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The application of health technology assessment in osteoporosis

John A. Kanis, MD, Professor Emeritus [a,*], Mickaël Hiligsmann, PhD, Assistant Professor [b,1]

[a] Centre for Metabolic Bone Diseases, University of Sheffield Medical School, Beech Hill Road, Sheffield S10 2RX, UK
[b] Department of Health Services Research, School for Public Health and Primary Care (CAPHRI), Maastricht University, P.O. Box 616, 6200MD Maastricht, The Netherlands

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Because of the high costs to patients, health care payers and to society, it is important to allocate healthcare resources appropriately and efficiently. Health technology assessment aims to evaluate the clinical, economic, social, and ethical implications of a disease, and its prevention and treatment to guide national healthcare policies (e.g. clinical and research investment, reimbursement decisions). In this chapter, we review the various aspects of health technology assessment in osteoporosis, including epidemiology and burden of disease, and assessment of the cost-effectiveness of the treatment of osteoporosis and the prevention of fracture. Health technology assessment indicates an immense burden of osteoporotic fractures for patients and society that is set to increase as the number of elderly people increases. Prevention and treatment of osteoporosis have been shown to be a cost-effective way of allocating scarce healthcare resources.

Introduction

Osteoporosis is a major cause of fracture worldwide, most notably of the hip, spine, and forearm. Because of the high costs to patients, health care payers and to society, it is becoming increasingly important to allocate healthcare resources appropriately and efficiently. Health technology assessment

* Corresponding author. Tel.: +44 114 285 1109; Fax: +44 114 285 1813.
E-mail addresses: w.j.Pontefract@shef.ac.uk (J.A. Kanis), m.hiligsmann@maastrichtuniversity.nl (M. Hiligsmann).
[1] Tel.: +31 43 38 82 219; Fax: +31 43 38 84 162.

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(HTA) aims to evaluate the clinical, economic, social, and ethical implications of a disease and its prevention and treatment to guide national healthcare policies (e.g. clinical and research investment, reimbursement decisions) [1]. The principal aim of HTA is to form a bridge between scientific experts in clinical practice and decision-makers in healthcare, in order to make the most appropriate use of available resources. The ultimate target is the optimization of public health initiatives.

Scope of health technology assessment

According to the International Network of Agencies for Health Technology Assessment [2], HTA is the systematic evaluation of "the medical, social, ethical and economic implications of development, diffusion, and use of health technology". Its purpose is to support healthcare decisions and inform policy-making through objective information at the local, national, or international levels. The aim of HTA is to improve the quality of care by promoting an appropriate and rational use of healthcare technologies [3] and by facilitating the introduction and dissemination of new technologies.

HTA covers not only drugs, medical equipment, and devices, but also prevention, diagnostic, and treatment procedures. HTA is conducted by interdisciplinary groups that use explicit analytical frameworks [2]. The field of research was developed in the 1970 and 1980s in the USA and Europe, and has spread to the rest of the world over the last two decades [4]. HTA government agencies are now available in many countries. They have been established to provide advice to governments and to address the containment of healthcare costs and the assessment of the impact of new technologies [5]. The organization of HTA and its influence on the public policy-making process can vary markedly between countries [6]. In addition, many research institutions are concerned with HTA [7], for example, the National Health Service Centre for Reviews and Dissemination in the UK. In March 2014, the International Network of Agencies for HTA comprised 57 members from 32 countries.

HTA is increasingly used by regulatory agencies to authorize a drug, device or technology for market or for reimbursement. HTA can also be used to support decision-making by clinicians and patients. It may also be used by other bodies, for example, by associations of health professionals, hospitals for the acquisition of new technologies, and by companies to aid product development and marketing decisions [2]. The application of HTA in osteoporosis is covered below, except where covered elsewhere in this volume (i.e. the efficacy of interventions).

Burden of osteoporosis

The burden of osteoporosis in terms of epidemiology can be quantified in several ways. Examples include the prevalence of osteoporosis as defined by bone mineral density (BMD), the incidence of fracture, lifetime or 10 year probability of fracture, prevalence of prior fracture, cost of fractures and quality adjusted life years (QALYs) lost.

The burden of osteoporosis in the European Union (EU) has been extensively reviewed recently [8–10] and is summarised in Table 1. Using the World Health Organization (WHO) criteria for the diagnosis of osteoporosis, 22 million women and 5.5 million men aged 50 years or more were estimated to have a BMD T-score of less than −2.5 SD at the femoral neck (Table 1). The prevalence of osteoporosis was 6.6% in men over the age of 50 years and 22.1% in women over the age of 50 years, giving a prevalence of 5.5% in the general population.

Several risk indicators for fracture have been studied at a pan-European level. A prior fracture is a well recognised risk factor for a further fracture, and the number of men and women in the EU with a prior fragility fracture has been estimated at 22.5 million [8]. The number of individuals at high risk can also be assessed from FRAX, a country-specific tool to assess the 10-year probability of a major osteoporotic fracture (http://www.shef.ac.uk/FRAX/) [11]. High risk individuals have been characterised as those with a fracture probability equal to or greater than in a woman with a prior fragility fracture. This level of risk is adopted in several countries as an intervention threshold (e.g. [12]) and in European guidelines [13,14]. In 2010, there were 2.85 million men and 18.44 million women whose fracture probability lay at or above this threshold risk [8].

The number of new fractures in 2010 in the EU was estimated at 3.5 million, comprising approximately 620,000 hip fractures, 520,000 vertebral fractures, 560,000 forearm fractures and 1,800,000