

Chapter 10: Avoidable mortality and morbidity

Introduction

Chapter 9 analysed the scope for health gain by comparing health outcomes between population groups. This chapter assesses the scope for health gain by analysing the causal structure of health outcomes at the level of diseases and injuries – the proximal causes of these outcomes.

This analysis depends on two principles: firstly, the accurate assignment of cause of death or hospitalisation (or some other morbidity measure); and, secondly, categorical attribution of each cause as ‘avoidable’ or ‘unavoidable’. Categorical attribution of diseases and injuries was first proposed by Ruttstein et al (1976). The first widely accepted list of causes of avoidable mortality was assembled by Charlton et al (1983), although this list was restricted to conditions amenable to medical treatment only and was intended to serve as a health care system performance indicator (Holland et al 1994). Variations of Charlton’s list have been used in previous studies of avoidable mortality in New Zealand (Marshall and Keating 1989; Salmond and Malcolm 1993; Jackson et al 1998). The approach has also been extended from mortality to hospitalisation (Weissman et al 1992; Billings et al 1996).

For this analysis, in order to update and extend Charlton’s original list, an extensive reassessment of the categorical attribution of ICD 9 codes was undertaken by reviewing published updates (for example, Manitoba Department of Health 1992; Tengs et al 1995) and key references for each condition. The extended list covers causes amenable to population-based and individual-based preventive interventions as well as those amenable to medical or surgical treatment, and it reflects recent developments in health promotion and disease prevention practice as well as advances in health care technology. As such, the approach adopted here is broader than that originally conceptualised by Charlton and is intended to serve as a measure of the scope for health gain – not as a performance indicator for the health care sector.* The avoidable causes have been further categorised according to the level of intervention involved, building on earlier work by Albert (1995) and Simonato et al (1998). The subcategories differ for avoidable mortality and avoidable hospitalisation.

Avoidable mortality

A potentially avoidable death is one that, theoretically, could have been avoided given current understanding of causation and currently available disease prevention and health care technologies. Three subcategories of avoidable causes of death are distinguished for this analysis:

* The list of avoidable conditions used in this report, together with subcategories and key references, is included in Appendix 3.

- *Primary avoidable mortality* (PAM) – conditions that are preventable, whether through individual behaviour change (lifestyle modification) or population level intervention (healthy public policy). The condition is prevented before it develops by addressing its risk or protective factors: ‘primary prevention’.
- *Secondary avoidable mortality* (SAM) – conditions that respond to early detection and intervention, typically in a primary health care setting. As well as clinical preventive services such as cancer screening, it includes chronic disease management intended to delay the progression of diseases such as diabetes or the recurrence of events such as heart attacks or strokes (for example, through the monitoring and management of high blood pressure). This approach constitutes ‘secondary prevention’.
- *Tertiary avoidable mortality* (TAM) – those conditions whose case fatality rate can be significantly reduced by existing medical or surgical treatments (typically, but not necessarily, in a hospital setting), even when the disease process is fully developed. This constitutes ‘tertiary prevention’.

Inevitably there is overlap among the three subcategories, and judgement had to be applied in some cases to partition conditions across the three groups. For example, data from the ARCOS study (Beaglehole et al 1997) was used to attribute 50 percent of ischaemic heart disease mortality to primary avoidable mortality, 25 percent to secondary avoidable mortality, and 25 percent to tertiary avoidable mortality. By contrast, partitioning was not used in the initial categorisation of conditions into ‘avoidable’ or ‘unavoidable’. Thus avoidable mortality should be interpreted as mortality that is *potentially* or theoretically avoidable, rather than as mortality that could realistically be prevented in all cases, at least in the short to medium term. For example, road traffic injuries are considered avoidable, although the total prevention of such deaths may well involve a greater trade off or sacrifice of mobility for health than society is willing to make.

It should be emphasised once again that the concept of ‘avoidability’ applied in this report is wider than that originally developed by Ruttstein and Charlton (Ruttstein et al 1976; Charlton et al 1983), which was restricted to conditions amenable to treatment rather than to prevention. Ruttstein proposed avoidable mortality as a subset of premature mortality (since, by definition, only deaths occurring prematurely are potentially avoidable) and employed an arbitrary upper age limit of 65 years. For this analysis, the age limit has been extended to 75 years (roughly, the current New Zealand life expectancy at birth), so allowing a higher proportion of deaths (46 percent in 1996) to be categorisable. The justification for doing so is that cause of death coding is considered to be reliable up to age 75; beyond this age, co-morbidity makes disentangling avoidable from unavoidable deaths problematic. Thus the concept of ‘avoidability’ applied here is wider than the original conception, both in the range of conditions considered potentially avoidable and in the (arbitrary) upper age limit applied to the category.

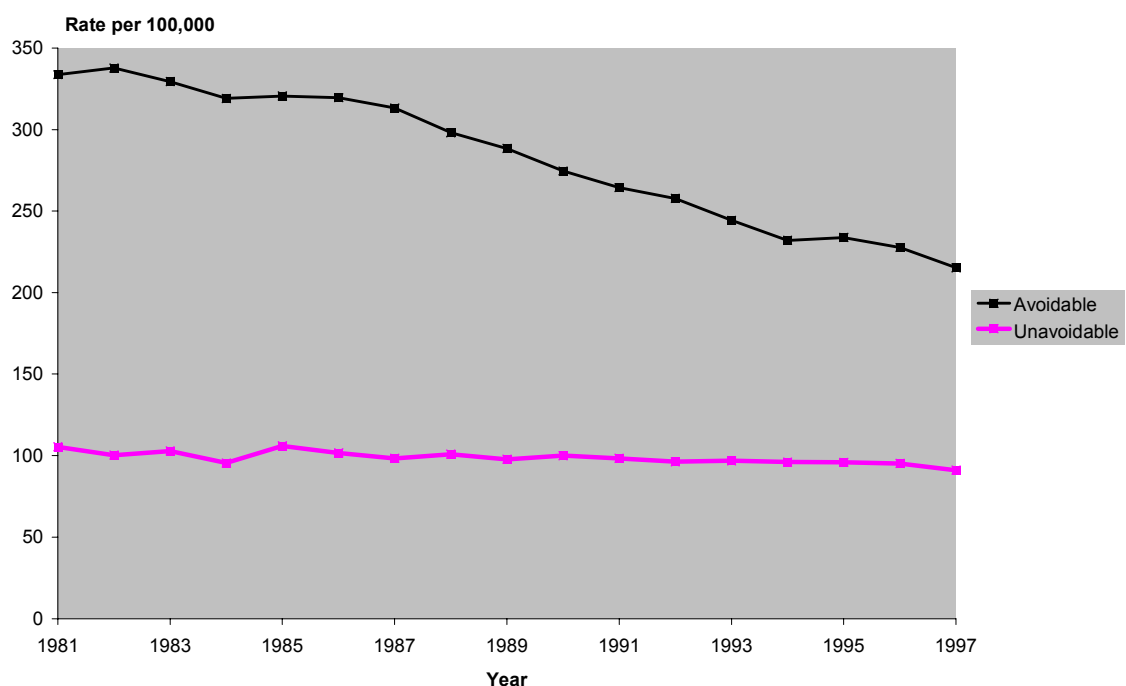
Data sources and methods

The analysis is based on mortality data for 1981–97 (the 1997 data are provisional) supplied by the New Zealand Health Information Service (NZHIS). ICD coding has been consistent over this period (except for minor changes in 1988 and 1995). Age standardisation has been carried out using the direct method, with Segi’s world population as the reference. Because ethnicity coding changed significantly in 1995, an ethnic specific time series cannot be calculated. It should be noted that this analysis uses a wider age range and a more extensive set of conditions (especially injuries) categorised as ‘avoidable’ than previous New Zealand studies, and so cannot be directly compared with those studies.

Avoidable mortality in the whole population

From 1981 to 1997 all-cause mortality in the 0–74 age group fell by 31 percent (Figure 153). This was made up of a 9 percent fall in unavoidable mortality and a 38 percent fall in avoidable mortality. The reduction in unavoidable mortality provides a baseline against which to interpret the reduction in avoidable mortality. The ‘excess’ (greater than expected) reduction in avoidable mortality – a fall of 29 percent over the period, or over 1.5 percent per year on average – represents the ‘added value’ of the health system (including health promotion and disease prevention as well as treatment services). In absolute terms this represents a gain of approximately 300 deaths avoided per year, or almost 5000 fewer deaths in 1997 than expected based on 1981 mortality (adjusting for the underlying trend in unavoidable mortality).

Figure 153: Avoidable and unavoidable mortality, ages 0–74 years, 1981–97



Source of base data: NZHIS

Note: rate is age standardised to Segi's world population.

Although the historical trend provides a measure of health system performance, the current level of avoidable mortality indicates the scope that remains for further health gain through health promotion, disease prevention and treatment. In 1996 or 1997, approximately 9000 potentially avoidable deaths occurred per year – about 70 percent of all deaths occurring in people under 75 years of age (Table 78). The majority of these potentially avoidable deaths are preventable (PAM), with early intervention (SAM) and medical treatment (TAM) making smaller contributions. The precise contributions of the three levels of intervention vary with age, gender, ethnicity and socioeconomic status.

Table 78: Avoidable deaths, ages 0–74, average of 1996 and 1997

	Number of deaths	Age standardised rate per 100,000	Percentage of total deaths in 0–74 age group	Percentage of avoidable deaths
Avoidable mortality	9025	223	70	100
PAM	4741	116	37	53
SAM	2302	56	18	26
TAM	1982	50	15	22
Unavoidable mortality	3861	94	30	
Total mortality	12,886	316	100	

Source of base data: NZHIS (1997 data are provisional)

Note: number and rate of deaths is the average for 1996 and 1997; PAM = primary avoidable mortality; SAM = secondary avoidable mortality; TAM = tertiary avoidable mortality.

Variations by age

In each age group under 75 years, between 65 and 81 percent of all deaths are avoidable (Table 79). In absolute terms, avoidable mortality is therefore predominantly a feature of middle and (early) old age, with almost 80 percent of avoidable deaths occurring in people aged 45 years and over (1996–97 average). Age specific rates of avoidable mortality are low until middle age (then rise exponentially), with the exception of infancy. However, the high infant rate (and proportion) may be partly an artefact: routine datasets do not hold all the variables needed to make firm categorical attributions of perinatal and infant deaths (Langhoff Ross et al 1996; Petrini et al 1998); as a result avoidable infant mortality may have been overestimated.

In all age groups, preventable conditions (PAM) dominate the pattern of avoidable mortality. Indeed, there is surprisingly little variation in the relative shares of the three subcategories across the different stages of the life cycle, apart from a slight rise in the proportion of TAM in the younger age groups.

Table 79: Avoidable mortality, by age, 1996–97

	Number of deaths (and rate)						Total
	Age: < 1	1–14	15–24	25–44	45–64	65–74	
Avoidable mortality	325 (581)	139 (18)	393 (73)	926 (84)	3043 (422)	4200 (1703)	9025
PAM	168 (300)	68 (9)	223 (42)	473 (43)	1564 (217)	2247 (911)	4741
SAM	53 (95)	18 (2)	63 (12)	228 (21)	814 (113)	1125 (456)	2302
TAM	104 (186)	53 (7)	107 (20)	224 (20)	665 (92)	829 (336)	1982
Unavoidable mortality	78 (139)	77 (10)	114 (21)	422 (38)	1334 (185)	1838 (745)	3861
Total mortality	403 (721)	216 (28)	506 (95)	1347 (122)	4377 (606)	6038 (2448)	12,886
AM %	81	65	78	69	70	70	70

Source of base data: NZHIS (1997 data are provisional)

Note: number and rate of deaths is the average for 1996 and 1997 (age specific rate per 100,000 in brackets).

Among infants, the standout conditions are SIDS and low birthweight (Table 80), with maternal smoking being the common preventable exposure. Birth defects are sensitive to maternal folate and vitamin consumption, and birth trauma and asphyxia responds to effective obstetric care.

Among children and youth, injuries dominate the avoidable mortality picture. Averaging over 1996 and 1997, road traffic injuries accounted for 20 percent of all deaths (and 32 percent of avoidable deaths) in the under 15 age group. The corresponding proportions for youth (15–24) were 33 percent and 43 percent. Suicide accounted for a further 29 percent of all deaths (37 percent of avoidable deaths) among young people. Were it not for these two causes, only 20 percent of (remaining) deaths in this age group would have been considered avoidable. Injury (especially suicide and road traffic injury) remains the leading contributor to avoidable mortality among young adults. Ischaemic heart disease (IHD) emerges for the first time, becoming the leading cause in middle and old age. The common cancers (breast, colorectal and lung) and (smoking related) chronic obstructive respiratory disease (CORD) occupy the remaining rankings in the adult age groups.

Table 80: Major causes of avoidable mortality, by age, 1996–97

Age (years)	Condition	Deaths	Percentage
< 1	SIDS	89	22
	Low birthweight	67	17
	Congenital anomalies	43	11
	Birth trauma and asphyxia	35	9
1–14	Road traffic injury	44	20
	Leukaemia	16	7
	Congenital anomalies	12	5
	Fire	11	5
15–24	Road traffic injury	169	33
	Suicide	147	29
	Drowning	16	3
25–44	Suicide	242	18
	Road traffic injury	171	13
	IHD	108	8
	Breast cancer	63	5
45–64	IHD	947	22
	Lung cancer	383	9
	Colorectal cancer	296	7
	Breast cancer	253	6
65–74	Ischaemic heart disease	1513	25
	Lung cancer	545	9
	CORD	459	8
	Colorectal cancer	351	6

Source of base data: NZHIS

Notes: deaths are per year averaged over two years 1996–97; percentage is of all deaths (including unavoidable deaths) in that age group.

Although medical treatment could achieve considerable health gains, primary preventive strategies (such as reducing smoking and improving diet and physical activity) and secondary preventive services (such as management of high blood pressure, diabetes and cancer screening) appear to hold the key to substantive reductions in these causes of death (Table 81).

Table 81: Major causes of avoidable mortality, by age and intervention category, 1996–97

Age (years)	PAM		SAM		TAM	
	Condition	Deaths	Condition	Deaths	Condition	Deaths
< 1	SIDS	89	Birth trauma	14	Congenital anomalies	30
	Low birth weight	34	Congenital anomalies	9	Low birth weight	27
1–14	Road traffic injury	26	Epilepsy	5	Road traffic injury	17
	Fire	11	Other infections	3	Leukaemia	14
15–24	Road traffic injury	101	Suicide	44	Road traffic injury	67
	Suicide	88	Epilepsy	5	Suicide	15
25–44	Suicide	145	Suicide	73	Road traffic injury	68
	Road traffic injury	102	Epilepsy	27	Breast cancer	31
45–64	IHD	474	IHD	253	IHD	237
	Lung cancer	364	Colorectal cancer	148	Breast cancer	127
65–74	IHD	757	IHD	378	IHD	378
	Lung cancer	518	Colorectal cancer	175	Breast cancer	69

Source of base data: NZHIS (1997 data are provisional)

Notes: deaths are per year averaged over two years ie, 1996–97.

Since 1981 avoidable mortality rates have fallen in every age group (Table 82). The largest percentage reductions have occurred at both extremes of the 0–74 age range. The lowest reduction has been in the 15–44 age group; indeed, unavoidable causes have declined faster than avoidable causes in this age group. Given the dominance of injury among avoidable causes in those aged 15–44, this pattern reflects the net effect of moderate improvements in road safety offset by worsening suicide rates over this period.

Table 82: Change in mortality rates, by age and intervention category, 1981–97

	Percentage fall in rates					
	Age: <1	1–14	15–24	25–44	45–64	65–74
PAM	60	39	6	5	44	36
SAM	63	44	60	39	45	41
TAM	44	35	5	28	46	34
Total avoidable mortality	56	39	11	11	44	36
Unavoidable mortality	18	27	28	18	12	1
Total mortality	51	35	15	13	37	28

Source of base data: NZHIS (1997 data are provisional)

Variations by gender

Males have a higher rate of avoidable mortality than females: age standardised rates of 270 per 100,000 and 175 per 100,000 in 1996–97 respectively.* This represents a 54 percent male excess, compared to a 40 percent male disadvantage in unavoidable mortality. The gender difference in avoidable mortality is largely attributable to a higher rate of preventable deaths (PAM) (Table 83).

* age standardised to Segi's world population

Table 83: Avoidable mortality, ages 0–74, by gender, 1996–97

	Number of deaths per year			Age standardised rate		Ratio
	Male	Female	Total	Male	Female	M:F
PAM	3009	1642	4741	150	83	1.8
SAM	1330	972	2302	63	48	1.3
TAM	1140	842	1982	57	44	1.3
Total avoidable mortality	5569	3456	9025	270	175	1.5
Unavoidable mortality	2298	1563	3861	109	78	1.4
Total mortality	7867	5019	12,886	379	253	1.5
Avoidable mortality as % all deaths	71	69	70			

Source of base data: NZHIS (1997 data are provisional)

Notes: age standardised rate is per 100,000 population per year (standardised to Segi's world population).

Table 84 lists the most common causes of avoidable death in the 0–74 age group for each gender. The higher male avoidable mortality rate partly reflects the differential magnitude of the IHD epidemic in the two genders: if males and females had experienced the same IHD mortality rates in 1996 or 1997, approximately 1200 fewer males (aged less than 75 years) would have died each year. Another contributor to the gender inequality in avoidable mortality is injury, males having much higher death rates than females for both road traffic injuries and suicide.

Table 84: Leading causes of avoidable mortality, ages 0–74, by gender, 1996–97

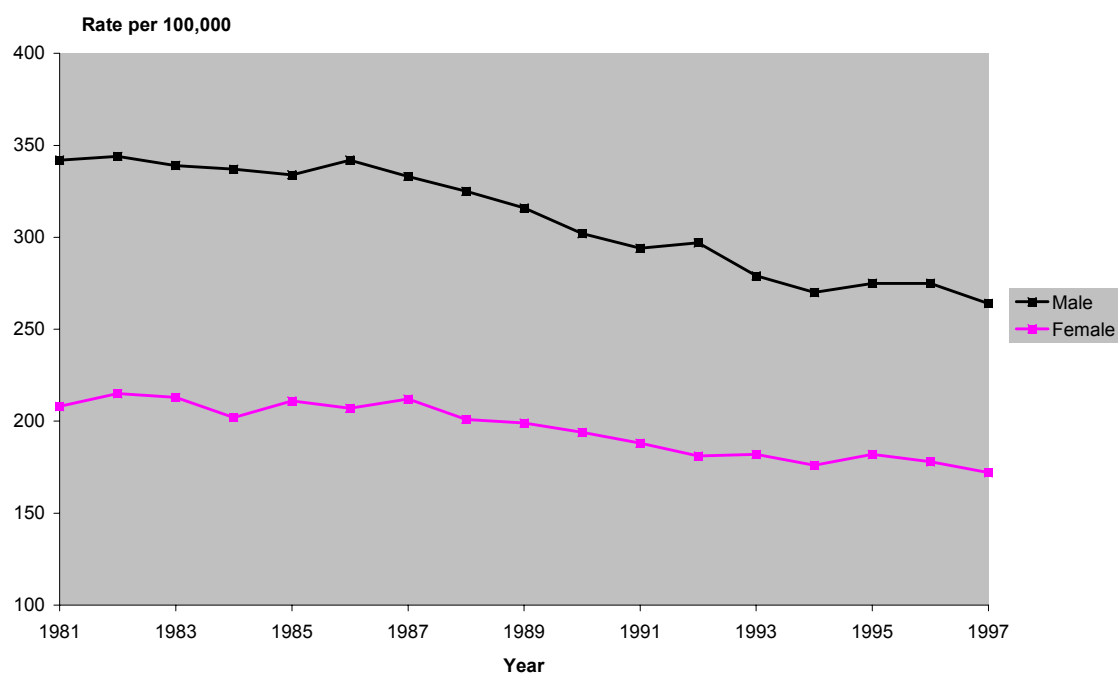
	Condition	Deaths per year	Percentage all 0–74 deaths	Male 'excess' deaths
Male	IHD	1877	24	1160
	Lung cancer	597	8	210
	Suicide	420	5	290
	Colorectal cancer	387	5	90
	Road traffic injury	360	5	210
Female	IHD	693	14	
	Breast cancer	453	9	
	Lung cancer	358	7	
	Colorectal cancer	284	6	
	CORD	255	5	

Source of base data: NZHIS (1997 data are provisional)

Notes: percentage is of all 0–74 deaths (including unavoidable deaths) by gender.

However, analysis of the trends in avoidable mortality since 1981 shows that there has been a faster rate of improvement for males than females, so narrowing the gap significantly (Figure 154). These trend differences may reflect the differential timing of the tobacco epidemic in the two genders, with smoking-related mortality falling in males (from a high base) but increasing in females (from a lower base) over the period concerned.

Figure 154: Avoidable mortality, by gender, 1981–97



Source of base data: NZHIS (1997 data are provisional)
Note: rate is age standardised to Segi's world population; broken axis.

Variations by ethnicity

Māori and Pacific people aged 0–74 years have much higher rates of avoidable deaths than European/Others (Table 85): in 1996–97 the Māori avoidable death rate was 2.5 times and the Pacific rate 1.9 times that of European/Other New Zealanders. Had these rates been the same, Māori would have experienced 970 fewer deaths and Pacific people 210 fewer deaths each year than actually occurred; this represents 45 percent and 35 percent of all Māori and Pacific deaths in the 0–74 age group respectively.

Since the majority of avoidable deaths in all ethnic groups fall into the PAM subcategory, the scope for health gain – and equity – is clearly greatest through primary prevention strategies. Yet the largest *relative* difference is in SAM, where the rates are approximately 2.5 times greater for both Māori and Pacific people. This subcategory includes conditions such as diabetes, high blood pressure, rheumatic heart disease and screenable cancers, all of which are amenable to early intervention and ongoing management in the primary or integrated care setting. At present, health care providers do not appear to be fully meeting the needs of Māori and Pacific people in this respect, although sufficient time has not elapsed for recent innovations in the funding and delivery of primary and integrated care to take effect (Malcolm 1999).

Table 85: Avoidable mortality, ages 0–74, by ethnicity, 1996–97

	Number			Rate			Ratio		Excess	
	Māori	Pacific	Eur	Māori	Pacific	Eur	Māori	Pacific	Māori	Pacific
PAM	855	202	3685	254	179	100	2.5	1.8	520	90
SAM	400	121	1781	125	110	48	2.6	2.3	250	70
TAM	346	102	1534	98	85	44	2.2	1.9	190	50
Total avoidable mortality	1601	424	7000	477	374	192	2.5	1.9	970	210
Unavoidable mortality	543	168	3150	163	148	85	1.9	1.7	260	70
Total all mortality	2144	592	10,150	640	523	278	2.3	1.9	1240	280
Avoidable mortality as % all mortality	75	72	69							

Source of base data: NZHIS (1997 data are provisional)

Notes: number = number of deaths, averaged over 1996 and 1997; rate = age standardised rate per 100,000; ratio = ratio of rate to Eur (= European and other ethnic groups); excess = number of excess deaths in group compared to European/Other group.

The major contributor to avoidable mortality in all ethnic groups is IHD (Table 86). Higher smoking rates, poorer diet and lower levels of physical activity all contribute to this ethnic differential. Higher Māori smoking rates also contribute to other causes of avoidable mortality, including lung cancer and CORD. Diabetes, itself related to diet and physical activity levels, also makes a major contribution to the gap in avoidable mortality (for both Māori and Pacific people), both as a direct cause of death and indirectly as a risk factor for IHD and stroke. The differential impact of diabetes on mortality mainly reflects higher incidence. Another factor is less access to high quality primary health care, a situation that leads to more rapid progression to complications and higher case fatality (Simmons 1996a). Higher rates of fatal road traffic injuries (70 excess deaths per year in the 0–74 age group), SIDS (50 excess deaths) and rheumatic heart disease (30 excess deaths) also contribute to the high Māori burden of avoidable mortality.

Table 86: Major causes of avoidable mortality, ages 0–74, by ethnicity, 1996–97

	Top four conditions, by number of deaths 1996–97	Deaths per year	Percentage of deaths	Excess deaths
Māori	IHD	379	18	230
	Lung cancer	179	8	130
	Road traffic injury	131	6	70
	Diabetes	120	6	110
Pacific	IHD	102	17	50
	Diabetes	32	5	30
	Lung cancer	30	5	10
	Stroke	26	4	20
European/Other	IHD	1969	20	
	Lung cancer	717	7	
	Colorectal cancer	601	6	
	CORD	496	5	

Source of base data: NZHIS (1997 data are provisional)

Notes: percentage is of all 0–74 deaths (including unavoidable deaths) by ethnic group; 'excess deaths' are in comparison to European/Other.

Variations by socioeconomic status

For this analysis, the NZDep96 index was used to stratify all avoidable and unavoidable deaths occurring in 1996 and 1997 (provisional). The NZDep96 scores were then grouped into deciles. To increase statistical stability and ease data presentation, for some analyses the deciles have been collapsed asymmetrically (reflecting the curvilinear relationship between deprivation and mortality) to create five deprivation strata: deciles 1–4 (least deprived group), deciles 5–6, deciles 7–8, decile 9, and decile 10 (most deprived group).

Table 87 and Figure 155 illustrate the strong relationship between deprivation and both avoidable and unavoidable mortality.

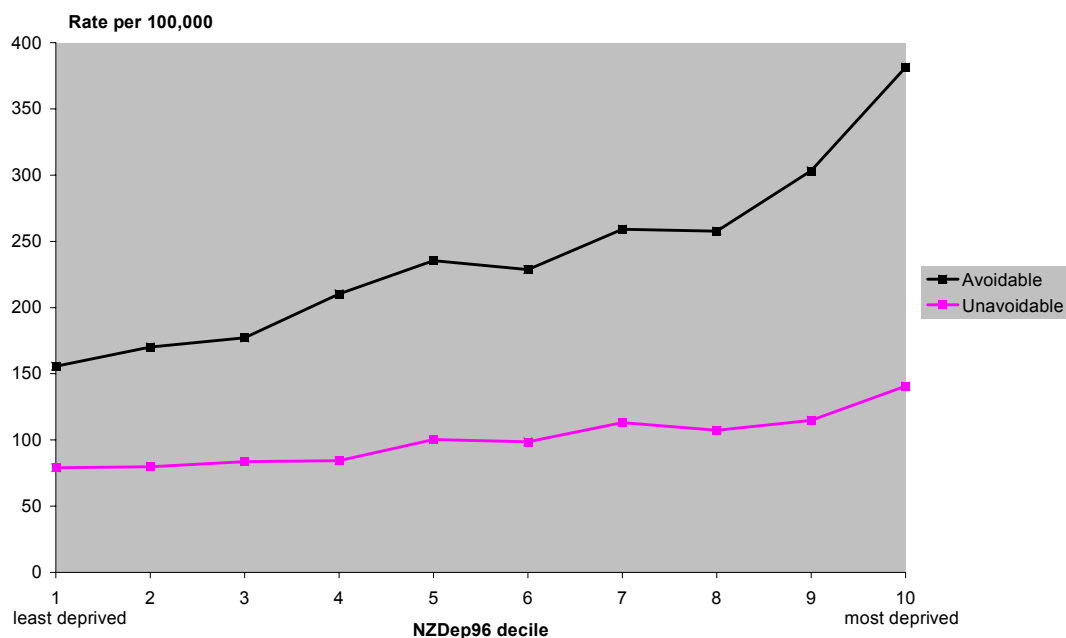
Table 87: Avoidable mortality, ages 0–74, by NZDep96 decile, 1996–97

	Number of deaths per year, by NZDep96 decile					Rate per 100,000, by NZDep96 decile					Ratio
	1–4	5–6	7–8	9	10	1–4	5–6	7–8	9	10	
PAM	1403	925	1080	597	690	92	121	136	165	202	2.2
SAM	697	457	526	267	337	45	58	66	73	98	2.2
TAM	622	388	436	234	277	43	53	57	66	81	1.9
Total avoidable mortality	2722	1770	2042	1098	1304	180	232	259	303	382	2.1
Unavoidable mortality	1269	770	876	419	485	82	99	110	115	141	1.7
Total mortality	3991	2539	2918	1517	1789	261	332	369	418	522	2.0
AM as % of all deaths	68	70	70	72	73						

Source of base data: NZHIS (1997 data are provisional)

Notes: ratio is decile 10 to decile 1–4; rate is age standardised to Segi's world population.

Figure 155: Avoidable and unavoidable mortality, by NZDep96 decile, ages 0–74, 1996–97



Source of base data: NZHIS (1997 data are provisional)

Note: rate is age standardised to Segi's world population.

One measure of health system performance (including health promotion and disease prevention as well as treatment and rehabilitation services) is the extent to which the system is able to mitigate the impact of social inequality on the health of the population. This is reflected in the relative steepness of the socioeconomic mortality gradients.

In New Zealand in 1996–97, the slope of the socioeconomic gradient in mortality for avoidable causes was steeper than that for unavoidable causes. Among avoidable causes, TAM had the shallowest gradient, suggesting that treatment services are being accessed more equitably than preventive services. The gradient was slightly steeper for SAM and PAM: people living in the most deprived areas had age standardised SAM and PAM rates more than double those of people living in the least deprived areas. This suggests that the health sector could do more to meet the preventive and chronic disease management needs of low income and less educated people (especially in primary health care settings). Much the same applies to PAM: affluent people are better able to respond to health education messages and have the necessary resources to make and sustain lifestyle changes. Smoking, a high fat low fruit and vegetable diet, physical inactivity, obesity, unrecognised or poorly controlled high blood pressure and type 2 diabetes are now becoming increasingly concentrated into poorer neighbourhoods (Ministry of Health 1999d; 1999a).

A complex interaction exists between ethnicity and deprivation in New Zealand: Māori and Pacific people are heavily concentrated into the more deprived NZDep96 strata (see Figure 25). This analysis does not attempt to disentangle ethnic or cultural from socioeconomic or structural effects. The analysis of life expectancy presented in Chapter 2, as well as earlier work (Pearce et al 1993), suggests that both sets of factors contribute independently and jointly to mortality differentials.

The impact of socioeconomic inequality on mortality is summarised in Table 88. The size of this impact is noteworthy: if mortality in all socioeconomic groups equalled that of the least deprived neighbourhoods (NZDep96 deciles 1–4), approximately 2850 fewer deaths would have occurred in New Zealand in 1996 or 1997 in the 0–74 age group, including 2160 fewer ‘avoidable’ deaths. This represents 18 percent of unavoidable and 24 percent of avoidable deaths.

Table 88: Excess deaths from avoidable causes, by NZDep96 decile, 1996–97

	Excess deaths, by NZDep96 decile					Percentage of deaths
	5–6	7–8	9	10	Total	
PAM	220	350	260	380	1220	26
SAM	110	170	100	180	560	25
TAM	70	110	80	130	390	20
Total avoidable deaths	400	620	450	690	2160	24
Unavoidable deaths	140	230	120	200	690	18
Total all deaths	540	850	570	890	2850	22

Source of base data: NZHIS (1997 data are provisional)

Notes: excess deaths are relative to least deprived group (deciles 1–4); percentage is by row.

With few exceptions (certain cancers such as melanoma, and birth defects) all the conditions included in the ‘avoidable mortality’ category show a socioeconomic gradient in cause specific mortality. About half the excess avoidable deaths among people living in deprived areas can be attributed to IHD, stroke, diabetes, lung cancer and CORD. These conditions are common and have steep socioeconomic gradients, with at least a two- to threefold difference in age standardised mortality rates between extreme groups (see Box 26). Table 89 summarises the

10 major contributors to the excess avoidable mortality of deciles 5–10 relative to deciles 1–4. Smoking contributes to each of the top three causes, and to several others as well. Diabetes is also a major risk factor, contributing to IHD and stroke deaths as well as directly to excess avoidable mortality.

Table 89: Major causes of excess mortality, by NZDep96 decile, ages 0–74, 1996–97

	Number of excess deaths per year, by NZDep96 decile					Percentage of all deaths from cause
	5–6	7–8	9	10	Total	
IHD	100	180	110	180	570	22
Lung cancer	60	70	70	80	280	30
CORD	50	70	50	50	220	36
Diabetes	20	40	20	70	150	48
Stroke	20	40	30	40	120	26
Colorectal cancer	40	40	10	10	90	14
Road traffic injury	20	20	30	30	90	19
Suicide	10	30	10	20	70	13
SIDS	10	20	10	20	60	67
Respiratory infections	5	20	10	20	50	41
Top 10 contributors	330	520	350	520	1720	

Source of base data: NZHIS (1997 data are provisional)

Notes: percentage is of all deaths from the cause; totals may not sum due to rounding; excess deaths are relative to least deprived group (NZDep decile 1–4).

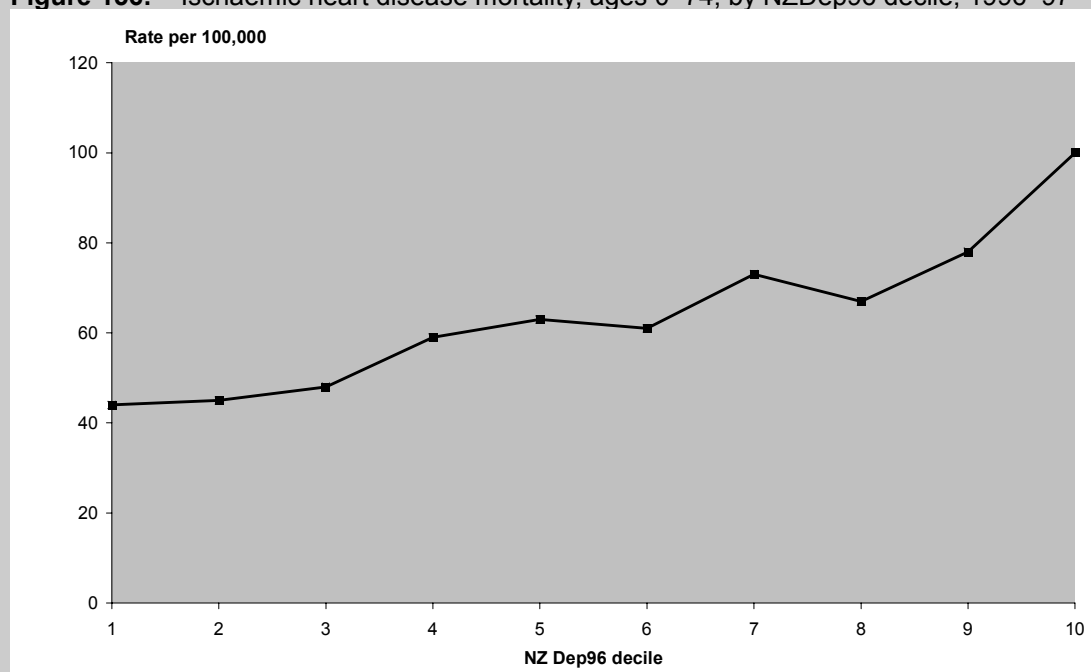
Unintentional injury also shows a steep socioeconomic gradient in avoidable mortality, with road traffic injuries being ranked within the top 10 causes. Factors involved include the quality of the fleet (new vehicles are safer), use of motorbikes (which are cheaper than cars), and behavioural factors (average speeds, drink drive rates). For children, differential exposures include traffic calming, traffic density, safe play areas, fencing, car seat, seat belt and cycle helmet use, and parental supervision.

Another cause worthy of note is SIDS: no fewer than two thirds of SIDS deaths would have been avoided if the risk in all areas were the same as that in the least deprived areas, reflecting a six fold variation in SIDS rates across NZDep96 strata. Up to half of SIDS may currently be attributed to maternal smoking behaviour (Mitchell et al 1997), which would explain part but not all of this gradient.

Box 26: Socioeconomic gradients in avoidable IHD mortality

IHD is by far the largest single contributor to the socioeconomic gradient in avoidable mortality. In 1996–97 it caused an average of 2541 deaths per year in the 0–74 age group – approximately 20 percent of total mortality in this age range. IHD mortality shows a statistically significant gradient from an age and gender standardised rate of 49 per 100,000 in the least deprived decile to 100 per 100,000 in the most deprived – a rate ratio between extreme deciles of almost exactly two (Figure 156).

Figure 156: Ischaemic heart disease mortality, ages 0–74, by NZDep96 decile, 1996–97



Source of base data: NZHIS (1997 data are provisional)

Note: rate is age standardised to Segi's world population; decile 1 = least deprived, decile 10 = most deprived.

Approximately 570 deaths occurring in 1996 or 1997 might have been postponed had all areas experienced the IHD mortality of the least deprived stratum. This represents 22 percent of all IHD mortality in the 0–74 age group.

This scope for health gain remains despite dramatically falling IHD mortality over the past two or three decades in New Zealand, suggesting that the trend may have been largely restricted to people living in more advantaged circumstances (Kawachi et al 1991). Evidence in support of this comes from surveys indicating declining rates of smoking and lower mean blood pressure among higher income or more educated adults, but stable or even rising levels of these risk factors among more deprived people (Ministry of Health 1999d). Similarly, the prevalence of obesity has risen dramatically over the past one or two decades, but probably less so among the more advantaged (Ministry of Health 1999a).

The analysis presented here supports the view that lifestyle changes are more easily made by better educated and more affluent people, who have the necessary resources to make and sustain such changes. By contrast, less advantaged New Zealanders may require additional support, often at a policy level, to gain similar benefit.

Avoidable morbidity

Introduction

The concept of avoidability can be extended from fatal to non-fatal outcomes. Limitations in the measurement of the latter, however, necessitate the use of hospitalisation as a proxy for disease (or injury) severity: a potentially avoidable hospitalisation therefore signals the occurrence of a severe illness or injury that, theoretically, could have been avoided.

Potentially avoidable hospitalisations fall into two subcategories:

- *preventable hospitalisations* (PH) – hospitalisations resulting from diseases preventable through population-based health promotion strategies (eg, tobacco excise tax, smokefree laws)
- *ambulatory sensitive hospitalisations* (ASH) – hospitalisations resulting from diseases sensitive to prophylactic or therapeutic interventions deliverable in a primary health care setting (such as vaccine preventable diseases, early recognition and excision of melanoma, effective glycaemic control in people with diabetes).

As with avoidable mortality, all causes of hospitalisation can be categorically attributed as (potentially) avoidable* or unavoidable, and the former further subdivided into the subcategories of ‘preventable’ and ‘ambulatory sensitive’. For some causes, there is extensive overlap between the two subcategories, and judgement had to be applied to partition cause specific hospitalisations between them. The majority of categories attributed to preventable hospitalisation are those identified as causes of primary avoidable mortality; others are derived from the literature review. The ambulatory sensitive codes are largely derived from lists prepared by earlier workers (Weissman et al 1992; Begley et al 1995; Billings et al 1996; Jackson et al 1998), and were extended where necessary to reflect recent developments in health care technology and New Zealand practice patterns. A list of the conditions included and the key references used is appended (Appendix 3).

In the analysis that follows, injury admissions have been separated from other cause groups of preventable hospitalisations to reflect the different epidemiology of injury versus (preventable) disease: injuries have different risk and protective factors and respond to different prevention strategies. The analysis therefore presents avoidable hospitalisations in three subcategories:

- preventable hospitalisations (excluding injuries) (PH)
- ambulatory sensitive hospitalisations (ASH)
- hospitalisations avoidable through injury prevention (IP).

Ambulatory sensitive hospitalisations are sometimes monitored as a performance indicator for primary health care. In this report, however, this measure is used purely as an indicator of the scope for health gain – the potential to reduce the incidence of severe disease in the population. As with avoidable mortality, the analysis is restricted to the population aged less than 75 years.

* A potential cause of confusion is the categorisation of admissions as ‘discretionary’ or ‘non-discretionary’. These terms are not synonymous with the concept of avoidability. For example, an admission for appendicitis is non-discretionary and unavoidable, but an admission for ruptured appendix is non-discretionary yet avoidable.

Method and data sources

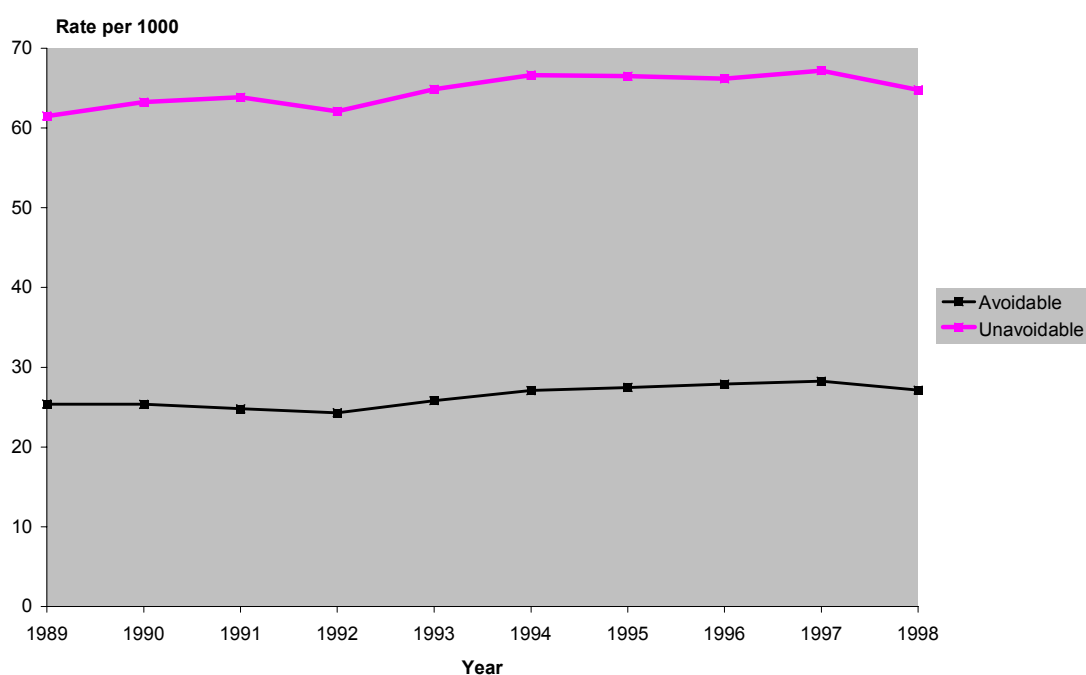
Discharges of persons aged 0–74 years from public hospitals for 1989–98 were analysed (1998 data are provisional). Detailed analysis of current levels uses the average of the two year period 1997–98. The discharge dataset provided by NZHIS was cleaned using a data filtering process developed by the Ministry of Health (1998c). Day cases, small rural hospitals, private hospitals, maternity and neonatal services, mental health services, and disability support services are excluded.

Avoidable hospitalisations in the whole population

In 1997–98 there were an annual average of 329 659 inpatient discharges from public hospitals (excluding the hospitals and services listed above) among persons aged 0–74 years. Of these, 97,390 or 30 percent are considered potentially ‘avoidable’. Preventable hospitalisations accounted for 15,932 discharges (4.8 percent of total discharges within the age range), ambulatory sensitive hospitalisations for 63,721 (19.3 percent), and injuries for 17,736 (5.4 percent).

Since 1989, the age standardised rate of hospitalisation (0–74 age group) has *increased*. Both unavoidable and avoidable hospitalisations have shown a similar rising trend (Figure 157).

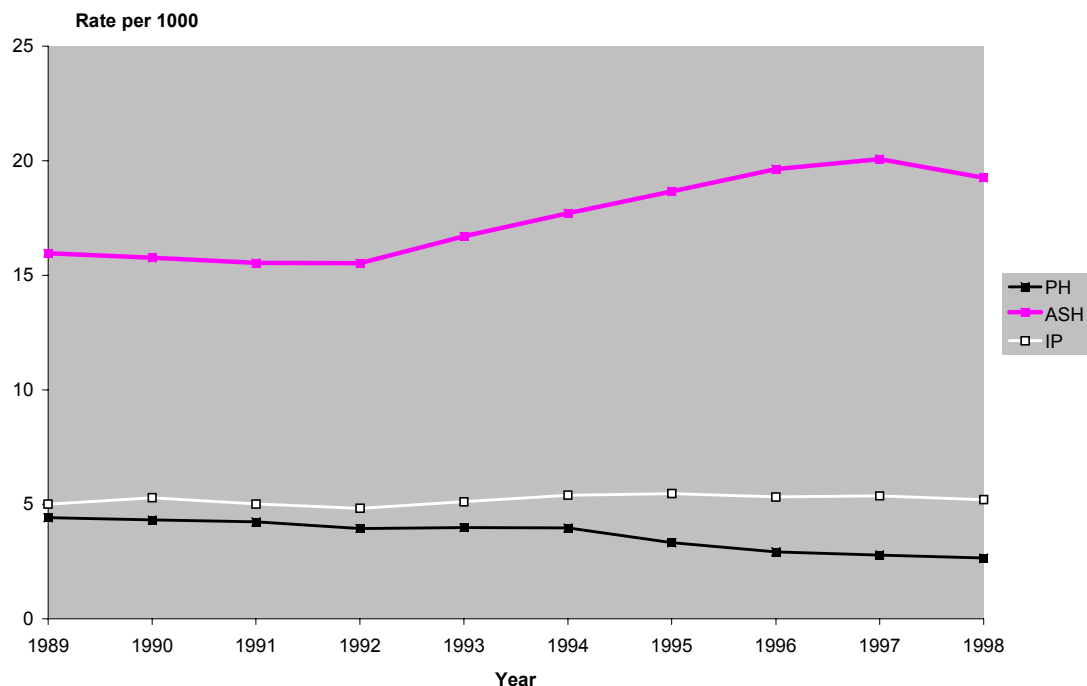
Figure 157: Avoidable and unavoidable hospitalisations, ages 0–74, 1989–98



Source of base data: NZHIS (1998 data are provisional)
Note: rate is age standardised to Segi's world population.

However, when avoidable hospitalisations are disaggregated into the three subcategories (Figure 158), it can be seen that the PH rate has in fact declined over the decade. By contrast, the ASH rate has risen dramatically. IP hospitalisations have also increased, but much less steeply.

Figure 158: Avoidable hospitalisations, by subcategory, ages 0–74, 1989–98

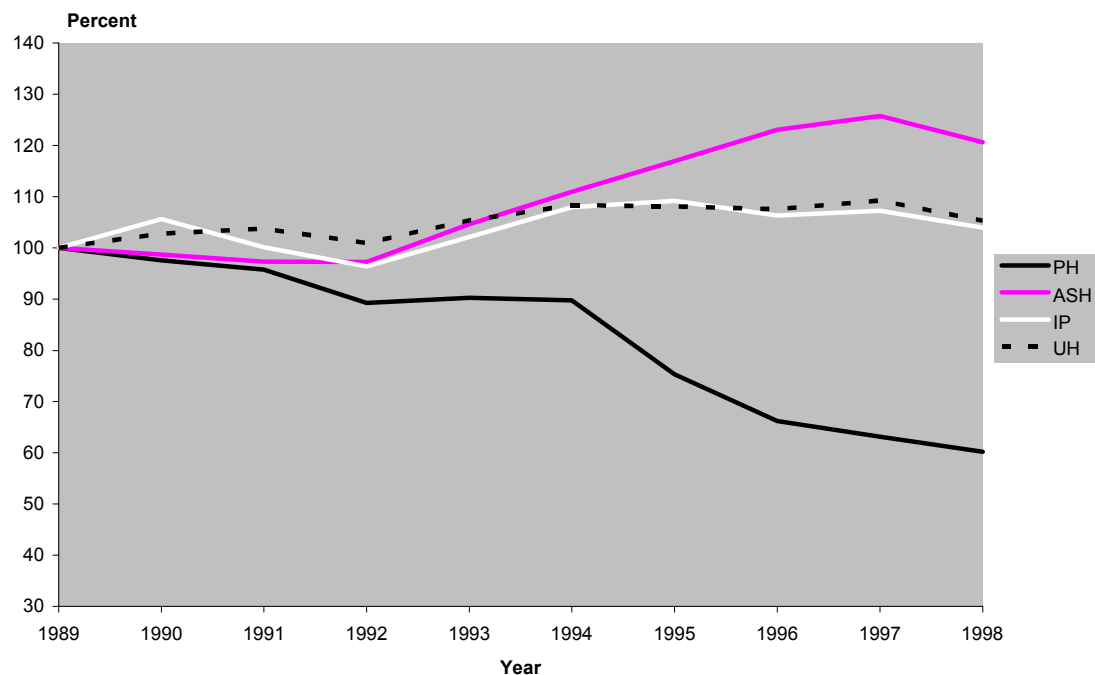


Source of base data: NZHIS (1998 data are provisional)

Note: rate is age standardised to Segi's world population; PH = preventable hospitalisation; ASH = ambulatory sensitive hospitalisation; IP = hospitalisation avoidable by injury prevention.

These trends can be seen more clearly in Figure 159, which indexes rates to a base of 100 in 1989. The figure also shows the relative trend in unavoidable hospitalisations for comparison.

Figure 159: Relative trends in categories of hospitalisations, ages 0–74, 1989–98



Source of base data: NZHIS (1998 data are provisional)

Note: scaled to 1989 = 100; UH = unavoidable hospitalisations; broken axis.

The 40 percent fall in preventable hospitalisations (PH) over the decade is a measure of the success of health promotion in reducing disease incidence. However, this success has been more than offset by the 25 percent increase in ambulatory sensitive hospitalisations (ASH) over the same period. The 6 percent rise in injury hospitalisations exactly mirrors the trend in the 'baseline' of unavoidable hospitalisations, and contributes little to the overall increase in the avoidable hospitalisation rate.

Almost all of the rise in avoidable hospitalisations – and over half of the rise in total hospitalisations (all categories combined) – can therefore be attributed to the trend in ASH, especially since 1993. A proportion of this apparent increase may be an artefact of improvements in data management and coding systems in hospitals, including the introduction of the Australian coding standards in 1995 and the introduction of case mix funding, which may have shifted some cases from the PH to the ASH subcategories. This could partly explain the sharp decline in PH at about the same time as the sharp rise in ASH.

Changes in the funding and delivery of health care are likely to have also contributed to the rising trend in ASH, including altered incentives for GPs and hospitals to refer or admit patients respectively arising from the health reforms of 1992–93, higher perceived risk of litigation if hospitalisation is deferred, and possibly increased barriers (geographic, cultural or socioeconomic) to access to primary health care experienced by some sections of the population (Ministry of Health 1998c).

The rising trend in ASH also reflects, to some (unquantified) extent, real increases in the prevalence of some chronic conditions. In a few cases this may reflect increasing incidence (for example, asthma, diabetes), but in most it reflects reductions in both cause specific and/or other cause mortality: people are living longer with the disease and so are admitted to hospital more often, or are surviving long enough to develop the disease in the first place.

Whatever the contributions of coding changes, changing patterns of health care funding and delivery, and real changes in chronic disease epidemiology, the result of this trend has been that, by 1997 or 1998, one in three hospitalisations of people aged 0–74 years were theoretically avoidable, two thirds of these through more effective primary health care. Although in practice all of these potentially avoidable hospitalisations could not realistically have been avoided, these estimates nevertheless reveal considerable scope for further reduction in the incidence of serious disease and injury. However, these whole of population estimates disguise significant variation among subgroups of the population.

Variations by age

Unlike avoidable mortality, avoidable hospitalisations are more evenly distributed across the 0–74 age range (Tables 90 and 91). The rate of AH is highest in infancy, with just over 1 percent of all infants being admitted in 1997 or 1998 for an avoidable cause, most commonly an infectious disease (gastroenteritis or respiratory tract infection). However, avoidable causes account for less than 20 percent of total hospitalisations in infancy. For children aged 1–14 years, the rates of avoidable and unavoidable hospitalisations are much lower, yet avoidable causes account for almost half (45 percent in 1997 or 1998) of the total – the highest proportion in any age group. The single leading cause of AH in childhood is asthma, which accounted for 18 percent of AH in this age group in 1997–98.

Avoidable causes account for 25 percent of all hospitalisations of youth (15–24 years). Injury admissions peak in this age group, with road traffic injuries and sports injuries heading the list. Road traffic injuries remain the leading cause of avoidable hospitalisation in young adults (25–44

years). Cellulitis (a type of skin infection, often complicating minor lacerations or abrasions) is a surprisingly common cause of AH for people aged 15–44. Pelvic inflammatory disease and ectopic pregnancy – both often complications of sexually transmitted infections, especially chlamydia – are common avoidable reasons for admission among females aged 25–44.

From middle age the AH rate begins to rise with the emergence of chronic diseases, reflecting cumulative exposure to smoking, poor diet and physical inactivity over many decades. This pattern is further accentuated in old age (65–74 years). From age 45 onwards, one in three hospitalisations is potentially avoidable, mostly through effective chronic disease and risk factor management in the primary care setting. It is worth noting that both the sharp upward trend in ASH from 1993 onwards and the sharp downward trend in PH from 1994 onwards are largely restricted to the 45 and over age groups.

Table 90: Avoidable hospitalisations, by age, 1997–98

	Discharges per year (number)					
	Age: < 1	1–14	15–24	25–44	45–64	65–74
PH	423	660	386	1745	6387	6331
ASH	5213	14,414	5346	10,932	15,312	12,505
IP	80	4970	4467	5559	1995	666
AH (total)	5716	20,044	10,198	18,236	23,695	19,503
UH	24,431	24,127	29,925	77,904	44,559	31,324
Total	30,147	44,171	40,123	96,139	68,253	50,827
AH as % total	19	45	25	19	35	38
	Discharges per year (age specific rate)					
	Age: < 1	1–14	15–24	25–44	45–64	65–74
PH	8	1	1	2	9	26
ASH	93	19	10	10	21	51
IP	1	6	8	5	3	3
AH (total)	102	26	19	16	33	79
UH	437	31	56	70	62	127
Total	539	57	75	87	95	206

Source of base data: NZHIS (1998 data are provisional)

Notes: rate is per 1000 population, UH = unavoidable hospitalisations.

Table 91: Major causes of avoidable hospitalisations, by age, 1997–98

Age (years)	Condition	Number of discharges per year	Percentage
< 1	Gastroenteritis	1579	5
	Respiratory infection	1441	5
	Failure to thrive	477	2
	Kidney/urinary infections	394	1
1–14	Asthma	3627	8
	Respiratory infection	3263	7
	Gastroenteritis	1987	4
	Road traffic injury	1871	4
15–24	Road traffic injury	2157	5
	Sport injury	1126	3
	Cellulitis	998	2
	Asthma	888	2

Table 91 continued

Age (years)	Condition	Number of discharges per year	Percentage
25–44	Road traffic injury	2501	3
	Cellulitis	1929	2
	Sexually transmissible infections	1394	1
	Self harm	1332	1
45–64	Angina	4418	6
	Myocardial infarction	2683	4
	Respiratory infection	1497	2
	CORD	1424	2
65–74	Angina	3984	8
	Myocardial infarction	2279	4
	CORD	2200	4
	Congestive heart failure	1528	3

Source of base data: NZHIS (1998 data are provisional)

Notes: percentage is of total hospitalisations for each age group; IHD has been subdivided into myocardial infarction, angina and heart failure, to distinguish first episodes of IHD (which are preventable) from subsequent management of chronic IHD (which is ambulatory sensitive); sexually transmissible infections include complications (pelvic inflammatory disease, ectopic pregnancy).

Variations by gender

Among people aged 0–74 in 1997 or 1998, males had a rate of AH that was 18 percent higher than that of females (Table 92).

Table 92: Avoidable hospitalisations, by gender, ages 0–74, 1997–98

	Number of discharges per year			Rate		Ratio	Male
	Male	Female	Total	Male	Female	M:F	excess (deficit)
PH	9416	6516	15,932	4.6	3.4	1.4	2610
ASH	32,272	31,449	63,721	19.2	18.4	1.0	1430
IP	10,936	6799	17,735	6.6	4.1	1.6	4190
AH (total)	52,624	44,764	97,388	30.5	25.8	1.2	8080
UH	93,045	139,220	232,265	55.5	78.4	0.7	(38,470)
Total	145,669	183,984	329,653	86.0	104.2	0.8	(30,940)
AH as % total	36	24	30				

Source of base data: NZHIS (1998 data are provisional)

Note: age standardised rates per 1000 population are standardised to Segi's world population.

The leading causes of AH for each gender are shown in Table 93. Respiratory infections (mainly pneumonia and influenza) are the leading overall cause over the 0–74 age range for both males and females. Road traffic injury ranks second for males and fourth for females: had males experienced the same rate of road traffic injury hospitalisation as females in 1997, 2400 fewer males would have been hospitalised. Angina is ranked high among males, reflecting their higher prevalence of IHD. Urinary tract infections are highly ranked for females. Although cellulitis ranks highly for both, the male rate is 50 percent higher than the female rate, corresponding to an excess of approximately 1300 hospitalisations per year.

Table 93: Major causes of avoidable hospitalisation, by gender, ages 0–74, 1997–98

		Number of discharges per year	Rate	Male excess (deficit)
Male	Respiratory infections	4953	6.5	890
	Road traffic injury	5154	6.1	2380
	Angina	5675	5.4	2320
	Asthma	3455	4.8	(150)
	Cellulitis	3925	4.6	1270
	Sports injury	2754	3.3	1980
Female	Respiratory infections	4219	5.4	
	Asthma	4139	5.1	
	Gastroenteritis	3137	4.1	
	Road traffic injury	2762	3.3	
	Angina	3259	3.2	
	Urinary tract infection	2287	2.8	

Source of base data: NZHIS (1998 data are provisional)

Note: rate is age standardised (to Segi's world population) per 1000 population.

Variations by ethnicity

Māori and Pacific people experienced age standardised rates of AH 60 percent and 70 percent higher than European/Other New Zealanders in 1997–98 (Table 94). Had the ethnic specific rates been equal, 6800 fewer Māori and 2800 fewer Pacific people aged 0–74 years would have been hospitalised. The scope for equity gain is greatest for ASH, because this subcategory has both the highest rate ratio (approximately 2.0) and accounts for the largest proportion of total AH in all three ethnic groups.

Table 94: Avoidable hospitalisations by ethnicity, ages 0–74, 1997–98

	Number of discharges per year			Rate		
	Māori	Pacific	European/Other	Māori	Pacific	European/Other
PH	1849	633	13,007	5.4	5.6	3.7
ASH	12,872	5,040	44,333	28.5	33.7	16.1
IP	3304	878	12,493	6.0	4.8	5.2
AH (total)	18,025	6551	70,208	40.0	44.1	25.0
UH	36,854	15,472	173,716	75.8	92.0	61.6
Total	54,878	22,023	243,924	115.7	136.0	86.6
AH as % total	33	30	29	35	32	29
	Ratio of rates			Number of excess discharges		
PH	1.5	1.5		580	210	
ASH	1.8	2.1		5590	2630	
IP	1.2	0.9		550	(50)	
AH (total)	1.6	1.8		6760	2840	
UH	1.2	1.5		6880	5100	
Total	1.3	1.6		13,830	8010	

Source of base data: NZHIS (1998 data are provisional).

Notes: ratio of rates is to European/Other ethnic group; rates are per 1000, age standardised to Segi's world population; UH = unavoidable hospitalisations.

The leading causes of avoidable hospitalisations (across the whole 0–74 age range) for each ethnic group are summarised in Table 95. For both Māori and Pacific people, three of the top five causes are infectious diseases – respiratory infections, gastroenteritis and cellulitis – reflecting both social conditions and primary health care access (for example, immunisation, antibiotics, oral rehydration, skin care). Māori and Pacific people also have high rates of hospitalisation for asthma, diabetes and other chronic diseases. These causes again reflect socioeconomic status, but are also responsive to primary health care (effective chronic disease and risk factor management), a situation similar to that already described for SAM.

Table 95: Top five causes of avoidable hospitalisation, by ethnicity, ages 0–74, 1997–98

		Number of discharges per year	Percentage	Excess (number)
Māori	Respiratory infection	2357	4	1240
	Asthma	2107	4	1030
	Cellulitis	1531	3	790
	Road traffic injury	1456	3	230
	Gastroenteritis	938	2	(250)
Pacific	Respiratory infection	1127	5	760
	Cellulitis	879	4	640
	Asthma	633	3	300
	Gastroenteritis	351	2	(20)
	Road traffic injury	314	1	(100)
European/ Other	Angina	7770	3	
	Road traffic injury	5611	2	
	Respiratory infection	5296	2	
	Myocardial infarction	4558	2	
	Asthma	4525	2	

Source of base data: NZHIS (1998 data are provisional)

Notes: percentage is of total hospitalisations for each ethnic group; IHD is divided into subcategories (angina, myocardial infarction, congestive heart failure).

Variations by socioeconomic status

As for mortality, the NZDep96 index was used to assign a deprivation score (aggregated into deciles 1–4, 5–6, 7–8, 9 and 10) to each discharge based on the domicile of residence. People living in the most deprived areas (decile 10) had twice the probability of being hospitalised for an avoidable cause as people living in the least deprived areas (deciles 1–4) (Table 96 and Figures 160a and 160b). Had all New Zealanders enjoyed the AH rates of deciles 1–4, 28 percent fewer avoidable hospitalisations would have occurred in 1997 or 1998 – an annual ‘saving’ of approximately 26,000 hospital admissions. This is equivalent to the annual inpatient throughput of a middle sized hospital such as Whangarei or Palmerston North.

Table 96: Avoidable hospitalisations, by NZDep96 decile, ages 0–74, 1997–98

	Number of discharges per year, by NZDep96 decile					Rate per 1000					Rate ratio
	1–4	5–6	7–8	9	10	1–4	5–6	7–8	9	10	
PH	4713	3234	3628	2056	2097	6.3	8.6	9.7	11.2	12.4	1.9
ASH	17,248	12,633	14,015	8453	10,675	27.8	39.9	44.3	50.8	63.4	2.3
IP	5291	3639	3848	2309	2447	8.9	11.9	12.5	13.6	14.2	1.6
AH (total)	27,252	19,506	21,491	12,819	15,219	43	60	66	76	90	2.1
UH	70,123	46,996	50,427	28,898	33,106	110	144	154	168	194	1.8
Total	97,375	66,501	71,917	41,717	48,324	153	205	221	243	284	1.9
AH as % total	28	29	30	31	31	28	29	30	31	32	

Source of base data: NZHIS (1998 data are provisional)

Notes: NZDep96 deciles are grouped into five strata: deciles 1–4 is the least and decile 10 the most deprived; rate ratio is decile 10 to deciles 1–4.

Figure 160a: Avoidable and unavoidable hospitalisations, by NZDep96 decile, ages 0–74, 1997–98

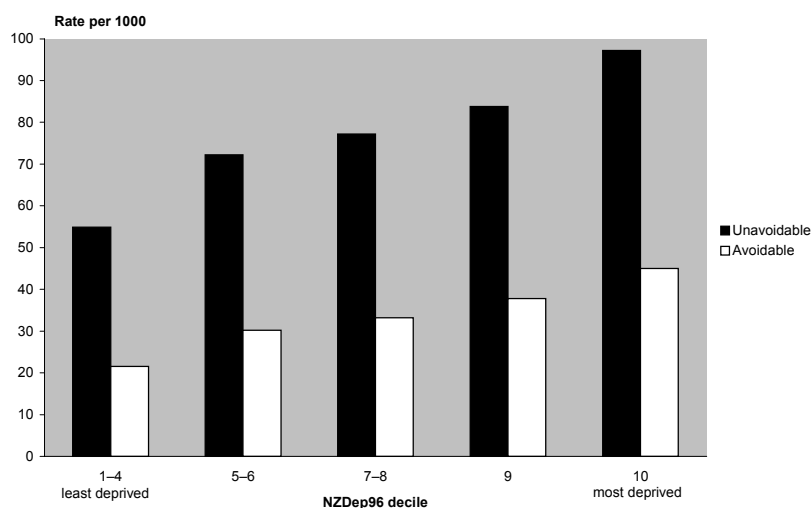
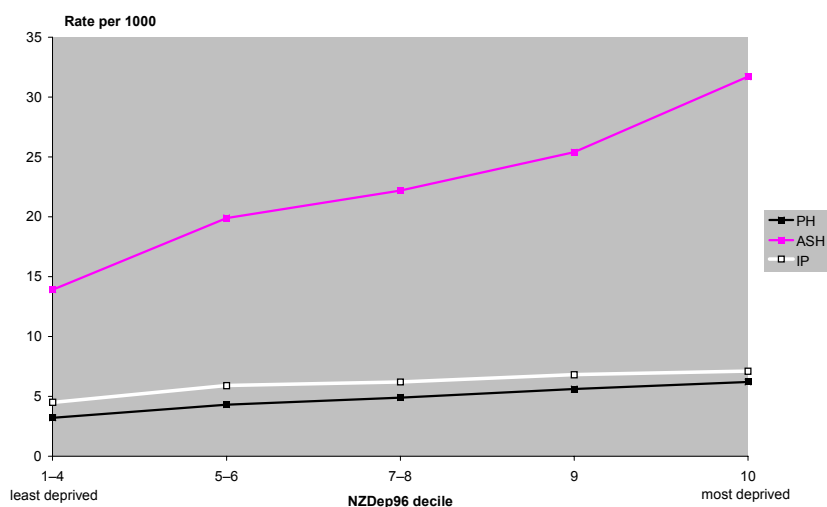


Figure 160b: Subcategories of avoidable hospitalisations, by NZDep96 decile, ages 0–74, 1997–98



Source of base data: NZHIS (1998 data are provisional)

Note: rate is age standardised to Segi's world population.

Higher rates of both avoidable and unavoidable hospitalisation are seen for people living in deprived areas. However, the excess varies depending on subcategory (Tables 96 and 97). For unavoidable hospitalisations, the ratio of age standardised rates between people in NZDep96 decile 10 and those in deciles 1–4 was 1.8 in 1997–98. For both injury and other preventable hospitalisations, the corresponding ratio was close to or less than 1.8, suggesting some success in ameliorating the impact of social inequality with respect to these causes. However, for ASH the corresponding ratio was 2.3 – significantly higher than the 1.8 ‘baseline’. This suggests that people from deprived areas may be benefiting less from (effective) primary health care than their more advantaged counterparts (especially with regard to preventive services, including chronic disease management).

Table 97: Excess discharges, by NZDep96, ages 0–74, 1997–98

	Excess discharges by NZDep96 decile, compared with deciles 1–4					Percentage of discharges
	5–6	7–8	9	10	Total	
PH	840	1250	890	1020	4000	25
ASH	3810	5200	3820	5990	18,820	30
IP	920	1090	790	910	3720	21
AH (total)	5580	7530	5510	7930	26,550	28
UH	11,270	14,590	9980	14,410	50,260	22
Total	16,860	22,140	15,490	22,350	76,840	24

Source of base data: NZHIS (1998 data are provisional)
 Note: percentage is of total hospitalisations for each deprivation stratum.

The major causes contributing to the socioeconomic gradient in AH are listed in Table 98. Respiratory infections were the single largest contributor to the gradient in 1997–98. However, if all forms of IHD were combined into a single category, this would be the leading cause. (These conditions have been separated to distinguish first episodes of IHD, which are preventable, from subsequent management of chronic IHD, which is ambulatory sensitive.) Other respiratory disorders also feature prominently, with asthma in second place and CORD ranked fifth. Diabetes would rank even more highly if its macrovascular complications were included within this category. Although injury is also a significant contributor to the socioeconomic gradient in AH, the only injury type to appear in the top 10 causes is road traffic injury, accounting for 1580 excess hospitalisations (20 percent of total hospitalisations for this cause).

Table 98: Major causes of excess hospitalisation, by NZDep96 decile, ages 0–74, 1997–98

	Excess discharges per year by NZDep96 decile, compared with deciles 1–4					Percentage of total for cause
	5–6	7–8	9	10	Total	
Respiratory infection	520	750	580	1200	3050	34
Asthma	490	690	530	750	2470	33
Cellulitis	410	550	430	880	2280	35
Angina	660	740	420	410	2240	25
CORD	300	440	380	500	1620	41
Road traffic injury	410	430	320	410	1580	20
Congestive heart failure	190	270	240	440	1140	41
Epilepsy	230	330	210	310	1080	30
Myocardial infarction	240	340	190	210	980	18
Diabetes	140	260	190	340	920	41
Top 10 causes	3600	4800	3500	5450	17,350	18

Source of base data: NZHIS (1998 data are provisional)
 Note: percentage is proportion of total hospitalisations for the specific cause in 1997–98 (averaged).

Summary and conclusions

Categorical attribution of diseases and injuries (coded as causes of death or hospitalisation) as 'avoidable' or 'unavoidable' provides one way to identify the scope for health gain. This categorisation is not meant to imply that every death or hospitalisation classed as 'avoidable' could in fact have been avoided – merely that the potential to do so exists. For this analysis, the categorisation of causes has been taken one step further, subdividing both avoidable mortality and avoidable hospitalisations into three subcategories, representing different levels of intervention within the health sector.

An upper age limit of 75 years has been used in this analysis. This does not mean that some deaths or hospitalisations involving people older than 75 years could not have been avoided; only that disentangling avoidable from unavoidable causes becomes problematic as the prevalence of co-morbidity increases. Indeed, it is conventional in this field to use a cut-off of 65 years; however, a higher upper age limit better reflects recent advances in coding and provides an analysis of greater policy relevance.

Mortality

Avoidable mortality in the 0–74 age range declined by 38 percent from 1981 to 1997, compared with a decline of only 9 percent in unavoidable mortality. This difference in trend (amounting to approximately 5000 fewer deaths in 1997 than expected, based on 1981 mortality rates) is a measure of the success of the health system (including population-based interventions) in reducing fatal outcomes. Even so, in 1996–97 almost 70 percent of deaths in the 0–74 age range (approximately 9000 deaths per year) were still considered to be potentially avoidable.

Although the proportion of deaths categorised as avoidable does not vary much across age groups, the exponential rise in mortality with age means that almost 80 percent of all avoidable deaths occur in the 45–74 age group. These deaths are dominated by the emergence of chronic diseases such as IHD, diabetes and smoking related cancers. In younger age groups, injury (including suicide) dominates avoidable mortality. Not surprisingly, these age groups have experienced less improvement in avoidable mortality rates over the past one to two decades than have the older age groups.

Males experience a greater burden of avoidable mortality than females – a relative excess of 54 percent (corresponding to approximately 2000 excess avoidable deaths) in 1996–97. The gender difference is largely attributable to diseases and injuries amenable to primary prevention, with the largest single contribution coming from IHD. The downward trend in avoidable mortality since 1981 has been steeper for males than females, narrowing the gender differential.

The ethnic gap in avoidable mortality remains wide: rates for Māori and Pacific people were 2–2.5 times higher than European/Other rates in 1996–97. In absolute terms, the greatest scope for narrowing the ethnic gap is in primary prevention – reducing disparities in socioeconomic status and in lifestyle (smoking, diet, physical activity).

Similar gradients are seen with socioeconomic status, using the NZDep96 index of deprivation. Eliminating the socioeconomic gradient in AM would postpone over 2000 deaths per year. The gradient is steepest for SAM and flattest for TAM, mirroring the ethnic differences. People with lower socioeconomic status, and Māori and Pacific people, appear less able to access preventive/primary health care services. Health education messages may be less relevant or culturally appropriate for these groups; alternatively, the resources needed to respond to these messages may be less readily available.

Morbidity

Unlike mortality, over the past decade the age standardised rate of hospitalisation has steadily increased, and this rising trend applies to both avoidable and unavoidable causes. But disaggregating avoidable hospitalisations into subcategories reveals a more complex pattern: injury hospitalisation rates have increased in line with unavoidable hospitalisations, preventable hospitalisation rates have declined by 40 percent, and ambulatory sensitive hospitalisations (the largest subgroup of AH) have increased by 25 percent (most of this increase involving the 45–74 age group and occurring since 1993).

The increase in ASH has multiple causes, including changes in incentive structures and practice patterns emanating from the health reforms of 1992–93, improvements in hospital technology, increases in the incidence and/or prevalence of some chronic diseases, and artefact arising from coding changes.

Whatever the contributions of each of these causes, the trends described in this chapter indicate that significant scope exists to reduce hospitalisation rates, mainly through (integrated) primary care. In 1996–97, almost 100,000 potentially avoidable hospitalisations occurred – about 30 percent of total inpatient admissions in the 0–74 age range (excluding psychiatric and maternity services, small rural hospitals and private hospitals). Almost two thirds of these were judged to be ambulatory sensitive.

These avoidable hospitalisations, unlike avoidable deaths, were relatively evenly spread throughout the age range. The proportion of hospitalisations characterised as avoidable varied from 20 percent among infants to 45 percent among older children. Infections dominated this category among infants, asthma ranked first among older children, and injury dominated among the 15–44 age range (mainly road traffic and sports injuries). From middle age, chronic diseases emerge as cumulative exposure to tobacco, poor diet and physical inactivity – often over decades – begins to take its toll. From 45–74 years at least one in three hospitalisations could be avoided through a combination of health promotion and clinical preventive services, including effective management of chronic diseases and their risk factors.

The ethnic and socioeconomic inequalities seen in avoidable mortality are also present in avoidable hospitalisation. Māori and Pacific people have age standardised AH rates approximately 60 percent higher than those of European/Other New Zealanders, corresponding to 6600 and 2800 excess hospitalisations among Māori and Pacific people respectively in 1997. The best opportunity for narrowing the ethnic gap is in the ASH subcategory, which has the highest ethnic excess (almost twofold) and accounts for the largest proportion of avoidable hospitalisations. This means improving the access of Māori and Pacific people to culturally appropriate and effective primary health care.

As with mortality, both avoidable and unavoidable hospitalisation rates are higher for people living in more deprived areas. The slope of the gradient is shallower for injury and other preventable hospitalisations than it is for unavoidable hospitalisations, but significantly steeper for ASH. As with SAM, this suggests that the health system, and in particular the primary care sector, could do more to mitigate the impact of social inequality on health outcomes.

This analysis of avoidable mortality and morbidity in New Zealand in the mid to late 1990s has revealed significant scope for the health sector to contribute to population health gain and, in particular, to improvement in equity of outcomes across ethnic and socioeconomic groups.

