BRIEFING STATEMENT

Interpreting health statistics

Introduction

The beneficial or adverse health consequences of particular foods, activities, environmental conditions or medical treatments are frequently the subject of public debate. Not surprisingly, many people are either confused or sceptical about the plethora of health statistics that often appear contradictory. Consequently, important information may not get the attention it deserves, while, in some cases, the potential consequences of misinformation are very serious.

The practical application of statistics is central to the work of the actuarial profession. One of the key aims of the Society of Actuaries in Ireland is to contribute to, or stimulate, debate on issues where the public interest is concerned. In producing this briefing statement, our purpose is:

- to explain why health statistics may be confusing or potentially misleading
- to suggest ways of presenting statistics which may help to achieve a better understanding, and
- to highlight the need for care in acting on health information that may potentially be misleading.

Why is there so much confusion?

Confusion about health information stems from two principal sources: the intrinsic complexity of human health, and the way in which health issues are presented, reported and discussed.

Health issues are fundamentally complicated because human biology is complex. The health effects of various medical treatments, foods, environmental conditions, etc. are often similarly complex and will vary from one person to another, depending on their circumstances and genetic make-up.

Something that has a positive health effect in one way may have a detrimental effect in another way. Many substances are harmful in excess, but it is often difficult to determine what constitutes excess. For example, high levels of alcohol intake are clearly damaging, while moderate levels may benefit health; however, the cross-over point is difficult to determine, and may be different for each individual.

It is generally difficult, and often impossible, to derive conclusive results in relation to issues of human health for a number of reasons:

- Scientists typically study cause and effect by experimentation, but it is difficult, and, except within tightly controlled boundaries, highly unethical, to experiment on people.
- The assessment of long term benefits or risks requires observation of large numbers of people over long periods of time.
- It is virtually impossible to control for all the other potential variables when one particular factor is being studied.
- Most studies can only identify an association, not cause and effect, between a particular factor and particular health benefits or risks.
- Risk factors are often correlated and it may not be possible to isolate the impact of one particular factor.

The way in which information is presented, reported and discussed, can also distort the picture. Health scares are more likely to receive attention than "good news" stories, but there is also a risk that positive health stories may be "oversold". While the results of a health study may be caveated in the original academic report, it is not uncommon for them to be presented in the media as definitive.

Moreover, when the same information is iteratively reported, it may create a misleading perception that there is cumulative evidence for a particular claim, rather than mere repetition of the same information.

How health statistics can mislead

There are a number of ways in which health statistics can be misleading:

- The importance of a percentage increase (or reduction) in the incidence of an illness depends on how common the illness is to begin with. A small change to the incidence of a very common illness is likely to be of much more significance than a big change to the incidence of a rare illness. For example, in Ireland, a 5% reduction in heart disease would have a significant impact on overall mortality, whereas a 50% increase in vCJD would have a negligible impact on overall mortality. Hence, it would generally be more useful to say that the incidence of a particular condition has increased from 1% to 2% than to say that the incidence has doubled.

- Where the number of people with a particular illness is quoted, this may create a perception that the risk of suffering this illness is greater than is actually the case. For example, as well as saying that 10,000 Irish people have a particular condition, it would be helpful to explain that this means that 0.25% of the population suffer from it, or that the odds of suffering from it are 400 to 1 (many people find odds easier to understand than percentages).

- The number of deaths from a particular disease may provide a misleading picture as to the overall impact of that disease. Everyone will die of something, and, particularly for the very old, multiple causes may be implicated, although death will be attributed to one particular cause. On the other hand, the impact of causes of death that primarily affect younger people may be understated by the number of deaths. It is therefore useful to make comparisons in terms of the number of "years of life lost", as well as the number of deaths. For example, in Ireland the total "years of life lost" due to accidents and suicides is greater than the years lost due to all cancer deaths.

- Results based on the outcomes for a small study group may not be a reliable indicator of the outcomes for the population as a whole. Large study groups are required in order to provide results that are statistically reliable. When the results of a study are quoted, the size of the study should also be indicated.

- In some cases, research may be undertaken, or information put into the public domain, by parties with vested interests or a particular agenda, which may not be immediately obvious to the public. The media should seek to identify cases where the information source may not be wholly impartial.

How inter-country comparisons can mislead

Comparison of health statistics between countries is fraught with difficulty. Health systems are structured differently from one country to another and there are significant cultural differences at play. What is done by a doctor in one country may be left to a nurse in another; in one country, a particular treatment may only be provided during a hospital stay, in another it may be provided on an out-patient basis.

In addition, it is virtually impossible to disentangle the impact of different health care systems on the one hand and different environmental and behavioural factors on the other hand. We simply do not know whether French people live longer than Irish people because their diet is better or because they spend more on health care. Therefore, life expectancy figures should not be taken as a measure of health system performance.

Cross-country rankings of health care systems, such as those produced by the World Health Organisation in 2000, are generally based on a number of performance indicators. However, the choice of, and the relative weightings attributed to, those factors will inevitably be somewhat subjective.

Demographic differences also need to be taken into account when making cross-country comparisons. For example, a country with a relatively young age profile, like Ireland, should not need to spend as much on health care as a country with a much higher proportion of older people, such as Italy. Comparisons of health care spending, numbers of hospital beds, numbers of doctors etc. should preferably be made after adjusting for each country's age profile.

One simple but effective method of adjusting for age profile is to calculate an age-adjusted index with a weighting of one for each person under age 65 and a higher weighting for each person over age 65, to reflect the much higher costs for older people. For example, a recent paper presented to the Society of Actuaries in Ireland *("Population Ageing in Ireland and its Impact on Pension and Healthcare Costs"*[1]) used a weighting of one for each person under age 65 and a weighting of 6.8 for each person aged 65 to calculate this kind of index. Using this method, out of the 15 (pre-May 2004) EU member states, Ireland had the lowest index figure, which means that Ireland should need to spend less on health care than other EU countries, all else being equal.

An evidence-based approach to health issues

As already noted, human health is an enormously complicated subject. There is a great deal of scope for scientific findings relating to health risks, benefits and treatments to be oversimplified or overstated – and sometimes sensationalised. On the other hand, claims that are not grounded in scientific evidence may be given equal or similar weight. People therefore need to take care as to how they act on information that may potentially be misleading.

Headlines, or simplistic statements, should not always be taken at face value – it is important to look for the detailed evidence in support of claims that particular treatments or lifestyle changes are either beneficial or harmful. It is also important to try to ensure that information is obtained from sources that are sound and free of bias.

To ensure that a particular course of action – or inaction - is suitable for a particular individual, a medical professional should be consulted.

And finally….our health now is better than ever before

The extent of public concern and debate about various health risks might suggest that our state of health has been deteriorating. However, continuing increases in life expectancy provide objective evidence that our overall state of health is better now than at any time in the past.

[1] http://www.actuaries.ie/Resources/events_papers/Events%202003/2003-10-08_Ageing%20Seminar/PopulationStudiesReport2..pdf