Mortality rate ratio summary: 17 causes of death and total

Standardised mortality ratios for leading causes of death among males aged 20–59, covering five-year intervals between 1966 and 2000, are summarised in Table 2. Among these 17 causes of death, several trends are apparent.

Table 2: Standardised mortality ratios for causes of death among males aged 20–59 in manual and non-manual occupations, 1966–1970 to 1996–2000

ICD–9 cause of death	1966–70	1971–75	1976–80	1981–85	1986–90	1991–95	1996–00
151, Cancer of stomach	1.39*	1.34*	1.14	1.69*	1.26*	1.41*	1.35*
153–154, Cancer of colon & rectum	0.76*	0.81*	0.81*	0.87*	0.91	1.01	1.22*
157, Cancer of pancreas	1.33*	1.00	0.93	1.13	0.90	1.24*	1.34*
162, Cancer of trachea, bronchus & lung	1.30*	1.35*	1.25*	1.45*	1.54*	1.60*	1.86*
172, Malignant melanoma of skin	0.80*	0.64*	0.71*	0.83*	0.85	0.90	1.16
191–192, Cancer of brain & nervous system	0.86	0.87	0.87	0.89	0.93	1.00	1.09
204–208, Leukaemia	0.90	0.96	0.92	1.04	1.02	1.00	1.11
250, Diabetes	0.86	0.89	0.97	1.25*	1.20	1.36*	1.43*
304, Drug dependence	1.78	2.49*	2.05*	1.59*	2.27*	1.85*	2.10*
410–414, Ischaemic heart disease	0.94*	1.01	1.07*	1.21*	1.32*	1.40*	1.62*
430–438, Stroke	1.01	1.11*	1.26*	1.47*	1.60*	1.40*	1.56*
480–487, Pneumonia & influenza	2.00*	1.99*	1.92*	1.81*	1.89*	1.53*	1.78*
490–493, Bronchitis, emphysema & asthma	1.17	1.27*	1.33*	1.51*	1.31*	1.56*	1.51*
531–533, Ulcer of stomach & duodenum	1.67*	1.70*	1.89*	1.90*	1.99*	1.52	1.47
571, Cirrhosis of liver	1.08	1.27*	1.48*	1.71*	1.74*	1.55*	1.79*
E810–E819, Motor vehicle traffic accidents	1.62*	1.83*	1.84*	1.95*	1.80*	1.74*	1.75*
E950–E959, Suicide & self-inflicted injury	1.23*	1.24*	1.37*	1.61*	1.45*	1.55*	1.60*
All causes of death	**1.17***	**1.24***	**1.28***	**1.41***	**1.38***	**1.34***	**1.53***

* Rate ratio is significantly different from 1.00 (non-manual occupations) at the 5% level.

First, there is a group of diseases where mortality rates among males in manual occupations are significantly higher, and the ratio inequality has tended to increase. These diseases include lung cancer (steady increase in the ratio inequality since at least the early 1980s), cirrhosis of the liver, and suicide and self-inflicted injury. This is also the trend for all causes of death combined (Figure 3).

Second, in another group of diseases mortality rates among males working in manual occupations are consistently and significantly higher than among males in non-manual occupations—at least between 1966 and 2000—and the inequality as measured by mortality ratios has remained much the same. These diseases include stomach and pancreas cancers; drug dependence; pneumonia and influenza; bronchitis, emphysema and asthma; stomach ulcer; and motor vehicle traffic accidents.

Last, in a further group of diseases mortality was previously higher among males in non-manual occupations, but is now higher among males in manual occupations. These diseases include colorectal cancer, diabetes, ischaemic heart disease, and perhaps

Trends in male mortality by broad occupational group

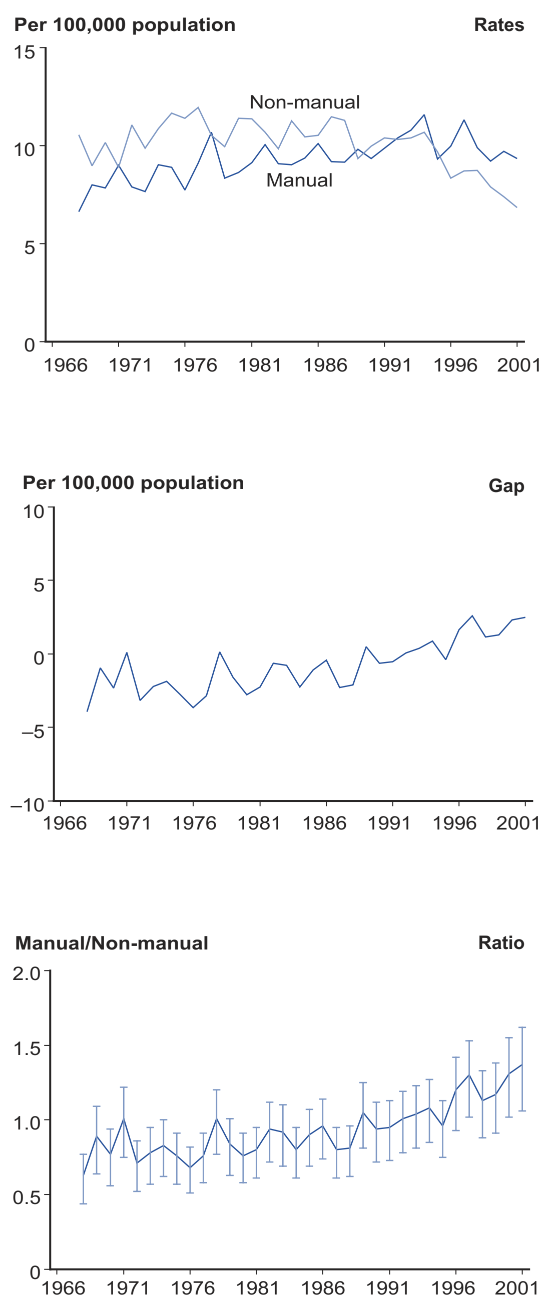
malignant melanoma, brain and central nervous system cancer, and stroke, although small numbers of deaths for some diseases often make it difficult to determine trends.

In considering these inequalities, it should be noted that for the great majority of causes of death, rates of mortality have declined over the period 1966–2001 for both these broad occupational groups. The exceptions are diabetes, where rates have increased since the early 1980s among males in both manual and non-manual occupations, and suicide (Figure 5), along with some cancers such as colorectal (Figure 8), melanoma, and brain and central nervous system, where rates have increased among males in manual occupations only.

For the years 1996–2000, there were no causes of death among those examined here where mortality rates were higher among males in non-manual occupations. This emphasises the point that although rates for workers in both manual and non-manual occupations have declined for almost all causes of death, the general position of manual workers in relation to non-manual workers has worsened.

Previous research had noted that mortality rates for diseases such as colorectal cancer, brain and central nervous system cancer, and melanoma were higher among males working in non-manual occupations (McMichael & Hartshorne 1982; McMichael 1985; Turrell & Mathers 2000a). Current data indicate that over time a transition has taken place, so that the limited health advantages once enjoyed by males in manual occupations have disappeared, resulting in these diseases also being added to their burden of inequality. Figure 8 gives an example of this 'crossover' effect and shows the trend in the mortality rate ratio for colorectal cancer. Note that this crossover occurred quite recently, being completed in the mid-1990s.

Figure 8: Colorectal cancer among males aged 20–59 in manual and non-manual occupations, age-standardised mortality rates, gap between rates and standardised mortality ratio



Discussion

Some limitations of this study have been summarised in Box 2, namely the inability to include women in the analysis, potential numerator–denominator mismatch arising from varying data collection methods, misassignment into the two broad occupational groups, and exclusion of those unemployed at the time of death. However, as explained, this analysis is conservative because the latter three of these limitations would tend to reduce the apparent differences between the two groups, not exaggerate them. Also, there is no reason to expect that these limitations would affect the analysis of trends.

In addition, it would probably have been possible to divide the occupations into a hierarchy of groups rather than just the two broad ones examined here, in order to examine if there is a graded relationship between occupational status and mortality levels. However, that relationship has been examined in numerous studies in Australia and overseas (Wilkinson & Marmot 2003; AIHW 2004a) and the distinctive focus of this analysis has been on longer term trends.

This study has shown that mortality inequalities have been a persistent feature of Australian society for at least the last few decades. This inequality has overwhelmingly been to the health disadvantage of a group that is disadvantaged in other ways as well, despite significant improvements in its mortality rates over the years. It may be a matter of philosophy whether the overall mortality inequality has remained steady or increased during the 35-year period (see Box 1). However, it is beyond dispute that, at the very least, inequality examined this way has shown no improvement over the period examined.

There has also been a clear trend from one perspective: initially in the period those in manual occupations were disadvantaged by having higher mortality rates for seven of the 17 major causes of death examined, but were advantaged by having lower rates for ischaemic heart disease and two of the cancers. By the second half of the 1990s, however, they had no advantages across these 17 causes and had higher mortality rates for 13 of them. Put another way, over the past few decades the general position of manual workers in relation to non-manual workers has worsened.

In general terms, these findings are consistent with the few other Australian studies that have examined inequalities in longer term mortality trends, though over shorter and less recent periods (Bennett 1996; Hayes et al. 2002). These inequalities among socioeconomic groups have also been observed not only in Australia but in most other developed countries (Turrell & Mathers 2000b).

It should be noted, however, that there are some favourable trends from other perspectives. For example, the proportion of employed Australian males in the 'manual' category has fallen from 64% to 51% over the years examined, which would tend to reduce the total number at a health disadvantage. And using a different approach, Draper et al. (2004) recently reported a narrowing of the gap in absolute total mortality rates between the most and least disadvantaged fifths (based on the area they lived in) of Australian males aged 25–64 between 1985–1987 and 1998–2000, and similarly with females.

However, the challenge remains how to explain these inequalities and what to do about them. In most cases the inequalities noted here are unlikely to be due to the functions

and features of the actual occupation or place of employment, although there may be elevated risks of illness or accident associated with some occupations such as mining, farming or labouring. In addition, Lawson and Black (1993) have argued that generally the health differences in Australia do not appear to be due to lack of resources available to lower socioeconomic groups. However, the common implication between this and many other studies is that health, in this case mortality, is strongly affected by people's social and economic circumstances (Harris et al. 1999). Turrell and Mathers (1999, 2000a) suggest a range of reasons in a recent conceptual framework that describes numerous multilevel and diverse socioeconomic determinants of health inequalities. Some of these determinants include education, employment, income, occupation and housing, as well as health behaviours such as diet and nutrition, smoking, physical activity and preventive health care use. The relative contributions and the interaction of each of these determinants have yet to be fully understood.

An implicit goal in most health inequality research is that these inequalities should be reduced or, more preferably, eliminated. Reduction of inequalities might take place by attempting to reduce mortality rates for the most disadvantaged group relative to those of the most advantaged group, if indeed the levels for the most advantaged group are seen as acceptable. (Of course, inequalities could also be eliminated by allowing mortality levels for the most advantaged group to increase to those of the most disadvantaged, but no one would argue that this is a desirable health outcome.) Attempting such reduction must be seen as a worthwhile endeavour, and will not be without cost.

Considering the duration of many of them, these inequalities may appear to be entrenched. But the demonstration of a previous social class crossover for some diseases, coupled with evidence that many of the determinants can be changed (Beaglehole & Magnus 2002), strongly suggests otherwise. However, an evidence base for when, how and to what degree change should be attempted has yet to be developed.

Recent Australian Government initiatives such as the Health Inequalities Research Collaboration have aimed to add to this evidence base, with a stated goal of enhancing Australia's knowledge on causes and effective responses to health inequalities, and then applying this evidence to reduce these inequalities (DoHA 2004). International initiatives in the United States of America, the United Kingdom and the Netherlands have also been launched in order to tackle their own health inequalities (Dixon et al. 2000; SEGV-II 2001).

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Abbreviations and definitions

ABS—Australian Bureau of Statistics.

Age standardisation—A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, then the disease rates that would have occurred with that structure are calculated and compared.

AIHW—Australian Institute of Health and Welfare.

ASCO—Australian Standard Classification of Occupations.

CCLO—Classification and Classified List of Occupations.

Confidence interval—A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has a 95% or higher chance of doing so.

DoHA—Australian Government Department of Health and Ageing.

HIRC—Health Inequalities Research Collaboration.

ICD—International Classification of Diseases.

IHD—Ischaemic heart disease.

OECD—Organisation for Economic Co-operation and Development.

QUT—Queensland University of Technology.

Standardised Mortality Ratio—Here, a measure of death from a condition for males working in manual occupations relative to males working in non-manual occupations. A ratio of 1.13 among manual workers would indicate a rate that is 13% higher than among non-manual workers.

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