The axiom of Rose

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"It makes little sense to expect individuals to behave differently from their peers; it is more appropriate to seek a general change in behavioural norms and in the circumstances which facilitate their adoption." – Geoffrey Rose (1992)

Geoffrey Rose was not a Grand Master of the Priory of Scion, but rather a well-known British epidemiologist and author of *The Strategy of Preventive Medicine* (1). His book frames our understanding of the concept of risk. Clinicians constantly estimate risk when faced with an individual patient and act on that determination. When a statin is prescribed to an obese patient who smokes, he or she is being treated for risk, not actual disease. Strategies to mitigate risk are divided into two types – primary and secondary prevention – depending on the absence or presence of clinically evident disease, respectively. This is a simplistic framework that reduces the continuity of risk to a dichotomy. Risk factors such as hypertension and serum cholesterol are continuously distributed, with the incidence of disease following suit. Designations such as 'hyperlipidemic' and 'hypertensive', while logistically convenient, are artificial and ignore the influence of smaller degrees of cholesterol or blood pressure elevation.

Rose sought to change the paradigm of risk factor modification by treating the whole population rather than high-risk individuals exclusively. According to Rose (1), "a large number of people at small risk may give rise to more cases than a small number of people at high risk". As such, a small reduction in cholesterol in the overall population would yield fewer deaths from vascular disease than a large reduction of cholesterol in high-risk individuals. The high-risk approach will only flatten out the right-hand side of the bell curve of disease. Another example is the reduction of the average speed of all motorists to prevent accidents rather than just targeting those that speed excessively. The key assumption of this hypothesis is that risk is uniformly diffused throughout the population. The population-based approach also does away with screening because the patient is the entire population.

Recently, Manuel and colleagues (2) from the Institute for Clinical Evaluative Sciences in Toronto and the University of Toronto (Toronto, Ontario) tested this population-based strategy against a strategy of targeting patients with a high baseline risk and those with a single risk factor using data from the Canadian Heart Health Survey. Over 10 years, the population-based approach avoided 42 deaths per 100,000 population, whereas the high baseline risk approach prevented 290 deaths

and the single risk factor approach prevented 125 deaths. Rather than disproving Rose, the authors argued that risk is not uniformly diffused throughout the Canadian population (2). In fact, the risk of death due to coronary artery disease over 10 years was less than 0.1% for over one-half of the population. Indeed, the finding of heterogeneous risk distribution would seem to argue against population-based strategies of prevention, such as the 'polypill', which is purported to reduce the incidence of coronary artery disease by 80% if all patients over the age of 55 take this combination of six low-dose medications (3).

Clearly, a population-based strategy is not without ethical concerns, as outlined by Charlton (4). The strategy assumes that the entire population requires treatment because it is 'sick', which would then expose individuals to involuntary treatment. Herein lies a fundamental difference between disease treatment and prevention. It is generally accepted that a treatment should be expected to do more good than harm and that it should be administered only after a patient autonomously enters into a relationship with the physician. Prevention cannot be regarded in the same light because the intervention, ostensibly for the purposes of a healthier population, is an intrusion on a nonconsenting individual, which is a violation of the ethical principle of freedom.

There have been a number of successes with the population-based approach to disease prevention, although some of these practices still have detractors. These successes include fluoridation of drinking water for the prevention of dental caries, iodization of salt for the prevention of thyroid disease, and folate fortification of cereal for the prevention of neural tube defects. The reduction of global risk was the subject of the 2002 World Health Report. The report is an excellent discussion of precisely what risk is, how it should be balanced against protective factors and, ultimately, how it should be modified. The concept of risk must be well understood by both physicians, who treat the population one patient at a time, and health policy-makers.

REFERENCES

1. Rose G. *The Strategy of Preventive Medicine*. Oxford: Oxford University Press, 1992.
2. Manuel DG, Lim J, Tanuseputro P, et al. Revisiting Rose: Strategies for reducing coronary heart disease. *BMJ* 2006;332:659-62.
3. Wald NJ, Law MR. A strategy to reduce cardiovascular disease by more than 80%. *BMJ* 2003;326:1419.
4. Charlton BG. A critique of Geoffrey Rose's 'population strategy' for preventive medicine. *J R Soc Med* 1995;88:607-10.

Selected sites

1. World Health Organization. The World Health Report 2002 – Reducing Risks, Promoting Healthy Life
<www.who.int/whr/2002/en>

2. World Health Organization. The World Health Report 2002 – Reducing Risks, Promoting Healthy Life: Chapter 2
<www.who.int/whr/2002/chapter2/en/index4.html>

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