for short-term risk.

### Smoking

Approximately one in five adults aged 18 years or over (15.8 per cent) were current smokers in 2011–12, down from a high of 21.9 per cent in 2003.

### Physical activity

The proportion of persons undertaking adequate physical activity (measured in both sufficient time and sessions) to meet the national guidelines was 63.7 per cent in 2011–12. This figure has not changed significantly since 2005.

### Self-reported health

The proportion of persons reporting their health as excellent, very good or good was 83.8 per cent in 2011–12. This figure did not change significantly over the period from 2005 to 2011–12.

### Self-reported dental health

The proportion of persons reporting their dental health as excellent, very good or good was 75.0 per cent in 2011–12. Just over half (56.7 per cent) of Victorian adults had visited a dental professional within the 12 months preceding the survey.

### Body weight

Measures of height and weight were collected for the first time in 2002 to calculate body mass index (BMI). The proportion of persons categorised as obese according to their BMI increased from 13.9 per cent in 2003 to 17.5 per cent in 2011–12.

### Asthma

The prevalence of current asthma (experienced asthma symptoms in the previous 12 months) among adults was 10.9 per cent in 2011–12. The prevalence of current asthma did not significantly change between 2003 and 2011–12 in men, women or all Victorian adults.

### Diabetes

The prevalence of type 2 diabetes was 5.0 per cent in 2011–12. The prevalence of self-reported doctor-diagnosed type 2 diabetes significantly increased from 2003 to 2011–12 in both men and women.

### Psychological distress

The proportion of persons with high or very high levels of psychological stress, as determined using the Kessler 10 measure of psychological distress, remained steady at 10–13 per cent over the period from 2003 to 2011–12.

### Health checks and screening

In 2011–12 more than three-quarters (82.3 per cent) of all persons surveyed reported having had their blood pressure checked, more than half (60.8 per cent) reported having had a blood cholesterol test and more than half (56.1 per cent) reported having had a blood glucose test in the past two years.

More than half (61.2 per cent) of all persons aged 50 years or over who had received a faecal occult blood test (FOBT) kit from the national bowel cancer screening program in the mail had completed and returned the kit.

Among the female population, almost three-quarters (70.8 per cent) reported having had a Pap test in the preceding two years.

Among the female population, aged 50 years or over, less than three-quarters (69.7 per cent) reported having had a mammogram in the past two years.

### Social inequalities in health

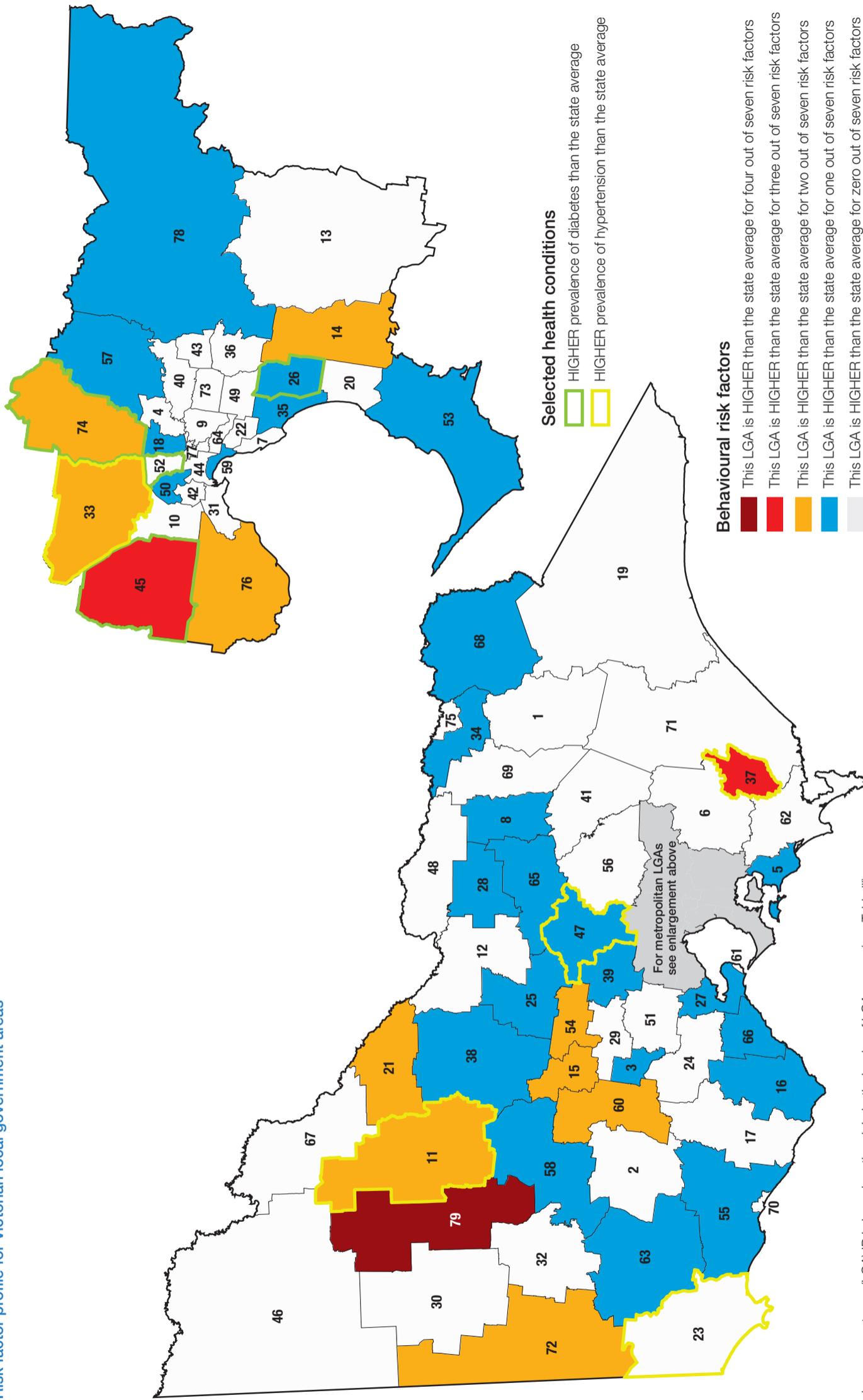
Overall, 4.6 per cent of Victorian adults reported that they had run out of food in the previous 12 months and had been unable to afford to buy more.

### LGA risk factor profile

The combined distribution of seven selected risk factors in each LGA is presented in Map iii. These risk factors are: obesity, inadequate physical activity, inadequate intake of fruit and vegetables, daily intake of sugar-sweetened soft drinks, smoking status (current smoker), alcohol-related harm (risky drinking) and high or very high levels of psychological distress. In conjunction with these risk factors, Map iii also highlights those LGAs where the prevalence of diabetes and hypertension among the adult population is higher than the state estimate.

Additional maps within this report separately describe the distribution of selected risk factors and chronic diseases in each LGA.

Map iii: Risk factor profile for Victorian local government areas



Note: Local government area (LGA) ID is based on the alphabetical order of LGA names (see Table iii).

a. Risk factors are: obesity, inadequate physical activity, inadequate intake of fruit and vegetables, daily intake of sugar-sweetened soft drinks, smoking status (current smoker), alcohol-related harm (risky drinking), high or very high levels of psychological distress.

# 1. Methods

ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMIACK ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMIACK ALPINE ARARAT BALLARAT BANYULE BASS COAST BAW BAW BAYSIDE BENALLA BOROONDARA BRIMBANK BULOKE CAMPASPE CARDINIA CASEY CENTRAL GOLDFIELDS COLAC-OTWAY CORANGAMITE DAREBIN EAST GIPPSLAND FRANKSTON GANNAWARRA GLEN EIRA GLENELG GOLDEN PLAINS GREATER BENDIGO GREATER DANDENONG GREATER GEELONG GREATER SHEPPARTON HEPBURN HINDMARSH HOBSONS BAY HORSHAM HUME INDIGO KINGSTON KNOX LATROBE LODDON MACEDON RANGES MANNINGHAM MANSFIELD MARIBYRNONG MAROONDAH MELBOURNE MELTON MILDURA MITCHELL MOIRA MONASH MOONEE VALLEY MOORABOOL MORELAND MORNINGTON PENINSULA MOUNT ALEXANDER MOYNE MURRINDINDI NILLUMBIK NORTHERN GRAMPIANS PORT PHILLIP PYRENEES QUEENSLIFFE SOUTHERN GRAMPIANS SOUTH GIPPSLAND STONNINGTON STRATHBOGIE SURF COAST SWAN HILL TOWONG WANGARATTA WARRNAMBOOL WELLINGTON WEST WIMMERA WHITEHORSE WHITTLESEA WODONGA WYNDHAM YARRA YARRA RANGES YARRIAMIACK





# 1. Methods

## Background

Population health surveys based on computer-assisted telephone interviews (CATI) are used to collect key population health surveillance data because they provide time series data, collection procedures that are acceptable to respondents, an adequate sample size, use current technology and provide quality data (especially through greater supervision of interviewers, computer data entry and question sequencing). Further, they allow for data collection that is timely, cost-effective (especially in rural and metropolitan areas) and adaptable to changing and emerging information needs. CATI surveys also fill strategic information gaps – that is, they can be used to gather information not available from other sources – and provide data for further analysis and interpretation.

## Method

The Victorian Population Health Survey 2011–12 followed a method developed over several years to collect relevant, timely and valid health information for policy, planning and decision making. The survey team administered CATI on a representative sample of persons aged 18 years or over who resided in private dwellings in Victoria. The Department of Health Human Research Ethics Committee approved the survey method and questionnaire content.

The department outsourced the fieldwork data collection to a market research organisation, which department staff supervised. All data were self-reported and stored directly in the CATI system.

## Stratification

There are five rural and three metropolitan Department of Health regions in Victoria that comprise 79 LGAs. The survey sample was stratified by LGA, with a target sample size of 426 respondents per LGA. A total of 33,673 interviews were completed, including 800 interviews in languages other than English.

## Sampling frame

Victorian Population Health Surveys up to and including 2009, used a 'list assisted' form of random digit dialling (RDD) for the sample frame. While list-assisted RDD approaches have provided a good contemporary coverage of households with a landline telephone connection, they tend to under-represent phone numbers in new exchanges and generate a relatively high proportion of non-working telephone numbers, which leads to some loss in fieldwork efficiency. An exchange-based approach to RDD was employed for the first time in 2010, using a commercial list provider to provide the RDD landline telephone sample.

The advantages of this exchange-based approach to random digit dialling sample generation include:

- improved coverage in areas where new telephone number ranges have been activated

- improved coverage in growth corridors, peri-urban areas and central business district developments
- representing each bank of phone numbers in the sampling frame in proportion to the current population of working landline numbers
- higher connection rates and therefore greater fieldwork efficiency.

## Sample generation

RDD was used to generate a sample of telephone numbers that formed the household sample for CATI. All residential households with landline telephone connections were considered 'in-scope' for the survey. People who are homeless or itinerant were excluded from the survey, as were people in hospitals or institutions, the frail aged and people with disabilities who are unable to participate in an interview.

## Sample size

The sample size for each LGA for the Victorian Population Health Survey (conducted in 2008 and 2011–12) was 426. The sample size is based on the following formula assuming a prevalence of 7.5 per cent for a variable of interest, with a confidence interval of 2.5 per cent (7.5 (5.0, 10.0) per cent), all percentages being expressed as a proportion:

$$\text{Sample size } (n) = \frac{Z^2 * p * (1 - p)}{c^2} = 426$$

where:

- p = proportion (0.075)
- Z = 1.96 (Z-score of level of significance (alpha = 0.05))
- c = confidence interval (0.025)

## Statistically detectable difference between two estimates

While a sample size of  $n = 426$  in each LGA permitted the detection of a variable of interest with a population prevalence of 7.5 (95% CI: 5.0, 10.0) per cent and a statistical power of 80 per cent, the sample size required to determine a difference between two estimates is considerably higher. Figure 1.1 shows the estimated sample size required to detect a statistically significant difference of five to 15 per cent between two estimates. The two estimates could be, for example, two different geographic areas or the same estimate across two different points in time. Figure 1.1 also shows that the sample size required for any given absolute difference between two estimates varies according to the prevalence of the estimate. In general, larger sample sizes are needed to detect differences between estimates with a prevalence of 50 per cent compared with estimates that have a prevalence that is higher (e.g. 70 per cent) or lower (e.g. 10 per cent) than 50 per cent.

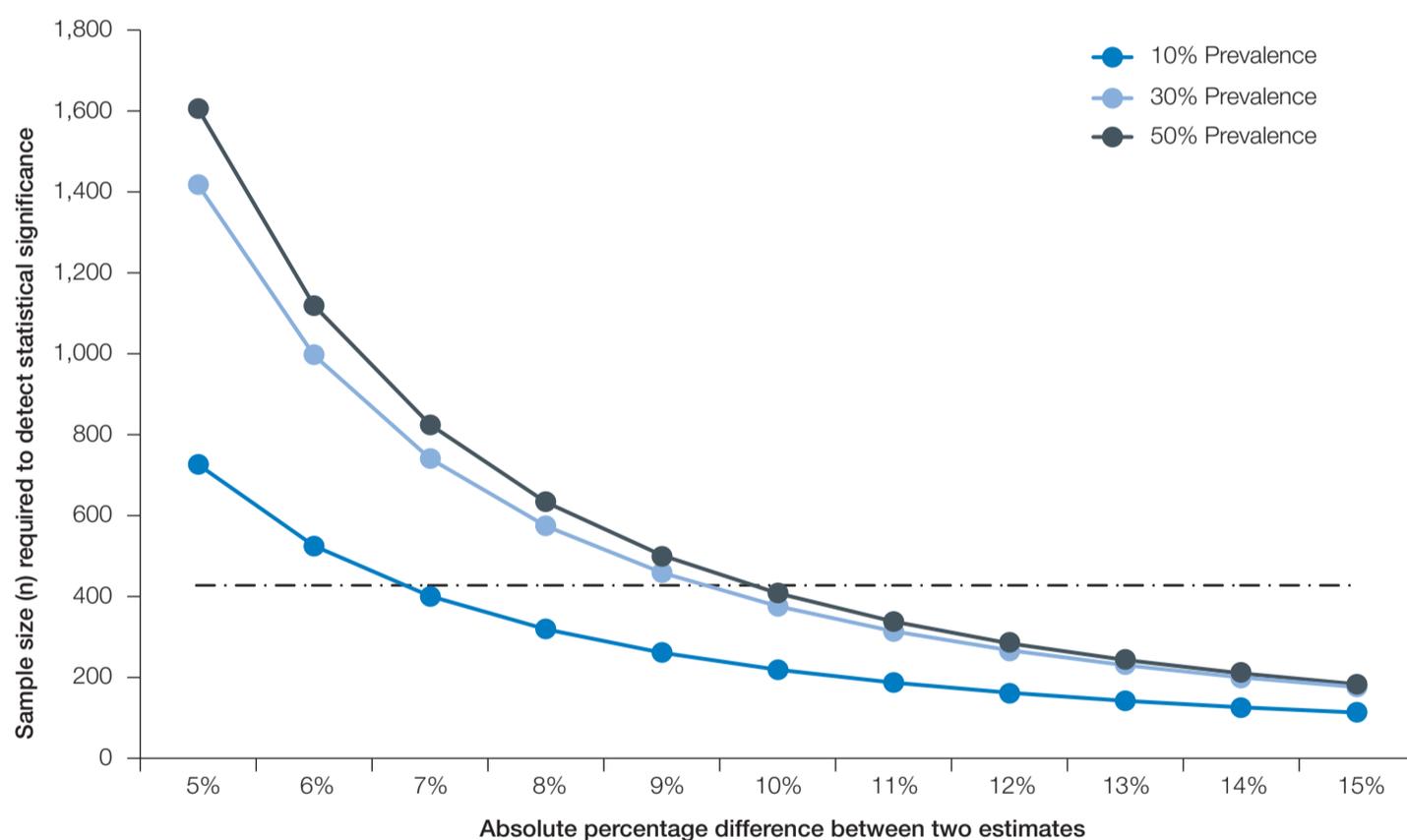
The figure shows that to be able to detect a five per cent difference across time or between two LGAs in a variable with a prevalence of approximately 50 per cent (for example, the proportion of adults in Victoria who met the recommended guidelines for daily fruit intake), a sample size of 1,600 people per LGA would be required.

The LGA-level Victorian Population Health Survey with an LGA sample size of 426 is only able to statistically detect true differences of 10 per cent or more where the prevalence of the estimate of interest is in the range of 10 to 50 per cent. Therefore, in response to a frequently asked question about whether the 2008 LGA-level Victorian Population Health Survey can be directly compared with the 2011–12 LGA-level Victorian Population Health Survey in order to be able to track changes over time, the answer is ‘yes’ but only if any observed difference in the variable of interest **exceeds** the range of **7–10 per cent** (depending on its prevalence). However, a difference in the range of seven to 10 per cent is a very large difference in public health terms and few health outcomes or risk factors have been observed to change by such large amounts, particularly over short periods of time. For example, while a much celebrated

and major public health intervention success story is the decline in the prevalence of smoking, the decline in men in Australia from 1998 to 2010 was only five per cent (27 per cent to 22 per cent). Therefore, for all practical purposes, comparing prevalence estimates for any given variable between the 2008 and 2011–12 surveys in order to look for changes over time is highly unlikely to yield any useful information.

However, at the statewide level, the Victorian Population Health Survey with a sample size of approximately 7,500 (statewide surveys) or 34,000 (LGA-level surveys) is powered to be able to detect very small differences of two per cent or more from year to year. This has enabled the time-series analyses that can be found throughout the report.

**Figure 1.1: Estimated sample size to detect statistically significant differences for prevalence at 10, 30 and 50 per cent**



Dotted black line indicates the sample size per LGA employed in the 2008 and 2011–12 LGA-level surveys.

## Data collection

Almost two-thirds of all completed interviews were achieved within the first three calls. This proportion is consistent with national experience on similar surveys.

## Call routine

The algorithm spreads call attempts over different times of day and days of the week. Other features of the call regime included:

- call initiation on weekday evenings and weekends only (since these are proven to be the best times to establish initial contact with households)
- appointments made for any time the call centre was operational
- appointments set for five days' time after leaving the first answering machine message and eight days' time after leaving the second answering machine message.

After establishing contact, interviewers could make calls, by appointment, outside the time block hours. After contacting a household, an interviewer would select for interview the person aged 18 years or over with the most recent birthday.

The department operated a survey hotline number during business hours throughout the data collection period to help establish survey bona fides and address sample member queries about the survey or survey process and arrange appointment times with respondents for their interview.

## Interviewing in languages other than English

Interviews were conducted in eight community languages. As for previous surveys in the series, the department provided translated survey questionnaires in Italian, Greek, Mandarin, Cantonese, Vietnamese, Arabic, Turkish and Serbo-Croatian, with a view to achieving a more representative sample in those areas with a relatively high proportion of speakers of these languages. CATI interviewers were recruited to undertake the interviews in these other languages, as required. The average interview length was 25.5 minutes.

## Participation

The response rate, defined as the proportion of households contacted that were not identified as out of scope and an interview completed, was 66.8 per cent. The response rate was higher in the rural LGAs (69.9 per cent) compared with metropolitan LGAs (62.8 per cent) and ranged from 53.7 per cent in Greater Dandenong (C) to 76.5 per cent in Indigo (S).

## Weighting

The survey data was weighted to reflect the following.

### (i) The probability of selecting the respondent within the household

Although a single respondent was randomly selected from within a household, the size of any household can vary upwards from one person. To account for this variation, each respondent was treated as representing the whole household, so his or her weight factor included a multiplier of the number of persons in the household. Further, a household may have more than one telephone line (that is, landlines used primarily for contact with the household), which would increase that household's probability of selection over those households with only one telephone line. To ensure the probability of contacting any household was the same, the project team divided the weight factor by the number of telephone lines connected to the household.

The formula for the selection weight (*sw*) component:

$$sw = nah/npl$$

where:

*nah* = the number of adults aged 18 years or over in the household  
*npl* = the number of telephone lines in the household.

### (ii) The age/sex/geographic distribution of the population

The project team applied a population benchmark (*pbmark*) component to ensure the adjusted sample distribution matched the population distribution for the combined cross-cells of age group and sex by LGA, based on the 2011 estimated resident population of Victoria. The categories used for each of the variables were:

- *Age group*: 18–24, 25–34, 35–44, 45–54, 55–64 and 65 years or over
- *Sex*: male, female
- *Geography*: 79 LGAs

The *pbmark* component was calculated by dividing the population of each cross-cell by the sum of the selection weight components for all the respondents in the sample within that cross-cell. For each cross-cell, the formula for this component was:

$$pbmark_i = Ni/\sum sw_{ij}$$

where:

*i* = the *i* th cross-cell  
*j* = the *j* th person in the cross-cell  
*Ni* = the population of the *i* th cross-cell  
 $\sum sw_{ij}$  = the sum of selection weights for all respondents (1 to *j*) in the *i* th cross-cell.

## Calculating the person weight to be applied

The project team assigned respondent records a weight factor (pwt) by multiplying the selection weight (sw) value by the population benchmark value (pbmark):

$$pwt_{ij} = sw_{ij} * pbmark_i$$

where:

$i$  = the  $i$  th cross-cell

$j$  = the  $j$  th person in the cross-cell.

## Statistical analysis

The survey data was analysed using the Stata statistical software package (Version 12.1, StatCorp LP, College Station Texas).

### Crude rates

A crude rate is an estimate of a proportion of a population that experiences a specific event over a specified period of time. It is calculated by dividing the number of events recorded for a given period by the number of people in the population. Crude rates (expressed as percentages) are only presented in the report where estimates are broken down by age group. Crude rates are useful for service planning purposes as they indicate the absolute estimate of the indicator of interest.

However, in making comparisons of estimates over time, crude rates can be difficult to interpret because the age distribution of the population is also changing over time. If one does *not* take into account changes in the age distribution, any observed increases, or decreases, in the prevalence of the indicator of interest may just reflect changes in the age distribution. For example, bearing in mind that the risk of heart disease increases with age, an increase in the crude rate of heart disease over time could be due to (a) more people developing heart disease due to a change in the prevalence of a predisposing factor or (b) an increase in the proportion of older people. There is no way to distinguish between the two possible explanations. However, if we take into account (adjust for) the changing age distribution and still see an increase in the prevalence of heart disease, we can rule out explanation (b). To adjust for age, we calculate an **age-standardised rate** (described below). Only age-standardised rates are reported for time-series data in this report. Similarly, only age-standardised rates are reported when making comparisons between different geographic areas. This is particularly pertinent for Victoria because rural LGAs tend to have populations characterised by larger proportions of older people compared with metropolitan LGAs.

### Age standardisation

Age-standardised rates, also known as age adjusted rates, were calculated using the direct method of standardisation. The direct age-standardised rates that are presented in this report are based on the weighted sum of age-specific rates applied to a standard population – the 2011 estimated resident population of Victoria. Five-year age groups were used to calculate the age-specific rates for data at the state and Department of Health region level. However, 10-year age groups were used to calculate the age-specific rates for data at the LGA level, due to small numbers in some of the smaller LGAs.

## Standard error

The standard error is a measure of the variation in an estimate produced by sampling a population. The standard error can be used to calculate confidence intervals and relative standard errors, providing the likely range of the true value of an estimate and an indication of the reliability of an estimate.

### Confidence interval (95 per cent)

A confidence interval is a range in which it is estimated that the true population value lies. A common confidence interval used in statistics is the 95 per cent confidence interval. This is interpreted as: if we were to draw several random samples from the same population, on average, 19 of every 20 (95 per cent) such confidence intervals would contain the true population estimate and one of every 20 (five per cent) would not. 95 per cent confidence intervals are reported for all estimates throughout the report and used to ascertain statistical significance (see below). The width of a confidence interval expresses the precision of an estimate; the wider the interval the less the precision.

$$95\% \text{ confidence interval} = \text{point estimate} \pm (\text{standard error} \times 1.96)$$

### Statistical significance

Only statistically significant trends and patterns are reported for the 2011–12 Victorian Population Health Survey. Statistical significance provides an indication of how likely a result is due to chance. With the exception of time trends over time (see below), statistically significant differences between estimates were deemed to exist where the 95 per cent confidence intervals for percentages did not overlap.

The term ‘significance’ is used to denote statistical significance. It is not used to describe clinical significance, the relative importance of a particular finding, or the actual magnitude of difference between two estimates.

### Relative standard error

A relative standard error (RSE) provides an indication of the reliability of an estimate. Estimates with RSEs less than 25 per cent are generally regarded as ‘reliable’ for general use. The percentages presented in tables and graphs in this report have RSEs less than 25 per cent, unless otherwise stated. Rates that have an RSE between 25 and 50 per cent have been marked with an asterisk (\*) and should be interpreted with caution. For the purposes of this report, percentages with RSEs over 50 per cent were not considered reliable estimates and have not been presented. A double asterisk (\*\*) has been included in tables and graphs where the percentage would otherwise appear, indicating the relevant RSE was greater than 50 per cent.

$$\text{Relative standard error (\%)} = \text{standard error} / \text{point estimate} \times 100$$

### Testing for trends across time

Ordinary least squares linear regression of the logarithms of the age-standardised rates was used to test for trends across time. Regression analysis to determine trends over time has the advantage of taking into consideration all the time points rather

than considering each time point separately. It calculates the line that best fits the data and the slope of the line is the average annual change over the period of time.

The 95 per cent confidence interval for the standard error of the slope is used to determine whether any observed increase or decrease over time is statistically significant at the  $p < 0.05$  level. This is ascertained if the 95 per cent confidence interval for the regression coefficient does not include the value 0.

Only data that were collected in an identical manner were included in time-series analyses. Therefore some time-series analyses go back to 2003, while others to 2005. This is because additional response options were included in 2005 for many of the survey questions.

## Profile of survey respondents

Known *pbmarks* for selected data items may be used to assess the representativeness of the sample. Table 1.1 shows the profile of respondents in the Victorian Population Health Survey 2011–12, and indicates the following:

- Females were more likely than males to participate in the survey.
- Adults aged 18–34 years were less likely to participate in the survey.
- Adults aged 55 years or over were more likely to participate in the survey.

**Table 1.1: Profile of respondents in the Victorian Population Health Survey, 2011–12**

	Benchmark data <sup>a</sup> (%)	Unweighted survey sample (%)	Weighted survey sample (%)
<b>Sex</b>			
Males	49	39	49
Females	51	61	51
<b>Age group (years)</b>			
18–24	13.0	3.4	14.2
25–34	18.9	6.2	19.1
35–44	18.4	14.6	17.9
45–54	17.3	19.5	16.7
55–64	14.5	22.6	13.6
65+	18.0	33.7	18.4

a. Service Planning, Department of Health, 2011, State Government of Victoria.

