Fractures cause an enormous burden on the individual and on society worldwide. In the Round Table discussion that begins on page 416 of this issue, the impact on the individual is described by Delmas and Fraser in terms of mortality and morbidity, and the effect on quality of life is clearly described through personal experience in a discussion article by Anna Peckham. The economic costs to health care and society are considerable.

The lifetime risk of fracture in women in developed countries may be as high as 40% which includes mostly low trauma fractures sustained by the elderly due to underlying osteoporosis. Fracture epidemiology is different in developing countries with road traffic accidents accounting for an increasingly higher number of fractures in younger people; the burden of osteoporosis-associated fractures in the elderly is largely ignored.

The burden of osteoporosis is increasing in all societies, as reviewed by Delmas and Fraser and emphasized in several of the Round Table commentaries from different parts of the globe. Important reasons are the increase in the global population and prolonged life expectancy with a disproportionate increase in the number of very elderly. Along with development, there are social and lifestyle changes that increase the risk of non-communicable disorders. People are becoming more sedentary, have diets of poor quality, and are increasingly exposed to toxic substances such as tobacco, excess alcohol and pollutants, and there is a resultant increase in obesity, cardiovascular disease, diabetes and road traffic accidents with premature death. Despite the increase in the more elderly population, the greatest current growth in the population of developing countries is at a younger age, and it is this age group who are the victims of many of these conditions, as described in Tunisia by Ben Khalifa. Competing priorities therefore exist in the prevention of noncommunicable disorders, but the effect of these demographic trends on the burden of osteoporosis must not be ignored. Strategies should be developed that reduce the burden of all these “development-associated” conditions together.

Osteoporosis will only be able to claim priority over other conditions when data on the burden to the individual and to society in all countries are available. This information is lacking in most countries, in particular, as highlighted by Wark, in those where the most increase is expected. Data from developed countries show interesting differences, such as within Europe and in Japan, which emphasizes the inability to make assumptions between populations. Several authors in the Round Table stress the need for reliable local data of incidence and prevalence of fractures and impact on health. In addition, health and economic indicators are necessary to monitor the implementation of strategies to reduce the burden. Such indicators can also be used to highlight the disproportion between what is invested in preventing osteoporotic fractures and the resources used to treat them. Data alone do not always result in changed priorities and there is a need for active pressure by patient and professional organizations. The increased awareness of and priority given to osteoporosis is a result of this although there is still clearly a long way to go.

What strategies should be applied to prevent osteoporosis and fracture? Gundert-Remy argues for data on cost-effectiveness for any intervention before considering its introduction. These data are difficult to provide for a chronic condition where the human and economic costs are poorly documented and where the socioeconomic impact may be totally different in different countries. The methods used to assess the economics of preventing a chronic disease such as osteoporosis, where there is often a long delay before benefit, have to be carefully considered if we are to avoid only treating the disease once it is established.

The need for strategies to prevent osteoporotic fracture is emphasized, but who is to be targeted? As the young of today throughout the world are now increasingly likely to survive into old age and be increasingly exposed to risk factors, it is arguable that all ages should be targeted to ensure maximal bone strength by the time of most risk, that is in old age. This starts in childhood and the USA National Bone Health Campaign is attempting to improve lifestyle to reduce future risk of osteoporosis.

On page 431, Kanis highlights the lack of data required to demonstrate whether this is possible. The delay in benefit makes it likely that we will never get this confirmatory data. It is clear that various lifestyle factors do increase the risk of osteoporosis and data suggest that reversing these lifestyle trends, for instance by increasing dietary calcium and physical activity and stopping smoking, is of benefit. They have the attraction of being simple, inexpensive and beneficial to health in general, but more data are needed to demonstrate that these measures actually prevent fractures before they can be recommended as part of public health policy.

Improving lifestyles may be more effective. Unhealthy lifestyles are associated with a spectrum of disorders in addition to osteoporosis and in developing countries, where osteoporosis is considered of less priority, a broad public health message that will have benefits beyond bone health may achieve greater priority and success. The difficulty is whether public health messages can overcome the pressures of social change in developing countries with diets of poor quality, less exercise and commercial pressures promoting foods of poor quality, smoking, alcohol and the use of motor vehicles. Research is needed on how best to avoid or reverse harmful changes in lifestyle in these countries.

The targeting of risk factors for osteoporosis and fracture requires knowledge of the risk factors in different societies. For example, as mentioned by Nakamura and Fujiwara, the risk of hip fracture in Japan is increased with coffee drinking and sleeping in a bed rather than on a mat. We also need to know more of the present and future prevalence of the risk factors in different societies as this will influence the public health message.

The benefit for individual recipients of an intervention is greatest for those who are at high risk or who have the condition. Delmas and Fraser recommend the early identification of those at risk of fracture by bone density assessment. However, the appropriateness, practicality and cost-effectiveness of this as a strategy are disputed by various participants of the Round Table. The success of such a strategy depends on increasing the sensitivity of measurements and ensuring that any assessment influences patient management. Delmas and Fraser

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1 Chairman, UK National Osteoporosis Society and Member of Steering Committee, Bone and Joint Decade 2000–2010, Duke of Cornwall Rheumatology Unit, Royal Cornwall Hospital, Truro TR1 3LJ, England.
suggest using bone density assessments for post-menopausal women who are not taking hormone replacement therapy as other risk factors are not yet accurate or sensitive predictors of fracture. However, this could not be afforded in many countries and may not be reimbursed in others. A hierarchy of risk is needed against which cost-effectiveness of any intervention and priority to prevent fracture can be judged. There is evidence from a study of osteoporotic fractures performed in the United States suggesting additive effects of risk factors in addition to bone density that might allow one to identify a higher risk group. Case-finding strategies and new tests such as peripheral measurements by dual energy X-ray absorptiometry or quantitative ultrasound, and biochemical markers of bone turnover, need to be evaluated for sensitivity, specificity and cost-effectiveness to identify those at future risk of fracture.

This debate must not prevent those who already have osteoporosis receiving effective treatment. A low trauma fracture is a hallmark of the condition and high-dose corticosteroid treatment is associated with a high risk of osteoporosis and justifies intervention. We have effective interventions that have been shown in randomised controlled trials to prevent fracture of the vertebrae and hip, principally in those at risk with low bone mass or previous fracture. The cost-benefit ratio must be debated by society and different conclusions may be reached as to how much one is prepared to spend to prevent a fracture in different countries with competing priorities.

We are entering the Bone and Joint Decade, the aim of which is to improve the health-related quality of life of those with musculoskeletal disorders. The effective prevention of osteoporosis is a necessity, not a luxury, yet there is a danger that nothing will happen and the burden will continue to rise whilst there is uncertainty about how to prevent osteoporosis, how to identify who to treat, and what treatments are cost effective. Although there is a need for more data and research, much is already known, as reviewed in the recent European Community report (1), and there are important public health messages that should now be promulgated that will also benefit other aspects of health. Education is needed of the public and of all health professionals on what can be done and how. Case-finding strategies need to be developed to ensure we are able to target the high-risk individuals. These strategies need, as emphasized by Sisson de Castro, to be put into clear guidelines. The effectiveness of such strategies, like those being used in Hungary, needs to be evaluated in routine clinical settings and this requires better data collection on fractures and assessment of their impact on quality of life. In this way, effective strategies can then be developed that are appropriate to each country, disseminated, implemented and evaluated for preventing fracture and reducing the enormous and increasing burden of disease due to osteoporosis.
