Best Practice & Research Clinical Rheumatology 30 (2016) 536–558

Contents lists available at ScienceDirect

Best Practice & Research Clinical Rheumatology

journal homepage: www.elsevierhealth.com/berh

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Implementation of Models of Care for secondary osteoporotic fracture prevention and orthogeriatric Models of Care for osteoporotic hip fracture

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Keywords:
Fracture liaison service
Care gap
Secondary fracture prevention
Cost-effectiveness
Orthogeriatric
Hip Fracture Registry
Clinical Standards
Quality Standards
Consensus guidelines
Hip fracture
Fragility fracture

A B S T R A C T

As the world's population ages, the prevalence of osteoporosis and its resultant fragility fractures is set to increase dramatically. This chapter focuses on current frameworks and major initiatives related to the implementation of fracture liaison services (FLS) and orthogeriatrics services (OGS), Models of Care designed to reliably implement secondary fracture prevention measures for individuals presenting to health services with fragility fractures. The current evidence base regarding the impact and effectiveness of FLS and OGS is also considered.

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http://dx.doi.org/10.1016/j.berh.2016.09.008
1521-6942/

Burden of disease for osteoporosis and fractures

As the world's population ages, the prevalence of osteoporosis and its associated fragility fractures is set to increase dramatically. The epidemiology of fragility fracture has been reviewed extensively elsewhere. The International Osteoporosis Foundation (IOF) has conducted a series of regional audits that have summarised the burden of disease for all regions other than North America, and other studies provide data for Canada and the United States. Key findings from the IOF audits and some more recent studies include the following:

- Asia Pacific [1]: In 1995, 5.3% of the population living in Asia was aged 65 years and over, which is projected to increase to 9.3% by 2025. Almost 700,000 hip fractures occur annually in China alone. In India, 36 million people already have osteoporosis.
- Eastern Europe and Central Asia [2]: In the Russian Federation, only 13% of patients with hip fracture undergo surgical repair. Consequently, post-hip fracture mortality during the first year after fracture reaches approximately 50% in many Russian cities. In 2012, work undertaken to inform the development of a FRAX® model for the Russian Federation provided estimates of fracture incidence for Russia [3]. The total number of hip fractures estimated to have occurred in 2010 (112,000) was expected to increase to 159,000 in 2035. The estimated number of major fractures was expected to increase from 590,000 to 730,000 over the same time interval.
- European Union [4]: The number of new fractures during 2010 in the EU was 3.5 million, comprising approximately 610,000 hip fractures, 520,000 vertebral fractures, 560,000 forearm fractures and 1.8 million other fractures.
- Latin America [5]: In 2012, the proportion of the nations' populations aged 50 years and more was between 13% and 29%. By 2050, these figures were estimated to increase to between 28% and 49%. In 2015, Zerbini et al. estimated the annual incidence of hip fracture in Brazil to be 80,640 cases among individuals aged 40 years and over. This is expected to increase to almost 193,000 cases annually by 2040 [6].
- Middle East and Africa [7]: By 2050, the proportion of the population of this region aged over 50 years is expected to increase by 25%–40%. In 2010, 24,000 cases of hip fracture occurred among Turks aged over 50 years, which is expected to increase by 50% by the end of the current decade.
- North America [8,9]: In 2007, Burge et al. modelled the incidence and economic burden of osteoporosis-related fractures in the United States for the period 2005–2025 [8]. More than 2 million incident fractures at all skeletal sites were estimated to have occurred in 2005, which was projected to increase to more than 3 million by 2025. In 2012, Tarride et al. estimated that more than 57,000 Canadians were hospitalised for fractures caused by osteoporosis [9].

In 2013, an IOF report issued for World Osteoporosis Day summarised the current and future threat posed by osteoporosis [10]:

> '*Over the next 20 years, 450 million people will celebrate their 65th birthday. On account of this, absolute hip fracture incidence will remain high and costly in the West and presents a major threat to financing of health systems in the East*.'

The Global Burden of Disease Study 2010 analysed bone mineral density (BMD) as a risk factor for fractures, which formed part of the health burden because of falls [11]. Global deaths and disability-adjusted life years (DALYs) attributable to low BMD increased from 103,000 to 3,125,000 in 1990 to 188,000 and 5,216,000 in 2010, respectively. Around one-third of falls-related deaths were attributable to low BMD.

Prevention of the first fragility fracture is described as primary fracture prevention, whereas prevention of second and subsequent fragility fractures is described as secondary fracture prevention. Most osteoporosis clinical guidelines address both primary and secondary fracture preventions. However, the National Institute for Health and Care Excellence (NICE) in the UK published separate guidelines [12,13].