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Premature mortality from chronic disease

Highlights

In 2007, 83% of all premature deaths (that is, deaths among people aged less than 75 years) were due to chronic disease.

The leading cause of chronic disease premature mortality among females was breast cancer, accounting for 12% of years of life lost; among males it was coronary heart disease, accounting for 16% of years of life lost.

Premature mortality from chronic disease among the most socioeconomically disadvantaged males was nearly twice as high as among the least disadvantaged males; among the most socioeconomically disadvantaged females it was 60% higher than the least disadvantaged females.

Of all the premature chronic disease deaths in 2007, more than 3 in 5 (64%) were potentially avoidable.

Introduction

Chronic disease contributes enormously to the burden of morbidity and mortality in Australia. For many years, it has been the major cause of death among the elderly. The impact of chronic disease is growing: the latent effects of health risk factors and an ageing population contribute to increasing prevalence of chronic conditions. As a large proportion

(introduction continued overleaf)

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of chronic disease and deaths from these conditions is preventable, tackling chronic disease and its determinants is central to health policy initiatives and broader societal objectives.

What is chronic disease?

Chronic disease is usually characterised as a prolonged and multifaceted course of illness and, in many cases, functional impairment and disability (see Box 1). It is associated with multiple risk factors and long latency.

Diseases that fall under the broad heading of chronic disease include cardiovascular conditions (such as coronary heart disease and stroke), endocrine disorders (most commonly diabetes), some respiratory diseases, digestive diseases, mental and nervous system disorders, and cancers.

Despite most chronic diseases not being immediately life-threatening, these illnesses contribute significantly to mortality and premature mortality. Furthermore, chronic diseases contribute indirectly to premature mortality from other underlying causes of death (for example, a substantial proportion of deaths due to intentional self-harm can be attributed to depression (DHAC and AIHW 1999).

Box 1: Characteristics of chronic disease

There is no explicit definition for chronic disease, rather many illnesses and health conditions can be classified under the broad heading of chronic disease. Some characteristics of chronic disease are:

- *complex causality, often associated with multiple risk factors*
- *gradual onset during which there may be no symptoms*
- *long lasting with persistent effects that progress over an individual's life*
- *sometimes associated with the development of other chronic diseases*
- *functional impairment or disability.*

Most chronic diseases are rarely cured and do not resolve spontaneously. They persist over time, and can become immediately life-threatening (for example, heart attacks associated with coronary heart diseases). Chronic diseases can be intensive in terms of management (for example, end-stage kidney disease) and most persist throughout an individual's life, but are not always the cause of death (for example, arthritis).

People can live for many years with chronic conditions; however, quality of life can be significantly compromised through activity limitation and impairment and a need for prolonged assistance.

Burden associated with chronic disease

According to burden of disease estimates, the magnitude of the chronic disease problem in Australia is significant. In 2003, the burden associated with premature mortality, disability, illness and injury due to cancer, cardiovascular diseases, mental disorders, neurological diseases, chronic respiratory diseases and diabetes amounted to nearly three-quarters (74%) of the total burden of disease and injury (Begg et al. 2007). These conditions contributed a similar proportion to the fatal burden, that is, to the potential years of life lost arising from premature mortality. A loss to the economy through decreased participation in the labour force has also been associated with the prevalence of, and fatality due to, chronic disease (AIHW 2009a).

Estimates of chronic disease prevalence indicate that three-quarters (75%) of the Australian population live with a long-term condition. Excluding sight-related conditions (for example, long-sightedness and short-sightedness), the most commonly reported long-term conditions include arthritis (15%), asthma (10%) and hypertensive disease (9%) (ABS 2009).

The high prevalence of chronic conditions results from a combination of increasing incidence of some chronic diseases, better management for people with chronic conditions, and decreased mortality from chronic disease. Recent gains in health care, technology and pharmacology have enabled people suffering from chronic disease to live longer, albeit with some compromise to their quality of life.

Despite recent declines in the prevalence of some risky behaviours (smoking, for example), an increasing prevalence of some chronic diseases may be attributable to the latency in the development of chronic diseases some time after exposure to risk factors.

This bulletin describes premature mortality from chronic disease in terms of potential years of life lost. The contribution of specific chronic disease deaths to the burden of mortality is presented, followed by analysis of premature mortality by age and socioeconomic status. Trends in premature mortality from selected chronic diseases have also been included.

What is premature mortality and how is it measured?

In Australia, as in most developed countries, the vast majority of deaths occur in older ages. Consequently, the usual mortality summary statistics—crude and age-adjusted mortality rates—are principally influenced by disease processes among the elderly.

Measures of mortality that are more influenced by deaths at younger ages provide a more comprehensive picture of the burden of mortality. One such measure is the potential years of life lost (PYLL), which gives greater weight to deaths occurring at younger ages (see Box 2).

Premature mortality refers to deaths that occur at a younger age than expected. The expected age at death can be determined by life expectancy, for example, or by setting an arbitrary age.

Box 2: Potential years of life lost

Potential years of life lost (PYLL) are an indicator of premature death. PYLL are determined by age at death and takes into account only deaths that occur before a particular age. If dying before the age of 75, for example, is considered premature, then a person dying at age 40 would have lost 35 potential years of life.

In contrast to measures of mortality that encompass all deaths equally, PYLL highlight deaths that occur at younger ages. It can be used as an indicator of the social and economic impact of premature mortality and for setting public health priorities.

PYLL is also useful for examining the contribution of specific conditions to the total years of life lost.

Methods

The analysis presented in this bulletin is based on deaths that were registered in 2007. These data were sourced from the Australian Institute of Health and Welfare's National Mortality Database (see Appendix for more information). Deaths for 2007 are based upon preliminary data and some of these data are subject to revision. Specifically, the cause of some deaths registered in 2007 were referred to a coroner may be updated with more specific detail about the cause of death once the coroner's work is completed. As a result, many deaths coded to non-specific causes (such as 'undetermined intent') may be recoded to a more specific cause. This recoding will likely result in more deaths being due to intentional self-harm, assault and heart attacks, while reducing the number of deaths coded with non-specific causes.

There were 11 deaths excluded from the analysis due to age at death being unknown.

In this bulletin, deaths were grouped and counted as chronic disease or otherwise according to the underlying cause of death. As there is no pure definition for 'chronic disease', the nature of the condition formed the basis of classification for the purpose of these analyses (Table A1). A proportion of deaths due to intentional self-harm was counted as being due to depression. These deaths were allocated a cause of depression based on population attributable fractions used for estimating burden of disease (AIHW 2001). As a result, 42% of male and 53% of female deaths due to intentional self-harm were attributable to depression.

Estimates of the burden of mortality from chronic disease are summarised using potential years of life lost (PYLL), where deaths before age 75 were considered premature.

In this bulletin, socioeconomic status was determined using an area-based measure known as the Index of Relative Socioeconomic Disadvantage (IRSD). This measure, developed by the Australian Bureau of Statistics, is based on population Census data and reflects the overall level of socioeconomic disadvantage of an area according to income, educational attainment, levels of public sector housing, levels of unemployment and jobs in relatively unskilled occupations. Small geographical areas are ranked according to their IRSD and then grouped into quintiles according to population. The lowest socioeconomic quintile refers to the fifth of the population living in an area ranked as having the most socioeconomic disadvantage.

A limitation of this method is that the age and sex distributions in each quintile may not be comparable. For example, the population in the lowest socioeconomic quintile may have a greater portion of young people that the highest socioeconomic quintile. To counter this bias, PYLL are expressed as (age-standardised) rates per 1,000 population.

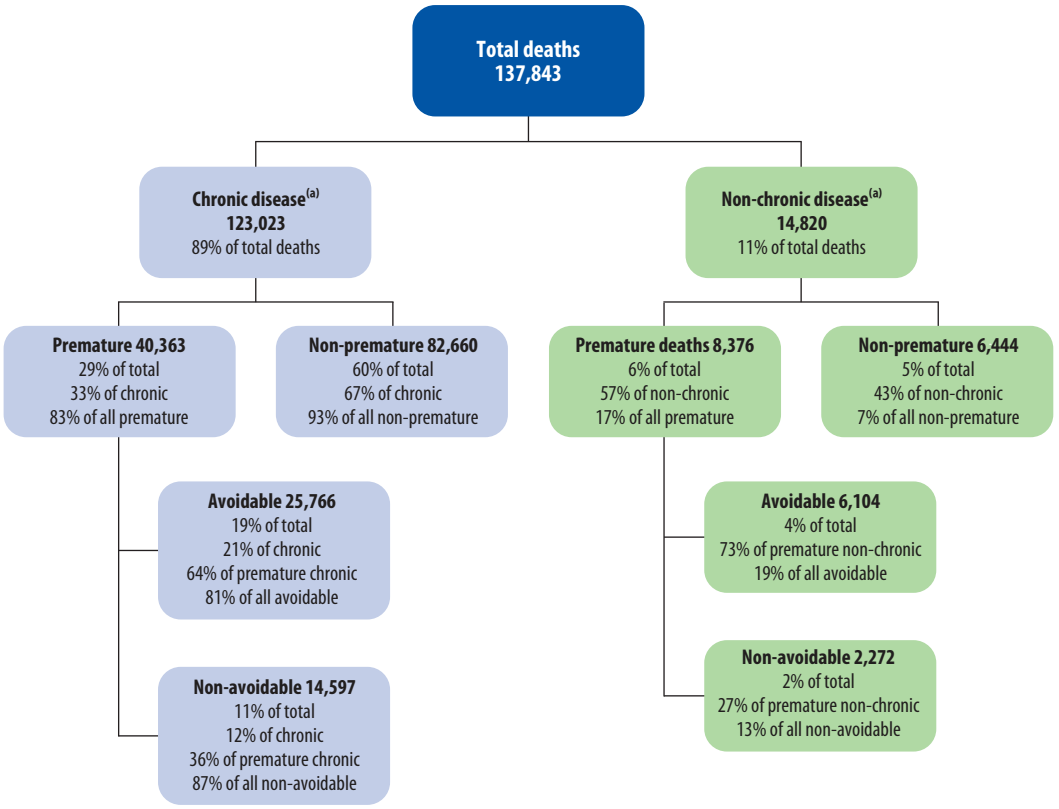
The proportion of premature chronic disease deaths that is potentially avoidable is also described. Chronic disease causes of death were categorised as potentially avoidable according to a commonly used classification for avoidable mortality (see CRC 2010 for the categories used in this bulletin). Generally, these are deaths due to conditions that,

in the context of the current health system, should not occur. They comprise deaths that could potentially be prevented (that is, the conditions are amenable to primary prevention; for example, through immunisation or early detection through screening) or potentially treatable (that is, the conditions are amenable to therapeutic interventions).

Results

In 2007, nearly 138,000 deaths were registered in Australia. Of these deaths, around 123,000 (89%) were due to chronic disease (Figure 1). Most of these deaths were among people aged 75 years or more (65%); that is, 35% of deaths registered in 2007 were premature deaths.

Of all the chronic disease deaths in 2007, more than 40,000 (33%) were premature deaths and more than 25,000 (21%) were potentially avoidable. In addition, of all the premature chronic disease deaths, the majority, 64% were also potentially avoidable (Figure 1).



(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression.

Figure 1: Distribution of deaths: chronic, premature and avoidable, 2007

Among premature deaths—that is, to people aged less than 75 years—most (83%) were due to chronic disease: 81% for males and 86% for females (Table 1).

Table 1: Deaths by broad cause grouping, sex and age group, 2007

	Males			Females		
Broad cause of death	**Under 75 years**	**75 and over**	**Total deaths**	**Under 75 years**	**75 and over**	**Total deaths**
			Number			
Communicable, maternal, neonatal and congenital conditions	1,342	1,506	2,848	942	2,031	2,973
Chronic diseases[(a)]	24,651	37,389	62,040	15,711	45,271	60,983
External causes[(a)]	3,585	1,007	4,592	1,305	1,209	2,513
Unknown causes	806	274	1,080	397	417	814
All deaths	**30,384**	**40,176**	**70,560**	**18,355**	**48,928**	**67,283**
			Per cent by age group			
Communicable, maternal, neonatal and congenital conditions	47.1	52.9	100.0	31.7	68.3	100.0
Chronic diseases[(a)]	39.7	60.3	100.0	25.8	74.2	100.0
External causes[(a)]	78.1	21.9	100.0	51.9	48.1	100.0
Unknown causes	74.6	25.4	100.0	48.8	51.2	100.0
All deaths	**43.1**	**56.9**	**100.0**	**27.3**	**72.7**	**100.0**
			Per cent by broad cause of death			
Communicable, maternal, neonatal and congenital conditions	4.4	3.7	4.0	5.1	4.2	4.4
Chronic diseases[(a)]	81.1	93.1	87.9	85.6	92.5	90.6
External causes[(a)]	11.8	2.5	6.5	7.1	2.5	3.7
Unknown causes	2.7	0.7	1.5	2.2	0.9	1.2
All deaths	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression; deaths due to external causes were adjusted accordingly.
Note: Deaths by sex may not add to total deaths for all persons due to rounding: non-integer deaths arise due to fractions of deaths being attributed to chronic disease for some suicide deaths.

How many years of life are lost?

In 2007, the total potential years of life lost amounted to nearly 870,000 years (Table 2). The majority of this loss (65%) was due to chronic disease, followed by external causes (19%) (Table 2). Premature chronic disease deaths among males contributed 63% of PYLL and external causes 23%, while for females, 70% were due to chronic disease and 13% to external causes.

Table 2: Potential years of life lost, by broad cause grouping and sex, 2007

Broad cause of death	Males	Females	Persons
		Number	
Communicable, maternal, neonatal and congenital conditions	54,016	41,199	95,214
Chronic diseases[(a)]	343,423	225,243	568,666
External causes[(a)]	124,781	42,728	167,509
Unknown causes	25,105	13,103	38,208
All deaths	**547,325**	**322,272**	**869,597**
		Per cent by sex	
Communicable, maternal, neonatal and congenital conditions	56.7	43.3	100.0
Chronic diseases[(a)]	60.4	39.6	100.0
External causes[(a)]	74.5	25.5	100.0
Unknown causes	65.7	34.3	100.0
All deaths	**62.9**	**37.1**	**100.0**
		Per cent by broad cause	
Communicable, maternal, neonatal and congenital conditions	9.9	12.8	10.9
Chronic diseases[(a)]	62.7	69.9	65.4
External causes[(a)]	22.8	13.3	19.3
Unknown causes	4.6	4.1	4.4
All deaths	**100.0**	**100.0**	**100.0**

(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression; deaths due to external causes were adjusted accordingly.

Which chronic diseases contribute most to premature mortality?

The 20 leading causes of PYLL accounted for 71% of the total years of life lost—72% for males and 70% for females (Table 3). Among males, most chronic disease PYLL arose from coronary heart disease (16%), followed by lung cancer (8%) and depression (6%). For females, however, the largest burden of mortality from chronic disease was from breast cancer, accounting for 12%, followed by lung cancer (9%) and coronary heart disease (6%).

Table 3: Leading causes of potential years of life lost due to chronic disease, Australia, 2007

	Males			Females		
Rank	Cause of death	PYLL	Per cent of male PYLL	Cause of death	PYLL	Per cent of female PYLL
1	Coronary heart disease	54,908	16.0	Breast cancer	28,118	12.5
2	Lung cancer	28,949	8.4	Lung cancer	19,509	8.7
3	Depression[(a)]	20,132	5.9	Coronary heart disease	13,156	5.8
4	Colorectal cancer	14,827	4.3	Colorectal cancer	10,907	4.8
5	Liver disease	14,317	4.2	Stroke	10,284	4.6
6	Stroke	12,472	3.6	Unknown primary cancer	7,993	3.5
7	Unknown primary cancer	10,516	3.1	Ovarian cancer	7,327	3.3
8	Brain cancer	10,431	3.0	Depression(a)	7,159	3.2
9	Pancreatic cancer	9,321	2.7	Liver disease	6,184	2.7
10	Diabetes	8,565	2.5	Brain cancer	6,176	2.7
11	Melanoma	8,011	2.3	COPD	5,683	2.5
12	COPD	7,069	2.1	Uterine cancer	5,149	2.3
13	Liver cancer	6,853	2.0	Diabetes	5,064	2.2
14	Oesophageal cancer	6,796	2.0	Pancreatic cancer	4,854	2.2
15	Leukaemia	6,766	2.0	Leukaemia	4,629	2.1
16	Prostate cancer	6,059	1.8	Melanoma	4,605	2.0
17	Cardiomyopathy	5,511	1.6	Stomach cancer	3,378	1.5
18	Lymphoma	5,495	1.6	Lymphoma	3,071	1.4
19	Stomach cancer	5,102	1.5	Pulmonary heart diseases	2,661	1.2
20	Heart failure & complications	4,418	1.3	Heart failure & complications	2,628	1.2
	Total leading causes	**246,516**	**71.8**	**Total leading causes**	**158,532**	**70.4**
	Total chronic disease PYLL	**343,423**		**Total chronic disease PYLL**	**225,243**	

PYLL Potential years of life lost.
COPD Chronic obstructive pulmonary disease.
(a) Depression deaths have been adjusted to reflect deaths caused by intentional self-harm that were likely due to depression.
Notes
1. PYLL derived from deaths occurring before age 75 years.
2. PYLL by sex may not add to PYLL for all persons due to rounding.

Comparing leading causes of death and leading causes of PYLL

The usual way of summarising mortality is to rank causes by the number of deaths occurring at all ages. Given that the large majority of deaths occur among people aged 75 years or more, this method is largely descriptive of deaths among older people. Using this method, the leading chronic disease causes of death for males in 2007 were coronary heart disease, lung cancer and stroke (accounting for 20%, 8% and 7% of all male chronic disease deaths, respectively). For females, the leading chronic disease causes were coronary heart disease, stroke, and dementia and Alzheimer's disease (accounting for 17%, 11% and 8% of all female chronic disease deaths, respectively).

An alternative method of assessing mortality in a population is to summarise deaths according to PYLL, hence giving more emphasis to deaths in the younger age groups.

A different picture emerges when summarising mortality by years of life lost. The leading causes of PYLL from chronic disease were summarised in the previous section.

Among males, depression ranked as the 3rd leading cause of PYLL whereas it ranked as the 24th leading cause of chronic disease deaths. Also for males, brain cancer ranked 8th in chronic disease causes of PYLL while it was the 22nd most common cause of chronic disease death. For females, the most striking changes in rank were for depression (ranked 8th as a cause of PYLL and 35th in leading causes of chronic disease death), liver disease (ranked 9th as a cause of PYLL ranked 22nd in leading causes of chronic disease death) and brain cancer (ranked 10th leading cause of PYLL and 23rd leading cause of death).

Ranking of chronic disease deaths according to the proportion of all chronic disease deaths and by their contribution to years of life lost, for the leading causes of years of life lost, is shown in Table 4.

Table 4: Chronic disease deaths ranked according to proportion of potential years of life lost and the corresponding rank according to proportion of chronic disease deaths for all ages, Australia, 2007

	Males			Females		
Rank by PYLL	Chronic disease cause of death	Rank by number of deaths	Shift relative to rank by number	Chronic disease cause of death	Rank by number of deaths	Shift relative to rank by number
1	Coronary heart disease	1	◁▷	Breast cancer	5	▲
2	Lung cancer	2	◁▷	Lung cancer	4	▲
3	Depression[a]	24	▲▲▲	Coronary heart disease	1	▼
4	Colorectal cancer	7	▲	Colorectal cancer	9	▲▲
5	Liver disease	14	▲▲	Stroke	2	▼
6	Stroke	3	▼	Unknown primary cancer	10	▲
7	Unknown primary cancer	9	▲	Ovarian cancer	15	▲▲
8	Brain cancer	22	▲▲▲	Depression[a]	36	▲▲▲
9	Pancreatic cancer	11	▲	Liver disease	22	▲▲▲
10	Diabetes	8	▼	Brain cancer	23	▲▲▲
11	Melanoma	16	▲▲	COPD	6	▼▼
12	COPD	4	▼▼	Uterine cancer	21	▲▲
13	Liver cancer	19	▲▲	Diabetes	8	▼▼
14	Oesophageal cancer	17	▲	Pancreatic cancer	14	◁▷
15	Leukaemia	15	◁▷	Leukaemia	20	▲▲
16	Prostate cancer	5	▼▼▼	Melanoma	26	▲▲▲
17	Cardiomyopathy	28	▲▲▲	Stomach cancer	25	▲▲
18	Lymphoma	18	◁▷	Lymphoma	19	▲
19	Stomach cancer	20	▲	Pulmonary heart diseases	29	▲▲▲
20	Heart failure & complications	10	▼▼▼	Heart failure & complications	7	▼▼▼

PYLL Potential years of life lost.
COPD Chronic obstructive pulmonary disease.
(a) Depression deaths have been adjusted to reflect deaths caused by intentional self-harm that were likely due to depression.
Note: Arrows indicate magnitude and direction of shift: one arrow for a change in rank of less than 5 positions, two arrows for a shift in rank between 5 and 9 positions and 3 arrows for a change in rank of 10 or more positions.

Which age groups contribute the most PYLL?

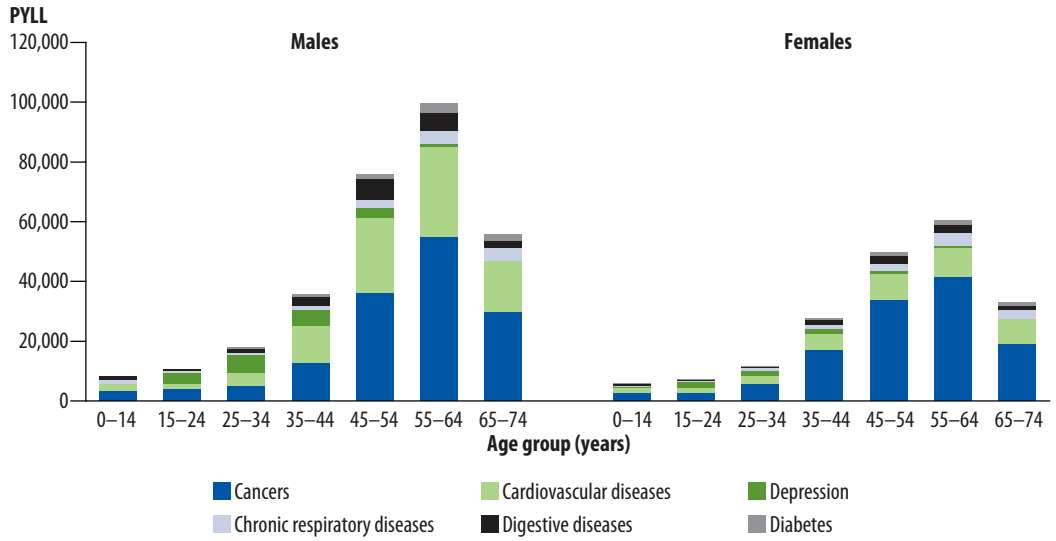
The highest number of premature chronic disease deaths occurred among those aged 65–74 years, while deaths among those aged 55–64 years contributed the most PYLL (Table 5). More than half of all chronic disease PYLL (55%) arose from deaths among 45–64 year olds. Per population, the majority of PYLL were associated with the 55–64 years age group (75 years of life lost per 1,000 population) followed by the 65–74 years age group (67 years of life lost per 1,000 population) (Table 5).

Table 5: Summary measures of premature chronic disease[(a)] deaths by age group, 2007

Age group	Number of chronic disease deaths	Chronic disease deaths per 100,000	Per cent of chronic disease deaths	Chronic disease PYLL	Chronic disease PYLL per 1,000	Per cent of total chronic disease PYLL
0–14	349	8.5	0.9	24,434	6.0	4.3
15–24	425	14.4	1.1	23,290	7.9	4.1
25–34	807	27.5	2.0	36,227	12.4	6.4
35–44	2,110	68.2	5.2	73,311	23.7	12.9
45–54	5,595	192.2	13.9	139,300	47.9	24.5
55–64	11,619	497.8	28.8	174,095	74.6	30.6
65–74	19,458	1,337.9	48.2	98,010	67.4	17.2
Total 0–74	**40,363**	**204.2**	**100.0**	**568,666**	**28.8**	**100.0**

PYLL Potential years of life lost.
(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression.

In nearly all age groups, the conditions contributing the most male chronic disease PYLL were cancer followed by cardiovascular disease (Figure 2). Among males, depression followed by cancer caused the most PYLL among 15–24 and 25–34 year olds. For females, the leading chronic disease causes of PYLL were cancer followed by cardiovascular diseases, except in the 15–24 year age group, where depression followed by cancer were the leading contributors.



Note: Depression deaths include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression.

Figure 2: Potential years of life lost by age group, sex and major chronic disease groups, Australia, 2007

Does PYLL vary by socioeconomic status?

In 2007, more than one-quarter (26%) of the chronic disease mortality burden was experienced by people living in the most socioeconomic disadvantaged areas. Males in this group accounted for 27% of the total male fatality burden (PYLL) for chronic disease while for females this figure was 24%. Adjusting for age, the chronic disease mortality burden per male population was nearly twice (1.9 times) as high among those in the most socioeconomically disadvantaged areas compared with those in the least disadvantaged areas (Table 6). With similar adjustment, females living in the most socioeconomically disadvantaged areas experienced a greater rate of chronic disease mortality burden—the burden per female population was 60% higher than those in the least disadvantaged areas (Table 6).

Estimates of PYLL are influenced by mortality rates and age at death. Therefore, differences in PYLL between two populations (with the same age structure) could be due to either a different average age at death or different mortality rates.

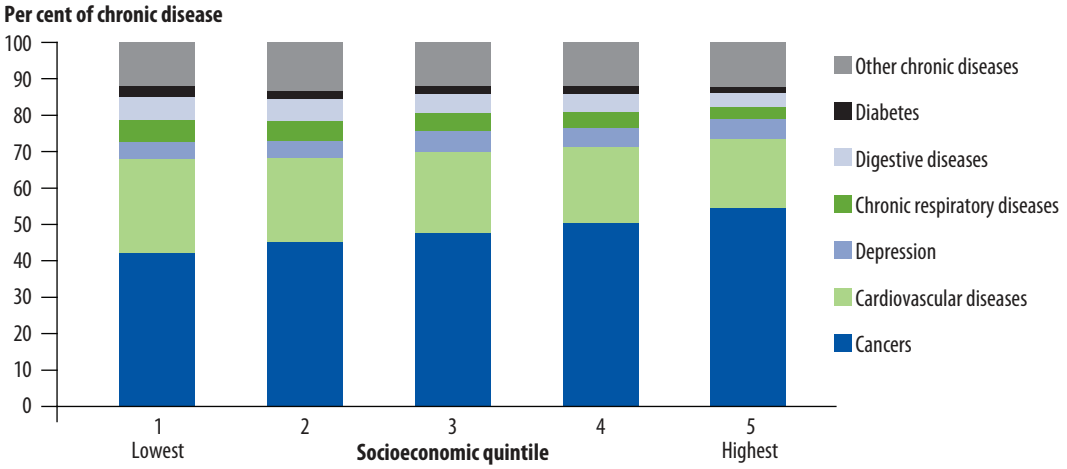
For premature chronic disease deaths, the average age at death varied little between the socioeconomic areas (Table 6) and so differences in PYLL between the socioeconomic areas reflect the different mortality rates. That is, the PYLL rates in these results are more likely influenced by the different numbers of chronic disease deaths in the socioeconomic areas. More chronic disease deaths occurred among those living in the most disadvantaged areas than among the least disadvantaged areas (Table 6).

Table 6: Summary measures of premature mortality from chronic disease[a] by sex and socioeconomic quintile, 2007

	Socioeconomic quintile				
Mortality summary measure	**Lowest**	**2**	**3**	**4**	**Highest**
			Males		
Number of chronic disease deaths (all ages)	14,849	14,429	12,132	10,519	9,901
Number of premature chronic disease deaths	6,464	5,895	4,876	3,970	3,294
Chronic disease death rate[b]	715.9	673.3	643.8	600.2	529.7
Mean age at death[c] (years)	61.0	61.5	61.2	60.9	60.7
Chronic disease PYLL	90,811	79,534	67,227	56,127	47,017
Chronic disease PYLL rate[d]	43.7	37.8	32.8	27.7	23.0
Rate ratio (compared to highest quintile)	1.9	1.6	1.4	1.2	1.0
			Females		
Number of chronic disease deaths (all ages)	13,586	13,581	11,586	10,692	11,419
Number of premature chronic disease deaths	3,910	3,658	3,022	2,696	2,351
Chronic disease death rate[b]	487.8	463.1	442.4	426.0	389.9
Mean age at death[c] (years)	61.0	61.2	60.6	60.1	60.2
Chronic disease PYLL	54,543	50,505	43,575	40,037	34,817
Chronic disease PYLL rate[d]	26.4	23.9	21.5	19.7	16.5
Rate ratio (compared to highest quintile)	1.6	1.5	1.3	1.2	1.0

PYLL Potential years of life lost.
(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression.
(b) Chronic disease deaths for all ages, per 100,000 population, age-standardised to the 2001 Australian population.
(c) For deaths at all ages.
(d) Chronic disease PYLL per 1,000 population, age-standardised to the 2001 Australian population.
Note: 227 (0.6%) premature chronic disease deaths were excluded due to unknown socioeconomic quintile.

The PYLL associated with different categories of chronic disease varied by socioeconomic status. For example, cancer deaths were associated with greater years of life lost among those living in the least disadvantaged areas (55%) compared to those living in the most disadvantaged areas (42%) (Figure 3). A socioeconomic gradient favouring the least disadvantaged areas was evident for cardiovascular diseases, chronic respiratory diseases, digestive diseases and diabetes. Cardiovascular deaths contributed 26% of PYLL from premature chronic disease deaths among the most disadvantaged areas compared with 19% among the least disadvantaged areas. Depression deaths contributed a similar proportion of PYLL (between 5% and 6%) in each of the socioeconomic areas.



PYLL Potential years of life lost.
Notes
1. 227 (0.6%) premature chronic disease deaths were excluded due to unknown socioeconomic quintile.
2. Depression deaths include a portion of the deaths coded as intentional self-harm, equivalent to age-specific proportions that were likely to be due to depression.
3. Per cents are age-standardised to the 2001 Australian population.

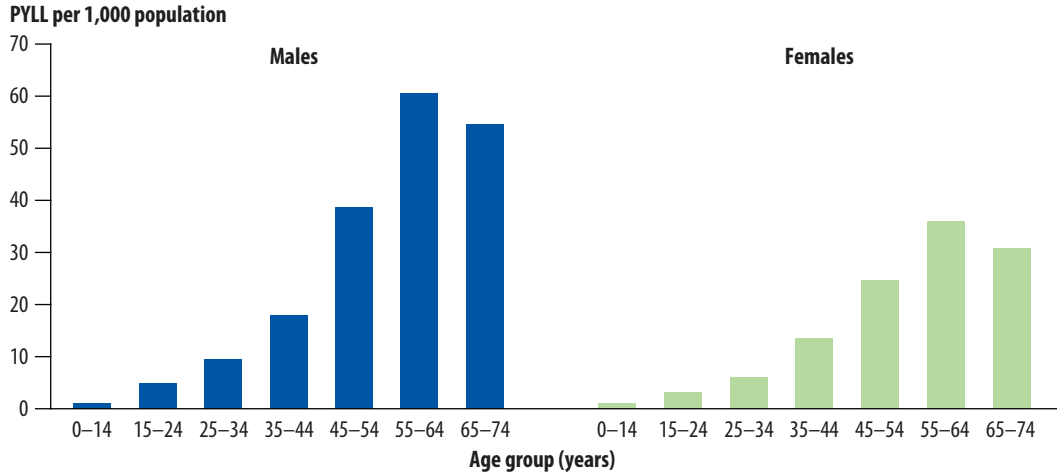
Figure 3: Potential years of life lost by socioeconomic status and major chronic disease groups, Australia, 2007 (per cent)

Avoidable chronic disease mortality

Avoidable chronic disease deaths comprise premature deaths due to chronic conditions which could potentially be avoided through primary prevention, screening, or therapeutic intervention.

In 2007, there were more than 25,000 chronic disease deaths that were potentially avoidable (Figure 1). This was 19% of all deaths in that year (and 21% of the chronic disease deaths). Nearly 360,000 PYLL resulted from avoidable chronic disease mortality, making up 63% of the total chronic disease PYLL.

Males contributed the majority (61%) of avoidable chronic disease PYLL. Avoidable chronic disease PYLL rates were highest among the 55–64 years age group for males and females (Figure 4).



PYLL Potential years of life lost.
Note: Chronic disease deaths were adjusted to include a portion of the deaths coded as intentional self-harm, equivalent to age-specific proportions that were likely to be due to depression.

Figure 4: Potential years of life lost rates for avoidable chronic disease deaths by sex and age group, Australia, 2007 (per 1,000 population)

Does avoidable chronic disease mortality vary by socioeconomic status?

PYLL rates for potentially avoidable chronic disease were more than twice as high for males in the most socioeconomically disadvantaged areas compared with those in the least disadvantaged areas (Table 7). The most disadvantaged females had avoidable chronic disease PYLL rates that were 60% higher than their least disadvantaged counterparts.

Table 7: Summary measures of avoidable mortality from chronic disease[(a)] by sex and socioeconomic quintile, 2007

	Socioeconomic quintile				
Mortality summary measure	**Lowest**	**2**	**3**	**4**	**Highest**
			Males		
Number of avoidable chronic disease deaths	4,315	3,788	3,203	2,499	2,002
Avoidable chronic disease PYLL	60,095	49,993	43,603	34,556	28,348
Avoidable chronic disease PYLL rate[(b)]	28.9	23.6	21.3	17.1	13.8
Rate ratio (compared to highest quintile)	2.1	1.7	1.5	1.2	1.0
			Females		
Number of avoidable chronic disease deaths	2,493	2,276	1,900	1,677	1,450
Avoidable chronic disease PYLL	34,003	30,421	27,309	24,658	21,371
Avoidable chronic disease PYLL rate[(b)]	16.4	14.3	13.5	12.1	10.0
Rate ratio (compared to highest quintile)	1.6	1.4	1.3	1.2	1.0

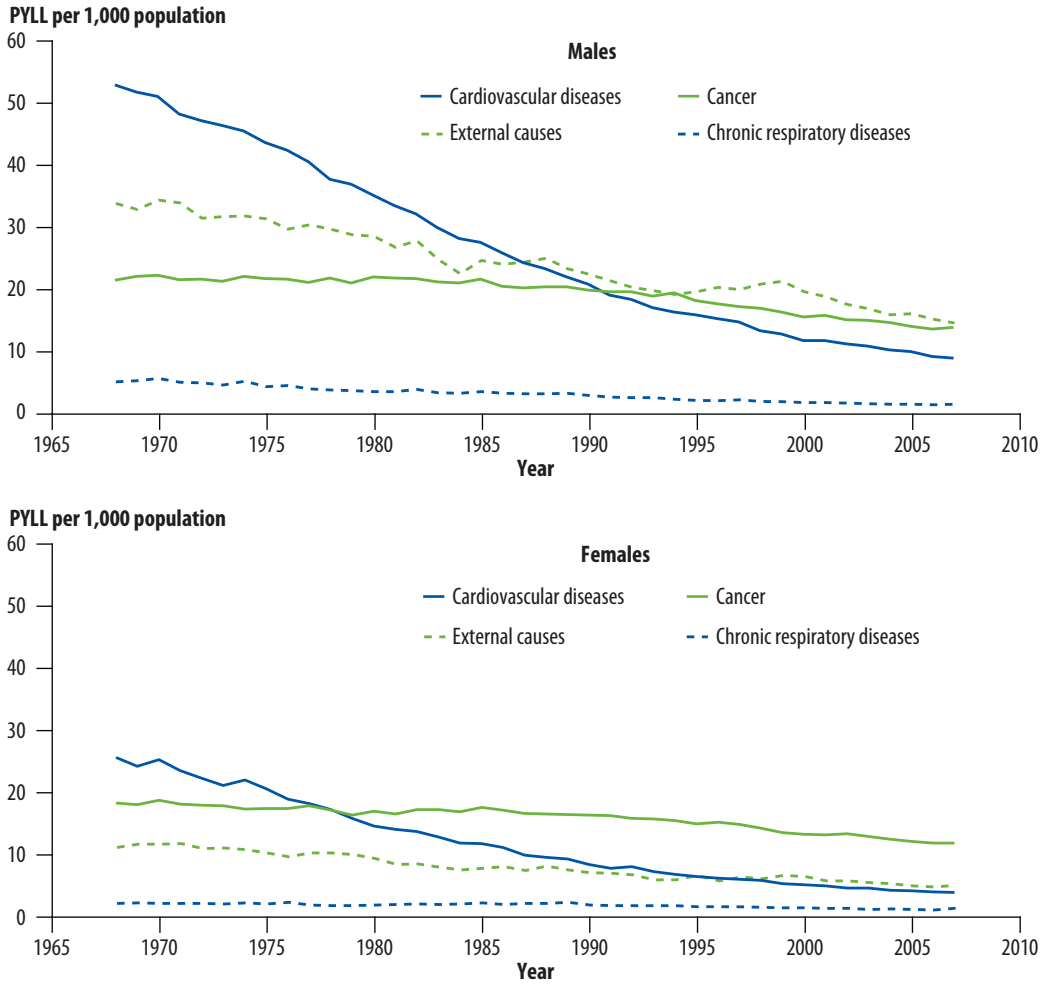
PYLL Potential years of life lost.
(a) Deaths due to chronic disease include a portion of the deaths coded as intentional self-harm equivalent to age-specific proportions that were likely to be due to depression.
(b) Chronic disease PYLL per 1,000 population, age-standardised to the 2001 Australian population.
Note: 163 (0.6%) avoidable chronic disease deaths were excluded due to unknown socioeconomic quintile.

Trends in premature mortality from selected chronic diseases

Declines in PYLL are influenced by things such as improved medical technology and pharmaceuticals, and better prevention and control measures; for example, by reducing deaths from chronic disease through addressing risk factors. Historically, a decline in PYLL was attributed to the interventions that brought about reductions in infant mortality. More recent declines have been associated with declines in early deaths from heart disease (AIHW 2009b).

Age- and sex-adjusted PYLL rates for all causes of death declined by nearly two-thirds during 1968–2007. In this period, PYLL rates for all male deaths declined from 151 to 53 years per 1,000 population and for females from 86 to 31 years per 1,000 population.

Trends in PYLL rates for selected broad causes of death are shown in Figure 5. During the period 1968–2007, a decline in PYLL rates for cardiovascular diseases and external causes was evident for both males and females, and for males for chronic respiratory diseases. PYLL for cardiovascular diseases declined from 53 to 9 years per 1,000 population for males, and from 25 to 4 for females. Changes in PYLL were less apparent for deaths due to cancer. In 1968, cancer deaths were associated with 21 and 18 years of life lost for every 1,000 males and females, respectively, while in 2007 these figures were 14 and 12, respectively.



PYLL Potential years of life lost.
Note: PYLL calculation is based on the midpoint of 5 year age groups rather than exact age at death in years.

Figure 5: Trends in potential years of life lost PYLL from selected broad causes of death, males (top) and females (bottom), Australia, 1968–2007

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Appendix

About the data

The analysis in this bulletin is based on mortality data from the AIHW National Mortality Database. This is a historical register of all deaths in Australia since 1964, comprising data that was collected by the Registrars of Births, Deaths and Marriages in each state and territory and coded by the Australian Bureau of Statistics. The coding process translates information provided by medical practitioners and coroners about the causes of death into a set of standard codes that accord with the International Classification of Disease (ICD). Mortality data are currently coded to ICD version 10 (ICD-10).

For this bulletin, 2007 deaths refer to the preliminary data for 2007. These data are subject to revision; that is, open coroner cases will be revised upon closure to indicate a more specific cause of death. As a result, the number of deaths coded with less specific codes (for example, deaths with undetermined intent) will likely decrease, while those with a more specific code (for example, intentional self-harm, assault and heart attacks) will likely increase.

Classification of chronic disease

As there is no definition for 'chronic disease', the nature of conditions and the structure of ICD-10 formed the basis of classification for the purpose of this analysis. Conditions that were not counted as chronic disease comprise those due to infectious diseases, pregnancy or childbirth, conditions that originated in the perinatal period, congenital conditions and those where the cause was unknown. In addition, non-chronic disease deaths comprise those that were due to external causes such as accidents and assault. A proportion of deaths due to intentional self-harm, that were attributable to underlying depression, were counted as chronic disease (namely, depression), according to the age- and sex-specific fractions used in the Australian burden of disease study (Begg et al. 2007). The specific codes and broad categories of cause of death used in these analyses are shown in Table A1.

Table A1: Classification of cause of death and associated ICD-10 codes, according to broad disease groupings

Broad cause of death group	ICD-10 code
Chronic diseases	
Chronic disease covers a diverse range of deaths comprising conditions that are non-communicable and tend to be long-lasting. This group includes cancers, endocrine disorders, circulatory conditions, digestive diseases, musculoskeletal diseases, genitourinary diseases, most mental and nervous system disorders and most respiratory diseases. Examples of specific conditions include stroke, coronary heart disease, diabetes, arthritis, depression, breast, prostate and colorectal cancer, and chronic obstructive pulmonary disease. A proportion of intentional self-harm deaths are considered to be caused by depression. As a result, for this bulletin, deaths due to depression were adjusted with a portion of intentional self-harm deaths using population attributable fractions consistent with those used in burden of disease estimates (Begg et al. 2007).	C00–D48, D50–D89, E00–E90, F00–F99, G04–G99, H00–H59, H60–H95, I00–I99, J30–J98, K00–K93, L00–99, M00–M99, N00–N99 and a proportion of intentional self-harm deaths (X60–84)
Non-chronic disease causes of death	
Communicable, maternal, neonatal and congenital conditions	
This category covers infectious diseases, maternal death and neonatal deaths (including deaths from causes that originated in the perinatal period) and congenital causes of death. For the purposes of this bulletin, these deaths also include those primarily caused by acute respiratory conditions (namely, acute upper and lower respiratory diseases and influenza and pneumonia) and meningitis.	A00–B99, G00–G03, J00–J22, O00–O99, P00–P96, Q00–Q99
External causes	
This grouping encompasses almost all deaths due to accidents and poisoning. This group includes deaths where the intent was unknown. A portion of deaths resulting from intentional self-harm considered to be attributable to depression are therefore counted as chronic disease (see above).	V01–Y98, minus a proportion of deaths due to intentional self-harm (X60–X84)
Unknown	
Deaths coded to ICD-10 Chapter XVIII where the cause was not able to be classified as natural or external.	R00–99

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