The health of the people of New South Wales

SUMMARY REPORT

Report of the Chief Health Officer

2010

NSW GOVERNMENT | Health

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Suggested citation: Centre for Epidemiology and Research. 2010. *The health of the people of New South Wales - Report of the Chief Health Officer. Summary Report*, 2010. Sydney: NSW Department of Health.

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SHPN (CER) 100007
ISBN 978 1 74187 528 7

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Cover design: Marian Weatherstone. This cover design is dedicated to the memory of Wayne Geddes who passed away in February 2010. As Director of the Media and Communications Branch at the NSW Department of Health, Wayne gave me a wonderful opportunity to work for 11 months in the Publishing Unit. This experience, for which I will always be grateful, aided me in creating my cover design.

September 2010

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The preparation of The *health of the people of New South Wales - Report of the Chief Health Officer. Summary Report 2010*, was a team effort. The following list indicates the broad roles played by the many contributors to the Summary Report only. Contributors to the electronic version of the full report (e-CHO) can be found on the web site at www.health.nsw.gov.au/publichealth/chorep.

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Acknowledgements: Renee Iannotti, Geoff Honnor and Daniel Madeddu (latter two from the AIDS/Infectious Disease Branch, NSW Department of Health), Ann Brassil (Family Planning NSW), Dr Anna McNulty (Sydney Sexual Health Centre), A/ Professor David Wilson, Professor Basil Donovan, James Ward and Professor Andrew Grulich, (latter four from the National Centre in HIV Epidemiology and Clinical Research, UNSW).

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Foreword

This year marks the 20th anniversary of an ambitious program to change the way we work on public health issues in NSW.

Before the 1980s, public health officials were mainly concerned with quarantine, infectious disease control, safe water supply, and proper sewage and garbage disposal. Since then, we have looked at the broader picture which includes health promotion, chronic disease and injury prevention, environmental health, disease surveillance, communicable disease control, as well as the social determinants of health and the effect of climate change on health.

Substantial investments have been made in this state's public health infrastructure to ensure we can continue to meet new challenges and work towards improving the health of the people of NSW.

In the last 20 years we have established a network of Public Health Units and Health Promotion Units; developed public health data and information systems which are disseminated throughout the public health network; and developed workforce programs to train epidemiologists, biostatisticians and public health practitioners. This infrastructure provides NSW with a world standard system for monitoring and responding to threats to public health such as the Influenza A (H1N1) epidemic that occurred in 2009.

The health of the people of NSW – Report of the Chief Health Officer. Summary Report, 2010 draws from and is part of this infrastructure. It has been produced every two years since 1996 to provide key information on the status of the health of our community. It also plays the vital role of providing information on the effectiveness of public health programs and on factors that are critical to maintaining a healthy life.

This report shows that the life expectancy of people living in NSW has increased significantly over the last 10 years and is increasing faster for males than females. A child born in NSW in 2007 would now expect to live 79.8 years if male and 84.4 years if female, an increase of 3.3 years for males and 2 years for females since 1998. Death rates from major causes of disease and injury have significantly fallen in the last 10 years and there have been improving trends for some risky behaviours such as smoking, sedentary behaviour and inadequate fruit and vegetable consumption, which lead to disease.

However, overweight and obesity rates have increased by more than 3% in women and by 2% in men in the last five years. The consumption of vegetables, while improving, has remained too low in both men and women, with fewer than 15% of men and women eating the recommended amount of vegetables in 2009.

The report also highlights the poor health outcomes of the Aboriginal population of NSW.

Rates of avoidable deaths and hospitalisations, infant mortality and premature or low birth weight babies are unacceptably higher in Aboriginal compared with non-Aboriginal people in NSW. Reducing inequities in health outcomes remains a major challenge in NSW.

Kerry Chant
Chief Health Officer and Deputy Director-General Population Health

September 2010

About this Summary Report

This Summary Report is a condensed version of a subset of indicators available in the electronic version of the report, or e-CHO. The full e-CHO is available on the internet at **http://www.health.nsw.gov.au/publichealth/chorep**

The health of the people of NSW – Report of the Chief Health Officer, has been produced since 1996 and has become a flagship publication of the NSW Department of Health. This is the eighth edition, and the second year that this Summary Report has been produced to replace the previous hard copy version. It provides an overview of key population health indicators, health inequalities, emerging health priorities and new health data sources.

This eighth edition of *The health of the people of NSW – Report of the Chief Health Officer* consists of three components:

1) the updated and re-designed electronic report or **e-CHO**, which is an interactive web-based report providing graphs and complete data tables and explanatory text on hundreds of population health indicators, as well as files for each indicator which can be downloaded by users.
2) **Data books** of each chapter or of a selection of indicators in portable document format (pdf) containing all graphs and tables on a particular topic and which can be printed from the website.
3) This **Summary Report**, which provides summary tables of trends in key population health indicators, a comparison of differences in key indicators among the eight NSW health areas, an overview of each chapter of the e-CHO and a detailed analysis of two special topics – this year on sexually transmissible infections and urbanism and health.

The latest available data are presented, including hospitalisation data to 2008-09, deaths data to 2007, NSW Population Health Survey data to 2009, mothers and babies data to 2008, cancer incidence and screening data to 2008, and communicable diseases data to 2009. The 2010 report uses estimated residential populations based on the 2006 Australian Census of Population and Housing and the Australian standard population based on the 2001 Census for calculating age-standardised rates for comparing trends over time. Geographical areas were grouped according to the Australian Standard Geographical Classification (ASGC) Remoteness categories. This was calculated using the Accessibility/Remoteness Index for Australia (ARIA+ version) score based on the 2006 Census boundaries. Socioeconomic Indices for Areas (SEIFA) based on the 2006 Census have been also used in the report. Details of methods used in this report can be found in the Appendix.

Sections 1 and 2 provide summary statistics on 75 indicators in tables allowing the reader to directly compare figures for each health area and over time, with a colour-coded indication of significant differences with the state average among health areas, the statistical significance of trends over time and the link to national and statewide plans.

Section 3 provides a more in-depth analysis of two special topic areas.

Sections 4 to 7 provide an introduction and key points for each of 18 chapters included in the e-CHO, with up to three selected graphs from the e-CHO for each chapter. The full data tables and explanatory text for these and other indicators can be found in the e-CHO.

Links to statewide plans

The tables in Sections 1 and 2 of this Summary Report show the link between the key population health indicators and the current strategic national and statewide plans, the ***National Healthcare Agreement, NSW State Plan***, ***NSW State Health Plan*** and the ***Two Ways Together*** plans.

Colours have been used to denote the relationship of the indicator to the relevant plan. Official performance indicators are a subset of the indicators presented in this report.

The reporting requirements for each plan are to different levels of government, ranging from the *National Healthcare Agreement* (reporting to the Federal Minister for Health), *NSW State Plan* (reporting to the Premier), *NSW State Health Plan* (reporting to the NSW Minister for Health), and *Two Ways Together* (reporting to the Premier).

Performance on all *NSW State Plan* and *NSW State Health Plan* indicators is also reported by each health area to the Director-General of Health through the Area Health Service Performance Agreements. All indicators included in the higher-level reporting plans are also included in the lower level plans.

National Healthcare Agreement

This Agreement defines the objectives, outcomes, outputs and performance measures in the delivery of services across the health sector. It affirms that Australia's health system should:

(a) be shaped around the health needs of individual patients, their families and communities;
(b) focus on the prevention of disease and injury and the maintenance of health, not simply the treatment of illness;
(c) support an integrated approach to the promotion of healthy lifestyles, prevention of illness and injury, and diagnosis and treatment of illness across the continuum of care; and
(d) provide all Australians with timely access to quality health services based on their needs, not ability to pay, regardless of where they live in the country.

NSW State Plan

Describes priorities, targets and actions for NSW Government action, in five areas: rights, respect and responsibility; delivering better services; fairness and opportunity; growing prosperity across NSW; and environment for living.

NSW State Health Plan

Reflects the priorities in the *NSW State Plan* with seven strategic directions for health priorities over the next five years:

SD1: Make prevention everybody's business.
SD2: Create better experiences for people using health services.
SD3: Strengthen primary health and continuing care in the community.
SD4: Build regional and other partnerships for health.
SD5: Make smart choices about the costs and benefits of health services.
SD6: Build a sustainable health workforce.
SD7: Be ready for new risks and opportunities.

Two Ways Together

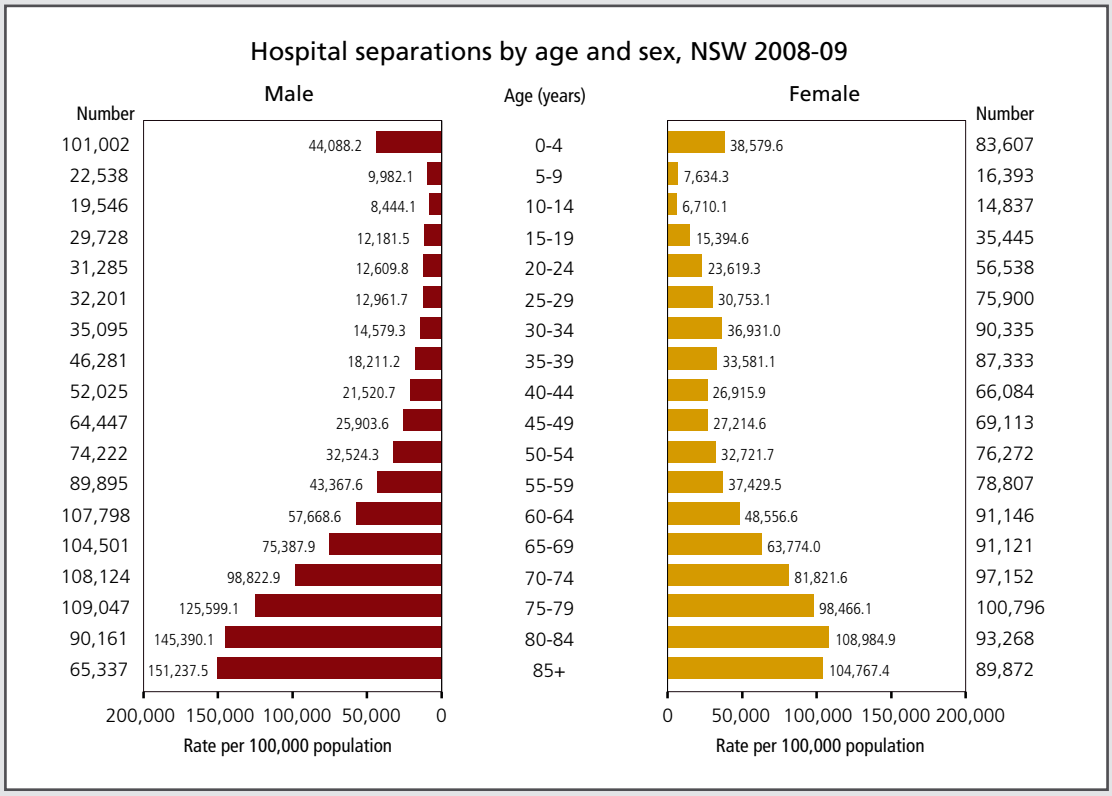
The NSW Aboriginal Affairs Plan 2003-2012 - developed in consultation with the Aboriginal communities of NSW, has seven priority areas: health; housing; education; culture and heritage; justice; economic development; and families and young people.

Guide to interpreting figures in the CHO Summary Report

In this Summary Report, a number of sections contain graphs of age-specific rates and numbers of events (such as hospitalisations or deaths), and a breakdown of age-specific events by cause. Taking page 63 from section 5.1 Burden of Disease as an example, this document explains how to correctly interpret information in these graphs.

Age-specific rates and numbers of events

The figure below provides an indication of the total burden of hospitalisations in NSW during 2008-09 by sex and age-group. That is, sex and age-specific rates and numbers of hospital separations for all causes during this period. In this figure it is apparent that total hospital separation rates tend to increase with age for both sexes, with the exception of those aged 0-4 years and females from 20-39 years of age. Hospitalisations include birthing services and births of liveborn infants, which explain the differing patterns of hospitalisation for young children and women of child-bearing age. This figure does not provide an overview of the reasons for hospitalisation.



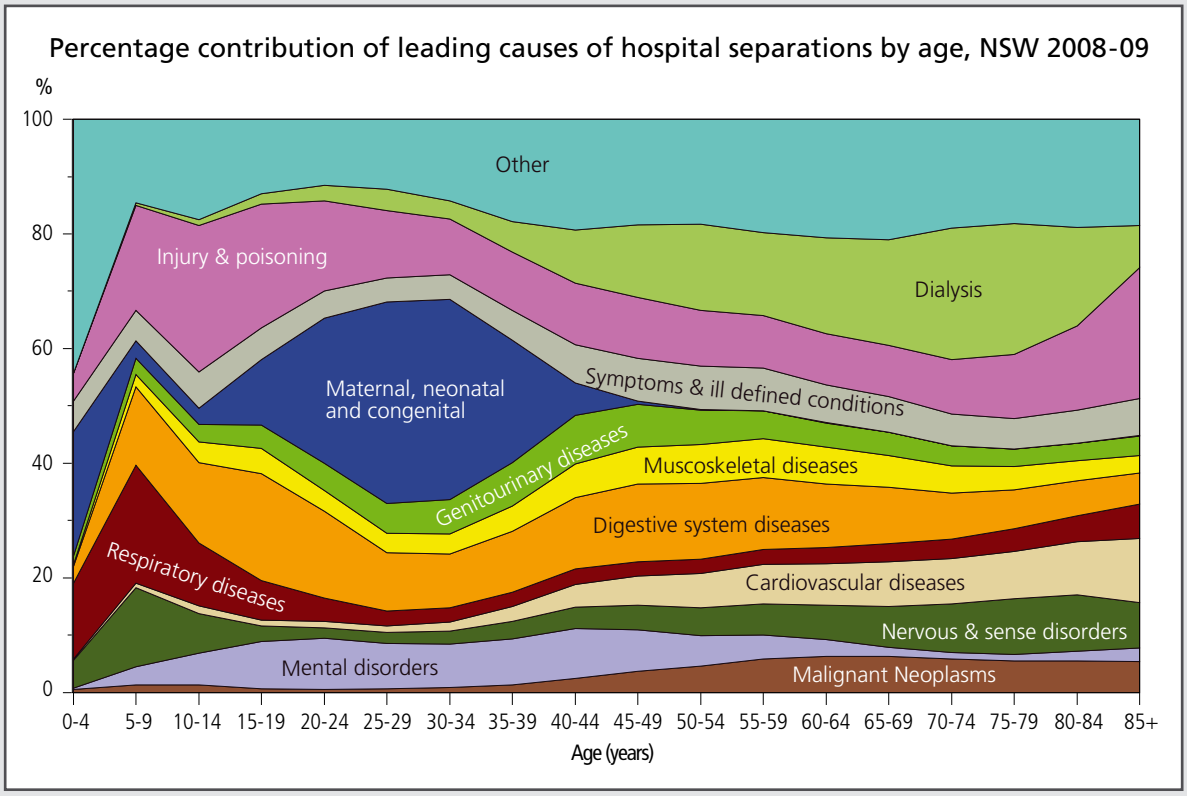
Percentage contribution of leading causes of events

The figure below provides a breakdown of total hospitalisations in NSW during 2008-09 by age-group and principal diagnosis. The height of the individual coloured areas at each age simply represents the percentage (%) of total hospitalisations at that age due to the stated cause. This figure does not provide any indication of burden as measured by the number or rate of hospitalisations but rather, is designed to provide a high-level overview of the how the distribution of causes of hospitalisations changes by age. As this graph was created by extrapolating between the results for each age-group, only the height of the coloured areas at actual age-group tick-marks should be interpreted.

An example

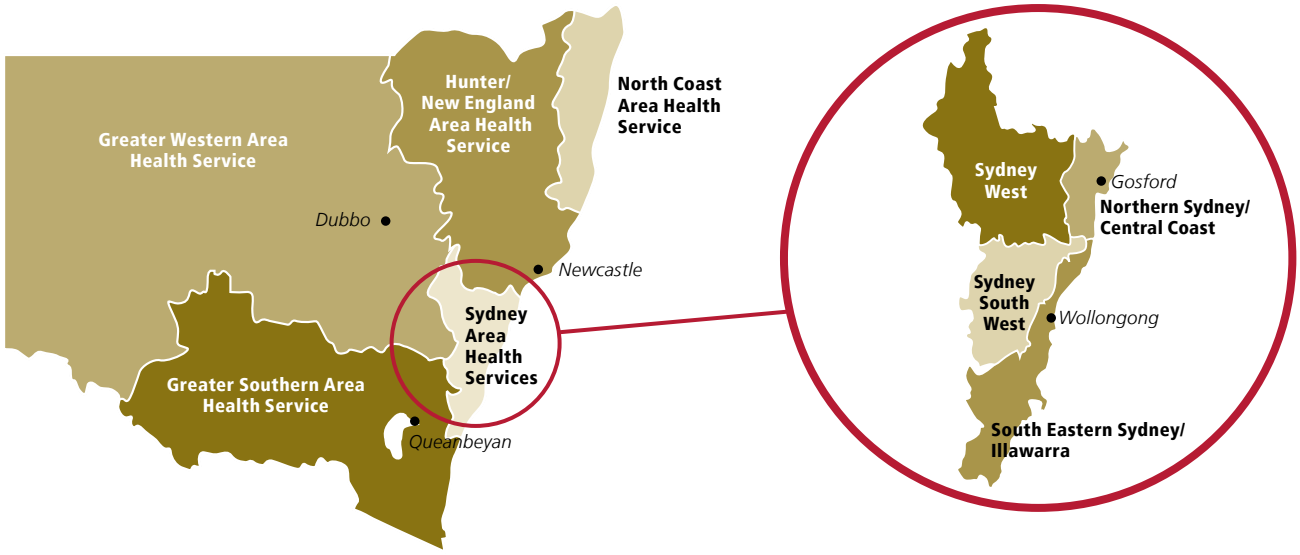
This graph shows the reasons why people of different ages are admitted to hospital. We can see that respiratory diseases were responsible for a relatively large proportion (20.6%) of hospitalisations in 5-9 year olds, and a relatively small proportion of hospitalisations in 75-79 year olds (3.9%). Conversely hospitalisations relating to dialysis increasingly accounts for a larger proportion of hospitalisations as people get older.

What this graph does not show is the burden of disease nor does it take into account the number of hospitalisations. To do that we would need to dig a little deeper. Following on with the above example, the 20.6% of hospitalisations in children aged 5-9 years who were admitted to hospital for respiratory disease actually represents a total of 8,019 hospitalisations, while the 3.9% for those aged 75-79 years represents 8,195 hospitalisations. In other words, the actual numbers of hospitalisations for respiratory disease were highly similar in these two groups despite the fact that a considerably greater proportion (over five times) of hospitalisations in the 5-9 year age group were due to respiratory diseases than in 75-79 year age group. This is because there were also approximately five times more hospitalisations in persons aged 75-79 years than in those aged 5-9 years, as shown in the graph on page vi.



Map of NSW Area Health Services

These maps illustrate the current boundaries of the eight NSW Area Health Services. Each Area Health Service is made up of a number of statistical local areas or local government areas (see table below).



Area Health Service	Localities within Area Health Service boundaries
Sydney South West	Ashfield, Bankstown, Burwood, Camden, Campbelltown, Canada Bay, Canterbury, Fairfield, Leichhardt, Liverpool, Marrickville, Strathfield, Sydney (part), Wingecarribee, Wollondilly
South Eastern & Illawarra	Botany Bay, Hurstville, Kiama, Kogarah, Randwick, Rockdale, Shellharbour, Shoalhaven, Sutherland Shire, Sydney (part), Waverley, Wollongong, Woollahra
Sydney West	Auburn, Baulkham Hills, Blacktown, Blue Mountains, Hawkesbury, Holroyd, Lithgow, Parramatta, Penrith
Northern Sydney & Central Coast	Gosford, Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Manly, Mosman, North Sydney, Pittwater, Ryde, Warringah, Willoughby, Wyong
Hunter & New England	Armidale Dumaresq, Cessnock, Dungog, Glen Innes Severn, Gloucester, Greater Taree, Great Lakes, Gunnedah, Guyra, Gwydir, Inverell, Lake Macquarie, Liverpool Plains, Maitland, Moree Plains, Muswellbrook, Narrabri, Newcastle, Port Stephens, Singleton, Tamworth Regional, Tenterfield, Upper Hunter Shire, Uralla, Walcha
North Coast	Ballina, Bellingen, Byron, Clarence Valley, Coffs Harbour, Kempsey, Kyogle, Lismore, Nambucca, Port Macquarie-Hastings, Richmond Valley, Tweed
Greater Southern	Albury, Bega Valley, Berrigan, Bland, Bombala, Boorowa, Carrathool, Conargo, Coolamon, Cooma-Monaro, Cootamundra, Corowa Shire, Deniliquin, Eurobodalla, Goulburn Mulwaree, Greater Hume Shire, Griffith, Gundagai, Harden, Hay, Jerilderie, Junee, Leeton, Lockhart, Murray, Murrumbidgee, Narrandera, Palerang, Queanbeyan, Snowy River, Temora, Tumbarumba, Tumut Shire, Upper Lachlan Shire, Urana, Wagga Wagga, Wakool, Yass Valley, Young
Greater Western	Balranald, Bathurst Regional, Blayney, Bogan, Bourke, Brewarrina, Broken Hill, Cabonne, Central Darling, Cobar, Coonamble, Cowra, Dubbo, Forbes, Gilgandra, Lachlan, Mid-Western Regional, Narromine, Oberon, Orange, Parkes, Walgett, Warren, Warrumbungle Shire, Weddin, Wellington, Wentworth, Unincorporated Far West NSW

Key population health indicators by Area Health Service

Introduction 2

1.1 Determinants of health 3

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About this section

This section reports key population health indicators of determinants of health, the burden of disease, health inequalities, and health priority areas, for NSW and by Area Health Service (AHS).

Area Health Service-level indicators were compared with the NSW average, where possible, by assessing the overlap of appropriate 95% confidence intervals for NSW and each Area Health Service. For full details of the methods used to calculate and compare 95% intervals see Appendix 2 – Methods.

How to interpret tables

Indicators are reported by population group for the period and in the units specified in tables. Cells are highlighted based on the results from the comparison of 95% confidence intervals, and signify whether the AHS-level indicator was higher, lower or no different from the NSW average (see Key).

For example, in 2009 a greater proportion of males in Hunter New England Area Health Service and a lower proportion of males in Sydney West Area Health Service engaged in risk alcohol drinking compared with the NSW average. There was no difference between the NSW average and the proportion of males engaging in risk alcohol drinking in all other Area Health Services.

KEY

- Linked to National Healthcare Agreement, NSW State Plan and NSW State Health Plan
- Linked to NSW State Plan, NSW State Health Plan only
- Linked to Two Ways Together only
- Higher than NSW average
- Lower than NSW average
- No difference from NSW average
- – Data not available

NOTES

a See appendix Explanatory Notes for full description of indicators

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001.

c Some of the indicator definitions used in the National Healthcare Agreement differ from those used in the NSW State Plan. Where this has occurred, the NSW definition was used in this report.

NSW = New South Wales
SSW = Sydney South West Area Health Service
SESI = South Eastern Sydney & Illawarra Area Health Service
SW = Sydney West Area Health Service
NSCC = Northern Sydney & Central Coast Area Health Service
HNE = Hunter & New England Area Health Service
NC = North Coast Area Health Service
GS = Greater Southern Area Health Service
GW = Greater Western Area Health Service

* No data on statistically significant differences available

Table 1.1 Determinants of health

Social determinants[a]	Period	Group	Unit[b]	NSW	SSW	SESI	SW	NSCC	HNE	NC	GS	GW
Household weekly income < $500	2006	Households	%	12.1	13.0	10.8	10.3	7.6	15.3	17.8	13.7	16.0
Household weekly income > $2000	2006	Households	%	21.7	21.4	26.7	22.7	34.1	14.1	8.2	13.6	12.2
Health-related behaviours[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Adequate physical activity	2009	Males	%	60.7	55.1	68.5	56.8	64.4	60.8	57.6	60.3	59.9
	2009	Females	%	49.8	47.6	53.6	46.9	52.9	48.5	54.3	47.2	43.8
Overweight and obesity (16+ yrs)	2009	Males	%	59.5	57.3	56.3	62.5	57.8	60.8	58.3	65.1	68.5
	2009	Females	%	45.4	46.3	39.3	46.9	37.7	53.9	47.3	50.5	57.4
Overweight and obesity in children (9-15 yrs)	2009	Males	%	31.0	35.6	33.0	28.8	24.3	34.8	29.7	30.8	27.4
	2009	Females	%	23.2	29.4	17.0	27.8	19.3	21.0	26.7	20.4	19.4
Recommended fruit consumption	2009	Males	%	52.5	46.8	59.1	53.8	53.1	54.4	53.6	46.6	46.5
	2009	Females	%	60.9	57.3	61.2	60.3	66.5	60.8	65.1	56.3	57.9
Recommended vegetable consumption	2009	Males	%	7.5	5.8	7.7	4.6	7.1	11.1	9.7	8.9	10.6
	2009	Females	%	13.2	8.0	12.3	12.0	12.9	18.4	18.6	16.8	16.9
Children free of dental caries (5-6 yrs)*	2007	Children	%	61.2	61.1	71.1	59.1	62.9	40.7	50.8	45.4	61.2
Current smoking	2009	Males	%	20.3	25.3	17.5	18.8	17.5	21.5	20.6	18.9	23.3
	2009	Females	%	14.2	13.7	12.7	16.0	10.6	16.1	14.5	18.6	18.2
Risk alcohol drinking	2009	Males	%	41.4	40.4	39.7	30.2	42.0	50.1	45.2	49.2	49.2
	2009	Females	%	19.8	14.9	23.2	14.5	21.0	23.2	21.1	24.1	23.0
Vaccinated against influenza in last 12 months (65+ yrs)	2009	Males	%	70.0	70.0	71.9	60.6	72.2	73.0	66.5	71.1	73.0
	2009	Females	%	74.8	71.3	77.1	73.1	73.2	79.7	72.9	76.9	72.9
Vaccinated against pneumococcal in last 5 years (65+ yrs)	2009	Males	%	53.7	47.7	56.0	40.4	54.4	60.2	57.9	57.6	58.6
	2009	Females	%	57.9	54.1	55.3	52.3	55.0	65.6	64.0	61.2	64.2

Table 1.2 **Burden of disease**

Deaths[a]	Period	Group	Unit[b]	NSW	SSW	SESI	SW	NSCC	HNE	NC	GS	GW
All causes	2003-2007	Males	ASR	750.1	763.3	690.7	751.9	672.5	823.8	769.0	802.8	907.4
	2003-2007	Females	ASR	501.7	495.5	468.6	514.7	470.4	541.6	499.5	532.7	587.9
Potentially avoidable	2003-2007	Males	ASR	211.0	214.5	199.5	209.6	169.6	233.1	230.8	231.2	259.3
	2003-2007	Females	ASR	118.3	115.3	110.1	123.9	100.3	133.5	125.0	126.0	147.5
Hospital separations[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
All causes	2008-09	Males	ASR	33,457.1	31,987.7	35,249.0	32,254.5	33,861.3	31,459.7	34,036.3	35,763.1	37,464.8
	2008-09	Females	ASR	34,805.5	31,928.8	36,320.6	33,998.0	35,800.9	35,246.6	34,952.7	36,072.0	38,670.8
Ambulatory care sensitive conditions	2008-09	Males	ASR	2,618.2	2,745.3	2,483.5	2,690.5	2,167.0	2,621.4	3,019.0	3,115.7	3,752.5
	2008-09	Females	ASR	2,436.2	2,242.1	2,346.5	2,501.4	2,001.3	2,409.0	2,902.5	3,102.1	3,607.7
Other[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Life expectancy at birth	2003-2007	Males	Years	79.1	79.0	80.1	79.2	80.7	77.8	78.4	78.1	76.4
	2003-2007	Females	Years	83.9	84.1	84.7	83.7	84.8	82.9	83.8	83.2	81.9
Life expectancy at age 65 yrs	2003-2007	Males	Years	83.5	83.3	84.3	83.3	84.3	82.8	83.7	83.0	82.1
	2003-2007	Females	Years	86.8	86.9	87.5	86.6	87.2	86.3	87.1	86.3	85.6

KEY

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NOTES

a See appendix Explanatory Notes for full description of indicators.

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001.

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Table 1.3 **Health inequalities**

Deaths[a]	Period	Group	Unit[b]	NSW	SSW	SESI	SW	NSCC	HNE	NC	GS	GW
Potentially avoidable (males)	2003-2007	Aboriginal	ASR	483.8	354.2	467.3	362.4	344.2	474.5	538.1	444.1	657.4
	2003-2007	non-Aboriginal	ASR	209.2	219.0	196.9	214.6	164.7	229.7	224.6	232.9	249.0
Potentially avoidable (females)	2003-2007	Aboriginal	ASR	303.8	263.2	362.3	237.6	154.5	294.5	351.2	269.6	372.9
	2003-2007	non-Aboriginal	ASR	116.2	116.9	108.0	125.4	96.0	131.1	121.0	125.9	138.9
Hospital separations[a]	**Period**	**Group**	**Unitb**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Ambulatory care sensitive conditions (males)	2008-09	Aboriginal	ASR	5,777.7	3,484.3	5,714.7	4,711.5	4,055.3	5,416.8	8,082.6	6,049.1	6,914.8
	2008-09	non-Aboriginal	ASR	2,543.4	2,419.8	2,460.7	2,577.2	2,170.1	2,511.0	2,862.3	3,006.3	3,468.7
Ambulatory care sensitive conditions (females)	2008-09	Aboriginal	ASR	6,417.8	3,866.4	4,690.1	5,442.2	5,023.6	5,949.7	7,874.9	7,783.9	9,179.8
	2008-09	non-Aboriginal	ASR	2,382.0	2,223.0	2,346.1	2,456.4	2,014.4	2,316.2	2,727.0	3,022.2	3,255.1
Pregnancy and the newborn[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Perinatal deaths	2004-2008	Aboriginal	RLB	15.6	18.2	13.8	14.6	14.0	18.4	14.6	13.6	15.0
	2004-2008	non-Aboriginal	RLB	8.6	9.6	8.3	8.7	6.9	10.4	8.3	6.2	9.5
First antenatal visit before 14 weeks gestation	2004-2008	Aboriginal	%	60.0	45.8	59.4	59.4	74.5	60.5	62.3	62.5	60.3
	2004-2008	non-Aboriginal	%	72.6	59.9	72.2	72.3	83.8	73.7	81.6	79.4	82.0
Premature babies	2004-2008	Aboriginal	%	11.9	14.4	11.8	11.5	12.6	13.2	11.9	8.5	11.0
	2004-2008	non-Aboriginal	%	7.2	7.1	7.4	7.4	6.9	8.4	6.6	5.4	7.2
Low birth weight babies	2004-2008	Aboriginal	%	12.3	13.4	10.3	11.8	11.2	13.2	12.4	10.6	12.5
	2004-2008	non-Aboriginal	%	6.1	6.3	6.0	6.3	5.5	6.9	5.6	4.5	6.3
Teenage births	2004-2008	Females	%	1.5	1.3	0.9	1.6	0.7	2.3	2.2	1.6	3.2
Other[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Immunisation coverage (12-15 months)	2009	Aboriginal	%	87.2	78.2	84.5	88.1	98.0	85.5	89.9	87.8	87.4
	2009	non-Aboriginal	%	91.9	91.4	91.2	92.6	92.5	93.8	85.3	93.8	93.8

KEY

- Linked to National Healthcare Agreement, NSW State Plan and NSW State Health Plan
- Linked to NSW State Plan and NSW State Health Plan only
- Linked to Two Ways Together only
- Higher than NSW average
- Lower than NSW average
- No difference from NSW average
- – Data not available

NOTES

a See appendix Explanatory Notes for full description of indicators.

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001, RLB = rate per 1,000 live births.

c Some of the indicator definitions used in the National Healthcare Agreement differ from those used in the NSW State Plan. Where this has occurred, the NSW definition was used in this report.

NSW = New South Wales, **SSW** = Sydney South West Area Health Service, **SESI** = South Eastern Sydney & Illawarra Area Health Service, **SW** = Sydney West Area Health Service, **NSCC** = Northern Sydney & Central Coast Area Health Service, **HNE** = Hunter & New England Area Health Service, **NC**= North Coast Area Health Service, **GS** = Greater Southern Area Health Service, **GW** = Greater Western Area Health Service

Table 1.4 **Health priority areas**

New cases of cancer[a]	Period	Group	Unit[b]	NSW	SSW	SESI	SW	NSCC	HNE	NC	GS	GW
All cancer	2004-2008	Males	ASR	592.6	548.1	602.8	560.4	596.3	632.5	631.5	601.0	595.4
	2004-2008	Females	ASR	395.7	375.1	400.7	379.3	407.9	401.2	423.5	395.3	395.0
Lung cancer	2004-2008	Males	ASR	57.9	66.7	55.6	58.1	48.0	59.1	60.5	59.0	61.9
	2004-2008	Females	ASR	31.0	31.4	30.7	32.2	29.3	29.5	35.4	29.9	32.4
Colorectal cancer	2004-2008	Males	ASR	75.3	72.1	74.1	71.3	75.9	79.8	78.9	75.3	81.6
	2004-2008	Females	ASR	52.7	47.5	50.9	48.9	54.1	55.0	58.5	59.9	54.1
Melanoma	2004-2008	Males	ASR	61.6	40.0	62.7	46.8	72.0	75.8	90.2	57.9	62.6
	2004-2008	Females	ASR	38.6	24.3	37.5	29.8	42.6	49.2	60.4	41.1	43.5
Prostate cancer	2004-2008	Males	ASR	181.2	146.8	183.6	176.0	190.6	202.9	182.8	200.7	174.1
Breast cancer	2004-2008	Females	ASR	111.7	104.6	112.5	106.5	122.0	110.6	112.1	111.1	113.8
Cervical cancer	2004-2008	Females	ASR	6.8	6.8	8.2	6.3	6.0	7.3	6.9	5.6	7.9
Cancer deaths[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
All cancer	2003-2007	Males	ASR	226.6	224.5	215.2	220.1	211.7	247.7	243.4	231.8	245.6
	2003-2007	Females	ASR	140.3	134.9	138.2	137.7	135.9	149.5	145.3	147.2	145.2
Lung cancer	2003-2007	Males	ASR	47.1	52.7	44.2	46.3	39.5	49.5	53.3	48.0	50.3
	2003-2007	Females	ASR	22.4	20.6	22.2	23.1	21.7	22.8	25.5	21.2	24.0
Colorectal cancer	2003-2007	Males	ASR	22.5	21.4	23.8	22.8	20.8	23.9	20.1	25.0	24.7
	2003-2007	Females	ASR	14.3	13.7	14.2	12.9	13.7	16.6	13.5	16.3	15.3
Melanoma	2003-2007	Males	ASR	9.2	7.2	9.0	7.6	9.8	10.9	12.4	8.9	8.7
	2003-2007	Females	ASR	3.5	2.8	3.7	2.8	3.8	4.3	4.7	3.8	2.6
Prostate cancer	2003-2007	Males	ASR	31.6	26.8	26.0	30.6	30.8	40.0	36.7	33.0	37.5
Breast cancer	2003-2007	Females	ASR	23.2	21.0	22.7	22.4	24.1	25.4	23.0	23.4	25.5
Cervical cancer	2003-2007	Females	ASR	2.0	2.1	2.1	2.1	1.2	2.5	2.3	1.6	3.1
Cancer biennial screening rates[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Breast cancer*	2007-2008	Females	%	53.6	47.2	55.4	49.1	55.1	61.5	55.1	54.3	54.9
Cervical cancer	2007-2008	Females	%	58.8	55.6	60.6	54.4	64.9	59.0	61.2	58.3	54.3
Other deaths[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Cardiovascular disease	2003-2007	Males	ASR	260.8	265.8	229.0	265.4	237.1	288.5	258.3	287.2	321.9
	2003-2007	Female	ASR	185.2	182.9	164.5	193.5	172.4	202.5	182.7	200.0	288.6
Diabetes-related	2003-2007	Males	ASR	40.0	44.2	34.6	47.4	30.5	46.7	37.2	41.5	49.2
	2003-2007	Female	ASR	24.6	29.3	20.8	30.0	16.5	28.7	21.3	27.3	34.2
Chronic obstructive pulmonary disease (65+ yrs)	2003-2007	Males	ASR	231.8	238.5	193.3	247.5	184.8	253.8	241.8	299.6	306.5
	2003-2007	Female	ASR	120.3	115.2	106.4	144.1	111.7	120.8	123.1	127.6	144.2
Asthma (5-34 yrs)	2003-2007	Males	ASR	0.3	0.2	0.1	0.2	0.3	0.5	0.6	0.3	0.7
	2003-2007	Female	ASR	0.2	0.1	0.1	0.2	0.1	0.6	0.2	0.0	0.0
Injury and poisoning	2003-2007	Males	ASR	47.4	45.2	45.1	43.4	38.1	55.5	58.7	56.4	63.1
	2003-2007	Female	ASR	19.3	17.9	20.0	16.7	17.8	21.6	23.9	21.8	20.5
Fall-related (65+ yrs)	2003-2007	Males	ASR	62.3	65.4	68.3	54.2	64.3	66.7	60.4	47.3	56.0
	2003-2007	Female	ASR	52.1	42.8	56.9	50.6	51.3	56.9	57.1	50.8	46.6

Suicide	2003-2007	Males	ASR	13.1	12.4	13.3	13.7	11.9	14.7	13.2	14.4	12.3
	2003-2007	Female	ASR	3.4	3.8	3.9	3.3	3.4	3.1	3.5	3.2	2.6
Hospital separations[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Cardiovascular disease	2008-09	Males	ASR	2,541.3	2,280.7	2,709.8	2,423.1	2,315.7	2,529.8	2,522.7	3,168.4	3,061.8
	2008-09	Female	ASR	1,596.8	1,403.0	1,660.9	1,578.4	1,378.6	1,579.1	1,665.7	2,141.7	2,081.4
Diabetes (principal diagnosis)	2008-09	Males	ASR	367.8	360.6	315.2	387.7	306.8	419.4	422.4	368.6	474.3
	2008-09	Female	ASR	350.7	393.6	305.2	347.7	278.5	410.6	353.3	347.2	402.0
Chronic obstructive pulmonary disease (65+ yrs)	2008-09	Males	ASR	1,961.7	2,192.8	1,658.6	2,120.1	1,321.9	2,000.7	1,991.9	2,321.8	3,419.4
	2008-09	Female	ASR	1,250.8	1,310.9	1,041.9	1,456.6	986.5	1,109.2	1,348.4	1,858.4	1,547.8
Asthma (5-34 yrs)	2008-09	Males	ASR	135.0	133.1	123.9	152.3	104.7	97.8	196.2	170.7	162.6
	2008-09	Female	ASR	134.4	133.8	124.2	154.4	95.9	124.1	179.1	173.4	150.7
Injury and poisoning	2008-09	Males	ASR	2,568.0	2,166.0	2,585.8	2,591.7	2,339.2	2,706.9	2,976.2	3,358.0	3,111.3
	2008-09	Female	ASR	1,762.8	1,503.1	1,766.7	1,809.7	1,772.3	1,884.5	1,852.1	2,043.1	1,975.3
Fall-related (65+ yrs)	2008-09	Males	ASR	2,342.0	2,558.0	2,565.8	2,523.1	2,556.0	1,768.6	1,863.2	2,257.7	2,166.7
	2008-09	Female	ASR	3,235.9	3,264.8	3,462.2	3,552.8	3,564.2	2,393.5	2,725.5	3,277.6	3,395.3
Intentional self-harm	2008-09	Males	ASR	109.3	88.4	92.9	95.0	87.0	142.5	149.2	158.4	147.4
	2008-09	Female	ASR	164.0	117.1	148.3	150.8	128.0	239.0	214.2	244.7	216.1
Notifications of communicable disease[a]	**Period**	**Group**	**Unit[b]**	**NSW**	**SSW**	**SESI**	**SW**	**NSCC**	**HNE**	**NC**	**GS**	**GW**
Arboviral infection	2007-2009	Persons	ASR	22.4	2.7	8.5	4.8	8.5	50.2	107.4	35.1	55.6
Chlamydia	2007-2009	Persons	ASR	199.8	164.8	250.0	137.6	162.9	246.6	275.8	194.4	254.5
Gonorrhoea	2007-2009	Persons	ASR	21.1	27.4	42.9	12.2	14.5	11.3	13.3	5.4	7.1
Hepatitis A	2007-2009	Persons	ASR	1.1	1.3	1.3	1.4	1.3	0.5	0.9	0.5	0.3
Hepatitis B	2007-2009	Persons	ASR	37.7	67.1	37.0	52.1	28.6	10.4	10.6	12.5	12.7
Hepatitis C	2007-2009	Persons	ASR	57.6	56.9	54.5	52.5	32.2	59.1	91.8	60.8	84.9
Measles	2007-2009	Persons	ASR	0.3	0.8	0.3	0.3	0.2	0.0	0.1	0.0	0.0
Meningococcal disease	2007-2009	Persons	ASR	1.4	1.1	2.0	1.2	1.3	1.4	1.4	1.6	1.7
Pertussis (whooping cough)	2007-2009	Persons	ASR	115.3	73.7	139.4	134.8	110.5	92.9	182.5	108.9	132.6
Pneumococcal infection	2007-2009	Persons	ASR	7.1	7.1	6.9	7.6	6.4	8.3	6.2	6.1	9.7
Salmonella infection (non-typhoid)	2007-2009	Persons	ASR	36.2	33.1	35.2	33.0	44.2	31.3	57.2	30.6	27.8
Syphillis (infectious)	2007-2009	Persons	ASR	6.8	9.5	19.4	3.0	2.6	1.5	1.4	1.1	1.2
Tuberculosis	2007-2009	Persons	ASR	6.8	11.3	6.3	12.5	5.2	1.8	2.4	2.3	0.2

KEY

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- Linked to NSW State Plan and NSW State Health Plan only
- Linked to Two Ways Together only
- Higher than NSW average
- Lower than NSW average
- No difference from NSW average
- – Data not available

NOTES

a See appendix Explanatory Notes for full description of indicators.

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001.

c Some of the indicator definitions used in the National Healthcare Agreement differ from those used in the NSW State Plan. Where this has occurred, the NSW definition was used in this report.

NSW = New South Wales, **SSW** = Sydney South West Area Health Service, **SESI** = South Eastern Sydney & Illawarra Area Health Service, **SW** = Sydney West Area Health Service, **NSCC** = Northern Sydney & Central Coast Area Health Service, **HNE** = Hunter & New England Area Health Service, **NC**= North Coast Area Health Service, **GS** = Greater Southern Area Health Service, **GW** = Greater Western Area Health Service.

* No data on statistically significant differences available.

Trends in key population health indicators

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2.3 Health inequalities 13

2.4 Health priority areas 14

About this section

This section reports trends in key population health indicators of the determinants of health, the burden of disease, health inequalities, and health priority areas in NSW over the most recent ten year period for which data is available.

Where possible, linear trends in indicators were analysed using appropriate regression models to estimate average annual rates of change over time. For full details of the methods used to conduct trend analyses see Appendix 2 – Methods.

How to interpret tables

Indicators are reported by group in the units specified in tables, and the estimated average annual rate of change and period of analysis are indicated in the final two columns of each table. Cells containing the average annual rate of change and period of analysis are highlighted when there was a significantly increasing or decreasing linear trend over the specified period of analysis. These cells are left blank when there was no significantly increasing or decreasing linear trend over time (see Key).

For example, in the ten-year period from 1998 to 2007, age-adjusted mortality rates from lung cancer decreased significantly in males (by an average of 3.1% per year), and increased significantly in females (by an average of 1.1% per year). Over the same period of time there were no significant trends in age-adjusted mortality rates from melanoma for males or females.

KEY

- Linked to National Healthcare Agreement, NSW State Plan and NSW State Health Plan
- Linked to NSW State Plan, NSW State Health Plan only
- Linked to Two Ways Together only
- Significantly increasing linear trend
- Significantly decreasing linear trend
- No significant increasing or .decreasing linear trend
- – Data not available

NOTES

a See appendix Explanatory Notes for full description of indicators.

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001.

c Average annual relative rate of change over specified period of time (see Appendix Methods for full description). NA = no trend analysis performed.

d 10Y = 10-year period, 5Y = 5-year period.

e Some of the indicator definitions used in the National Healthcare Agreement differ from those used in the NSW State Plan. Where this has occurred, the NSW definition was used in this report.

* over-estimation resulting from different methodology

Table 2.1 Determinants of health

Social determinants[a]	Group	Unit[b]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	% / yr[c]	Period[d]
Unemployment rate	Persons	%	5.8	5.5	6.2	5.9	5.5	5.2	5.2	5.0	4.6	5.7	NA	–
Student retention to Year 12	Persons	%	67.5	68.2	69.9	70.5	71.1	71.1	70.5	69.7	69.6	71.3	NA	–
Health-related behaviours[a]	**Group**	**Unit[b]**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**% / yr[c]**	**Period[d]**
Adequate physical activity	Males	%	-	-	51.0	49.4	57.0	56.6	60.4	62.1	61.3	60.7	+1.6	5Y
	Females	%	-	-	43.4	40.3	47.9	47.3	49.6	47.6	48.9	49.8	+0.9	5Y
Overweight and obesity (16+ yrs)	Males	%	-	-	53.4	55.7	56.2	57.5	57.4	58.8	60.0	59.5	+1.2	5Y
	Females	%	-	-	38.2	41.0	40.5	42.3	43.3	44.7	45.7	45.4	+2.0	5Y
Overweight and obesity in children (7-16 yrs)	Boys	%	-	-	-	-	26.1	-	-	-	-	-	NA	-
	Girls	%	-	-	-	-	23.7	-	-	-	-	-	NA	-
Recommended fruit consumption	Males	%	-	-	41.4	40.1	40.6	44.6	47.0	48.4	52.0	52.5	+4.4	5Y
	Females	%	-	-	51.2	54.5	53.4	57.5	59.6	59.8	60.9	60.9	+1.4	5Y
Recommended vegetable consumption	Males	%	-	-	5.8	8.1	6.0	4.7	6.4	7.2	7.2	7.5	+11.2	5Y
	Females	%	-	-	9.1	11.4	10.3	10.1	12.4	13.8	13.0	13.2	+6.0	5Y
Children free of dental caries (5-6 yrs)*	Children	%	68.3*	-	-	-	-	-	-	61.2	-	-	NA	-
Current smoking	Males	%	-	-	23.9	24.9	22.5	22.6	19.2	21.9	19.7	20.3	-1.9	5Y
	Females	%	-	-	19.2	19.8	19.3	17.6	16.2	15.4	17.2	14.2	-3.6	5Y
Risk alcohol drinking	Males	%	-	-	39.3	41.2	40.5	37.2	37.3	37.2	38.9	41.4	+2.6	5Y
	Females	%	-	-	30.2	30.2	30.3	27.3	28.4	27.0	29.0	19.8	-6.1	5Y
Recent illicit drug use (14+ yrs)	Persons	%	-	-	-	-	14.6	-	-	12.1	-	-	NA	-
Vaccinated against influenza in last 12 months (65+ years)	Males	%	-	-	74.6	76.0	76.1	75.3	73.8	71.1	69.7	70.0	-2.0	5Y
	Females	%	-	-	75.8	75.9	75.5	74.5	75.9	74.2	73.1	74.8	-0.3	5Y
Vaccinated against pneumoccal in last 5 years (65+ years)	Males	%	-	-	36.0	45.3	43.4	51.0	60.0	56.7	55.1	53.7	+0.2	5Y
	Females	%	-	-	40.9	48.6	50.3	56.5	61.6	61.1	61.8	57.9	+0.5	5Y

Table 2.2 **Burden of disease**

Deaths[a]	Group	Unit[b]	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	% / yr[c]	Period[d]
All causes	Males	ASR	915.4	897.5	864.9	821.1	827.1	794.9	783.8	744.8	740.1	692.9	-3.5	10Y
	Females	ASR	578.6	565.1	561.9	529.7	536.6	532.1	520.5	495.7	496.3	467.2	-2.5	10Y
Potentially avoidable	Males	ASR	290.2	293.7	274.3	257.3	248.9	231.8	223.1	207.4	198.4	195.6	-5.1	10Y
	Females	ASR	149.3	147.8	143.3	134.5	136.3	127.3	124.5	114.3	112.8	113.1	-3.3	10Y
Hospital separations[a]	**Group**	**Unit[b]**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**% / yr[c]**	**Period[d]**
All causes	Males	ASR	29,243.3	29,234.8	29,694.7	30,241.5	30,623.1	31,141.3	32,285.2	32,951.3	32,952.5	33,457.1	+1.4	10Y
	Females	ASR	30,901.7	31,107.1	31,372.0	31,706.9	31,892.5	32,236.1	33,345.2	34,011.9	34,309.1	34,805.5	+1.3	10Y
Ambulatory care sensitive conditions	Males	ASR	2,472.6	2,564.4	2,526.6	2,478.5	2,528.6	2,497.9	2,572.9	2,590.1	2,566.9	2,618.2	+0.9	5Y
	Females	ASR	2,209.1	2,312.7	2,275.7	2,260.5	2,304.6	2,273.0	2,373.3	2,401.3	2,414.8	2,436.2	+1.5	5Y
Other[a]	**Group**	**Unit[b]**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**% / yr[c]**	**Period[d]**
Life expectancy at birth	Males	Years	76.5	76.7	77.3	78.0	78.0	78.4	78.7	79.2	79.3	79.8	+0.5	10Y
	Females	Years	82.4	82.6	82.7	83.4	83.3	83.3	83.6	84.1	84.2	84.4	+0.3	10Y
Life expectancy at age 65 yrs	Males	Years	81.9	82.0	82.4	82.8	82.7	83.0	83.1	83.6	83.7	84.0	+0.3	10Y
	Females	Years	85.7	86.0	85.9	86.5	86.4	86.4	86.6	87.0	87.0	87.2	+0.2	10Y

KEY

- Linked to National Healthcare Agreement, NSW State Plan and NSW State Health Plan
- Linked to NSW State Plan and NSW State Health Plan only
- Linked to Two Ways Together only
- Significantly increasing linear trend
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- No significant increasing or decreasing linear trend
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NOTES

a See Appendix 1 - Explanatory Notes for full description of indicators.

b ASR = rate per 100,000 population, age-adjusted to the Australian population as at 30 June 2001.
RLB = rate per 1,000 live births. Age-R = Age specific rate per 100,000 population.

c Average annual relative rate of change over specified period of time (see Appendix 2 - Methods for full description).
NA = no trend analysis performed.

d 10Y = 10-year period, 5Y = 5 year period.

e Some of the indicator definitions used in the National Healthcare Agreement differ from those used in the NSW State Plan. Where this has occurred, the NSW definition was used in this report.

= Figures include data from NSW and Qld combined.

Table 2.3 Health inequalities

Deaths[a]	Group	Unit[b]	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	% / yr[c]	Period[d]
Potentially avoidable (males)	Aboriginal	ASR	604.1	577.3	574.3	589.3	676.4	549.8	456.0	456.2	482.4	478.7	-4.2	10Y
	non-Aboriginal	ASR	302.0	305.0	282.7	263.0	251.8	232.7	222.9	204.9	195.4	192.1	-5.4	10Y
Potentially avoidable (females)	Aboriginal	ASR	294.2	294.1	423.3	314.2	318.5	291.3	311.4	265.7	320.1	327.0	-1.7	10Y
	non-Aboriginal	ASR	155.4	152.5	145.0	135.7	136.3	126.7	122.8	112.4	110.0	110.3	-3.7	10Y
Hospital separations[a]	**Group**	**Unit[b]**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**% / yr[c]**	**Period[d]**
Ambulatory care sensitive conditions (males)	Aboriginal	ASR	5,094.2	5,197.6	5,140.8	4,961.8	4,986.0	4,898.7	5,332.9	5,651.8	5,458.7	5,777.7	+3.3	5Y
	non-Aboriginal	ASR	2,384.5	2,479.1	2,456.6	2,409.1	2,458.8	2,417.2	2,489.6	2,511.2	2,494.1	2,543.4	+0.9	5Y
Ambulatory care sensitive conditions (females)	Aboriginal	ASR	5,098.7	5,359.7	5,257.0	5,230.8	5,441.3	5,241.4	6,040.3	5,757.0	6,511.6	6,417.8	+4.1	5Y
	non-Aboriginal	ASR	2,173.8	2,276.7	2,246.5	2,229.5	2,270.9	2,226.1	2,320.2	2,352.9	2,362.9	2,382.0	+1.3	5Y
Pregnancy and newborn[a]	**Group**	**Unit[b]**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**% / yr[c]**	**Period[d]**
Perinatal deaths	Aboriginal	RLB	14.0	17.4	18.3	11.0	15.1	11.6	15.2	12.1	22.6	15.3	+1.2	10Y
	non-Aboriginal	RLB	9.0	9.4	9.0	8.6	8.4	9.0	8.6	8.8	8.6	8.4	-0.9	10Y
First antenatal visit before 14 weeks gestation	Aboriginal	%	46.9	49.2	46.0	49.0	52.2	50.2	56.4	58.4	63.6	68.6	+7.6	5Y
	non-Aboriginal	%	63.8	64.1	63.9	64.5	63.7	65.5	68.3	68.9	76.8	82.4	+6.0	5Y
Premature babies	Aboriginal	%	12.3	11.7	12.5	12.3	12.0	11.7	12.1	10.7	12.9	12.3	+1.9	5Y
	non-Aboriginal	%	7.0	7.1	7.1	6.9	6.9	7.2	7.1	7.3	7.2	7.3	+0.4	5Y
Low birth weight babies	Aboriginal	%	12.6	11.8	13.6	12.8	12.3	12.9	12.5	12.3	12.3	11.5	-0.8	10Y
	non-Aboriginal	%	6.2	6.3	6.2	6.2	6.1	6.2	6.1	6.2	5.9	6.0	-0.5	10Y
Teenage births	Females	%	1.9	1.8	1.7	1.6	1.5	1.5	1.5	1.5	1.5	1.4	-1.4	5Y
	Group	**Unit[b]**	**1997-99**	**1998-00**	**1999-01**	**2000-02**	**2001-03**	**2002-04**	**2003-05**	**2004-06**	**2005-07**	**2006-08**	**% / yr[c]**	**Period[d]**
Infant mortality	Aboriginal	RLB	10.4	11.8	10.9	9.5	8.6	8.5	8.4	7.5	8.9	7.7	NA	-
	NSW	RLB	5.1	5.1	5.4	5.0	4.8	4.6	4.7	4.8	4.7	4.5	NA	-
Other[a]	**Group**	**Unit[b]**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**% / yr[c]**	**Period[d]**
Immunisation coverage (12-15 months)	Aboriginal	%	-	-	-	85.3	87.6	82.4	83.5	87.0	88.0	87.2	+1.7	5Y
	non-Aboriginal	%	-	-	-	90.9	90.8	91.8	92.0	92.0	92.3	91.9	+0.1	5Y
	Group	**Unit[b]**	**1997-99**	**1998-00**	**1999-01**	**2000-02**	**2001-03**	**2002-04**	**2003-05**	**2004-06**	**2005-07**	**2006-08**	**% / yr[c]**	**Period[d]**
Child mortality (1-4 yrs)[#]	Aboriginal	Age-R	-	-	-	-	-	-	-	-	-	42.6	NA	-
	non-Aboriginal	Age-R	-	-	-	-	-	-	-	-	-	21.2	NA	-

Table 2.4 Health priority areas

New cases of cancer[a]	Group	Unit[b]	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	% / yr[c]	Period[d]
All cancer	Males	ASR	537.8	539.9	560.3	556.4	561.5	596.2	594.5	592.6	596.9	583.9	-0.3	5Y
	Females	ASR	373.2	382.8	403.3	400.8	401.2	402.0	399.5	395.9	390.3	391.3	-0.8	5Y
Lung cancer	Males	ASR	62.3	63.0	60.3	58.0	56.6	62.1	57.1	58.7	58.0	54.1	-1.3	10Y
	Females	ASR	24.9	27.2	26.3	27.6	27.4	28.9	31.3	30.8	31.1	32.9	+3.0	10Y
Colorectal cancer	Males	ASR	76.0	79.5	74.6	72.5	71.4	76.4	74.4	75.5	77.8	73.0	-0.2	10Y
	Females	ASR	53.8	50.8	55.2	50.5	51.2	52.6	51.7	54.1	54.3	51.0	0.0	10Y
Melanoma	Males	ASR	55.2	53.7	56.5	62.2	59.2	60.8	61.8	64.5	61.3	59.9	-0.1	5Y
	Females	ASR	33.8	34.8	35.9	38.1	38.2	40.3	40.8	37.3	37.1	37.4	-2.1	5Y
Prostate cancer	Males	ASR	128.8	131.4	128.9	135.8	146.8	168.0	178.7	180.3	188.5	189.4	+6.9	10Y
Breast cancer	Females	ASR	104.6	112.7	116.8	117.2	114.1	113.7	110.7	111.2	110.0	112.7	-0.3	5Y
Cervical cancer	Females	ASR	8.3	8.5	7.5	6.3	6.9	7.3	6.1	6.3	7.7	6.7	+0.6	5Y
Cancer deaths[a]	**Group**	**Unit[b]**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**% / yr[c]**	**Period[d]**
All cancer	Males	ASR	251.1	247.2	242.4	246.7	234.5	229.2	233.2	232.9	224.6	213.4	-2.0	5Y
	Females	ASR	149.6	144.0	146.3	145.1	144.9	144.6	144.4	142.2	141.0	129.9	-2.1	5Y
Lung cancer	Males	ASR	60.5	56.1	53.7	53.8	51.5	48.1	51.4	48.2	44.8	44.9	-3.1	10Y
	Females	ASR	21.9	20.7	21.7	22.5	23.1	21.1	22.2	23.1	22.3	24.0	+1.1	10Y
Colorectal cancer	Males	ASR	30.7	30.7	29.8	29.1	25.9	22.4	23.8	22.8	21.7	22.6	-4.4	10Y
	Females	ASR	20.9	18.2	19.3	17.7	18.2	15.0	15.8	13.8	13.5	14.2	-4.5	10Y
Melanoma	Males	ASR	8.6	8.5	8.0	9.2	10.0	8.4	8.9	10.2	8.8	9.9	+1.3	10Y
	Females	ASR	3.2	3.7	3.5	4.3	3.2	3.8	3.1	3.9	3.9	3.2	+0.2	10Y
Prostate cancer	Males	ASR	36.1	33.4	34.3	35.1	35.4	31.8	31.2	34.8	31.5	30.2	-1.6	10Y
Breast cancer	Females	ASR	25.6	23.5	23.7	24.1	24.5	23.9	24.9	22.8	23.3	22.1	-0.8	10Y
Cervical cancer	Females	ASR	2.8	2.2	2.6	2.5	2.0	2.1	2.1	2.2	2.1	1.7	-3.7	10Y
Cancer biennial screening rates[a]	**Group**	**Unit[b]**	**1997 - 1998**		**1999 - 2000**		**2001 - 2002**		**2003 - 2004**		**2005-06**	**2006-07**	**% / yr[c]**	**Period[d]**
Breast cancer (50-69 yrs)	Females	%	52.6		53.3		53.0		50.2		57.2	53.6	NA	-
Cervical cancer (20-69 yrs)	Females	%	59.5		59.2		60.7		57.3		57.8	58.8	NA	-
Cancer five year survival	**Group**	**Unit[b]**	**1980 - 1983**		**1984 - 1988**		**1989 -1993**		**1994-1998**		**1999-03**	**2002-06**	**% / yr[c]**	**Period[d]**
All cancer	Males	%	42.5		45.5		51.3		58.5		60.6	62.8	NA	-
	Females	%	55.1		57.4		60.6		63.6		65.5	66.2	NA	-
Other deaths[a]	**Group**	**Unit[b]**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**% / yr[c]**	**Period[d]**
Cardiovascular disease	Males	ASR	363.7	363.0	335.9	308.0	306.7	292.9	281.1	254.5	249.5	230.6	-5.4	10Y
	Female	ASR	251.8	247.7	235.5	219.7	213.9	206.5	197.8	184.2	176.3	163.6	-5.5	10Y
Diabetes-related	Males	ASR	45.3	45.1	44.2	44.4	45.0	43.3	43.0	37.1	36.9	39.9	-2.4	10Y
	Female	ASR	28.6	27.6	28.2	24.5	25.3	26.0	25.0	23.5	24.6	23.9	-1.8	10Y
Chronic obstructive pulmonary disease (65+ yrs)	Males	ASR	329.6	326.5	315.9	290.0	286.4	264.3	245.9	227.6	214.1	218.5	-5.4	10Y
	Female	ASR	130.6	148.7	142.1	132.5	139.0	127.4	128.3	112.2	116.4	120.8	-2.3	10Y
Asthma (5-34 yrs)	Males	ASR	0.9	0.8	0.4	0.6	0.3	0.3	0.2	0.3	0.1	0.6	+15.8	5Y
	Female	ASR	0.9	0.4	0.6	0.4	0.6	0.2	0.3	0.1	0.1	0.1	-12.4	5Y
Injury and poisoning	Males	ASR	62.1	62.5	56.5	56.3	53.8	50.5	47.8	47.9	49.2	44.2	-3.6	10Y
	Female	ASR	20.7	23.3	20.8	20.6	19.8	20.1	20.3	19.5	17.5	20.3	-1.5	10Y

Fall-related (65+ yrs)	Males	ASR	61.9	67.5	64.2	66.8	67.9	65.6	56.8	58.4	65.1	65.7	-0.4	10Y
	Female	ASR	46.8	47.7	46.1	44.8	51.0	48.8	54.3	53.2	46.9	57.1	+1.9	10Y
Suicide	Males	ASR	21.7	21.8	18.8	19.4	16.7	14.9	13.8	13.3	11.9	11.4	-7.4	10Y
	Female	ASR	4.8	5.4	4.4	5.0	4.1	3.9	3.5	3.2	3.0	3.5	-5.8	10Y
Hospital separations[a]	**Group**	**Unit[b]**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**% / yr[c]**	**Period[d]**
Cardiovascular disease	Males	ASR	2,908.7	2,801.2	2,750.8	2,747.1	2,732.5	2,673.8	2,694.2	2,674.5	2,601.9	2,541.3	-1.2	5Y
	Female	ASR	1,851.9	1,821.5	1,813.3	1,752.5	1,733.7	1,654.3	1,683.4	1,672.8	1,641.7	1,596.8	-0.9	5Y
Diabetes (principal diagnosis)	Males	ASR	113.9	218.7	242.8	251.1	272.0	313.7	336.3	368.8	357.9	367.8	+3.4	5Y
	Female	ASR	148.1	212.5	228.0	253.6	265.3	293.0	322.0	350.9	345.9	350.7	+4.4	5Y
Diabetes (comorbidity)	Males	ASR	1,321.6	1,317.3	1,484.0	1,573.9	1,705.5	1,877.7	2,006.9	2,167.3	2,240.5	1,035.2	-7.7	5Y
	Female	ASR	1,075.6	1,072.1	1,183.7	1,249.6	1,348.6	1,490.9	1,612.1	1,689.3	1,737.1	827.5	-8.7	5Y
Chronic obstructive pulmonary disease (65+ yrs)	Males	ASR	2,334.7	2,263.4	2,227.9	2,259.3	2,246.4	2,117.2	2,009.1	1,927.3	1,962.4	1,961.7	-2.2	10Y
	Female	ASR	1,116.7	1,200.2	1,191.7	1,175.8	1,225.8	1,157.7	1,159.5	1,131.2	1,224.6	1,250.8	+0.7	10Y
Asthma (5-34 yrs)	Males	ASR	225.2	253.5	199.2	166.0	164.4	166.9	151.8	169.9	146.3	135.0	-6.4	5Y
	Female	ASR	236.4	260.0	181.0	159.6	166.3	157.3	149.0	160.5	143.4	134.4	-4.2	5Y
Injury and poisoning	Males	ASR	2,368.5	2,358.6	2,412.3	2,325.7	2,408.8	2,423.5	2,585.5	2,598.0	2,549.8	2,568.0	+1.6	10Y
	Female	ASR	1,546.2	1,566.7	1,623.1	1,540.4	1,614.7	1,627.8	1,723.5	1,763.2	1,718.9	1,762.8	+1.4	10Y
Fall-related (65+ yrs)	Males	ASR	1,947.6	1,838.1	1,855.1	1,819.9	1,976.8	2,021.7	2,229.0	2,278.9	2,335.7	2,342.0	+3.4	5Y
	Female	ASR	2,835.1	2,729.7	2,749.4	2,608.6	2,814.1	2,789.2	2,967.9	3,092.7	3,127.1	3,235.9	+3.5	5Y
Intentional self-harm	Males	ASR	110.8	119.4	121.0	115.9	119.9	122.3	125.7	122.3	116.9	109.3	-2.8	5Y
	Female	ASR	144.0	165.0	170.3	175.2	180.0	188.4	186.8	184.5	168.5	164.0	-3.2	5Y
Notifications of communicable disease[a]	**Group**	**Unit[b]**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**% / yr[c]**	**Period[d]**
Arboviral infection	Persons	ASR	15.1	18.0	9.9	15.1	16.9	15.9	27.9	21.4	26.1	19.8	+7.1	10Y
Chlamydia	Persons	ASR	53.8	68.5	88.1	117.3	150.8	168.5	179.2	181.6	202.0	215.4	+6.8	5Y
Gonorrhoea	Persons	ASR	16.1	20.7	22.8	19.9	21.4	23.6	25.9	20.2	19.1	23.8	+0.7	5Y
Hepatitis A	Persons	ASR	3.0	3.0	2.2	1.9	2.1	1.2	1.4	1.0	1.0	1.4	+0.5	5Y
Hepatitis B	Persons	ASR	58.1	60.9	51.4	41.0	40.1	40.6	36.9	38.1	36.7	38.5	-1.2	5Y
Hepatitis C	Persons	ASR	117.6	111.6	94.5	73.9	69.4	64.8	64.4	61.5	54.5	56.9	-3.8	5Y
Human immunodeficiency virus	Persons	ASR	5.3	5.2	6.0	6.2	6.1	5.9	5.5	5.8	4.7	4.9	-1.2	10Y
Measles	Persons	ASR	0.5	0.5	0.1	0.3	0.2	0.1	0.9	0.0	0.6	0.3	+2.4	10Y
Meningococcal disease	Persons	ASR	3.9	3.5	3.3	3.0	2.3	2.1	1.6	1.6	1.2	1.4	-12.7	10Y
Pertussis (whooping cough)	Persons	ASR	57.2	67.9	30.6	41.8	53.1	85.1	70.9	30.1	128.9	185.8	+13.6	10Y
Pneumococcal infection	Persons	ASR	0.0	6.7	12.8	11.8	13.2	9.2	8.0	7.3	7.5	6.4	-7.3	5Y
Salmonella infection (non-typhoid)	Persons	ASR	21.4	25.0	31.7	27.7	32.2	32.5	30.5	37.2	32.5	38.9	+5.0	5Y
Syphillis (infectious)	Persons	ASR	1.2	1.0	1.9	3.6	4.4	3.6	3.3	6.7	6.2	7.4	+17.0	10Y
Tuberculosis	Persons	ASR	6.8	6.3	6.7	5.6	6.3	6.5	6.7	6.7	6.9	6.8	+0.4	10Y

KEY

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a See Appendix 1 - Explanatory Notes for full description of indicators.

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d 10Y = 10-year period, 5Y = 5-year period.

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Special topics from the NSW Chief Health Officer

3.1 Sexually Transmissible Infections 18

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3.1 Sexually Transmissible Infections

The issue

Sexually Transmissible Infections (STIs) are a significant source of preventable morbidity and are amenable to control via population health interventions. There are more than 30 different sexually transmissible bacteria, viruses and parasites, which can lead to acute symptoms, chronic infection and sequelae such as infertility, ectopic pregnancy, cervical cancer and death. Some STIs can be transmitted by routes other than sexual contact, including blood-borne transmission and from mother to child during pregnancy and childbirth.

The NSW Sexually Transmissible Infections Strategy 2006–2010 provides the state-wide policy framework for prevention, detection, treatment, research and surveillance to reduce the transmission and morbidity associated with STIs. The Strategy prioritises efforts to increase community awareness and knowledge of STIs; increase the use of condoms with casual sexual partners; increase STI testing within priority groups; and increase the diagnosis, treatment and management of STIs (NSW Department of Health 2006). An independent evaluation commenced in July 2010 to assess the impact and outcomes of the Strategy and to make recommendations to strengthen future efforts. A second National Sexually Transmissible Infections Strategy 2010–2013 provides strategic direction and key performance indicators for Australian STI control efforts (Commonwealth Department of Health and Ageing 2010).

This Special Topic of the Report highlights the achievements and current challenges of STI control in NSW by presenting and commenting on a range of STI surveillance, risk behaviour and disease burden data. In the Methods section we provide a description of the various data sources relating to sexual behaviour, disease surveillance and disease burden. In the Results section we present data on the overall trends in these measures followed by disease-specific information on chlamydia, infectious syphilis, gonorrhoea, HPV /genital warts and HSV /genital herpes.

Methods

STI surveillance

STI surveillance is an epidemiological activity through which patterns of disease transmission and burden are monitored. STI surveillance systems allow measures or estimates of disease incidence and prevalence, burden of disease, and sexual and other risk behaviours. This section describes a range of STI surveillance tools including the sources of data presented in this report.

Measuring sexual behaviour

Surveys of sexual behaviour are essential for understanding the distribution of sexual, risk and protective practices that can affect the transmission of STIs within populations. Many factors influence participant responses to survey questions regarding sexual behaviour including perceptions of what is safe or risky behaviour. The measurement of risk association with behaviour can be problematic. For example, it is difficult to compare risk among people who have safe sex with few high-risk partners, to those who have unsafe sex with low-risk partners.

Data in this report are derived from:

- Australian Study of Health and Relationships: a study of 19,307 Australian men and women aged 16-59 of sexual and reproductive health (Rissel et al. 2003).
- New South Wales Population Health Survey: a telephone interview survey, conducted continuously, which samples the whole of the NSW population from birth upwards (Centre for Epidemiology and Research 2007).
- National Survey of Secondary Students and Sexual Health: conducted every five years throughout Australia of students from both government, and non-government schools (Smith et al. 2009).
- STIs and Blood-borne Viruses among Aboriginal Young People in NSW: a survey of knowledge, risk practice and access to services among young Aboriginal people attending community events (Bryant et al. 2010).

Measuring incidence and prevalence of STIs

Incidence is defined as the number of new events of a given condition within a specified period, whilst prevalence refers to the total number of people who currently have a given condition (Last 2001). For STIs, incident data more closely reflects recent infection and can therefore more reliably inform the development of effective prevention strategies.

Diseases that have an acute onset and are symptomatic in the early stages are most amenable to incidence measurement (World Health Organization 2002). Many STIs, however, are chronic and asymptomatic. Obtaining incidence data can therefore be challenging as asymptomatic cases may not be detected and when a chronic condition was acquired may be unknown.

Prevalence data can be collected by systematically screening for a particular disease within a defined population. While incidence and prevalence measures are ideal for understanding STI epidemiology, there are significant practical, cost and other barriers to the routine collection of these measures. Disease surveillance systems often utilise case reporting as a primary collection tool.

Notifications

The NSW Public Health Act, 1991 requires that diagnosing doctors and/or laboratories notify cases of specified diseases including some STIs, to NSW Health.

Notification systems do not capture all cases of STIs because, in the absence of symptoms, tests are not carried out to diagnose many STIs and, in some cases, the infection will spontaneously resolve. The rate of case detection of new or existing infections in a population varies by disease. The rate of case detection, and therefore notification, is also affected by access to health services and testing.

Enhanced surveillance

The Australian Collaboration for Chlamydia Enhanced Sentinel Surveillance (ACCESS) collects data from six chlamydia sentinel surveillance networks (sexual health network, antenatal network, family planning networks, general practitioner network, laboratory network, and Aboriginal health service network) each reporting on rates of testing and the prevalence of chlamydia infection in a range of priority populations (http://www.access-study.org/).

Measuring the burden of disease

Although the prevention, diagnosis and treatment of STIs are recognised priorities, the burden of such infections is often under-recognised. While bacterial STIs, such as chlamydia and gonorrhoea are curable, sexually transmissible viruses such as Human Immunodeficiency Virus (HIV), Herpes Simplex Virus (HSV) and Human Papillomavirus (HPV) cause lifelong infection. Burden of disease studies measure the morbidity, mortality, economic and other costs of various risk factors and diseases. In one study, unsafe sexual behaviour, defined as behaviour resulting in a range of outcomes including abortion, cervical cancer, and STIs or HIV, was found to account for 0.6% of the total burden of disease in Australia in 2003 (Begg et al. 2007).

Data on disease burden in this report are derived from:

General practice

The 'Bettering the Evaluation And Care of Health' (BEACH) study is a continuous randomised study of national General Practice activity directly linking management actions to the problem under management (http://www.fmrc.org.au/beach.htm). This dataset extrapolates the total encounters occurring nationally as estimates and is likely to overestimate the management rate of a group of conditions because more than one problem may be managed in a single encounter. That is, two problems managed at one encounter will be counted as two encounters.

Hospitalisations

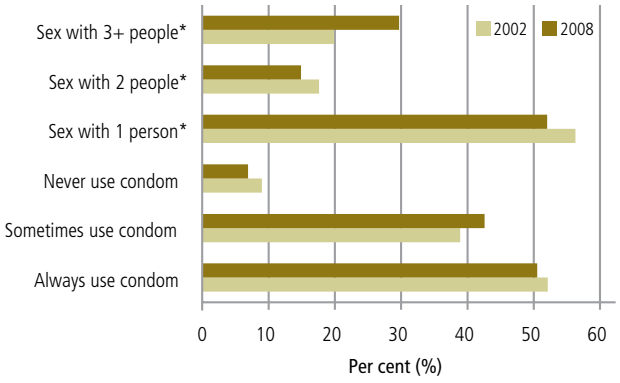
The Admitted Patient Data Collection reports all admitted patients treated in NSW hospitals since 1993. It covers all completed inpatient admissions (separations) from public and private hospitals, procedure centres and public nursing homes in NSW. This dataset documents separations, not individuals, and one person may have multiple separations within a reporting period. Outpatient episodes of care provided by hospital services for non-admitted patients are not included in this analysis.

Results

Sexual behaviour

An Australian study of school students found that approximately 25% of Year 10 students and 50% of Year 12 students reported having had sexual intercourse in the past 12 months (Smith et al. 2009). Of these sexually active students, 50.5% reported always using condoms (n=1,130 in 2008) and a further 42.6% reported using condoms sometimes. Between the 2002 and 2008 surveys, there was a 10% increase in the number of students who reported having greater than three sexual partners in the past 12 months (Figure 1).

Figure 1. Sexual behaviour of secondary school students (Y10 and Y12), Australia 2002 and 2008.



*In the past 12 months.
Source: Fourth National Survey of Secondary Students and Sexual Health, Australia

'The Australian Study of Health and Relationships' found that in 2003 the proportion of younger Australian people (16-19 years) who have first vaginal intercourse before the age of 16 years was approximately 27% in males and 18% in females (Rissel et al. 2003). Among respondents of all ages in NSW, most (81.8% men and 89.3% women) reported being in a regular relationship.

The NSW Adult Health Survey has defined 'unsafe sex' according to the following parameters: 'having sex with more than one partner in the last 12 months and not using a condom', or 'having sex in the last 12 months with one or more partners and contracting an STI'. In 2007, males (7.2%) and females (4.7%) aged 16-24 years were more likely to practice unsafe sex than those in older age groups. The proportion of these males reporting unsafe sex decreased from 9.6% in 2004 to 7.2% in 2007 (Centre for Epidemiology and Research 2007).

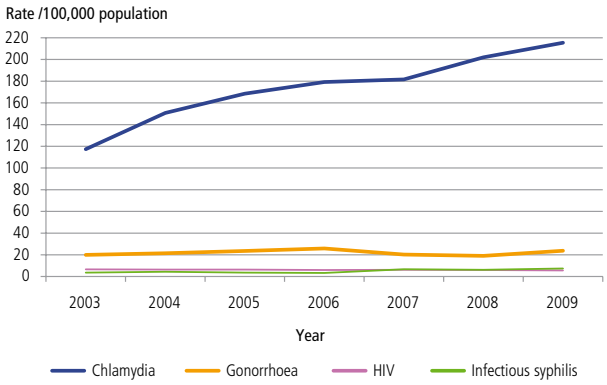
Among young Aboriginal people (16-30 years) attending a community event in NSW, 64% reported having at least one casual sex partner in the previous six months. Of the participants who reported having had a casual sex partner, 57.8% (n=107) reported that they did not always use a condom with their casual partner. Approximately one third of the survey participants reported that they had never been tested for an STI or HIV and a further 24% had not been tested in the previous 12 months (Bryant et al. 2010).

Incidence and prevalence of STIs

Notifications

In NSW in 2009, chlamydia was the most commonly notified STI with rates notably higher than infectious syphilis, HIV or gonorrhoea (Figure 2).

Figure 2. Rate of notifiable STIs by year, NSW 2003-2009.

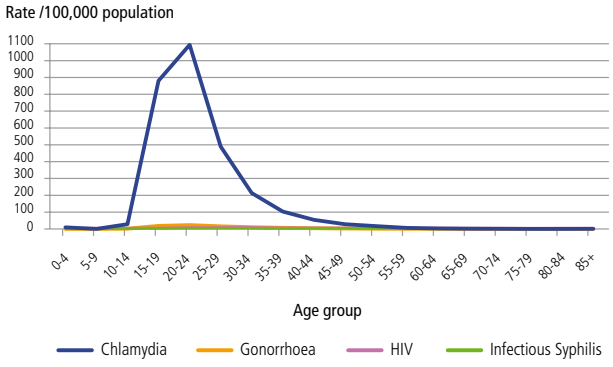


Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

The rates of chlamydia (117.3 to 215.4 per 100,000) and infectious syphilis (3.6 to 7.4 per 100,000) notification have doubled since 2003. The rate of gonorrhoea notification has remained relatively stable over this period (19.9 in 2003 to 23.8 per 100,000 in 2009). HIV notification rates have remained stable at below 7 per 100,000 population since 2003. Gonorrhoea and chlamydia notifications are most common among young people aged 15-34 years (Figure 3). Rates of chlamydia notification among women in this age group (Figure 3a) are double that of males (Figure 3b) suggesting possible gender-specific differences in sexual activity, biological susceptibility or better health care ascertainment among females who are more likely to seek reproductive or other

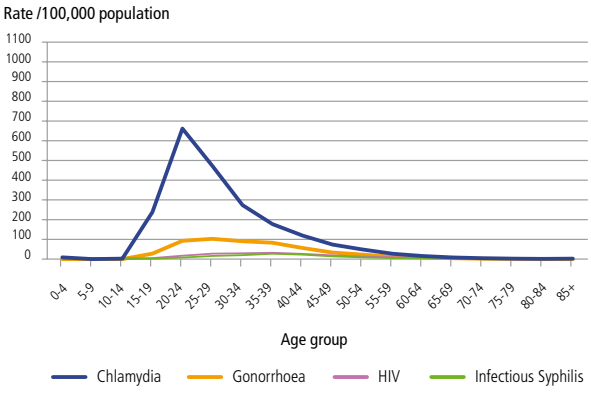
sexual health services. Notification rates are 5-10 times higher amongst males aged 20-39 years for infectious syphilis (range from 7.8 to 26.8 per 100,000), HIV (range from 13.2 to 28.1 per 100,000) and gonorrhoea (range from 82.5 to 102.6 per 100,000) compared to females.

Figure 3a. Age-specific rates of notifiable STIs in females by age group, NSW 2003-2009.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

Figure 3b. Age-specific rates of notifiable STIs in males by age group, NSW 2003-2009.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

Burden of disease

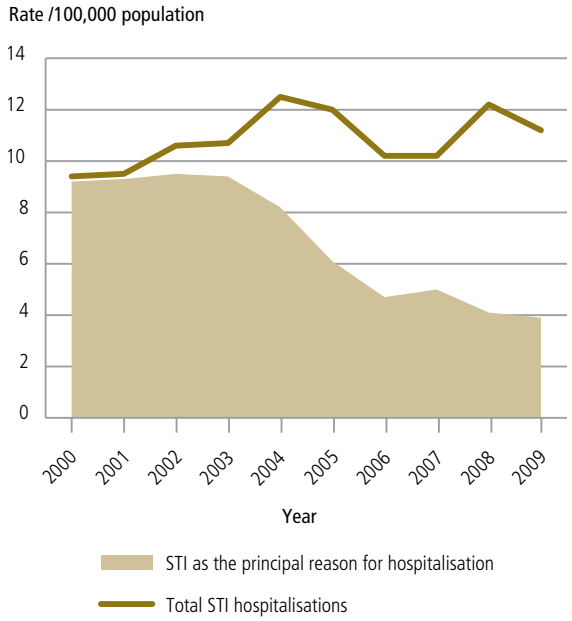
General practice

The management rate of all STI-related problems in Australian general practice increased by two thirds from a rate of 480.5 in 1998 to 781.7 per 100,000 encounters in 2007 (Britt & Miller 2009). This is associated with the rate of STI testing and risk management, which has increased from a rate of 77.1 in 1998 to 226.0 per 100,000 encounters in 2007. Within this category, chlamydia testing increased 10-fold (0.6 in 1998 to 6.2 per 100,000 encounters in 2007) and there was an increase in the management of diagnosed chlamydia (4.4 in 1998 to 57.9 per 100,000 encounters in 2007). Similarly, over the decade, the management rate has doubled for both genital herpes (71.6 to 144.8 per 100,000 encounters) and HPV/genital warts (58.4 to 103.6 per 100,000 encounters). The highest management rate of STI screening and risk factors was for patients aged 15-24 years and this age group along with those aged 25-44 years also had the highest rate of diagnosed STIs (Britt & Miller 2009). The management rate of STIs including STI testing, risk factors and diagnosed infection among Aboriginal and Torres Strait Islander Australians was almost double (1,076 per 100,000 encounters) that of non-Aboriginal and Torres Strait Islander Australians (572 per 100,000 encounters, 2008) (Britt & Miller 2009).

Hospitalisations

The rate of hospital separations in which an STI is recorded as the principal diagnosis or comorbid condition can provide a measure of the burden of more serious STI complications. The total rate of STI admissions (principal diagnosis and comorbid condition) has gradually increased since 2000 (Figure 4, line). Females are more likely to be hospitalised for an STI than males at a ratio of 1.3:1. However, there has been a decrease since 2000 in hospital admissions with an STI as the principal cause of the hospitalisation (defined as the diagnosis that caused the patient's episode of care in hospital) (Figure 4, solid area). During this period, there were no known relevant changes in coding or health data standards relating to STIs however there was an increase in the number of comorbid conditions which could be recorded and this may account for an increase in STIs being coded as a comorbidity.

Figure 4. Rate of STI hospitalisations by year, NSW 2000-2009.



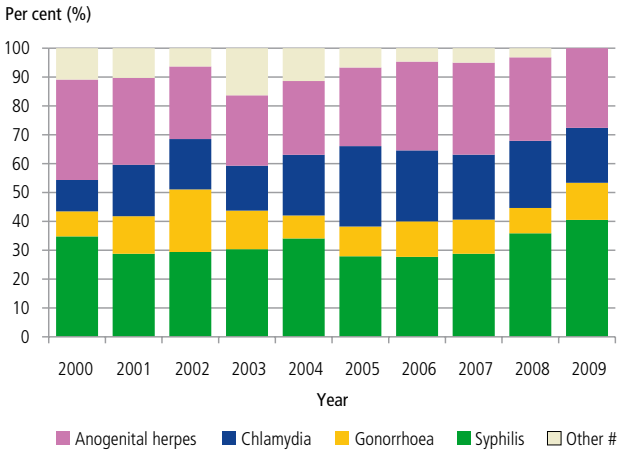
Source: Admitted Patient Data Collection (HOIST), Centre for Epidemiology, NSW Department of Health.

Note: Rates have been age-adjusted using the Australian standard population, 2001.

Disease specific changes in STI hospitalisations by year for diseases coded as the principal diagnosis are shown in Figure 5. For hospitalisations in which an STI was the principal diagnosis, syphilis, anogenital herpes and chlamydia represented the greatest proportion of total STI-related hospital admissions (2000-2009). Trend analysis shows that hospitalisations for chlamydia and syphilis have increased between 2000 and 2009, while hospitalisations for conditions related to anogenital herpes and gonorrhoea have remained stable. In 2009, gonorrhoea contributed the lowest proportion of STI-related hospitalisations (12.9%, n=21), chlamydia contributed 19.0% (n=31), anogenital herpes contributed 27.6% (n=45) and syphilis contributed the largest proportion of 40.5% (n=66). Young adults (20-34 years) experienced the highest rates of STI-related hospital admissions.

A more detailed description of the principal diagnoses for comorbid STI-related hospitalisations, including the procedures and interventions carried out during the hospital episode were not analysed in this report.

Figure 5. Percent contribution of STI-related hospitalisations* where an STI was the primary cause of hospitalisation



The total hospitalisations where an STI was the principal diagnosis for the period of 2000-2009 was 1,515.

* does not include comorbid conditions (n=2,359) and conditions coded as "other predominantly STI, not elsewhere specified" (n=3,092).

\# "Other" refers to hospitalisations for chancroid, granuloma inguinale and urogenital trichomoniasis.

Source: Admitted Patient Data Collection (HOIST), Centre for Epidemiology, NSW Department of Health.

Specific Sexually Transmissible Infections in NSW

Chlamydia

Key points

- Chlamydia is the most commonly notified disease in NSW
- Women aged 15-24 years are the most affected
- Chlamydia largely affects young heterosexual males and females
- Highest notification rates are in rural areas, followed by regional and metropolitan areas
- NSW has the second lowest rate of testing in General Practice for those aged 16-29 years of any State or Territory
- General Practice testing for chlamydia is highest in rural/regional NSW followed by metropolitan areas
- Chlamydia accounted for 19.0% of hospitalisations in which an STI was the principal diagnosis in 2009.

Chlamydia is a common STI caused by the bacterium, *Chlamydia trachomatis*. In males, chlamydia, when symptomatic, manifests primarily as urethritis and in females as a cervical infection (Heymann 2008). Chlamydia can be treated and cured however as infection is frequently asymptomatic, untreated people may unknowingly transmit the infection to their sexual partners (Turner et al. 2002).

Incidence and prevalence of chlamydia

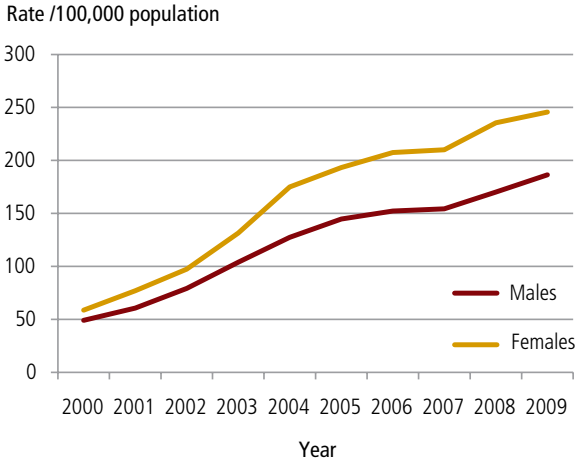
Chlamydia is the most commonly notified disease in Australia (Communicable Diseases Intelligence 2009). Australia-wide studies have shown variable prevalence for chlamydia ranging from 0.5% to 19.7% (Debattista et al. 2002).

Notifications

In Australia, the rate of chlamydia notification has almost quadrupled among females since 1999 (National Centre in HIV Epidemiology and Clinical Research 2009).

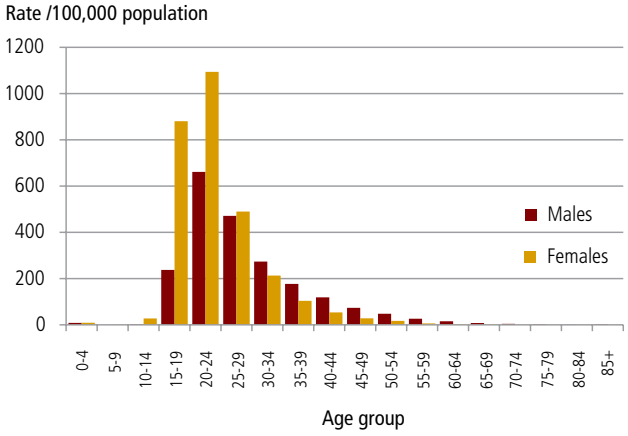
In the period 2000 to 2009, the number of chlamydia notifications in NSW increased markedly amongst both males (from 1,603 in 2000 to 6,489 in 2009) and females (from 1,868 in 2000 to 8,394 in 2009). In 2009, the NSW age adjusted rate of notifications amongst males was 186.4 per 100,000 (n=6,489) and 245.6 per 100,000 (n=8,394) amongst females (Figure 6a). Young people have the highest notification rate of chlamydia infection, in particular women aged 20-24 years (1,093.8 per 100,000 female population) and 15-19 years (880.6 per 100,000 female population) (Figure 6b).

Figure 6a. Rate of chlamydia notification by gender, NSW 2000-09.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

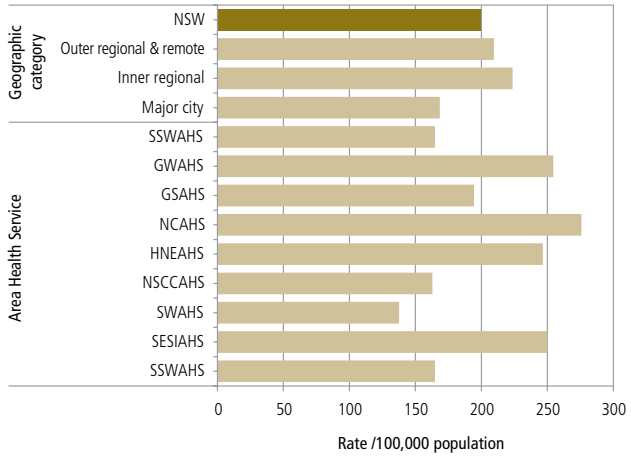
Figure 6b. Age-specific rate of chlamydia notification by age group, NSW 2000-09.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

Notifications of chlamydia are higher in inner regional (223.6 per 100,000) and outer regional and remote areas (209.5 per 100,000) than in major cities (168.5 per 100,000) (Figure 7). This may be a true reflection of higher infection rates in regional areas or it may reflect higher chlamydia testing and diagnosis rates.

Figure 7. Rate of chlamydia notification by AHS and geographic category, NSW 2007-09.

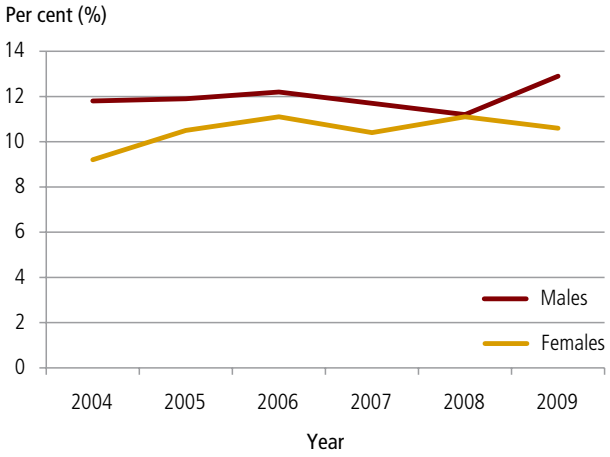


Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.
Note: Rates have been age adjusted using the Australian standard population 2001.

Enhanced surveillance

Data from enhanced surveillance of chlamydia shows that testing for chlamydia infection at NSW sexual health clinics has remained stable for the period of 2004 until 2008, with approximately two thirds of new patients (66.5% males, n=28,556; 62.8% female, n=23,731) being tested for chlamydia. Similarly, the overall rate of diagnosis of chlamydia infection has remained stable with an average of 8.4% of males (n=2,407) and 7.8% of females (n=1,851) testing positive. Among young heterosexual people aged 16-29 years who visit a NSW sexual health clinic, the percentage of new male patients diagnosed with chlamydia remained stable between 2004 and 2008 (Figure 8). The proportion of females diagnosed with chlamydia increased from 9.2% in 2004 to 11.1% in 2006 and has since remained stable (Figure 8). Data from Australian sexual health clinics shows that chlamydia rates are highest among young heterosexual men and women (National Centre in HIV Epidemiology and Clinical Research 2009).

Figure 8. Percentage of chlamydia positive diagnosis in new heterosexual patients aged 16-29 years at NSW sexual health services, NSW 2004-09.



Total number of patients (n=22,500) from 15 sexual health clinics.
Source: ACCESS data, National Centre for HIV Epidemiology and Clinical Research, UNSW.

Among new Aboriginal patients aged 16-29 years visiting NSW sexual health clinics in 2004-2008, the chlamydia testing rate was 56% with a 9.2% positivity rate among those tested (ACCESS project). The proportion of new men who have sex with men being tested for chlamydia in 2008 was 79.4% (n=1,586 out of a total of 1,998 new patients). For the period 2004 to 2008, the average testing rate for men who have sex with men was 80.7% with a positivity rate of 7.2%. Among those tested, female sex workers had the highest testing rate (82%) and a 6.3% positivity rate (2004 to 2008).

Burden of disease

General practice

Young people aged 16-29 years residing in NSW who attended a GP recorded the second lowest chlamydia testing rate of any State or Territory at 7.3% compared to a national average of 8.9%. A greater proportion of females (10.2%) compared to males (3.7%) were tested. Testing for chlamydia was higher (9.0%) for those aged 16-29 years living in regional /rural areas of NSW compared with metropolitan NSW (6.7%), which may account for the higher notification rate in these areas (Kong et al. 2008).

A recent study which investigated general practice testing rates for chlamydia in residents of Greater Southern Area Health Service for the period of 2004 until 2008 showed that the proportion of patients being tested remained at a low level (Reynolds & Oakman 2010). Of those tested however, the percentage of positive results in those aged 15-44 years was higher in males (ranging from 13.5% to 16.3%) than in females (ranging from 8.8% to 10.5%). A high percentage of positive tests were also found in older males aged 25-34 years (ranging from 9.7% to 15.4%) (Reynolds & Oakman 2010). The results of this study provide further support for the need to improve testing rates in both males and females.

Hospitalisations

During the period 2000 to 2009, chlamydia-related complications (ICD10-AM A55, A56.0-A56.2, A56.4, A56.8) accounted for an average of 16.0% of total hospitalisations where an STI was the principal diagnosis, and 19% in 2009. Sequelae of untreated chlamydia include ectopic pregnancy, pelvic inflammatory disease (PID) and epididymitis. In NSW the number of hospitalisations for chlamydia-related PID has increased since 2000 with chronic and unspecified duration PID showing the greatest increase. Acute PID has remained below 200 admissions per year since 2000. The proportion of chlamydia-related PID coded as principal reason for hospital admission has decreased from 97.2% in 2000 to 55.3% in 2009.

Gonorrhoea

Key points

- Rates of gonorrhoea have remained stable since 2000
- Males aged 20-34 years in inner metropolitan areas are most commonly affected
- The pattern of gonorrhoea infection implies that it largely affects men who have sex with men
- The most commonly reported site of infection is anogenital (genito-urinary system and anus /rectum)
- Gonorrhoea accounted for 12.8% of hospitalisations in which an STI was the principal diagnosis, in 2009.

Neisseria gonorrhoeae is a bacterium responsible for gonorrhoea. In the male urethra, gonococcal infection generally presents as an acute purulent discharge (Heymann 2008). In the female cervix, infection is sometimes followed by the development of mucopurulent cervicitis that is usually asymptomatic. Females and males can also acquire pharyngeal and anorectal infections, both of which are usually asymptomatic. Disseminated gonorrhoea is rare. In NSW, the transmission of gonorrhoea occurs predominantly via male-to-male sexual contact.

Effective antibiotic treatment is an essential component of gonococcal disease control at the individual and population-level, hence the development of antimicrobial treatment resistance is of concern. The Australian Gonococcal Surveillance Program monitors the antibiotic susceptibility of gonococci isolates in all States and Territories (Lahra & Tapsall 2010).

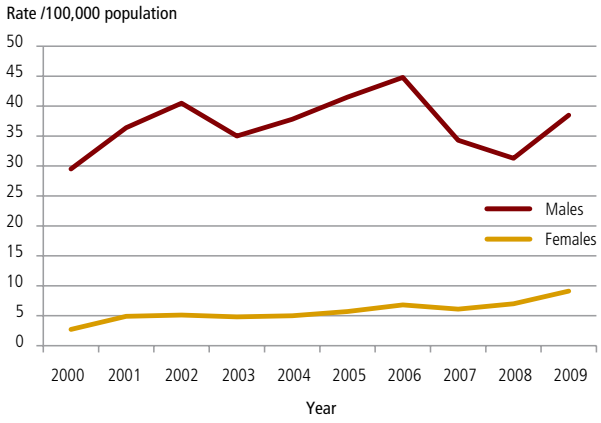
Incidence and prevalence of gonorrhoea

Studies of gonorrhoea in public sexual health services in Australia have found prevalence rates ranging from 0.17% in (Bowden et al. 1999) in Aboriginal and Torres Strait Islander women to 0.57% in a community based cohort of HIV-negative homosexual men (Templeton et al. 2009).

Notifications

In NSW, notification data shows that the age-standardised rate of gonococcal infection (of the eye, pharynx, genito-urinary system, anus /rectum and other or unspecified sites) among men is markedly higher than among women (Figure 9 and Figure 10).

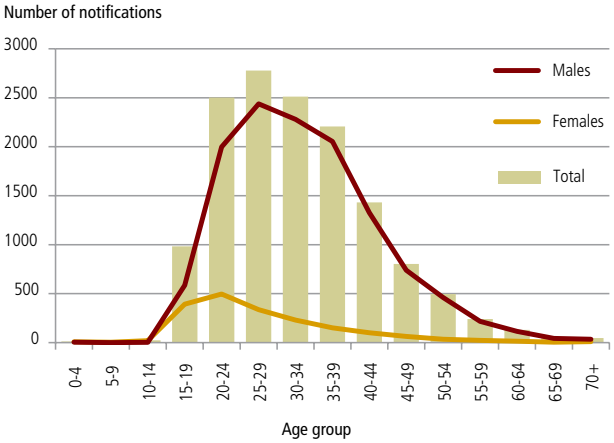
Figure 9. Rates of gonorrhoea by gender, NSW 2000-09.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.
Note: Rates have been age adjusted using the Australian standard population 2001.

In 2000, the age-standardised rate of gonorrhoea in males was 10 times higher than for females (2.7 per 100,000 population). The disparity of gonoccocal notifications between genders has since narrowed with a current (2009) rate ratio of 4.2:1 male to female. Gonococcal infections predominantly affect those aged 20-34 years, with the peak age range in those aged 25-29 years for men and 20-25 years for women (Figure 10).

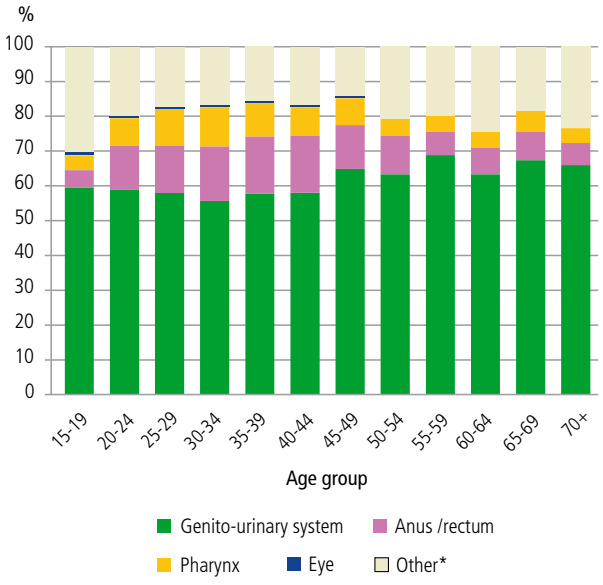
Figure 10. Gonorrhoea notifications by gender and age group, NSW 2000-09.



For 26 notifications gender was not specified.
Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

The site of infection is most commonly anogenital, which accounts for approximately 70% of the gonoccocal notifications of people aged 15 years and over (Figure 11).

Figure 11. Percentage contribution of gonorrhoea by site of infection, NSW 2000-09.



* Other refers to gonorrhoea of an unspecified site.
Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

South Eastern Sydney Illawarra Area Health Service has the highest rate of gonorrhoea notifications (44.6 per 100,000) followed by Sydney South West Area Health Service (29.4 per 100,000), with both Area Health Services having rates well above the NSW state average rate of 20.6 per 100,000 population.

Burden of disease

Hospitalisation

Infection with gonorrhoea can result in admission to a hospital for a number of conditions including gonoccocal infection of anus and rectum (ICD10-AM A54.0-54.6, A54.8, A54.9). The frequency of hospitalisations in which gonococcal infection was the principal diagnosis has more than doubled since 2000, to 33 hospital admissions in 2009. Gonorrhoea accounted for an average of 10% of total STI-related hospitalisations in which it was the principal diagnosis during the period 2000 to 2009 and 12.9% in 2009.

Infectious Syphilis

Key points

- There has been an 11-fold increase in infectious syphilis notifications among males since 2000
- Males aged 35-39 years are most affected
- Infectious syphilis largely affects middle-aged men who have sex with men
- Highest rates of notifications in inner metropolitan Sydney
- Hospitalisations and notification rates of congenital syphilis are low
- Syphilis accounted for 40.5% of hospitalisations in which an STI was the principal diagnosis in 2009

Syphilis is a complex systemic infection caused by the spirochete *Treponema pallidum*. The acute, infectious phase of the infection is characterised by a primary lesion termed a chancre and a secondary eruption involving the skin and mucous membranes (Heymann 2008). Infection may occur in the rectum or on the cervix without a characteristic external chancre. Syphilis infection can also facilitate the transmission of HIV (CDC Atlanta: U.S. Department of Health and Human Services 2008). If left untreated, it can result in chronic, end-organ complications, often many years after the initial infection. Infection of the foetus results in congenital syphilis and occurs in pregnant women with untreated early syphilis.

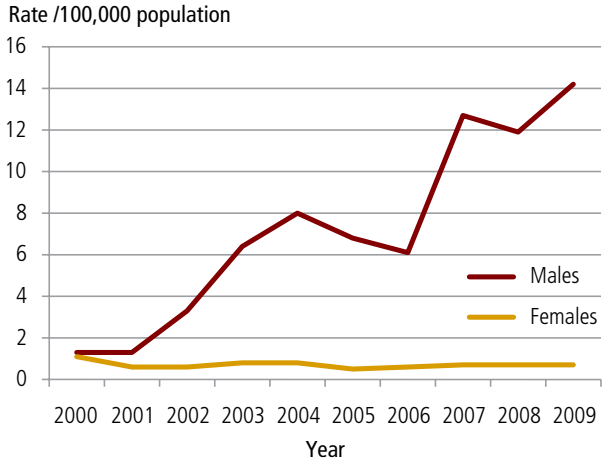
Incidence and prevalence of infectious syphilis

Notifications

In NSW, between 2000 and 2009, there was an 11-fold increase in infectious syphilis notifications among males. The age-standardised rate increased from a rate of 1.3 per 100,000 in 2000 to 14.2 per 100,000 in 2009 (Figure 12). There were 2,420 notifications of infectious syphilis in men during this period with the highest rate among males aged 35-39 years (Figure 13). The 2009 rate of notifications for infectious syphilis among females was 0.7 per 100,000 population and has remained very low for the past decade (Figure 13). Among Aboriginal people in NSW the rates of

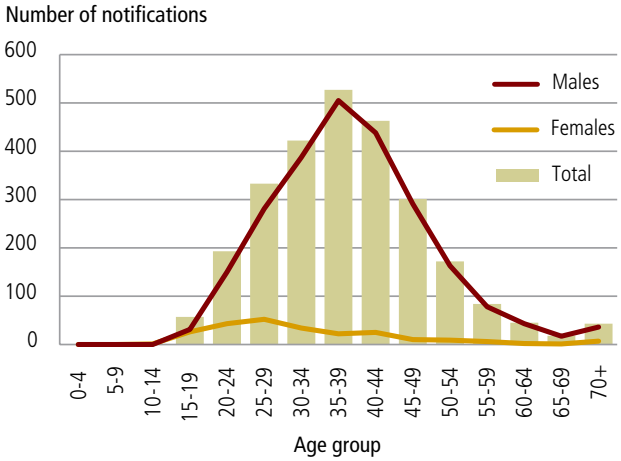
infectious syphilis decreased from 11 per 100,000 population during the period 2004 to 2007, to 4.6 per 100,000 population in 2009, a rate below that of non-Aboriginal people (5.6 per 100,000). An analysis of routine surveillance data, case series of infectious syphilis and data from a cohort study of HIV-negative men showed that the inner Sydney gay community experienced a resurgence of syphilis between 1999 and 2003 (Jin et al. 2005). The gender ratio Australia-wide is 8:1 male to female (Communicable Diseases Intelligence 2009) and the NSW-specific ratio is 20:1 male to female, which strongly supports a predominance of transmission among males in NSW.

Figure 12. Rate of infectious syphilis by gender, NSW 2000-09.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.
Note: Rates have been age adjusted using the Australian standard population 2001.

Figure 13. Infectious syphilis notifications by gender and age group, NSW 2000-09.



Source: Notifiable Conditions Information Management System, (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

The rate of infectious syphilis notification for the period of 2007 to 2009 was highest in the South Eastern Sydney Illawarra Area Health Service (SESIAHS) (19.4 per 100,000) and the Sydney South West Area Health Service (SSWAHS) (9.5 per 100,000). Both of these Health Areas had rates higher than the NSW average (6.8 per 100,000 population). Infectious syphilis is most prevalent in the inner metropolitan Sydney areas of these Area Health Services.

Enhanced surveillance

In 1999, an enhanced syphilis surveillance program was established in SESIAHS and SSWAHS to routinely collect de-identified information on HIV status and the gender of the sexual partner(s) of each case. The enhanced surveillance system has demonstrated that the majority of infectious syphilis cases are being detected in the primary and secondary stages, and that the cases are occurring predominantly amongst men who have sex with men, approximately half of whom also have HIV infection (Botham et al. 2007).

Burden of disease

Hospitalisation

Infection with syphilis can result in admission to a hospital for a number of conditions including congenital syphilis (ICD-10AM A50.0-50.3, A50.9), early syphilis (ICD10-AM A51.0-50.5), late syphilis (ICD-10AM A52.0-52.3, A52.7-52.9) or other and unspecified syphilis (ICD-10AM A53.0, A53.9). Admissions in which syphilis was the principal diagnosis account for the greatest proportion of STI-related hospitalisations (40.5%, n=66) in 2009 (Figure 5). Hospitalisation for congenital syphilis and early syphilis has been low, contributing less than 3% of total STI-related hospitalisations where the condition was listed as the principal diagnosis. Late syphilis contributed to 18.4% of the total hospitalisations for an STI as the principal diagnosis for the period of 2000 to 2009.

Genital warts

Key points

- 4.2% of Australian adults report being diagnosed with genital warts
- The incidence of genital warts in Australian general practice is estimated to be 2.19 cases per 1,000 population
- HPV vaccination may have contributed to a reduction in the diagnosis rate of genital warts

Human papillomavirus (HPV) can cause genital warts (Garland et al. 2007), cervical cancer (zur Hausen 1996, Franco, Rohan & Villa 1999), other anogenital cancers and oropharyngeal cancer. Transmission of genital HPV occurs through contact with infected skin or mucosal surfaces, primarily via sexual contact, including during the early stages of infection when the person is asymptomatic. There is a high probability of transmission (estimated at 50% to 80%) following unprotected sexual intercourse with a person with an active HPV infection. Most genital HPV infections clear spontaneously and are no longer detectable within 12-24 months (Giuliano et al. 2002).

In 2007 and 2008 a mass HPV vaccination program for females aged 12-26 years was started in Australia. From 2008, the HPV vaccine has been offered to all girls in the first year of high school. The vaccine was also licensed for use in boys aged 9-15 years and for older women, but is not free-of-charge. This vaccine targets two oncogenic strains of HPV (16,18) and two wart-causing HPVs (6,11) (Villa et al. 2005).

Incidence and prevalence of genital warts

In the Australian Study of Health and Relationships, 4.2% of Australian adults reported that they had been diagnosed with genital warts (Grulich et al. 2002). Pirotta et al. (2010) utilised the BEACH dataset of GP activity in Australia to estimate an annual caseload of 43,900 cases of genital warts annually, providing an incidence of 2.19 cases per 1,000 population. Surveys of GP encounters show that women aged 20-24 years are most likely to attend their GP for management of genital warts with an estimated incidence of 8.61 per 1,000 population whilst in men, those aged 25-29 years most commonly present for management with an estimated incidence of 7.4 per 1,000 population (Pirotta et al. 2009).

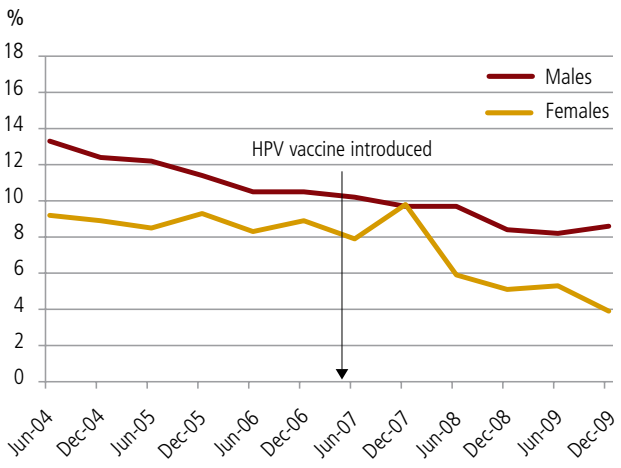
Notifications

HPV /genital warts are not notifiable diseases in NSW.

Enhanced surveillance

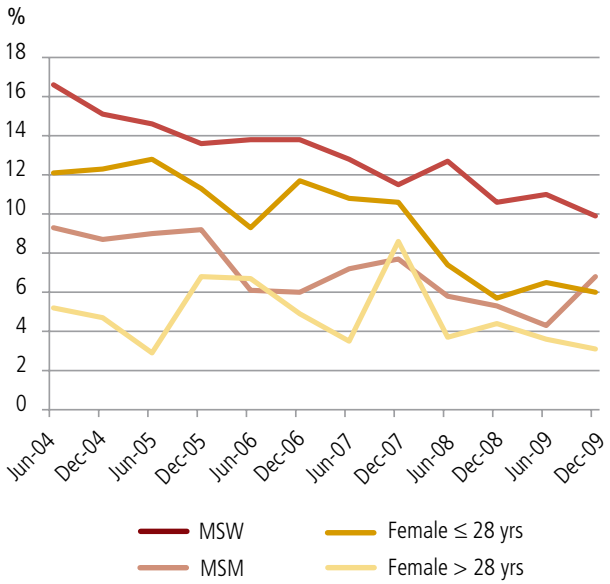
There is emerging evidence from sexual health clinics of a reduction in the number of new patients diagnosed with genital warts. Figure 14 provides data from a study of 1,810 male and 946 female clients of two sexual health clinics in Sydney over the period 2004 to 2009. In the period June 2004 to July 2007 there was a modest reduction in genital wart diagnoses amongst males attending the clinics, but not females. Following the commencement of the HPV vaccination program in April 2007 (Figure 14), there has been a significant reduction (p=0.05) in the percentage of new female patients diagnosed with genital warts compared with the pre-vaccination period. Amongst new patients of sexual health clinics, genital wart diagnoses were highest amongst men who reported only having sex with women, followed by females under the age of 28 years. These younger women experienced the greatest decline in the diagnosis of genital warts in the period since July 2007, while men who reported only having sex with women experienced a more gradual decline. The rate amongst women aged 28 years and over and men who have sex with men, remained unchanged (Figure 15).

Figure 14. Proportion of new patients diagnosed with genital warts in two Sydney sexual health clinics by gender and half-year, NSW 2004-2009.



Source: National Centre in HIV Epidemiology & Clinical Research, UNSW.

Figure 15. Genital wart diagnosis in new patients attending two Sydney sexual health clinics by risk category (gender of partner for males and age for females), NSW 2004-2009.



MSW, men who have sex with women only. MSM, men who have sex with men.
Source: National Centre in HIV Epidemiology & Clinical Research, UNSW.

Burden of disease

In the 'Sex in Australia' survey, most patients diagnosed with genital warts reported that they were treated by a GP (49.1%) or at a sexual health clinic (17.1%) (Grulich et al. 2002).

General practice

In the BEACH study, approximately 0.1% of all GP encounters were for the management of genital warts and, of these, 35% were classified as 'a new problem' (Pirotta et al. 2009).

Genital herpes

Key points

- Prevalence of HSV-2 is estimated to be 12% in Australia, and is highest in people aged 35-44 years
- Prevalence is twice as high in females (16%) compared to males
- Anogenital herpes accounted for 27.6% of hospitalisations in which an STI was the principal diagnosis in 2009

Herpes Simplex Virus (HSV) is a viral infection characterised by systemic and local symptoms and a tendency to localised recurrence (Heymann 2008). There are two types of HSV: type 1 (HSV-1) which typically affects the oral mucosa and type 2 (HSV-2) which more commonly affects the genital tract, although it is increasingly recognised that either type can infect either site.

HSV-2 is the most common cause of genital ulcer disease worldwide (Smith & Robinson 2002). The principal sites of infection in females are the cervix and vulva, whilst lesions in males are primarily found on the penis or prepuce, and anus and rectum. The risk of infection increases with increasing number of lifetime sexual partners (Fleming et al. 1997).

Incidence and prevalence of genital herpes

A number of prevalence studies of HSV-2 have been undertaken in Australia, including a population-based survey (Cunningham et al. 2006) and several smaller studies of particular populations (Jin et al. 2006, Butler et al. 2000). In the population-based study, the prevalence of HSV-2 was highest in those aged 35-44 years (14-19%) with an overall prevalence estimate of 12%. Females had significantly higher rates of anti-HSV-2 antibodies (16%) compared to males (8%) (Cunningham et al. 2006). An Australian study of gay men found that, since 1992, there has been a greater than 4-fold increase in the proportion of cases of anogenital herpes attributable to HSV-1 to 76% in 2004-2006 (Ryder et al. 2009). This suggests that in some populations, HSV-1 may account for the majority of first-episode anogenital herpes (Ryder et al. 2009).

Notifications

HSV-2 /genital herpes are not notifiable diseases in NSW.

Burden of disease

Hospitalisation

The second largest contributor to hospitalisations for all STIs (principal diagnosis, comorbid diagnosis and 'other predominantly STI, not elsewhere specified') was admission for anogenital herpes infection (ICD-10AM A60.0, A60.1, A60.9, A63.0), accounting for an average of 12% (n=7287) of the total STI hospitalisations during the period of 2000 to 2009 and 27.6% in 2009. Anogenital herpes accounted for approximately 9.4% (n=433, 2000-2009) of admissions in which an STI was the principal diagnosis.

Conclusions

STIs are a significant public health issue in NSW. Notification rates of chlamydia and infectious syphilis have risen in NSW since 2003. Other STIs, such as genital warts and genital herpes, have high prevalence rates. These STIs are a significant cause of morbidity in NSW. The epidemiology of STIs in NSW (whether measured by incidence, prevalence or notification rates) varies considerably across different diseases, with genital warts, chlamydia and genital herpes being the most prevalent conditions and other conditions being diagnosed at a lower rate. Chlamydia predominantly affects young heterosexual people, and gonorrhoea and infectious syphilis are detected more commonly among gay men. Of special note is the decline in the rate of infectious syphilis notification among Aboriginal people in NSW to a level below that of the general population.

In April 2010, the Australian Health Ministers' Conference endorsed the second National Sexually Transmissible Infections Strategy 2010-2013. The Strategy establishes goals, objectives, directions and priorities for future efforts to control the transmission of STIs and reduce STI-related morbidity. The Strategy additionally identifies a range of indicators against which national efforts and performance will be assessed. A forthcoming NSW Sexually Transmissible Infections Strategy for the period from 2010 will support the implementation of agreed national priorities in NSW. An effective and timely surveillance system will be an essential underpinning of these efforts.

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3.2 Urbanism and Health

The Issue

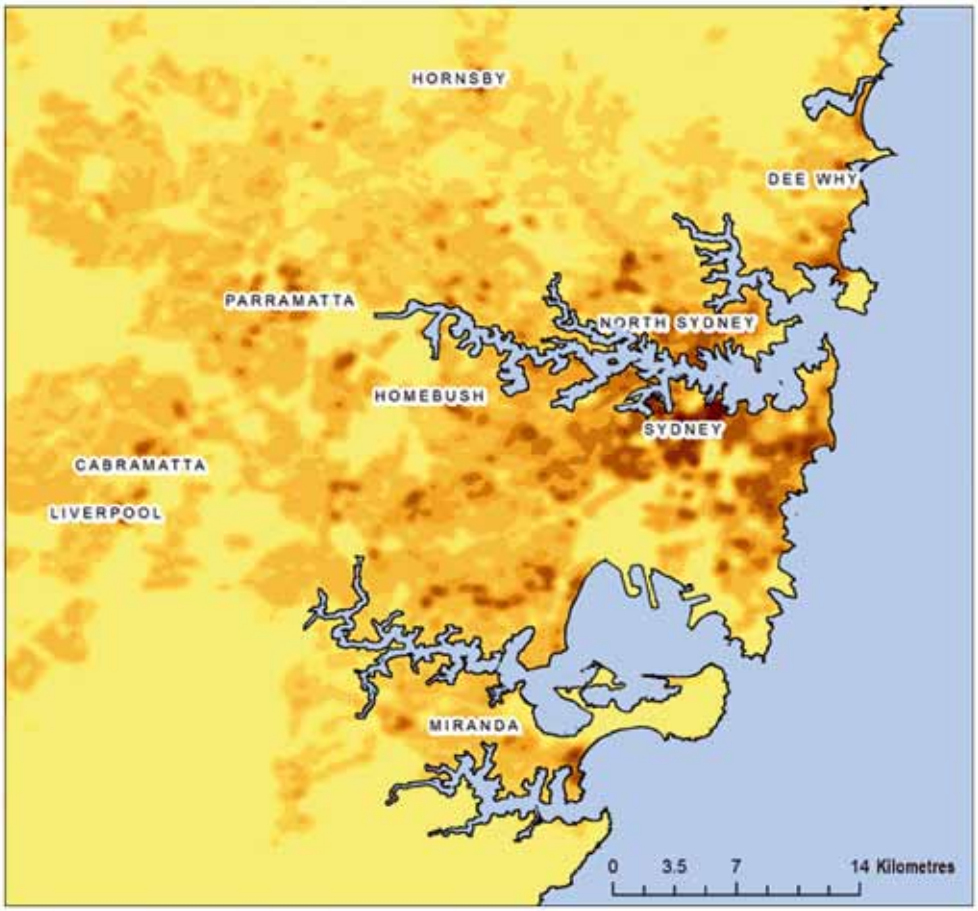
Urbanisation refers to the shift from a rural to an urban society, with the concomitant growth of cities due to industrialisation and economic development. The term 'urbanism' describes cities and urban areas as more than just location and physical structure. Instead, it focuses on how people live and go about their daily lives, their attitudes to life and to other individuals, and the effects on, and impacts of, the built environment. The Australian Bureau of Statistics (Australian Bureau of Statistics, 2010) defines Capital Cities and Significant Urban Areas as having a population over 10,000 people. On this basis, almost 90% of the Australian population now live in urban areas, whilst 75% live in major cities of more than 100,000 people. Sydney is categorised as a global city, with a population of over 4.3 million people or over 20% of the total Australian population.

The shift to urban living is tied to better employment opportunities, education, social and cultural opportunities and access to shops, food outlets, health care and other services. On average, health and access to health care in New South Wales (NSW) is better in urban areas than in rural (NSW Department of Health, 2008). However, health is not evenly distributed within urban areas, where some areas enjoy the best of health, and other areas have very poor health. This 'structural' or 'locational' inequality necessitates addressing problems in terms of urban infrastructure now, before it becomes more difficult to address in the future. The physical and psychological changes associated with urbanism are becoming an increasingly important issue for health.

Urbanisation in NSW

At the turn of the 20th Century, the population of NSW was around 1.3 million, with 60% living inland and in rural areas. Today, NSW has a population of more than

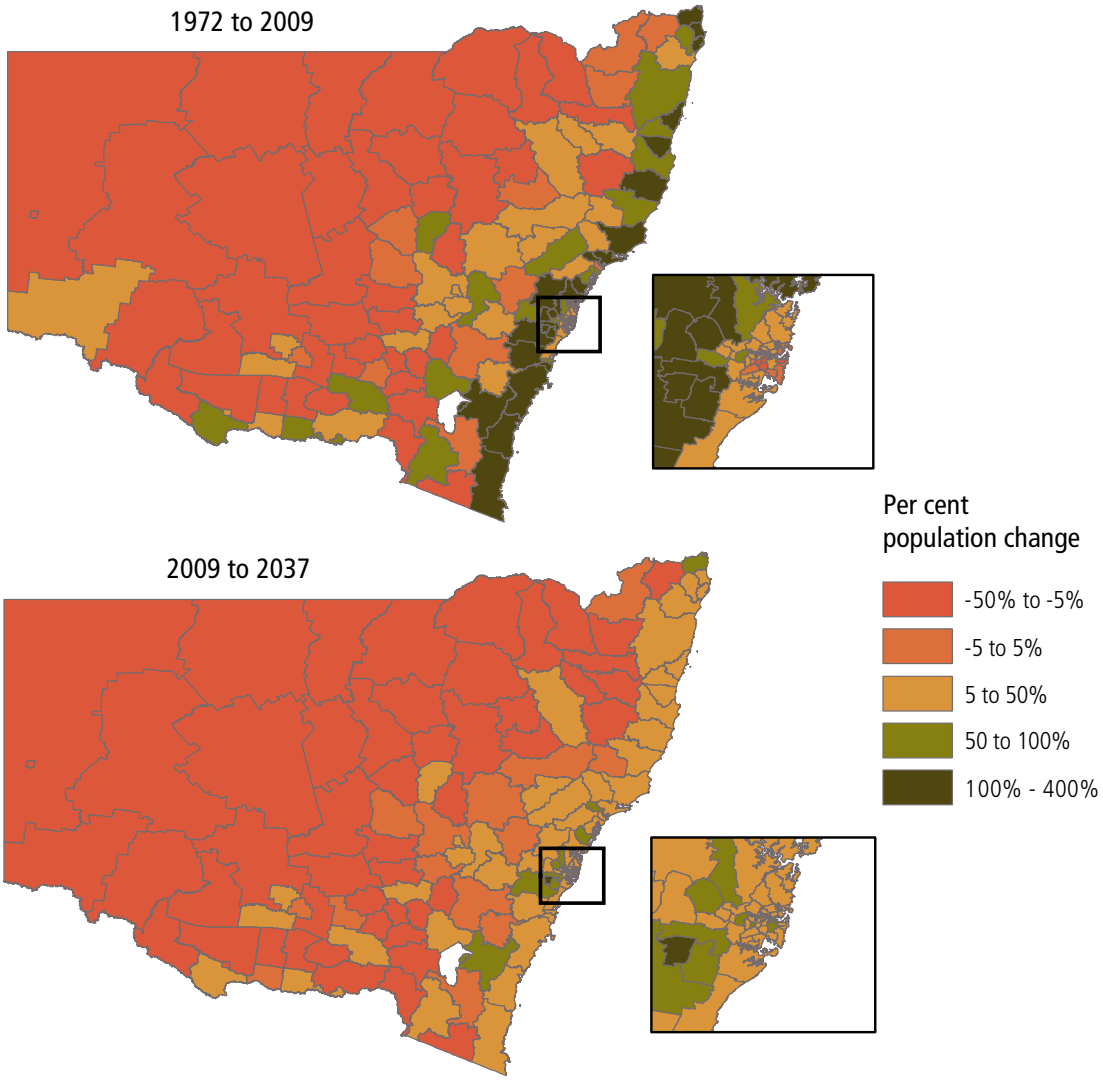
Figure 1: Housing density across Sydney, with darker areas representing higher density.



Map produced using 2006 census data.

7 million, with more than 60% living in Sydney alone. The average new house size in NSW has increased over 50% between 1985 and 2003, whilst the average number of people living in Australian households has declined from 4.5 in 1910 to 2.7 in 2000 (Australian Bureau of Statistics, 2009). This has led to a considerable increase in the use of resources and, in turn, greenhouse gas emissions. This increase in population and low density residential areas means Sydney is expanding rapidly outward (Figure 1), with government seeing the imperative to address this 'urban sprawl' and house people in more compact cities to make them more sustainable (Ohlin, 2003). Another phenomenon which will affect the way that health resources are distributed is the so-called 'sea-change' demographic transition which has seen an increase in urban development along the coastline (Gurran et al., 2005, Gurran et al., 2006). Figure 2 demonstrates how the population has increased along the coast in the last 30 years as well as the projection for the next 30 years. Combined, these demographic changes are likely to put a strain on health resources in these urban areas.

Figure 2: Change in population between 1972 and 2009 (top), with predicted change for 2009 to 2037 (bottom).



Source (Australian Bureau of Statistics, 2008)

Impacts of Urbanism on Health

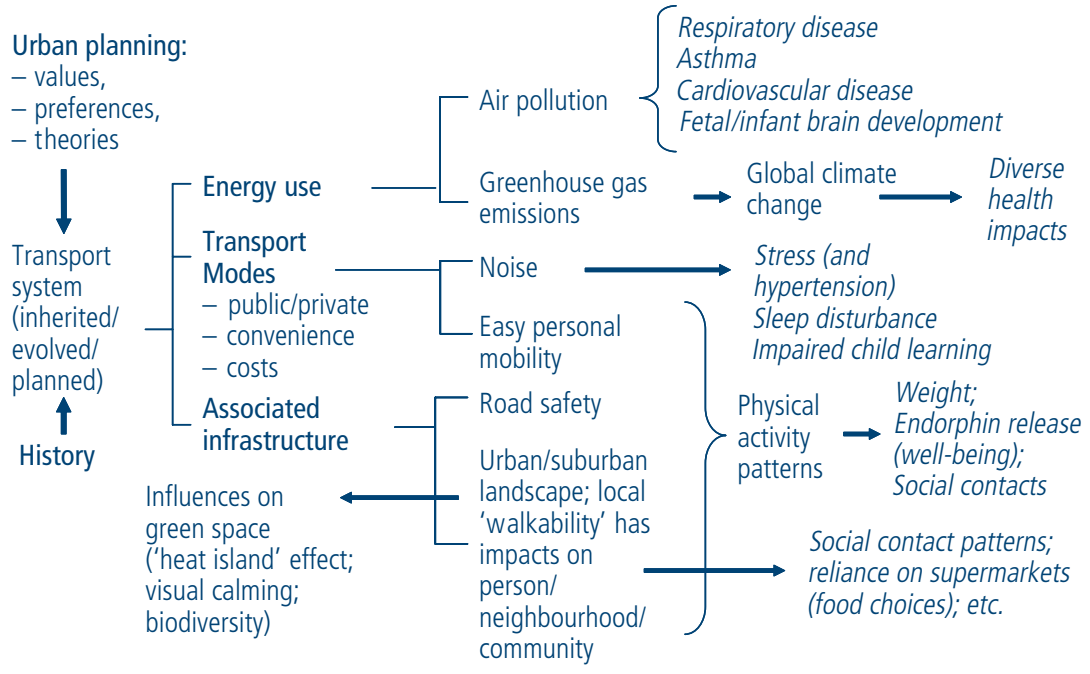
Urbanism can impact on health directly through exposure to pollutants and traffic hazards and indirectly through lifestyle choices such as changes in physical activity, food choices and social interaction. Figure 3 depicts an overview of putative links between urban transport systems and health.

A review of the health impact of the major factors associated with urbanism follows. These factors include transport, air and noise pollution, crime, heat, access to fresh food and the availability of and access to public spaces.

Transport and urban form

Urbanisation has had a great effect on our modes of transport, with urban design centred around the use of the car. Street networks for instance have changed over the last century from a connected to a disconnected design. A comparison of low connectivity and high connectivity is shown in Figure 4, where the grid like pattern of a well connected design, allows a greater area to be covered for the same distance walked. Thus, as connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations, creating a more accessible and resilient transportation system, and increasing the probability of walking (Li et al., 2005). Having destinations within walking distance from homes is a strong correlate of transport activity such as walking or cycling (Hoehner et al., 2005). Urban sprawl generally results in lesser connectivity (Kelly-Schwartz et al., 2004), and a greater likelihood of residents driving their car (Frank et al., 2007). A recent analysis has shown that urban sprawl in NSW is associated with inadequate physical activity, no time spent walking during the past week, and the likelihood of being overweight or obese (Garden and Jalaludin, 2009). Research has shown that increased housing

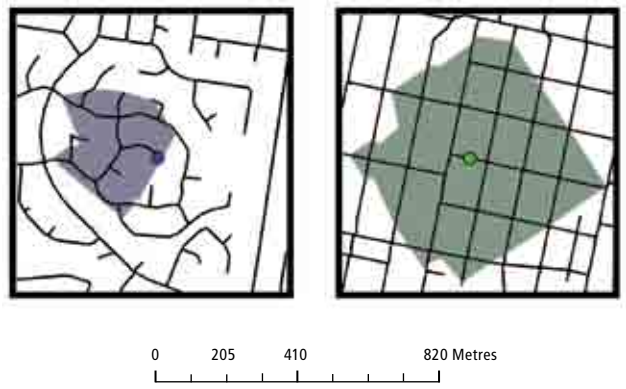
Figure 3: Social and health impacts of urbanism.



Source: (McMichael, 2007)

density or mixed density is one of the built environment features that contributes to increased 'active transport', along with mixed use planning and increased connectivity (Gebel et al., 2005). 'Active transport' is a term used to describe non-motorised forms of transport (including cycling and walking).

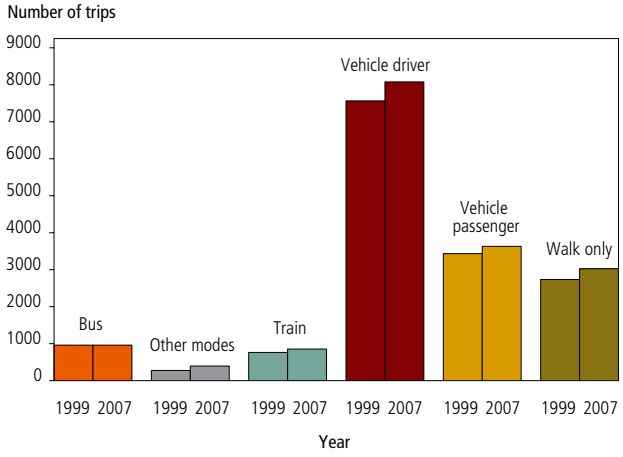
Figure 4. Street connectivity. Area covered from walking 400 metres from the central point on a poorly connected street (left) and a well connected street design (right) .



Sydney has seen a 9% increase in bicycle journeys to work between 2001 and 2006, with a lesser proportion in outer Sydney and the Greater Metropolitan Region (New & Rissel, 2008). A study using the 2003 New South Wales Adult Health Survey found that cycling was associated with a reduced likelihood of being overweight or obese compared to other means such as driving, public transport or walking (Ming Wen & Rissel, 2008). There is a perception that bicycle riding is unsafe, however, experience from overseas shows infrastructure changes such as the provision of separate cycling facilities along roads, cycling rights of way, full integration with public transport, traffic education and promotional events can lead to the reduction in the number of cyclists killed despite a large increase in the number of cyclists on the road (Pucher & Buehler, 2008).

The availability of public transport is an important aspect of urban design, resulting in reduced usage of cars and reduced greenhouse gas emissions. Residents in NSW have a heavy reliance on cars compared to other modes of transport such as public transport (Figure 5). People driving to work are more likely to be overweight or obese that those using other means of transport (Wen et al., 2006). The inequality in access to public transport is borne out in a report which found that areas relatively well serviced by public transport are concentrated within a 10km radius of Sydney CBD, with 60% of transport disadvantage lying in Western Sydney (Hurni, 2006).

Figure 5: Number of trips per year using different modes of transport for 1999 and 2007 (NSWTI, 2007)



Air pollution

Motor vehicle use is the most important source of urban air pollution in New South Wales, contributing to pollutants such as oxides of nitrogen (NO_x), ozone (O_3), and particulate matter (PM). The health effects of these pollutants have mostly been demonstrated with epidemiological studies which have linked background air pollution from monitors and proxies for long term exposure, with respiratory symptoms, cardiovascular disease, mortality rates and childhood cancer (HEI Publications, 2010). In Sydney, an association between air pollution and daily emergency department visits for cardiovascular disease in the elderly has been demonstrated (Turner et al., 2007). Studies have shown a possible link between ambient air pollution and outcomes such as low birth weight, intrauterine growth restriction and preterm births, although the effects were not always consistent between studies (Glinianaia et al., 2004, Maisonet et al., 2004). The association between average exposure during pregnancy to five common air pollutants was estimated for births in metropolitan Sydney between 1998 and 2000 and found that carbon monoxide and NO_2 concentrations in the second and third pregnancy trimesters had a statistically significant adverse effect on birth weight (Mannes et al., 2005).

Noise pollution

The Department of Environment, Climate Change and Water (DECCW) received over 1000 noise incident calls, and NSW Police recorded and attended over 100,000 noise incidents in 2008 (New South Wales. DECCW, 2009). A report by the NSW Health Department concluded that noise affects sleep, child health and performance at school, and increased the risk for cardiovascular disease and vulnerability to mental health problems in some groups (enHealth-Council, 2004). The report recommended that further research is required, including longitudinal studies, to better establish whether effects are long term, and the degree to which noise affects the general population.

Crime

Official crime statistics show that whilst absolute crime rates are lower in regional Australia, violent and property offences have increased at faster rates in rural areas than in major urban centres (Carcach, 2000). Research suggests that the beliefs of many Australians about crime rest on unsupported perceptions that crime rates are rising (Wilson et al., 2005). Therefore, urban planners need to improve the perception of safety by well maintained amenities, public meeting places, and street lighting. (Foster 2008). Crime Prevention through Environmental Design (CPTED), relies on such strategies to reduce the fear and incidence of crime and improve quality of life (Crowe, 2000). These strategies have also been found to reduce depression, improve daily coping and mental wellbeing of community members and support mental health by promoting community capacity, cohesion and connectivity (NSW Deptartment of Health, 2009). In NSW, these CPTED strategies have been promoted by government, police and community organisations (Cozens, 2009).

The urban heat island

An urban heat island is an urban area which is significantly warmer than its surrounding rural areas, mainly due to the modification of the land surface by urban development. There may also be a contribution by energy usage within urban areas. This phenomenon has been directly measured in Melbourne (Morris & Simmonds, 2000), and a submission to the Environment and Heritage Sustainable Cities 2025 Inquiry, emphasises its importance to urban planning (Samuels, 2004). It is difficult to assess the extent that this effect has on the health of the population, but it can be inferred that those vulnerable to heat stroke and similar conditions would be more so in urban areas. Given that the impact of urban air pollution/photochemical smog is magnified by heat, the exacerbating effects of air pollution must also be considered. Measures to reverse the urban heat island include afforestation and the widespread use of highly reflective surfaces.

Access to fresh food/loss of agricultural land

Urban and environmental factors such as location of agricultural lands, retail type and location, food transport systems and infrastructure, food service locations (including fast foods), food advertising exposure within public places and affordable housing are potential factors influencing food choice (Gebel et al., 2005). One study found that the local environment was associated with residents dietary intake (Morland et al., 2002). As urban areas increase, agriculturally important areas of NSW such as the Sydney hinterlands are under threat (NSW Government, 2005, Johnson et al., 1998). This poses a severe threat to the accessibility of fresh fruit and vegetable markets.

Public spaces

There is a growing body of evidence that demonstrates that social, economic and environmental conditions play an important role in mental health. Research has shown that a sense of community increases when neighbourhoods are walkable, and when well-maintained public spaces are located near homes (Frumkin, 2003). Access to parks, open spaces, and playgrounds has been associated with better perceived general health (Maas et al., 2006, Maller et al., 2008), and more walking (Giles-Corti et al., 2005). Designing facilities that encourage meeting, gathering and social interaction in communities could therefore improve mental health and increase social networks.

Strategies for improving health

Improving the measurement of the impact of urbanism:

Location Intelligence and Research

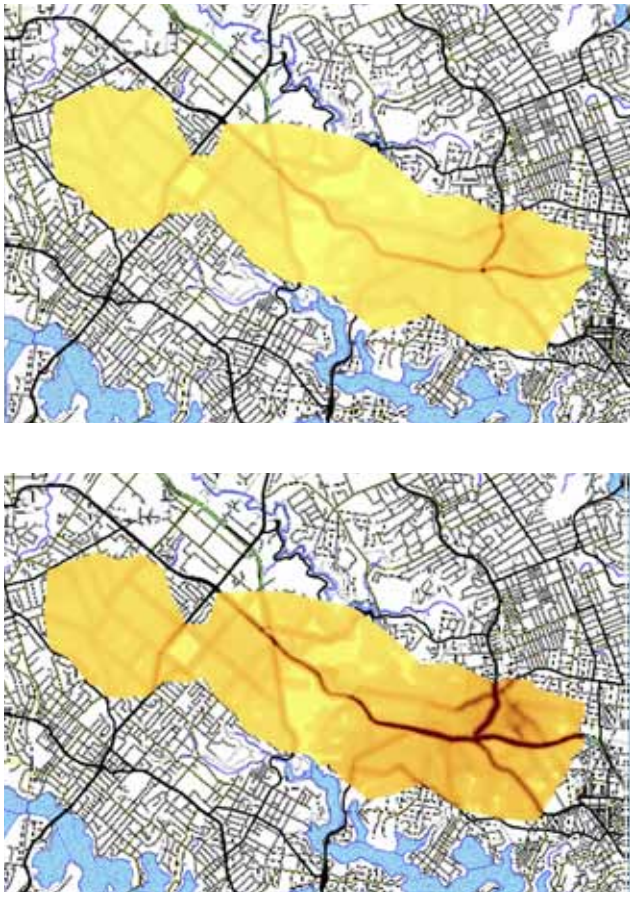
The study of urbanism and health necessitates the use of technology that exploits the analysis of information within a spatial context. Geographic Information Systems

(GIS) are systems that capture, store, analyse, manage and present data that are linked to location. This rapidly developing technology in 'Location Intelligence' has led to the establishment of the Common Spatial Information Initiative (CS2i), a whole of NSW government initiative that provides a framework where government, business and the community can access spatial and related information and services. The NSW Spatial Information eXchange (SIX) provides direct access to high resolution imagery across the whole of NSW, along with a wide range of property and topographic features, cadastral (land tenure) and searchable address information, together with a growing range of spatial data sets from other sources (Spatial Information Exchange, 2010).

The University of NSW's CITYFUTURES Research Centre has established an integrated information model to support metropolitan planning, with a project theme of spatial decision support, city modelling, metropolitan strategic planning, urban sustainability and urban information systems. The NSW Department of Health is currently investing in GIS infrastructure, including GIS applications, training and an enterprise server which will deliver location intelligence to the population health network. This capacity will complement current efforts to geocode (i.e. to add latitude and longitude information) population health records.

There have been a growing number of research projects in Australia incorporating GIS and location intelligence. The Woolcock Institute of Medical Research is in the final stages of analysis into the health effects of opening the Lane Cove Tunnel on residents in the area. This will help in understanding how traffic interventions such as a road tunnel impact on the health of a community and will help inform urban planners in the future (Woolcock Institute of Clinical Medicine, 2010). An important component of this study involved the use of GIS to estimate pollution exposure by utilising methods to accurately model exposure to air pollution such as Land Use Regression (Cowie et al., 2008). GIS is also being used to develop indices of walkability for the purposes of research and to evaluate new environment and policy initiatives (Cerin et al., 2007, Leslie et al., 2007). The walkability index combines information related to dwelling density, street connectivity, land use attributes and net retail area to provide a quartile index. A related concept involves the 'walk score', which calculates the walkability of an address based on the distance from a place of residence to nearby amenities. This can help the public choose houses that promote walking, and urban planners to maximise the amenities available to residents in the community (Walk Score, 2010).

Figure 5: Pollution estimate maps of the Lane Cove area for January-February 2006 (top) and May-June 2006 (bottom) using Land Use Regression. Darker areas signify higher pollution levels. (Cowie et al., 2008).



Healthy Urban Development Checklist

The Centre for Health Advancement in the NSW Health Department recently published a Healthy Urban Development Checklist (NSW Department of Health, 2009). The purpose of the Checklist is to help build the capacity of NSW Health to provide valuable feedback to local councils, and other relevant organisations, on health issues in relation to urban development plans and proposals. It is intended that the use of the Guideline will facilitate strengthened partnerships and collaboration between NSW Health and urban planners and developers as part of NSW Health's initiatives to promote healthy communities in NSW.

Healthy Built Environments Program

In 2009, the NSW Department of Health and the Faculty of the Built Environment at the University of NSW jointly established a Healthy Built Environments Program (HBEP) in the CITYFUTURES Research Centre (Thompson et al., 2010). HBEP will foster cross-disciplinary research, deliver education and workforce development, and advocate for health as a primary consideration in built environment decision making. HBEP brings the combined efforts of researchers, educators, practitioners and policymakers from the built environment and health sectors to the prevention of contemporary health problems. The vision of HBEP is that built environments will be planned, designed, developed and managed in ways that promote and protect the health of all people. HBEP is co-directed by Associate Professor Susan Thompson and Professor Anthony Capon and the NSW Department of Health will provide funding of $1.5m over five years.

Conclusions

The growth of our cities has seen concomitant improvements in infrastructure such as sewerage, access to clean water, housing and health care resulting in a substantial increase in life expectancy and improved health. These more obvious benefits have overshadowed the insidious impact of urbanism on the way we eat, exercise and interact with our fellow human beings. Fortunately, interest and research in this area has enabled governments to implemented evidence based guidelines for urban planners to maximise the health of residents in the community.

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Determinants of health

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Determinants of health: section review

Introduction

The determinants of health include characteristics such as age and sex, as well as external factors which can bring about a change in the health of individuals and populations. This section provides an overview of the age and sex structure of the NSW population, as well as the social, environmental and behavioural factors that affect the health of populations.

The e-CHO

The indicators of the following chapters are also available in the e-CHO, the on-line, electronic version of *The health of the people of New South Wales – Report of the Chief Health Officer.* A detailed description of this content of can be found at:
http://www.health.nsw.gov.au/publichealth/chorep/

NSW Population

In this report, the NSW population chapter includes the population distribution in NSW by age and sex and by Health Area and rurality index. Differences in the age and sex structure of populations in different geographic areas and subgroups affects the overall burden of disease and death in those areas and subgroups.

The adjustment for differences in the age and sex structure of populations by weighting rates to a standard population over time or between geographic allows for risks to be compared after controlling for these factors. Both the overall burden and risk are important measures for population health services planning and evaluation.

The following indicators are also included in the e-CHO:

NSW population pyramids by sex and age, with projected change in 20 years for:

- NSW
- individual Health Areas
- Local Government Areas
- five NSW geographic areas based on the Accessibility/ Remoteness Index of Australia scores.

Social Determinants

In this report, the social determinants of health chapter shows the geographic distribution by local government area of socioeconomic disadvantage in NSW.

The following indicators of the social determinants of health are also included in the e-CHO:

- income
- employment
- educational attainment
- family structure
- reported crime
- social capital
- a map by local government area of the Index of Relative Socioeconomic Disadvantage scores.

Environment

In this report, the Environment chapter includes indicators of the air quality index by geographic region in NSW and also water quality as measured by the level of indicator pathogenic bacteria.

The following environmental indicators are also included in the e-CHO:

- air quality index in fours regions of NSW
- sources of domestic heating and their contribution to indoor air pollution
- blood lead levels in children in Broken Hill
- water pollution by: bacteria and inorganic chemicals
- sources of drinking water and fluoridation of water sources
- healthy living practices in Aboriginal communities.

Health-related behaviours

In this report, the Health-related behaviour's chapter includes indicators of the prevalence of selected risk factors in the population of NSW aged 16 years and over.

The following indicators of health-related behaviours are also included in the e-CHO presented by age, Area Health Service and trends over time:

- physical activity
- body mass index and overweight and obesity
- fruit and vegetable consumption
- breastfeeding
- sun protection
- sexual behaviour
- smoking
- alcohol consumption
- illicit drug use
- deaths and hospitalisations attributable to smoking, excessive alcohol consumption, overweight and obesity, physical activity and nutrition.

4.1 NSW population

Introduction

Age and sex are important determinants of the health of individuals. Thus, the age and sex structure of a population has a strong effect on patterns of illness and use of health services.

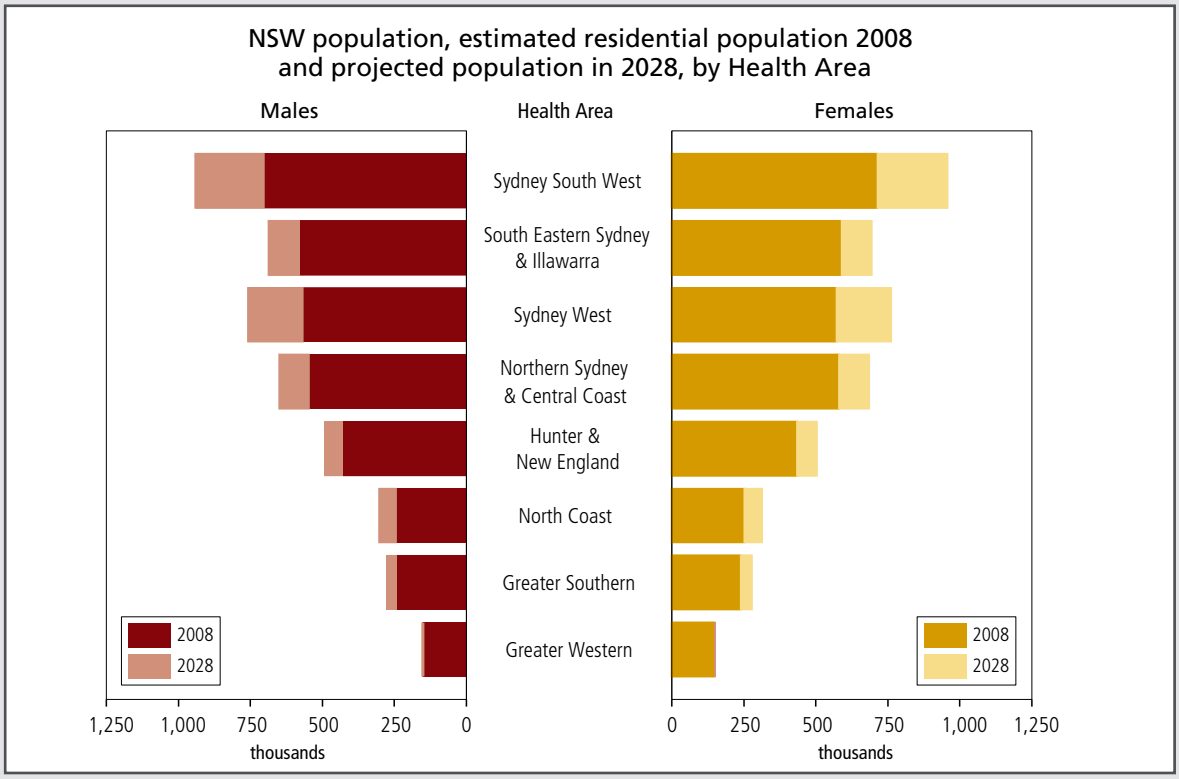
In 2008 the estimated resident population of Australia was 21.4 million. A third of the Australian population lives in NSW, with just over one fifth in the Sydney Statistical Division. In NSW, Aboriginal and Torres Strait Islander people accounted for 2.2% of the population in 2008.

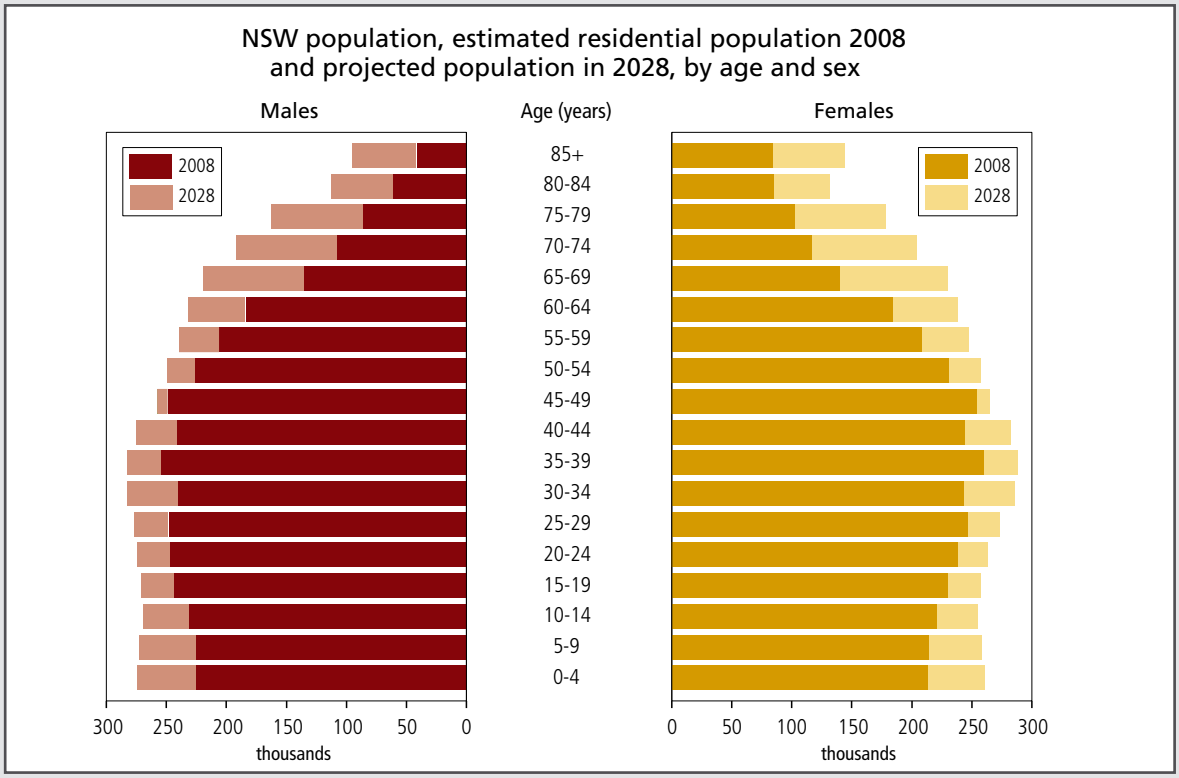
The five yearly Census of Population and Housing is the primary source of basic population statistics, providing a total count of the population on census night. Population counts can be provided according to place of enumeration or according to place of usual residence. In Australia the key population measure is the estimated resident population (ERP), which is based on the concept of a person's 'usual residence' for a period of 12 months or more within Australia. The ERP in a census year is derived from the census count, with adjustments for estimated undercount and for Australian residents temporarily overseas on census night. Between censuses the ERP is updated using information on birth and death registrations from state and territory Registrars of Births, Deaths and Marriages, and overseas arrivals and departures data from the Department of Immigration and Citizenship, as well as Medicare registration changes of address for modelling interstate migration.

The age and sex structure will vary among different regions, for reasons such as young adults moving to cities for study or work and older people retiring to coastal areas.

Key points

- The estimated residential population of NSW in 2008 was 6,984,172. The population of NSW in 2028 is projected to be approximately 8,600,000.
- The rate of growth of the NSW population is currently declining but is projected to increase slightly over the next 20 years. Between 1998 and 2003 the average annual growth rate was approximately 1.05%. Between 2003 and 2008 the average growth rate was 0.93% per year, and it is projected to slightly increase to 1.10% per year between 2008 and 2028.
- The NSW population continues to age. For the NSW population in 2003 the median age, or the age for which half the population are older and half are younger, was 36 years. In 2008 the median age was 37 years, and in 2028 the median age is projected to be 41 years.
- In 2008 the female population slightly outnumbered the male population (98.1 males per 100 females) and this gap is predicted to remain similar in 2028.
- The proportion of females in the population increases with age. In 2008 females made up 55% of the NSW population aged 65 years or more, and 67% of the population aged 80 years or more.
- The NSW population is predominantly urban. In 2008 approximately 73% of the NSW population lived in metropolitan areas, 20% lived in inner regional areas and 7% in outer regional and remote areas.
- In 2028 Sydney will remain the dominant population centre in NSW. Most growth in Sydney will occur to the west and south west of the city. The population of most Local Government Areas along the NSW coast will increase, while the population of most inland areas of NSW will decline.





Note: Population estimates as at 30 June each year. Where a bar does not have a segment for 2028, the number of people in that category is predicted to remain the same by 2028.

Source: ABS estimated residential populations based on 2006 Census counts and population projections from the Transport and Population Data Centre, Department of Planning (HOIST).

4.2 Social determinants

Introduction

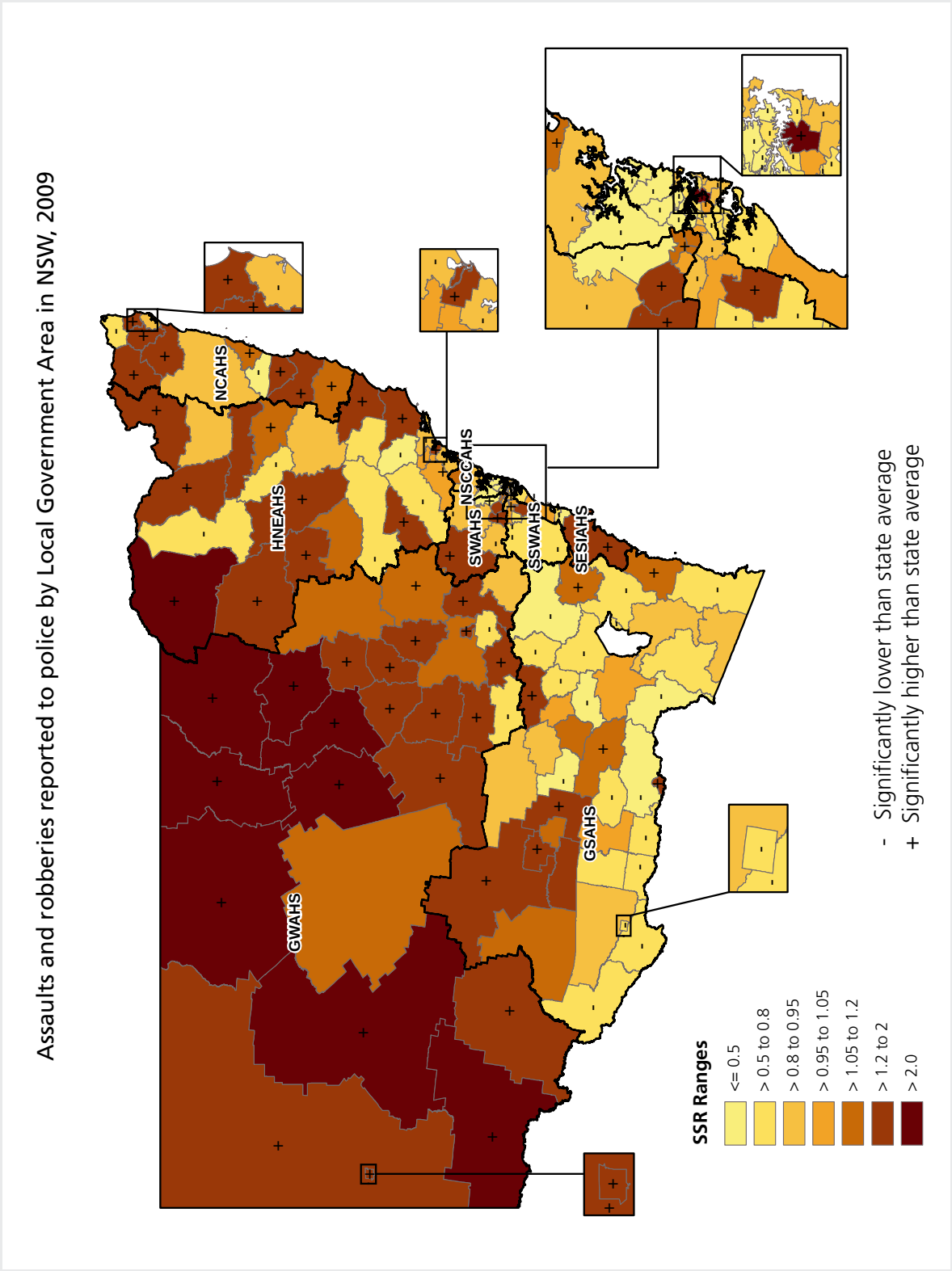
The World Health Organization established the Commission on the Social Determinants of Health in 2005. It outlines what can be done to promote health equity and aims to foster a global movement to achieve it.

This chapter presents data on social and economic factors that are associated with health. These include indicators of household income, income sources, pensions, unemployment rates, family composition, school retention rates, crime rates and social capital. The indicators are based on data from the Australian Bureau of Statistics; the NSW Population Health Survey; the NSW Department of Education and Training; the NSW Bureau of Crime Statistics and Research; and CentreLink.

Low income is one of the main determinants of poverty, which is closely linked to poor health. Average total weekly earnings figures, which are published by the Australian Bureau of Statistics each quarter, provide one measure of income. The averages are calculated based on the total number of employees, not the total population of working age. Changes in the averages may be affected not only by changes in the level of earnings of employees but also by changes in the overall composition of the wage and salary earner segment of the labour force. For example, an increase in the number of part-time employees will generally lower the average.

Key points

- Social factors such as income, socioeconomic status, employment status, educational attainment and crime rates are associated with inequalities in health.
- In NSW in 2007-08, the gross average weekly household income was $1,690 and the average equivalent disposable weekly household income was $821. In NSW in 2006, 12% of households had household weekly incomes of less than $500 per week and 22% of households had household weekly incomes of more than $2,000 per week. Outer regional, remote and very remote areas of NSW had lower average weekly household incomes, with 18% having less than $500 per week and only 9% more than $2,000 per week.
- Among NSW area health services, in 2006, the North Coast Area Health Service (AHS) had the largest proportion of low-income households of less than $500 gross income per week (18%), while the Northern Sydney Central Coast AHS had the lowest proportion (8%) of such households.
- In NSW in 2009, measures of social capital related to safety and social reciprocity were higher in rural compared to urban areas. Social reciprocity was lowest in Sydney South West and Sydney West AHSs. Greater Southern AHS reported the highest proportion of residents (86%) who believed their area had a reputation as a safe place compared to only 66% in Sydney South West AHS. Rates of assault and robbery reported to police by contrast were highest in Greater Western, Hunter New England and North Coast AHSs in 2009.
- Just over 74,500 assaults and robberies and just under 257,000 thefts were recorded in NSW in 2009.
- The proportion of the population receiving income support varied widely among areas. Overall, of those in the eligible age groups in 2010:
  - 68.8% received the age pension
  - 10.6% received disability or sickness benefits
  - 6.6% received unemployment benefits and youth allowance
  - 13.4% of families received parenting payment.
- The unemployment rate has remained relatively steady since 2000, and stood at 6.1% for males and 5.5% for females in December 2009.
- The Year 12 retention rate rose slightly in 2009 to 71.3% and ranged from 66.3% in NSW government schools to 79.4% in non-government schools.
- In 2006, four of the five most socioeconomically disadvantaged local government areas of NSW were in remote or very remote parts of the state (Brewarrina, Central Darling, Walgett and Coonamble). Fairfield Local Government Area, also one of the five most disadvantaged areas, is in south-western Sydney. The five least disadvantaged local government areas were all in metropolitan Sydney: Ku-ring-gai, Mosman, Woollahra, Lane Cove and Baulkham Hills.



Note: Indirect standardisation was used to calculate rate ratios and then Bayesian smoothing was used to calculate the smoothed ratios (see Methods).

Source: Bureau of Crime Statistics and Research, Department of Justice and Attorney General, NSW Government. Lawlink NSW, http://www.lawlink.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/pages/bocsar_onlinequeries [accessed on 28 July, 2010.]

4.3 Environment

Introduction

Factors in the natural and built environment have direct and indirect effects on human health which can be immediate or long-term. In rural areas issues as diverse as land use, agricultural practice, water quality and biodiversity all affect human health. People in urban and built environments are affected by air and water quality, transport choice, urban form and environmental health infrastructure.

The effects on human health of global phenomena such as population growth and climate change are also recognised at a local level. Potential health impacts include direct (eg increasing number of heatwaves and air pollution from bushfires) and indirect (increases in food- and water-borne diseases, increasing prevalence of mosquito-borne diseases from changes to natural ecological systems).

Responsibility for the management of environmental health hazards is deployed across three tiers of government. The Commonwealth and States work cooperatively to set environmental standards for drinking water and air quality. In NSW, the NSW Department of Environment, Climate Control and Water has carriage of legislation governing controls on air and water quality, chemical hazards, and contaminated land. The NSW Department of Health has responsibilities in relation to drinking water; and a variety of infectious hazards linked to premises including *Legionella* in public air conditioning systems, tattooing and the funeral industry.

The NSW Department of Health, Public Health Units in Area Health Services and local government manage these hazards in partnership. The NSW Department of Health also manages statewide programs such as the Aboriginal Environmental Health Program, the NSW Drinking Water Monitoring Program and the Arboviral Disease Program.

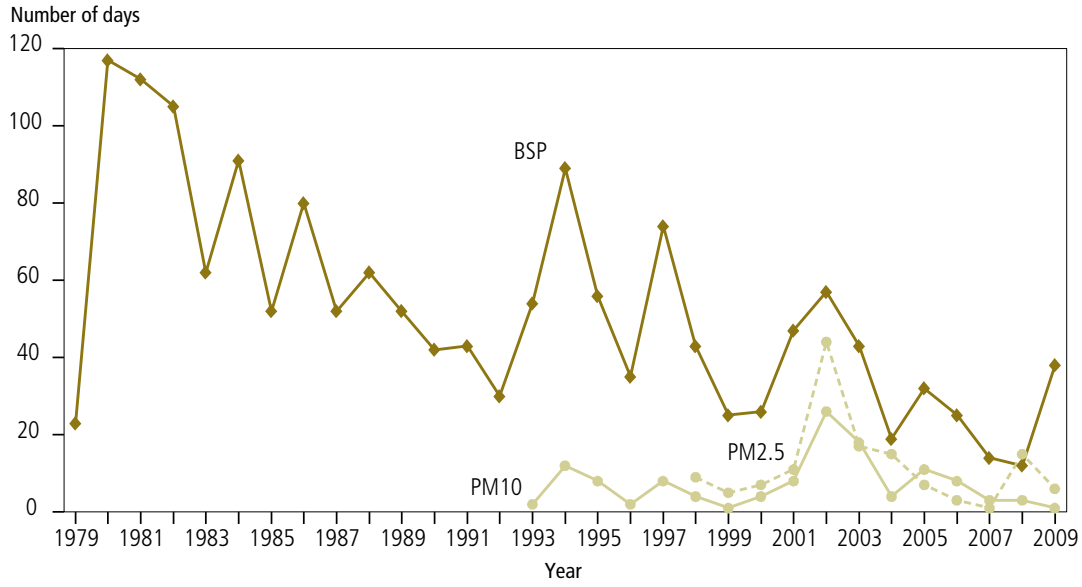
Key Points

- Human health is inextricably linked to the environment.
- The main contributors to air pollution in cities are industry, motor vehicles and wood-burning heaters.

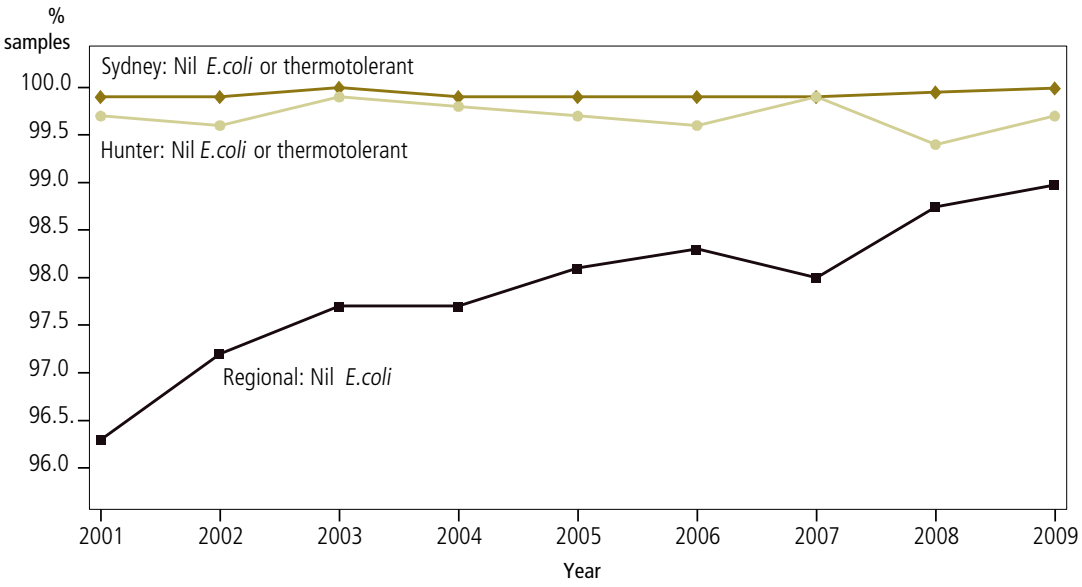
In the last ten years in Sydney:

- Levels of ozone in the air have exceeded permissible levels from 5 to 21 days.
- Levels of particulate air pollution have peaked at the time of bushfires. The 2009 dust storm in Sydney caused extreme levels of particulate pollution for a short duration.
- A range of indicators of the quality of drinking water, and water for recreational use, are monitored continuously. The majority of households in NSW use public water supplies. Recent testing of drinking water indicates that drinking water supplied by the Sydney and Hunter Water Corporations meets Drinking Water Guidelines and is of good quality.
- Overall compliance rate for rural water supplies is high, but results from individual supplies vary substantially
  - the level of fluoride in Sydney and Hunter Water Corporations' drinking water stayed within the required daily limits for the majority of samples tested in 2009. Over three quarters of the samples in rural water supplies met the daily fluoride standards in 2009.
  - tall samples tested for inorganic chemicals (lead, copper, nitrate and nitrites) met the standards in the Sydney and Hunter regions. In the regional water supplies tested, lead was detected at unacceptable levels in 0.7% and copper in 0.1% of samples in 2009.
- Leaded petrol has been the main source of lead exposure for most NSW children, except those living near major sites for lead mining. In recent years blood lead levels among preschool children living in Broken Hill have declined steadily, with 80% of children aged 1 to 4 years tested in 2009 having lead levels below the maximum permissible.
- The Housing for Health program aims to assess, repair, and replace health hardware in Aboriginal residences. Surveys conducted on 357 houses 6-12 months apart identified major improvements in key areas of safety, and facilities such as working showers and laundries, as a result of the program in 2008-09 and 2009-10.
- In 2010, NSW Health published an evaluation of the program that assessed health outcomes from 1998 to 2008. This evaluation provides evidence of a 40% reduction in hospitalisation with infectious diseases among residents of houses that received Housing for Health, compared to the rest of the rural NSW Aboriginal population.

Visibility and atmospheric fine particle standards exceeded in Sydney (number of days), NSW 1979 to 2009



Indicator bacteria counts in drinking water, Sydney, Hunter and regional water supplies, NSW 2001 to 2009



Note: TOP GRAPH: BSP=particles which backscatter light. The NSW standard for visibility is <2.1 BSP units (equivalent to a visibility of 9km). PM10=particulate material less than 10 micrometres in diameter. The National Environment Protection Council's standard for PM10 is 50 micrograms per cubic metre averaged over 24 hours. PM2.5 =particulate material less than 2.5 micrometres in diameter. The advisory reporting standard for PM2.5 is 25 micrograms per cubic metre averaged over 24 hours.
BOTTOM GRAPH: Presence of bacteria *Escherichia coli* (*E. coli*) is the most reliable and specific indicator of recent faecal contamination in drinking water.

Source: TOP GRAPH: NSW Department of Environment, Climate Change and Water. Centre for Epidemiology and Research, NSW Department of Health.
BOTTOM GRAPH: Sydney Water and Hunter Water Corporations (Quarterly Reports) and NSW Health Drinking Water Monitoring Program (Database).

4.4 Health-related behaviours

Introduction

Good health enhances the quality of human life and benefits the community. Conversely, health-related behaviours also contribute significantly to cardiovascular and respiratory diseases, cancer, and other conditions that account for much of the burden of morbidity and mortality in later life.

Measuring and reporting on health behaviours provides important information for planning public health programs and for evaluation, at the macro level, of the net gains of these programs. The health behaviours described in this chapter include: physical activity, fruit and vegetable consumption, overweight and obesity, sun protection, smoking, and alcohol and illicit drug use.

Two of the measures of success in the *NSW State Plan* are: a reduction in avoidable hospital admissions of older people and people with chronic illnesses; and a reduction in smoking rates, unhealthy alcohol consumption, illicit drug use and obesity. Population health action in NSW includes a range of strategies aimed at preventing chronic diseases, with specific initiatives aimed at reducing obesity, tobacco smoking, alcohol misuse, illicit drug use and preventing chronic diseases in Aboriginal communities.

Childhood obesity prevention initiatives aim to promote healthy eating and physical activity among children. *Live Life Well @ School*, a range of programs in NSW Government primary schools and *Munch and Move*, a program in preschools, will help prevent children from becoming overweight later in life by creating good habits while they are young. *Go for 2&5* fruit and vegetable campaign targets adults aged 20-50 years and *Get healthy* is a free coaching service which aims to support NSW adults with healthy eating, physical activity and maintaining healthy weight.

With legislation now banning smoking in enclosed public places in New South Wales, other amendments to the Public Health Act 1991 included banning smoking in a car when a child is present and banning the display of tobacco products at point of sale. These initiatives have further strengthened measures to prevent young people from taking up smoking. *The NSW Health Drug and Alcohol Health Promotion Plan* details initiatives to reduce the problems caused by drug and alcohol use,including: prevention (such as the responsible drinking campaign, 'What are you doing to yourself?'); brief and early intervention; and treatment and extended care.

This chapter includes information from the NSW Population Health Surveys conducted between 1997 and 2009 and covering both children and adults in NSW; Australian Bureau of Statistics (ABS) National Health Surveys; the NSW School Students Health Behaviours Surveys for 1993 to 2007 (formerly the Australian Secondary School Students' Surveys); the NSW Department of Health Admitted Patient Data Collection; and ABS mortality data.

Key points

- Unhealthy behaviours contribute significantly to the burden of death and ill-health in NSW. For example:
  - smoking causes more than 5,200 deaths and just over 44,000 hospitalisations per year
  - alcohol causes more than 1,220 deaths and just under 48,000 hospitalisations each year.

- Unhealthy behaviours affect people of all ages

- Among adults in 2009:
  - 20% of men and 14% of women are current smokers
  - 60% of men and 45% of women are overweight or obese

while only:

  - 61% of men and 50% of women are adequately physically active
  - 53% of men and 61% of women eat adequate quantities of fruit
  - 8% of men and 13% of women eat adequate quantities of vegetables.

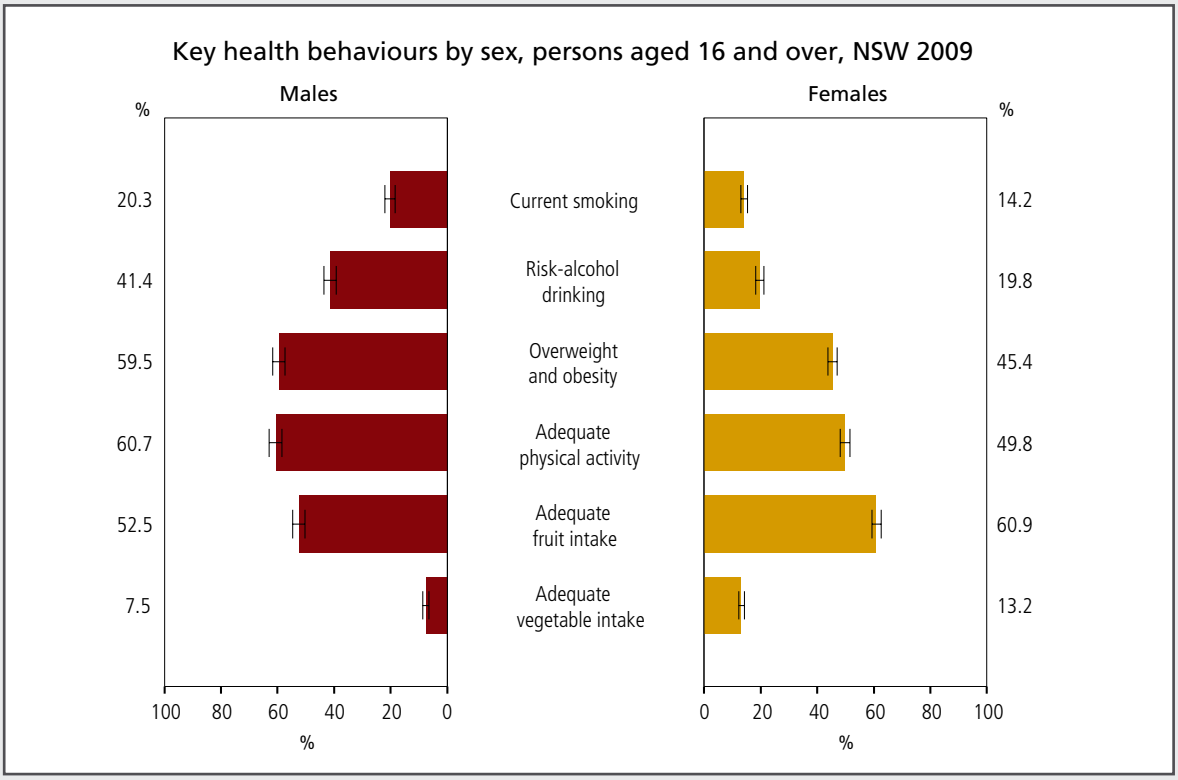
- Of secondary school students aged 12-17 years in 2008:
  - 7% of boys and 8% of girls smoked in the previous week
  - 21% of boys and 20% of girls consumed alcohol in the previous week
  - 26% of boys and 15% of girls were overweight or obese
  - 13% of boys and 12% of girls have used cannabis at least once

and only:

  - 33% of boys and 17% of girls wear a hat in the sun
  - 34% of boys and 53% of girls usually use sunscreen.

- Among children aged 2 to 15 years in 2007 to 2008:
  - 71% eat adequate quantities of fruit
  - 42% eat adequate quantities of vegetables.

- Encouragingly, though:
  - smoking rates have been consistently declining among both men and women since 1977
  - in 2009, for both sexes, the number of ex-smokers was greater than the number of current smokers
  - there has been a slight increase in the proportion of adults undertaking adequate physical activity over the last five years
  - the proportion of children consuming the recommended daily vegetable intake increased significantly between 2001-2002 and 2007-2008
  - the proportion of adults reporting risk drinking behaviour has decreased since 1997
  - the death rate from heroin overdose has declined steeply since 1999.



Note:

Smoking: Estimates are based on 10,730 respondents in NSW. For this indicator 16 (0.15%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who smoked daily or occasionally.

Risk alcohol: Estimates are based on 10,638 respondents in NSW. For this indicator 81 (0.76%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who exceed Guideline 1 of the 2009 NHMRC Australian Alcohol Guidelines and drink more that 2 standard drinks of alcohol on any day.

Overweight or obesity: Estimates are based on 10,072 respondents in NSW. For this indicator 459 (4.36%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who are overweight or obese ie with a Body Mass Index (BMI) of 25 or higher.

Fruit intake: Estimates are based on 10,614 respondents in NSW. For this indicator 105 (0.98%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who met the recommended fruit consumption of 2 serves a day for people aged 16 years and over. One serve is equivalent to one medium piece or 2 small pieces of fruit.

Vegetable intake: Estimates are based on 10,475 respondents in NSW. For this indicator 244 (2.28%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who met the recommended consumption of 5 serves per day of vegetables for persons aged 16 years and over. One serve is equivalent to 1/2 cup of cooked vegetables or one cup of salad vegetables.

Physical activity: Estimates are based on 9,984 respondents in NSW. For this indicator 381 (3.68%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who did adequate physical activity. Adequate physical activity is a total of 150 minutes per week on 5 separate occasions.

Source: NSW Population Health Survey. Centre for Epidemiology and Research, NSW Department of Health.

Burden of disease

Burden of disease: section review 59

5.1 Burden of disease 60

Burden of disease: section review

This section contains indicators which describe the overall health status of the NSW population. The indicators compare the relative burden of death and illness for different diseases in males and females in NSW. The section includes international comparisons of the health of the Australian population.

In this report, the Burden of disease section includes international life expectancy rankings, a comparison of disability-adjusted life years for different diseases, as well as age and sex-specific charts of the major causes of hospitalisation and death in NSW.

The following indicators of the burden of disease are also included in the e-CHO for NSW as a whole, as well as selected indicators by the 8 NSW Area Health Services, 37 Divisions of General Practice and the 153 Local Government Areas:

- Trends in life expectancy at birth and at 65 years
- Trends in deaths from all causes and by category of cause
- Trends in premature and potentially avoidable deaths
- Trends in infant deaths
- Trends in all hospitalisations with projections to 2019
- Hospitalisations by category of cause
- Self-rated health status by age and sex
- Disability adjusted life years by category of cause and by risk factor and sex
- Hospitalisations for ambulatory care sensitive conditions
- International health comparisons of life expectancy, infant mortality and obesity
- Hospitalisations for dementia, musculoskeletal conditions and dialysis.

e-CHO

A detailed description of the content of the on-line, electronic version of *The health of the people of New South Wales – Report of the Chief Health Officer* can be found at **http://www.health.nsw.gov.au/publichealth/chorep/**

5.1 Burden of disease

Introduction

Burden of disease refers to the health burden that diseases, injuries and risk factors place on populations. Traditional indicators used to quantify the burden of disease include life expectancy, mortality and hospitalisations, and show the contribution of various diseases, injuries and risk factors to the loss of life and disability in the population. The major limitation of using this is that the impact of conditions which cause substantial suffering or disability that do not result in death or hospitalisation is underestimated. The global burden of disease approach aims to address this limitation, by using a summary health gap measure called the 'disability-adjusted life year' (DALY).

The DALY aims to quantify the amount of full health lost due to disease or injury occurring in a particular period. It is calculated as the sum of the years of life lost due to premature death in the population, and the equivalent years of 'healthy' life lost due to poor health or disability. A discounting factor, which reflects the greater importance people place on the loss of health in the near future compared with the distant future, is also incorporated into the calculation.

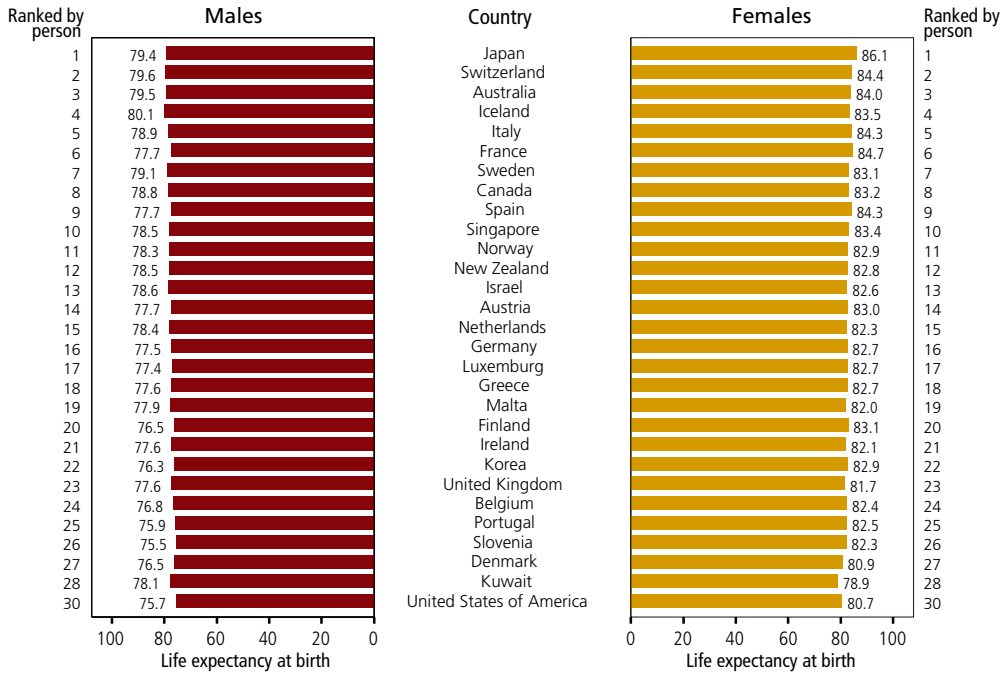
The study *The burden of disease and injury in Australia, 2003* calculated total and age and sex-specific DALYs for 176 diseases, injuries and risk factors, is a complete assessment of the burden of disease in the Australian population. The DALYs for NSW and Australia are presented in this report.

Other non-DALY measures of the overall burden of disease and injury in NSW used in this chapter are: potentially avoidable mortality and ambulatory care sensitive conditions. Potentially avoidable mortality refers to premature deaths (persons aged less than 75 years) from conditions considered preventable or avoidable through earlier intervention or action by the health and related sectors. Ambulatory care sensitive conditions are those for which hospitalisation could be avoided through preventive care and early disease management, usually delivered in an ambulatory setting, such as primary health care. For more information on methods used to calculate these measures see Appendix 2 – Methods.

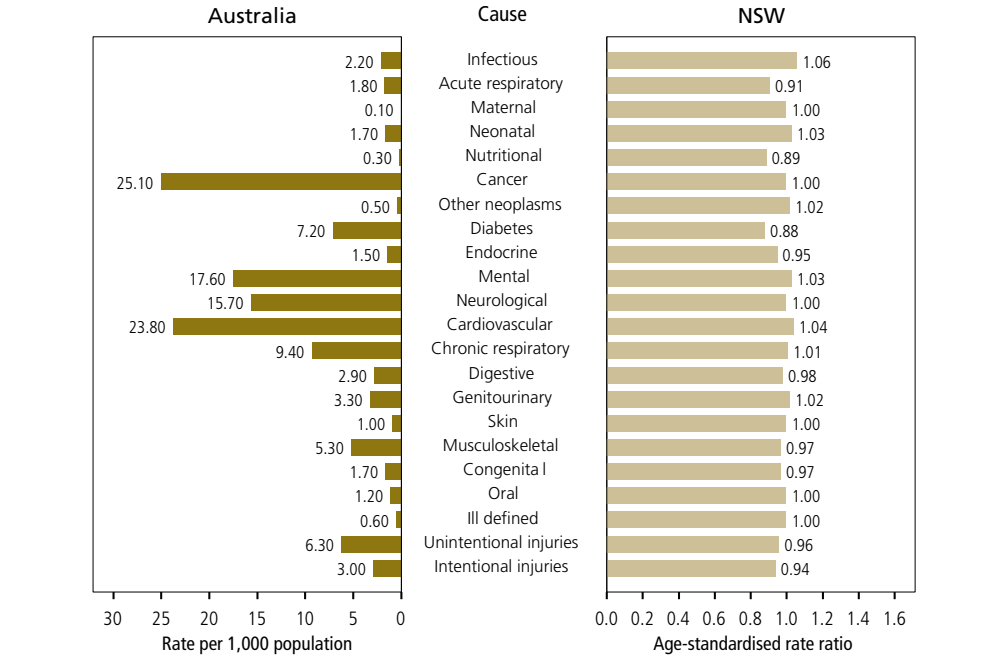
Key Points

- Life expectancy in NSW continues to increase. In 2007:
  - Newborn males could expect to live for 79.8 years, while newborn females could expect to live for 84.4 years
  - Men who have reached age 65 years could expect to live to 84.0 years of age, while women who have reached age 65 could expect to live to 87.2 years of age
  - Although females can still expect to live longer than males, the difference between the sexes is decreasing.
- Australia has the third highest life expectancy in the world.
- The age standardised death rate in NSW has more than halved in the last 35 years. The male death rate was 48% higher than the female rate in 2007.
- In 2007, more than one-third of premature deaths were classified as avoidable. The avoidable deaths rate has more than halved in the last 20 years.
- In 2008, the infant mortality rate was 4.4 per 1,000 live births in NSW and 4.1 per 1,000 live births in Australia. In 2007, Australia's infant mortality rate ranked 20th (compared with the best) among other developed countries.
- Hospital separation rates have increased by more than 47% over the last twenty years, but under 14% over the last 10 years. Rates have been consistently higher in females, but the gap is narrowing. In 2008-09 the most common causes of hospital separations were: factors influencing health (dialysis), factors influencing health (other), injury and poisoning, digestive system diseases and maternal conditions.
- Over three-quarters of adult NSW residents rated their health as 'good' or better in 2009. Almost one-half of NSW children were reported to enjoy 'excellent' health in 2007-08.
- The disease burden (measured by disability adjusted life years) was greater in NSW than in Australia from infectious disease, neonatal causes, non-cancerous tumours, mental conditions, cardiovascular, chronic respiratory and genitourinary diseases.
- Ambulatory care sensitive hospitalisation separation rates have increased by less than 10% over the last 20 years. There were over 22,000 hospital separations for knee and hip replacement in NSW in 2008-09, and just over 80% of those were due to osteoarthritis.

Life expectancy in the 30 highest ranking selected WHO countries by sex, 2008

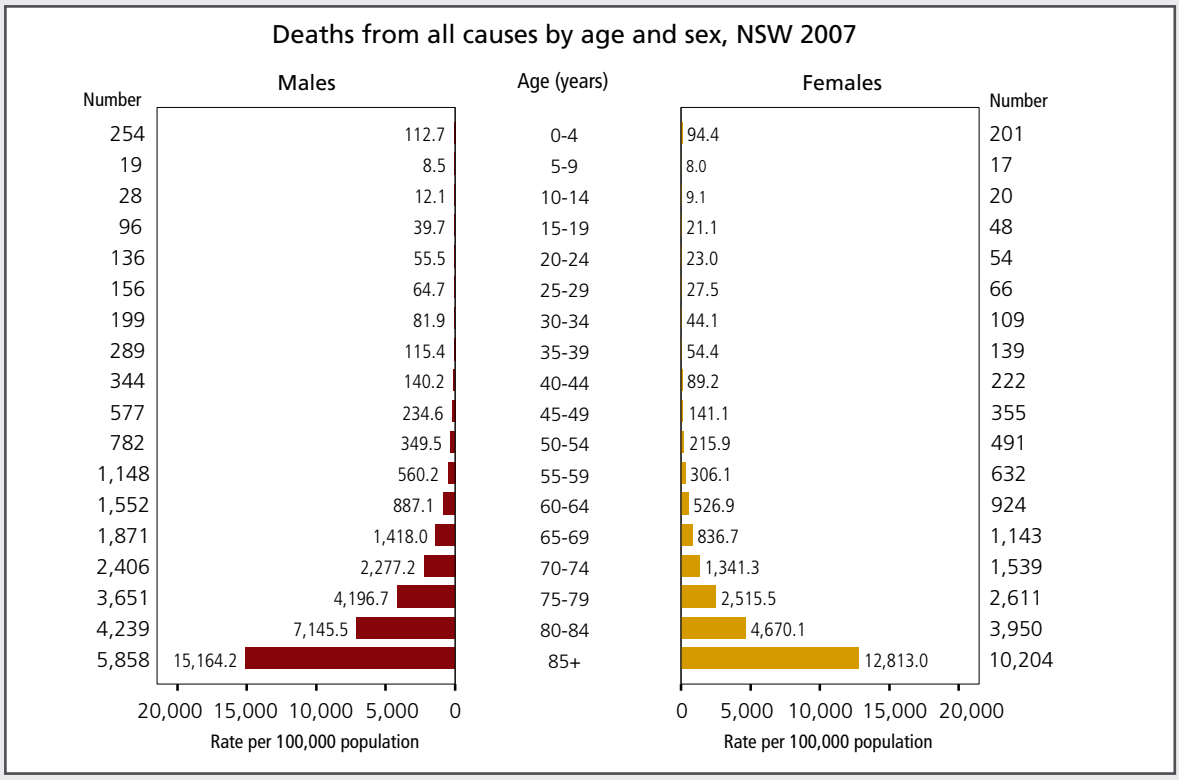


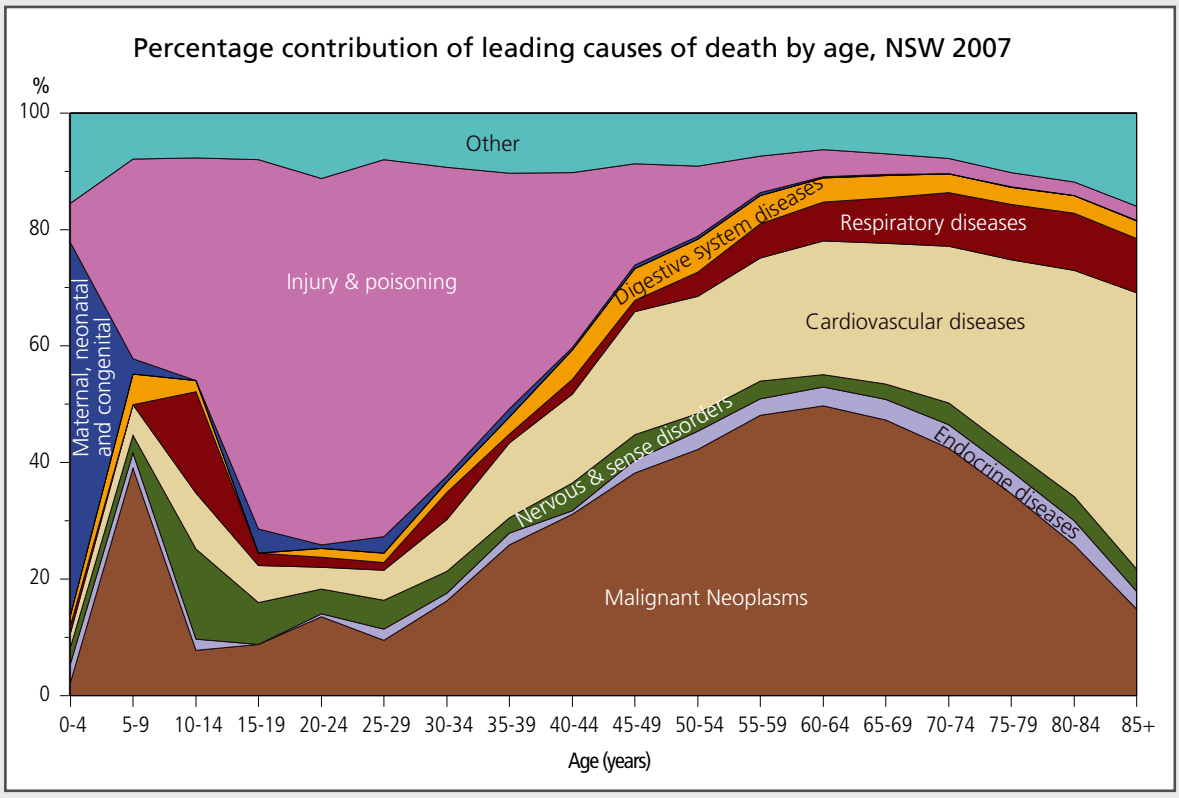
Disability adjusted life years (DALYs) by category of cause, Australia and NSW, 2003



Note: TOP GRAPH: Only WHO countries are included. Hong Kong and Taiwan, both with high self reported life expectancy, are not included.
BOTTOM GRAPH: The measure of burden of disease is DALY = disability adjusted life years. The DALY measures healthy years of life lost due to a disabling health state or death before a specified age. Age – Satandardise rate ready = NSW rate/Australian rate.

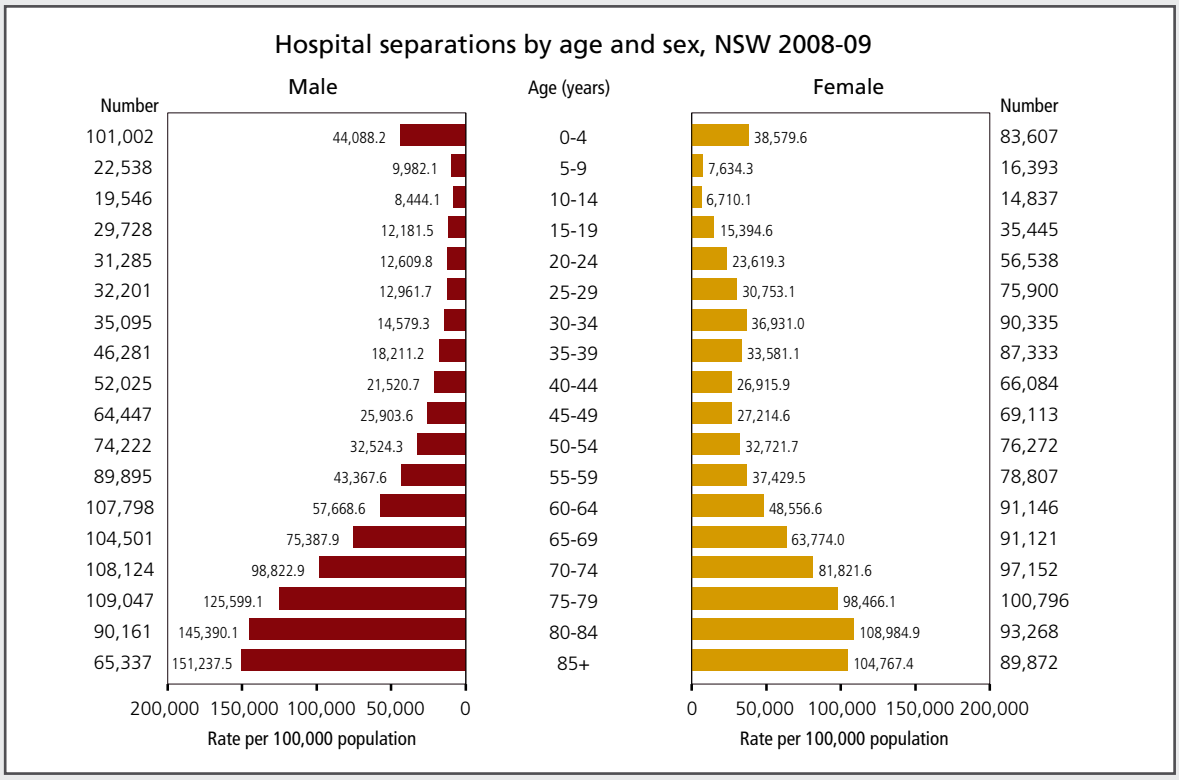
Source: TOP GRAPH: WHO 2008. WHO Statistical information system. Life tables for WHO member states. Geneva: WHO, 2008.
BOTTOM GRAPH: Begg S, Vos T, Barker B. et al. ***The burden of disease and injury in Australia, 2003***. Centre for Epidemiology and Research, NSW Department of Health.

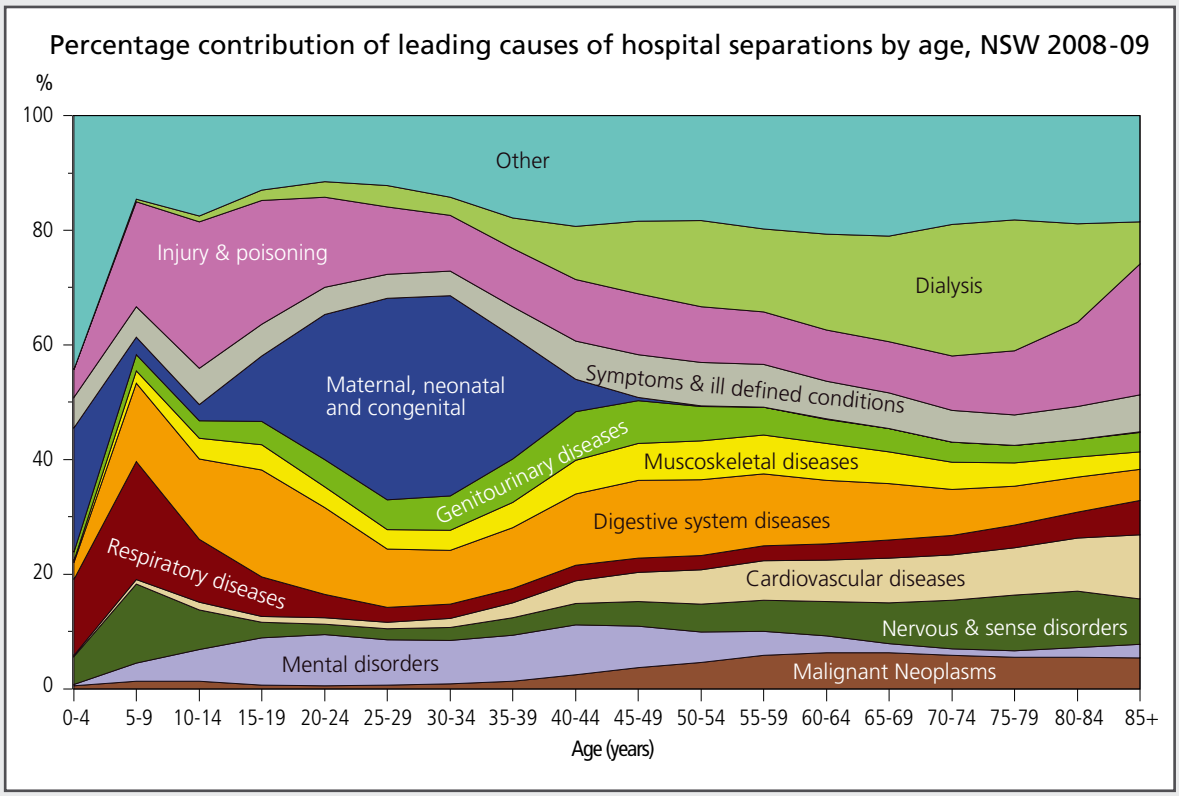




Note: Deaths were classified using ICD-10. Grouping follows ICD-10 categories. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.





Note: Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Health inequalities

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6.2 Country of birth 72

6.3 Rural and remote populations 74

6.4 Socioeconomic status 76

Health inequalities: section review

Introduction

This section focuses on the inequalities in health outcomes and risk factors in subgroups of the NSW population. Poorer health is experienced in NSW in different social, economic, cultural and ethnic groups and in rural and remote areas of NSW. While these subgroups are considered individually in this report, in reality, there is a great degree of correlation between the factors causing poorer health within them, which should be considered in interpreting indicators for any individual subgroup. For example, remote areas of NSW tend to have a lower socioeconomic status and also have a higher proportion of Aboriginal people.

Aboriginal peoples

In this report, the chapter on Aboriginal people covers the distribution of the Aboriginal population in NSW by age and rurality and remoteness based on place of residence, as well as age and sex-specific charts of the major causes of hospitalisation and death of Aboriginal people in NSW.

The following indicators of the health of Aboriginal people in NSW compared wherever possible to that of the non-Aboriginal population, are also included in the e-CHO:

- sex and age distribution
- socioeconomic factors
- life expectancy
- all deaths, avoidable deaths, infant and perinatal deaths
- premature and low birth weight babies and antenatal maternal care
- hospitalisations for all causes and for ambulatory care sensitive conditions
- hospitalisation rates for acute respiratory, skin and gastrointestinal conditions
- interpersonal violence and alcohol attributed trauma
- injuries
- cardiovascular health, diabetes and dialysis
- smoking and cancers
- otitis media and oral health
- substance abuse treatment, mental conditions and suicide and self-harm
- Infant and adult immunisation coverage.

Country of birth

In this report, the chapter on Country of Birth includes indicators of the change in the NSW migrant population over time and deaths and hospitalisations by country of birth.

The following indicators of health status by country of birth are also included in the e-CHO:

- NSW population distribution by country of birth
- income and country of birth for NSW and by Health Area
- fluency in English language among persons born overseas
- premature births and antenatal maternal care
- death rates from all causes
- alcohol use
- prevalence of smoking, overweight and obesity and psychological distress
- diabetes
- heart disease
- cancer
- tuberculosis.

Rural and remote populations

In this report, the chapter on Rural and remote populations describes regional variations in health using an Australia-wide standardised geographical classification of remoteness which categorises Statistical Local Areas into ‘major cities’, ‘inner regional’, ‘outer regional’, ‘remote’ and ‘very remote areas’ on the basis of a score determined by the distance travelled by road to a major service centre (the Accessibility/Remoteness Index of Australia, or ARIA + score). This report features avoidable death rates and hospitalisations for ambulatory care sensitive conditions by ARIA+ category.

The following indicators of the health of rural and remote populations in NSW are also included in the e-CHO:

- population distribution by Aboriginality
- life expectancy by sex
- hospitalisation rates for all conditions and for ambulatory care sensitive conditions
- premature deaths and deaths from motor vehicle crashes and unintentional injuries
- low birth weight and premature babies and antenatal maternal care
- overweight and obesity
- cardiovascular disease and revascularisation procedures
- suicide
- difficulties in obtaining health care
- recent dental treatment, visits to community health centres and emergency departments
- self sufficiency as measured by the proportion of hospitalisations of residents within their Area Health Service

Socioeconomic status

In this report, the chapter on Socioeconomic status describes variations in health status by population-weighted quintiles of socioeconomic status as measured using an Australia-wide standardised Index of Relative Socioeconomic Disadvantage which was developed by the Australian Bureau of Statistics from census data as one of the Socioeconomic Indexes for Areas (SEIFA index). This chapter shows life expectancy and smoking, high risk drinking and overweight and obesity by socioeconomic status.

The following indicators of the health of rural and remote populations in NSW are also included in the e-CHO:

- life expectancy
- premature and avoidable deaths
- hospitalisations for ambulatory care sensitive conditions
- teenage mothers
- selected health risk factors such as overweight and obesity, smoking and risky alcohol drinking.

Other topics

The following chapters are only available in the e-CHO version of the report

The **Refugee health** chapter contains information on migrants arriving under the Humanitarian Program and settling, at least initially, in NSW. The indicators of the health of Refugees in NSW in the e-CHO include:

- demographic information including sex, age, country of birth and the local government area of initial settlement.

The **Prisoner health** chapter describes health status of a particularly disadvantaged social group. Indicators focusing on Aboriginal prisoners and young offenders are also included, in this chapter. The indicators of the health of prisoners in NSW in the e-CHO include:

- prisoner population distribution by age and sex and Aboriginality
- trend in proportion of Aboriginal people in prison population
- prevalence of risk factors among prisoners by age
- prevalence of chronic conditions, mental disorders and communicable diseases in different age groups.

e-CHO: A detailed description of the content of the on-line, electronic version of *The health of the people of New South Wales. Report of the Chief Health Officer* can be found at **http://www.health.nsw.gov.au/publichealth/chorep/**

6.1 Aboriginal peoples

Introduction

The physical and social environments in which people live determine to a large degree whether they live productive lives relatively free of serious illness. This is particularly the case for Aboriginal people, who still suffer disproportionately from some of the consequences of European colonisation, in particular the impact of new infectious and chronic diseases and social dislocation. Many Aboriginal people live today in conditions of clear social and economic disadvantage. These things interact to contribute to poor health in many groups of Aboriginal people.

In 2008, Aboriginal and Torres Strait Islander people comprised 2.2% of the total NSW population. The NSW Aboriginal population is 94.4% Aboriginal only, 3.4% Torres Strait Islander only, and 2.2% both Aboriginal and Torres Strait Islander. In this report all these people are referred to as Aboriginal in recognition of the fact that Aboriginal people are the original inhabitants of NSW.

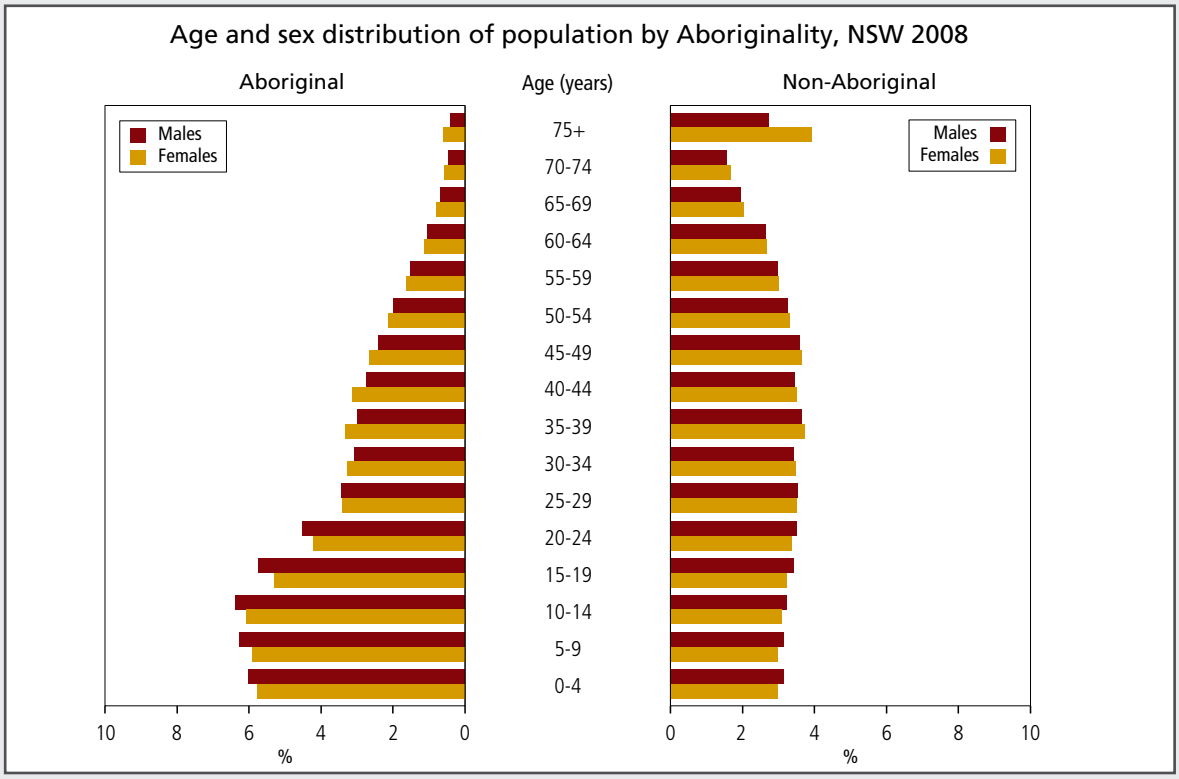
Estimating the size and composition of the Aboriginal population is difficult for a range of reasons, in particular the incomplete and differential identification of Aboriginal people in administrative data collections. The Aboriginal population is generally under-identified in administrative data collections for reasons such as staff reluctance to ask about Aboriginality and Aboriginal people's reluctance to identify as Aboriginal in some circumstances. Identification is usually better in rural and remote regions than in major cities. The Aboriginal population is relatively young, with a median age of 21 years, compared with 36 years for the non-Aboriginal population. As age is closely related to health, care should be taken when comparing information for these two populations, except where rates have been age-adjusted.

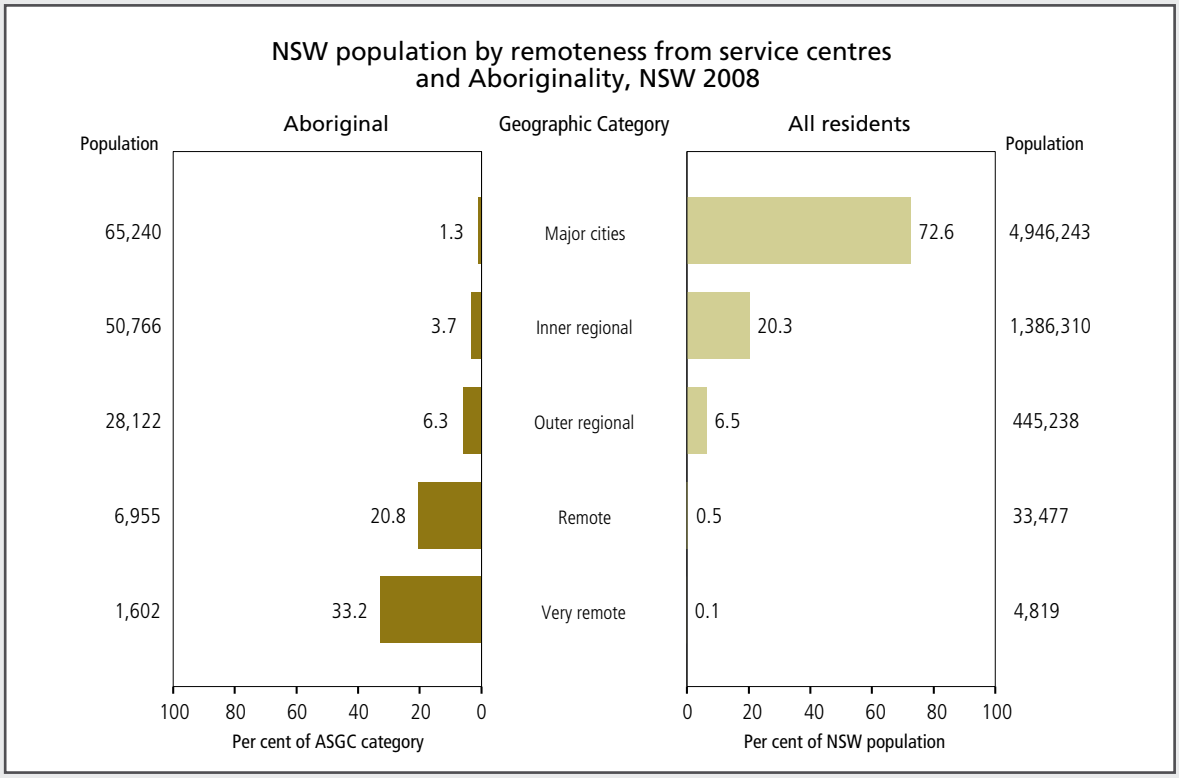
NSW Health is committed to working in partnership with Aboriginal people and other government agencies to improve the health outcomes for Aboriginal people. Two Ways Together, the NSW Aboriginal Affairs Plan 2003–2012, adopts a whole-of-government approach to improve the lives of Aboriginal people.

This chapter presents a selection of health and health-related indicators based on a range of administrative data sources, performance indicators for specific program areas and self-reported survey data.

Key Points

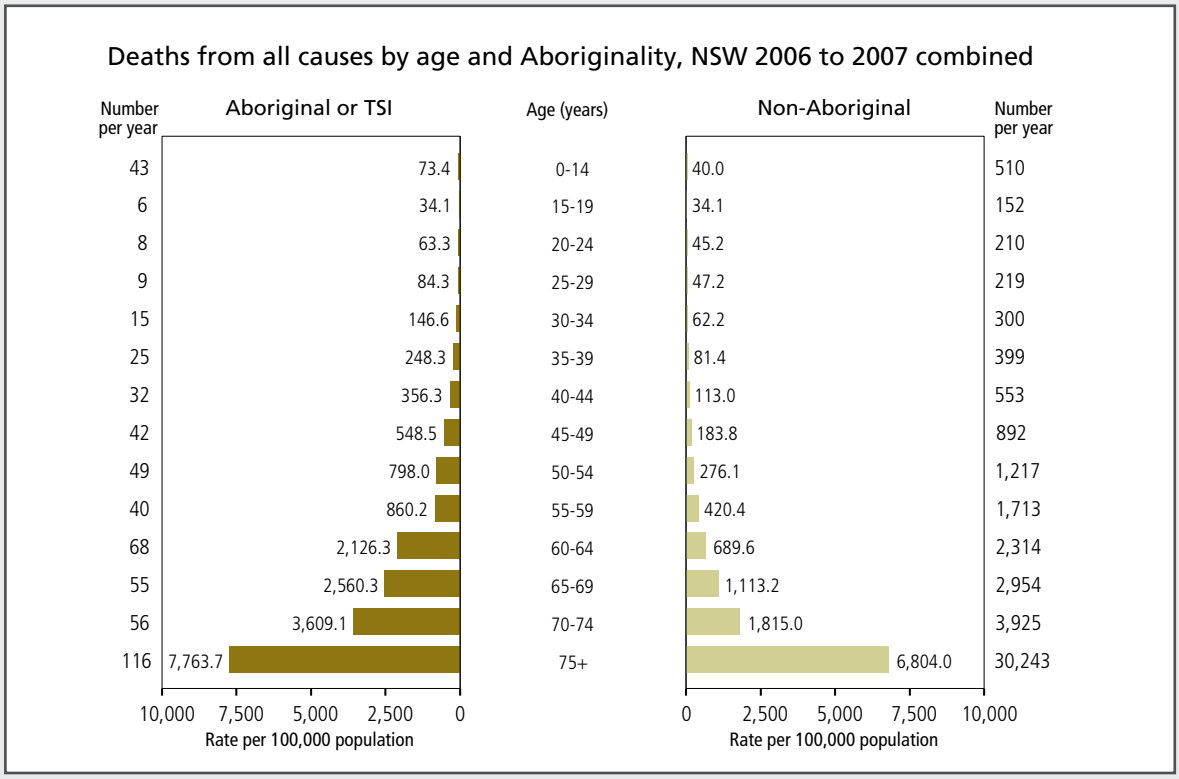
- Around 156,554 Aboriginal people live in NSW making up around 2.2% of the total population and 29% of the total Australian Aboriginal population.
- The relative socioeconomic disadvantage experienced by Aboriginal people in NSW continues to place them at a greater risk of exposure to behavioural and environmental health risk factors.
- The Aboriginal population is younger, with 37% of the population under 15 years of age, compared with 19% of the non-Aboriginal population. The proportion of the Aboriginal population over the age of 65 years is just over 3.5% compared with just over 14% of the non-Aboriginal population.
- Aboriginal people are more likely to die at younger ages. People aged less than 25 years make up around 10% of deaths of Aboriginal people, compared with 2% of deaths among non-Aboriginal people.
- The infant mortality rate for babies born to Aboriginal mothers was 7.7 per 1,000 births, almost twice the rate for NSW babies overall.
- Aboriginal people are more than three times as likely as non-Aboriginal people to die as a result of diabetes and more than 1.5 times as likely to die from injury or poisoning than non-Aboriginal people.
- Aboriginal people are admitted to hospital at about 1.7 times the rate of non-Aboriginal people. Renal dialysis accounts for the largest number of hospitalisations for Aboriginal people.
- Compared with rates for non-Aboriginal people, hospitalisation rates for Aboriginal people in NSW are:
  - 200% higher for diabetes
  - 70% higher for cardiovascular diseases
  - 100% higher for chronic respiratory diseases
  - 60% higher for injury and poisoning.
- Reported rates of current smoking for Aboriginal adults are around double those for the general population across all age groups; while reported rates of risk drinking are around 1.4 times the general population rates across all age groups.

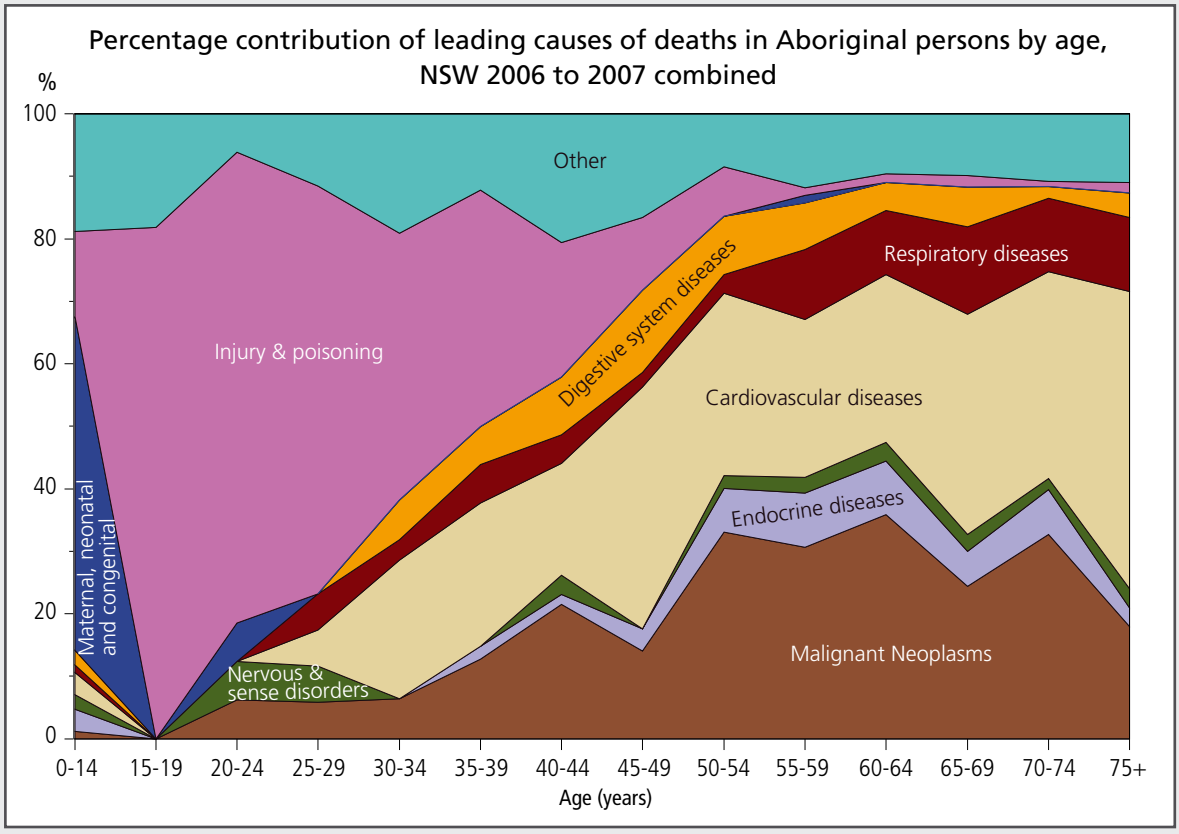




Note: TOP GRAPH: Estimated residential populations based on the 2006 ABS Census of Population and Housing. BOTTOM GRAPH: Statistical Local Areas were grouped according to Australian Standard Geographical Classification (ASGC) Remoteness categories on the basis of Accessibility/Remoteness Index of Australia (ARIA+ version) score. 'Aboriginal' is used here to refer to both Aboriginal and Torres Strait Islander people.

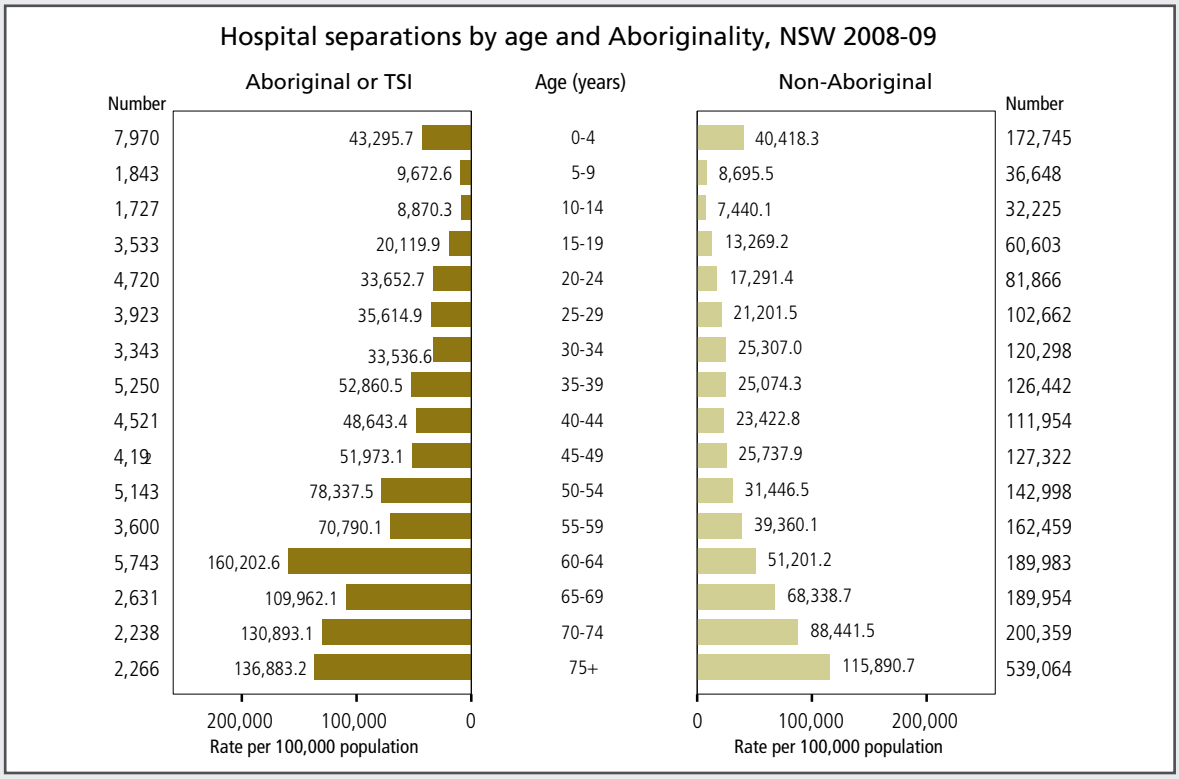
Source: TOP GRAPH: ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: Accessibility/Remoteness Index for Australia (ARIA+ version) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

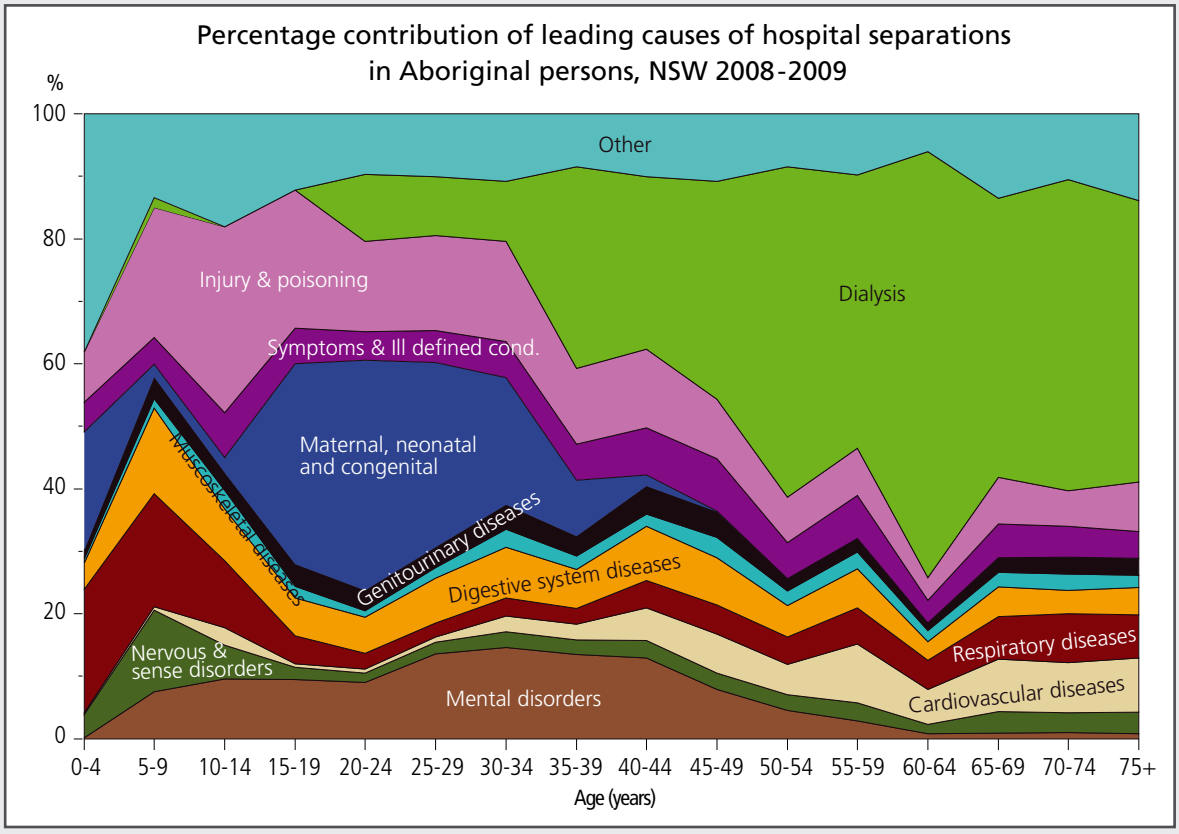




Note: Deaths were classified using ICD-10. Grouping follows ICD-10 categories. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.





Note: Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production. Records where Aboriginal status was not stated were classified as non-Aboriginal.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

6.2 Country of birth

Introduction

In 2006, just under one third (31%) of NSW residents were born overseas and one in four (25%) speaks a language other than English at home. The composition and age structure of the overseas-born population reflects patterns of migration. After World War II, there was a large migration of Europeans to NSW, followed by people from the Middle East, mainly from Turkey, Lebanon, and Egypt. Most recently, migrants have come in large numbers from Asian countries, particularly China, Vietnam, and the Philippines. The net overseas migration (that is, the net gain or loss of population through immigration to Australia and emigration from Australia) into Australia in the 2008-09 financial year was 298,924, of which NSW received the largest share (30%), closely followed by Victoria (27%).

In general, overseas-born residents have better health than Australian-born residents. This reflects the 'healthy migrant effect', whereby people in good health are more likely to meet eligibility criteria, and to be willing and economically able to migrate. However, certain diseases and health risk factors are more prevalent among some country-of-birth groups. This reflects diverse social, economic, environmental, cultural, and genetic influences.

The health experiences and needs of refugees are very different from those of other overseas-born residents of NSW. Experiences of persecution, psychological trauma, disrupted access to health care and other adverse effects of conflict contribute to their health needs. Health issues commonly identified in resettlement countries include psychological problems, injuries due to hostilities or torture, poor oral health, infectious diseases, under-immunisation, conditions related to under-nutrition and developmental issues among children. Refugees are also known to face significant barriers to accessing appropriate health care.

This chapter examines health differentials by country of birth, including information on specific health issues for people of refugee background.

Key points

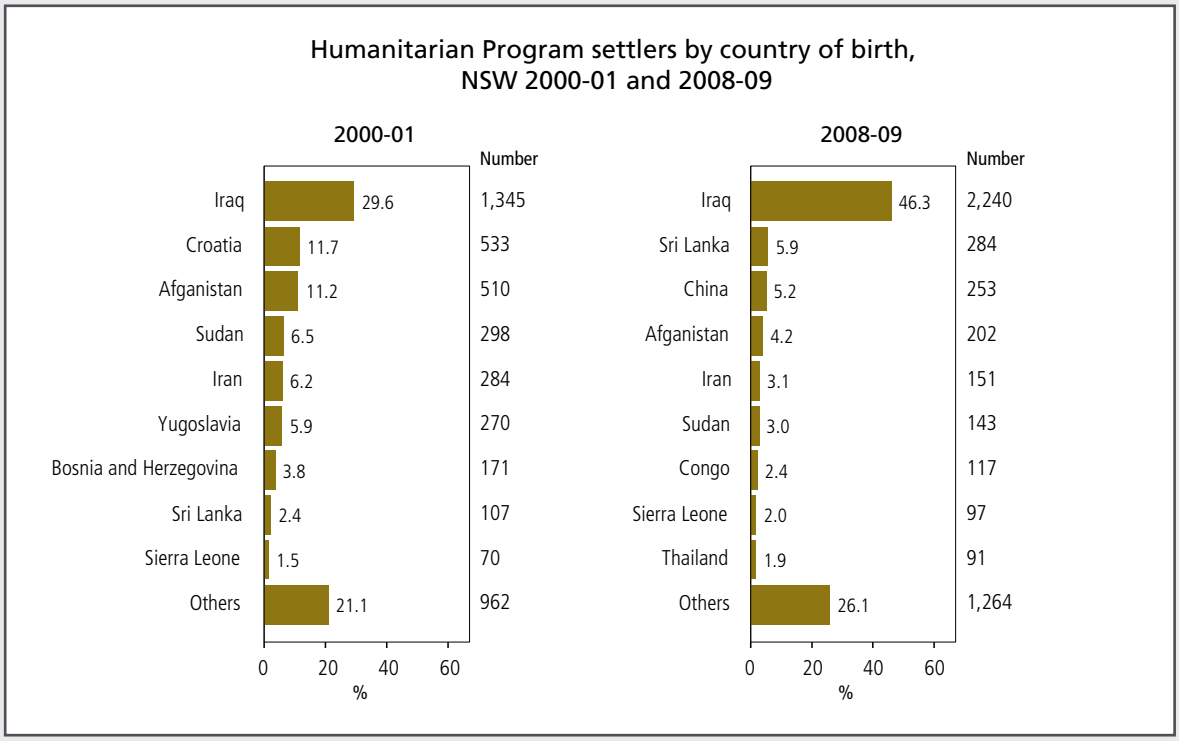
- In 2006, just under one third (31%) of NSW residents were born overseas and around one in four speak a language other than English at home. Resident populations born in India, China and Iraq, all grew by 20% or more between 2001 and 2006, as did populations speaking Hindi, Korean, Chinese, Persian, Assyrian and Tamil languages at home.

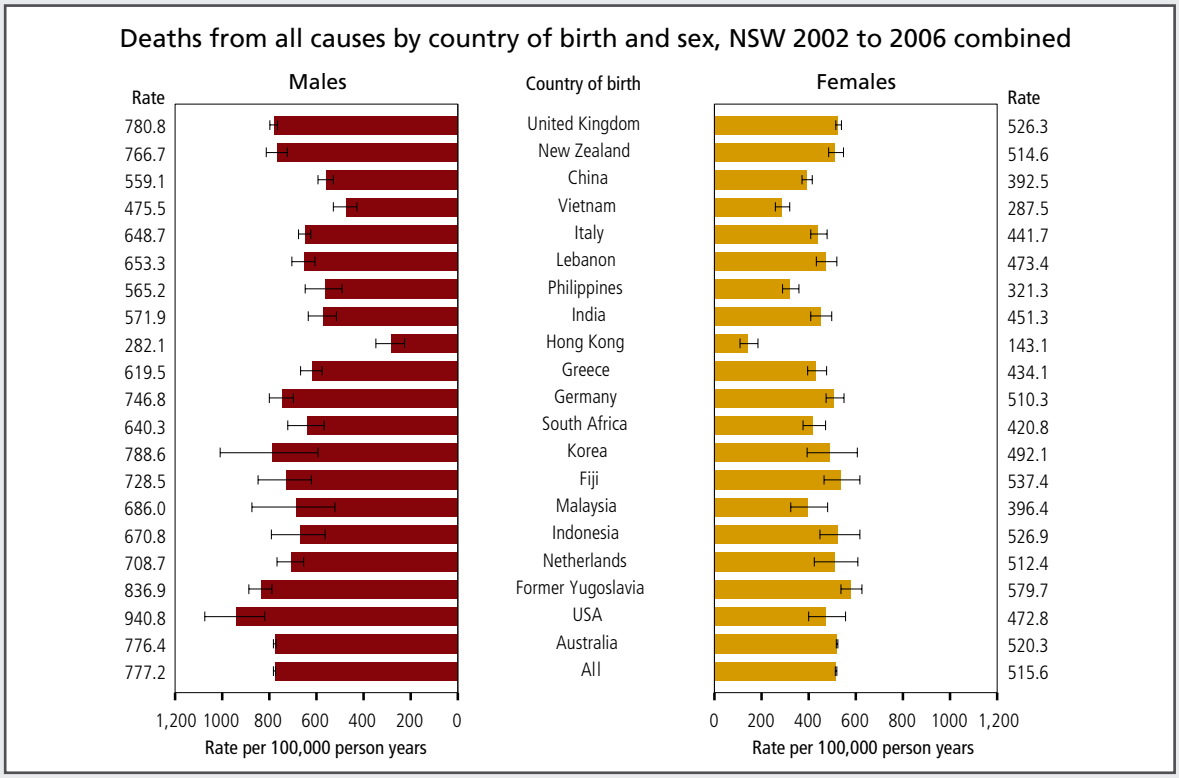
- Overseas-born people generally have good health, but patterns of some health conditions and health risk factors vary with country of birth.

- Compared with the Australian-born, people born in some overseas countries have high rates of:
  - self-reported current smoking (people born in Lebanon)
  - self-reported overweight and obesity (males born in Lebanon; females born in Italy, Lebanon and Greece)
  - self-reported diabetes (people born in Italy, Greece, Germany, Lebanon and United Kingdom) and of hospitalisation for diabetes or its complications (people born in Lebanon and the Philippines)
  - hospitalisation for coronary heart disease (Fiji, Lebanon, Iraq and Sri Lanka) and cardiac revascularisation procedures (Fiji, Lebanon, Iraq, Sri Lanka, Greece, Indonesia, India, and Italy)
  - tuberculosis (India, Vietnam, the Philippines, Indonesia, China, Korea, Hong Kong, Fiji and Malaysia)
  - self-reported psychological distress (people born in Lebanon and Greece).

- Compared with the Australian-born, people born in some overseas countries:
  - are more likely to have premature babies (mothers born in Italy, Fiji, the Philippines and New Zealand)
  - are less likely to have their first antenatal visit before 20 weeks gestation (mothers born in Lebanon, New Zealand, Fiji, Iraq, Pakistan, Korea, China, Indonesia, Vietnam and the Philippines)

- Compared with people born in many overseas countries, people born in Australia:
  - are more likely to have premature babies
  - have high rates of self-reported risk alcohol drinking
  - have high rates of self-reported overweight and obesity.





Note: TOP GRAPH: The Australian Government sets an annual quota of places for refugees and others in refugee-like situations. Yugoslavia denotes the Federal Republic of Yugoslavia, which was the name applied in 2000-01 to the countries presently called Serbia and Montenegro. BOTTOM GRAPH: Rates were age-adjusted using the Australian population as at 30 June 2001. Numbers for 2006 include an estimate of the small numbers of deaths that were registered in 2007, data for which were unavailable at the time of production. LL/UL 95%CI = lower and upper limits of the 95% confidence interval for the point estimate.

Source: TOP GRAPH: The Department of Immigration and Citizenship Settlement Database. Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

6.3 Rural and remote populations

Introduction

Across Australia, people living in rural and remote areas have worse health generally than those living in metropolitan areas. Many factors contribute to this differential, including geographic isolation, socioeconomic disadvantage, shortage of health care providers, lower levels of access to health services, greater exposure to injury risks, and poorer health among Aboriginal people who comprise a significant proportion of the population in rural and remote areas. This chapter explores the effect on health outcomes of living in areas of NSW which are increasingly remote from major service centres.

This chapter presents a range of health indicators for NSW according to the Australian Standard Geographical Classification (ASGC) Remoteness categories as well as NSW Area Health Services. ASGC Remoteness categories were released by the Australian Bureau of Statistics (ABS) and are based on the Accessibility-Remoteness Index of Australia Plus (ARIA+) index, which was developed by the National Key Centre for Social Applications of Geographic Information Systems (GISCA). ARIA+ index values (between 0 and 15) are based on road distance from a locality to the closest service centre in each of five classes of population size. ASGC Remoteness categories are assigned to Census Collection Districts (CDs) on the basis of the average ARIA+ score within the CD. An assessment of remoteness in larger areas (such as Statistical Local Areas or Local Government Areas) can then be made on the basis of the ASGC Remoteness categories allocated to the CDs making up that area, weighted to the population. There are five ASGC Remoteness categorises areas: 'major cities', 'inner regional', 'outer regional', 'remote' and 'very remote'. The term 'rural and remote' is used when referring generally to areas outside 'major cities'.

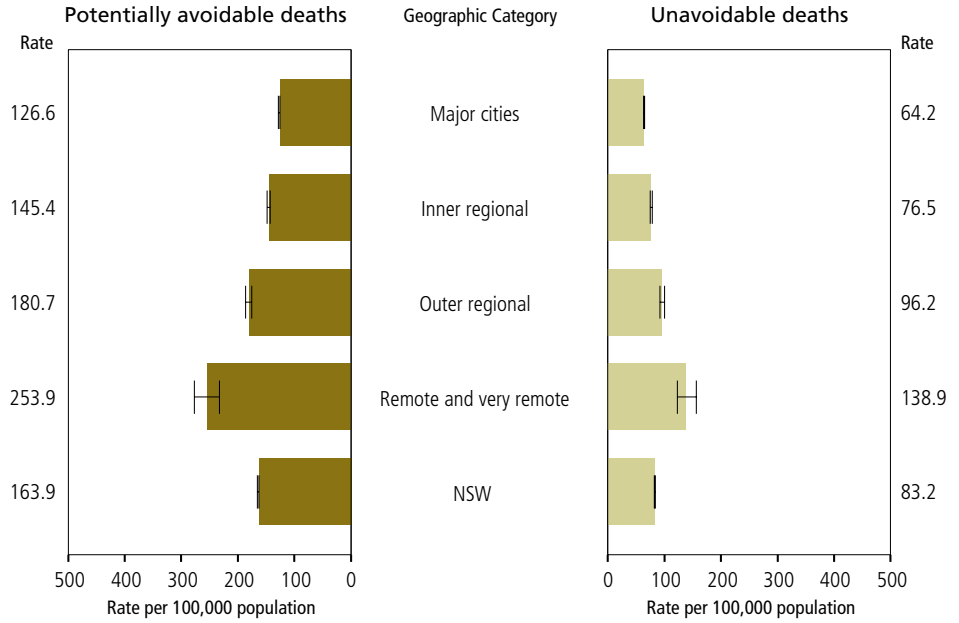
The population of NSW is highly urbanised. An estimated 38,000 people (0.6% of the population) live in areas classified as 'remote' or 'very remote', according to the ASGC categories. Local Government Areas with more than one-third of their area classified as 'remote' or 'very remote' are clustered in the west and northwest of the state. The only Local Government Areas with a significant component in the 'very remote' category are Bourke, Central Darling, Brewarrina and Unincorporated NSW (Unincorporated Far West and Lord Howe Island).

Aboriginal people continue to make up an increasing proportion of the population with increasing remoteness, and comprise just under one-third of the population of 'very remote' areas. However, it is important to also note that only around 6% of the total Aboriginal population in NSW live in 'remote' or 'very remote' areas, with 43% living in 'major cities' in NSW.

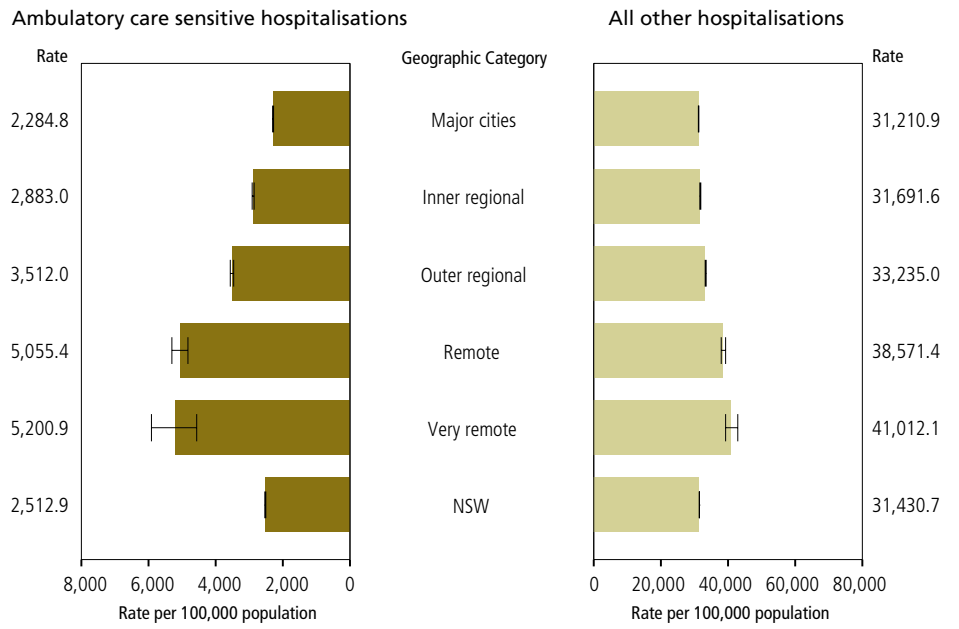
Key Points

- Across Australia, people living in rural and remote areas generally have worse health than those living in cities.
- Reasons for this health differential include geographic isolation, socioeconomic disadvantage, shortage of health care providers, lower levels of access to health services, greater exposure to injury risks, and poor health among Aboriginal people who comprise a significant proportion of the population in rural and remote areas.
- The population of NSW is highly urbanised. Less than 1% of the total population live in areas classified as 'remote' or 'very remote'.
- In 2008 around 38,000 residents in NSW lived in 'remote' or 'very remote' areas of the state and just under a quarter of these (8,600) were Aboriginal. In 'very remote' areas alone Aboriginal people comprise almost one-third of the total population.
- Compared with people who live in 'major cities', people who live in 'remote' or 'very remote' areas:
  - can expect to live about five fewer years in 'remote' areas and eight fewer years in 'very remote' areas
  - are more likely to die prematurely, and from causes classified as 'potentially avoidable'
  - report greater difficulties in getting health care when they need it
  - are more likely to be hospitalised for conditions for which hospitalisation can be avoided through prevention and early management
  - are more likely to be overweight and obese
  - are more likely to die in motor vehicle crashes
  - are more likely to be hospitalised for heart disease.

Potentially avoidable and unavoidable deaths by remoteness from service centres, persons aged under 75 years, NSW 2003 to 2007 combined



Hospitalisations for ambulatory care sensitive and all other conditions by remoteness from service centres, NSW 2008-09



Note: Statistical Local Areas were grouped according to Australian Standard Geographical Classification (ASGC) Remoteness categories on the basis of Accessibility/Remoteness Index for Australia (ARIA+ version) score. TOP GRAPH: Deaths were classified using ICD-10. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production. BOTTOM GRAPH: Hospital separations were classified using ICD-10-AM. Figures include an estimate of the small number of interstate hospitalisations of NSW residents, data for which were unavailable at the time of production. Rates were age-adjusted using the Australian population as at 30 June 2001. LL/UL 95%CI = lower and upper limits of the 95% confidence interval for the point estimate.

Source: TOP GRAPH: Accessibility/Remoteness Index for Australia (ARIA+ version), ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

6.4 Socioeconomic status

Introduction

The health of all Australians has improved enormously over the 20th century, with the life expectancy of both genders increasing by about 20 years over this time. Despite this, health outcomes remain unequally distributed between different socioeconomic subgroups of the NSW population.

There is a well-documented socioeconomic gradient on population health: as socioeconomic disadvantage increases, there is a simultaneous increase in mortality and morbidity from both avoidable and other causes. The health burden in the Australian population attributable to socioeconomic disadvantage is large and much of this burden is potentially avoidable.

The term "socioeconomic position" means the social and economic factors that influence what position individuals and groups hold within society that may have an influence on their health. Individual-level measures of socioeconomic position include occupation, income, assets and education. Group or area-level measures include occupational, educational and economic structure, housing characteristics and indexes of poverty or deprivation.

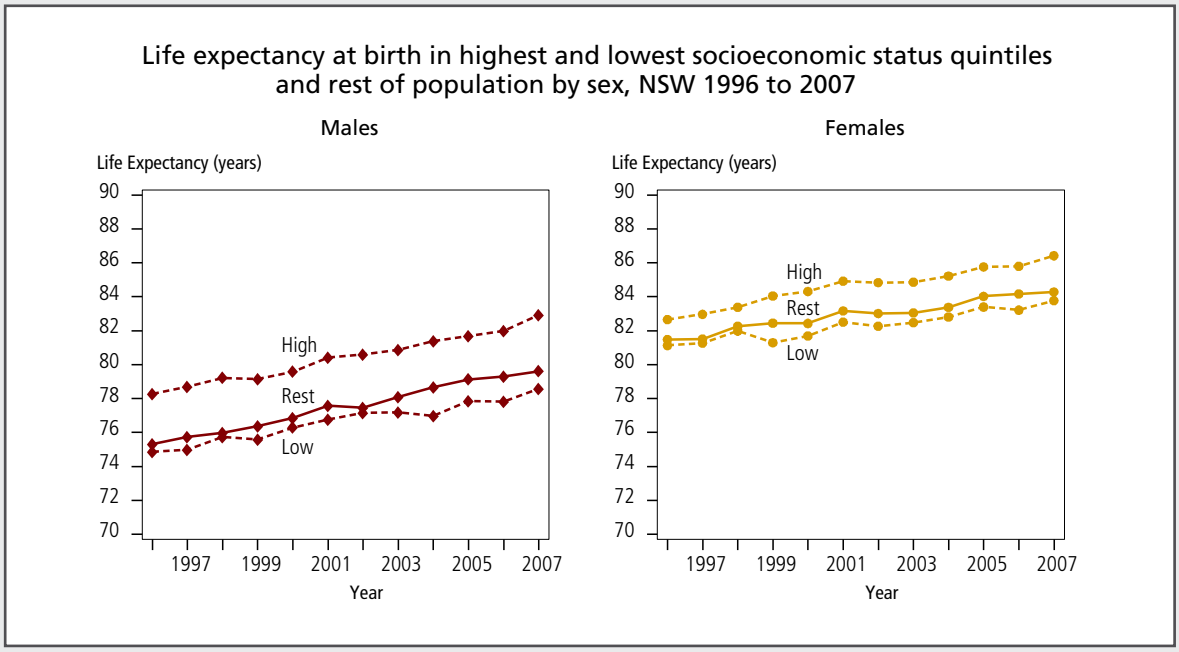
This report uses the Index of Relative Socio-Economic Disadvantage (IRSD), one of four Socio-Economic Indexes for Areas (SEIFA) developed by the Australian Bureau of Statistics based on census data, to measure socioeconomic disadvantage in the NSW population. The IRSD includes the main measures of disadvantage (low income, high unemployment, low levels of education and high levels of unskilled occupations) as well as other measures shown to be associated with disadvantage, such as the proportions of Aboriginal people, persons with low English fluency, and multiple families living in the one house in an area. IRSD scores are assigned to geographic areas rather than individuals, weighted to the population of the area, and ranked for the whole of Australia.

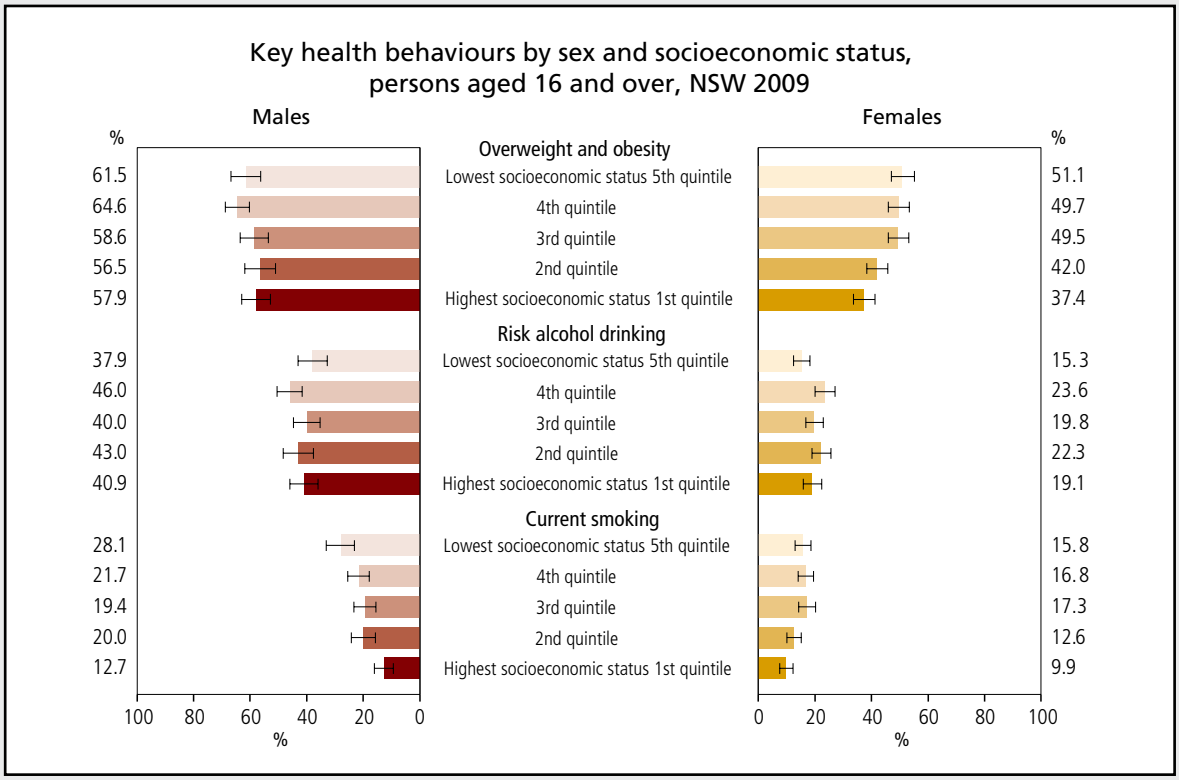
Such an approach means that health outcomes can be compared between areas based on the overall socioeconomic status of areas. A disadvantage is that area scores may hide pockets of disadvantage in larger geographic areas. The IRSD also does not consider other socioeconomic measures which may be important, such as wealth, community infrastructure, or cost of living differences.

This chapter considers differences in trends of a selection of key population health indicators across socioeconomic groups in NSW. Both absolute and relative changes in indicators are presented as each of these measures provides important information for assessing the success of any initiative aiming to reduce inequality.

Key Points

- In NSW and Australia there are differences between socioeconomic groups in many measures of mortality and morbidity, due to differences in the determinants of health (both social and behavioural) between groups and to inequalities in the health system.
- Life expectancy has increased and rates of premature and potentially avoidable deaths have declined among all socioeconomic groups over the past 20 years in NSW.
- In this period life expectancy has remained consistently higher and premature and potentially avoidable death, ambulatory care sensitive hospital separations, and teenage pregnancy rates consistently lower, in the highest socioeconomic group than in the lowest socioeconomic group.
- Smoking and overweight and obesity show a similar pattern of sustained differences between the highest and lowest socioeconomic groups over time.
- Rates of decline in premature and potentially avoidable death have been greatest in the highest socioeconomic quintile for both males and females, resulting in an increasing relative 'gap' between this group and the rest of the population.
- Relative gaps in teenage pregnancy rates increased between all three socioeconomic groups.
- From 2002 to 2009, the relative gap in the prevalence of overweight and obesity was stable for both sexes, while the relative gap in the prevalence of smoking was stable for females but increased for males.





Note: TOP GRAPH: Top graph: Life expectancy was calculated using the method of Chiang (see Methods section). Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production. BOTTOM GRAPH: **Overweight or obesity**: Estimates are based on 10,072 respondents in NSW. For this indicator 459 (4.36%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who are overweight or obese ie with a Body Mass Index (BMI) of 25 or higher. **Risk alcohol:** Estimates are based on 10,638 respondents in NSW. For this indicator 81 (0.76%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who exceed Guideline 1 of the 2009 NHMRC Australian Alcohol Guidelines drink more that 2 standard drinks of alcohol on any day. **Smoking**: Estimates are based on 10,730 respondents in NSW. For this indicator 16 (0.15%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who smoked daily or occasionally.

Source: TOP GRAPH: ABS Socio-Economic Indices for Areas, ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: NSW Population Health Survey. Centre for Epidemiology and Research, NSW Department of Health.

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Health priority areas: section review

Health priority areas cover the major causes of ill health and premature death in NSW and in Australia, including: cardiovascular disease, diabetes mellitus, cancer, respiratory diseases, injury and poisoning and mental health. Other priority areas included in this section are oral health, pregnancy and the newborn period and communicable diseases in recognition of both the impact that these issues have on the health of populations and the need for sustained effort in prevention in order to maintain good population outcomes.

Cardiovascular disease

In this report, the chapter on Cardiovascular disease covers trends in surgical procedures as well as age and sex-specific charts of the major causes of hospitalisation and death from cardiovascular conditions NSW.

The following indicators on cardiovascular disease, as a whole as well as on selected conditions separately, in NSW are also included in the e-CHO:

- Trends in deaths and hospitalisations with projections to 2018
- Deaths by Area Health Service and by Local Government Area
- Trends in deaths and hospitalisations for specific conditions (coronary heart disease, stroke, peripheral vascular disease and heart failure)
- Trends in hospitalisations for acute coronary syndrome
- Trends in procedures for cardiovascular diseases and in deaths and hospitalisations for aortic aneurysms and dissections.

Diabetes

In this report, the chapter on Diabetes mellitus focuses on diabetes prevalence by age as well as age and sex-specific charts of hospitalisations and deaths from different types of diabetes in NSW.

The following indicators on diabetes are also included in the e-CHO:

- Diabetes prevalence and incidence
- Risk factors for diabetes
- Diabetes management
- Diabetes-related deaths
- Hospitalisations for diabetes by type of diabetes
- Amputations due to diabetes by site of surgery
- Persons hospitalised for diabetes and dialysis
- Diabetes and dialysis in the Aboriginal population and by country of birth.

Cancer

In this report, the chapter on Cancer shows cancer survival and prevalence as well as age and sex-specific charts of the causes of death and new cases (incidence) of cancer.

The following indicators on cancer are also included in the e-CHO:

- Trends in deaths and incidence of all cancer with projections
- Cancer deaths, incidence and survival by leading type of cancer
- Trends in deaths and incidence for lung, breast, colorectal, prostate and cervical cancers and melanoma
- Incidence of lung, breast, colorectal, prostate cancers and melanoma by Health Area and by Divisions of General Practice
- Screening rates for breast, cervical and colorectal cancers.

Respiratory disease

In this report, the chapter on Respiratory disease shows asthma prevalence, hospitalisations for influenza and pneumonia, as well as age and sex-specific charts of causes of death and hospitalisation for respiratory disease.

The following indicators on respiratory disease are also included in the e-CHO:

- Prevalence of asthma by age
- Trends in deaths and hospitalisations from asthma and chronic obstructive pulmonary disease (COPD) and Area Health Service for the latest year
- Deaths and hospitalisations by leading respiratory diseases and sex
- Hospitalisations for tuberculosis, asbestosis and other pneumoconioses, influenza and pneumonia
- Incidence of mesothelioma.

Injury and poisoning

In this report, the chapter on Injury and poisoning shows a map of fall-related injury in older people by Local

Government Area as well as age and sex-specific charts of the causes of death and hospitalisation from injury and poisoning.

The following indicators on injury and poisoning are also included in the e-CHO:

- Trends in deaths from injury and poisoning as an under-lying and associated cause with projections to 2018
- Trends in hospitalisations for injury and poisoning as principal reason for hospitalisation and as a comorbidity with projections by sex
- Leading causes of injury and poisoning death and hospitalisation
- Trends in injury death and hospitalisation due to motor vehicle transport (by road user type), alcohol, falls, drowning, interpersonal violence, firearms (by intent), burns and scalds, sport and leisure, and work-related.

Mental health

In this report, the chapter on Mental health shows the burden of psychological distress in the general community and among secondary school students in NSW.

The following indicators on mental health are also included in the e-CHO:

- Deaths and hospitalisations by leading mental and behavioural disorders
- Psychological distress and high psychological distress in adults by Area Health Service
- Trends in attention deficit disorder treatment with stimulant medication
- Trends in suicide and hospitalisations for self-harm.

Oral health

In this report, the chapter on Oral health shows the oral health status of the NSW population as well as Area Health Service differences in hospitalisations for removal or restoration of teeth associated with dental decay.

The following indicators on oral health are also included in the e-CHO:

- Dental status in adults and in children
- Dental visits and treatment in adults and in children
- Trends in removal or restoration of teeth for dental decay in adults and in children by age, by sex and by AHS.
- Fluoridation of drinking water by Area Health Service and Local Government Area and attitudes to water fluoridation
- Trends in deaths and incidence of oral cancer.

Pregnancy and the newborn period

In this report, the chapter on Pregnancy and the newborn period shows trends in fertility and births by the age of the mother and premature and low birth weight babies.

The following indicators on pregnancy and the newborn period are also included in the e-CHO:

- Trends in fertility and births by age of the mother
- Birth and fertility rates by Area Health Service
- Maternal and perinatal deaths
- Trends in folate supplementation in pregnancy
- Prenatal diagnostic procedures
- First maternal antenatal visit by gestational age
- Low birth weight and premature babies
- Sleeping position of babies
- Hospitalisations for special neonatal care and neonatal intensive care and congenital abnormalities
- Maps of smoking in pregnancy and antenatal care by Local Government Area.

Communicable diseases

In this report, the chapter on Communicable diseases shows age and sex-specific charts of the causes of notifications of communicable diseases in NSW and also charts showing emergency department visits for H1N1 influenza during the pandemic in 2009.

The following indicators on communicable diseases are also included in the e-CHO:

- Immunisation in children, in adults and by Aboriginality
- Trends in notifications, hospitalisations and deaths, including analyses by Area Health Service for selected diseases. The following communicable diseases are analysed in detail: measles, pertussis , chickenpox, rubella, pneumococcal disease, gonorrhoea, chlamydia, infectious syphilis, HIV and AIDS, HIV and hepatitis C prevalence in injecting drug users, hepatitis A, B and C, meningococcal disease, salmonellosis, Ross River and Barmah Forest virus infections, tuberculosis, Q fever and Legionnaires disease.

7.1 Cardiovascular disease

Introduction

Cardiovascular (or circulatory) diseases comprise all diseases of the heart and blood vessels. Among these diseases, the four types responsible for the most deaths in NSW are: coronary heart disease (or ischaemic heart disease), stroke (or cerebrovascular disease), heart failure, and peripheral vascular disease. Other common causes of mortality are cardiac arrhythmias (most notably atrial fibrillation), heart valve disorders, non-ischaemic cardiomyopathies, pulmonary embolism, and hypertensive renal and heart disease. Other significant causes of morbidity are hypertension, deep vein thrombosis, haemorrhoids and varicose veins.

Cardiovascular diseases accounted for 18% of the total disease burden in Australia in 2003, second only to cancers. In 2008, cardiovascular diseases accounted for 48,456 (34%) of all deaths in Australia, more than any other group of diseases. This proportion has been in decline since 1970, when nationally cardiovascular diseases were responsible for over half of all deaths.

The four major causes of death from cardiovascular disease share a number of behavioural risk factors (tobacco smoking, physical inactivity, poor diet, risky alcohol consumption) and physiological risk factors (high blood pressure, elevated blood lipids, diabetes mellitus, and overweight or obesity).

This chapter presents recent data on deaths and hospitalisations and hospital procedures in NSW for cardiovascular diseases as a group, with particular emphasis on the four main causes of death.

Key points

- Cardiovascular diseases cause about 16,260 deaths and almost 160,000 hospitalisations of NSW residents in each year. Coronary heart disease and stroke contribute the most to this disease burden, followed by heart failure and peripheral vascular disease.

- Death rates, and numbers of deaths, from cardiovascular disease are higher in males than in females. Death rates are higher in outer regional and remote areas of NSW than in metropolitan areas.

- Death rates from all forms of cardiovascular disease have more than halved since 1988, after adjusting for population ageing. This is due to both:
  - decreased incidence, associated with reductions in some risk factors, including smoking, saturated fats in the diet, and levels of blood pressure
  - increased survival, as a result of improvements in medical and surgical treatment and follow-up care.

- Coronary heart disease caused just over 7,800 deaths in 2007, or about 21 deaths every day. Coronary heart disease was the principal reason for just under 51,000 hospitalisations in 2008-09.

- Stroke caused just over 4,100 deaths in NSW in 2007. Stroke was the principal reason for just over 20,000 hospitalisations in 2008-09.

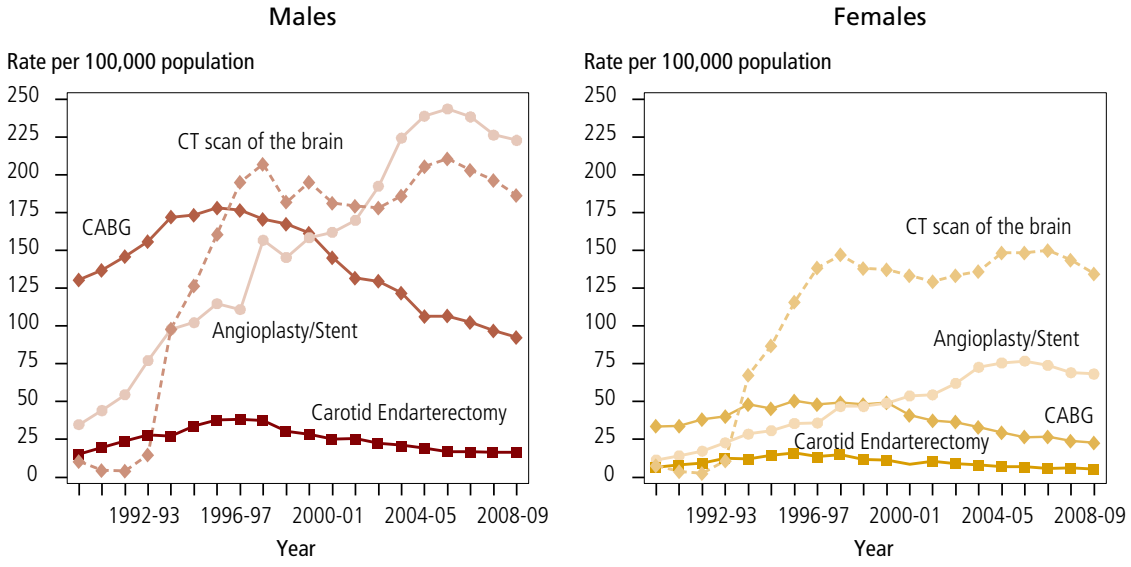
- Heart failure was the principal cause just over 1,000 deaths in NSW in 2007 and was a contributing cause in many more. Heart failure was the principal reason for almost 14,500 hospitalisations in 2008-09.

- Peripheral vascular disease caused just under 750 deaths in NSW in 2007. Peripheral vascular disease was the principal reason for just under 8,500 hospitalisations in 2008-09.

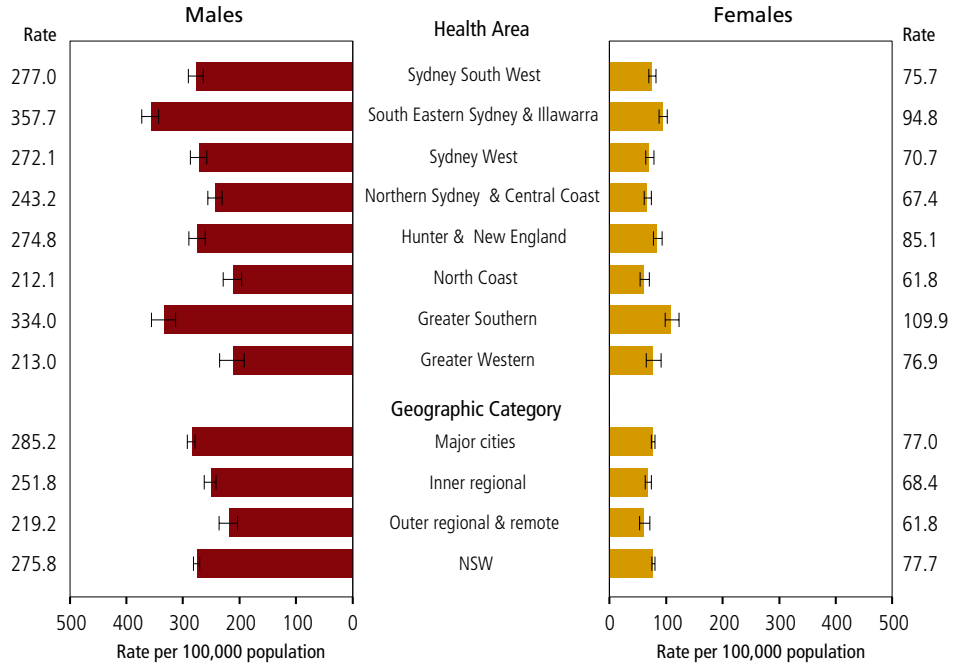
- If hospitalisation rates follow the same trend as the last 15 to 20 years, by 2019-2020, hospitalisation rates for all cardiovascular diseases will be 13% lower than in 2008-09. The overall number of hospitalisations are, however, projected to increase to around 175,000 by 2019-2020 due to the ageing of the population. Despite this, if death rates for cardiovascular diseases follow the same trend as the last 15 to 20 years, by 2018, death rates will be 35% lower than in 2007 and the number of deaths is projected to fall to around 14,700.

- In the treatment of coronary heart disease, the number of percutaneous transluminal angioplasty (PCTA) procedures (with and without stents) first exceeded the number of the more invasive coronary artery bypass graft (CABG) procedures in 2000-01. More than 11,000 PCTAs were performed in 2008-09, more than double the 4,300 CABGs.

Cardiovascular disease procedures: hospitalisations by procedure type and sex, NSW 1989-90 to 2008-09

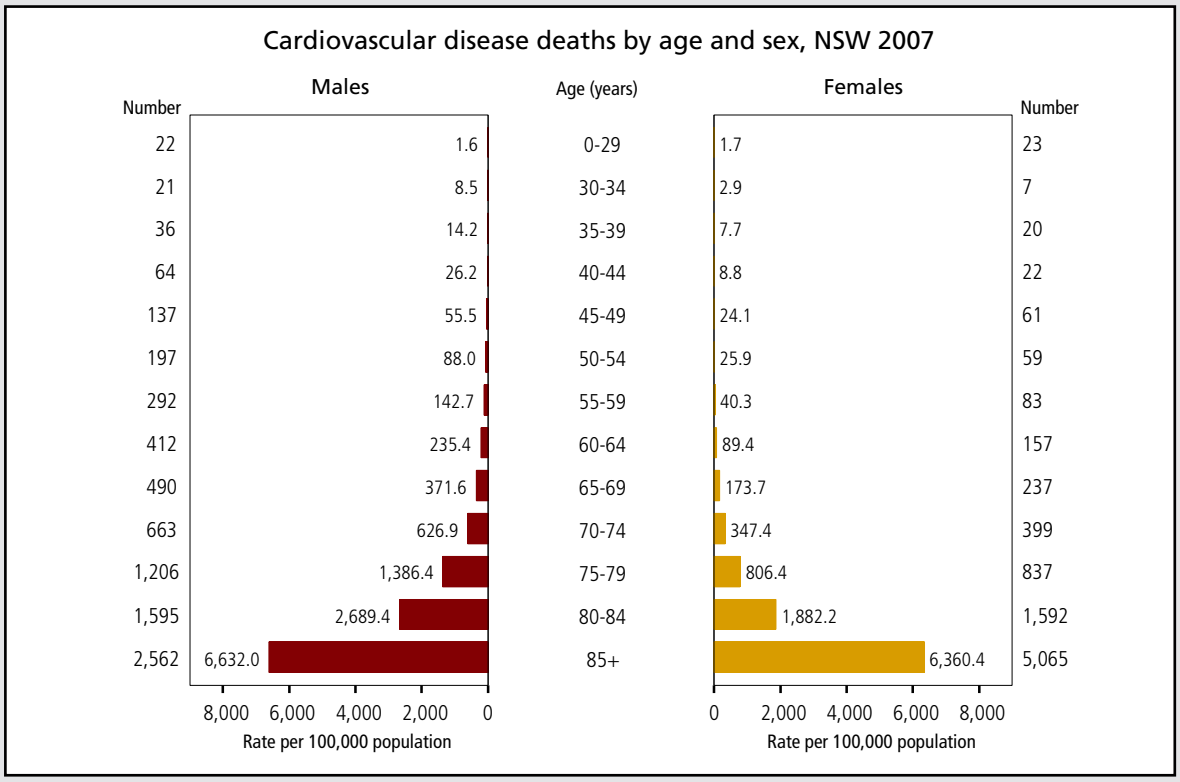


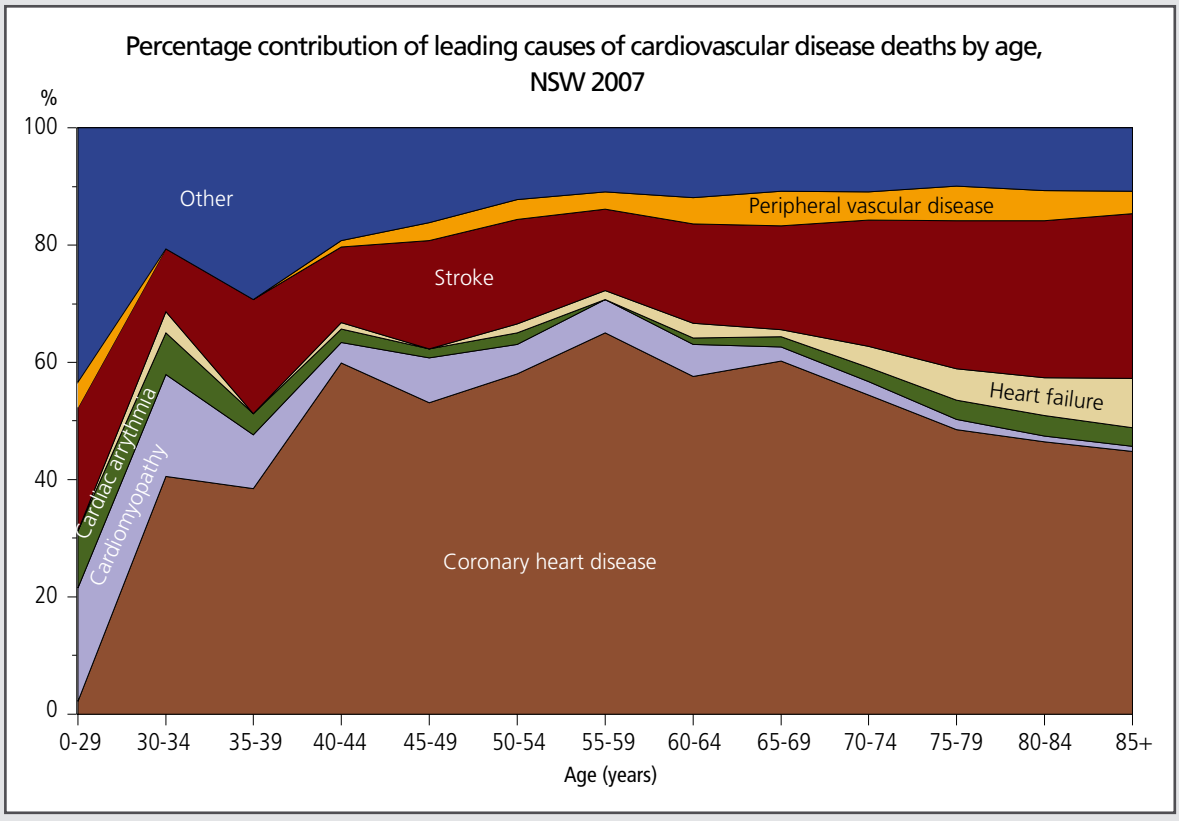
Coronary revascularisation procedures: hospitalisations by Health Area, NSW 2008-09



Note: Hospital separations were classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards. Rates were age-adjusted using the Australian population as at 30 June 2001. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

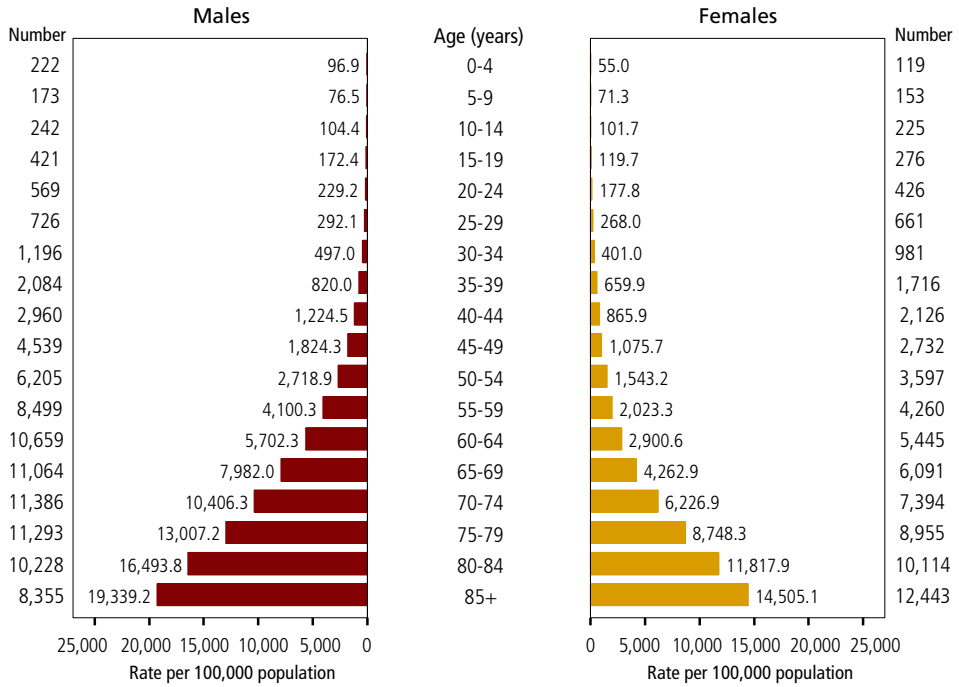




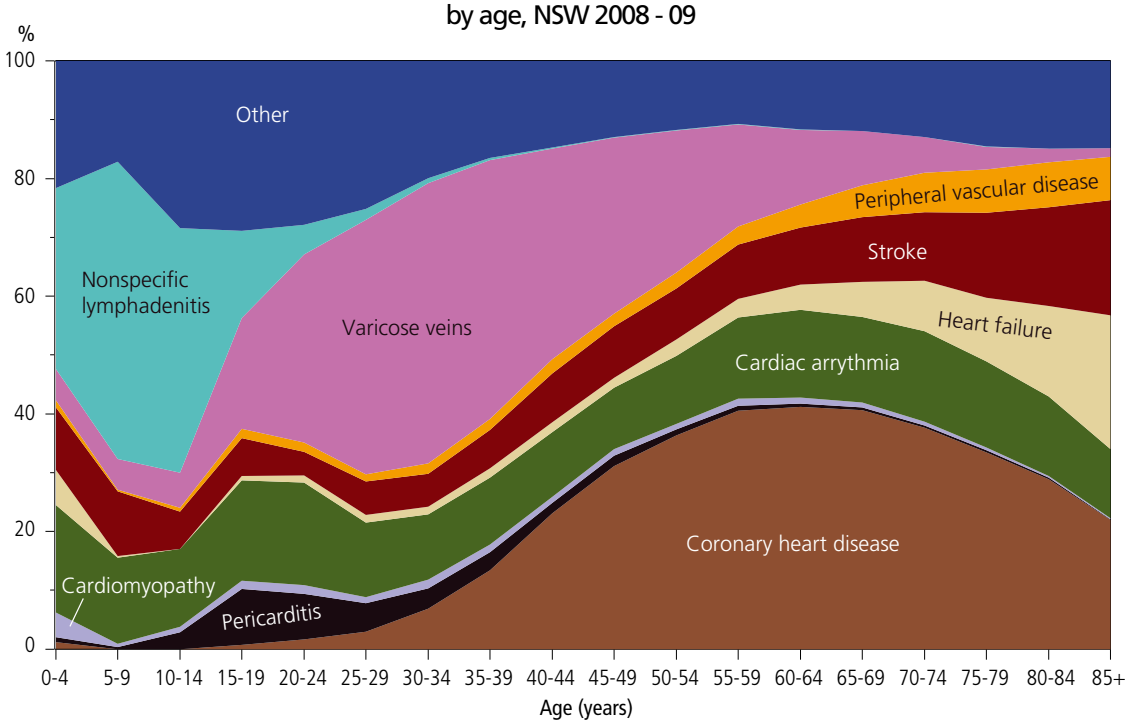
Note: Deaths were classified using ICD-10. Grouping follows ICD-10 categories. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Cardiovascular disease hospital separations by age and sex, NSW 2008-09



Percentage contribution of leading causes of cardiovascular disease hospital separations, by age, NSW 2008 - 09



Note: Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.2 Diabetes

Introduction

Diabetes mellitus is a group of closely related chronic conditions characterised by high blood sugar (glucose) levels. In uncontrolled diabetes, glucose builds up in the bloodstream and leads to a range of short- and long-term problems, including damage to vital organs. Diabetes imposes a large burden on the health system and on some communities and in 2003 diabetes accounted for over 5% of the disease burden in Australia.

There are three main forms of diabetes mellitus: Type 1 diabetes, Type 2 diabetes and gestational diabetes. Type 1 diabetes is estimated to be present in 10-15% of people with diabetes and is caused by a combination of genetic and environmental factors, but there are no known modifiable risk factors for this form of diabetes. Type 2 diabetes accounts for about 85-90% of all diabetes cases and primarily affects people older than 40 years. Several modifiable risk factors play a role in the onset of Type 2 diabetes, including obesity, physical inactivity and poor nutrition, as does genetic predisposition and ageing. Gestational diabetes mellitus occurs during pregnancy in about 3-8% of females not previously known to have diabetes. It is a temporary form of diabetes and usually resolves after the baby is born.

Diabetes can lead to acute and chronic complications. Acute metabolic disturbances can lead to coma. Chronic high blood glucose levels (hyperglycaemia) is associated with long-term damage, dysfunction and failure of virtually every body organ, especially the heart and blood vessels, eyes, kidneys and nerves. Consequently, diabetes predisposes those suffering from it to many severe conditions, including cardiovascular disease, as well as visual loss, amputations and renal failure.

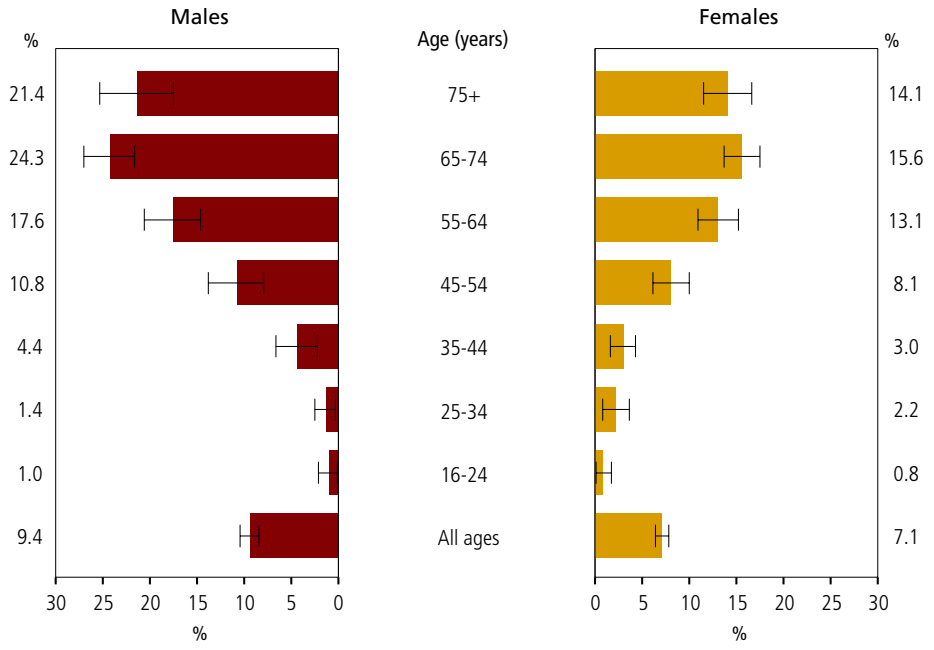
Sustained, individualised management substantially reduces the risk of complications in people with diabetes. A combination of diet, exercise and medication (including insulin injections) is used and very frequent monitoring of blood glucose levels and other risk factors (for example blood lipids, blood pressure) is also required, as is regular screening for complications.

This chapter presents recent data on the prevalence of diabetes, self-reported management of diabetes, selected cardiovascular risk factors among people with diabetes, deaths from diabetes, hospitalisations for diabetes by diabetes type and type of complication as well as hospitalisations for lower limb amputations and eye complications due to diabetes.

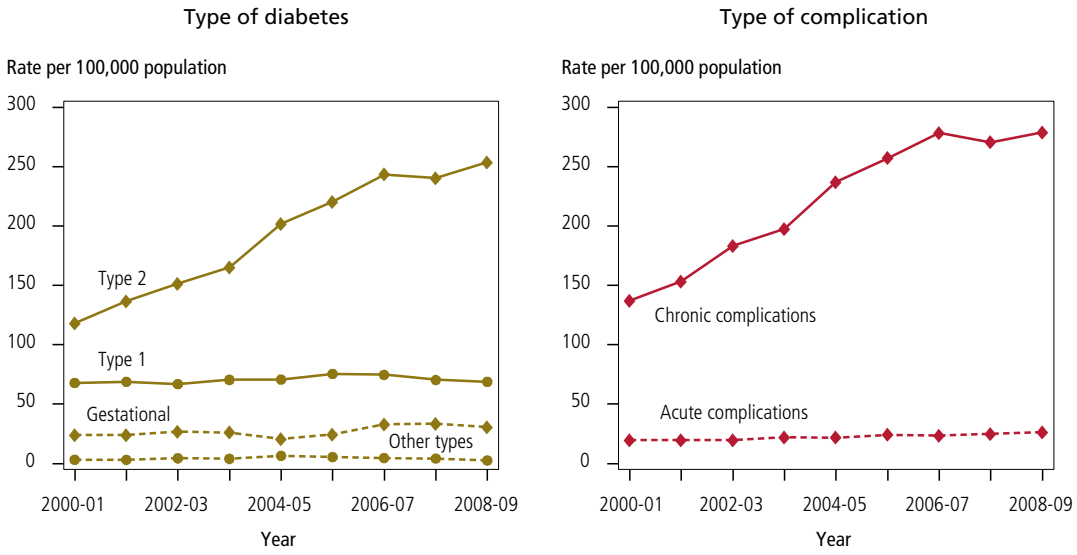
Key points

- In NSW in 2009, 9.4% of males and 7.0%of females aged 16 years and over reported having diabetes or high blood sugar. It is likely that there are many people with diabetes in NSW who are unaware they have it.
- Diabetes prevalence increases with age and socio-economic disadvantage and is more prevalent among Aboriginal people and people born in the Mediterranean region.
- In NSW in 2006, around 60% of people with diabetes reported following a special diet, 43% reported taking tablets to manage their diabetes, around 11% required insulin injections and 8% reported 'not doing anything'.
- While diabetes was the principal cause of just over 2% of all deaths in NSW in 2007, 2,435 or just over 5% of all deaths in that year were related to diabetes. Cardiovascular disease was the most common cause of death among people with diabetes.
- Hospitalisations for which diabetes was recorded as a principal diagnosis increased by more than 155% between 1989-90 and 2008-09.
- While Type 2 diabetes accounts for up to 90% of all diabetes cases in the community, it accounts for only around 74% of all hospitalisations for diabetes. Type 1 diabetes accounts for around 18% of hospitalisations and gestational diabetes around 8%.
- The complications of diabetes include poor blood circulation and nerve function in the limbs, eye problems and kidney failure. There were 916 hospital admissions for lower extremity amputations and 9,448 hospitalisations for eye complications in people with diabetes in 2008-09.

Diabetes or high blood glucose by age and sex, persons aged 16 years and over, NSW 2009

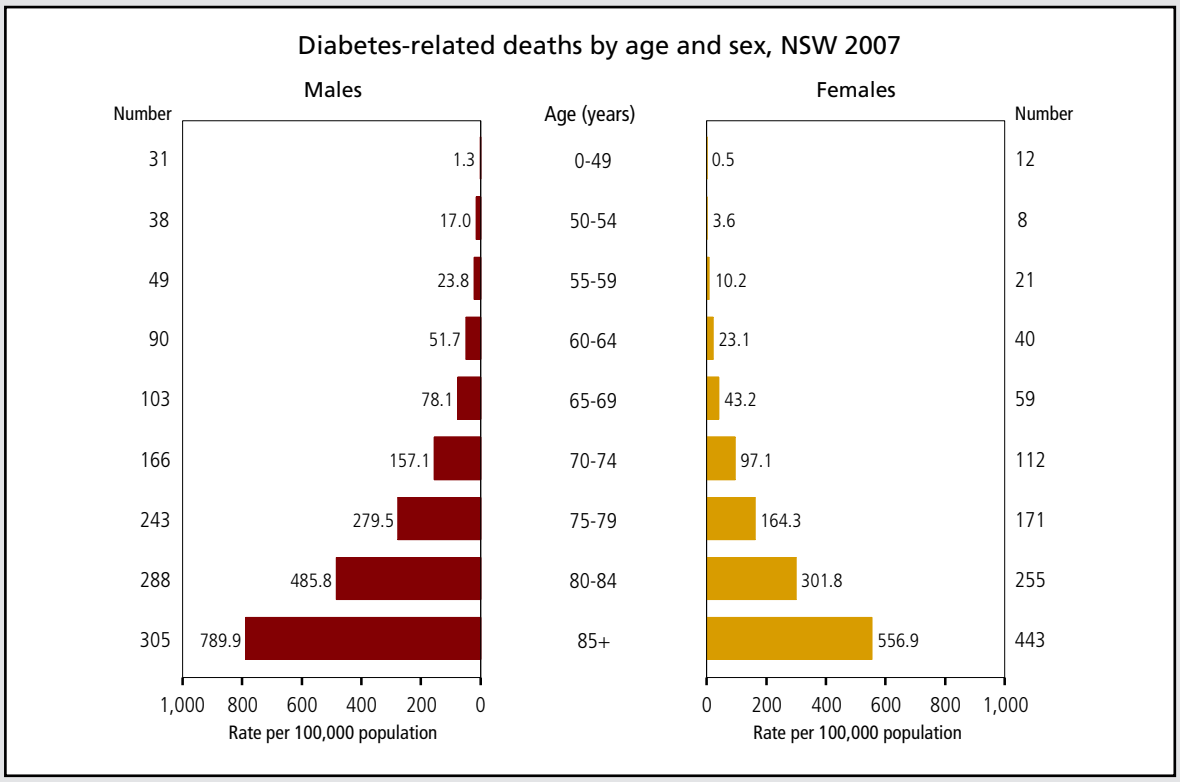


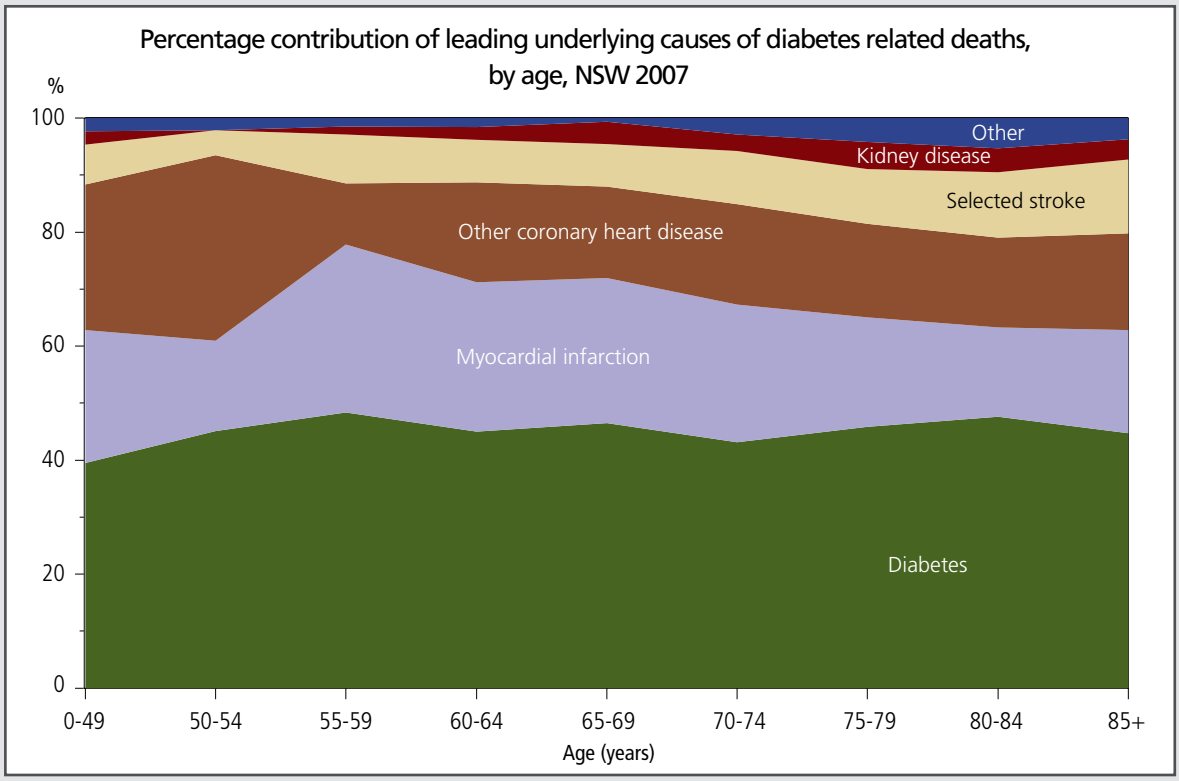
Diabetes hospitalisations by type of diabetes and by type of complication, NSW 2000-01 to 2008-09



Note: TOP GRAPH: Estimates are based on 10,629 respondents in NSW. For this indicator 87 (0.81%) were 'not stated' (Don't know or Refused) in NSW. The indicator includes those who had ever been told by a doctor or hospital that they either had diabetes or high blood glucose but did not have gestational diabetes. BOTTOM GRAPH: Diabetes coded in the first diagnosis field only is included. Gestational and diabetes in pregnancy are included under relevant diabetes type and in 'no complications' category. Hospital separations were classified using ICD-10-AM. Rates were age-adjusted using the Australian population as at 30 June 2001. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

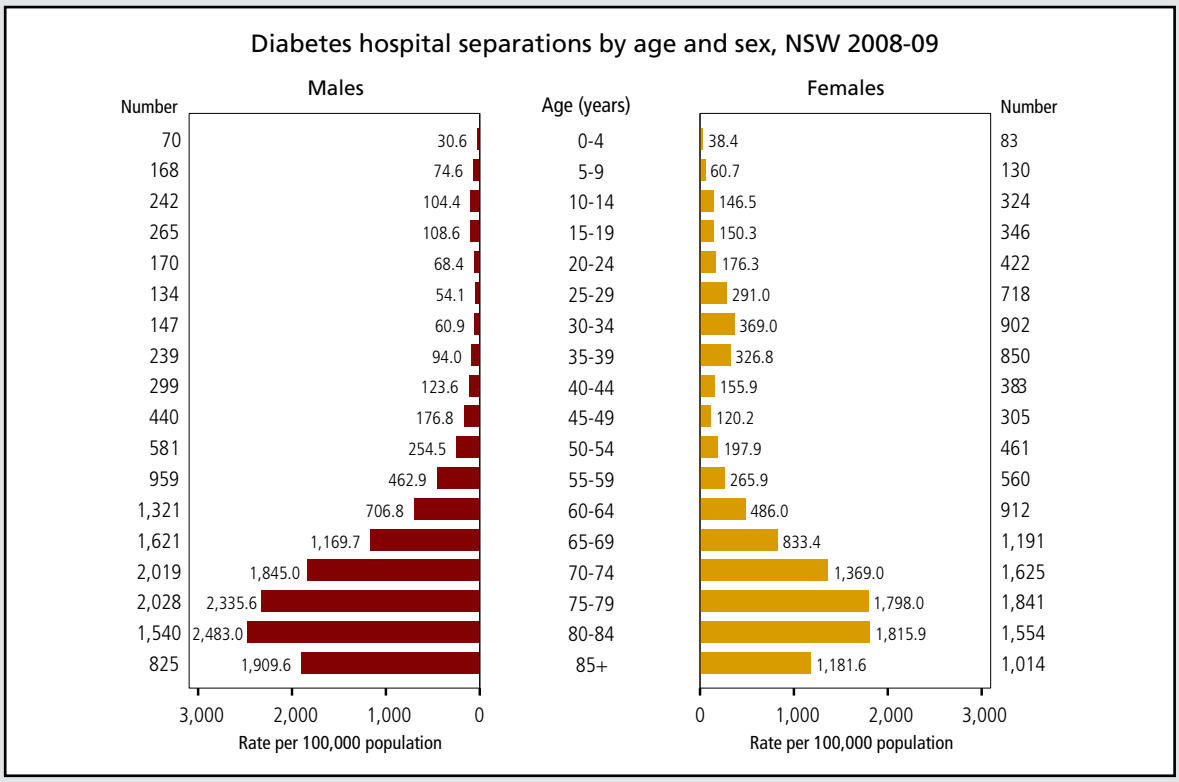
Source: TOP GRAPH: New South Wales Population Health Survey. Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

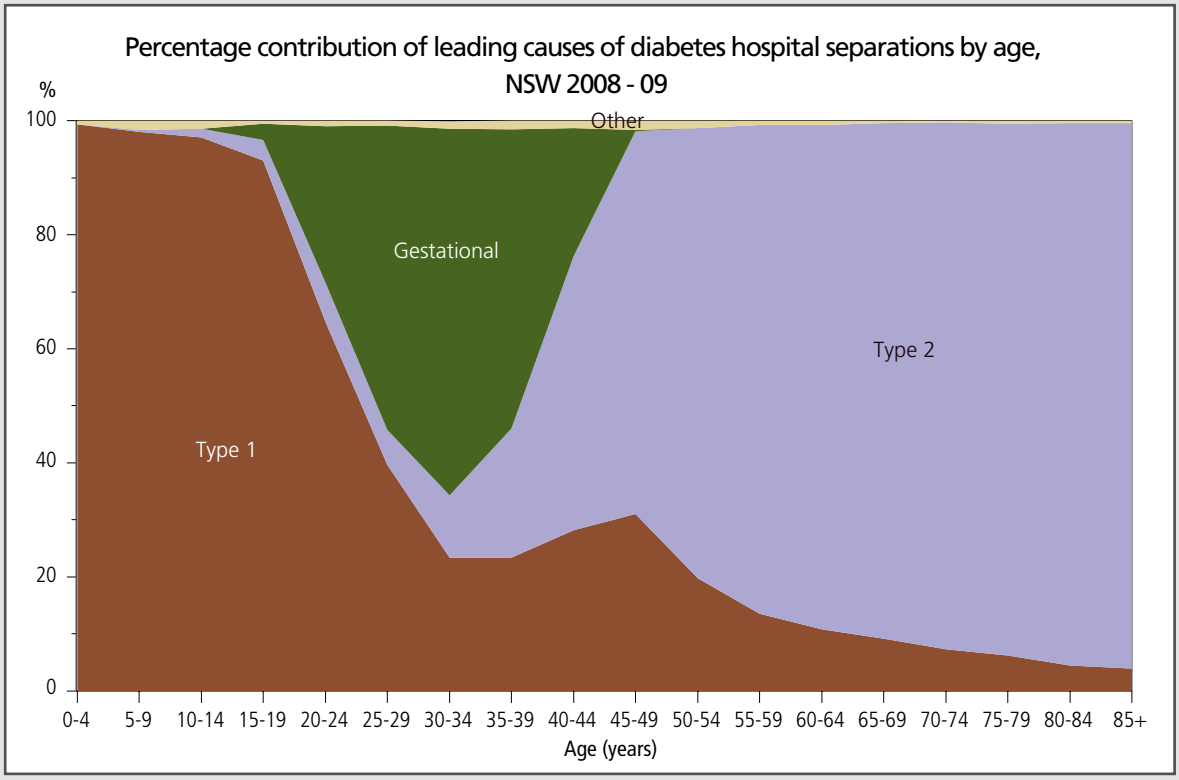




Note: Diabetes-related deaths are those where diabetes was either the underlying or an associated cause of death, when the underlying cause was a complication of diabetes (see Methods section). Deaths were classified using ICD-10. Labelled groupings include ICD-10 categories further refined for association with diabetes. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.





Note: Diabetes coded in the first diagnosis field only is included. Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.3 Cancer

Introduction

Cancer is a major cause of mortality in Australia and contributes greatly to morbidity and disability. It accounts for the highest (19%) of the total burden of disease in Australia.

Most cancers have a unique set of causal factors, but some share risk factors. These include: smoking (responsible for the majority of preventable cancers); dietary influences; infectious agents; radiation (including ultraviolet radiation); and genetic factors. Risk of death from some cancers can be reduced by screening, early detection and treatment, and appropriate management and follow-up.

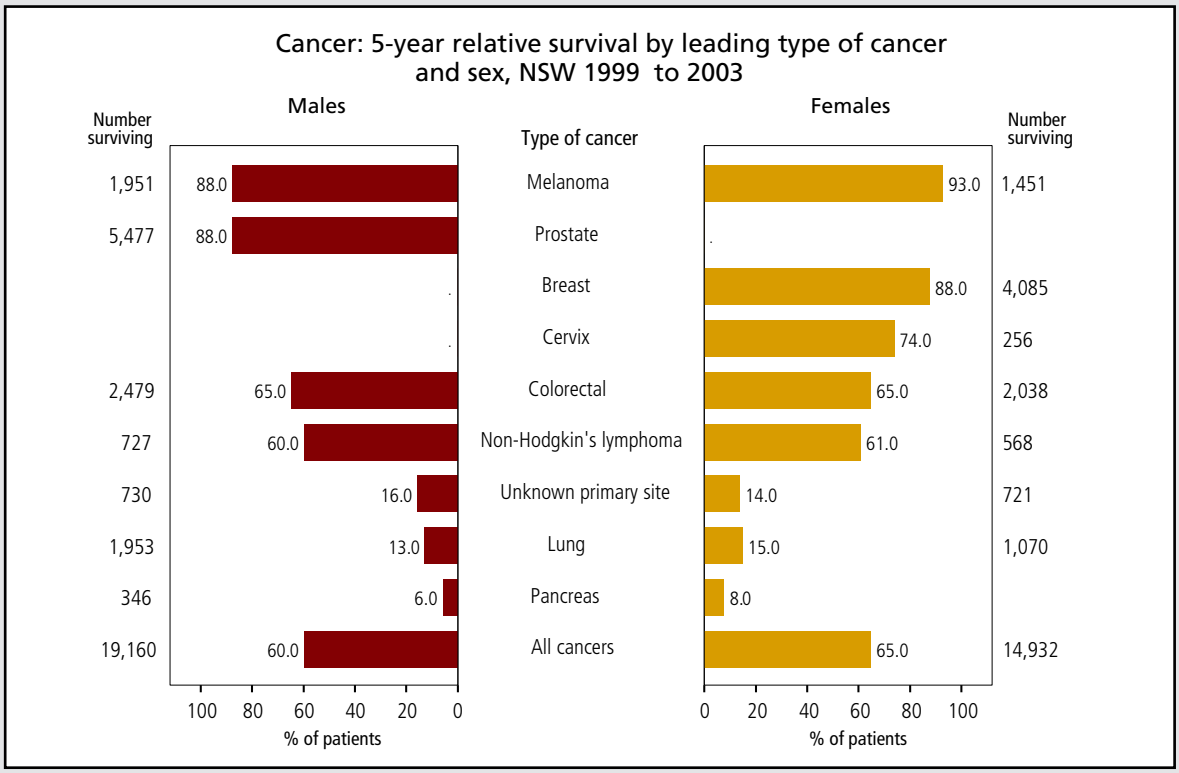
Legislation requires Australian states and territories to maintain a cancer registry. As such, cancer is the only major disease for which almost complete coverage of incidence data (new cases) is available. The NSW Central Cancer Registry (established 1972) collects and reports annually on invasive cancer cases and deaths in NSW on behalf of the NSW Department of Health. Basal and squamous cell carcinomas of skin (non-melanocytic skin cancers), the most common types of cancer, are not notifiable and are not included in the Registry reports. The latest published data are for cases diagnosed in 2008.

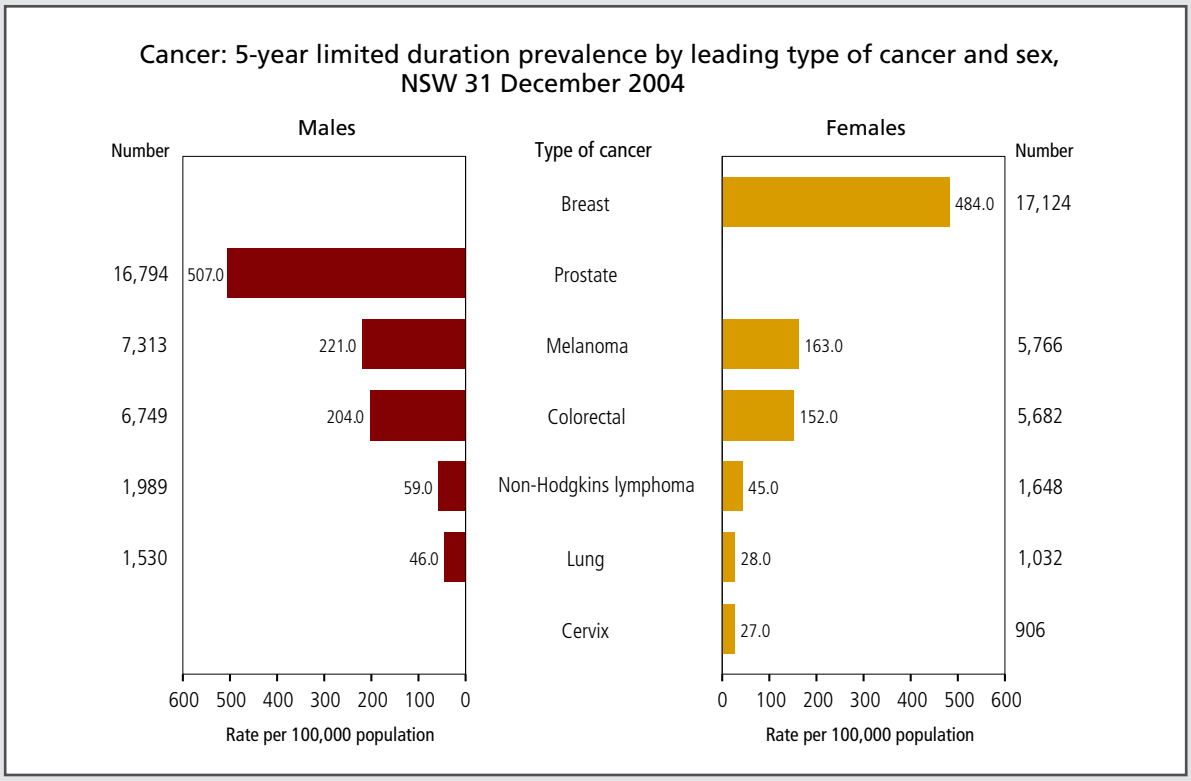
Since the Registry's inception the number of new cancers registered has increased and the rankings of individual cancers have also changed. The Cancer Institute NSW is responsible for the Administration of the NSW Central Cancer Registry, The NSW Pap Test Registry and BreastScreen NSW data.

This chapter contains an analysis of the incidence and mortality the most common and most preventable cancers. Deaths data presented here are from the Australian Bureau of Statistics (ABS) mortality collection. The ABS deaths data is used here to maintain consistency with other chapters, however, the Cancer Institute NSW's cancer death figures may differ slightly as the data is verified against histopathology reports for cases while the ABS data is sourced only from death certificates.

Key points

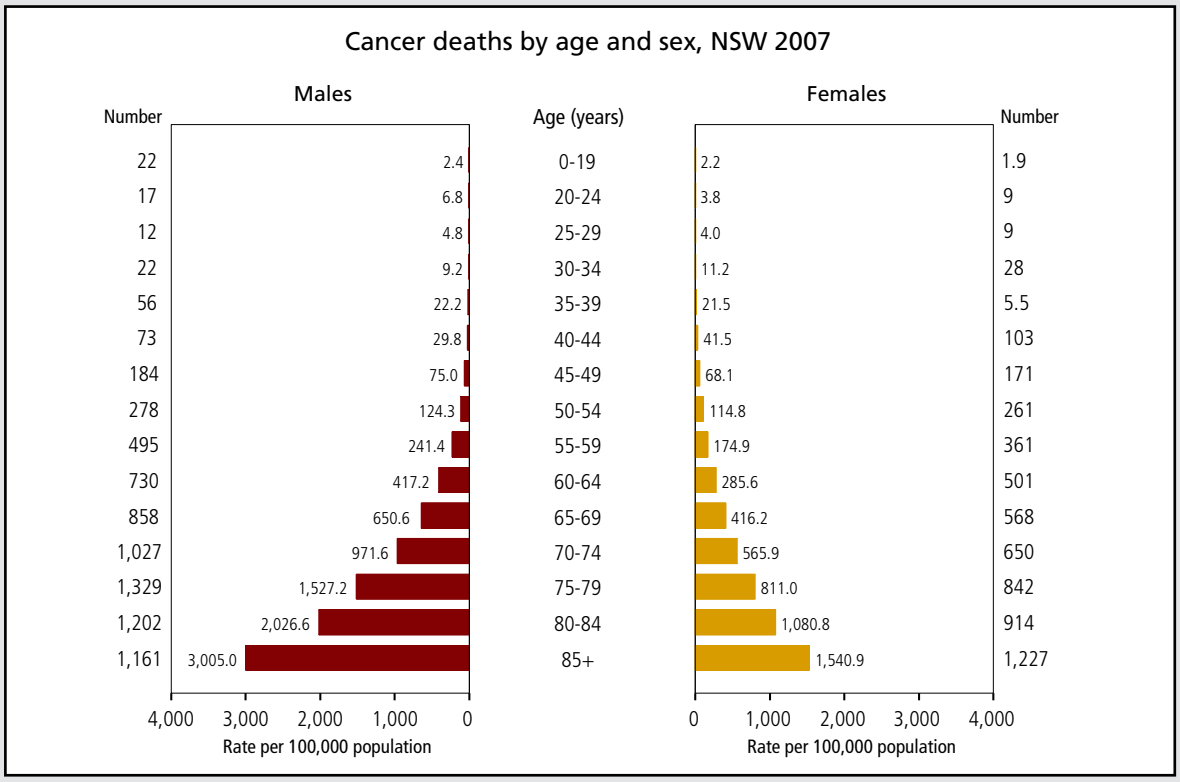
- Cancer is Australia's leading cause of disease burden. It accounts for almost one-fifth of years of healthy life lost due to premature death, disease, and injury.
- In NSW in 2008, there were 36,611 new cases of cancer (57% in males) and 13,186 deaths (57% in males). Between 1998 and 2007 the incidence rate for all cancers rose by 11% in males, but was stable in females. Death rates fell by 12.9% in males and 6.4% in females between 1998 and 2007.
- In 2008 in NSW the five leading types of new cases of cancer in descending order were:
  - Prostate cancer
  - Colorectal cancer
  - Breast cancer
  - Melanoma
  - Lung cancer
- However in 2007 in NSW:
  - Lung cancer was the leading cause of cancer death
  - Colorectal cancer was the second leading cause of cancer death
  - Prostate cancer was the third leading cause of cancer death
  - Breast cancer was the fourth cause of cancer death
  - Melanoma was the eighth leading cause of cancer death.
- A bowel/colorectal cancer screening program commenced in NSW in August 2006.
- Cervical cancer cases and deaths decreased between 1998 and 2007 and in 2007 it was the fourteenth most common female cancer. It can be prevented through the early detection of precancerous lesions by two-yearly Pap tests of women aged 20-69 years. The percentage of eligible women who had their Pap test by December 2008 was 58.8%.
- Breast cancer was the most common cancer among females and the second most common cause of cancer death among females. BreastScreen NSW provides a biennial mammographic screening service to women aged 50-69 years in NSW, which aims to detect early cases of breast cancer. The percentage of eligible women who had their mammogram by December 2008 was 53.6%.

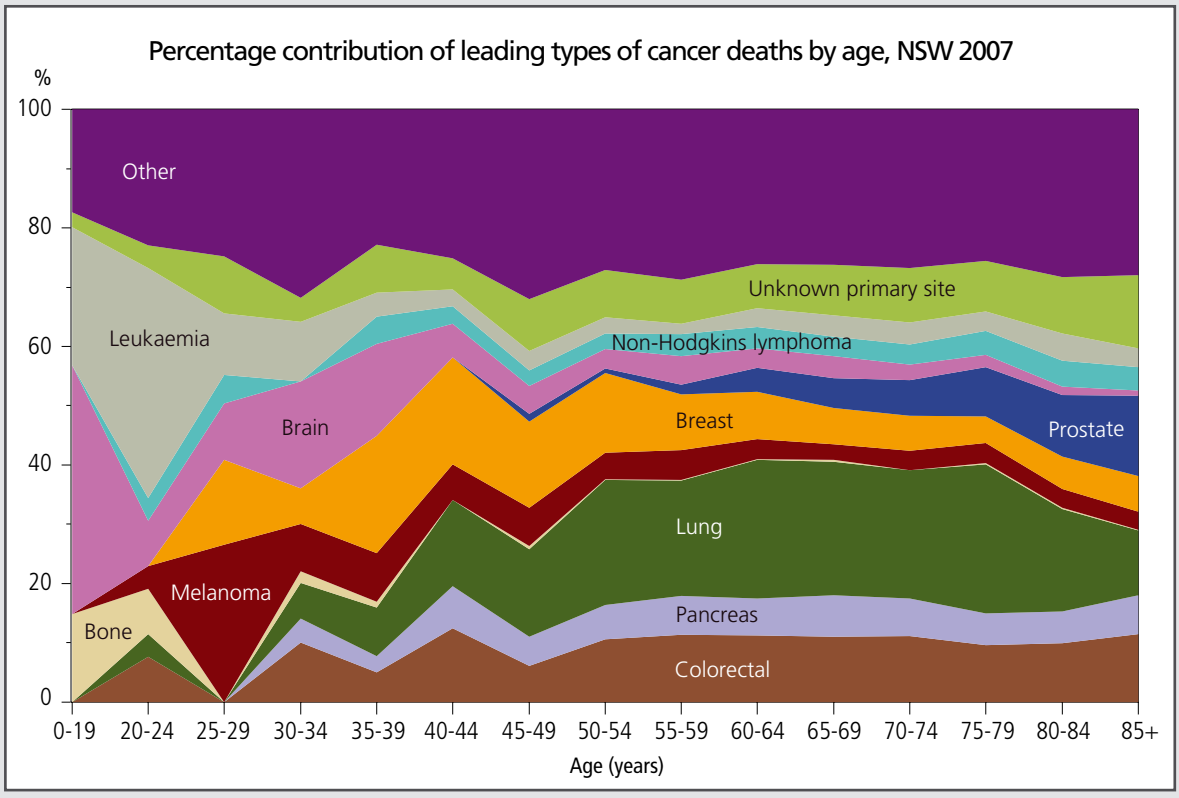




Note: TOP GRAPH: Relative survival is the ratio of observed survival to that which would be expected in the absence of the cancer. BOTTOM GRAPH: Prevalence is a measure of the number of people with cancer at a specified point in time. Five-year prevalence includes everyone who is alive and who was diagnosed five years prior to 2004.

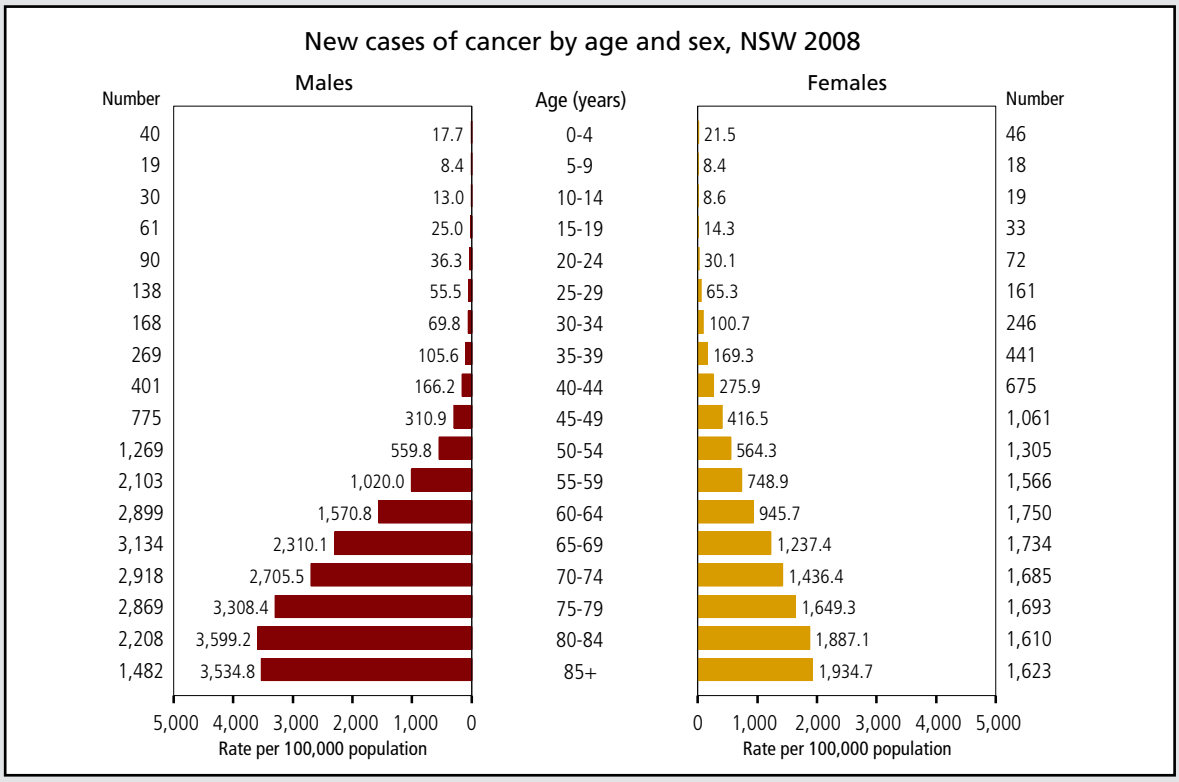
Source: NSW Central Cancer Registry survival and prevalence data. Cancer Institute NSW.

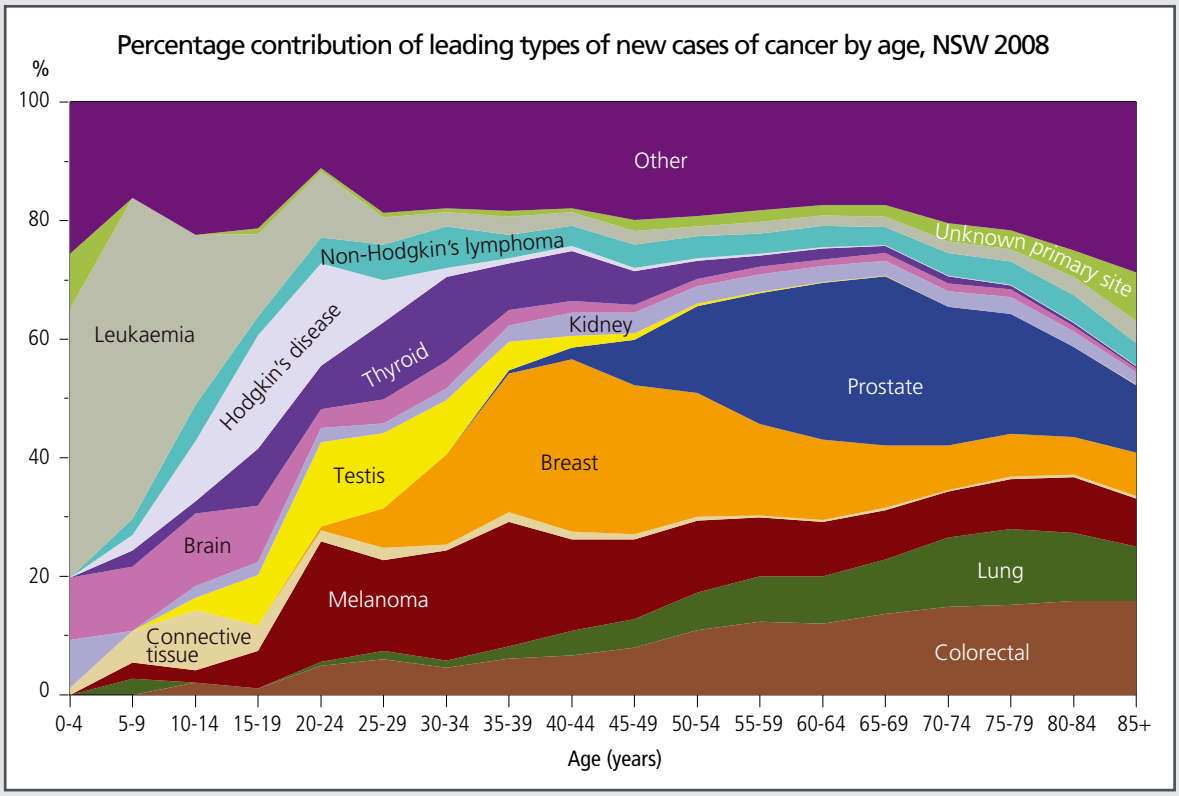




Note: Deaths were classified using ICD-10. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.





Note: Cases were classified by ICD-10.

Source: NSW Central Cancer Registry incidence data (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.4 Respiratory disease

Introduction

Respiratory diseases include acute diseases, such as influenza and pneumonia, and chronic respiratory diseases (specifically asthma, chronic obstructive pulmonary disease, asbestosis, and respiratory tuberculosis), where preventive measures and better management of conditions can reduce the burden of disease and reduce associated healthcare costs. Respiratory diseases, including lung cancer, were together responsible for around 14% of all deaths in NSW in the period 2003 to 2007, and about 5% of hospital separations in 2008-09.

Influenza and pneumonia are acute respiratory diseases that can be very severe and, in persons at high risk, can lead to death.

Asthma is a significant public health problem in Australia and it is estimated that Australian prevalence rates are among the highest in the world, although recent studies in children show no further increase in prevalence. The overall prevalence of asthma reported in the 2007-08 National Health Survey was 9.9%, down from 11.6% in the 2001 survey. Among children, asthma is the most prevalent long term condition in Australia. In youth aged 15-24 years, the prevalence of asthma has declined from 16% in 2001 to 11 % in 2007-08, although only those who had used asthma medications in the last 12 months were included in 2007-08, which reduced the prevalence estimates. In Australia in 2003, asthma was estimated to account for 2.3% of the disease burden.

Chronic bronchitis and emphysema are the two main conditions comprising chronic obstructive pulmonary disease (COPD). In Australia in 2003, COPD was estimated to account for 2.9% of the disease burden.

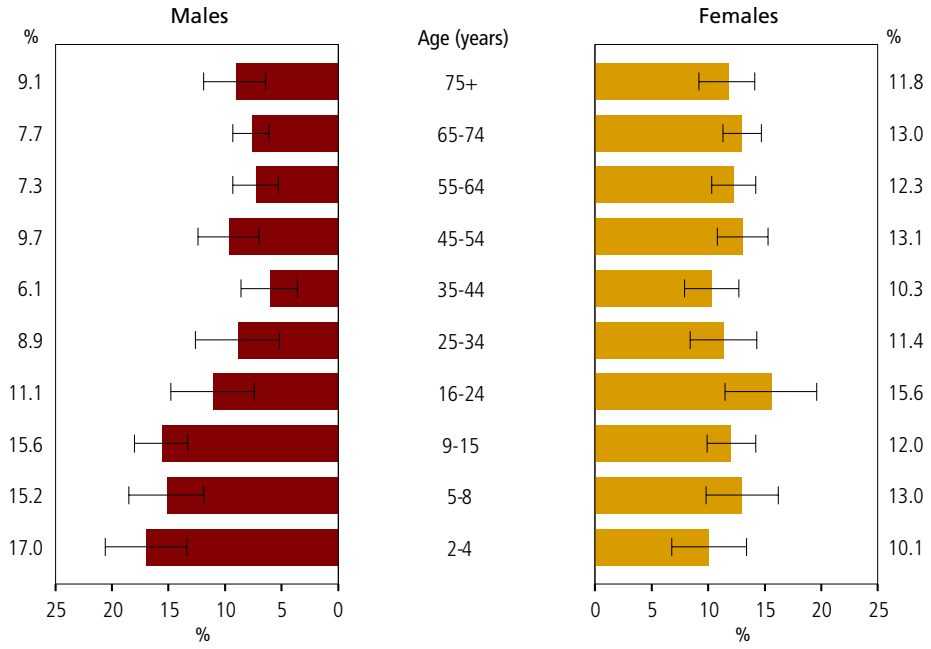
Tuberculosis (TB) is caused by the bacterial organism *Mycobacterium tuberculosis*. Despite the increasing burden from respiratory tuberculosis globally, it is not a major public health problem in NSW; in fact the mortality and morbidity from all types of tuberculosis in NSW is one of the lowest in the world.

Cigarette smoking is the main risk factor for both COPD and lung cancer and the current incidence rates of these conditions reflect smoking rates 20 years and more in the past. Lung cancer is one of the leading causes of death in Australia.

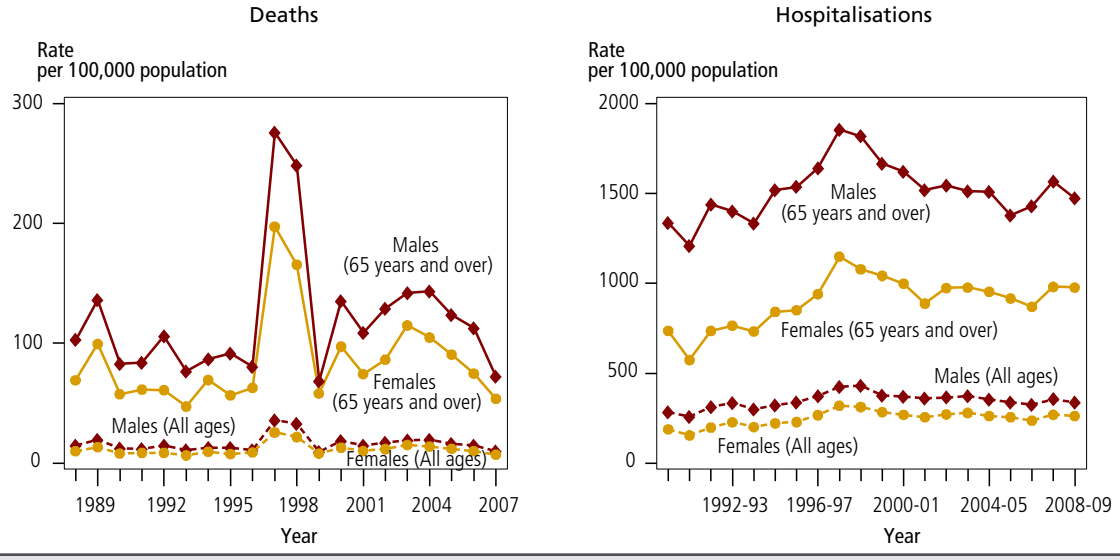
Key points

- In 2009 in NSW, around 9% of adult males and 13% of adult females had asthma, and in 2007 and 2008, just under 16% of boys and almost 12% of girls aged 2-15 years had asthma. Asthma was responsible for 130 deaths in 2007 and around 12,500 hospitalisations in 2008-09.
- Chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema, was responsible for over 1,700 deaths in 2007 in NSW and nearly 20,000 hospitalisations in 2008-09.
- In 2007, 75% of all deaths from COPD in NSW and 91% of all lung cancer deaths were attributable to smoking. In 2008-09, smoking caused around 82% of all hospitalisations for chronic obstructive pulmonary disease and lung cancer.
- Asbestosis is a chronic lung disease that is associated with occupational exposure to asbestos. Total hospitalisations due to asbestos in NSW have decreased in the past five years.
- Death rates from respiratory tuberculosis have remained low and stable since 1994 in NSW.
- The rate of new cases of malignant mesothelioma (a cancer that is associated with past exposure to asbestos) more than doubled in NSW between 1986 and 2003. It has decreased each year since then.

Current asthma by age and sex, persons aged 16 years and over, 2009 and persons ages 2-15, 2007 and 2008 combined, NSW

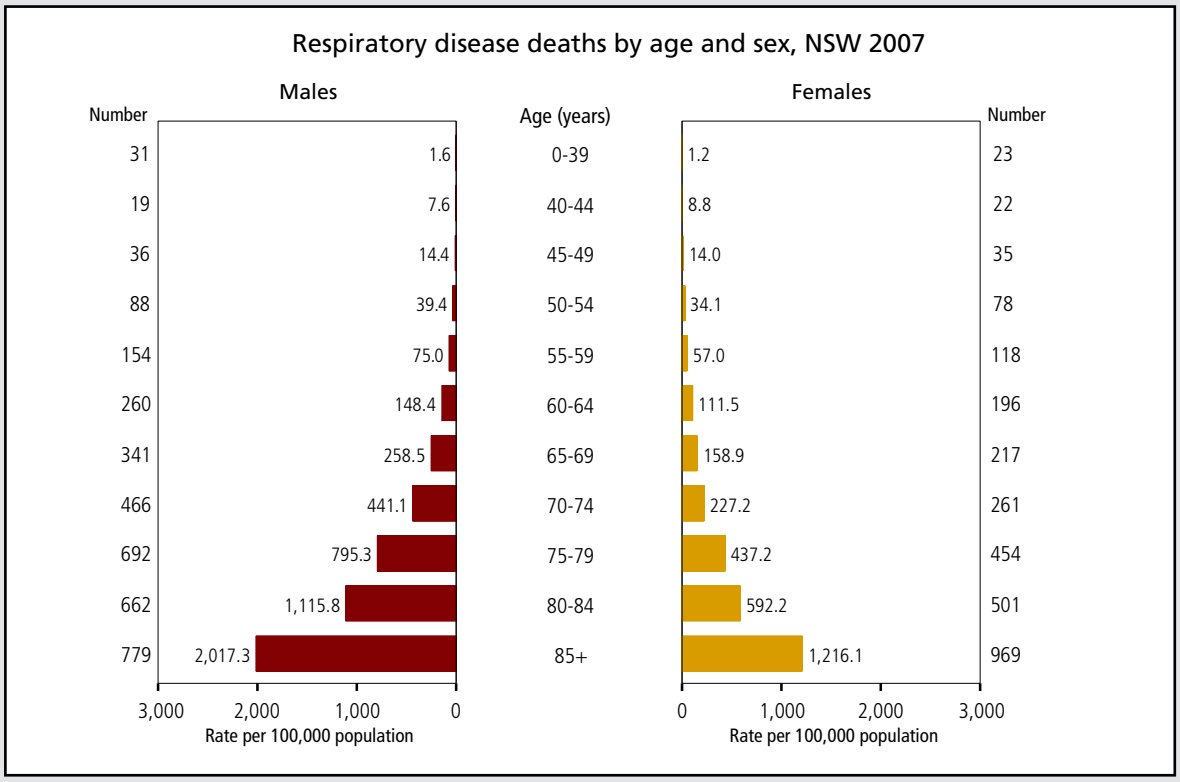


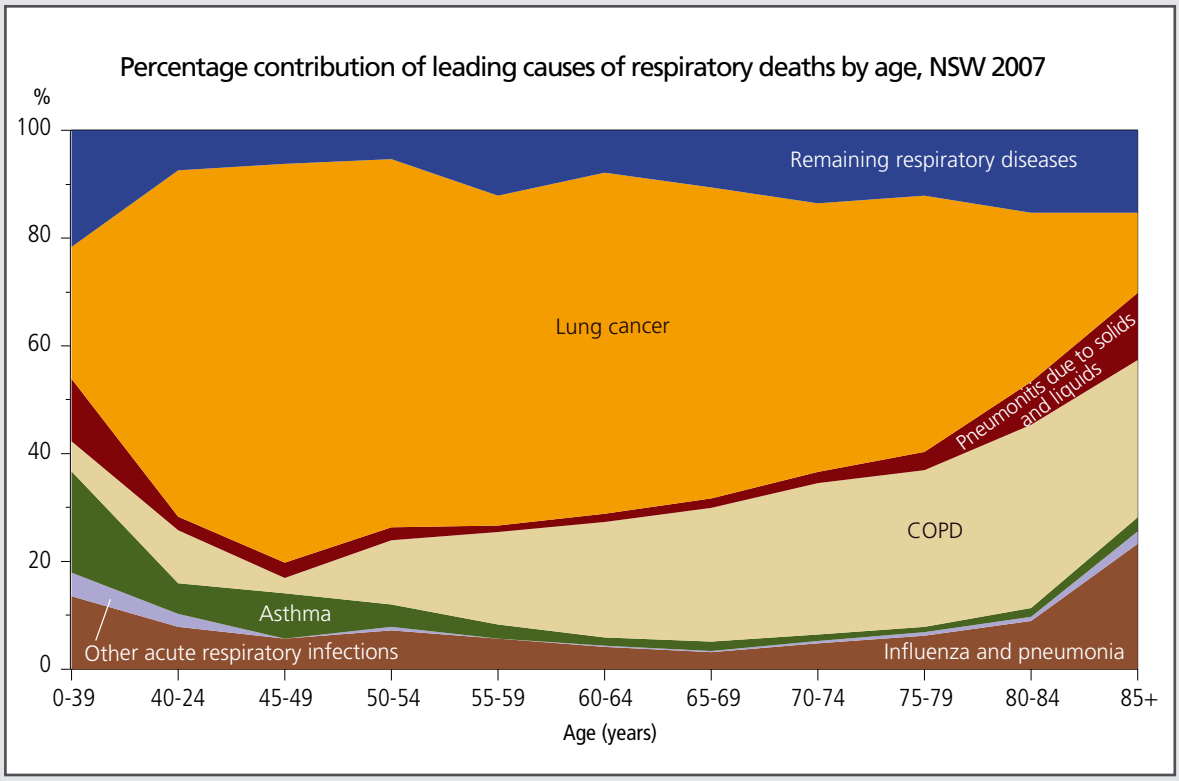
Influenza and pneumonia deaths 1988 to 2007 and hospital separations 1989-90 to 2008-09, persons of all ages and 65 years and over, NSW



Note: TOP GRAPH: Current asthma was defined as diagnosed by a doctor and producing symptoms or requiring treatment in previous 12 months. Estimates based on 10,688 respondents in NSW Health Survey 2009 (31, that is 0.29%, not stated for current doctor diagnosed asthma) and 4,410 in the NSW Child Health Survey 2007-2008 (14, that is 0.32%, not stated). Bars show lower and upper limits of the 95% confidence interval for the point estimate. BOTTOM GRAPH: Deaths were classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards. Hospital separations were classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards. Rates were age-adjusted using the Australian population as at 30 June 2001. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

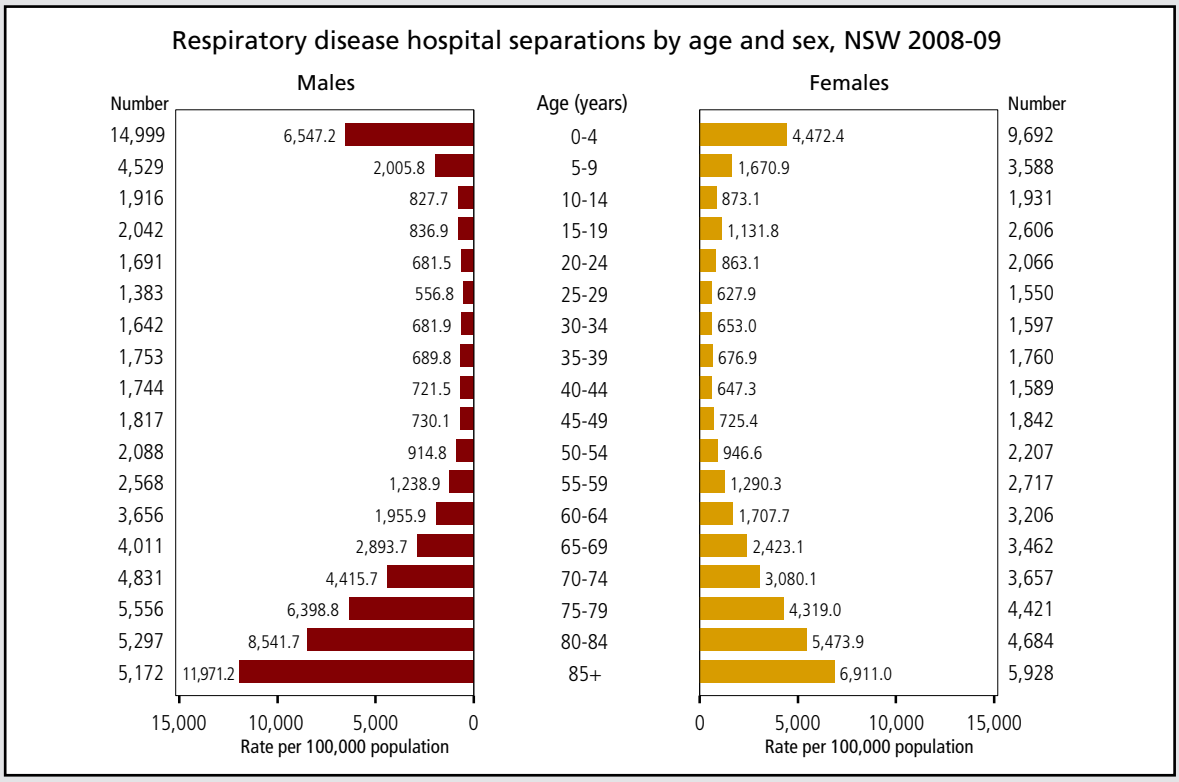
Source: TOP GRAPH: NSW Population Health Survey (HOIST), NSW Admitted Patient Data Collection, ABS mortality data and population estimates (HOIST). BOTTOM GRAPH: LHS: ABS mortality data and population estimates (HOIST). RHS: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health..

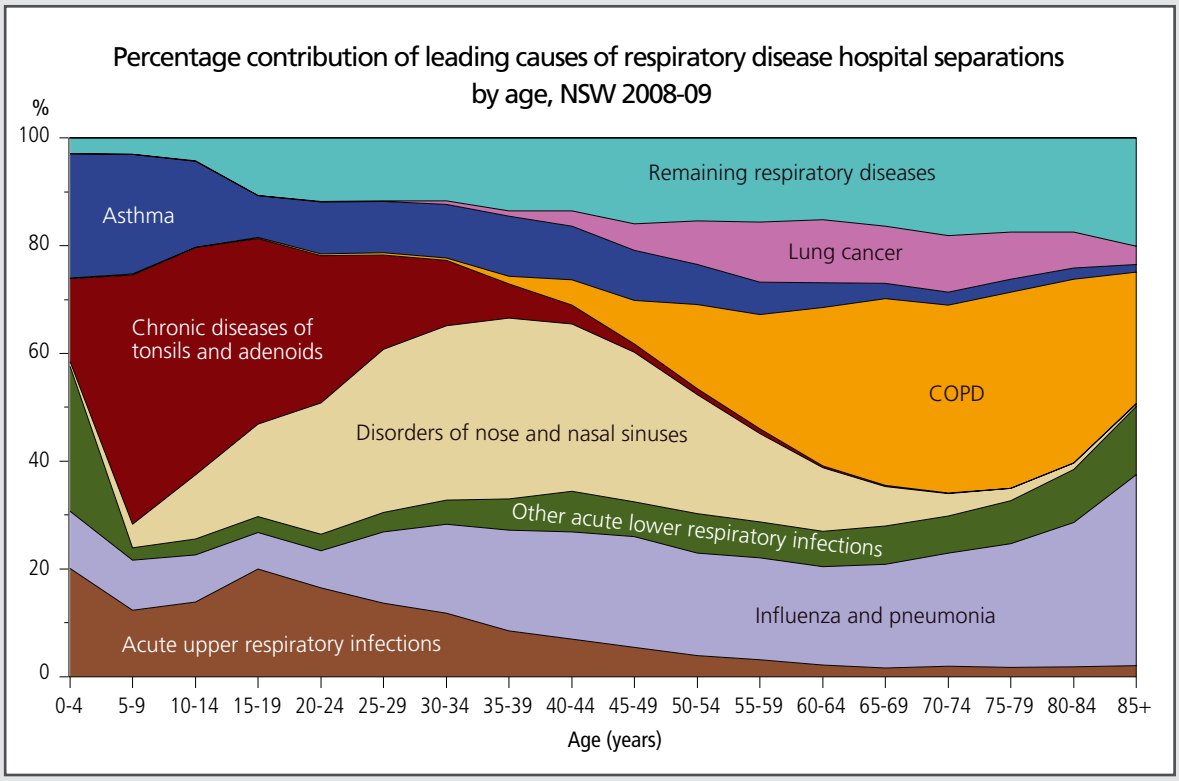




Note: Deaths were classified using ICD-10. Grouping follows ICD-10 categories. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.





Note: Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.5 Injury and poisoning

Introduction

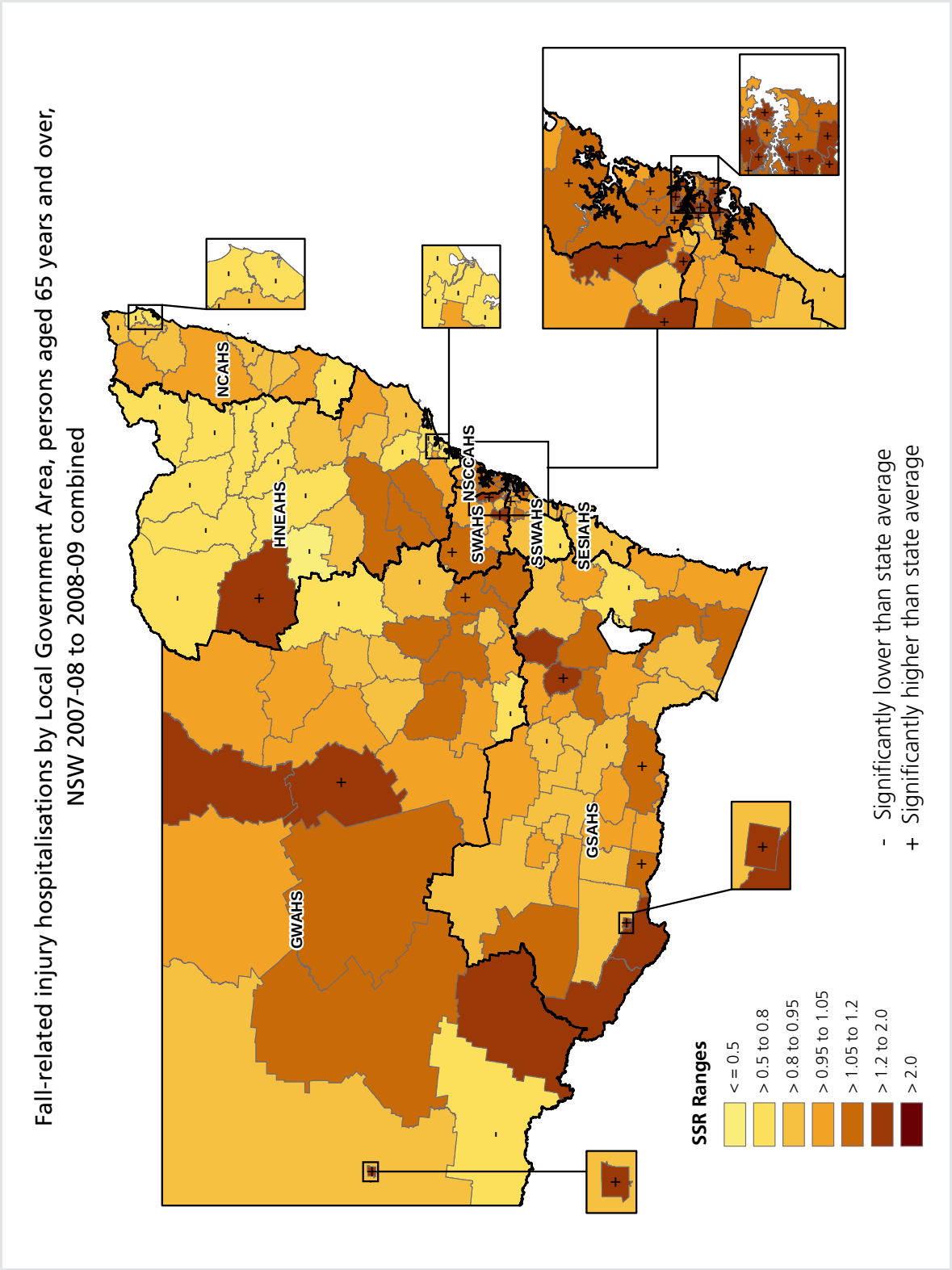
In 2002, just over five million people died from injury or poisoning worldwide. This equates to around 14,100 people dying each day and gives a rate of 83 per 100,000 of population. For each person who dies of injuries there are several thousand individuals who survive and are left with permanent disabilities.

In Australia, injury remains a leading cause of death, illness and disability. In 2008, 8,804 people died as a result of injury (including poisoning) as a leading cause of death, accounting for just over 6% of all deaths. Injury was the leading cause of death in people aged 1-44 years, and caused half of all deaths in this age group. Just over 543,000 hospitalisations in Australia in 2008-09 were attributed to injury and poisoning as a principal diagnosis. Nationwide, inpatient health system costs due to injury are $4.0 billion per annum, around 8.0% of total recurrent health expenditure. In NSW, the total direct health-system cost due to injuries is estimated to be around $1.16 billion per year.

Injuries are often preventable. Effective injury prevention strategies have been developed for a wide-range of potential causes of injury. For example, balance and strength training is effective in reducing falls in older people, fencing around private swimming pools has reduced childhood drownings and seat-belt and drinking-driving legislation together with measures relating to vehicle and road design have greatly increased road safety.

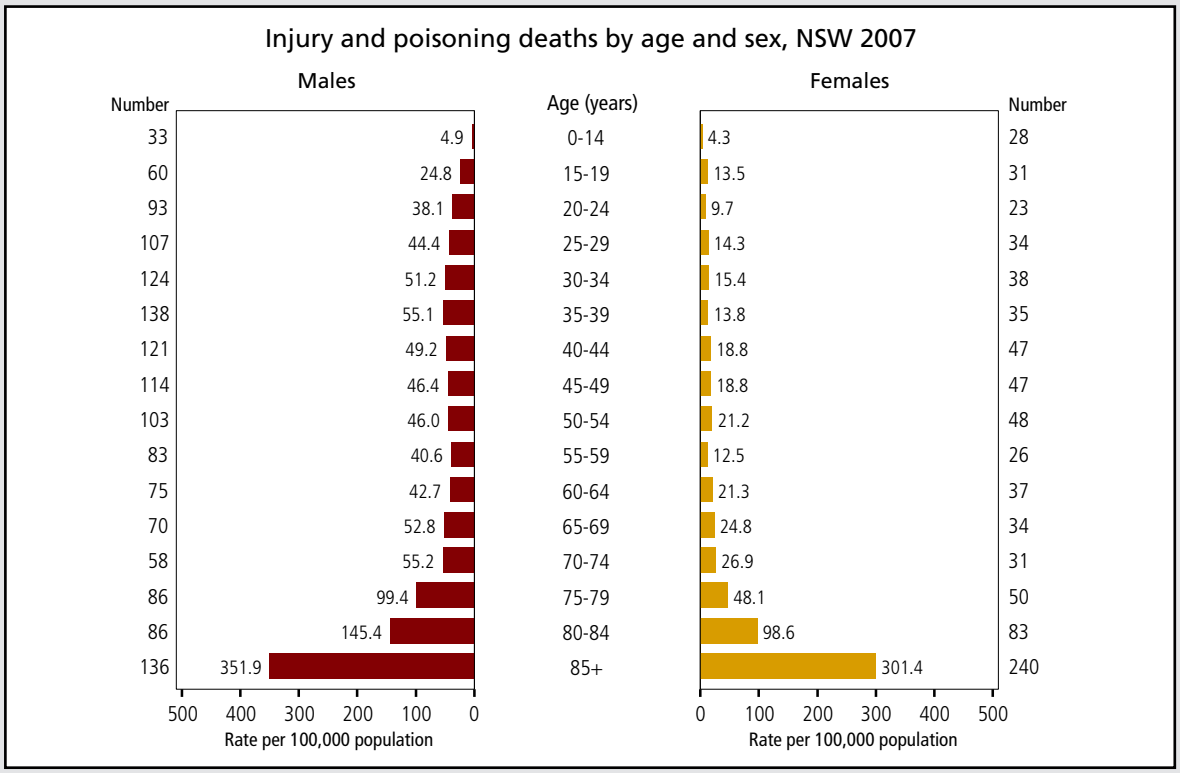
Key points

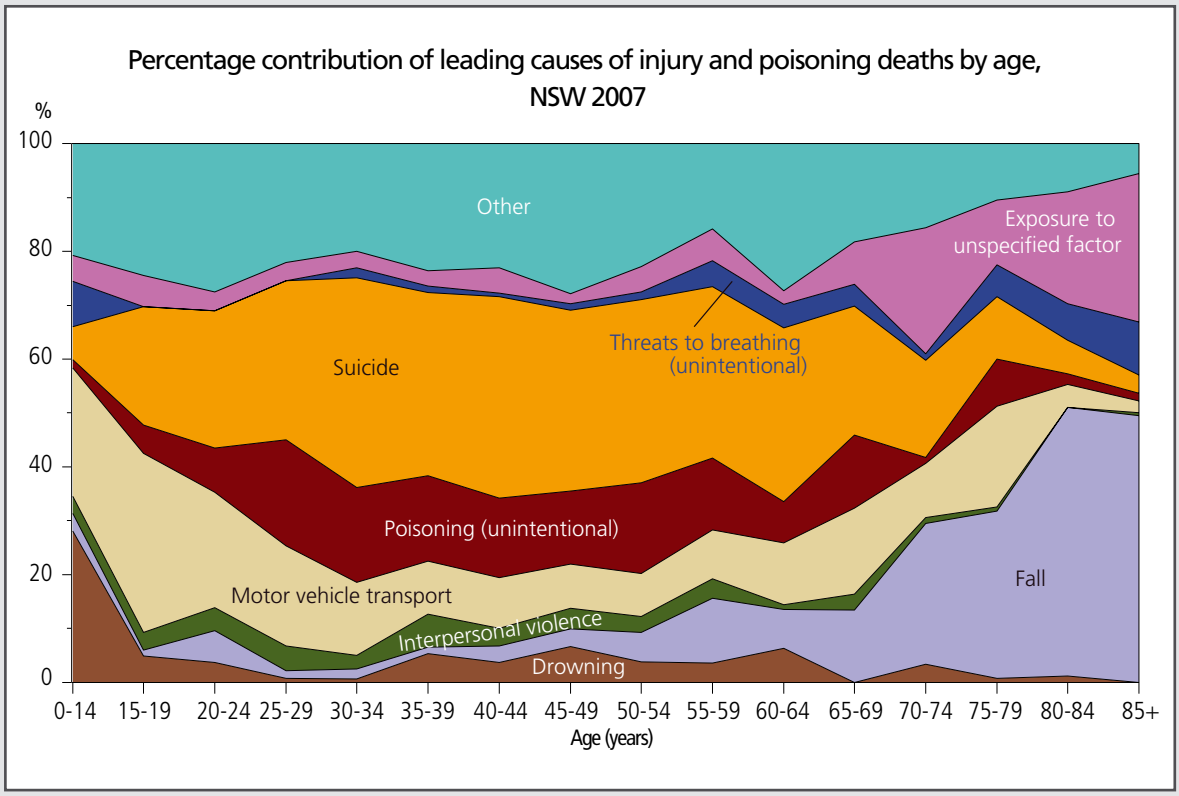
- There were around 3,300 injury-related deaths in 2007 and 160,000 injury-related hospitalisations in 2008-09 in NSW.
- Injury and poisoning is the leading cause of death among people aged 1 to 45 years.
- In the period 2006 to 2007, the most common causes of injury-related deaths were suicide, falls, motor vehicle crashes and unintentional poisoning.
- In the period 2008-09, the most common causes of injury-related hospitalisations were falls, motor vehicle crashes and interpersonal violence.
- In recent years, death rates have declined for:
  - injuries and poisonings overall
  - motor vehicle crash injuries
  - injuries to pedestrians
  - alcohol-related injuries
  - drowning
  - firearm-related deaths.
- Hospitalisation rates have decreased for:
  - unintentional poisoning
  - scalds in young children
  - firearm-related injuries
  - workplace injuries.
- Hospitalisation rates have increased for:
  - injuries to motorcycle riders
  - fall-related injuries
  - injuries caused by knives
  - alcohol-related injuries.
- Males have much higher rates of death and hospitalisation than females for all major injury causes, except for falls among older people.
- Rates of death and hospitalisation from injury and poisoning are higher in remote areas than in metropolitan areas.



Note: Records relating to acute hospital transfer and statistical discharge were excluded. Numbers for the latest year include an estimate of the small number of interstate hospitalisations of NSW residents, data for which were unavailable at the time of production. Hospital separations were classified using ICD-10-AM. Indirect age and sex standardisation was used to calculate standardised incidence ratios, and then Bayesian smoothing was used to calculate the smoothed ratios (see Methods).

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

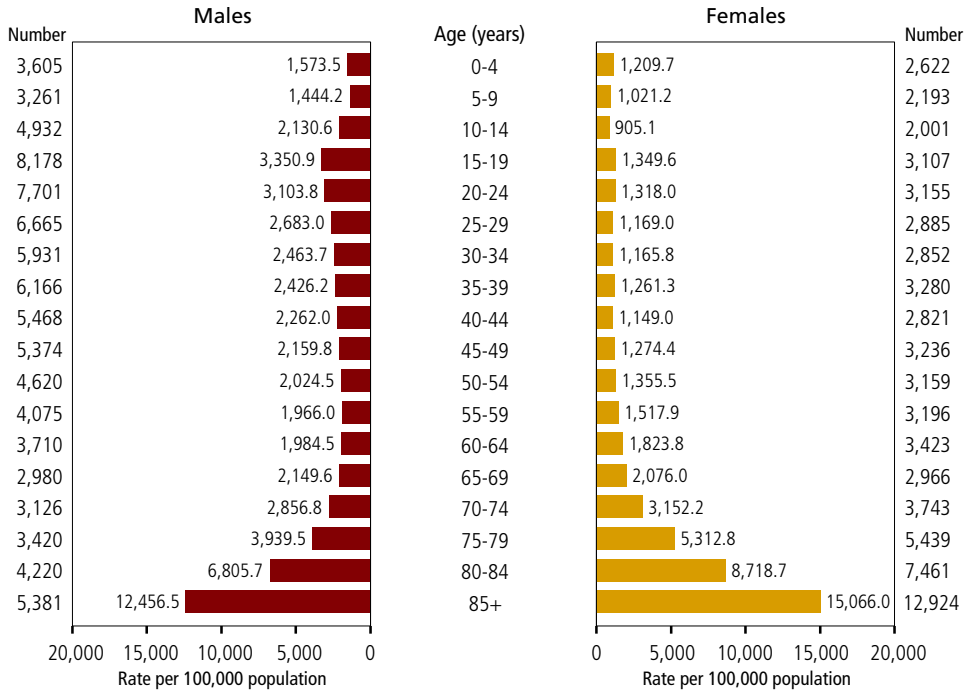




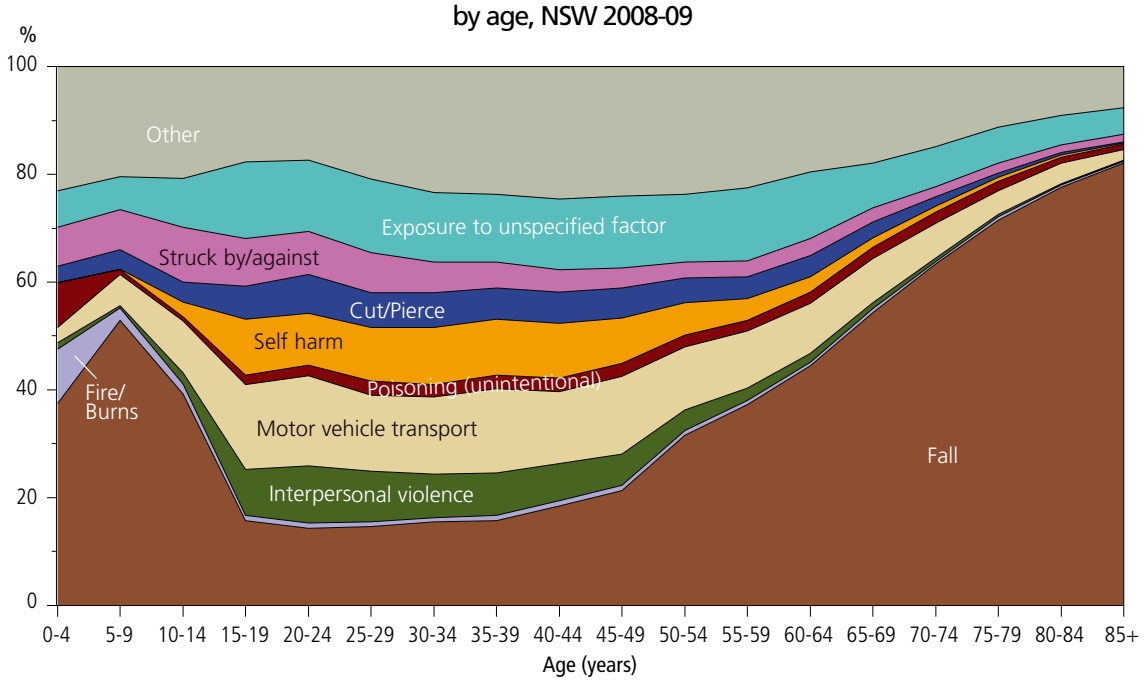
Note: Deaths were classified using ICD-10. Grouping follows ICD-10 categories. See ICD Codes for diseases and procedures for details. Numbers for 2007 include an estimate of the small numbers of deaths that were registered in 2008, data for which were unavailable at the time of production. All injuries known to be intentional were classified as suicide or interpersonal violence, regardless of the cause of the injury.

Source: ABS mortality data and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Injury and poisoning hospital separations by age and sex, NSW 2008-09



Percentage contribution of leading types of injury and poisoning hospital separations by age, NSW 2008-09



Note: Hospital separations were classified using ICD-10-AM. See ICD Codes for diseases and procedures for details. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations, data for which were unavailable at the time of production. Records relating to acute hospital transfer and statistical discharge were excluded.

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.6 Mental health

Introduction

Mental ill health is one of the leading causes of nonfatal burden of disease and injury in Australia. Mental problems are also associated with higher rates of health risk factors, poorer physical health and higher rates of deaths from many causes including suicide. Mental ill health was estimated to account for 13% of the disease burden in Australia in 2003, with anxiety and depression, alcohol abuse and personality disorders accounting for almost three-quarters of this burden. Only 7% of the burden from mental disorders is due to mortality, most of which is accounted for by fatal outcomes associated with substance abuse.

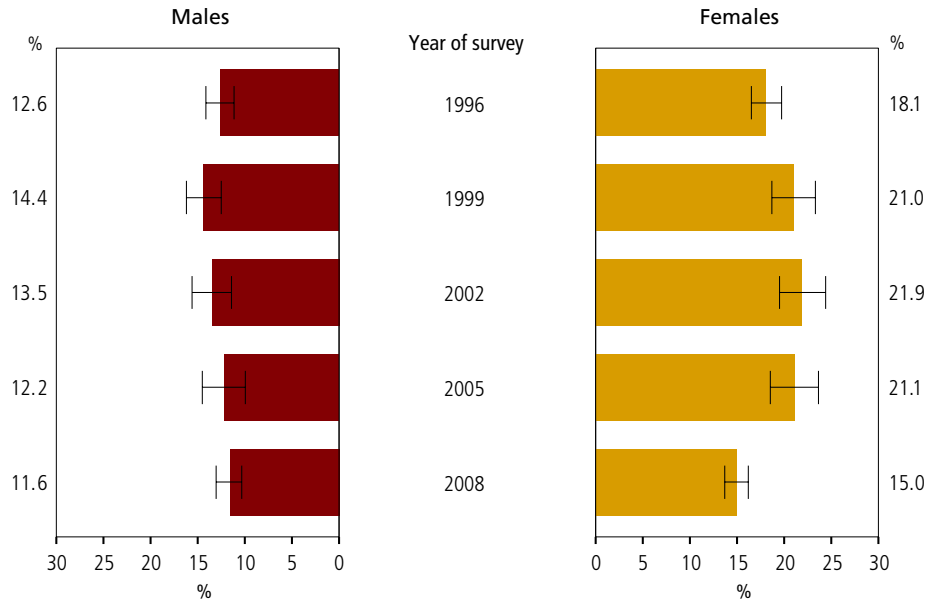
A range of early intervention, prevention and promotion initiatives are in place in NSW to cover the age spectrum alongside clinical care. These include: integrated perinatal and infant care focusing on the antenatal and post-natal periods; supportive programs for children whose parents have mental illness; the NSW School-Link initiative to improve the understanding, recognition, treatment and prevention of mental health problems in children and adolescents; the Early Psychosis Program for young people with first onset psychosis; and the Housing and Accommodation Support Initiative (HASI) for people with mental illness, which supports people with mental health problems to access safe, stable and affordable housing to enable them to live successfully in the community.

NSW is also implementing the NSW Aboriginal Mental Health and Well Being Policy 2006-2010 and finalising the whole of government NSW Suicide Prevention Strategy 2010-2015. New South Wales: A New Direction for Mental Health is a five-year plan to provide improved access to a greater range of mental health services in NSW. The plan, which was published in June 2006, aims to balance hospital focused care with community care.

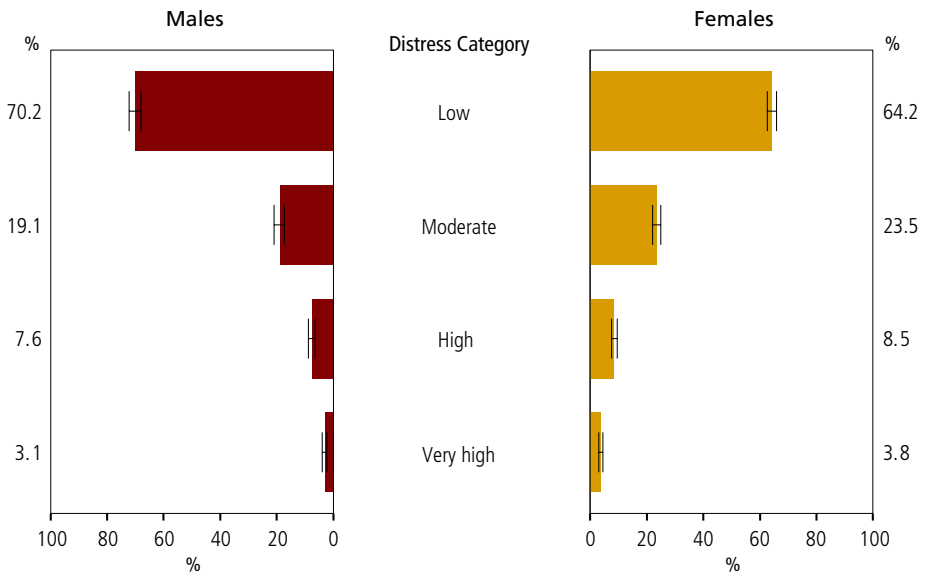
Key points

- In 2009 in NSW, around 12% of adults (11% of males and 12%of females) reported high or very high levels of psychological distress.
- Around 3% of adults in NSW report very high levels of psychological distress and overall adults cut down on their activities in almost 1 day per month on average due to psychological distress.
- Overall suicide rates have been dropping in NSW since 1997 but, still, 515 people died by suicide in 2007 and this was 2% greater than in the previous year. Males accounted for almost 76% of suicides in 2007.
- In 2008-09, there were more than 9,000 hospitalisations of NSW residents for intentional self harm. Females accounted for 60% of these hospitalisations.
- In 2009, around 1% of NSW children aged 17 years or under were prescribed stimulant medication for attention deficit hyperactivity disorder (ADHD). This was well below the estimated prevalence of ADHD.
- In 2008, 13.3% of high school students reported high levels of psychological distress in the last six months (11.6% of males and 15% of females). The proportion of students reporting high levels of psychological distress has decreased since 1996.
- In 2009 in NSW a lower proportion of older adults had high levels of psychological distress than the overall adult population in NSW.
- A higher proportion of younger adults had high levels of psychological distress than the overall adult population in NSW in 2009.
- The least socioeconomically disadvantaged adults had lower levels of psychological distress than the overall adult population in NSW.
- The proportion of adults reporting high and very high levels of psychological distress did not change during the previous decade.

High psychological distress in previous 6 months by sex, secondary school students aged 12-17 years, NSW 1996 to 2008



Psychological distress by category and sex, persons aged 16 years and over, NSW 2009



Note: TOP GRAPH: Estimates are based on the following numbers of respondents for NSW: 1996 (4,712), 1999 (3,419),2002 (3,254), 2005 (2,644), 2008 (7,285). The indicator includes those students who answered 'almost more than I could take' to questions about feelings of unhappiness or sadness or depression, nervousness or stress or pressure, or being in trouble because of their behaviour in the last 6 months. BOTTOM GRAPH: The K10 is a 10-item questionnaire that measures the level of psychological distress in the most recent 4-week period. The categories shown for the K10 scores are low (K10 between 10 and 15.9), moderate (K10 between 16 and 21.9), high (K10 between 22 and 29.9), and very high (K10 of 30 and over). Estimates are based on 10,466 respondents in NSW. For this indicator 69 (0.65%) were 'not stated' (Don't know or Refused) in NSW. Bars show lower and upper limits of the 95% confidence interval for the point estimate.

Source: TOP GRAPH: NSW School Students Health Behaviour Survey (HOIST) and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: NSW Population Health Survey (HOIST), and population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.7 Oral health

Introduction

Oral health is an integral component of lifelong health and is much more than the absence of oral disease. Oral health includes a person's comfort in eating and social interactions, their self-esteem and satisfaction with their appearance.

In recent years, dental caries was the most prevalent health problem, and periodontal diseases were the fifth most prevalent health problem in Australia. About 90% of all tooth loss can be attributed to these two health problems and, because they are preventable and treatable, most tooth loss is avoidable. In recent decades, factors such as changes in diet, reduced sugar consumption, exposure to fluoride, and changes in disease management, have contributed to significant improvements in oral health. Australians in all states and territories enjoy a relatively high standard of oral health. However, this high standard is not equally distributed among different age and social groups.

Oral health is affected by a complex interplay of social, environmental, and economic factors that extend beyond risk behaviour. Specific population groups, such as refugees and prison inmates, continue to experience extensive oral disease.

Currently, public health effort is focused on identifying disadvantaged populations that require special attention and, in the NSW population as a whole, on oral health promotion, disease prevention and improving access to services. This chapter presents an overall picture of the oral health of the people of NSW.

Water fluoridation is the most effective, cost-effective, equitable and safe means of providing protection from tooth decay. In 2003, NSW Health developed a coordinated, strategic, multidisciplinary approach to water fluoridation in order to reduce the growing inequalities in oral health. This approach has been successful, and many councils in NSW either voted or had been directed to fluoridate their community water supplies. As a consequence, the proportion of the NSW population without access to fluoridated water in their main supply will decrease from 8.6% in 2006 to 3.4% in 2009.

Data presented in this chapter come from four main sources. The NSW Population Health Survey was the source for data on dental status and ambulatory treatment patterns in adults, and on treatment patterns in children. Data on hospitalisations for the removal or restoration of teeth and ambulatory care sensitive conditions came from the NSW Admitted Patient Data Collection. Data on water fluoridation by Area Health Service has been supplied by the NSW Centre for Oral Health Strategy.

Key points

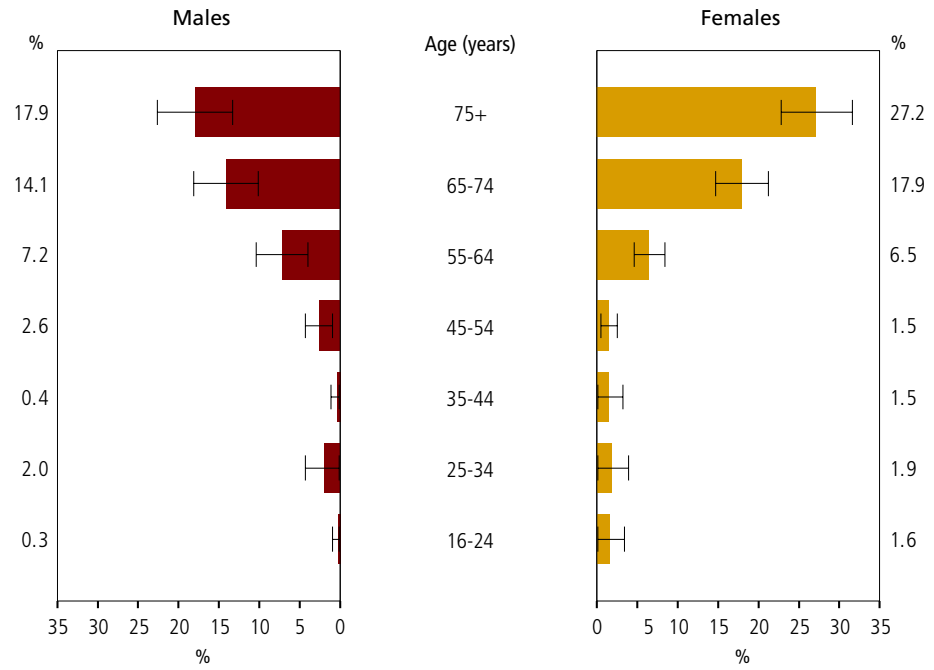
Overall, oral health in NSW is good by world standards. However, oral health varies with age and among population subgroups.

- Among children:
  - more than half have no evidence of tooth decay
  - 12% attended a public dental service on 1 or more occasions in the last 12 months. 94.2% of parents or carers of children aged 0-15 years gave a positive rating to the public dental care the child received
  - hospitalisations for the removal or restoration of teeth due to dental decay have not increased in recent years in older children and have decreased in toddlers
  - an increasing proportion of hospitalisations for dental decay has been occurring in private hospitals.

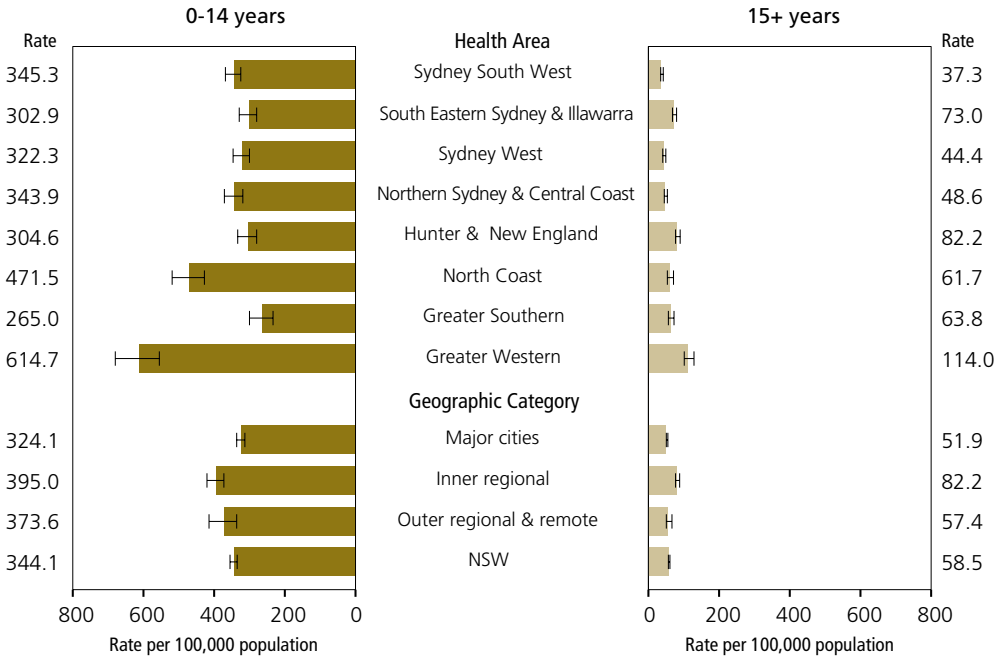
- Among adults:
  In Australia:
  - the average number of decayed, missing or filled teeth has fallen from 14.9% to 12.6% in the last two decades
  - In 2004-06 there was an average of eight fewer decayed, missing or filled teeth among the fluoride generation (born after 1967) compared with older Australians.

  In NSW:
  - Just over 1 in 20 adults have no natural teeth
  - around 60% visit a dentist every year
  - around one-third have a filling each year
  - hospitalisations for the removal or restoration of teeth due to dental decay have increased in recent years, with an increasing proportion occurring in private hospitals.

All natural teeth missing by age,
persons aged 16 years and over, NSW 2009



Removal and restoration of teeth for dental caries: hospitalisations by Area Health Service,
persons aged 0-14 years and 15 years and over, NSW 2008-09



Note: TOP GRAPH: Estimates are based on 5,918 respondents in NSW. For this indicator 11 (0.19%) were 'not stated' (Don't know or Refused) in NSW. BOTTOM GRAPH: Hospital separations were classified using ICD-10-AM. Numbers for 2008-09 include an estimate of the small number of interstate hospitalisations of NSW residents, data for which were unavailable at the time of production.

Source: TOP GRAPH: New South Wales Population Health Survey. Centre for Epidemiology and Research, NSW Department of Health. BOTTOM GRAPH: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.8 Pregnancy and the newborn period

Introduction

The health of Australian mothers and babies is generally good by world standards. Maternal deaths are rare, and perinatal mortality rates continue to decline. There were 294,205 births in Australia in 2007 (one-third in NSW), an increase from 2006 of 12,036 (4.3%) births. The total fertility rate in Australia in 2008 of 1.97 babies per woman, was the highest since 1977 and the fertility of women aged 30-34 years was the highest of all age groups. The median age of mothers in 2007 was 30.0 years; the percentage of mothers aged 35 years or older was 22.3% and teenage mothers was 4.1%. In 2008 there were 15,011 births registered in Australia where at least one parent was Aboriginal and the total fertility rate for Aboriginal women was 2.52 babies per woman.

In the period 2003 to 2005, in Australia, there were 65 maternal deaths (ie either during pregnancy or within 42 days of the end of pregnancy) that were directly or indirectly related to pregnancy or its management. In NSW there were 16 maternal deaths in the same period.

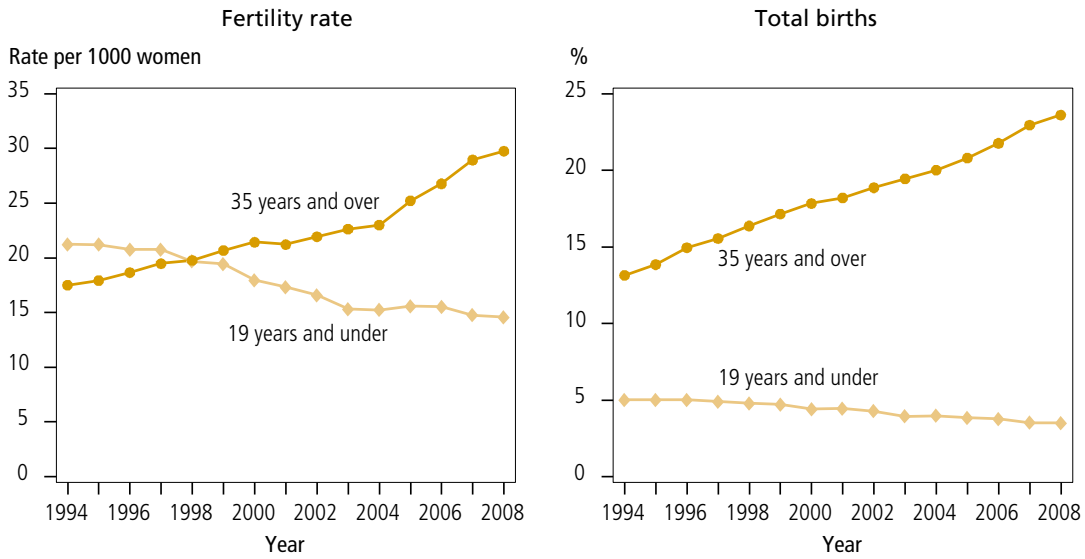
In 2007, NSW ranked third highest in Australia for spontaneous vaginal delivery of babies (60.3% of all deliveries compared with the Australian average of 57.9%) and had the third lowest caesarean section delivery rate (29.0%, compared with the Australian average of 30.9%). NSW also had the lowest rate of low birth weight babies (less than 2,500 grams in weight) of 5.7% of all babies, compared with an Australian average of 6.2% in 2007.

Aboriginal mothers and babies, those from socio-economically disadvantaged areas and some country-of-birth groups, continue to experience worse outcomes than other NSW mothers and babies. This chapter presents information on the main indicators of maternal and perinatal health in NSW, including trends in fertility rates, teenage pregnancy, prenatal diagnosis, low birth weight and premature babies, neonatal morbidity, perinatal mortality, maternal deaths and information on peri-conceptional folate supplementation.

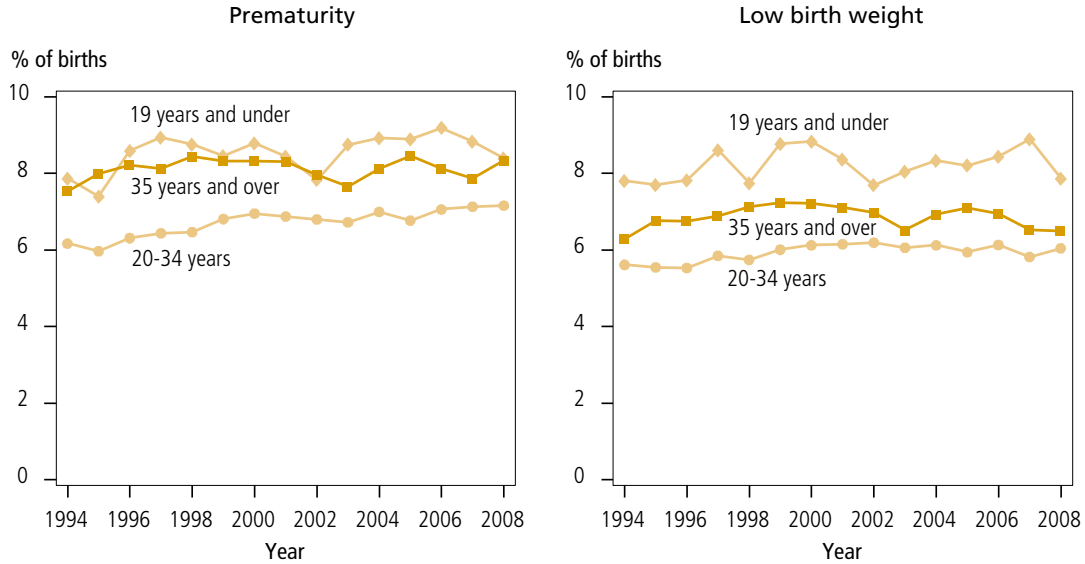
Key Points

- In 2008, 95,196 births occurred in NSW.
- The average woman in NSW can currently expect to give birth to 1.9 babies in her lifetime.
- Among NSW mothers:
  - teenage mothers account for 4% of all births, while mothers aged 35 years and over account for 24% of all births
  - 55% of mothers take folate supplements, both one month before and in the first trimester of pregnancy, as recommended to prevent neural tube defects, with 47% of mothers without tertiary qualifications compared with 66% of mothers with tertiary qualifications taking folate supplements as recommended
  - around 87% make their first antenatal visit before 16 weeks and 93% before 20 weeks gestation
  - around 12.9% report smoking during pregnancy, with this percentage varying markedly according to Local Government Area of residence.
- Among NSW babies:
  - around 7.5% are born prematurely, and 6.2% are of low birth weight
  - babies born to teenage mothers had the highest rates of prematurity (8.4%) and low birth weight (7.9%)
  - around 15% of live born babies were admitted to a neonatal special care nursery or a neonatal intensive care unit.
  - there were 785 perinatal deaths in NSW in 2008. Almost half of the perinatal deaths were related to the length of gestation and fetal growth.

Fertility and births by maternal age, NSW 1994 to 2008



Prematurity and low birth weight, mothers aged 19 years and under, 20-34 and 35 years and over, NSW 1994 to 2008



Note: TOP GRAPH: Age-specific fertility rate and total births include births for which the woman's age was not stated. Fertility rate is the number of livebirths that were reported from NSW public and private hospitals per 1,000 female population. Total births include stillbirths, but not miscarriages prior to 20 weeks gestation or terminations. BOTTOM GRAPH: Low birth weight: less than 2,500 grams. Premature birth: less than 37 weeks gestation. Rates of prematurity and low birth weight include both stillbirths and livebirths. Births in NSW to women from interstate were included, but not births to NSW residents occurring interstate.

Source: NSW Midwives Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

7.9 Communicable diseases

Introduction

Under the Public Health Act 1991, laboratories, hospitals, medical practitioners, schools and child care centres must notify the NSW Department of Health or their local public health unit of diagnoses of certain diseases. For some diseases a notification triggers a public health response by the public health unit, such as immunisation or prophylactic treatment of contacts. Notifications also provide valuable information that is used for planning and evaluation of prevention programs. Doctors, hospital staff, and laboratory staff reported 70,904 cases of notifiable diseases among NSW residents in 2009 (including 11,308 cases of H1N1 influenza).

The number of notifications received for any particular condition is almost always an underestimate of the number of cases that actually occur. For a condition to be notified a patient must seek medical help, be diagnosed with the condition, in some cases must have the appropriate laboratory tests done and then the diagnosis must be reported. Nonetheless, communicable disease notifications provide valuable information on disease patterns in NSW.

Among the most frequently reported notifiable conditions in 2009 were:

- Chlamydia trachomatis infections: 14,923 cases (215.4 per 100,000 population)
- Pertussis: 12,567 cases (185.8 per 100,000 population)
- Hepatitis C: 3,935 cases (56.9 per 100,000 population)
- Salmonella infections: 2,719 cases (38.9 per 100,000 population)
- Hepatitis B: 2,661 cases (38.5 per 100,000 population).

Conditions in 2009 with the most marked **declines** compared to previous years included:

- Measles: 19 cases, compared with 39 cases in 2008
- Arboviral infection: 1409 cases, compared to the 1837 cases in 2008 with a decline across all types of arboviral infections
- Haemolytic uraemic syndrome: 4 cases, compared with the 17 cases in 2008, a decrease of 76%
- Mumps: 39 cases, compared with 76 cases in 2008 and 318 cases in 2007
- Psittacosis: 22 cases, compared with 40 cases in 2008
- Rubella: seven cases, a 59% decrease compared with the 17 cases in 2008.

Conditions in 2009, with the most marked **increases** compared to previous years included:

- Pertussis: 12,567 cases, an increase of 40% compared to the 8,754 cases in 2008 and increase of 500% compared to the 2,098 cases in 2007
- Cryptosporidiosis: 1,459 cases compared to the 542 cases in 2007, an increase of 170%
- Hepatitis A: 96 cases compared to 69 cases in 2008, an increase of 40%
- Shigellosis: 153 cases, up from 107 cases in 2008, an increase of over 40%
- Chlamydia trachomatis infections: 14,923 cases, the rate has increased from 168.5 cases per 100,000 in 2005 to 215.4 cases per 100,000 , an increase of 30%
- Salmonella infections: 2,719 cases up from 2,166 cases in 2005, an increase in rates of notification of 20%
- Brucellosis: Five cases reported up from one case on 2008.

Key Points

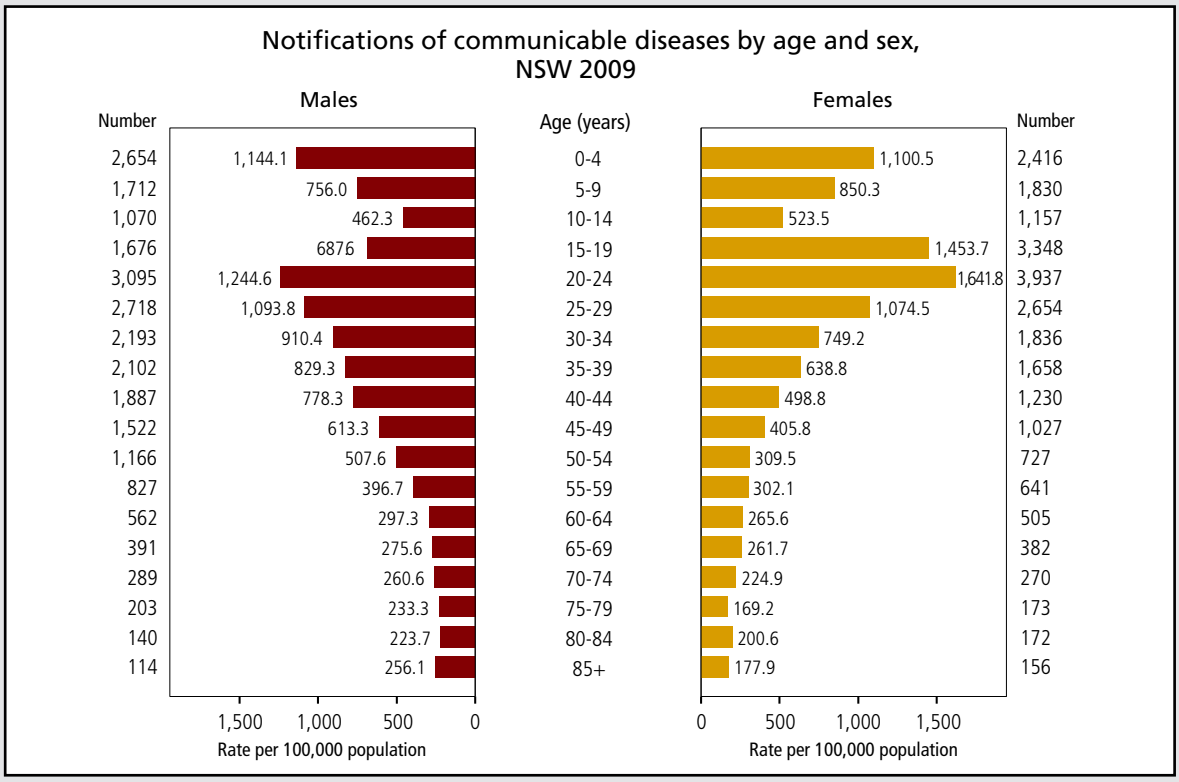
- At the end of 2009, 92.1% of children aged 12-15 months in NSW were fully immunised.

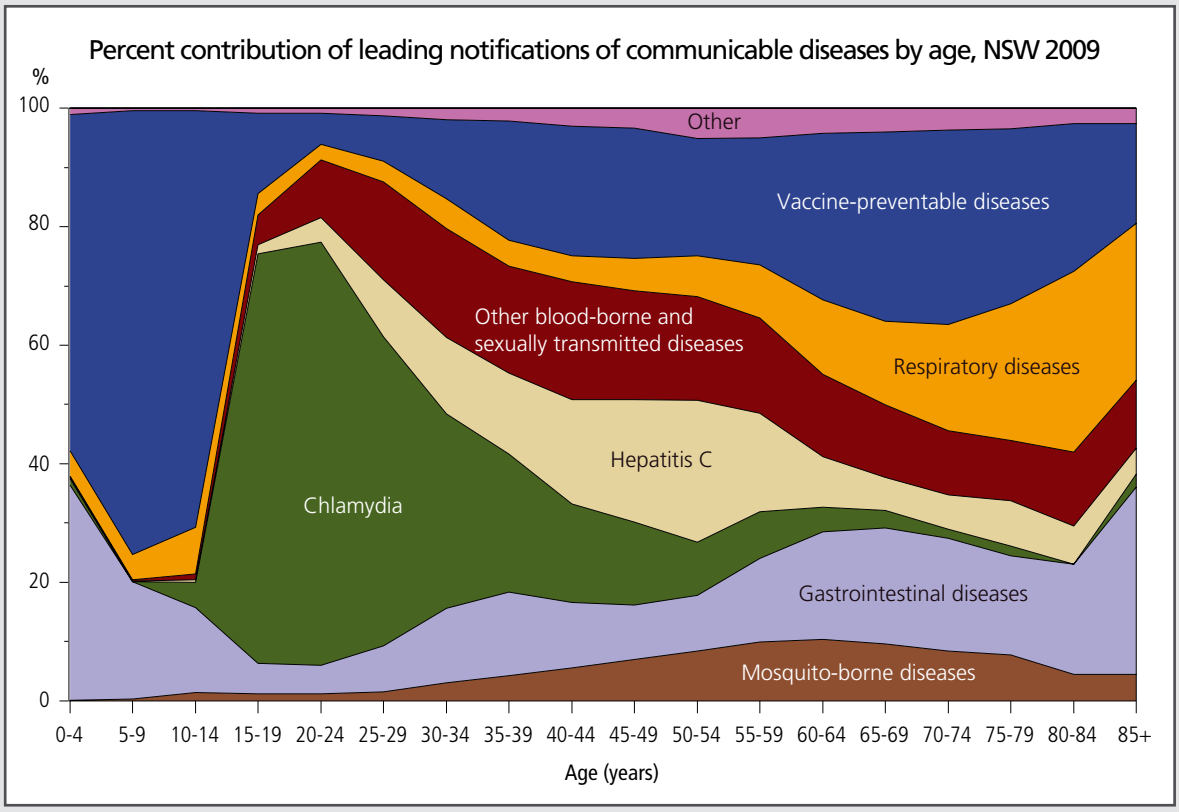
- In 2009, 7 cases of meningococcal serogroup C disease was notified; the lowest numbers recorded for this vaccine preventable diseases since 1991.

- In 2009, 14,923 cases of chlamydia infection were notified. Notifications of chlamydia have risen steeply since June 1999 and it is now the most frequently notified communicable disease.

- The number of infectious syphilis notifications have increased from 224 in 2006, to 506 cases in 2009.

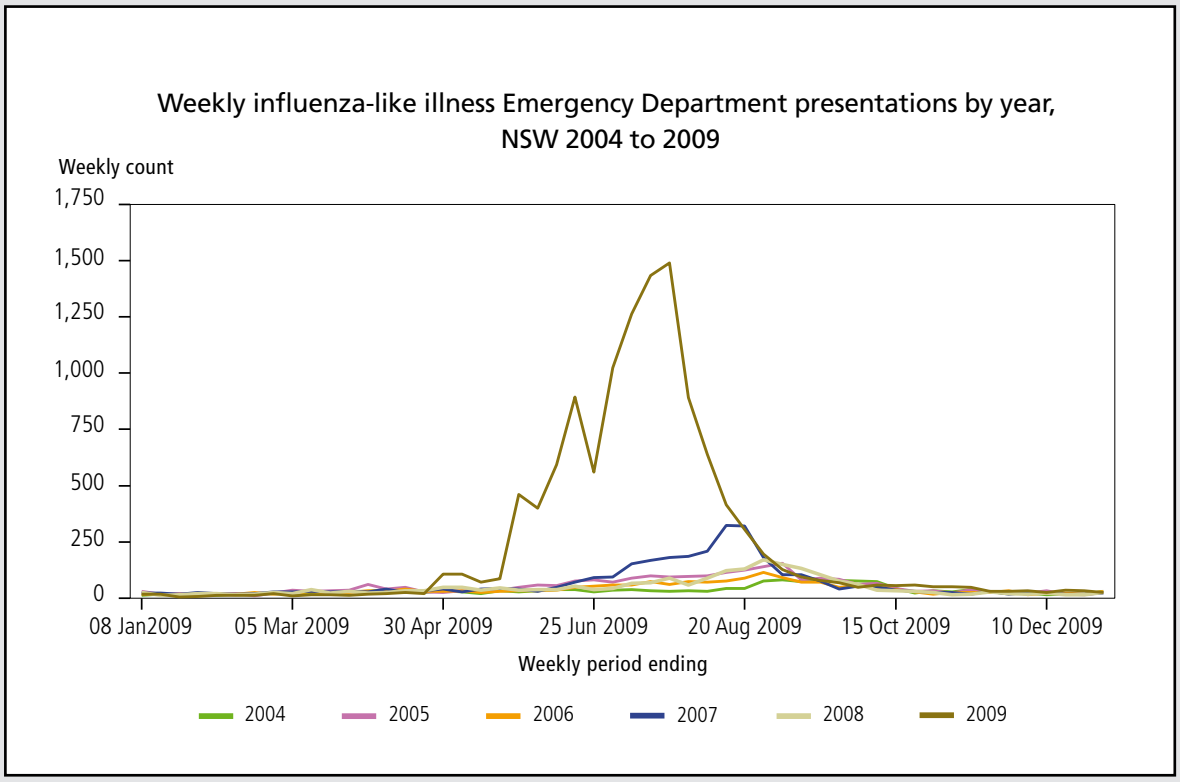
In 2009, countries throughout the world were affected by an influenza pandemic caused by the pandemic (H1N1) 2009 virus. In NSW, the epidemic of the virus started in mid June 2009, and peaked by mid July 2009 (with around 1500 visits in one week to the Emergency Departments of NSW hospitals for influenza-like illnesses). The usual annual weekly peak number of visits for influenza-like illness is around 150. Children, and adults (particularly those aged 35 to 59 years) were most susceptible to the infection, and, unlike in non-pandemic years, older adults (aged 60 years and over) were relatively protected from the disease.

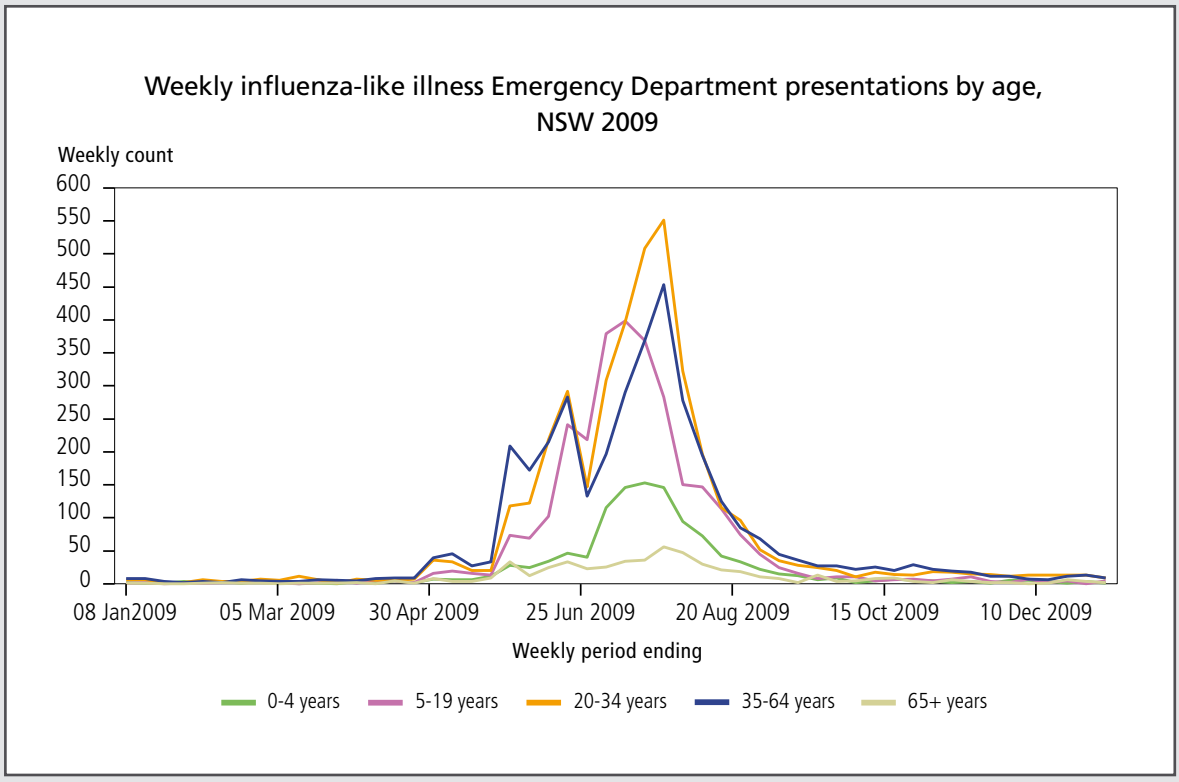




Note: TOP GRAPH: Rates were age-adjusted using the Australian population as at 30 June 2001.

Source: NSW Notifiable Conditions Information Management System, NSW HIV/AIDS Database and ABS population estimates (HOIST). Centre for Health Protection and Centre for Epidemiology and Research, NSW Department of Health.





Note: Based on principal provisional Emergency Department diagnoses. Includes metropolitan Emergency Departments and selected medium to large rural Emergency Departments.

Source: Emergency Data Collection (EDDC), HOIST, Centre for Health Protection and Centre for Epidemiology and Research, NSW Department of Health.

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APPENDIX 1 - EXPLANATORY NOTES AND SOURCES FOR INDICATORS IN THIS REPORT

DETERMINANTS OF HEALTH		
Social determinants	**Explanatory notes**	**Source**
Unemployment rate	Unemployed are 15 years and over, not employed, available and actively looking for work. Unemployment rate is a proportion of unemployed to a sum of employed and unemployed in civilian population aged 15 years and over (that is, to labour force)	Australian Bureau of Statistics*
Student retention to Year 12	School retention rate is a proportion of enrolled in Year 12 to all in a cohort who started secondary schooling	Australian Bureau of Statistics*
Household weekly income	Household weekly income is the sum of the individual incomes of each resident present in the household aged 15 years and over	Australian Bureau of Statistics*
Health-related behaviours	**Explanatory notes**	**Source**
Adequate physical activity	Total of 150 minutes of physical activity per week on 5 separate occasions is considered adequate.	NSW Population Health Survey
Overweight and obesity (16+ yrs)	Overweight is from Body Mass Index (BMI) 25, obese from BMI 30 in persons aged 16 years and over.	NSW Population Health Survey
Overweight and obesity in children	Overweight and obese in children are calculated from their Body Mass Index (BMI) score using Person-Body Mass Index Classification tables provided by AIHW. The indicator is a measure of children in grades K, 2,4,6,8 and 10.	NSW Schools Physical Acivity and Nutrition Survey*
Overweight and obesity in children (9-15 yrs)	Overweight and obese in children are calculated from their Body Mass Index (BMI) score using international cut off points by sex, between 2 and 18 years of age. This indicator is based on parental estimates of children's height and weight and if a parent or carer was unsure of a child's height and weight at the time of interview, they were asked whether they would measure the child and agree to being contacted again for that information.	NSW Population Health Survey
Recommended fruit consumption	At least 2 medium pieces or 4 small pieces of fruit are recommended daily for persons aged 16 years and over.	NSW Population Health Survey
Recommended vegetable consumption	At least 2.5 cups of cooked vegetables or 5 cups of salad vegetables daily are recommended for persons aged 16 years and over	NSW Population Health Survey
Children free of dental caries (5-6 years)	Children assessed during clinical examination to have no past or present dental decay in their deciduous teeth (dmft=0).	National Child Dental Health Survey*
Current smoking	Includes daily and occasional smokers.	NSW Population Health Survey
Risk alcohol drinking	Risk drinking is more than 2 standard drinks of alcohol on any day.	NSW Population Health Survey
Recent illicit drug use (14+ years)	Includes any of the following illicit drugs used in the last 12 months: heroin, amphetamines, cannabis, ecstasy and cocaine.	National Drug Strategy Household Survey*
Vaccinated against influenza (65+ yrs)	Immunised against influenza in the last 12 months	NSW Population Health Survey
Vaccinated against pneumococcal disease in last 5 years (65+ yrs)	Immunised against pneumococcal in the last 5 years	NSW Population Health Survey

Note: All data sources are from HOIST, Centre for Epidemiology and Research, NSW Department of Health, unless otherwise stated or marked with * in which cases data are directly from the source.

BURDEN OF DISEASE		
Deaths	**Explanatory notes**	**Source**
All causes	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards.	ABS mortality data and population estimates
Potentially avoidable deaths	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards.	ABS mortality data and population estimates (HOIST). Population Health Information Development Unit (2006) and Page et al.(2006)
Hospitalisations	**Explanatory notes**	**Source**
All causes	Classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards.	NSW Admitted Patient Data Collection and ABS population estimates
Ambulatory care sensitive conditions	Classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards.	NSW Admitted Patient Data Collection and ABS population estimates. Population Health Information Development Unit (2006) and Page et al. (2007)
Other	**Explanatory notes**	**Source**
Life expectancy at birth	The Chiang method used in calculations.	ABS mortality data and population estimates
Life expectancy at age 65 years	The Chiang method used in calculations.	ABS mortality data and population estimates

HEALTH INEQUALITIES		
Pregnancy and the newborn	**Explanatory notes**	**Source**
Perinatal deaths	Counting all fetuses and infants who died within 28 days of birth, weighing at least 400 grams or (when birthweight is unavailable) having the corresponding gestational age (20 weeks) or body length (25 cm crownheel). Reported by 1,000 of all births (defined as above).	Australian Bureau of Statistics*
First antenatal visit before 14 weeks gestation	Women with at least one antenatal visit in the first 14 weeks of pregnancy	NSW Midwives Data Collection
Premature babies	Premature baby is born after fewer than 37 weeks gestation. Live and stillbirths are included.	NSW Midwives Data Collection
Low birth weight babies	Low birth weight is under 2,500 grams. Live and stillbirths are included.	NSW Midwives Data Collection
Teenage births	The percentage of teenage mothers is the number of livebirths among women aged less than 20 years as a proportion of the female population aged 15-19 years	NSW Midwives Data Collection
Infant motality	Infant mortality rate is the number of deaths in children within the first year of life per 1,000 live births	Australian Bureau of Statistics*
Other	**Explanatory notes**	**Source**
Immunisation coverage (12-15 months)	Received all vaccines on the National Immunisation Program (NIP) Schedule. hepatitis B, diphtheria, tetanus, pertussis, polio, Hib, pneumococcal, rotavirus, measles, mumps, rubella, meningococcal C.	Australian Childhood Immunisation Register*
Child mortality (1-4 yrs)	Number of deaths in children aged between 1 and 4 years. Rate per 100,000 population	Australian Bureau of Statistics*

Note: All data sources are from HOIST, Centre for Epidemiology and Research, NSW Department of Health, unless otherwise stated or marked with * in which cases data are directly from the source.

HEALTH PRIORITY AREAS		
New cases of cancer	**Explanatory notes**	**Source**
Cancer (all, lung, colorectal, melanoma, prostate, breast and cervical)	Classified using ICD-9 up to July 1999, ICD-O-2 up to June 2004 and ICD-O-3 onwards.	ABS population estimates and NSW Central Cancer Registry (cancer cases).
Cancer deaths	**Explanatory notes**	**Source**
Cancer (all, lung, colorectal, melanoma, prostate, breast and cervical)	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards.	ABS mortality data and population estimates.
Cancer biennial screening rates	**Explanatory notes**	**Source**
Breast cancer (50-69 yrs)	No adjustments for screening outside NSW BreastScreen program.	BreastScreen NSW (Cancer Institute NSW)*
Cervival cancer (20-69 yrs)	Adjusted for hysterectomy rates and opted-off.	NSW Cervical Screening Program (Cancer Institute NSW)*
Cancer five year survival	**Explanatory notes**	**Source**
All cancer	Relative cancer survival is the ratio of observed survival to that which would be expected in the absence of the cancer.	Cancer Institute NSW*
Other deaths	**Explanatory notes**	**Source**
Deaths (cardiovascular disease, chronic obstructive pulmonary disease (>65 yrs), asthma (5-34 years), injury and poisoning, fall-related)	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards.	ABS mortality data and population estimates.
Fall-related	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards using Australian Institute of Health and Welfare (diabetes-related).	ABS mortality data and population estimates.
Intentional self-harm	Classified using ICD-9 up to 1998 and ICD-10 from 1999 onwards. Coded as 'Suicide and self-inflicted injury' in ICD-9 and 'Intentional self-harm' in ICD-10.	ABS mortality data and population estimates.
Hospitalisations	**Explanatory notes**	**Source**
Arboviral infection, gonorrhoea, hepatitis A, hepatitis B, hepatitis C, salmonella infection (non-typhoid), Tuberculosis	Classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards.	NSW Admitted Patient Data Collection and ABS population estimates.
Fall-related	Classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards. Excludes day-only hospitalisations, transfers and statistical discharges.	NSW Admitted Patient Data Collection and ABS population estimates.
Intentional self-harm	Classified using ICD-9-CM up to 1997-98 and ICD-10-AM from 1998-99 onwards. Includes suicide (attempted) and purposedly self-inflicted poisoning or injury.	NSW Admitted Patient Data Collection and ABS population estimates.
Communicable diseases	**Explanatory notes**	**Source**
Arboviral infection, gonorrhoea, hepatitis A, hepatitis B, hepatitis C, Salmonella infection (non-typhoid), Tuberculosis	Includes only laboratory confirmed cases.	NSW Notifiable Conditions Information Management System and ABS population estimates.
Chlamydia	Notifiable from 1998.	NSW Notifiable Conditions Information Management System and ABS population estimates.
Measles, meningococcal disease, pertussis (whooping cough), syphillis (infectious)		NSW Notifiable Conditions Information Management System and ABS population estimates.
Pneumococcal infection	Notifiable from 1998. Includes only laboratory confirmed cases.	NSW Notifiable Conditions Information Management System and ABS population estimates.
Human immunodeficiency virus	Notifiable from 1985.	NSW HIV database and ABS population estimates.

Note: All data sources are from HOIST, Centre for Epidemiology and Research, NSW Department of Health, unless otherwise stated or marked with * in which cases data are directly from the source.

APPENDIX 2 - METHODS

2.1 Statistical methods

2.1.1 Crude rates

Crude rates represent an estimate of the proportion of a population that experiences an outcome during a specified period. It is calculated by dividing the number people with an outcome in a specified period by the number at risk during that period (typically per year).

It does not take into account the age structure of the population studied and can be misleading when long-term trends are examined - or geographic areas are compared - because age structures of populations may vary over time or among areas.

2.1.2 Age-adjusted rates

Age-adjustment of rates uses direct age-standardisation. This method adjusts for effects of differences in the age composition of populations across time or geographic regions. The directly age-standardised rate is the weighted sum of age-specific (five-year age group) rates, where the weighting factor is the corresponding age-specific standard population. For this report, the Australian estimated residential population (persons) as at 30 June 2001 was used as the standard population (Table 1). The same population was used for males and females to allow valid comparison of age-standardised rates between the sexes.

Ninety-five per cent confidence intervals around the directly standardised rates were calculated using the method described by Dobson et al. (1991). This method gives more accurate confidence intervals than the usual normal approximation for rarer conditions. Where the number of events is larger, the confidence intervals are equivalent to those calculated in the conventional fashion (Armitage, Berry & Matthews, 2002).

2.1.3 Life expectancy

Life expectancy at birth

Life expectancy at birth is an estimate of the average length of time (in years) a person can expect to live, assuming that the currently prevailing rates of death for each age group will remain the same for the lifetime of that person. In fact, death rates will almost certainly change over the lifetime of a person born now, owing to changes in social and economic conditions, changes in lifestyle, advances in health care and possibly the emergence of new diseases. However, because no-one knows what the death rates for each age group and sex will be in the future, the usual practice is to use the current rates of death to calculate life expectancy. For this report, estimates and confidence intervals for life expectancy were calculated using abridged current life tables based on five-year age groups, except for the first 5 years of life, which were split into 2 age groups 0-≤1 years and 1-4 years. The methods used are described in detail by Chiang (1984).

Life expectancy at age 65

The average number of additional years a person who has reached the age of 65 would expect to live if current mortality trends continue to apply is based on the age specific death rates for a given year. This measure assumes that death rates will remain constant for the next 20 to 30

TABLE 1: AUSTRALIAN STANDARD POPULATION (30 JUNE 2001)

Age (years)	Persons
0-4	1,282,357
5-9	1,351,664
10-14	1,353,177
15-19	1,352,745
20-24	1,302,412
25-29	1,407,081
30-34	1,466,615
35-39	1,492,204
40-44	1,479,257
45-49	1,358,594
50-54	1,300,777
55-59	1,008,799
60-64	822,024
65-69	682,513
70-74	638,380
75-79	519,356
80-84	330,050
85+	265,235
All ages	19,413,240

Source: ABS population estimates (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

years, a much more conservative assumption than the one used to calculate life expectancy at birth. For this report life expectancy was calculated using abridged current life tables based on five-year age groups.

2.1.4 Analysis of NSW Population Health Survey data

Data from NSW Population Health Surveys were weighted to adjust for differences in the probabilities of selection among subjects. These differences were due to the varying number of people living in each household, the number of residential telephone connections for the household and the varying sampling fraction in each Area Health Service. Post-stratification weights were used to reduce the effect of differing non-response rates among males and females and different age groups on the survey estimates. These weights were adjusted for differences between the age and sex structure of the survey sample and the Australian Bureau of Statistics 2007 mid-year population estimates (excluding residents of institutions) for each Area Health Service (CER 2010).

The 'Surveyfreq' procedure in SAS® for Windows Version 9.1 was used to calculate point estimates and 95% confidence intervals. This procedure uses the Taylor expansion method to estimate sampling errors of estimators based on a stratified random sample (SAS, 2009).

2.1.5 Analysis of trend in key population health indicators

Ten-year trends in key population health indicators were analysed using appropriate regression models to take into account outcomes in each year and estimate average change (linear trend) in outcomes over time. Where there was less than ten years of data available or strong evidence of a non-linear trend over ten years, trends were instead analysed over the most recent five years. No trend analysis was performed for indicators with less than five years of available data. A significance level of 5% was used to identify significant trends over time.

Negative-binomial regression models (Hilbe, 2007) were used to analyse age- and sex-adjusted trends in death rates, hospital separation rates, cancer incidence rates and communicable disease notification rates and to analyse age-specific trends in teenage birth rates, which were found to be over-dispersed in almost all cases. The average annual rate of change in these rates was determined by taking the exponent of the coefficient for the year, which was parameterised as a continuous variable.

Log-binomial regression models (Hardin & Hilbe, 2007) were used to analyse maternal age-adjusted trends in rates of perinatal deaths, first antenatal visit before 14 weeks gestation, premature and low birth weight babies by Aboriginality. Similar to negative-binomial regression models, the average annual rate of change in rates was determined by exponentiating the coefficient for the year variable.

Linear regression models (Neter et al., 1996) were used to analyse trends in life expectancy from birth and 65 years, immunisation coverage by Aboriginality and health-related behaviours population prevalence estimates obtained from the NSW Population Health Survey. Each outcome was log-transformed prior to modelling, to improve the assumption of linearity. The average annual rate of change in life expectancy and population prevalence was again calculated by taking the exponent of the coefficient for the year variable.

2.1.6 Analysis of key population health indicators by Area Health Service

Key population health indicators for Area Health Services (AHS) were compared with the NSW average by assessing the overlap appropriate 95% confidence intervals (CI). When the lower bound of the 95% interval for an AHS was above the upper bound of the 95% CI for all of NSW, the AHS indicator was considered to be higher than the NSW average. Conversely, when the upper bound of the 95% CI for an AHS was below the lower bound of the 95% CI for all of NSW, the AHS indicator was considered to be less than the NSW average. There was considered to be no difference between AHS and NSW average indicators when their respective 95% CI's overlapped.

Confidence intervals for life expectancy, NSW Population Health Survey estimates, immunisation coverage by Aboriginality, teenage births and all directly age-standardised rates were calculated using the methods previously described. Although only crude rates are presented for perinatal deaths, first antenatal visit before 14 weeks gestation, premature and low birth weight babies in tables, for analysis by AHS rates were first age standardised to the distribution of maternal age for all births (Aboriginal and non-Aboriginal) during

the study period and 95% CI were calculated using the method described by Dobson et al. (1991). Intervals used in comparisons of all other indicators were calculated assuming an approximate normal distribution.

2.1.7 Analysis of indicators by Local Government Area using statistical smoothing (Bayesian smoothing methods)

Mapping cases or rates of events of interest such as rates of deaths, cases of disease, or rates of smoking, can be informative in understanding the geographical distribution of the events. However, low numbers and rates can occur if the event is rare or if the areas studied have small populations. If numbers or rates are low, then they will also be very variable, since chance events will have an undue effect on the total number. Consequently, estimates of numbers or rates may be too changeable to be reliable for most purposes. Occasionally, there may not be any cases of interest at all in an area in a particular time period and the estimated rate for that area would be zero.

More reliable estimates of numbers and rates can be obtained by extending the length of time within which the cases are counted, or by increasing the size of the areas considered, but both these methods undermine the usefulness of the data. Another option is to apply statistical smoothing methods to data collected in smaller areas and for shorter periods. Statistical smoothing methods are used to improve the estimates for individual areas by including information on events in areas which are expected to be similar (such as adjacent areas) and general variability between all areas. Smoothing has the most effect for areas where the number of cases is the lowest. Rates can be estimated even when there were no cases in an area in the relevant period of time.

In this report, Bayesian smoothing was used to adjust raw estimates by taking information into account from adjacent areas (local or spatial variability) and from the whole state (global or non-spatial variability).

For indicators such as rates of hospitalisation, rates of death and other population-based indicators, Bayesian smoothing was obtained using the convolution or Besag, York & Mollie (BYM) model (Lawson et al, 2003). This model is widely used for disease mapping. The smoothed estimates calculated are the relative risk for each area compared to NSW, ie the standardised incidence ratio (SIR) for hospitalisations and the standardised mortality ratio (SMR) for deaths.

For indicators which are based on binary data, such as smoking in pregnancy, attendance at antenatal care and other proportions or percentages, smoothing was obtained by modelling the data using a binomial distribution with a logit link function. Smoothed proportions incorporate both local and global information, but are not age-standardised.

The results of the Bayesian smoothing were used to determine whether the results obtained from individual areas were significantly different from the estimate of the average for all areas. The level of significance and the direction of difference from the state average is shown using '+' and '-' signs. One plus sign means that the best estimate for an area is significantly greater than the state average at the 5% level of significance. Conversely, one minus sign means that the best estimate for an area is significantly lower than the state average at the 5% level of significance. If an area does not differ from the state, then no symbol is shown. All maps were produced using SAS® V9.1.3 (SAS, 2009).

The success of the Bayesian smoothing method depends largely on the degree of similarity between areas that are used in the calculations. In the case of Local Government Areas in NSW, similarity is very high and the method works well.

2.2 Methods used for specific chapters, topics or indicators

2.2.1 Rural and remote populations

The chapter on rural and remote populations presents a range of health indicators for NSW according to ARIA+, an enhanced Accessibility–Remoteness Index of Australia classification.

In ARIA+ the remoteness index value is based on road distance from a 'populated locality' to each of five categories of 'service centre'. Almost 12,000 populated localities in Australia have been classified. The service centre categories are based on population size, with the smallest centres having populations of 1,000-4,999. Centres with populations of at least 1000 persons are considered to contain at least some basic level of services (for example health, education, or retail) (GISCA,1999).

Service centres with larger populations are assumed to contain a greater level of service provision. ARIA+ scores are calculated for each populated locality and then interpolated to give index values for points on a one km grid covering all Australia. The index values range from 0 to 15 and are grouped into remoteness categories. There are five classes of remoteness: major cities, inner regional, outer regional, remote and very remote (AIHW, 2004). Census Collection Districts (CDs) are then assigned ASGC remoteness categories based on the average ARIA+ score of grid points within the CD. Statistical Local Areas (SLAs), which are larger than CDs, are then classified by the proportion of the population living in CDs in each ASGC remoteness category.

2.2.2 Country of birth

In September 2008, the six countries that comprise the Former Yugoslavia are: Bosnia and Herzegovina, Croatia, the Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Slovenia. An additional category: Former Yugoslavia, not further defined (nfd) is also included in some analyses by country of birth. Depending on the data source and the span of years, the Former Yugoslavia nfd, category may comprise all data concerning all six countries or only a small proportion of data that cannot be defined more precisely. Footnotes describe specific cases. Persons born in Yugoslavia comprised 1% of population of NSW and Australia at the time of the breakup of Yugoslavia in the early 1990s (ABS, 2008).

2.2.3 Socioeconomic status measures

Socioeconomic (SES) groups were constructed using the index of relative socioeconomic disadvantage (IRSD), which is one of the socioeconomic indices for areas (SEIFA) produced by the Australian Bureau of Statistics (ABS) (ABS, 1998, 2003, 2008). Non-overlapping geographical areas covering all of NSW are assigned an IRSD score calculated from ABS census data on various socioeconomic characteristics of the people living in the areas. These characteristics relate to occupation, education, non-English speaking background, Aboriginal origin and the economic resources of the household.

The ABS has released IRSD scores after the last five censuses. The methods used for calculation of the IRSD index were similar in 1986, 1991 and 1996, but changed for 2001 and 2006. The major change for the 2006 IRSD was that it was created based on a person's usual area of residence rather than their location on census night. The IRSD score is an ordinal measure based on a standard score of 1000 and standard deviation of 100 for Australia, based on the index scores of all collection districts (CDs) in Australia. The areas can be ranked by IRSD score but other arithmetic comparisons using the score are not valid. Only ranks and not the scores calculated using data from different censuses, can be compared. For instance, the score for NSW was 1006 using 1996 census data, which means that the SES of NSW was slightly better than Australia as a whole. The score for NSW in 1991 was 1002; however, that does not mean that NSW in 1996 was better off than NSW in 1991 because the scores were calculated based on a socioeconomically different Australian population. Calculation of the IRSD scores for a Local Government Area involves the weighting of the indexes based on the population for the particular year.

2.2.4 Potentially avoidable mortality

The method used to calculate potentially avoidable mortality in NSW in this report is based on a method described in ANZ Atlas of avoidable mortality (Page et al. 2006), which, in turn, is a revision of the original set of conditions and methodology developed by Tobias and Jackson (Tobias & Jackson, 2001). The Atlas is an authoritative source of information on avoidable conditions for Australia and New Zealand.

Avoidable deaths are defined as those which occur before 75 years and are due to avoidable causes. Avoidable causes are those whose case fatality could be substantially reduced either by currently available health care technologies (amenable causes) or by preventing the condition from occurring in the first place (preventable causes). To simplify and make the categorisation more stable over time, each condition classified as avoidable is ascribed totally to the preventable or amenable group, depending on which type of intervention plays a greater role in making the condition 'avoidable'. Only three conditions: diabetes, ischaemic heart disease and cerebrovascular diseases have been placed equally apportioned in both groups (Page et al. 2006) .

The codes used to define avoidable mortality groups, along with the sub-categorisation can be found in the disease and procedure codes section of this report.

2.2.5 Ambulatory care sensitive conditions

The method used to calculate potentially avoidable hospitalisations used the concept of ambulatory care sensitive (ACS) conditions. These are hospitalisations that could have been avoided through the use of preventive healthcare or early disease management given in an ambulatory setting, such as by a general practitioner or community health centre. The categories used for the ambulatory care sensitive conditions are based on those used by the Public Health Information Development Unit (PHIDU) of the Australian Institute of Health and Welfare (Page et al. 2007).

The information presented in this report differs from information presented in earlier editions. In July 2008 a change relating to the ICD-10-AM coding for gastroenteritis was required to align Australia with the World Health Organisation (WHO) coding requirements. A new code was included in the ACSS code set in NSW as its inclusion provides a more complete picture of the unspecified (both non-infective and unknown origin) gastroenteritis cases in NSW, which are considered to be able to be managed in an ambulatory care setting rather than on an inpatient basis.

The codes used can be found in the disease and procedure codes section of this report.

2.2.6 Diabetes-related deaths

The term 'diabetes-related death' is used in this report to refer to deaths where either diabetes was recorded as the underlying cause of death, or where diabetes was recorded as an associated cause of death and the underlying cause of death was one of a specific list of commonly recognised diabetes complications. These complications are: myocardial infarction, ischaemic heart disease*, stroke or sequelae of stroke*, heart failure*, sudden death (cardiac arrest), peripheral vascular disease, kidney disease, hyperglycaemia and hypoglycaemia (AIHW, 2005).

The reason for this approach was that, more than other disorders, diabetes often causes death indirectly because it is a strong risk factor for common causes of death such as heart, kidney disease and stroke. These complications are likely to appear as the underlying cause of death, the basis for official mortality statistics. As such, the contribution of diabetes to death rates in Australia is underestimated unless it is included as an associated cause of death (AIHW, 2005).

The concept of 'diabetes-related deaths' is based on the definition of 'death related to diabetes' used in the United Kingdom Prospective Diabetes Study (UKPDS) since 1998. The UKPDS definition has been modified by diabetes specialists on the National Diabetes Data Working Group, associated with the AIHW, to include additional conditions (marked above with an asterisk*) (AIHW, 2005).

2.2.7 Psychological distress

The K10 (Kessler & Mroczek, 1992, 1994; Kessler et al., 2002) was included in the 1997, 1998, 2002, 2005, 2006, 2007, 2008 and 2009 NSW Population Health Surveys as a relatively short measure of psychological distress that allowed comparison against international survey data and validation against concurrent diagnostic data in the National Survey of Mental Health and Wellbeing (NSMHW) (ABS, 1997; Andrews and Slade, 2001).

The K10 is currently being used in a series of surveys similar to the Australian NSMHW, in 20 countries, under the auspices of the WHO. These surveys have a total sample size of about 200,000. The WHO regions surveyed include North America (Canada and the United States), Latin America (Brazil, Colombia, Mexico and Peru), Europe (Belgium, France, Germany, Italy, The Netherlands, Spain and The Ukraine), the Middle East (Israel), Africa (South Africa) and Asia (China, India, Indonesia, Japan and New Zealand) (Kessler et al., 2000).

The K10 measure is a ten item self-report questionnaire intended to yield a global measure of 'psychological distress' based on questions about the level of restlessness, anxiety and depressive symptoms in the most recent four-week period. It is designed to span the range from few or minimal symptoms through to extreme levels of distress, which is an essential feature of an instrument for use in population studies. Thus the K10 contains both low-threshold items, that many people may endorse, through to high-threshold items that very few will endorse. Overall, the item-response scale is designed to yield most precision around the 90th to 99th percentile of the general population.

For each item there is a five level response scale based on the amount of time (from none through to all) during a four-week period when the person experienced the particular problem. In NSW, there are also four follow-up questions, that aim to quantify the level of disability resulting from the feelings of distress; the health service

usage resulting from the distress; and the extent to which the distress is believed to be mainly due to physical health problems.

Scoring of the raw questionnaire assigns between 1 to 5 points to each symptom in the direction of increasing problem frequency. Thus, the raw score range is from 10 (all responses to all questions are 'none of the time') through to 50 (all responses to all questions are 'all of the time'). Low scores indicate low levels of psychological distress and high scores indicate high levels of psychological distress (ABS, 2003).

The creators of the K10 have not yet published details on scoring the scale and there has been no international standard for determining cut off points for low, medium and high levels of psychological distress (ABS, 2003). Various interpretations of scoring were used in the past in Australia and worldwide. Recently and following the advice of the K10 originators, NSW adopted a four level approach to illustrate prevalence and severity. The four levels are given in Table 2.

These cut-off scores were previously used in the 2000 Health and Wellbeing Survey (conducted in Western Australia) and the ABS 2001 National Health Survey Summary of Results Publication (ABS, 2003). The adoption of the above scores in NSW ensures comparability of the NSW results with national and, increasingly, international data.

TABLE 2: K10 SCORE AND LEVEL OF PSYCHOLOGICAL DISTRESS

K10 score	Level of psychological distress
10-15	low
16-21	moderate
22-29	high
30-35	very high

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APPENDIX 3 - DISEASE AND PROCEDURE CODES AND GROUPS USED IN THIS REPORT

3.1 International Classification of Disease (ICD) codes

DISEASE GROUP	ICD-10 AND ICD-10-AM CODES USED FROM JULY 1998
Acute lower respiratory infection	J10-J22
Acute respiratory infection	J00-J22
Acute upper respiratory infection	J00-J06
Ambulatory care sensitive conditions	See separate table
Asthma	J45,J46
Burns and scalds	X00-X19
Cancer (all)	C00-C97
Cancer: bone	C40-C41
Cancer: brain	C71
Cancer: breast	C50
Cancer: cervical cancer	C53
Cancer: colorectal	C18-C21
Cancer: connective tissue	C47, C49
Cancer: Hodgkin's disease	C81
Cancer: leukaemia	C91-C95
Cancer: lung	C33-C34
Cancer: melanoma	C43
Cancer: Non-Hodgkin Lymphoma	C82-C85
Cancer: pancreas	C25
Cancer: prostate	C61
Cancer: testis	C62
Cancer: thyroid	C73
Cancer: unknown primary	C26,C39,C48,C76,C80
Cardiac arrhythmia	I47-I49
Cardiomyopathy	I42-I43
Cardiovascular diseases	I00-I99
Chronic diseases of tonsils & adenoids	J35
Chronic obstructive pulmonary disease	J41-J44
Chronic respiratory disease	J41-J46
Coronary heart disease	I20-I25
Cutting or piercing injury (unintentional)	W25-W29,W45
Diabetes	E10-E14, O24
Diabetes deaths	E10-E14 - Diabetes-related deaths: Underlying cause E10-E14, or associated cause E10-E14 with underlying cause E16.1-E16.2, I20-I22, I24-I25, I46, I50, I60-I64, I69.0-I69.4, I70-I74, N01-N28, R73
Diabetes: Gestational	O24.4
Diabetes: Other	E12, E13, E14, E12, O24.2, O24.3, O24.9
Diabetes: Type 1	E10, O24.0
Diabetes: Type 2	E11, O24.1
Dialysis	Z49
Digestive system diseases	K00-K93
Disorders of nose and nasal sinuses	J30-J34

DISEASE GROUP	ICD-10 AND ICD-10-AM CODES USED FROM JULY 1998
Drowning	W65-W74, V90, V92
Endocrine diseases	E00-E89
Exposure to unspecified factors injury	X59
Falls	W00-W19
Genitourinary diseases	N00-N99
Heart failure	I50
Influenza and pneumonia	J10-J18
Injury and poisoning (all external cause codes)	V00-Y89
Interpersonal violence	X85-Y09, Y87.1
Kidney disease	N01-N28
Maternal, neonatal and congenital causes	O00-Q99
Mental disorders	F00-F99
Mental disorders - adult personality disorders	F60-F69
Mental disorders-behavioural: due to physical factors	F50-F59
Mental disorders-behavioural: onset in child	F90-F98
Mental disorders-due to psychoactive substance	F10-F19
Mental disorders-mood disorders	F30-F39
Mental disorders-neurotic, stress-related	F40-F48
Mental disorders-organic	F00-F09
Mental disorders-psychological development disorders	F80-F89
Mental disorders-retardation	F70-F79
Mental disorders-schizophrenia	F20-F29
Mental disorders-unspecified	F99
Motor vehicle crash injury	V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.6, V20-V79, V80.3-V80.5, V81.0, V81.1, V82.0, V82.1, V83, V84-V86, V87.0-V87.5, V87.7-V87.8, V88.0-V88.5, V88.7-V88.8, V89.0, V89.2, Y85
Musculoskeletal	M00-M99
Myocardial infarction	I21-I22
Neoplasms - malignant	C00-C99
Nervous and sense disorders	G00-H95
Nonspecific lymphadenitis	I88
Pericarditis	I01.0, I09.2, I30-I32
Peripheral vascular disease	I70-I74
Pneumonitis due to solids and liquids	J69
Poisoning (unintentional)	X40-X49
Potentially avoidable deaths	See separate table
Respiratory diseases	J00-J99
Stroke	I60-I69, G45,G46
Stroke (selected)	I60-I64, I69.0-I69.4
Struck by/against injury	W20-W22, W50-W52
Suicide / Self harm	X60-X84, Y87.0
Symptoms and other ill defined conditions	R00-R99
Threats to breathing injury (unintentional)	W75-W84
Varicose veins	I83-I86
Note: External cause codes: ICD-10 or ICD-10-AM codes which begin with U-Y are external cause codes.	

3.2 International Classification of Disease (ICD) procedure codes

PROCEDURE	ICD-10 AND ICD-10-AM CODES USED FROM JULY 1998
Carotid endarterectomy	33500-00 in procedure codes 1-5
Coronary artery bypass graft	38497, 38500, 38503, 90201
Coronary artery bypass angioplasty/stent	35310, 35304-00, 30305-00
CT scan of the brain	56001-00, 56007-00, 56010-02, 56010-03 in procedure codes 1-5 with I60-I69 in diagnosis codes 1-11
Dental: Removal or restoration of teeth (procedures)	97311-97327, 97411-97679, 97386-00, 97387-00, 97388-00 or procedure block 457-458, 462-473
Revascularisation procedures	38497, 38500, 38503, 90201, 35310, 35304-00, 30305-00

3.3 International Classification of Disease (ICD) codes for potentially avoidable deaths

DISEASE GROUP	CONDITIONS	ICD-10 CODES
Enteritis and other diarrhoeal diseases	Diarrhoeal diseases	A00-A09
Infections	Tuberculosis	A15-A19, B90
Childhood vaccine-preventable diseases	Diphtheria, whooping cough, tetanus, polio, Hib, measles, rubella	A35-A37, A49.1, A49.2, A80, B01, B05-B06, J11
Infections	Selected invasive bacterial and protozoal infections	A38-A41, A46, A48.1, B50-B54, G00, G03, J13-J15, J18, L03
Infections	Sexually transmitted diseases except HIV/AIDS	A50-A64, M02.3, N34.1, N70-N73, N75.0, N75.1, N76.4, N76.6, O00
Infections	HIV/AIDS	B20-B24
Infections	Hepatitis	B15-B19
Infections	Viral pneumonia and influenza	J10, J12, J17.1, J21
Neoplasms	Lip, oral cavity and pharynx	C00-C14
Neoplasms	Oesophagus	C15
Neoplasms	Stomach	C16
Neoplasms	Colorectal	C18-C21
Neoplasms	Liver	C22
Neoplasms	Lung	C33-C34
Neoplasms	Melanoma of skin	C43
Neoplasms	Nonmelanotic skin cancer	C44
Neoplasms	Breast	C50
Neoplasms	Uterus	C54-C55
Neoplasms	Cervix	C53
Neoplasms	Bladder	C67
Neoplasms	Cancer of testis	C62
Neoplasms	Eye cancer	C69
Neoplasms	Thyroid	C73
Neoplasms	Hodgkins disease	C81
Neoplasms	Leukemia	C91.0, C91.1
Neoplasms	Benign	D10-D36
Nutritional, endocrine and metabolic conditions	Nutritional deficiency anaemia	D50-D53
Nutritional, endocrine and metabolic conditions	Thyroid disorders	E00-E07
Nutritional, endocrine and metabolic conditions	Diabetes	E10-E14

ICD codes for potentially avoidable deaths (continued)

DISEASE GROUP	CONDITIONS	ICD-10 CODES
Nutritional, endocrine and metabolic conditions	Adrenal disorders	E24, E25, E27
Newborn screening conditions	Congenital hypothyroidism, (coded under thyroid disorders), PKU, galactosaemia	E70.0, E74.2
Drug use disorders	Alcohol related disease	F10, I42.6, K29.2, K70
Drug use disorders	Illicit drug use disorders	F11-F16, F18-F19
Neurological disorders	Epilepsy	G40-G41
Ear and mastoid process diseases	Ear infections- Otitis media and mastoiditis	H65-H70
Cardiovascular diseases	Rheumatic and other valvular heart disease	I01-I09
Cardiovascular diseases	Hypertensive heart disease	I11
Cardiovascular diseases	Ischaemic heart disease	I20-I25
Cardiovascular diseases	Cerebrovascular diseases	I60-I69
Cardiovascular diseases	Aortic aneurysm	I71
Genitourinary disorders	Nephritis and nephrosis	I12-I13, N00-N09, N17-N19
Genitourinary disorders	Obstructive uropathy & prostatic hyperplasia	N13, N20-N21, N35, N40, N99.1
Respiratory diseases	DVT with pulmonary embolism	I26, I80.2
Respiratory diseases	COPD	J40-J44
Respiratory diseases	Asthma	J45-J46
Respiratory diseases	Upper respiratory tract infection	J00-J06
Digestive disorders	Peptic ulcer disease	K25-K28
Digestive disorders	Acute abdomen, appendicitis, intestinal obstruction, cholecystitis / lithiasis, pancreatitis, hernia	K35-K38, K40-K46, K80-K83, K85-K86, K91.5
Digestive disorders	Chronic liver disease (excluding alcohol related disease)	K73, K74
Osteomyelitis and other osteopathies of bone	Skin, bone and joint infections	M86, M89-M90
Maternal & infant	Congenital conditions	H31.1, P00, P04, Q00-Q99
Complication of pregnancy, labor or the puerperium	Complications of pregnancy	O01-O99
Maternal & infant	Complications of perinatal period	P03, P05-P95
Sudden infant death syndrome	SIDS	R95
Unintentional injuries	Road traffic injuries, other transport injuries	V01-V04, V06, V09-V80, V87, V89, V99
Unintentional injuries	Accidental poisonings	X40-X49
Unintentional injuries	Falls	W00-W19
Unintentional injuries	Fires, burns	X00-X09
Unintentional injuries	Drownings (swimming)	W65-W74
Intentional injuries	Suicide (coded as intentional self-harm)	X60-X84, Y87.0, Y10-Y34
Intentional injuries	Violence	X85-Y09, Y87.1
Intentional injuries	War	Y36
Iatrogenic conditions	Complications of treatment	Y60-Y84

3.4 International Classification of Disease (ICD) codes for Ambulatory Care Sensitive (ACS) conditions

DISEASE GROUP	ICD-10-AM CODES	FURTHER SELECTION INFORMATION
Vaccine-preventable		
Influenza and pneumonia	J10, J11, J13, J14, J15.3, J15.4, J15.7, J15.9, J16.8, J18.1, J18.8	In any diagnosis field (1-5); exclude people under 2 months; ICD-9-CM: exclude cases with secondary diagnosis of 282.6; ICD-10-AM: exclude cases with secondary diagnosis of D57
Other vaccine preventable	A35, A36, A37, A80, B05, B06, B16.1, B16.9, B18.0, B18.1, B26, G00.0, M01.4	In any diagnosis field (1-5)
Chronic		
Diabetes with complications	E10.0-E10.8, E11.0-E11.8, E12.0- E12.8, E13.0-E13.8, E14.0-E14.8	Principal diagnosis only
Nutritional deficiencies	E40-E43, E55.0, E64.3	Principal diagnosis only
Iron deficiency anaemia	D50.1-D50.9	Principal diagnosis only
Hypertension	I10, I11.9	Principal diagnosis only; ICD-9-CM: exclude cases with procedure code of 35, 36, 37.5, 37.6, 37.7, 37.8; ICD-10-AM: exclude cases with procedures in blocks 600-693, 705-707, 717 and procedure codes 38721-00, 38721-01, 90226-00
Congestive heart failure	I11.0, I50, J81	Principal diagnosis only; ICD-9-CM: exclude cases with procedure code of 35, 36, 37.5, 37.6, 37.7, 37.8; ICD-10-AM: exclude cases with procedures in blocks 600-693, 705-707, 717 and procedure codes 38721-00, 38721-01, 90226-00
Angina	I20, I24.0, I24.8, I24.9	Principal diagnosis only; ICD-9-CM: exclude cases with procedure codes 01 to 86.99; ICD-10-AM: exclude cases with procedure codes in blocks 1-1779
Chronic obstructive pulmonary disease	J41-J44, J47, (J20)	Principal diagnosis only; ICD-9-CM: 466.0 only with secondary diagnosis of 491, 492, 494, 496; ICD-10-AM: J20 only with secondary diagnosis of J41, J42, J43, J44, J47
Asthma	J45, J46	Principal diagnosis only
Acute		
Dehydration and gastroenteritis	A09.9, E86, K52.2, K52.8, K52.9	Principal diagnosis only
Convulsions and epilepsy	G40, G41, O15, R56	Principal diagnosis only
Ear, nose and throat infections	H66, H67, J02, J03, J06, J31.2	Principal diagnosis only
Dental conditions	A69.0, K02-K06, K08, K09.8, K09.9, K12, K13	Principal diagnosis only
Perforated/bleeding ulcer	K25.0- K25.2, K25.4-K25.6, K26.0-K26.2, K26.4-K26.6, K27.0-K27.2, K27.4-K27.6, K28.0-K28.2, K28.4-K28.6	Principal diagnosis only
Ruptured appendix	K35.0	In any diagnosis field (1-5)
Urinary tract infections including pyelonephritis	N10, N11, N12, N13.6, N39.0	Principal diagnosis only
Pelvic inflammatory disease	N70.0, N70.1, N70.9, N73, N74.0-N74.1, N74.2-N74.8	Principal diagnosis only
Cellulitis	L03, L04, L08.0, L08.8, L08.9, L88, L98.0, L98.3	Principal diagnosis only; ICD-9-CM: exclude cases with procedure codes 01 to 86.99 except 86.0 where it is the only listed procedure; ICD-10-AM: exclude cases when any procedure performed from blocks 1-1779 except when the following procedures done as the only ones: blocks: 1604-1606, 1608 and procedures: 90660-00, 30207-00, 30676-00, 30679-00, 34530-01 and 47912-00.
Gangrene	R02	In any diagnosis field (1-5)

3.5 Conditions for communicable disease groups

COMMUNICABLE DISEASE GROUP	CONDITION
Chlamydia trachomatis	Chlamydia trachomatis (non LGV)
Gastrointestinal diseases	Botulism
Gastrointestinal diseases	Cholera
Gastrointestinal diseases	Cryptosporidiosis
Gastrointestinal diseases	Giardiasis
Gastrointestinal diseases	Haemolytic Uraemic Syndrome (HUS)
Gastrointestinal diseases	Hepatitis A
Gastrointestinal diseases	Hepatitis E
Gastrointestinal diseases	Listeriosis
Gastrointestinal diseases	Salmonella infection
Gastrointestinal diseases	Shigellosis
Gastrointestinal diseases	Typhoid
Gastrointestinal diseases	Verotoxin-producing *Escherichia coli (E. coli)*
Gastrointestinal diseases	Other gastrointestinal diseases
Hepatitis C	Hepatitis C
Mosquito-borne diseases	Barmah Forest
Mosquito-borne diseases	Ross River
Mosquito-borne diseases	Other arboviral diseases
Other	Anthrax
Other	Brucellosis
Other	Leprosy
Other	Leptospirosis
Other	Meningococcal
Other	Plague
Other	Psittacosis

COMMUNICABLE DISEASE GROUP	CONDITION
Other	Q Fever
Other	Lyssavirus
Other	Rabies
Other	Other communicable diseases
Other blood-borne and sexually transmitted diseases	Chancroid
Other blood-borne and sexually transmitted diseases	Gonorrhoea
Other blood-borne and sexually transmitted diseases	Hepatitis B
Other blood-borne and sexually transmitted diseases	Hepatitis D
Other blood-borne and sexually transmitted diseases	Human immunodeficiency virus (HIV) infection
Other blood-borne and sexually transmitted diseases	Syphilis
Other blood-borne and sexually transmitted diseases	Other blood-borne and sexually transmitted diseases
Respiratory diseases	Influenza
Respiratory diseases	Legionellosis
Respiratory diseases	Pneumococcal disease (invasive)
Respiratory diseases	Tuberculosis
Respiratory diseases	Other respiratory diseases
Vaccine-preventable diseases	Adverse event following immunisation
Vaccine-preventable diseases	Diptheria
Vaccine-preventable diseases	Haemophilus influenza type b
Vaccine-preventable diseases	Measles
Vaccine-preventable diseases	Mumps
Vaccine-preventable diseases	Pertussis (whooping cough)
Vaccine-preventable diseases	Rubella (German measles)
Vaccine-preventable diseases	Tetanus
Vaccine-preventable diseases	Other vaccine-preventable diseases

APPENDIX 4 - ABBREVIATIONS USED IN THIS REPORT

ABS	Australian Bureau of Statistics
ACAM	Australian Centre for Asthma Monitoring
ACIR	Australian Childhood Immunisation Register
ACS	Ambulatory care sensitive conditions
AGPS	Australian Government Printing Service
AHR	Airway hyper-responsiveness
AHS	NSW Area Health Service or health area
AHTAC	Australian Health Technology Advisory Committee
AIDS	Acquired Immunodeficiency Syndrome
AIHW	Australian Institute of Health and Welfare
APDC	NSW Admitted Patient Data Collection, previously called Inpatients Statistics Collection (see Methods section)
ARIA+	Accessibility/Remoteness Index for Australia-plus
ARMCANZ	Agricultural and Resource Management Council of Australia and New Zealand
ASGC	Australian Standard Geographical Classification
ASHR	Australian Study of Health and Relationships
BFv	Barmah Forest virus
BMI	Body mass index
BSP	Back-scattering coefficient for particles
CATI	Computer Assisted Telephone Interviewing
CABG	Coronary artery bypass graft
CI	Confidence interval
COB	Country of birth
COPD	Chronic obstructive pulmonary disease
DALY	Disability-adjusted life years
DEC	Department of Environment and Conservation
dmft	The number of deciduous (infant) teeth which are decayed, missing or have been filled due to caries (that is, tooth decay)
DMFT	The number of permanent (adult) teeth which are decayed, missing or have been filled due to caries (that is, tooth decay)
DTP	Diphtheria-tetanus-pertussis combined vaccine (also called triple antigen vaccine)
ED	Emergency Department
ERP	Estimated resident population
ESRD	End-stage renal disease
F	Female
HARP	Health and Air Research Program
HIV	Human immunodeficiency virus
HOIST	Health Outcomes Information Statistical Toolkit (see Methods section)
ICD-9	International Classification of Diseases, 9th revision
ICD-9-CM	International Classification of Diseases, 9th revision, Clinical Modification
ICD-10	International Classification of Diseases, 10th revision
ICD-10-AM	International Classification of Diseases, 10th revision, Australian Modification
ICD-O-2	International Classification of Diseases for Oncology, second revision

ICD-O-3	International Classification of Diseases for Oncology, third revision
IRMRC	NSW Injury Risk Management Research Centre
IRSD	Index of relative socioeconomic disadvantage (a SEIFA index)
ISC	NSW Inpatients Statistics Collection or Admitted Patient Data Collection (see Methods section)
LGA	Local Government Area
LL 95% CI	Lower limit of 95% confidence interval
M	Male
microg/dL	Micrograms per decilitre
mg/L	Milligrams per litre
MMR	Measles-mumps-rubella combined vaccine
NAC	National Asthma Campaign
NATSEM	National Centre for Social and Economic Modelling
NCIMS	Notifiable Conditions Information Management System (see Methods section)
NHS	Australian Bureau of Statistics National Health Survey (see Methods section)
NEPC	National Environment Protection Council
NHMRC	National Health and Medical Research Council
No.	Number
NO_2	Nitrogen dioxide
NSW	New South Wales
NSWHS	New South Wales Health Surveys
OECD	Organization for Economic Cooperation and Development
PM10	Particulate matter <10 microns in diameter
PM2.5	Particulate matter <2.5 microns in diameter
ppm	parts per million
RPI	Regional pollutant index
RRv	Ross River virus
SEIFA	Australian Bureau of Statistics Socio-Economic Indices for Areas
SES	Socio-Economic status
SLA	Statistical Local Area
SIDS	Sudden Infant Death Syndrome
STIs	Sexually transmitted infections
Type 1 Diabetes	Insulin-dependent diabetes mellitus
Type 2 Diabetes	Non-insulin-dependent diabetes mellitus
UL 95%	CI Upper limit of 95% confidence interval
UVR	Ultraviolet radiation
WHO	World Health Organization
YLD	Years of healthy life lost due to disability
YLL	Years of life lost due to premature death

APPENDIX 5 - GLOSSARY OF TERMS

Admission	The formal process, using registration procedures, under which a person is accepted by a hospital or an area or district health service facility as an inpatient.
Aetiologic fraction	A measure of the amount of disease associated with an exposure within a population. In a situation in which exposure to a given factor is believed to be a cause of a given disease, the population attributable fraction (or population aetiologic fraction) is the proportion of the disease in the total population that can be attributed to exposure to the factor.
Age-adjusted rate	Rate adjusted to take account of differences in age composition when rates for different populations are compared.
Age-specific rate	Rate for a specified age group. Both numerator and denominator refer to the same age group.
Ambulance attendance	A response by the ambulance staff to a particular request for provision of care. Attendances are classified in several categories such as: cardiac, medical, surgical, trauma and routine attendance. Ambulance services mean services relating to the work of rendering first aid to and the transport of, sick and injured persons.
Ambulatory care sensitive conditions	Those for which hospitalisation is considered potentially avoidable through preventive care and early disease management, usually delivered through primary health care.
Associated cause of death	See UNDERLYING cause of death.
Contact	A person who has been in association with an infected person or a contaminated environment that may provide an opportunity to acquire the infection.
Confidence interval	The computed interval with a given probability (for example, 95 per cent) that the true value of a variable such as a rate, mean or proportion, is contained within the interval.
Crude death rate	An estimate of the proportion of a population that dies in a specified period. It is calculated by dividing the number of deaths in a specified period by the number at risk during that period (typically per year).
Day-only admission	A person who is admitted to hospital and leaves on the same calendar day.
Employed persons	All civilians aged 15 years and over who worked for pay or profit or worked without pay in a family business or farm.
Fertility rate	Number of live births in an area during a year divided by the mid-year female population aged 15-44 in the same area in the same year.
Fetal death	Delivery of a child who did not, at any time after delivery, breathe or show any other evidence of life, such as a heartbeat.
Hospital separation or Hospitalisation	see SEPARATION
Illicit drugs	The following drugs used for non-medicinal purposes: speed, cocaine, sleeping pills or tranquilisers, marijuana, analgesics, heroin, petrol sniffing, other inhalants, hallucinogens, designer drugs and injecting of any illegal drug.
Incidence	The rate at which new cases of a disorder occur in the population: that is, the number of new cases in a specified period, divided by the population at risk of the disorder in that period.
Infant death	The death of a child before its first birthday.

Labour force	All persons aged 15 years and over who are employed and unemployed.
Participation rate	The labour force expressed as a percentage of the civilian population aged 15 years and over.
Life expectancy	The average number of years of life remaining to a person at a particular age.
Live birth	The birth of a child who after delivery, breathes or shows any other evidence of life, such as heartbeat. For calculation of perinatal death rates, includes only infants weighing at least 400 grams at birth or, where birth-weight is unknown, of at least 20 weeks gestation.
Neonatal death	Death within 28 days of birth of any child who after delivery, breathed or showed any other evidence of life, such as a heartbeat.
Notification	Certification in an approved form of a disease listed in the Schedule 3 of Notifiable Diseases of the NSW Public Health Act 1991. In this report, notifications concern cases of communicable diseases reported by general practitioners, hospitals and pathology laboratories to the Director General of the NSW Department of Health.
Patient presentation at emergency department	Occurs following the arrival of the patient at the emergency department and is the earliest occasion of the patient being registered clerically or triaged. The patient may be subsequently provided with a service by a treating medical officer or nurse and a provisional diagnosis is recorded. A 'presentation' is equal to a 'visit' or an 'attendance' at the emergency department.
Perinatal death	A fetal or neonatal death.
Prevalence	The number of people with a disease at a given time (point prevalence) or in a specified period (period prevalence), divided by the number of people at risk from that disease.
Principal diagnosis	The first ICD-9 or ICD-10 coding variable reported on the hospital separation form. It means the final diagnosis that best accounts for inpatient care.
Rate ratio	The ratio of two rates: for example, the rate of disease in one population group divided by the rate in another population group.
Scheduled medical condition	Medical conditions to be notified under the provisions of the NSW Public Health Act 1991.
Separation	The formal process whereby an inpatient leaves a hospital or other area health service facility after completing an episode of care. For example, a discharge to home, discharge to another hospital or nursing home, or death.
Standardised rate	see AGE-ADJUSTED RATE
Underlying cause of death	The primary disease or injury causing the death. It is listed on a death certificate together with other diseases or injuries, which are classified as associated causes. These are all other conditions, diseases or injuries that were considered to have contributed to the death.
Unemployed	Persons aged 15 years and over who were not employed and who were actively seeking work, or waiting to be called back to a job from which they had been stood down.
Unemployment rate	The number of unemployed expressed as a percentage of the labour force (that is, employed and unemployed).

APPENDIX 6 - INDEX

Since this document focuses on NSW, organisations and publications officially starting with 'NSW...' or 'New South Wales' have been indexed under the words that follow: e.g. for 'NSW Divisions of General Practice' see 'Divisions of General Practice'.

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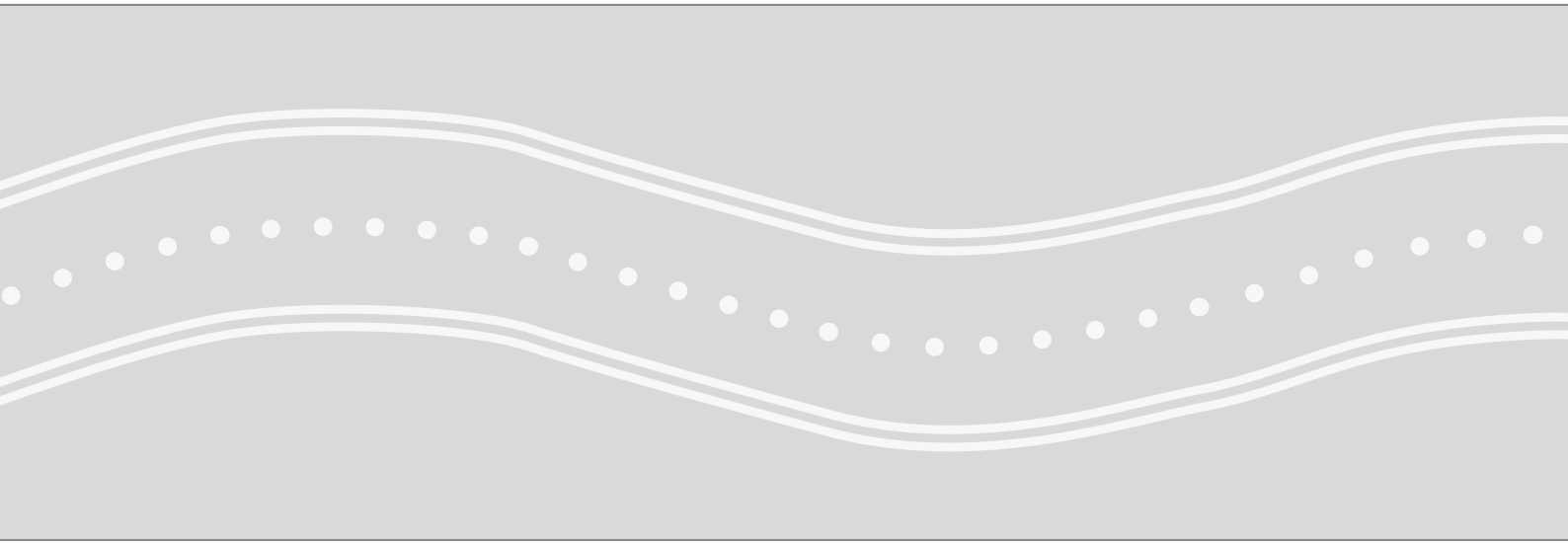
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