

# **Mortality over the twentieth century in Australia**

**Trends and patterns in major causes of death**

The Australian Institute of Health and Welfare is Australia's national health and welfare statistics and information agency. The Institute's mission is *better health and wellbeing for Australians through better health and welfare statistics and information.*

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**Trends and patterns in major causes of death**

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Australian Institute of Health and Welfare  
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# Preface

Mortality statistics are a vital indicator of a population's health. As one of the most longstanding and best kept statistics in Australia, they can provide an excellent historical overview of aspects of progress or failure.

At the beginning of the twenty-first century, this is an opportune time to document the trends and patterns of important causes of death in Australia over the past 100 years or so. Perhaps, along with other research, this exercise will also help to provide some lessons for the future as well as from the past.

Mortality statistics are derived from death registration data documents, including the medical certificate of cause of death. The registration of death is the responsibility of those registering deaths in their respective state and territories, while the collation and coding of death data are undertaken by the Australian Bureau of Statistics.

The Australian Institute of Health and Welfare (AIHW) has developed a database called the General Record of Incidence of Mortality (GRIM), commonly called the AIHW GRIM Books, which contains death data by age group and sex for many diseases for all years since 1907, or from the year the disease was first listed in the International Classification of Diseases. The GRIM Books were extensively used in the production of this publication.

Penny Allbon  
Director

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# Abbreviations

ABS	Australian Bureau of Statistics
AIDS	acquired immunodeficiency syndrome
AIHW	Australian Institute of Health and Welfare
COPD	chronic obstructive pulmonary disease
GRIM	General Record of Incidence of Mortality
ICD	International Classification of Diseases
ICD-7	International Classification of Diseases, Seventh Revision
ICD-8	International Classification of Diseases, Eighth Revision
ICD-9	International Classification of Diseases, Ninth Revision
ICD-10	International Classification of Diseases, Tenth Revision
IHD	ischaemic heart disease
HIV	human immunodeficiency virus
SIDS	sudden infant death syndrome
WHO	World Health Organization

# Symbols

. .	not applicable
n.a.	not available
<	less than



# Summary of findings

This report profiles causes of death over the twentieth century for males and females, at four levels of analysis.

First, total mortality statistics are presented as death rates, along with life expectancy.

The second level of analysis follows trends over the century for five major broad causes of death (each corresponding to the chapter level of the International Classification of Diseases) and two other broad conditions, with some reference to the more specific conditions they comprise.

The third level follows 20 of those specific conditions in more detail, showing their trends across all ages and within selected age groups.

The fourth level of analysis examines eight age groups, from infants to those aged 85 years or over, to show their death rates, their main causes of death, and how they have changed over time.

Note: in the statistics below, unless an age range is specified, death rates apply across all ages and are age-standardised (see Box 1.3, Chapter 1).

## Success stories

Over the twentieth century there were some notable success stories relating to trends in mortality. They include falls in the death rates of:

- over two-thirds for Australians overall, resulting in a major increase in life expectancy, now about 80 years at birth
- 95% for children aged four or younger, including infants
- 96% for infectious diseases
- 85% for stomach cancers and 80% for cervical and uterine cancers
- close to 80% for respiratory diseases
- over two-thirds for circulatory diseases after the mid-century epidemic
- over 30% for male lung cancer since its peak in the 1980s
- 70% for motor vehicle accidents since their peak in 1970.

## Areas of concern

The first and foremost concern is the far higher mortality and therefore lower life expectancy of Aboriginal and Torres Strait Islander peoples, and the lack of substantial improvement in this situation.

More generally, there are still some conditions that cause concern because their death rates have shown no improvement or have increased over the century. These include:

- a sevenfold increase in lung cancer for females since 1945
- for males, the relatively constant death rate from overall cancer after adjustment for the substantial rise in lung cancer
- the increased rate in deaths from septicaemia among older Australians (aged 65 and over) in the last two decades
- increasing death rates from mental health and nervous system diseases among older Australians (aged 65 and over) in the last two decades
- a recent increase in the infectious disease death rate since 1980, although rates in 2000 were still very much lower than those at the beginning of the century.

## **General findings**

### **Total mortality**

Over the century, age-standardised death rates declined by 64% for males, from 2,370 deaths per 100,000 population in 1900 to 853 in 2000, and for females by 72% from 1,957 in 1900 to 552 in 2000.

### **Life expectancy**

Life expectancy at birth increased by 23.6 years for males, from 53.8 years in 1900 to 77.4 in 2000, and by 25.1 years for females, from 57.5 to 82.6.

### **Broad causes of death 1907–2000**

#### **Circulatory diseases**

For males, the death rate for circulatory diseases increased from 437 deaths per 100,000 population in 1907 to 1,020 in 1968 (AIHW GRIM Books), before falling to 319 in 2000. Similarly, for females the increase was from 379 deaths per 100,000 population in 1907 to 718 in 1952, before falling to 224 in 2000.

#### **Cancers**

For males, the overall cancer death rate increased from 166 deaths per 100,000 population in 1907 to 287 in 1985, then fell to 247 by 2000. The female rate over the last four decades was similar to that at the beginning of the century, 148 deaths per 100,000 population in 2000 and 154 in 1907.

## **Respiratory diseases**

The respiratory diseases death rate for males fell from 320 per 100,000 population in 1907 to 81 in 2000, and for females from 263 in 1907 to 44 in 2000.

## **Injury and poisoning**

For males, the death rate from injury and poisoning fell from 147 per 100,000 population in 1907 to 61 in 2000. Similarly, for females the rate decreased from 55 per 100,000 population in 1907 to 25 in 2000.

## **Infectious diseases**

For males, the death rate from infectious diseases fell from 283 deaths per 100,000 population to around 6 between 1907 and 1980, after which it almost doubled to 11 in 2000. Similarly for females, the death rate fell from 230 to 4, before increasing to 7 in 2000.

## **Other diseases**

‘Other diseases’ means all other causes of disease apart from those above. For males, combined death rates from these other diseases fell from highs of over 880 deaths per 100,000 population early in the century to 136 in 2000, while for females the corresponding fall was from a high of 763 to 105. These rates include conditions of mental health and of the nervous system for which estimates only cover recent decades.

### *– Nervous system*

From 1980, death rates from nervous system diseases for males and females respectively increased from 14 and 10 deaths per 100,000 population to 24 and 20 in 2000.

### *– Mental health*

From 1980, death rates from mental health conditions for males and females respectively increased from 12 and 8 deaths per 100,000 population to 18 and 15 in 2000.

## **Specific causes of death**

### **Diarrhoea for children aged 0–4 years**

In 1907, death rates from diarrhoea among children aged 0–4 years were 700 and 579 deaths per 100,000 for males and females respectively. The rates fell to less than 1 death per 100,000 population in the late 1980s.

## **Septicaemia**

Death rates from septicaemia fell to very low levels over the first half of the century then rose back to their early levels over the final two or three decades. The rates began at 4.4 and 3.5 deaths per 100,000 population for males and females respectively in 1907, fell to corresponding lows of 0.5 and 0.3, then rose to 6.3 and 4.2 by 2000.

In contrast to this age-standardised picture, septicaemia death rates for those aged under 65 remained low and did not increase for either sex. The overall increase was in those aged 65 years or over, especially those aged 85 years or over.

## **Tuberculosis**

Deaths from tuberculosis were virtually eliminated in Australia by the 1980s. In 1907 the death rates were 121 and 93 deaths per 100,000 population for males and females respectively; by 2000 they were less than 1 per 100,000.

## **Lung cancer**

Lung cancer became prominent after World War II; the rate for males in 1945 stood at around 11 deaths per 100,000 population. This increased to a peak of around 80 deaths per 100,000 in the early 1980s, after which it fell to 55 in 2000. The lung cancer death rate among females presents concern because it rose over the decades from around 3 deaths per 100,000 population in 1945 to 22 in 2000.

## **Colorectal cancer**

The death rate from colorectal cancer varied for males over the century but was essentially unchanged as a whole. At 31 deaths per 100,000 population in 2000 it was lower than in the earlier peak periods, most recently in the early 1980s, but higher than the earliest measured level of 28 in 1922. For females, the death rate fell from around 30 deaths per 100,000 in the early and middle century to 21 in 2000.

## **Female breast cancer**

The death rate from female breast cancer hovered around 30 deaths per 100,000 throughout the century, but fell in the last decade to 25.

## **Prostate cancer**

The death rate from prostate cancer showed a clear general increase over most of the century, with some decrease after a peak in the early 1990s. The rate increased from 9 deaths per 100,000 population in 1920 to around 44 in 1993 and then fell to 36 in 2000. However, males aged less than 65 years, taken as a group, showed no significant rise during the decades examined.

### **Stomach cancer**

One of the cancer success stories is the reduction in the death rates from stomach cancer. The rates fell from 54 deaths per 100,000 population for males and 32 for females in 1925, to 10 and 4 respectively in 2000.

### **Cancers of the cervix and uterus**

Another cancer success story is the reduction in the death rate from cervical and uterine cancers. The age-standardised death rate fell from 26 deaths per 100,000 population in 1920 to 5 in 2000.

### **Cerebrovascular disease**

The reduction in the death rates from stroke and other forms of cerebrovascular disease in the latter part of the century is a further success story. Rates almost doubled from 127 deaths per 100,000 for males and 130 for females in 1907 to about 226 and 220 respectively throughout the 1950s and 1960s, and then fell sharply from the late 1960s to 69 and 63 in 2000.

### **Ischaemic heart disease**

The fall in death rates from ischaemic heart disease in the latter part of the century is yet another success. Rates for males doubled from 287 deaths per 100,000 population in 1950 to 589 in 1968; similarly, female rates rose from 140 to 304. From there the corresponding decline was to 185 and 108 in 2000.

### **Senility**

During the early century, deaths attributed to this cause contributed to about half of all deaths in the 80 years or over age group. This classification was discontinued in 1967.

### **Conditions originating in the perinatal period and congenital conditions, ages 0–4 years**

Deaths from conditions originating in the perinatal period and congenital conditions were leading causes of death early in the century. Death rates for 'certain conditions originating in the perinatal period' fell from 700 in 1907 for males and 596 for females to respective levels of 55 and 45 in 2000. Correspondingly, deaths in this age group from congenital conditions fell from 103 deaths per 100,000 for males and 67 for females to 30 and 25 in 2000. Conditions originating in the perinatal period remained the highest cause of death among 0–4-year-olds.

### **Motor vehicle accidents**

Rates for motor vehicle accident deaths rose from 11 and 4 deaths per 100,000 population for males and females respectively in 1924, peaked in 1970 at corresponding rates of 49 and 18, then fell to 14 and 6 deaths in 2000. Rates for males

and females aged 15–24 fell from respective highs of 97 and 25 deaths per 100,000 in 1970 to 28 and 10 in 2000.

### **Suicide**

The suicide rate for males varied over the century. It was generally higher in the early decades, with a peak in 1930 at 30 deaths per 100,000 population, fell during World War II to 12 in 1944, then stabilised at around 20 for the second half of the century.

For females, the rate remained steady for the first half of the century at about 5 deaths per 100,000 population. It rose rapidly during the 1960s to around 12 deaths per 100,000 population in the mid-1960s, but by the 1980s it returned to its earlier levels and remained there.

### **Age groups**

Unless otherwise specified, death rates in this section are age-specific rates. Where rates have been age-standardised this has been noted in the text.

#### **Infants (less than 1 year)**

The infant death rate fell by almost 93% for males over the century and by 92% for females. The falls were from 80 deaths per 1,000 live births for males and 63 for females in 1912, to 6 and 5 per live births respectively in 2000.

#### **Ages 0–4 years (including infants)**

The death rates for young children and infants fell by about 95%, from rates greater than 2,000 deaths per 100,000 population to around 100 deaths per 100,000.

At the beginning of the century, deaths in this age group accounted for more than 25% of all deaths, but the proportion fell steadily to 1.2% by 2000.

#### **Ages 5–14 years**

Between 1907 and 2000, the death rates for children aged 5–14 years declined by more than 90%, falling from 187 to 16 and from 172 to 12 deaths per 100,000 males and females respectively.

#### **Ages 15–24 years**

Comparing 1907 and 2000, the death rates in young adults fell by 72% for males and by 88% for females – from 316 to 90 deaths per 100,000 males and from 297 to 36 per 100,000 females.

### **Ages 25–44 years**

During the century, the death rate for males of 'parent age' fell by about 75%, from 578 deaths per 100,000 in 1907 to 149 in 2000. For females, the corresponding reduction was more than 85%, with the rate falling from 555 to 69.

### **Ages 45–64 years**

Among the middle-aged, the male death rate fell by about 70%, from 1,718 deaths per 100,000 in 1907 to 510 in 2000. For the females, the reduction was by 75%, from 1,241 in 1907 to 310 in 2000.

### **Ages 65–84 years**

For males aged 65–84 years, the death rate fell by more than 50%, from 7,741 deaths per 100,000 in 1907 to 3,742 in 2000. For females, the corresponding reduction was by more than 60%, from 6,281 to 2,404.

### **Ages 85 years or over**

The death rate among males aged 85 or over fell by 44%, from 29,234 deaths per 100,000 in 1907 to 16,395 in 2000. The corresponding fall for females was 48%, from 25,918 to 13,511. Initially, the death rates for both males and females increased and peaked in the second half of the 1920s. However the rates fell steadily from the early 1940s for both sexes, with the decline accelerating from around 1970 through to 2000.

