

Liveability: human well-being

This section reports on the following environmental indicators, which are defined in Newton et al. (1998).

Environmental Indicator	
HS 3.8	Home-based workers
HS 3.9	Physical assaults in public places
HS 3.10	Number of house burglaries
HS 3.11	Indices of urban socio-economic inequality
HS 3.12	Indices of socio-spatial segregation
HS 4.7	Average speed by mode and distance
HS 4.8	Mode choice by trip purpose by area
HS 4.9	Total time and distance travelled
HS 4.11	Economic costs of road accidents
HS 4.13	Costs of congestion
HS 5.3	Unemployment rates
HS 6.2	House price to income ratio
HS 7.5	Proportion of population sensitive to pollutants
HS 7.6	Proportion of adult smokers with children
HS 7.12	Incidence of Legionnaire's Disease
HS 8.2	Incidence of vector-borne diseases
HS 8.4	Passive smoking
HS 8.6	Depression and related disorders
HS 8.7	Melanoma of the skin
HS 8.8	Cause-specific mortality rates
HS 8.9	Mortality among Indigenous Australians
HS 8.10	GP consultations
HS 8.11	Hospital separations, all causes
HS 8.12	Health services expenditure

Findings from national surveys reveal that social and economic issues (health, crime, education, unemployment) outrank physical environment as key areas of concern among Australians (Table 31). This affirms the importance of recognising the dual dimensions of liveability of human settlements—human well-being and environmental quality—in SoE reporting (see Figure 3).

Table 31: Key concerns among Australians, 1999.

Issue	Percentage nominating issue as major concern	Issue	Percentage nominating issue as major concern
Health	29.7	Unemployment	13.3
Crime	25.5	Environment	9.0
Education	16.6	Don't know	2.8

Source: ABS (1999a).

Social and economic well-being

Australia's transition from an 'industrial' to a 'post-industrial' society has resulted in differing opportunities for both people and places (Baum et al. 1999). For human settlements, these transitions—which have included globalisation, new technologies, changes in the nature of work, the ability to access economic resources, and shifts in social dynamics generally—have resulted in increasingly noticeable social divides within Australian society which are reflected at the level of human settlements, with emerging disparities not only between the 'cities' and the 'bush', but also within the big cities and between towns within the non-metropolitan rural and regional Australia. These divides are more complex than is often portrayed in the media and politics. Many of the differences are the outcomes of processes of change that have been

occurring for a long time, such as the decline of small country towns as they are bypassed in favour of larger regional centres. In Australia, the big cities have always reflected the uneven nature of society, with poor neighbourhoods alongside richer areas, while there has always been concern about the gap between the city and the bush. The changes that have been occurring over recent decades have in many ways exacerbated these differences. However, new disparities certainly are emerging as a direct result of the fast-paced changes of contemporary society. In terms of human settlements, these disparities all impact on liveability, the economic viability of places and the people who live there.

The changing nature of work

A significant change has been occurring in the industry structure of employment, in the nature of work and how it is organised, and the expectations held by individuals regarding their careers. Australia's employment scene, like that of all industrialised nations, wears the stamp of rapid transformation, including economic restructuring and technological change. Individuals now expect to change jobs throughout their working life.

Participation in paid work and unemployment

Over the past two decades or so, transformations in the economy have resulted in roller-coaster unemployment rates, shifts in the balance of blue-collar and white-collar workers, shifts in male–female shares of employment, a shift from full-time to part-time work, and expanded hours on the job for people in work. Despite almost a decade of economic growth, in June 1999 the national unemployment rate stood at 6.9%, or a total of 648 500 people (Table 32). This was down from higher rates of unemployment earlier in the 1990s, but higher than during the boom years of the late 1980s, and it is certainly much higher than rates in the 1960s and early 1970s.

Table 32: Labour force characteristics, 1984–1999. [HS Indicator 5.3]

Type	1984		1989		1994		1999	
	n ('000s)	%	n ('000s)	%	n ('000s)	%	n ('000s)	%
Unemployed	634.1	8.9	477.4	5.8	839.2	9.6	648.5	6.9
Part-time	1 155.6	17.8	1 595.2	20.7	1 902.3	31.8	2 344.3	26.7
Labour force participation								
Male	4 042.1	76.3	4 570.6	75.1	4 534.8	73.8	4 977.6	72.5
Female	2 456.6	45.5	3 149.9	51.0	3 357.9	52.3	3 816.0	53.8

Source: ABS (2000c and various years).

Over the same period, Australia's labour force became characterised by a much greater incidence of part-time work. By 1999, part-time jobs accounted for 26.7% of all jobs, compared to 17.8% in 1984, with a peak of 31.8% having been reached in 1994. There was also an increase in the level of female labour force participation to 53.8% in 1999, while male labour force participation fell from 76.3% in 1984 to 72.5% in 1999. As the numbers of part-time workers has increased, there has been a trend towards longer working hours for those working full time. In the 10 years from 1990 to 2000, the proportion of workers working more than 45 hours per week increased from 25.5% to 28.0% (ABS 1999g, 2000h). This is consistent with a global trend (Thomas 2000).

More flexible work practices are having an effect in various ways. Table 33 shows the proportion of employed persons working at least part of the time at home grew from 22% to

Table 33: Employed persons working at home, April 1989 and September 1995. [HS Indicator 3.8]

Employment at home	April 1989		September 1995	
	Persons ('000s)	%	Persons ('000s)	%
Worked no hours at home	5 933.0	77.2	6 191.5	74.2
Worked some hours at home	1 750.2	22.3	2 149.0	25.8
Persons employed at home	266.6	3.5	343.3	4.1
Total	7 683.3		8 340.6	

Source: ABS (1996f).

26%, while the number of persons employed full time at home increased marginally from 3.5% in 1989 to 4.0% in 1995. A recent study by Newton and Wulff (1999) shows that the most dramatic changes have been for that category of the workforce (approximately 26%) who are working at home for significant periods of time during each week as an alternative to their office—frequently at night and weekends. This group is also working longer hours, is drawn from the ranks of professional occupations, and is more likely to be concentrated in the inner and middle ring suburbs of Australia's cities.

This trend is linked to a growth in the proportion of Australians working online as well as being linked to the Internet (see 'A digital divide' on page 69).

Changing structure of occupations

Significant occupational restructuring has been occurring in Australia, characterised by strong growth in service occupations and reduced growth in occupations associated with the old manufacturing economy. The key changes have been in relation to occupations tied closely to the emerging economic specialisations associated with globalisation and the information economy (Brain 1999, Reich 1991). They are highly paid with generally high levels of human capital as a requisite. They are concerned with problem solving, problem identification and strategic brokering activities. These occupations and the supporting services on which they rely have become key drivers of productivity and of economic growth in recent years.

In contrast, a range of occupations associated with the old manufacturing economy and low-skilled service jobs have become less important. Individuals in these industries have witnessed a decline in job security and reduced economic fortunes. The demise is a result of both industrial restructuring and deskilling through technological change, both of which have made some jobs less secure.

Census data show that, between 1986 and 1996, management, professional, para-professional and clerical occupations gained increasing shares of employment. These occupations are heavily represented in the new sectors of the service and information economy. In contrast, the share of employment declined for tradespersons, labourers, and production and transport workers, who are more closely associated with the old industrial economy (Table 34).

Table 34: The changing occupational structure of Australia's workforce, 1986–1996.

Occupation	Share of employed persons (%)	
	1986	1996
Managers	8	9
Professionals	13	18
Paraprofessionals	7	11
Clerical	28	30
Tradespersons	14	13
Production and tradespersons	11	8
Labourers	10	8
Other	9	3
Total	100	100

Source: ABS (1996a).

This disparity between winners and losers in occupational terms has been likened to boats in a rising tide (Reich 1991). The winner occupations are in a boat that is rising, with the national economic tide, while the loser occupations are in a boat that is sinking. And these winning occupations are highly concentrated in the big cities, particularly in the inner city areas. Sydney especially has a disproportionately high national share of those jobs.

Regional variations in participation in work and job opportunities

Table 35 shows there are significant differences across the settlement hierarchy and between the major cities in labour force participation. The major urban areas and the rural balance areas have lower rates of unemployment and commensurate levels of labour force participation. The higher level of employment in the rural balance can be explained by high levels of employment on family properties, and the fact that those who are unable to find work in these regions migrate to larger cities and towns.

Table 35: Regional differences in labour force characteristics, 1996. [HS Indicator 5.3]

Region	Employed ('000s)	Unemployed ('000s)	Not in the labour force ('000s)	Labour force participation rate (%)	Unemployment rate (%)
Section of state					
Major urban ^A	4 943.7	479.7	3 251.2	62.5	8.8
Other urban ^B	1 612.6	192.3	1 278.7	58.5	10.7
Bounded locality ^C	163.5	19.6	145.6	55.7	10.7
Rural balance ^D	908.9	80.2	497.2	66.5	8.1
Australia	7 636.3	772	5 174.2	61.9	9.2
Major population centres					
Sydney	1 684.3	133.6	1 056.1	63.3	7.4
Melbourne	1 402.1	139.4	919.2	62.6	9.0
Brisbane	665.9	63.2	403.9	64.3	8.7
Perth	560.3	49.5	346.7	63.8	8.1
Adelaide	440.8	51.4	339.3	59.2	10.4
Newcastle	177.1	22.9	149.5	57.2	11.4
Gold Coast–Tweed	140	20.8	108.5	59.7	12.9
Canberra–Queanbeyan	167.9	13.1	73.4	71.1	7.3
Wollongong	97.6	12.7	80	58.0	11.6
Greater Hobart	78.7	8.4	59.2	59.5	9.7
Sunshine Coast	55.8	10.2	50.6	56.6	15.4
Geelong	58.9	8	48.3	58.1	12.0
Townsville	54.2	5.5	28.9	67.4	9.2
Cairns	51.1	4.5	21	72.5	8.1
Launceston	38.3	4.7	31.3	57.9	11.0
Albury–Wodonga	38.4	4.4	24.4	63.7	10.2
Toowoomba	33.9	3.1	27.1	57.7	8.5
Darwin	39.4	3.1	13.9	75.3	7.3

^A Major urban means all urban centres with a population of 100 000 or more.

^B Other urban means all urban centres with a population of 1000 to 99 999.

^C Bounded locality means all population clusters of 200–999 people.

^D Rural balance means the rural remainder of the state or territory.

Source: ABS (1998b).

The differences in employment across the major population centres reflects the differential impact of economic restructuring across the big cities and the smaller urban centres. Metropolitan Sydney, Brisbane and Perth have suffered less from the long-term deleterious effects of economic restructuring than have Adelaide and Melbourne, whose industrial structure traditionally had been concentrated around manufacturing industries. Sydney, Perth and Melbourne have experienced more of the advantageous impacts of globalisation and the rise of new economy jobs. Some of the smaller cities, such as Newcastle and Geelong, have been adversely affected by the restructuring of Australia's industrial landscapes, while newer and rapidly growing urban areas such as Gold Coast–Tweed and the Sunshine Coast reflect the phenomenon of sun-belt migration (incorporating significant lifestyle, retirement and welfare streams, and tourism). However, unemployment rates are also relatively high in some of these sun-belt growth regions (Stimson et al. 1998).

A digital divide

A major contemporary issue is the differential levels of access of the population to new technologies such as personal computers and the Internet. While the rate of Internet connection is increasing, there is evidence of a digital divide. By November 1999, 3.2 million households in Australia had a home computer, and almost half of these had Internet access (ABS 2000i). This trend is growing rapidly although not uniformly (Table 36). The low level of connectedness to the Internet (approximately one-quarter of households) and the slower

rate of increase for certain family types—especially single parents—and for low-income households in general, illustrates the nature of the ‘digital divide’. There is also a significant gap between the metropolitan cities and rural and regional areas, with those in cities having higher levels of access. In an age where the ability to be able to tap into the Internet has become an important part of both human capital development and the operation of business—individual and corporate—individuals, families and firms who find it difficult or impossible to access these technologies and information networks will be at a significant disadvantage (Newton 1995).

Table 36: Household use of computer and communications technology in Australia, 1999. [HS Indicator 0.4]

Households with home computer	3.2 million (47%)
Households with Internet access	1.6 million (25.1%)
Age of person frequently using the Internet (%)	
18–24	72.0
24–34	56.0
35–44	46.0
45–54	36.0
55–64	22.0
65+	6.0
Family type with Internet access (%)	
Couples with no children	18.0
Couples with children	35.0
Single parents	15.0
Single person	8.0
Other	25.0
Income of households with Internet access (%)	
\$0–39,000 pa	34.0
\$40–79,000 pa	63.0
\$80,000 and above	73.0
Home Internet access by region	
Capital cities	29.8
Rest of Australia	17.0

Source: ABS (1998b).

A challenging issue is how universal service obligations—guaranteeing a minimal level of service in people’s access to telecommunications services—will continue to be implemented, and there is widespread concern over the regional differences in access to many services. There is a marked city focus in the private market-driven telecommunications sector. The big cities offer the advantage of having the highest demand, lowest marketing and servicing costs, and the highest anticipated revenue stream (Newton 1995, Morris 1999). The rural, regional and remote communities are disadvantaged in the availability and adoption of new services, being locations without high demand, but with high costs of supplying infrastructure and requiring heavy cross-subsidisation. All this reinforces the already strong agglomeration of economic activities, and especially in Sydney and Melbourne in the telecommunications-intensive activities, thus reinforcing both the urban and corporate hierarchy dominated by Australia’s largest cities. Bryant (1999) notes how these problems extend beyond network access to include elements such as technical support, training and skills development, and so on—issues that are intended to be addressed via the federal ‘Networking the Nation’ initiative funded by the part sale of Telstra, Australia’s largest telecommunications provider.

Income and access to material resources

The ability of Australians to consume a range of goods and services, to provide a home, and to participate actively in society all rely to varying degrees on the ability to access a minimum standard of income.

An emerging issue over recent decades is the question of inequalities in income distribution and in people's access to material resources. This concern follows periods of real income growth for Australia's population as a whole and an equalising trend in the income distribution until the late 1970s. Over the past decade, however, studies have suggested that not all population groups within Australian society have shared equally in this period of economic and income growth (NATSEM 2000, Saunders 2000). There appears to be growing research evidence, however, to show that the rapid economic changes which occurred in the last decade or two of the 20th century have resulted in widening gaps between socio-economic groups in Australian society. The growth in high-paid jobs, together with a continuation of relatively high levels of unemployment among certain parts of the population, have contributed to this change.

The 1996 SoE report noted mixed findings in this regard, with some suggesting increases in inequalities (Saunders 1994), while others claimed that inequalities had in fact declined (Johnson et al. 1995). The main difference between these findings appears to be methodological differences, including a different definition of income. The 1996 SoE report also noted income differentials by gender and ethnic background.

The debate still continues, and it is fraught with difficulties, particularly about how income is measured—should it be gross income, not adjusted for size of income units, or an after-tax measure equalised for the composition of income units? Trends in the distribution of gross income will tend to reflect the operation of the market and private sector forces. Trends in the distribution of disposable income will tend to reflect the effects of government intervention (i.e. taxes and benefits). Different measures of income and different ways of analysing the distribution can influence, to a degree, the patterns that emerge.

Using the P90/P10 ratio, ABS (unpublished data, 2000) analysed recent trends (1994–2000) in income distribution. Using the gross income measure, Figure 42 shows that levels of income inequality increased between 1994–1995 and 1999–2000. In 1994, those at the top of the distribution had a gross income 7–9 times higher than those at the bottom and, at the end of the period, this ratio had risen to 8.5. The increase in inequality is less evident using the disposable income measure, since this reflects the effect of government policy towards income equalisation via taxes (of higher incomes) and benefits (to those on lower incomes).

The ABS has also calculated a Gini coefficient for gross income distribution in Australia. Between 1994–95 and 1999–2000 this coefficient increased marginally, from 0.443 to 0.448 (Figure 43). Again using ABS data from income surveys (which typically have sampling standard errors of around $\pm 2.8\%$) over the period from the mid-1980s to the late 1990s, it is evident that there was a widening of gross income inequality. For example, in 1984 the top 25% of income units earned 38.8% of gross income, while the bottom 25% earned 6.3% (Figure 44). By 1997–98, the top 25% accounted for almost 50% of gross income, while the bottom 25% earned only 3.8% of that income. When one takes a shorter and more recent time perspective of this changing gross income distribution, then the ABS data shows that, between 1994–95 and 1999–2000, the share of the lowest quintile for gross income had increased from 3.6% to 3.8%, while the share of the highest quintile increased its share of gross income from 47.9% to 48.5%. There has thus been a decline in the shares of the middle 60%; the second quintile's share declined from 9.3% to 9.0%; the third quintile's share declined from 15.2% to 15.0%; and the fourth quintile's share declined from 24.0% to 23.8%.

Admittedly, these shifts showing a continuation of the 'hollowing out' of the middle income earners in Australia—something identified by researchers for almost two decades—are small shifts, and might reflect a decline in the rate of income inequality change occurring. The ABS, in its *1999–2000 Income Distribution* bulletin (ABS 2000i), made the point that an analysis based on gross income takes no account of the distributional impact of the income tax system or differences in the composition of income units. If disposable income is used (deducting personal income tax and the Medicare levy from each income unit's gross cash income), the Gini coefficient in 1999–2000 is 0.396, compared to 0.448 for gross weekly

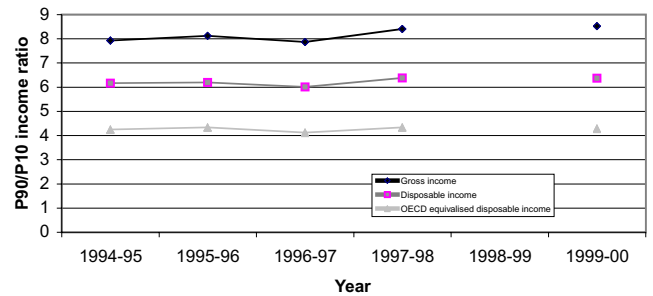


Figure 42: P90/P10 income ratio among income units, Australia.

P90 is the income of the income unit at the 90th percentile of the distribution, and P10 is the income of the income unit at the 10th percentile of the distribution. The P90/P10 ratio measures how much more an income unit close to the top of the income distribution receives to an income unit close to the bottom. Various equivalence scales can be used. These include those known as the Henderson scales (developed for the 1975 Commission of Inquiry into Poverty in Australia) and the now frequently used OECD equivalence scales.

Source: ABS (2001).

income, and when the OECD equivalent adjustments are made, the Gini coefficient is further reduced.

These reductions in the Gini coefficient would be expected, as the tax and welfare systems are supposed to have an income redistributive effect in favour of lower income and disadvantaged family households. Indeed, on the disposable income distribution measure, the lowest income quintile's share was 4.7% in 1999–2000 and the share of the highest quintile was 44.3% (these shares being 7.1% and 38.5% respectively for the Henderson equivalent measure).

Nonetheless, the gross income distribution data displayed in Figure 44 indicate that, since the 1980s, there has been a shift in the distribution of gross income of Australians from the poor to the rich, while the ABS analysis of disposable income by the Henderson equivalent shows that income inequality is being offset by interventions through the tax and social security system which, according to the Gini coefficients for 1999–2000, are having a redistributive effect of between 5% and 13%.

Using data for an earlier period, Norris and McLean (1999) show a similar trend in the distribution of incomes. Dividing employees into three income categories, they showed that between 1975 and 1998 there was significant growth in both the high-paid category and low-paid category, and a general hollowing out of the middle income earners (Table 37).

Table 37: Income distribution of male and female employees, 1975 and 1998. (Percentage of employees.)

Income category	Males		Females	
	1975	1998	1975	1998
Low	9.7	20.7	6.8	15.2
Middle	80.8	65.2	87.3	74.0
High	9.5	14.1	5.9	10.8

Source: Norris and McLean (1999).

Further confirmation of these trends is provided by Saunders (2000) who showed that ‘... between 1985 and 1998, earnings at the [lowest] 10th percentile rose by less than the CPI (ie the level of real earnings declined). Earnings at the median and 90th percentile rose substantially faster than the CPI’.

But aggregate distribution of income (however measured) across the nation's income units tells us nothing about the marked geographical variations that occur—something that economists tend not to focus on because they take a non-spatial view of the world, whereas geographers take a spatial view of the world.

Regional variations in income distribution

In relation to regional variations in income, a study by Lloyd et al. (2000, p.22) concluded that there is a ‘large and growing gap between the incomes of those Australians living in the capital cities and those living in the rest of Australia. The incomes of metropolitan residents increased at about double the rate of those living in the major urban centres and regional and rural towns in the five years to 1996. However, people living in rural areas (not rural towns) enjoyed by far the strongest income increase between 1991 and 1996 ... The results indicate that “regional Australia” is not uniformly disadvantaged and not uniformly declining. The biggest losses appear to be to the residents of small rural towns rather than residents of rural areas’ (Table 38).

When Lloyd et al. (2000) analysed income distribution patterns and trends across local government areas in Australia in 1991 and 1996, they noted how ‘spatial income inequality increased’, as ‘average household income grew strongly in the most affluent LGAs and declined in the

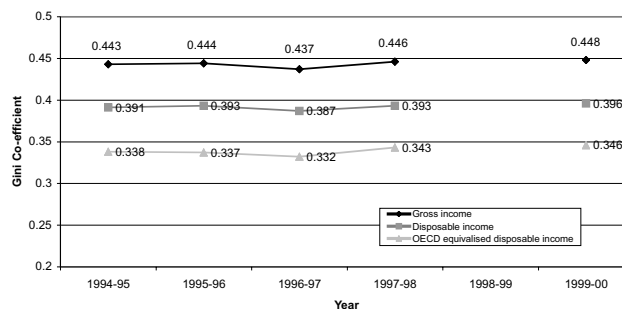


Figure 43: Distribution of income among income units in Australia: Gini coefficients.

Sources: ABS Income Distribution Surveys.

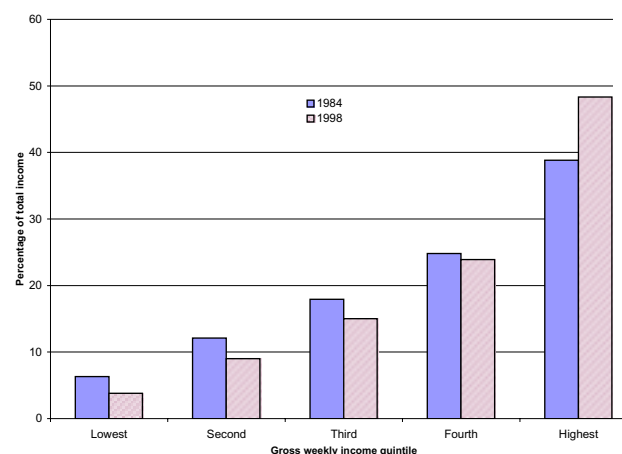


Figure 44: Share of income, gross weekly income quintiles, 1984 and 1998.

Sources: ABS (1998 and various years).

Table 38: Average household incomes in Australia, by size of settlement, 1991 and 1996.

Class of settlement ^A	Average household income (\$'000s) (in 1996 dollars)	
	1991	1996
Capital cities	43.9	44.7
Major urban	37.5	37.6
Regional towns	34.2	34.6
Rural towns	30.3	30.6
Rural areas	34.7	36.1

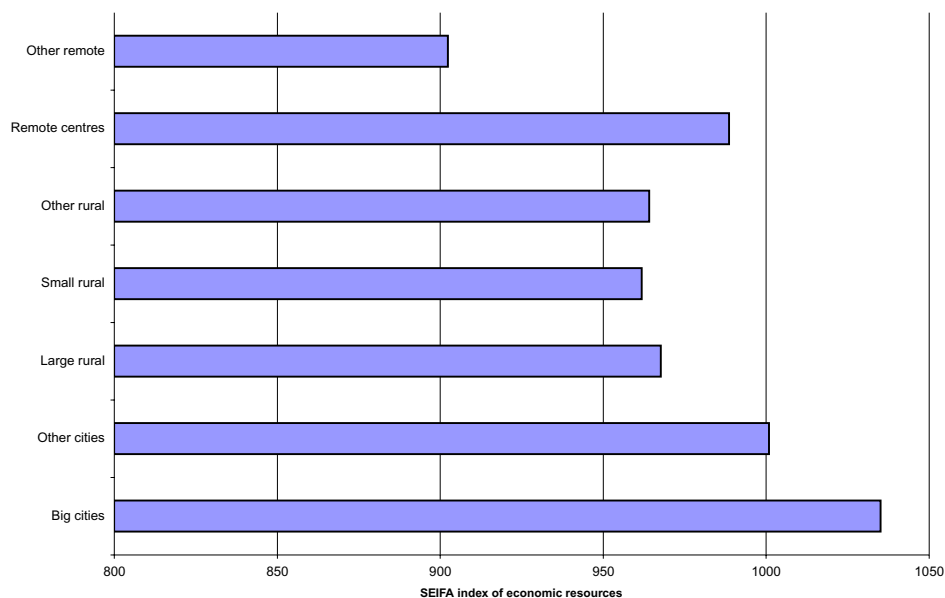
^A Major urban regions have populations over 100 000, regional towns 1000–100 000, and rural towns 200–999.
Source: Lloyd et al. (2000).

poorest LGAs ...’ This suggests a continuation of the process of increasing geographic polarisation of households within Australia’s cities and towns first identified by Gregory and Hunter (1995).

A mapping of the index of economic resources developed by the ABS (1998c) further illustrates the uneven nature of socio-economic well-being across Australia’s human settlements. Known as the SEIFA (Socio Economic Index For Areas) index, it provides a profile of the economic resources of families for defined areas. The index is produced using 1996 census data that include household income and expenditure (income, rent) as well as non-income assets such as dwelling size and number of cars. It is clear that residents of big cities and other urban areas have a larger share of economic resources than do residents in other human settlements, although people in remote centres, are also ‘better off’, reflecting the location of significant mining activities (Figure 45). Not surprisingly, metropolitan Sydney, Melbourne and Perth, together with Canberra, recorded a higher level of economic resources than other capital cities, a fact reflecting the performance of these cities in the national and international economy (Figure 46). These patterns reflect many factors, including the varying range of occupations and industries found in centres of different size, and differences in the number of wage earners per household—the proportion of households with two wage earners or more is much higher in the major urban centres and rural balance than elsewhere (ABS 1998a). A national study by Baum et al. (1999) on community opportunity and vulnerability in Australia presented a similar picture.

Crime and victimisation

One of the unfortunate negative aspects of life in Australia, particularly in large urban centres, seems to be the perceived increasing incidence of crime in society. A recent report from the

**Figure 45:** Distribution of economic resources across Australia, 1996. [HS Indicator 3.11]

Source: ABS (1996c).

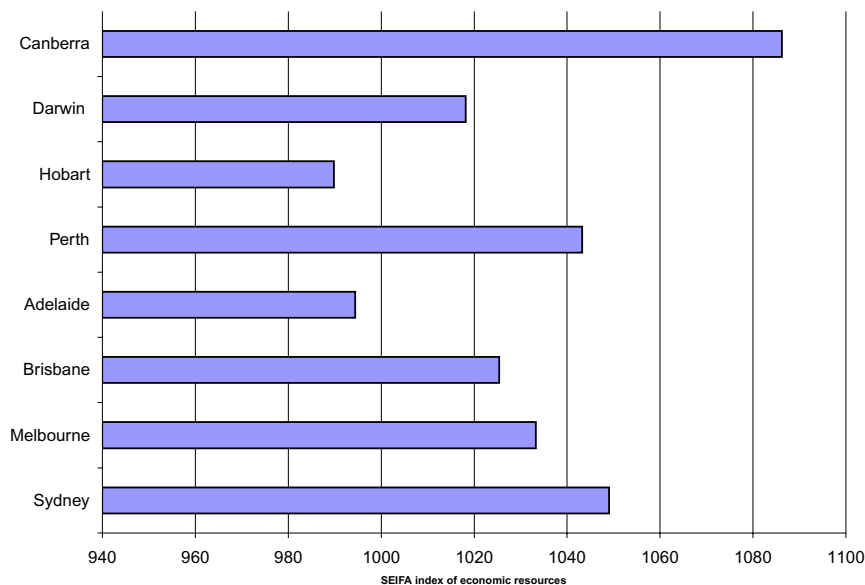


Figure 46: Distribution of economic resources in capital cities, 1996. [HS Indicator 3.11]

Source: ABS (1996c).

Australian Institute of Criminology (Mukherjee et al. 1997) indicated that certain types of crime seem to be more prominent in particular locations (Figure 47).

Property crime

Two out of three breaking and entering offences and attempts in Australia occur in residential locations, and a vast majority of these occur in private dwellings. Retail outlets are the most frequent targets of breaking and entering among non-residential locations. Some households are more at risk of being victims of burglaries than others. Based on an analysis of survey data, the ABS (1998f) estimates that there is a higher risk of being a victim of burglary in the following cases:

- one-parent households,
- households with dwellings where there were large amounts of motor vehicle traffic in the street,
- households with dwellings next to laneways and bicycle paths,
- households in areas with 10% or more unemployed persons,
- households in areas with 9% or more of males aged 15–24 years, and
- households in cities and towns with a population of 8000 or more.

More than one in three stolen motor vehicles are taken from streets and footpaths, and carparks are the second most frequent targets. There appears some marked differences in this pattern across states and territories. Residential locations are the most favoured targets for stealing motor vehicles in Western Australia and the Northern Territory. In New South Wales, more than three out of four stolen motor vehicles are taken from community locations such as streets, footpaths and carparks. Other thefts (excluding breaking entering and stealing, and motor vehicle thefts) occur in all types of locations, although a quarter of these take place in retail outlets. Some differences across states and territories are notable. About a third of these thefts in Western Australia take place in private dwellings, and a quarter of other thefts in New South Wales occur on the street/footpath.

Violent crime

Two in three homicides in Australia take place in residential locations, and a majority of these occur in private dwellings (diverging from this trend is the Northern Territory, where approximately 46% of homicides take place in community

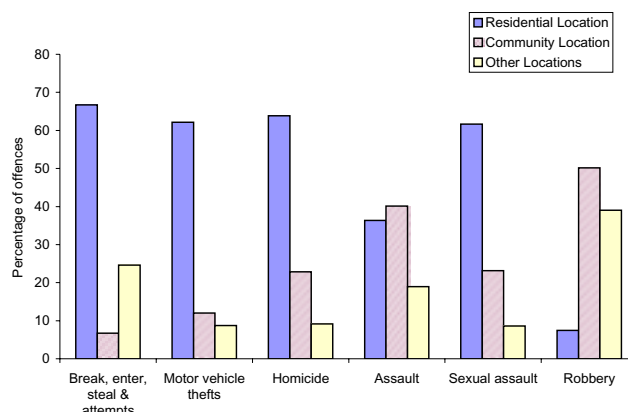


Figure 47: Locations of various criminal offences, 1995. [HS Indicator 3.9], [HS Indicator 3.10]

Source: Mukherjee et al. (1997).

locations such as streets). Assaults, both common and serious (excluding sexual assaults), take place in all types of locations, but about one in three take place in private dwellings and one in four occur in open areas such as streets. More than half of the assaults in the Australian Capital Territory take place in community locations. Victims of assault are more likely to be young males or females. Young females (18 and 19 years of age) reported much higher rates of sexual assault than other groups (ABS 1998f).

Victoria recorded the lowest rates of burglaries and personal assaults. High burglary rates occurred in Western Australia, the Northern Territory and the ACT. High rates of personal assaults occurred in the ACT and the Northern Territory.

The most common place for the crime of robbery is the street or footpath, but this pattern varies between states and territories. In WA and Tasmania, for example, retail outlets are the most common targets of robbery. More than 60% of sexual assaults in Australia take place in residential locations, mostly in private homes.

Attempts to address these problems are many and varied, ranging from those which view the problem as one of social inequality in distribution of assets, to law enforcement (e.g. the 'three strikes and you're out' policy operating in places as different as New York City and the Northern Territory), Neighbourhood Watch type programs, and attempts to improve personal security through intruder alarm systems and gated communities.

The Indigenous socio-economic environment

The micro-economy of Indigenous settlements is markedly different because of the considerable economic disadvantage endured by the Indigenous population. Unemployment among Indigenous people in 1996 was 25%, and it is estimated to rise to as high as 28% by 2006. Unemployment among non-Indigenous Australians is estimated to remain around the 1996 level of 8.5% into the near future (Altman and Hunter 1998). Other aspects of the Indigenous socio-economic environment also show considerable disadvantages, they are discussed in the Environmental Health and the Indigenous Housing sections of this report.

Implications

This section has identified several aspects of human well-being for which socio-economic divides appear to have been intensifying between both people and places. This goes to the heart of the 'equity' component of sustainable development.

In this context, then, we may look at elements of federal policies and programs that address this issue. Here, a trend impacting directly on the distribution of incomes is the increasing reliance of certain groups on government transfer payments. This may not be surprising given an ageing society, the continuing relatively high levels of unemployment, and the recent big increase in the incidence of people on disability support programs.

The Commonwealth Government's safety net programs have done much to slow the growth in the earnings gap, and without these interventions the social problems associated with uneven income distribution could be worse. But over time the reliance on this safety net has increased. Between 1965 and 1998, the proportion of the population receiving income support increased from 4% (200 000 people) to 18% (2.6 million people). This amounted to a total welfare bill of \$38.9 billion in 1998, representing approximately 7% of GDP (FACS 2000). The growth in welfare dependency has been the direct result of changing economic and social conditions that have seen weakening labour force prospects and social supports for many individuals and communities in late 20th century Australian society.

The knock-on environmental effects of economically vulnerable households, neighbourhoods and regions are also evident in the quality of housing, access to services and general physical and social amenity of area of residence.

Housing

Australians generally are well housed. For most people and households, accessibility to suitable housing and levels of satisfaction with housing remains high. Declining average household size and changing household composition, along with changing lifestyles and housing preferences, are resulting in changes to the nature of the housing stock.

In the early 1990s, surveys conducted for the *National Housing Strategy* found that residents were generally satisfied with their housing, but this varied between tenures. Generally, home owners recorded higher levels of satisfaction, while those in private rental were slightly less satisfied. More recently, a 1997 survey of quality of life in the south-east

Queensland mega-metro region found that the vast majority of respondents (88%) are highly satisfied with their housing. Moreover, the survey illustrates that respondents were also highly satisfied with their overall residential environment, with over 80% of respondents indicating they are satisfied with their neighbourhood (unpublished data, Department of Geographic Sciences and Planning, University of Queensland; see also Stimson et al. (1998)).

General satisfaction studies of this kind have to be treated with caution, however, since it has been found that people generally express satisfaction with their housing, especially their housing choices, whatever they may be. Variations in satisfaction level seem to be more a function of location than of housing. The most significant factors influencing differences in satisfaction include location, the availability of good facilities such as shops, recreation and public transport, good walking access to those facilities, and the quality of urban design.

Housing affordability

Given this high level of housing satisfaction, barriers continue to exist which affect access to affordable housing for some people, in particular lower-income private renters and especially households with a single female parent. Almost a decade ago, the National Housing Strategy (1992) identified issues of affordability as being among the most important barriers to choice, with affordability of home purchase being an especially important issue. During the 1990s housing affordability improved as interest rates declined, yet in the same period foreclosures were not uncommon, and many families continued to be placed into marginal housing situations because they could not afford to service their loans. Berry et al. (1999) show that the transitions occurring in the economy—which affect earnings, job stability and the real cost of home ownership—have resulted in an increase in the level of mortgage defaults.

Generally the proportion of income spent on housing declines as income increases. Regardless of tenure, all households in the lowest income quintile spend higher proportions of income on housing than do households in higher income quintiles (Figure 48). Financial stress among low-income households is prominent among both home owners with a mortgage and renters in the private rental market, with large proportions of income being expended on housing, creating significant levels of housing-related poverty. However, preliminary data from the 1999 Australian Housing Survey indicate that cheaper housing is not necessarily a strong motivator for people moving, as the location of such housing may provide fewer employment and education opportunities and poor access to transport and services, and for some it may reduce access to friends and relatives.

For those suffering housing financial stress, a solution for some is access to public housing. But access to public housing is controlled by strict eligibility requirements, as well as being constrained by the limited available public housing stock. Over 90% of residents in, and applicants for public housing are recipients of some form of social welfare benefit payment (Wulff and Newton 1996b). In most states and territories, the gap between eligible applicants for public housing and the available public housing stock remains high. In 1990, 195 000 households were on public housing waiting lists, but by 1997 this had increased to 221 000 (FACS 1999). Waiting lists are larger in New South Wales, Victoria and South Australia than in other states.

Not surprisingly, housing costs and the level of affordability of housing vary significantly across Australia's regions as well as within the big cities. Comparing the capital cities, housing affordability is lowest in Sydney and highest in Adelaide and Hobart (Figure 49). Generally, housing is less affordable in metropolitan cities than in the other parts of the states. Such regional differences in affordability constitute a driving force for some of the interstate migration noted earlier, especially out of Sydney (Flood et al. 1991). It is economically attractive for low-income households and those on fixed incomes (such as retirees) to migrate to places offering cheaper housing alternatives.

House prices vary significantly within metropolitan areas. In most big cities there is a clear although not perfect rent gradient, with house prices decreasing with increasing distance from the city. Cheaper housing is generally available in outer suburbs and in suburbs to the west of the CBD in east coast cities. More expensive housing is located

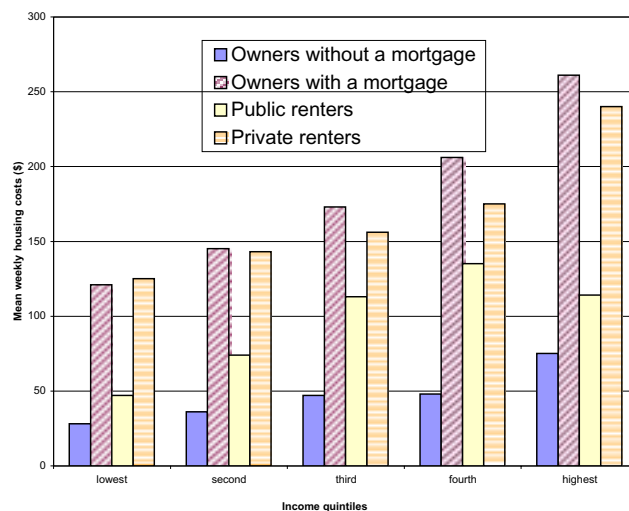


Figure 48: Mean housing cost as a percentage of income, 1999. [HS Indicator 6.2]

Source: ABS (1999h).

in the inner suburbs, the preferred location for many of the new economy jobs and workers (Gipps et al. 1997).

This is, however, an oversimplification of what has been occurring within the housing markets of the larger cities. Some suburbs are increasing in property value at a more rapid rate than the metropolitan average, while others are declining in value—sometimes in real terms. In Melbourne between 1986 and 1996, suburbs classed as ‘advantaged’ on the basis of the socio-economic characteristics of their residents enjoyed increases in average property values of 40%; by comparison, suburbs classed as ‘disadvantaged’ experienced a 9% decline (Wulff and Reynolds 2000).

Housing tenure

The shift in preferences towards medium density (attached) housing is being accompanied by a shift from home purchase towards renting. Between 1988 and 2000, outright home ownership declined from 43.0% to 39.4% nationally, while the proportion of households purchasing their homes remained relatively unchanged (29.4% in 1998; 30.42% in 2000). In contrast, the proportion of households renting in the private market increased from 17.3% to 20.4%, and those renting from state housing authorities remained stable at around 5% (Figure 50).

Explanations are multi-dimensional for the small but still significant shift in tenure patterns, indicating a declining propensity for home ownership. Wulff and Yates (1999) pointed to changes in the structure of households, delays in household formation, postponement of marriage and children, and increases in single parents, people living alone, and non-family households, together with economic and labour force restructuring, as being some of the driving forces behind these changes. Other factors may include the greater demands made on given levels of income (especially for traditional families), the desire to maintain after-housing living standards, together with the change in the relative cost of owning versus renting (Yates 1999), and the greater flexibility afforded to a more mobile labour force by the private rental market.

The shift away from home ownership has environmental as well as socio-economic implications, to the extent that concern for the operating energy efficiency of dwellings is likely to be less among landlords. (In the commercial building sector, it is common for building owners to be less sensitive to energy efficiency if they are not also the occupants.) Australia lacks legislation (e.g. operating in Denmark) which requires that all homes for sale or rent possess certificates detailing energy use.

Indigenous housing

Studies by Gale (1972), Gale and Wundersitz (1982) and Memmott (1991) indicate that Indigenous families prefer to live close to kin and family, whether it be in urban, rural or urban metropolitan centres. This may take several years of patiently relocating from one housing unit to another.

Within metropolitan cities such as Brisbane there is a clear relationship between the residential location of Indigenous people and a high incidence of disadvantage as measured by the SEIFA socio-economic index (Figure 51). Hunter and Gregory (1996) showed that the extent of residential segregation for Indigenous people is higher than for immigrants. Furthermore, the level of residential segregation is the same for Indigenous people regardless of socio-economic status, contrary to the trend observed amongst immigrants. Wealthy immigrants are therefore much more likely to live in wealthy suburbs than wealthy Indigenous people. A number of factors combine to explain this: institutional barriers limit access for Indigenous people to the private rental market, and internal ties within Indigenous social

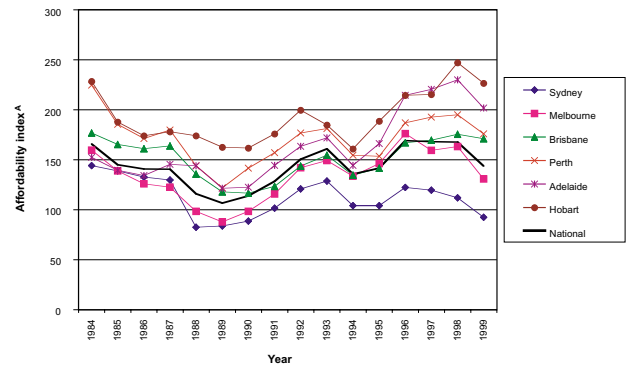


Figure 49: Housing affordability index, December quarter. [HS Indicator 6.2]

^A The CBA–HIA affordability index is derived from the ratio of average household disposable income to the qualifying income required to meet payments on a typical dwelling. Higher index numbers represent higher levels of affordability.

Source: CBA–HIA housing report, various years (December quarter).

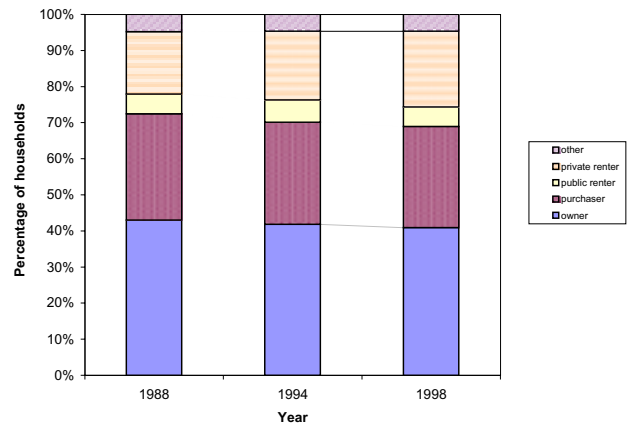


Figure 50: Housing tenure, 1988–1998.

Source: ABS (1999).

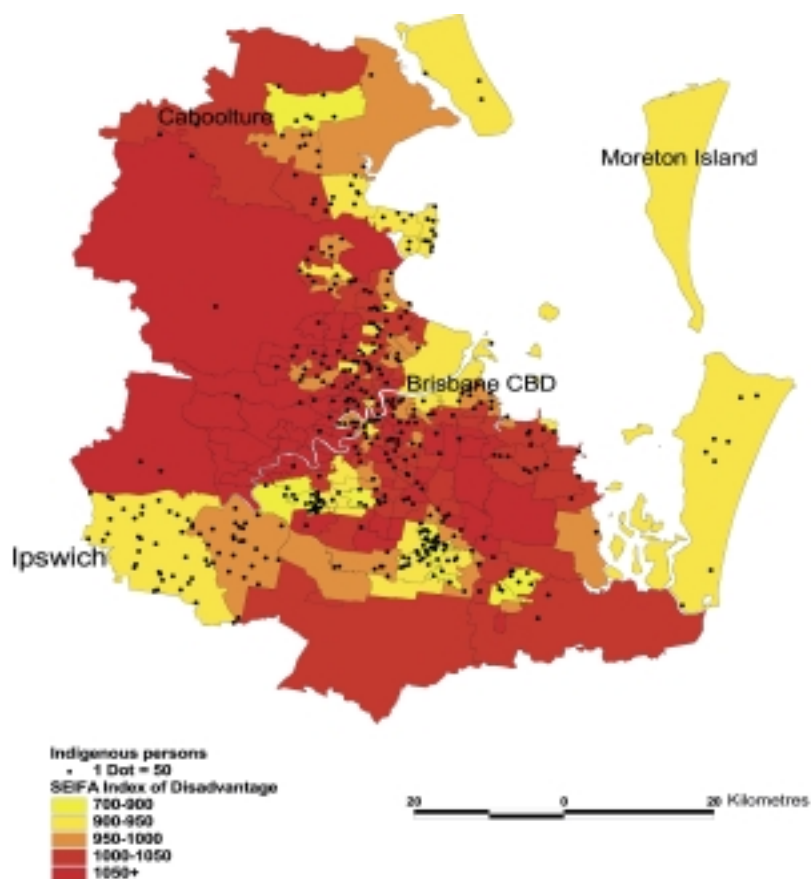


Figure 51: Distribution of Indigenous population by collector district, correlated with the SEIFA index of socioeconomic disadvantage in SLAs in the Brisbane metropolitan area, 1996. [HS Indicator 3.12]

Source: ABS (1996a, 1996c).

networks and societies result in a propensity for Indigenous people to choose to remain close to kin (Figure 51).

Because of the widespread poverty amongst the Indigenous population, and other cultural values concerning possessiveness and consumerism, the proportion of Indigenous people owning or buying their own house has always been considerably lower than for the mainstream population. However, between 1991 and 1996, census data indicated the proportion of Indigenous people who were home owners or buyers rose from 28 to 31%, compared to 70% of the non-Indigenous population in 1996.

Implications

In general, Australians are well housed. There are high rates of home ownership, and generally most households are satisfied with the standard of their dwelling. Despite high rates of satisfaction, housing affordability remains a significant problem. There are large differences in affordability within capital cities, and between capital cities and regional localities. Financial disadvantage associated with housing is strongly related to low-income and particular types of households (i.e. single-person households, and households with a single female parent). The position of Indigenous people in the housing market remains marginal, especially in large cities where they often live in disadvantaged areas in low-quality housing. Government policies and programs need to address housing assistance and target it better. However, this cannot simply involve providing housing to low-income or disadvantaged groups in traditional ways. The merits of the provision of public housing versus rental support for disadvantaged households needs to be debated further.



The backyard of a conventional rented house on an urban block in Dajarra, north-western Queensland.

Source: Memmott.

Transport demand, access and congestion

Travel demand

During the period August 1998 to July 1999, it is estimated that Australian road vehicles travelled 177 635 million kilometres—an average of 14 900 kilometres per vehicle. While freight-carrying vehicles and buses travelled greater average distances, 80% of all the vehicles on the road were passenger vehicles and they accounted for 78% (137 885 million kilometres) of total travel. Of that distance, 51% was for general private use, 25% for work and business, and 24% for commuting (ABS 2000g).

The average distances travelled per driver, rather than per vehicle, is less. Figure 52 compares average distances per vehicle for drivers in different gender and age groups. This accounts for vehicles being used by more than one driver, but not for drivers using more than one vehicle.

Travel for all purposes is increasing. The New South Wales Department of Transport’s Household Travel Survey (Transport Data Centre 1999), a continuous survey until June 1997 of households in the Greater Sydney Metropolitan region, provides the most recent source of detailed data about travel in Australian cities. Figure 53 shows increases in both trips and distance travelled by household members in Sydney between 1991 and 1997. The travel categories in this and following figures from the same source are collapsed from a list of 21 trip purposes surveyed. Their meanings are as follows:

- home* all trips back to home
- commute* trips to work
- business* trips as part of work
- education/childcare* from daycare for infants, to university
- shopping/personal business* described thus by respondent as medical, dental, social security etc.
- social/recreational* entertainment, sport, visiting friends and relatives
- serve passenger* drop off or pick up another household member.

Of particular interest is the large increase in travel for personal business and for dropping off or picking up other household members, termed ‘serve passenger’. ‘Household taxi’ trips contribute to the high mode share for car for all journey purposes. These trips are often linked to other trips. For instance, children are dropped at school or childcare on the way to work. Multipurpose journeys are increasing in comparison to single-purpose journeys because of

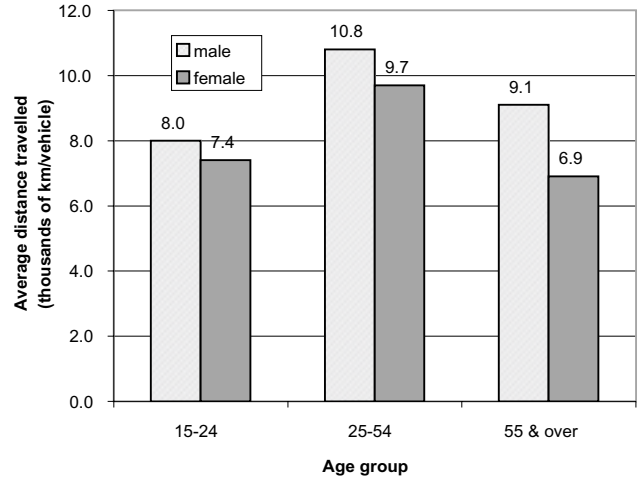


Figure 52: Comparison of average kilometres travelled per driver, 1998–1999. [HS Indicator 4.9]

Source: ABS (2000k).

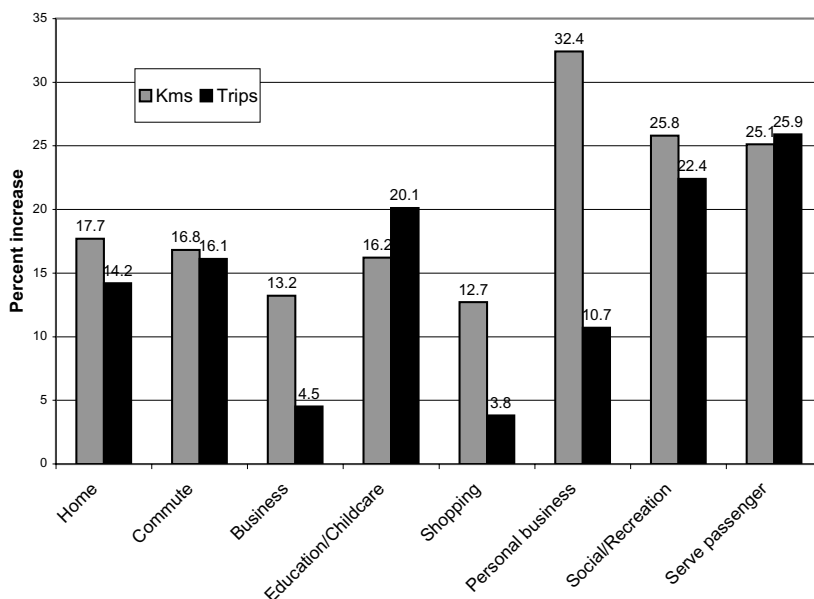


Figure 53: Change in distance and number of trips by purpose in Sydney, 1991–1997. [HS Indicator 4.8]

Source: Transport Data Centre (1999).

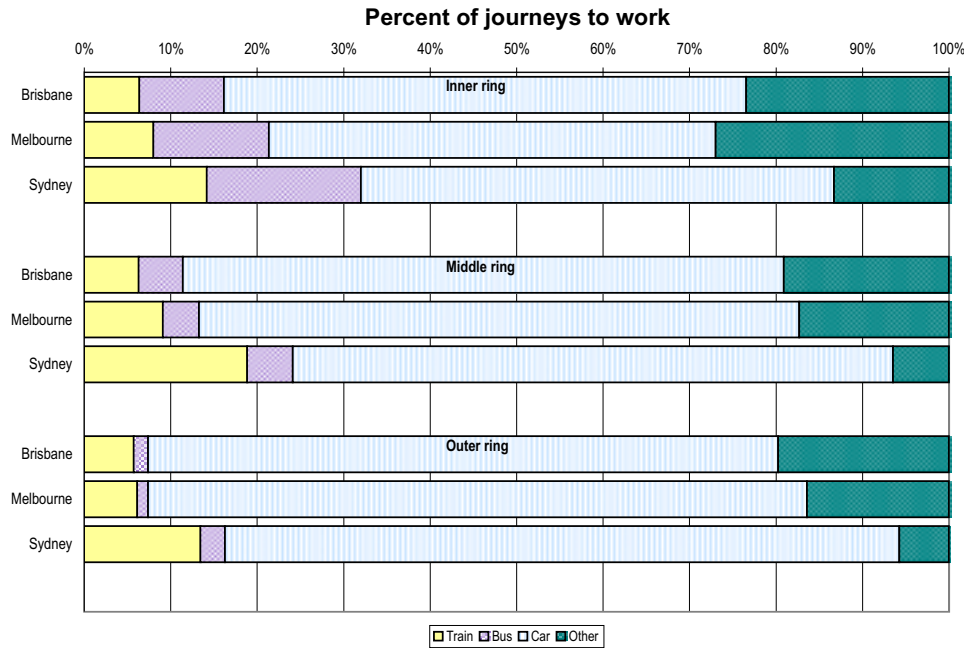


Figure 54: modes of journey to work in inner, middle and outer ring suburbs of Sydney, Melbourne and Brisbane. [HS Indicator 4.8]

Sources: Special tables from ABS (1996f, 1998e).

increased time pressures on households, and the flexibility provided by the car makes it particularly attractive for these trips. Thus, despite efforts to increase public transport use, car use still dominates all journey purposes. Figure 54 shows the mode share for journey to work travel, from the ABS 1996 census (ABS 1998g), in Brisbane, Sydney and Melbourne, and also compares inner, middle and outer suburban commuters. To facilitate display, workers who did not commute on census day have been excluded, and the mode categories collapsed. Hence, *car* = car passenger or driver; *train* = train; *bus* = bus/ferry/tram; and *other* = walk only/bicycle/taxi/motorbike/sometimes truck.

The only areas where less than 50% of commuting is by car are inner Sydney and inner Melbourne. Overall public transport use in Brisbane is less because the city’s rail system is less extensive. Inner city residents are better served by public transport, are likely to be making shorter journeys to work to central locations, and may face parking restrictions at both home and work. The major reason for using public transport cited by 35% of public transport users in response to the Sydney Household Travel Survey was to ‘avoid parking problems or costs’. In contrast, outer suburban commuters travel to a wider spread of locations, typically have garage space at home and free parking at work, make cross-suburb trips that are less suited to public transport, and have fewer public transport services available. Thus, public transport use is very low in the outer suburbs of Brisbane and Melbourne. The higher mode share for rail in outer Sydney is predominantly due to long-distance commuting on radial services towards the city.

Figure 55, again from Sydney Household Travel Survey, shows that car also dominates when all household travel is considered. Numbers of public transport trips have increased, but there has been a greater increase in car trips. Walk trips have actually dropped. This should be a concern, as walking is the most environmentally friendly transport mode and also provides health benefits. It is especially worrying that some children and teenagers now seldom walk. Numbers of walking trips by children under 16 on an average weekday have dropped by 5%, while trips as car passengers have risen by 5%.

A comparison of average trip time by mode broken down by purpose (Figure 56) shows that public transport

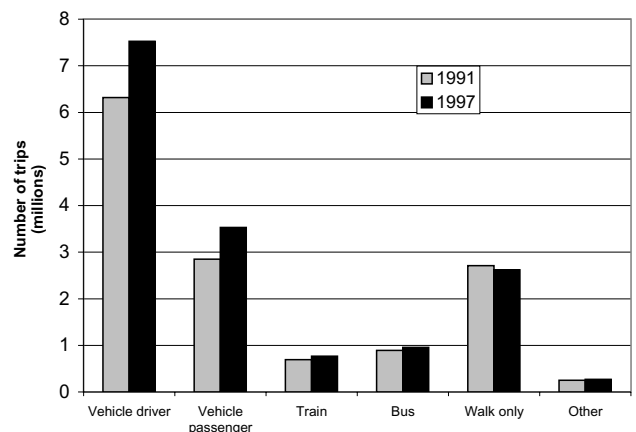


Figure 55: Number of trips made by households using various modes, 1991 and 1997.

Source: Transport Data Centre (1999).

journeys are in general more time-consuming than car journeys, even allowing that rail is often considered a long-haul mode. Fifty per cent of motorists responding to the Household Travel Survey cited delays as a reason for not using public transport.

All this travel imposes considerable costs on Australian households. The ABS Survey of Household Expenditure (ABS 2000e) found that, in the 12 months to June 1999, Australian households spent on average \$118 per week on transport, which represents 17% of their total expenditure on goods and services. This compares with 14% on housing and 18% on food. Moreover, transport was the fastest-growing expenditure category since the last survey, although it has been high since 1984 (16%). Costs range across Australian capital cities from a low of 14% in Adelaide, a relatively compact city, to 18% in Melbourne. They average 16% for other urban centres and are higher (21%) for rural households. Government taxes on petrol (47% in Australia in September 2000; the *Age*, 17 September 2000) is a significant part of the price paid at the pump and its knock-on impact to household expenditure. While petrol tax rates in Australia are lower than in most European countries (64–74% range is common), they are higher than in North America and remain a significant domestic public policy issue, particularly in the context of rising global oil prices.

Access and congestion

Increases in both motor vehicle volumes on the road and total distance travelled affect the quality of life in towns and cities in different ways. The widespread availability of cars, the number of licensed drivers, and improvements in road networks provide communities with increased mobility. For those with access to cars, personal mobility (as measured by vehicle kilometres travelled) is increasing at a faster rate than other transport indicators, such as number of cars, would suggest (Figure 57).

Increased mobility in turn results in access to much wider sets of activities for a larger proportion of the community. This includes access to specialised workplaces at a distance from home, access to markets for business, and access to a wider range of social, recreational, shopping and personal services. The number of out-of-home activities in which households are engaged is increasing across the age group spectrum, from children playing weekend team sports to increased eating out for all age groups.

As people move across cities during the day, the daytime population density in various parts of the city varies considerably from the night-time density. That is, there are people in cities on the move around the clock. The Victorian Activity and Travel Survey recorded the activities undertaken by household members throughout the day. While the available data is not as recent as that from Sydney, it provides extra information about activities at locations across a metropolitan area.

Unfortunately there are also negative impacts from increased motor travel. Increased travel is leading to increased congestion. In Melbourne, for example, congestion is restricting travel speeds to well below the speed limits, especially in inner areas (Table 39).

Moreover, on congested roads there is considerable variability in travel time, as an incident can bring traffic close to gridlock. This annoys commuters, imposes costs on business, and affects fuel costs and pollution levels. The Bureau of Transport Economics (BTE) forecast that congestion and its costs will increase across Australian cities. Figure 58 shows the Bureau's estimated costs, in 1996 dollars, for Australian cities in 2015 compared to 1995, with associated estimates of dollar costs per passenger car equivalent units (pcu) kilometres. Of particular interest is the BTE prediction that, in the future, congestion costs in Brisbane will exceed those in Sydney and Melbourne. Of

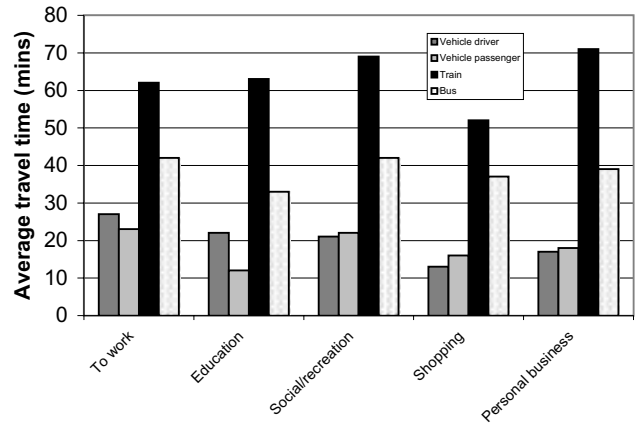


Figure 56: Average trip times for various household travel purposes, according to mode of transport. [HS Indicator 4.7]

Source: Transport Data Centre (1999).

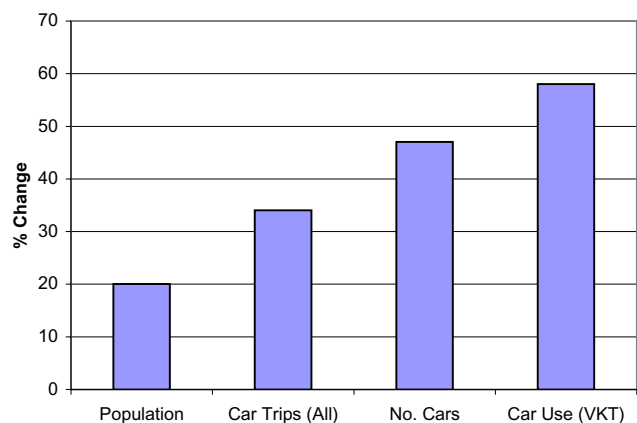


Figure 57: Mobility expansion in Sydney, 1981–1997. [HS Indicator 4.9]

Source: Transport Data Centre (1999).

Table 39: Travel time by road category, Melbourne, 1997–98. [HS Indicator 4.7]

Road category	Area	Average travel speed (km/h)				Nominal travel speed (km/h)
		Peak am	Peak pm	Off-peak	All day	
Freeways	Inner	44.9	67.6	69.6	63.0	96
	Outer	77.1	87.9	94.2	88.7	100
Divided arterials	Inner	34.9	35.7	44.0	39.3	64
	Outer	37.6	41.7	48.1	43.8	74
Undivided arterials	Inner	24.6	30.5	34.1	30.9	60
	Outer	40.5	40.0	44.8	42.4	65
Arterials with trams	Inner	22.1	23.2	23.4	23.1	60

Source: VicRoads (1999).

Australia’s principal cities, only Canberra can expect to be free of congestion problems. In 1996, costs due to traffic congestion in Australia’s major cities were of the order of \$12.8 billion. If nothing is done, the total cost of urban congestion could rise to about \$29.7 billion per year by 2015. From an environmental perspective, congestion is a major contributor to vehicle emissions. Fuel consumption per vehicle under congested traffic conditions is approximately twice that under free-flow conditions. Therefore, congestion has the potential to double the output of greenhouse gas emissions from a stream of vehicle traffic (BTE 2000).

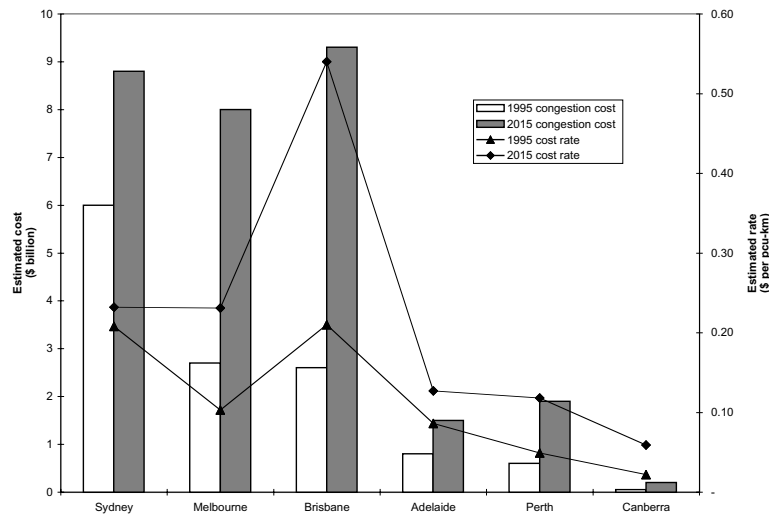


Figure 58: Estimates of congestion costs in Australian cities in 2015 and 1995. [HS Indicator 4.13]

Source: BTE (1996b).

Safety

Despite the increased numbers of vehicles and travel, the rate of road accidents throughout Australia has been falling. Figure 59 shows the fall in fatalities between 1981 and 1999.

In 1970 there were 7.96 road fatalities per 10 000 registered vehicles, but this rate decreased to 1.58 in 1997. Whereas in 1970 there were 30.4 fatalities per 100 000 of population, this rate decreased to 9.7 in 1997 (Federal Office of Road Safety 1998). Australia ranks equal sixth lowest of OECD countries on this measure (Australian Transport Safety Bureau 1996).

Better roads, better vehicles, random breath testing to deter drink-driving, and other initiatives to deter dangerous practices, such as the ‘stop, revive, survive’ campaign (Roads and Traffic Authority NSW 1998), have all contributed to the fall in accidents in general, and fatal accidents in particular.

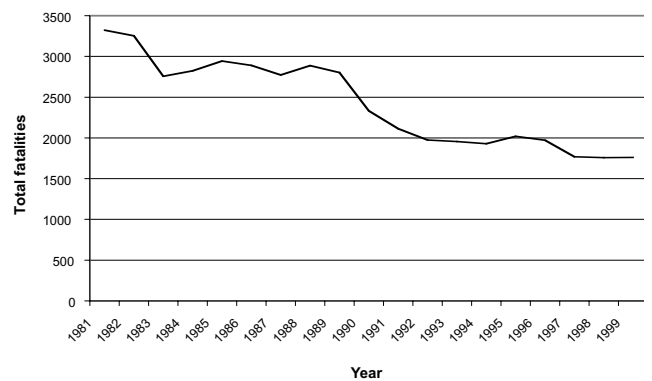


Figure 59: Australian road fatalities 1981–1999.

Source: Federal Office of Road Safety (2000).

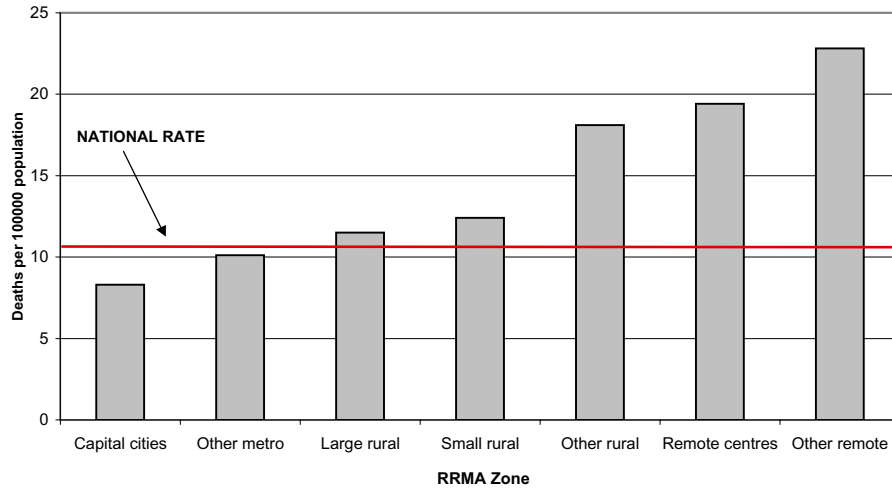


Figure 60: Motor vehicle accident deaths by settlement type, Australia, 1994-1998.

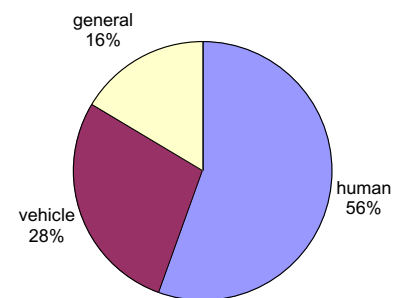
Source: AIHW (2000b).

However, the current rate is not a cause for complacency. Road accidents are a major cause of death and injury in Australia. Of particular concern are deaths of young drivers in rural areas and pedestrians in cities. The rate of fatal traffic accidents increases with increasing rurality and remoteness (Figure 60). Those living in the remote zone are more than twice as likely to die in motor vehicle accidents than those living in the metropolitan zone. Apart from the pain and suffering caused, both physical and psychological, road trauma is a major factor in destroying individual and national wealth instead of creating it (Figure 61). The annual cost attributed to road accidents is \$15.08 billion dollars. .

Figure 61: Road accident costs by category. [HS Indicator 4.11]

Human costs	\$M
Medical/Ambulance/Rehabilitation	268
Long term care	1990
Labour in the workplace	1663
Labour in the household	1522
Quality of life	1769
Legal	813
Correctional services	17
Workplace disruption	313
Funeral	3
Coroner	1
Vehicle costs	\$M
Repairs	3900
Unavailability of vehicles	296
Towing	42
General costs	\$M
Travel delays	1445
Insurance administration	926
Police	74
Property	30
Fire	8

Source: BTE (unpublished data, May 2000).



Air pollution and health

Public health and well-being is also threatened by pollutant emissions from road traffic. Emissions contribute to summer smog levels via volatile organic compounds and in winter to the buildup of particulate emissions, which particularly affect the vulnerable members of the community—the elderly, the very young and those suffering from respiratory illness. Table 40 shows possible health hazards from motor vehicle emissions (see Atmosphere theme report).

Table 40: Some road vehicle-related emissions and their effects on health: a summary.^A

Pollutant	Proportion emitted from motor vehicles	Impacts on human health
Carbon monoxide	Around 90% in summer and 70% in winter in Melbourne (EPA Victoria 1998). Diesel vehicles emit less than petrol vehicles	At high concentrations symptoms include headache, reduced mental acuity, vomiting, collapse, coma and death
Lead	Motor vehicles contribute around 90% of airborne lead in urban areas (ABS 1998)	Toxic effects include chronic renal disease, chronic anaemia and neurological disorders. Children are particularly susceptible
Nitrogen dioxide	Around 65% in summer and 60% in winter (EPA Victoria 1998). Diesel emits less than petrol vehicles	Can lead to respiratory infections, asthma, chronic obstructive airway disease and chronic lung damage
Ozone	Secondary pollutant not directly emitted from vehicles	Causes itchy and watery eyes, sore throats and nasal congestion. Also irritates the lower respiratory tract
Respirable particles	Up to 90% (by diesel vehicles) in some urban areas	Carries acidic gases and polycyclic aromatic hydrocarbons into the lungs. Can also trigger asthma attacks
Sulfur dioxide	Around 13% in both summer and winter (EPA Victoria 1998)	Aggravates existing respiratory conditions such as asthma and chronic bronchitis, increasing cough and mucous secretion. Also acts in combination with other environmental factors
Hydrocarbons (Benzene)	Around 50% in summer and 44% in winter. Vehicles without catalytic converters are high emitters of benzene	Benzene is a known carcinogen, linked to leukaemia
Hydrocarbons (Polycyclic aromatic)	Diesel exhaust is a rich source of polycyclic aromatic hydrocarbons (PAH)	Benzo(a)pyrene, a common constituent of PAH mixtures, is a major initiator of lung cancer

^A Figures are largely for Melbourne.

Sources: Institute of Engineers Australia cited in Brindle et al. (1999); EPA Victoria (1998).

GIS mapping of air pollutants against groups at risk (e.g. the very young and the elderly) reveals a significant number of neighbourhoods and zones of our cities where populations are at risk of exposure at above-average levels of pollutant emission (Newton 1997).

Implications

The amount of travel by households in cities is growing faster than growth in population, due to increased out-of-home activities and changes in work patterns. Travel is predominantly by car, due to the car's advantages for complex trips on tight schedules, and relatively low ownership and running costs. At the same time, road freight is increasing rapidly because of the growing numbers of goods, including construction materials for growing cities, and because of services provided to both households and business. Increasing vehicle kilometres by light commercial vehicles is of special concern. This increase in transport demand is leading to traffic congestion and to increased alienation of the natural and built environment as new road infrastructure and parking space is supplied. A wide mix of travel demand management strategies will be required. Some of these, such as allowing congestion to discourage traffic, may have adverse impacts in relation to pollution.

Motor vehicle transport is also imposing a high cost on community health and safety. While the number of car crashes is being contained, the human and financial costs are still high.

At the same time, air pollution is likely to increase in the short term, with increasing danger to the vulnerable members of the community on days when adverse weather conditions allow pollution to build up. Along highways, air pollution affecting both neighbourhoods and drivers is a special problem in congested conditions, which may also apply in smaller cities not yet affected by general air pollution caused by transport. The trend for children to be driven rather than walk is also a community health concern.

However, such costs need to be balanced by advantages of increasing community access to goods and services, and employment opportunities.

Environmental health

Human health is influenced by many different factors, including genetic inheritance, biomedical processes and environment, as well as economic, social and behavioural determinants. Delineating the role of environmental factors in health is complex, and needs to be studied in different dimensions. Prominent among these dimensions is the pattern of

human settlements. Human settlements generate a range of environmental settings and situations which affect human health.

Industrial bases, labour markets and housing markets provide the mechanisms—employment and income—by which individuals and households gain access to particular geographic spaces for work, recreation and residence. The locales in which different groups work, live and travel also vary by their physical amenity (quality of air, water) and their social amenity (quality of housing, indoor environments, access to health and community services). Employment, income, quality of living and working environment, and access to services all affect health outcomes.

The environment in which people live in remote areas differs in many ways to the metropolitan environment. There are issues such as fewer services, longer distances to travel for those out of town or those needing to travel between towns, diminished access to public transport, poorer road conditions, and environmental issues related to agricultural and mining occupations. The socio-economic disadvantage also tends to increase with increasing remoteness (Australian Institute of Health and Welfare (AIHW) 1998a).

This section discusses the health of Australians living in various types of settlements, in terms of environmental factors and determinants such as service accessibility and use, exposure to health risks and outcomes across the spectrum of human settlements.

Mortality

The most common and useful measure of a population's health is its death rate, since mortality statistics are the most widely available source of information on health and health problems. There are around 127 000 deaths in Australia each year. Deaths of persons aged 70 years and over accounted for 70% of all deaths, 20% occurred at ages 50–69 years, 8% at ages 20–49 years, and 2% at ages less than 20 years (AIHW 2000a).

Australia has experienced a considerable reduction in the death rate over the past century (Figure 62). Death rates are now less than half what they were in the early 1900s. Improvements in social and environmental conditions such as sanitation, health education, the quality of food and water supply, and better housing, contributed to the decrease in mortality in the early part of the century, particularly deaths from infectious diseases. In the later half of the century, behavioural or lifestyle changes such as decreased smoking and improved diet have contributed significantly to the reduction in death rates. Advances in medical technology (including mass immunisation and antibiotics), improved medical care and the development of surgical interventions (e.g. coronary bypass operations) are also believed to have had a significant impact on death rates.

These mortality reductions, however, have not occurred uniformly among all population groups. The death rate among males, for example, has remained consistently above that among females, with the male rate ranging from 1.2 to 1.7 times the female rate (AIHW 2000b). Life expectancy, a measure based on age-specific mortality patterns, also varies considerably among population groups. The life expectancy of Indigenous Australians born in

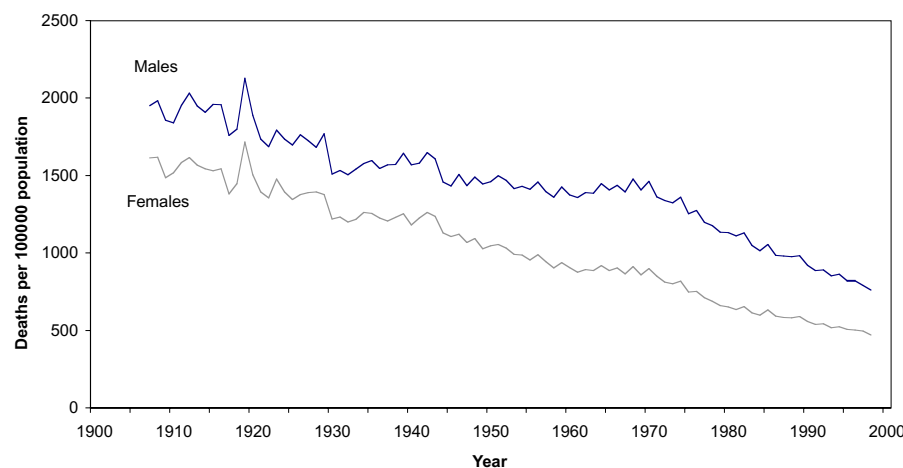


Figure 62: Death rates from all causes, 1907–1998.^A

^A Age-standardised to the Australian population as at 30 June 1991.

Source: AIHW (2000b).

the 21st century is similar to that for non-Indigenous Australians born at the beginning of the 20th century.

Three major trends are apparent:

- 1 The death rate in Australia is lower than the average for 28 other OECD countries (AIHW 1998b, 2000a). Australia ranked seventh lowest after Japan, Iceland, Canada, Switzerland, France and Sweden in 1997 (WHO 1998a).
- 2 The age-standardised death rate varies considerably across the different categories of settlement, increasing consistently with rurality and remoteness of the population. For example, the death rate in 'remote centres' was 29% higher than that in capital cities in 1994–1998. In the rural zone, the rate was around 7% higher (Table 41).
- 3 Death rates decreased in all settlement categories over the period 1986–1998 (AIHW 2000b). Among males, the greatest decreases were generally observed in capital cities and other metropolitan areas, while for females the decreases were greatest in large and small rural centres and in other remote areas.

Table 41: Deaths in Australia by class of settlement, 1994–1998.

Indicator	Metropolitan zone		Rural zone			Remote zone		Total
	M1	M2	R1	R2	R3	Rem1	Rem2	
Average annual number of deaths	77 548	10 336	8 295	9 756	18 494	1 007	1 983	127 419
All causes, age-standardised death rate ^A	618.2	641.2	659.3	663.8	658.6	794.6	767.6	635.1

^A Number of deaths per 100 000 persons, age-standardised to the Australian population at 30 June 1991. Note that values for all other zones vary significantly from M1 ('capital cities') at the 5% level.
 M1 – capital cities.
 M2 – other metropolitan areas (urban centre population 100 000 or more).
 R1 – large rural centres (urban centre population 25 000–99 000).
 R2 – small rural centres (urban centre population 10 000–24 999).
 R3 – other rural areas (urban centre population less than 10 000).
 Rem1 – remote areas (urban centre population 5000 or more).
 Rem2 – other remote areas (urban centre population less than 5000).

Source: AIHW (2000b).

Major causes of mortality in Australia are circulatory system diseases, cancers, respiratory diseases and injuries (Figure 63). Diseases of the digestive system are also large contributors to deaths. While a relatively consistent rise in death rates with rurality and remoteness is noted for circulatory, respiratory and digestive system diseases, as well as injury and poisoning, no consistent pattern emerges for cancer deaths. The pattern for deaths from infectious diseases was also not clearly associated with rurality.

The major factors contributing to these differences are the significantly higher proportions of Indigenous people, who have a much higher death rates than their non-Indigenous counterparts, living in rural and especially remote areas. In the remote zones, the much larger proportion of males, who have a much higher death rates than females, further adds to these differentials. Death rates for males are 1.5 times those for females, while the death rate for Indigenous people is almost 2.5 times the rate for non-Indigenous people. [HS Indicator 8.9]

Indigenous people are more likely than their non-Indigenous counterparts to be exposed to poor living conditions, including living in improvised or overcrowded dwellings, poor nutrition, smoking, consumption of dangerous amounts of alcohol, the use of illicit drugs and other harmful substances, and exposure to violence (ABS and AIHW 1999). These poor conditions contribute to high rates of infectious, rheumatic heart, respiratory and genito-urinary diseases (State of the Environment Advisory Council 1996).

Skin cancers in Australia

Australians have the highest rate of skin cancers in the world (DHFS and AIHW 1998). Each year, approximately 345 000 new cases of cancers are diagnosed in Australia.

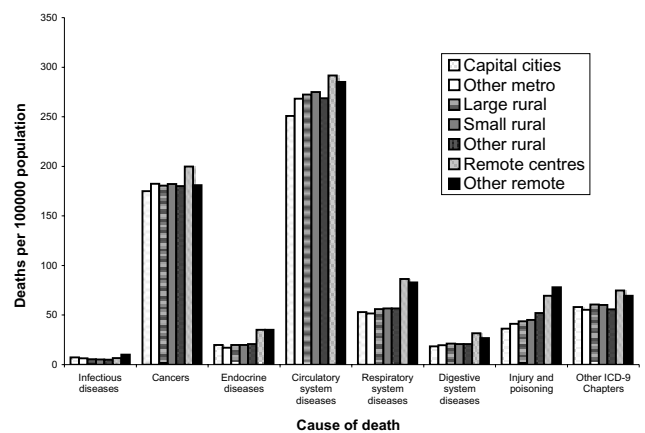


Figure 63: Death rates in Australia by cause of death and settlement type, 1994–1998.^A [HS Indicator 8.8]

^A Number of deaths per 100 000 persons, age-standardised to the Australian population at 30 June 1991. Causes of death are classified according to the International Classification of Diseases (9th revision) or ICD-9.

Source: AIHW (2000b).

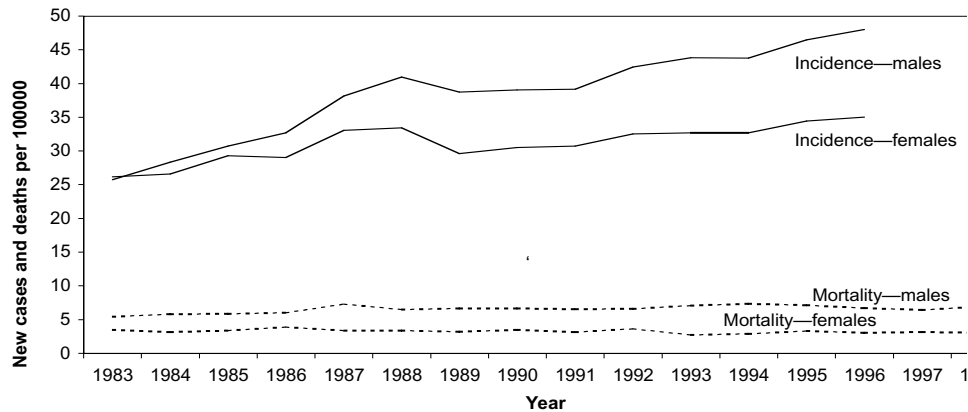


Figure 64: Trends in melanoma incidence and death rates, 1983–1998.^A [HS Indicator 8.7]

^A Age-standardised to the Australian population as at 30 June 1991.

Source: AIHW and AACR (1999).

About 78% of cases are non-melanocytic skin cancers (NMSCs). Melanoma, the other major form of skin cancer, is one of the most commonly diagnosed cancers in Australia, and has a significant impact on morbidity, mortality and health service use. Queensland has the highest incidence of melanoma in Australia (53.5 per 100 000 population). About 10 775 potential years of life would be lost to Australia each year as a result of people dying of melanoma before the age of 75.

The incidence of melanoma has increased considerably since the early 1980s (Figure 64). Overall there was an 87% increase in the incidence of melanoma among males and a 34% increase among females between 1983 and 1996. The largest increase among both sexes was in the 60 and over age group. Much of the increase in incidence rates is likely to be due to better detection and improved registration for this type of cancer. However, increases in UV exposure are also likely to play a large role (see the Atmosphere theme report). By comparison, age-standardised death rates for melanoma have changed little since 1983. Death rates have remained relatively low partly because the melanoma survival rate is high (South Australian Cancer Registry 1996; Supramaniam et al. 1999). In terms of settlement type, no consistent pattern emerges in the death rate for melanoma.

Vector-borne diseases

Several vector-borne diseases are notifiable in Australia to the National Notifiable Diseases Surveillance System (NNDSS). These include both mosquito-borne arboviral diseases and malaria. The vector-borne arboviral diseases covered by the NNDSS are Barmah Forest virus and Ross River virus (known to cause epidemic polyarthritis), encephalitis (caused by Murray Valley encephalitis and Kunjin viruses), Japanese encephalitis and dengue fever. Table 42 presents the number of notifications of vector-borne diseases in Australia from 1991 to 1998.

Ross River virus follows a seasonal pattern, with peak notifications in the wet season or summer months. The epidemic activity is commonly associated with heavy rainfalls and flooding, or with high tides inundating salt marshes and coastal wetlands. In general, epidemic

Table 42: Notifications of vector-borne diseases in Australia, 1991–1998. [HS Indicator 8.2]

Infection	Year							
	1991	1992	1993	1994	1995	1996	1997	1998
Arboviruses (NEC) ^A	199	303	578	587	67	52	18	81
Barmah Forest virus ^B	—	—	—	—	756	837	704	558
Dengue fever	46	366	690	17	34	43	210	557
Malaria	790	712	688	703	625	849	746	705
Ross River virus	3532	5630	5428	3974	2602	7823	6683	3094

^A Includes Murray Valley encephalitis, Japanese encephalitis, Kunjin, Kokobera and Stratford viruses.

^B Until 1995, Barmah Forest virus was included in arbovirus infection (not elsewhere classified).

Source: DHAC (2001).

activity is more often observed in temperate areas, with sporadic cases in other areas, whereas in tropical north-eastern Australia transmission occurs throughout the year (Mackenzie et al. 1998).

Barmah Forest virus has been reported from all states and territories in Australia, except Tasmania. In 1998, low rates of disease were reported in Victoria, the ACT and South Australia. The Northern Territory had the highest rate of 11 per 100 000 population, followed by Queensland with a notification rate of 10 per 100 000 population. Peak activity is seasonal, usually occurring from January through to April (Thomson et al. 1999). Notifications of Barmah Forest virus infection have decreased in recent years.

Dengue fever is not endemic in Australia, but epidemics have been reported several times since 1990. These have often been cases of importation by tourists or returning residents. No deaths have been attributed to dengue as the underlying cause in Australia since 1967. The potential for local transmission of dengue is confined to an area in Queensland corresponding to the geographic range of its mosquito vector *Aedes aegypti* (Mackenzie et al. 1998). However, increased rainfall could favour the spread of the vector into both the Northern Territory and New South Wales (Ewan et al. 1991).

Other arboviruses There were 81 notifications of arboviruses, not elsewhere classified, in Australia in 1998 (Thomson et al. 1999), predominantly from Queensland (52%) and Victoria (43%). These include Murray Valley encephalitis, Japanese encephalitis, Kunjin, Kokabera and Stratford viruses. Following outbreaks in the Torres Strait in 1995, the first case of Japanese encephalitis on the Australian mainland was reported in Queensland in March 1998. Around the same time, a further case of Japanese encephalitis was confirmed in the Torres Strait. Arbovirus transmission cycles in Australia, in relation to the environment, are understood poorly. The public health response to the threat of increased activity of these viruses therefore should include further research into the ecology and other environmental conditions that facilitate these outbreaks (Mackenzie et al. 1998).

Malaria Australia remains free from endemic malaria, but hundreds of imported cases occur each year among travellers returning from endemic areas. Strict malarial surveillance and prompt public health action is therefore important to prevent local transmission of the disease, particularly in northern Australia where environmental conditions favour transmission of malaria, were it to be reintroduced (Thomson et al. 1999). During the period 1979–1998, there were 22 deaths from malaria, an average of about one death every year.

Legionnaire's disease

Legionnaire's disease or legionellosis is a rare form of pneumonia caused by *Legionella* bacteria, including *Legionella pneumophila* and *Legionella longbeachae*. The bacteria are found naturally in soil and water, and are widespread in the environment. They have been found in lakes, rivers, creeks, springs and other bodies of water and soils. In recent years cases associated with the use of potting mix have been reported. *Legionella* is also found in manufactured systems such as cooling towers associated with air-conditioning and industrial systems, as well as in warm water systems where the temperature is kept between 20°C and 45°C, such as spa baths. These systems often provide conditions or environments that allow the bacteria to breed in large numbers. Outbreaks of disease often happen when air-conditioning cooling towers become contaminated with the bacteria, as was the case with the outbreak at the Melbourne Aquarium in April 2000 in which around 100 people were infected and four died. This was the largest outbreak of legionnaire's disease ever recorded in Australia.

Legionellosis is notifiable in all states and territories in Australia, and includes notifications of infections caused by all *Legionella* species (over 20 species). Table 43 presents the number and rate of notifications for legionellosis in Australia from 1991 to 2000.

Notifications of legionellosis have increased in recent years. The number more than doubled between 1991 and 2000.

Table 43: Notifications of legionellosis, Australia, 1991–1998. [HS Indicator 7.12]

Notifications	Year									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	110	185	178	179	160	192	161	271	260	473
Rate (per 100 000 population)	0.6	1.1	1.0	1.0	0.9	1.0	0.9	1.4	1.4	2.5

Source: National Notifiable Diseases Surveillance System.

There is no vaccine available against legionnaire's disease. As *Legionella* is widespread in the environment, eradication of the bacteria is impossible. Therefore, control measures must be in place to prevent the growth of the bacteria in cooling towers, warm water systems and spas, including regular maintenance and chemical treatment. In the event of an outbreak, victims require prompt treatment.

Active and passive tobacco smoking

Tobacco smoking is a leading cause of mortality and morbidity in Australia, with well-known health outcomes. Tobacco smoke contains approximately 60 known or suspected carcinogenic chemicals (NHMRC 1997).

Of all the known risk factors, tobacco smoking is responsible for the greatest burden on the health of Australians (AIHW 2000a). The risk of coronary heart disease, stroke and peripheral vascular disease, as well as a range of cancers and other diseases and conditions, increases significantly with tobacco smoking (AIHW 1999a). Around 85% of new cases of lung cancer (DHFS and AIHW 1997), 13% of deaths from cardiovascular disease and 21% of deaths from cancer are attributed to this health risk (AIHW 1996).

Almost 30% of males and about 22% of females between the ages of 25 and 64 years smoke tobacco regularly (Table 44). The proportion is highest among those living in remote areas. Approximately one in three living in remote areas report smoking compared with just over one in four males and one in five females from capital cities. There is also a significantly higher proportion of smokers living in other metropolitan centres than in capital cities.

Table 44: Proportion of Australians aged 25 to 64 who smoke^A, by settlement category and sex, 1995.

Sex	Metropolitan zone		Rural zone			Remote zone		All zones
	M1	M2	R1	R2	R3	Rem1	Rem2	
Males	28.1	36.3 ^B	27.5	28.7	29.1	33.5 ^B	38.4 ^B	29.0
Females	21.1	24.8 ^B	21.8	25.1 ^B	21.6	28.0	28.9 ^B	21.9

^A Refers to the daily smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, pipes and cigars. Data are age-standardised to the Australian population at 30 June 1991.

^B Significantly different from M1 ('capital cities') at the 5% level.

Source: AIHW (1998c).

Tobacco smoking rates have been declining in Australia since the 1960s, and this trend has continued into the 1990s. However, national surveys by the Anti-Cancer Council of Victoria show that the rate of decline of current smokers has slowed in more recent years (AIHW 1999a).

Passive smoking

Given the poor health outcomes from smoking and the toxic nature of tobacco smoke, researchers and health authorities have for some time been concerned about the possible health effects of 'passive' smoking; that is, exposure to environmental tobacco smoke. Tobacco smoke in the environment may be derived from sidestream smoke, which passes directly from the burning tobacco into the atmosphere, and exhaled mainstream smoke from the smoker.

Many children are exposed to tobacco smoke in the home (Table 45). Almost 39% of Australian children live in households where at least one adult smokes. The proportion is greater among children living in remote areas, where over half are exposed to tobacco smoke by at least one adult smoker living in the household.

The NHMRC has determined that passive smoking in the home contributes to the symptoms of asthma in approximately 46 500 Australian children each year, and causes lower

Table 45: Percentage of children (under 18 years) living in households where at least one adult smokes^A by RRMA category, 1995. [HS Indicator 7.6], [HS Indicator 8.4]

Indicator	Metropolitan zone		Rural zone			Remote zone		All zones
	M1	M2	R1	R2	R3	Rem1	Rem2	
One or more adult smokers in household	37.8	43.4	42.0	42.0	35.8	50.1	51.1	38.8

^A Refers to the daily smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, pipes and cigars.

Source: ABS National Health Survey, 1995 (unpublished).

respiratory illness (such as croup, bronchitis, bronchiolitis and pneumonia) in 16 300 children under 18 months of age. Passive smoking is also considered to contribute to the risk of sudden infant death syndrome (SIDS).

Prevalence of depression and related disorders

It is estimated that about 18% of Australian adults, based on results from the 1997 ABS Survey of Mental Health and Wellbeing (SMHWB), suffer from a mental disorder (ABS 1998h). Overall, women were more likely than men to experience anxiety disorders (12.1% compared with 7.1%) and affective disorders (7.4% compared to 4.2%). Men, on the other hand, were more than twice as likely (11.1% compared to 4.5%) to have substance use disorders (Table 46).

Table 46: Prevalence of mental disorders^A by sex and type of settlement in people aged 18 and over, 1997. [HS Indicator 8.6]

Mental disorder/condition	RRMA zone			Total
	Metropolitan	Large and small rural centres ^B	Other rural areas/remote zones ^C	
Males				
Anxiety disorders	7.2	8.4	5.5	7.1
Affective disorders	4.1	5.9	3.2	4.2
Substance use disorders	11.5	11.5	8.9	11.1
Females				
Anxiety disorders	11.9	14.2	11.6	12.1
Affective disorders	7.3	8.1	7.1	7.4
Substance use disorders	4.5	4.6	4.2	4.5
Persons				
Anxiety disorders	9.6	11.3	8.5	9.7
Affective disorders	5.7	7.0	5.1	5.8
Substance use disorders	7.9	8.0	6.6	7.7

^A A person may have more than one mental disorder. Affective disorders include depression, dysthymia, mania, hypomania and bipolar affective disorder. The survey excluded people in hospitals, nursing homes, hostels and dwellings in 'remote and sparsely settled parts of Australia'.

^B 'Large and small rural centres' include the RRMA categories 'large urban centres' and 'small urban centres'.

^C 'Other rural areas' include the RRMA category 'other rural areas' and the entire remote zone.

Source: ABS (1998h).

There is also a variation in the prevalence of anxiety disorders, affective disorders and substance use disorders between various settlement types. The prevalence of all three types of disorders tends to be higher in large and small rural centres compared with the metropolitan zone for both sexes. In contrast, the rates are the lowest in other rural areas and the remote zone, although among females the prevalence appears to be similar in both the metropolitan and other rural areas/remote groups.

Society's response to illness

The previous sections have described the prevalence of illness and death in the population. Differences in rates of illness and death are treated largely as consequences of variation in exposure to physical and psychosocial environments, including behavioural risk factors such as smoking, alcohol consumption, physical activity, diet and levels of stress.

This section describes society's response to illness, in the process creating environmental settings with direct consequences for health outcomes. This response generally takes the form of health care through preventive and curative services, mostly provided by medical practitioners, nurses and allied health workers. Access to health care facilities and health care professionals is critical to reducing the differences in health outcomes between people living in different regions.

Much of the action taken to prevent illness and injury is in the form of non-medical services such as better roads, safer cars, more rigorous traffic policing (deterring drink driving, speeding etc.), better sanitation, safer farm machinery, and education about risks such as smoking, fatty foods and lack of exercise.

The provision of and access to health care resources such as GPs, pharmacists, nurses and hospital facilities is another major aspect of the society's response to illness. For example, those living in rural and remote zones of Australia are considered to have lower access to health care compared to those living in the metropolitan zone (AIHW 1998a). Access difficulties caused by distance, time, cost and transport availability in rural and remote zones can be compounded by shortages and uneven distributions of health facilities and health professionals.

Australia has higher numbers of clinicians per capita compared with countries such as Canada and New Zealand, whose health systems are comparable and medical workforces are structured as in Australia. In 1998 there were 2.4 clinicians per 1000 population in Australia, 2.1 in Canada and 2.2 in New Zealand. However, while most of the OECD countries for which data is available show a continuing growth in the number of practising doctors per capita, Australia has shown slight decreases since the peak in 1996 (AIHW 2000c).

In Australia the medical workforce is unevenly distributed geographically. There is a higher number of GPs in metropolitan areas (AMWAC and AIHW 1996), and a pattern of undersupply of the health labour force in rural and remote areas (AIHW 1998a). In 1998 there was almost double the per capita number of primary care medical practitioners providing services in capital cities compared with remote areas (Table 47).

Table 47: Characteristics of primary care medical practitioners^A by settlement zones, December 1998.

Characteristic	Metropolitan zone		Rural zone			Remote zone	Total
	M1	M2	R1	R2	R3		
Number per 1000 population	1.2	1.1	1.1	0.9	0.8	0.7	1.1
Female practitioners (%)	35.7	27.9	32.7	24.5	24.7	30.4	33.2
Being on call (%)	28.9	38.8	53.3	63.6	63.8	64.0	36.6
Bulk billing rate (%)	85.6	79.6	60.2	59.4	58.7	66.0	79.6

^A Primary care medical practitioners include vocationally registered general practitioners, other medical practitioners, and GP trainees in general practice.

Sources: AIHW (2000c), AIHW (unpublished data).

There have been consistent efforts lately to bridge this gap. For example, between 1994 and 1997 the number of clinicians per 1000 population increased by 0.7% in metropolitan areas and by 4.5% in rural areas. It is expected that an increase in the proportion of medical students with a rural background will result in an increase in the proportion of Australian medical graduates willing to practice in rural areas in the long run.

GP consultations

In Australia, a general practitioner is usually the first point of contact for any health problem. The importance people place on access to a GP is illustrated by the fact that in 1998–99, on average, Australians visited their GPs 6.3 times per year (Table 48).

Table 48: GP consultations^A per year by settlement zone, 1998–99. [HS Indicator 8.10]

GP consultations	Metropolitan zone		Rural zone			Remote zone		Total
	M1	M2	R1	R2	R3	Rem1	Rem2	
Number (in millions)	81.9	9.4	6.9	7.3	11.5	0.8	0.9	118.8
Average (per person)	6.9	6.6	6.2	6.0	4.7	3.8	2.8	6.3

^A Excludes medical care provided by Aboriginal health services or defence force medical services, or not billed to Medicare.

Source: AIHW.

People living in rural and remote zones have lower rates of GP consultation than those living in metropolitan areas. In remote areas the rates fall below 50% of rates in metropolitan areas (an average of 2.8 visits per year in 'other remote areas' compared to 6.9 in 'capital cities'). One of the major reasons for lower GP consultation rates in remote areas is limited access to GPs (Humphreys et al. 1997).

The settlement distribution of other health workers differs considerably from that of GPs. For example:

- The number of specialists per capita in the remote zone is approximately one-tenth that for capital cities, although some 2% of metropolitan specialists also report practicing in rural or remote areas (AIHW 1999a, 2000c).
- Nursing employment in rural areas is well above that of other health professions. In 1996 the number of nurses per 1000 population in large rural centres (17), small rural centres (14) and remote centres (12) exceeded that of capital cities (11). Around 70% of nurses in the remote zone were registered (rather than enrolled), compared with about 80% in the other two zones combined (AIHW 1999b).
- The number of pharmacists decreases with remoteness, from 85 per 100 000 population in capital cities to 28 per 100 000 population in remote areas (AIHC 2000d).

There are more dentists per capita in capital cities (0.5 per 1000 population) compared with other areas (0.3 per 1000 population), although the number of dental therapists was similar between different areas (Szuster and Spencer 1997a, 1997b).

Hospital outpatient visits

Hospital outpatient visits are another point of contact for primary health care. However, the settlement pattern of these visits is a mirror image of that noted for GP consultations (Table 49). In 1997–98, the average number of occasions on which a person visited hospital outpatient facilities in remote areas was about twice that noted in metropolitan areas.

Table 49: Public hospital outpatient occasions of service by RRMA zone, 1997–98.^A [HS Indicator 8.12]

Outpatient visits	Metropolitan zone		Rural zone			Remote zone		Total
	M1	M2	R1	R2	R3	Rem1	Rem2	
All occasions (in millions)	11.8	0.9	1.2	1.0	1.4	0.3	0.7	17.3
Accident and emergency (in millions)	2.7	0.3	0.5	0.6	0.6	0.2	0.3	5.1
Other medical and surgical and obstetric care (in millions)	9.1	0.6	0.7	0.4	0.8	0.1	0.4	12.1
All occasions (per person)	1.0	0.6	1.1	0.8	0.5	1.5	2.0	0.9

^A An unknown proportion of hospital outpatient services are provided by accident and emergency specialists and other practitioners who do not provide primary care. Source: AIHW.

A main cause of a higher rate of outpatient visits is that the hospital outpatient facilities are used for primary care more often in rural and remote areas than in the metropolitan zone. This is likely in view of relatively lower GP accessibility in those areas. In particular, in remote areas a higher proportion of the population obtains primary care services through either hospital outpatient facilities or Aboriginal medical services. Data for the latter are not available, but average patient encounters with public hospital outpatient services in 'remote centres' (1.5) and 'other remote areas' (2.0) are significantly higher than in all other settlement categories (0.5–1.1).

Hospital separations

Statistics on people hospitalised, although sometimes referred to as hospital admissions, are technically referred to as hospital separations. This is because data on patients admitted are collated at the end of a period of care. By this time, the actual length of stay and the procedures carried out are known, and the diagnostic information is more accurate (AIHW 2000a).

Over the two-year period (1996–97 to 1997–98) there were approximately 11.1 million hospital separations in Australia, which is a rate of 282 per 1000 population (Table 50).

As Table 50 shows, the hospital separation rate increases from metropolitan to remote zones. Factors that could contribute to higher separation rates in rural and remote zones include higher morbidity, and rural patients being more likely to be admitted to hospital than treated as outpatients because of longer travel distances (Harvey and Mathers 1988). People needing more specialist treatments must travel even further to the larger towns or cities or wait longer for these services to come to them on a rotation basis (AIHW 1998a).

Table 50: Hospital separations^A in various settlement zones, 1996–97 and 1997–98 combined. [HS Indicator 8.11]

Hospital separation statistic	Metropolitan zone		Rural zone			Remote zone		Total
	M1	M2	R1	R2	R3	Rem1	Rem2	
Number (in millions)	6.9	0.8	0.7	0.8	1.6	0.2	0.3	11.1
Males	274.3	252.8	301.5	277.5	282.7	355.6	339.9	282.0
Females	301.8	281.7	324.7	316.6	334.7	429.2	429.2	313.4
Persons	273.6	253.4	296.4	279.4	288.4	399.3	378.7	282.2

^A Number of hospital separations per 100 000 persons, age-standardised to the Australian population at 30 June 1991. Rates for all other zones are significantly different from the M1 zone ('capital cities') at the 5% level.

Source: AIHW (200b).

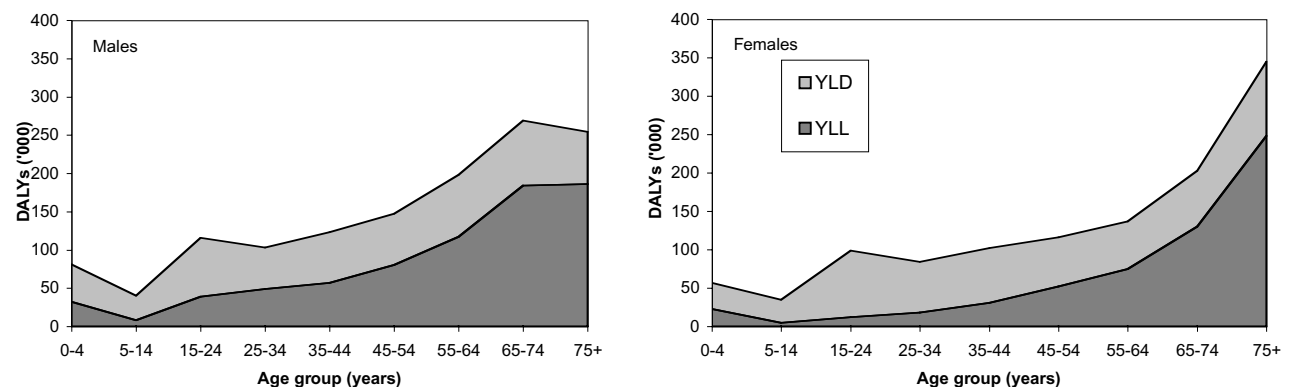
Higher hospital separation rates have been reported among Indigenous people—almost twice the rate among non-Indigenous people (Cunningham and Beneforti 2000). In 1997–98, 30% of male and 34% of female hospital separations in remote areas were Indigenous people. Major reasons for Indigenous hospitalisations were dialysis (25% of separations), complications of pregnancy and childbirth (17%) and injuries (8%). Indigenous hospital separation rates were highest among those living in remote areas (641 per 1000 males and 778 per 1000 females) and lowest for those living in metropolitan areas (424 per 1000 males and 505 per 1000 females).

Quality of life

Quality of life is difficult to conceptualise and measure at a population level. An alternative approach to summing up the health of a population is a measure of life expectancy adjusted to take account of time lived with a disability, called 'disability adjusted life expectancy' or DALE (Murray et al. 1999). To calculate DALE, the years of ill-health are weighted according to severity and subtracted from the expected overall life expectancy to give the equivalent years of healthy life (WHO 2000). The other major measure used is DALY. The DALY measure was developed for the World Bank in 1993 to study the global burden of disease (Murray and Lopez 1996). One DALY is a lost year of 'healthy' life and is calculated as a combination of years of life lost due to premature mortality (YLL) and equivalent 'healthy' years of life lost due to disability (YLD).

Based on 1996 data, Australians have a healthy life expectancy of 73.2 years, second only to the Japanese (74.5 years). The rest of the top 10 nations are in Western Europe. Years lost to disability are substantially higher in poorer countries. People in the wealthiest regions lose about 9% of their lives to disability, compared to 14% in the poorest countries.

It has been estimated that some 2.5 million DALY were lost because of premature mortality and disability in Australia in 1996. The male disease burden in DALY terms was estimated to be 13% higher than the female disease burden, primarily due to the difference in the premature mortality burden. Males lost 26% more years of life (YLL) than females. In contrast, YLD was 1% lower for males than females. Among males, the greatest disease burden

**Figure 65:** Burden of disease by age and sex, Australia, 1996.^A

^A YLL refers to years of life lost due to premature mortality and YLD refers to years of 'healthy' life lost due to poor health or disability.

Source: Mathers et al. (1999).

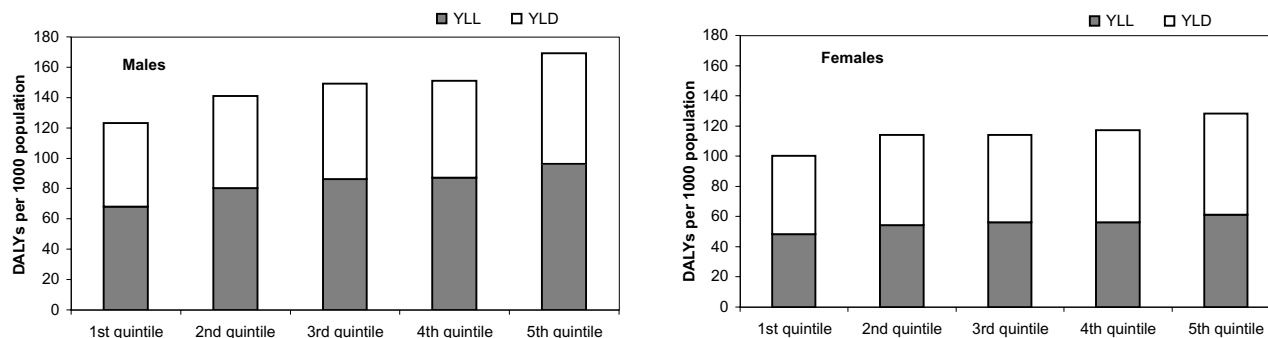


Figure 66: Estimated burden of disease and injury

Age-standardised DALYs per 1000 population among males and females, according to quintile of area of socio-economic disadvantage, 1996.

Source: Mathers et al. (1999).

was in the 25–64 age group (43%), while among females the burden was greatest for those aged 65 years and over (47%) (Figure 65).

Cardiovascular disease, cancers and injury were responsible for 72% YLL in both the sexes, while mental disorders were the leading YLD causes, accounting for nearly 30% of the non-fatal burden of disease in Australia.

The leading causes of disease burden also differ by age. For example, in 1996:

- asthma was the leading cause of disease burden among children aged 0–14, accounting for over 18% of DALY in that age group;
- among Australians aged 15–24 years, alcohol dependence/harmful use and road traffic accidents were the leading causes, each accounting for over 9% of DALY in this age group, followed by depression, bipolar affective disorder, and suicide and self-inflicted injuries, which together accounted for 22% of DALY among 15–24 year olds;
- ischaemic heart disease was the leading contributor to DALY in adults aged 25–64 years, accounting for 8.5% of their total DALY, with depression as the second most common cause (6.3% of DALYs);
- ischaemic heart disease and stroke were the leading causes of diseases burden among Australians aged 65 years and over, together accounting for 32% of the total DALY.

The burden of disease also tends to increase with increasing levels of socio-economic disadvantage for both the sexes. Classifying the Australian population into quintiles, using a small-area-based index of socio-economic disadvantage (the SEIFA index of relative socio-economic disadvantage), reveals that there is a marked increase in the total burden of disease with increasing socio-economic disadvantage (see Figure 66). The differences are largest for intentional and unintentional injuries, diabetes, digestive system disorders (in males) and mental disorders (Mathers et al. 1999).

A recent study of health status across Victoria (DHS 2001) using DALY, revealed significant geographic variability in outcomes. Metropolitan Melbourne residents fare best, with lowest number of years lost due to death, disease and disability.

Trends and implications

- Australia has experienced considerable reductions in mortality rates over the past century. Death rates are now less than half what they were in the early 1900s. These declines, however, have not been the same among all population groups.
- Improvements in social and environmental conditions, such as sanitation, health education, the quality of food and water supply, and better housing contributed to the decrease in mortality in the early part of the century, particularly deaths from infectious diseases.
- At present, major causes of mortality in Australia are cardiovascular diseases, cancer, respiratory diseases and injuries, particularly motor vehicle accidents and suicide. Lifestyle and environmental factors such as smoking (including passive smoking), poor diet, physical inactivity, exposure to allergens and air pollutants, poor road quality in some areas of Australia, and the distances travelled are some of the risk factors for these causes of death.

- Although chronic, non-communicable diseases—with significant environmental input—have become more prominent, improvements have been noted on several fronts lately. These include behavioural or lifestyle changes such as decreased smoking and improved diet. Advances in medical technology including mass immunisation and antibiotics, improved medical care and the development of surgical interventions such as coronary bypass operations, are also believed to have had a significant impact on health outcomes.
- Although Australia ranks highly in comparison to other countries in terms of healthy lives, certain groups in Australia are relatively worse off. In Australia, those living in poorer social and economic conditions have worse health than those living in better social and economic conditions.
- People living in rural and remote areas of Australia tend to have higher death rates than those living in capital cities and other metropolitan areas. This may be attributed partly to the harsher living environments in more remote areas, an environment in many ways different to the metropolitan environment. Relatively poor access to health services, lower socio-economic status and employment levels, exposure to comparatively harsher environments and occupational hazards contribute to and explain some of these differentials.
- Australians living in rural and remote areas have lower access to primary care medical practitioners, specialists, pharmacists and dentists. Shortages and uneven distributions of health facilities and health professionals are compounded by access difficulties relating to distance, time, cost and transport availability in rural and remote zones.
- Improved access to health care facilities and health care professionals is critical to minimising variation in health outcomes between people living in various zones. Attempts are being made to address some of these issues through telemedicine and other initiatives proposed in the last rural health strategy.
- Indigenous Australians have a worse health status than non-Indigenous Australians. Indigenous people have not shared to the same degree in the improvements in health enjoyed by other Australians over the past century, with life expectancies 100 years behind those of non-Indigenous Australians (AIHW 2000a).
- Indigenous people are more likely than non-Indigenous people to be exposed to poor living conditions, including living in improvised or overcrowded dwellings, poor nutrition, smoking, consumption of alcohol at hazardous levels, the use of illicit drugs and other harmful substances, and exposure to violence (ABS and AIHW 1999). These conditions can all contribute to high rates of disease and injury.
- Australia has the highest incidence of melanoma and other skin cancers in the world, and has experienced a number of outbreaks of vector-borne diseases such as Ross River virus and dengue fever in the last few years.
- Over the past two decades, more than 30 emerging diseases that afflict humans have been identified. Also, some of the diseases once thought to be under control have re-emerged as significant problems. Several different factors contribute to the emergence or re-emergence of diseases, including social, economic, political and ecological factors, and the interactions of organisms, hosts and the environment. The changing distribution of populations, the increase in international travel, the development of resistance to antimicrobials, changes in human behaviour and changes in the environment have all contributed to disease emergence.

Although environmental hazards are increasingly seen as important factors influencing health, there is insufficient data at present to systematically monitor environmental health at the national level.