Looking upstream:

A user's guide to disease prevention

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'Prevention is at least as important as treatment.' The logic of this claim is hard to fault: very few people enjoy being sick. On the whole we would prefer to avoid the patient experience altogether, however warm the doctor's hand, however kindly her manner. The same from a public policy point of view: fences at the tops of cliffs seem, intuitively, a better buy than ambulances at the bottom. Why then is there such asymmetry between the time and effort that goes into disease prevention and that devoted to medical treatments? Many of the public health big hitters (e.g. education, housing, transport) are provided for outside the health sector. Within the health budget, only a small fraction of total expenditure goes to public health. This is not all directed to prevention, and some of the clinical money goes to important preventive activities (immunisation for example). Nevertheless, the prevention:treatment split remains a long way from 50:50.

There are many reasons why prevention is the underdog in health care. One is time discounting – we find it difficult to take seriously problems that are over the horizon (look at where people build their houses in Wellington). Prevention is generally about the forgettable future, while treatment is about the urgent present. What is more, prevention does not have the grateful patient factor. Not only delayed, the benefits of prevention are also anonymous. If mortality rates are reduced by an intervention such as the Clean Air Act or raised taxes on tobacco, it is seldom possible to tell exactly whose lives were saved. Moreover, the treatable causes of ill-health (such as heart disease, meningitis, cancer) tend to be more visible, and better described, than preventable factors further up the causal chain. For all these reasons, we should welcome a recent report from the Ministry of Health, which provides the first comprehensive listing of causes of death by risk factor for New Zealand.

Looking Upstream,[1] estimates the numbers of deaths caused by a very long list of factors, from unsafe sex to inadequate fruit and vegetable consumption to environmental pollution. High-ranking causes of death include diet, linked with about 30% of deaths, smoking (18% of deaths – 40 times more than all deaths due to illicit drugs) and physical inactivity. A 'sleeper' in more ways than one, inactivity was connected with about 10% of deaths. Underlying social factors were also considered: it was estimated that if everyone enjoyed the living conditions of the top 20% of the New Zealand population, overall mortality would be reduced by one-fifth.

The report provides a useful guide to where the big problems lie. It also highlights a number of preventable causes of death that have tended to be overlooked in the past, or have been given little emphasis. For instance, approximately 970 deaths a year are thought to be due to air pollution, with 40% of these caused by vehicle emissions.

There are some important points to bear in mind when reading the report. First, anyone scanning the summary tables of results will notice that the proportions of deaths associated with avoidable risk factors add up to more than 100%. Why? Because in many instances the risk factors are not independent of one another. For example, 30% of deaths were attributed to the joint effects of dietary factors, and 17% to higher than optimal blood cholesterol levels. But the total effect of diet and cholesterol is not the sum of these two fractions, because high cholesterol levels are to some extent a consequence of diet. Moreover, in most instances, the way the attributable fractions are calculated assumes that none of the component causes are changed, apart from the variable of interest. This is an assumption of convenience, and an important one because risk factors not only vary over time, they also tend to interact with one another. High blood pressure is more dangerous, for example, if it is accompanied by heavy smoking. When we say that 13% of deaths are due to high systolic blood pressure, this means that if all systolic blood pressures were optimal, and there was no change in the prevalence of heavy smoking (or other related risk factors), then the death rate would fall by about 13%. But if at the same time everyone stopped smoking, then the impact of lowering blood pressures would not be 13% of deaths avoided, it would be less than 13%. How much less would depend on the strength of the interaction between high blood pressure and smoking. The take home message? Don't add attributable fractions.

This report is a very useful guide to planning disease prevention, but it is important to remember that the size of a problem is only one element of importance. Other features that are important are distribution (how

equally or unequally a problem is shared amongst the population) and tractability. To say that diet is the leading, preventable cause of death in New Zealand is not necessarily the same as saying that efforts to modify diet are the most cost-effective way of saving lives. It may be, but this conclusion cannot be drawn directly from league tables of the kind produced in *Looking Upstream*. The diet and health picture is a complex one, parts of it not so well delineated, and there are formidable obstacles to change. On the other hand, occupational injuries and diseases account for (only) 0.5% of deaths, according to the Ministry report, but given what we know about the immediate causes of these deaths, and the institutional and legal apparatus that exists to protect health of workers, this category should rank very highly in terms of preventability.

Looking Upstream counts deaths, but not years of life lost, or disability. Elsewhere the Ministry of Health has published estimates of the burden of disease, by disease, and by a limited number of risk factors, using the standard Disability Adjusted Life Year (DALY) framework.[2] What stands out in those reports is the importance of mental health and musculoskeletal disorders. Undoing the causes of depression and stiff joints, for example, would alter mortality rates only slightly, but would make a very large impression on the total amount of poor health in the country.

Looking Upstream refers to one year only – 1997. This provides a valuable snapshot but it is also useful to consider changes over time. Take blood pressure and body mass index for instance. These risk factors cause comparable numbers of deaths, but they are following quite different trajectories. The best evidence we have indicates that average blood pressures have been coming down over the last twenty years, but the prevalence of overweight and obesity is rising steeply – the number of obese adults in New Zealand almost doubled between 1988 and 2002.[3] When conditions are changing so rapidly, attributable and avoidable mortality tell different stories. The former refers to the current burden of mortality due to past exposures. But we cannot alter past conditions; avoidable mortality refers to those deaths that would be prevented in the future if present day exposures were changed. If a risk factor is becoming more common over time (like overweight), the potentially 'avoidable' burden of disease will be greater than the 'attributable' number of deaths.

Given all the difficulties and the uneven allocation of resources, are we making any headway with prevention? The answer must be yes, although the picture is a very mixed one. For instance, the most common cause of death in this country, heart disease, is much less common than before. We have seen almost a halving of mortality since the peak of the coronary epidemic in the 1960s.[4,5] But New Zealand remains a world leader in the cholesterol stakes – the proportion of deaths attributable to higher than optimal total blood cholesterol is greater than almost any other country.[1] Road traffic injuries have also reduced in number, and cause a small proportion of all deaths (2%). But road crash deaths still occur more commonly in New Zealand than elsewhere – between 1996 and 2000 we were the third highest in the OECD for children, for example.[6]

We know more perhaps about smoking than any other preventable cause of death. Total consumption of tobacco has fallen by more than half in twenty years, but prevalence of smoking in NZ has come down by much less. Tobacco use is now a rarity in some groups (about 5% of doctors in NZ smoke[7]), but smoking rates remain stubbornly high elsewhere. For instance, the proportion of Form 4 students who smoke daily increased during the 1990s. Since about 1997 the rate for boys has come down slightly, but there has been no marked change for girls. The pattern for Maori shows higher smoking rates in all age and gender groups, but also with some recent improvement for boys, not for girls.[8]

Globally, what declines there have been in smoking in countries such as ours have been more than balanced (in total numbers of smokers and smoking deaths) by trends in developing countries. Half the men in India smoke, two-thirds in Indonesia, and three-quarters in Vietnam. And China? A spokesman for Rothmans put it this way: *'thinking about smoking statistics in China is like trying to think about the limits of outer space.'*

In summary, New Zealand's health is improving. We are living longer, on average, and the latest data suggest that after a long period when Maori figures were not improving, this has changed, and the gap between Maori and non-Maori may be closing slightly. Although the data base is thin, it appears that levels of morbidity are also falling. This is all good news, but there remains room for improvement, and plenty of untaken opportunities for effective prevention of disease and injury.

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