Fragility Fracture Network Website
Fracture Care Resources Section
A fully referenced PDF version of the web content
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Fragility fracture overview
http://fragilityfracture.org/cug/overview/

- 9 million new fragility fractures occurred worldwide in year 2000, including 1.6 million hip fractures\(^1\)
- Fragility fractures are usually the result of fall by an individual who has osteoporosis - the most common chronic bone disease - which affects over 200 million people globally\(^2\)
- As almost half a billion people turn 65 years of age during the next 20 years\(^3\), the incidence of fragility fractures is set to increase dramatically, particularly in Asia\(^4\) and Latin America\(^5\)

The population of the world is ageing, and it is ageing fast\(^6\). As a direct result the prevalence of chronic disease will increase significantly in the coming decades. And osteoporosis – or, more precisely, the fragility fractures it causes in combination with the propensity to fall – will be a leading cause of the surge in demand for acute care of older people.

The links below summarise current knowledge of the global epidemiology of fragility fractures and the burden that they impose upon people who suffer them and healthcare budgets. Please note that a fully referenced PDF version of the content of the FFN Fracture Care Resources Centre is available for download from here and throughout the site.

1. Epidemiology
2. Impact on sufferers
3. Impact on healthcare budgets

Epidemiology
http://fragilityfracture.org/cug/overview/epidemiology/

The findings of the most recent epidemiological studies on fragility fractures are summarised below. Hip fractures are, arguably, the most catastrophic fragility fracture for sufferers and their families, and the most costly to healthcare systems. However, they only represent around 20% of the total incidence of all fragility fractures\(^1\). Sixty percent of the global burden attributable to osteoporosis relates to fractures at sites other than the hip. As such, all fragility fractures should be considered clinically important and financially significant.

- Hip fractures
- Non-hip non-vertebral fractures
- Vertebral fractures

Hip fractures
http://fragilityfracture.org/cug/overview/epidemiology/hip-fractures/

In year 2000, 1.6 million hip fractures occurred worldwide\(^1\).
More recent data on hip fracture incidence is available from a growing number of countries throughout the world:

- **Europe:** A comprehensive report on the epidemiology, burden and treatment of osteoporosis in the EU27 countries was published in 2013\(^7\). This report estimated that 610,000 hip fractures occurred in the EU27 in 2010. A compendium of country-specific reports provided estimates for the individual countries\(^4\). See:
  
  

- **Asia-Pacific:** Epidemiological data on hip fractures in this region is sparse. However, annual incidence data from the more populous countries gives an indication of the enormous burden of disease:
  
  - China: Almost 700,000 hip fractures occurred in 2008\(^9\)
  - India: More than 440,000 hip fractures were estimated to have occurred in 2008\(^10\)
  - Japan: More than 148,000 hip fractures were estimated to have occurred in 2007\(^11\)

  In 2013, the International Osteoporosis Foundation (IOF) published a second regional audit for Asia, which included Australia and New Zealand\(^4\). This audit summarised all available information on the epidemiology of fragility fractures in this region:


- **Middle-East:** Epidemiological data on hip fractures in this region is sparse. However, annual incidence data from the more populous countries gives an indication of the burden of disease:
  
  - Iran: 50,000 hip fractures occurred in 2010\(^12\)
  - Saudi Arabia: More than 8,700 hip fractures occurred in 2004\(^13\)
  - Turkey: Approximately 24,000 hip fractures occurred in 2009\(^14\)

In 2011, the International Osteoporosis Foundation (IOF) published a regional audit for the Middle East and Africa\(^15\). This audit summarised all available information on the epidemiology of fragility fractures in this region:


- **Africa:** Epidemiological data on hip fractures in this region is sparse. Hip fracture rates for countries that have data available are amongst the lowest in the world\(^16\). Estimates of annual incidence are available for Morocco and Tunisia:
  
  - Morocco: More than 4,300 hip fractures were estimated to have occurred in 2010\(^17\)
  - Tunisia: More than 3,100 hip fractures occurred in 2001\(^18\)
In 2011, the International Osteoporosis Foundation (IOF) published a regional audit for the Middle East and Africa\textsuperscript{15}. This audit summarised all available information on the epidemiology of fragility fractures in Kenya, Morocco, South Africa and Tunisia:


- **North America**: The epidemiology of hip fracture has been evaluated in Canada and the United States:
  - **Canada**: Almost 29,000 hip fractures occurred in 2007-8\textsuperscript{19}
  - **United States**: Almost 300,000 hip fractures occurred in 2005\textsuperscript{20}

  See:

- **Latin America**: Epidemiological data on hip fractures in this region is sparse. However, annual incidence data from the more populous countries gives an indication of the burden of disease:
  - **Argentina**: More than 34,000 hip fractures were estimated to have occurred in 2010\textsuperscript{21}
  - **Brazil**: 121,000 hip fractures were estimated to have occurred in 2012\textsuperscript{5}
  - **Mexico**: Almost 16,000 hip fractures were estimated to have occurred in 2010\textsuperscript{22}

In 2012, the International Osteoporosis Foundation (IOF) published a regional audit for Latin America\textsuperscript{5}. This audit summarised all available information on the epidemiology of fragility fractures in this region:


**Non-hip non-vertebral fractures**


In year 2000, 5.9 million non-hip non-vertebral fractures occurred worldwide\textsuperscript{1}.

More recent data on non-hip non-vertebral fracture incidence is available from a number of countries throughout the world. As compared to hip and vertebral fractures, there is a comparative paucity of data on these types of fracture:

- **Europe**: A comprehensive report on the epidemiology, burden and treatment of osteoporosis in the EU27 countries was published in 2013\textsuperscript{7}. This report estimated that 2.36 million non-hip non-vertebral fractures occurred in the EU27 in 2010, including 560,000
forearm fractures. A compendium of country-specific reports provided estimates for the individual countries. See:


- **Asia-Pacific**: Epidemiological data on non-hip non-vertebral fractures in this region is sparse. A study which evaluated a nationwide sample of women and men aged 50 years and over from five major cities in China reported the prevalence of fracture to be 26.6%. Whilst this sample includes patients with hip and vertebral fractures, this does give an indication of the prevalence of non-vertebral non-hip fractures in China. Osteoporosis Australia’s new burden of disease analysis reported that more than 92,000 non-hip non-vertebral fractures occurred in Australia in 2012.

- **Middle-East**: Epidemiological data on non-hip non-vertebral fractures in this region is very limited.

- **Africa**: Epidemiological data on non-hip non-vertebral fractures in this region is very limited.

- **North America**: The epidemiology of non-hip non-vertebral fracture has been evaluated in Canada and the United States:
  - **Canada**: More than 20,000 non-hip non-vertebral fractures resulting in hospitalisation occurred in 2007-8.
  - **United States**: More than 1.2 million non-hip non-vertebral fractures occurred in 2005.

See:


- **Latin America**: Epidemiological data on non-hip non-vertebral fractures in this region is sparse. The Brazilian Osteoporosis Study (BRAZOS) identified the prevalence of fragility fractures at all skeletal sites in a representative sample of Brazilian women and men aged 40 years and older. Fragility fractures were present in 15.1% of women and 12.8% of men, with notable variation in prevalence between geographic regions of Brazil. The fractures reported were mainly at sites other than hip and spine, which accounted for just 12% and 4% of fractures, respectively. In Mexico, more than 34,000 forearm fractures and 11,000 humerus fractures occurred in 2010.

**Vertebral fractures**

http://fragilityfracture.org/cug/overview/epidemiology/vertebral-fractures/

In 2000, 1.4 million clinical vertebral fractures occurred worldwide.
It should be noted that these clinically apparent vertebral fractures represent only one third of all vertebral fractures and that the majority of vertebral fractures go undiagnosed. More recent epidemiological data on vertebral fracture incidence and prevalence is available from a number of countries throughout the world:

- **Europe**: A comprehensive report on the epidemiology, burden and treatment of osteoporosis in the EU27 countries was published in 2013. This report estimated that 520,000 clinical vertebral fractures occurred in the EU27 in 2010. A compendium of country-specific reports provided estimates for the individual countries. See:


- **Asia-Pacific**: Epidemiological data on vertebral fractures in this region is limited. Estimates suggest that 1.8 million vertebral fractures caused by osteoporosis occurred in Mainland China in 2006. Osteoporosis Australia’s new burden of disease analysis reported that more than 25,500 vertebral fractures occurred in Australia in 2012. In 2013, the International Osteoporosis Foundation (IOF) published a second regional audit for Asia, which included Australia and New Zealand. This audit summarised all available information on the epidemiology of fragility fractures in this region:


- **Middle-East**: Epidemiological data on vertebral fractures in this region is very limited. In 2011, the International Osteoporosis Foundation (IOF) published a regional audit for the Middle East and Africa. This audit summarised all available information on the epidemiology of fragility fractures in this region:


- **Africa**: Epidemiological data on vertebral fractures in this region is very limited. In 2011, the International Osteoporosis Foundation (IOF) published a regional audit for the Middle East and Africa. This audit summarised all available information on the epidemiology of fragility fractures in Kenya, Morocco, South Africa and Tunisia:


- **North America**: The epidemiology of vertebral fracture has been evaluated in Canada and the United States:
Canada: Almost 2,300 vertebral fractures resulting in hospitalisation occurred in 2007-8.\textsuperscript{19}

United States: More than 547,000 million vertebral fractures occurred in 2005.\textsuperscript{20}

See:


Latin America: The Latin American Vertebral Osteoporosis Study (LAVOS) reported on the prevalence of radiographic vertebral fractures in women aged 50 years and older in Argentina, Brazil, Colombia, Mexico, and Puerto Rico.\textsuperscript{29} Overall, the prevalence of radiographic vertebral fracture was 11.2%, ranging from 12% in Puerto Rico to more than 19% in Mexico. More recent data from Mexico suggests that more than 14,700 clinical vertebral fractures occurred in women and men aged over 40 years in 2010.\textsuperscript{22}

Impact on sufferers

Impact on sufferers

http://fragilityfracture.org/cug/overview/impact-on-sufferers/

Fragility fractures are very common; up to one half of older women and one fifth of older men will suffer one during their lifetimes.\textsuperscript{30-32} And when individuals have suffered one fragility fracture, their risk of suffering second and subsequent fractures is doubled compared to those who are fracture free.\textsuperscript{33, 34} Countless millions of older people throughout the world are caught in a vicious ‘fragility fracture cycle’ which results in disability, institutionalisation and premature death for many.

- Disability
- Institutionalisation
- Mortality

Disability

Disability

http://fragilityfracture.org/cug/overview/impact-on-sufferers/disability/

Hip fractures are, arguably, the most catastrophic fragility fracture for sufferers and their families:

- Less than half of individuals who survive a hip fracture will walk without aids again.\textsuperscript{35, 36}
- 60% of hip fracture sufferers require assistance with activities of daily living one year after the hip fracture occurred.\textsuperscript{35}
- 60% of hip fracture sufferers report pain in the fractured hip and more than 30% report that the pain disrupts their sleep.\textsuperscript{35}

Vertebral fractures exert a significant burden on sufferers, including:

- Back pain, height loss and deformity.\textsuperscript{37, 38}
- Reduced quality of life and depression.\textsuperscript{39-41}
• Deterioration of activities of daily living\(^{42}\)

The Global Longitudinal Study of Osteoporosis in Women (GLOW) has also reported that non-hip non-vertebral fractures have a detrimental effect on quality of life\(^{43}\).

**Institutionalisation**

http://fragilityfracture.org/cug/overview/impact-on-sufferers/institutionalisation/

Hip fracture is a leading cause of institutionalisation of older people:

• Among women suffering a hip fracture in Belgium, 19% were newly admitted to nursing homes during the year following hospitalisation compared to just 4% of age and residence matched controls\(^{44}\).

• Investigators from Norway reported that the proportion of individuals living in nursing homes increased from 15% to 30% after sustaining a hip fracture\(^{35}\).

• A study from the United States reported the proportion of men and women living in an institution before their hip fracture to be 6.8% and 13%, respectively\(^{45}\). After hip fracture, 26.8% of men and 25.6% of women were newly admitted to institutions.

A large-scale study from Canada reported that fragility fractures at any skeletal site were associated with increased rates of institutionalisation\(^{46}\).

**Mortality**

http://fragilityfracture.org/cug/overview/impact-on-sufferers/mortality/

| Hip fractures have been reported to be the most common cause of accident-related death in older people in the United Kingdom\(^{47}\). Thirty percent die within a year. |

In 2010, the International Osteoporosis Foundation (IOF) estimated that 43,000 deaths in the European Union 27 countries were causally related to fragility fractures\(^7\). Hip fractures were accountable for 50% of these deaths, 28% related to clinical vertebral fractures and the remaining 22% to other fragility fractures. A compendium of country-specific reports provided estimates for the individual countries\(^8\). See:


**Impact on healthcare budgets**

http://fragilityfracture.org/cug/overview/impact-on-healthcare-budgets/

Fragility fractures impose a tremendous burden on healthcare budgets. The findings of the most recent health economic studies on fragility fractures are summarised below.
Europe
http://fragilityfracture.org/cug/overview/impact-on-healthcare-budgets/europe/

A comprehensive report on the epidemiology, burden and treatment of osteoporosis in the EU27 countries was published in 2013⁷. This report estimated the economic burden of new and prior fragility fractures to be Euro 37 billion in 2010. If Quality Adjusted Life Years (QALYs) lost were included, the total cost increased to Euro 98 billion. A compendium of country-specific reports provided estimates of the economic burden for the individual countries⁸. See:


Asia-Pacific
http://fragilityfracture.org/cug/overview/impact-on-healthcare-budgets/asia-pacific/

Health economic studies on fragility fractures in this region are limited. Estimates of the cost burden have been made for the following countries:

- **Australia**: Osteoporosis Australia’s new burden of disease analysis estimated the total direct and indirect costs of osteoporosis to be over AU$2.7 billion in 2012²⁴. See Osteoporosis costing all Australians 2013.

- **China**: In 2006, China spent US$1.5 billion treating hip fractures, a figure which is set to rise to US$12.5 billion by 2020, and US$265 billion by 2050¹⁰. See International Osteoporosis Foundation Asian Audit 2009.


Middle-East
http://frailtyfracture.org/cug/overview/impact-on-healthcare-budgets/middle-east/

Health economic studies on fragility fractures in this region are limited. Estimates of the cost burden have been made for the following countries:

- **Iran**: The direct costs of hip fracture in 2010 was US$28 million, a figure which is set to rise to US$51 million by 2020, and US$250 million by 2050\(^ {15,49}\).
- **Lebanon**: The total costs of hip fracture in 2011 was estimated to be US$7.7 million\(^ {15}\).
- **Saudi Arabia**: The total cost of hip fracture in 2004 was estimated to be US$1.14 billion\(^ {13,15}\).

See:


Africa
http://frailtyfracture.org/cug/overview/impact-on-healthcare-budgets/africa/

Health economic studies on fragility fractures are not currently available in this region.

North America
http://frailtyfracture.org/cug/overview/impact-on-healthcare-budgets/north-america/

Health economic studies on fragility fractures are available for Canada and the United States:

- **Canada**: Acute care costs for fractures resulting in hospitalisation in 2007-8 were CN$1.2 billion\(^ {19}\). Osteoporosis Canada has estimated the costs for each Canadian province from 2007 to 2035. See Appendix B: Fracture incidence and costs by province of Osteoporosis Canada’s Make the FIRST break the LAST with Fracture Liaison Services initiative\(^ {50}\). Link.
- **United States**: The cost of fragility fractures in 2005 was US$17 billion, a figure which is set to rise to more than $25 billion by 2025\(^ {20}\).

See:


Latin America

http://fragilityfracture.org/cug/overview/impact-on-healthcare-budgets/latin-america/

Health economic studies on fragility fractures in this region are limited. Estimates of the cost burden have been made for Argentina and Mexico:

- **Argentina**: In 2001, the total annual hospitalisation cost for hip fractures was estimated to be US$129.2 million and for vertebral fractures was US$62.3 million\(^5,51\).
- **Mexico**: The total costs of fragility fractures in 2010 was estimated to be US$256 million, a figure set to rise to US$490 million and $583 million by 2015 and 2020, respectively\(^22\).

See:


6 Themes of the FFN

http://fragilityfracture.org/cug/6-themes-of-the-ffn/

The aims of the FFN are:

- To disseminate globally the best multidisciplinary practice in preventing and managing fragility fractures
- To promote research aimed at better treatments of osteoporosis, sarcopenia and fracture
- To drive policy change that will raise fragility fracture higher up the healthcare agenda in all countries

To bring these changes about on a global scale, FFN has focused on 6 themes. A broad range of information and resources relating to each of the 6 themes are available from the links below:

- Peri-operative care
- Surgical treatment
- Rehabilitation
- Secondary prevention
- Research and education
- Changing healthcare policy

Peri-operative care

http://fragilityfracture.org/cug/6-themes-of-the-ffn/peri-operative-care/

Improving the peri-operative care of fragility fracture sufferers has, and will continue to be a major focus for FFN members and a theme of FFN Congresses.
The 2 key components of peri-operative care are:

- Anaesthesiology
- Orthopaedic-geriatric co-care

**Anaesthesiology**


**Guidance**

In 2011, the Association of Anaesthetists of Great Britain and Ireland (AAGBI) published guidelines on management of proximal femoral fractures for anaesthetists. These guidelines advocated the orthopaedic-geriatric co-care model and made specific recommendations regarding anaesthesia, which included:

- Surgery is the best analgesic for hip fractures.
- Surgery and anaesthesia must be undertaken by appropriately experienced surgeons and anaesthetists.
- Continuous audit and targeted research is required in order to inform and improve the management of patients with hip fracture.

The important issue of anaesthesia in patients taking anticoagulant therapy, including clopidogrel, is considered in this guideline.

See:


**Audit**

In 2014, the Anaesthetic Sprint Audit of Practice (ASAP) in the UK was undertaken to profile individual hospitals’ compliance with standards for peri-operative care described in the AAGBI guideline above. ASAP is available from the NHFD website - [http://www.nhfd.co.uk/](http://www.nhfd.co.uk/).

Also in 2014, a large scale observational audit was published on data from the UK National Hip Fracture Database. Outcomes for more than 59,000 patients who received general anaesthesia or spinal anaesthesia included:

- No significant difference in either cumulative 5-day (2.8% vs 2.8%, $p = 0.991$) or 30-day (7.0% vs 7.5%, $p = 0.053$) mortality between 30,130 patients receiving general anaesthesia and 22,999 patients receiving spinal anaesthesia.
- This remained so when 30-day mortality was adjusted for age and ASA physical status ($p = 0.226$).
- Mortality within 24 hours after surgery was significantly higher among patients receiving cemented compared with uncemented hemiarthroplasty (1.6% vs 1.2%, $p = 0.030$).
See:

Orthopaedic-geriatric co-care
http://fragilityfracture.org/cug/6-themes-of-the-ffn/peri-operative-care/orthopaedic-geriatric-co-care/

During the last decade, multidisciplinary models of care for hip fracture sufferers have emerged in a growing number of countries. Central to this fundamental overhaul of the way in which healthcare systems are managing hip fractures is development of the orthopaedic – geriatric co-care model. The feature which differentiates co-care models, as compared to traditional models of care, is that an orthopaedic surgeon and a geriatrician share responsibility for delivery of best practice in combination with a multidisciplinary team.

The links below provide information on what orthopaedic-geriatric co-care models have achieved and offer resources to support establishment of new programs:

- What does an orthopaedic-geriatric co-care program deliver?
- Implementing new programs
- Sharing best practice
- Orthopaedic-geriatric co-care in national policy

In countries where the speciality of geriatric medicine is well established, implementation of co-care models is gaining momentum. A key question yet to be answered is how to deliver best practice in peri-operative care of hip fractures in emerging economies, where geriatric medicine is not so well established. This question will be a focus of debate at the 3rd FFN Global Congress in Madrid in September 2014.

What does an orthopaedic-geriatric co-care program deliver
http://fragilityfracture.org/cug/6-themes-of-the-ffn/peri-operative-care/orthopaedic-geriatric-co-care/program/

The primary objectives of an orthopaedic-geriatric co-care program are:

1. Acute assessment and optimisation of patients before surgery should identify and treat correctable comorbidities to prevent avoidable delay
2. Undertake prompt and effective surgical treatment to aid early mobilisation
3. Minimise adverse events during the acute episode of care
4. Tailor rehabilitation to maximise recovery
5. Prevent subsequent falls and fractures

Models of care for hip fracture sufferers have been categorised into 4 distinct service configurations.
• **Traditional care:** The patient is admitted to a trauma ward where subsequent rehabilitation is primarily managed by the orthopaedic surgeon and team members. A consultative medical service deals with medical issues.

• **Regular geriatrician input:** A variation of the traditional model, which includes twice-weekly multidisciplinary ward rounds involving orthopaedic surgeons and geriatricians.

• **Geriatrician-led rehabilitation:** Pre-operative treatment is delivered by the orthopaedic team. Post-operatively, patients are transferred early to a geriatric rehabilitation unit, where combined orthopaedic-geriatrician ward rounds will take place.

• **Orthopaedic-geriatric co-care:** Patients are jointly admitted by an orthopaedic surgeon and a geriatrician to a dedicated orthogeriatric ward. Pre- and post-operative assessments are undertaken by the geriatric team and rehabilitation may occur on this ward or in a step-down rehabilitation unit.

Case studies on models of best practice and details of literature reviews on orthopaedic-geriatric co-care programs are available from the links below:

- Best practice case studies
- Literature reviews

**Best practice case studies**

Orthopaedic-geriatric co-care programs from a growing number of countries have published descriptions of their services and improvements in the quality of care. Summaries of key design features of services, results achieved and links to publications follow:

- Europe
- Asia-Pacific
- Middle East
- Africa
- North America
- Latin America

**Europe**

**Austria**

**Medical University of Innsbruck**

The Tyrolean Geriatric Fracture Center was opened in April 2009. A key features of this model is that a geriatrician is integrated within the trauma team on a full time basis. In addition to the geriatrician, anaesthesiologists, nurses, physiotherapists, social workers, and study nurses are also
members of the multidisciplinary team. The geriatrician sees 17 patients daily, ranging from 2 hours for new admissions to an average of 15 minutes per patient on post-operative ward rounds. Notably, just over a third of patients managed by the service had suffered a hip fracture.

The median time to surgery for hip fracture patients was 18 hours (mean was 24 hours). The mean length of stay was 11.3 days, inpatient mortality was 3.1% and 24% had a medical complication. Three months after the fracture, almost 87% of patients had returned to home.


Denmark

Aarhus University Hospital

A retrospective study evaluated the impact of a geriatric multidisciplinary team on the care of hip fracture patients admitted to the Orthopaedic Department. The two groups received the following care:

- **Historical control group:** Between July and December 2000, hip fracture patients received traditional rehabilitation on the orthopaedic ward.
- **Intervention group:** Between July and December 2003, hip fracture patients received care on weekdays from a geriatric team consisting of a geriatrician, a physiotherapist and a nurse with geriatric expertise. Geriatricians and orthopaedic surgeons shared responsibility for patients throughout their hospital stay.

As compared to the control group, the intervention group had a shorter median overall length of stay (13 days vs 15 days).


Germany

Nuremberg Hospital

In early 2010, an orthogeriatric ward co-managed by orthopaedic surgeons and geriatricians was opened in Nuremberg Hospital. All aspects of the design of the ward have been considered to optimise patient care and experience. In addition to a broad multidisciplinary team, co-called dementia companions (“Demenzbegleiter”) work as volunteers on the ward to support cognitively impaired patients. Five hundred patients were treated during the first 6 months that the ward was operational.
The average length of stay of all patients on the ward was 8.1 days, which is 2 days lower than the high trim point (HTP) defined in local DRG regulations. An overwhelming majority of staff surveyed (95%) considered that interdisciplinary cooperation had improved patient care.


Spain

Madrid, Hospital General Universitario “Gregorio Maranon”

A randomised, controlled clinical trial was conducted to determine whether an intensive multidisciplinary geriatric intervention during the acute phase of hip fracture hospitalisation decreased length of hospital stay and reduced the rate of postoperative medical complications and mortality. The two groups received the following care:

- **Control group**: All study patients were assigned an orthopaedic surgeon and a nurse on admission to hospital. Patients had access to hospital-wide services including physical therapy and social work.
- **Intervention group**: This group shared the same hospital wards as the control group and had access to the same hospital-wide services. In addition, this group were cared for by a geriatric team comprised of a geriatrician, a rehabilitation specialist and a specific social work. A comprehensive therapeutic plan was the output of a comprehensive geriatric assessment. The geriatrician visited the patient on a daily basis and was responsible for medical care.

The intervention group had a 2 day shorter length of stay than the control group, which was almost statistically significant (P=0.06). Significant differences favouring the intervention group were found for in-hospital mortality (0.6% vs 5.8%, P=0.03) and major medical complications rate (45.2% vs 61.7%, P=0.003).


Asia-Pacific


Australia

The Canberra Hospital, Australian Capital Territory

A prospective observational study with a historical control group evaluated the impact of an orthopaedic-geriatric co-care model on hip fracture outcomes. The two groups received the following care:
Historical control group (No GM): Between 1995 and 1997, hip fracture patients were managed exclusively by the orthopaedic team with limited input from geriatric medicine. All medical problems were managed by a consultation-only service.

Intervention group (GM): In 1998, a part-time orthogeriatric registrar was appointed to oversee daily medical care in working hours, with weekly consultant geriatrician review. On weekends and after-hours, geriatric medical care was usually provided by 1 of 2 geriatricians on-call.

For patients in the GM group, significant reductions were observed in postoperative medical complications and comorbid conditions (in total 49.5% vs. 71.0%, P<0.001) and in-hospital mortality (4.7% vs 7.7%, P<0.01). Also, readmission to medical wards within 6 months decreased (28% vs 7.6%, P<0.001). The proportion of GM patients receiving specific pharmacological thromboprophylaxis with low-molecular-weight heparin or unfractionated heparin increased was 94% compared to 63% for the No GM group (P<0.001). By 2001, 69% of GM patients received secondary preventive treatment with osteoporosis drugs, as compared to just 12% of the No GM group between 1995 and 1997.


Hong Kong

In 2007, a comprehensive geriatric hip fracture clinical pathway was established at Queen Mary Hospital in Hong Kong. Implementation of the clinical pathway was led by an orthopaedic surgeon in collaboration with a multidisciplinary team.

A 3 month pilot phase result in pre-operative length of stay being reduced by 2 days. After full implementation of the pathway, pre-operative length of stay was reduced to 1.4 days in 2009, as compared to 6.1 days in 2006. Post-operative length of stay was also reduced from 6.6 days in 2006 to 5.2 days in 2009. Accordingly, within 3 years of implementation of the pathway, the total length of the acute hospital stay has almost halved. This was also the case for length of stay for patients subsequently admitted to convalescence (rehabilitation) hospitals, from 40 days in 2006 to under 23 days in 2009.


New Zealand

Auckland, Auckland City Hospital

Hip fracture patients admitted to Auckland City Hospital are managed by an orthogeriatric co-care service. Components of this service include twice-weekly ward rounds by a geriatrician or advanced trainee in Older Peoples Health, weekly Ortho-Geriatric Team Meetings and pre- and post-operative assessment of hip fracture patients.
Fast-tracking of selected hip fracture patients to an Older Peoples Health ward was evaluated after introduction of this initiative in 2006. Patients were transferred on the day of surgery or on post-operative day 1. The median total length of stay for the fast-track group was 23 days as compared to 28 days for the usual care group.


**Auckland, Middlemore Hospital**

The Orthogeriatric Service at Middlemore Hospital in Auckland assessed ongoing improvements of hip fracture patients by comparing audit data from 2012 with data collected in 2008. The median time to theatre was 27 hours and >46 hours in 2012 and 2008, respectively. In 2012, the proportion of patients undergoing surgery within 48 hours of admission was over 72%, as compared to 51% in 2008. Lack of available theatre space continues to be a major cause of surgical delay. In terms of secondary fracture prevention, almost 90% of patients were discharged on bisphosphonate drugs.


**Christchurch Hospital**

Patients admitted to Christchurch Hospital with a hip fracture receive shared care from a geriatrician and an orthopaedic surgeon. Daily ward rounds are undertaken by either the geriatrician or an advanced trainee from Older Persons Health.

A retrospective audit undertaken in 2002-3 reported low rates of in-hospital mortality (0.7%) and that the majority (88%) of patients admitted from home, returned home. A subsequent evaluation of patients managed by this service reported mortality at 1 year to be 18.8%, which compared favourably with previous audit work undertaken in Christchurch, were 1 year mortality was 25%.


**Singapore**

**Tan Tock Seng Hospital**

An Orthogeriatric Service was implemented in 2011 at Tan Tock Seng Hospital. The principles underpinning this service are:

- Timely ARSRT (admission, review, surgery, rehabilitation and transfer).
• Multidisciplinary approach founded on co-management between the orthopaedic surgeon and the geriatrician, with specialised nursing and rehabilitation support.
• Integration of a care manager.

All patients are reviewed by a geriatrician and the care manager, in addition to pre- and post-operative assessments by a physiotherapist and an occupational therapist. A dedicated trauma list ensures patients are prioritised for surgery either on the day of admission or the next available operating list.

Almost 40% of patients were operated on within 48 hours, which was a marked improvement relative to 2010, when 29% of patients were operated on within 48 hours. Mortality rates were low, at 2.3% during the acute hospital stay and 5.9% at 1 year.


Middle-East

Israel

Tel Hashomer, Sheba Medical Center

Initially established in pilot form in 1999, the “Sheba” model of comprehensive orthogeriatric care has been subject to ongoing analysis for more than a decade69-72. Patients are admitted to the service directly from the emergency room, prepared for surgery, transferred to the operating theatre and returned to the orthogeriatric unit. The orthopaedic surgeon is a staff member of the unit, as are geriatricians and rehabilitation specialists.

A report on the first 5 years’ experience of the Sheba model noted that over 68% of patients returned to their pre-fracture residence, and that rates of major complications (4.1%) and in-hospital mortality (3.2%) were low70. A subsequent study compared survival rates of patients treated in the geriatric hip fracture unit with those receiving standard care on general orthopaedic wards in the same hospital71. Both crude and adjusted mortality rates were lower for the geriatric hip fracture unit, as compared with the standard of care model on general orthopaedic wards. Most recently, a cost-utility analysis found the geriatric hip fracture unit used 23% fewer resources per patient ($14,919 vs. $19,363) compared to standard care.


Africa

FFN is currently not aware of publications relating to orthopaedic-geriatric co-care programs located in Africa.

If FFN members have new information about emerging services in Africa, please contact the FFN Web Editor at web.editor@fragilityfracture.network

North America

United States

Rochester, Minnesota, Mayo Clinic

A historical cohort study evaluated the impact on care of hip fracture patients co-managed by a teaching orthopaedic surgery service and a hospitalist service73. The two groups received the following care:

1. **Pre-intervention group**: Between July 2000 and June 2001, hip fracture patients were triaged by the Emergency Department to either a teaching orthopaedic surgery service or a teaching medical service.
2. **Intervention group**: Between July 2001 and June 2002, hip fracture patients were admitted by the teaching orthopaedic surgery service and co-managed by the hospitalist service. At any given time, the hospitalist service was staffed by 1 physician and 2 allied health professionals (nurse practitioners or physician assistants). The hospitalist team managed all medical needs of the patients, including conducting preoperative examinations.

Patients in the intervention group had shorter time to surgery (25 hours vs 38 hours, P<0.001), shorter acute length of stay (8.4 days vs 10.6 days, P<0.001) and there was no difference in in-hospital deaths or 30-day readmission rates.

Rochester, New York, Highland Hospital

The Geriatric Fracture Center (GFC) program at Highland Hospital was established in 2004 and is the most extensively published high-performing orthopaedic-geriatric co-care model in the world74-83. The principles that underpin the GFC are:

- Most patients benefit from surgical stabilisation of their fracture.
- The sooner patients have surgery, the less time they have to develop iatrogenic illness.
- Co-management with frequent communication avoids iatrogenesis.
- Standardised protocols decrease unwarranted variability.
- Discharge planning begins at admission.

Short-term outcomes from the GFC have been compared to those achieved in a local institution which does not deliver orthopaedic-geriatric co-care75. GFC patients had:

1. Shorter times to surgery (24.1 hours vs 37.4 hours)
2. Fewer post-operative complications overall (30.6% vs 46.3%)
3. Shorter acute length of stay (4.6 days vs 8.3 days)

No differences were observed in in-hospital mortality or 30 day readmission rate. Subsequent study reported the 1-year mortality rate for GFC treated patients to be 21.2%, which compares favourably with other studies76. These findings are particularly encouraging given that the GFC does not exclude patients with dementia, non-ambulatory patients or nursing home residents, as is the case for many of the other studies considered.

The financial aspects of the GFC have been evaluated76,79. The average hospital charge to payers for hip fracture care was US$15,18876, representing less than half of the average inpatient hospital cost in the United States in 2005 (US$33,693)84, as calculated by the Agency for Healthcare Research and Quality.


Latin America

FFN is currently not aware of publications relating to orthopaedic-geriatric co-care programs located in Latin America.

If FFN members have new information about emerging services in Latin America, please contact the FFN Web Editor at web.editor@fragilityfracture.network

Literature reviews
http://fragilityfracture.org/cug/6-themes-of-the-ffn/peri-operative-care/orthopaedic-geriatric-co-care/program/literature-reviews/


Implementing new programs

If you work in a hospital or health system that has yet to establish an orthopaedic-geriatric co-care service, some of the key questions that you will be facing are indicated below. At the launch of this section of the FFN website, some illustrations of how these questions have been answered are available from the accompanying links.

We strongly encourage you to share your own experiences through the sharing best practice link, to enable colleagues elsewhere to benefit from your knowledge of how to establish an effective and sustainable service.

Who has done this in my country or region before? Connect with a mentor
Where to start? Click here for suggestions
How can my program be reimbursed? Click here for examples
Are business plan templates available? Click here for examples
What process metrics should I use? Click here for examples

What are the roles of other stakeholders? Click here for suggestions

**Connect with a mentor**


FFN is a network of activists with representation from all key disciplines which has global reach. Many of our members have established, or are in the process of establishing, orthopaedic-geriatric co-care models in their hospitals or health systems.

In order to expedite dissemination of best practice and experience in establishing effective systems of care for fragility fracture sufferers, FFN can make connections between professionals who are at differing stages of service development.

If you would like FFN to identify a colleague who could serve as a mentor to support you in the development of your service, please click here.

**Where to start?**


Practical first steps towards development and implementation of an orthopaedic-geriatric co-care model are suggested below.

- **Identify ‘Service Champion’:** Who will lead the process of development of an orthopaedic-geriatric co-care service? It is likely that one or two individuals will take this leadership role.

- **Review established models:** The Best practice case studies, Literature reviews and Global literature registry sections of this website provide details and links to publications from well-established high performing orthopaedic-geriatric co-care services. Relevant national clinical guidelines on the care of hip fracture patients should also be considered. Newly designated ‘Service Champions’ are strongly recommended to review the experience from these services to inform their own thinking.

- **Form a multi-disciplinary stakeholder group:** A feature common to practically all published descriptions of effective service models is the involvement of a multi-disciplinary team. Accordingly, from the outset of service development, the Champion(s) needs to convene a group comprised of representatives from all the professional groups that have a role to play in the optimal care of fragility fracture patients. This is likely to include:
  - Orthopaedics, geriatrics, internal medicine, anaesthetics, radiology, haematology
  - Lead Clinicians for osteoporosis, falls and dementia
  - Specialist nursing (particularly orthopaedics and geriatrics)
Allied health professionals: physiotherapists, occupational therapists, dieticians, nutritionists, discharge planners
Institution management, business planning and finance
Quality improvement professionals

- **Identify current standards of care**: Is audit data available on current standards of care for fragility fracture patients within your organisation? With respect to hip fracture patients, knowledge of the following information would be desirable:
  - How many hip fracture patients are managed by the hospital/health system annually?
  - What proportion of hip fracture patients are aged 60 years and over?
  - What is the speciality of the doctor with overall responsibility for the admission of hip fracture patients to the hospital/health system?
  - What is the average (mean or median) time to surgery for hip fracture patients?
  - How is medical care provided to hip fracture patients? Specifically:
    - What proportion of patients undergo a pre- and/or post-operative assessment of their medical needs by a physician (i.e. as distinct from a surgeon)?
  - What proportion of patients receive the following assessments before their final discharge from the hospital/health system:
    - Fracture risk, including osteoporosis?
    - Falls risk?
    - Cognitive function?
  - What is the length of stay for hip fracture patients (ideally, broken down into acute stay and subsequent stay in a rehabilitation ward or facility)?
  - What proportion of hip fracture patients return to their pre-fracture place of residence?
  - What proportion of hip fracture patients die during their acute stay?
  - What proportion of hip fracture patients are readmitted to hospital within 30 days?

- **Redesign current care**: The Service Champion(s) will lead the multidisciplinary stakeholder group through an analysis of current standards of care provided by the hospital/health system, making comparisons with outcomes for high performing orthopaedic-geriatric co-care models identified in the literature review suggested above and/or relevant national clinical guidelines for hip fracture care. LEAN methodology has been used to facilitate redesign of several aspects of the care of fragility fracture patients, as has Plan-Do-Study-Act rapid cycle improvement processes. See:
Long-term care: The Service Champion(s) should consider how outcomes can be optimised in the long-term. Local health system infrastructure will determine how long-term care is delivered. As an illustration, establishing protocols to optimise management of osteoporosis in the long-term will reduce the risk of subsequent fractures.

Useful resources: A suite of useful resources for those involved in developing orthopaedic-geriatric co-care services are available from the following websites:

- U.K. National Hip Fracture Registry – www.nhfd.co.uk
- Australian and New Zealand Hip Fracture Registry website – www.anzhfr.org
- New South Wales Agency for Clinical Innovation Orthogeriatric Model of Care - Link

Reimbursement


Identification of a sustainable source of funding for an orthopaedic-geriatric co-care service is essential if the service is to be established and be viable in the long-term. Reimbursement systems for healthcare vary considerably between countries. At the launch of this section of the FFN website, a method of financing services in the UK is considered below, in addition to an analysis of how services can be made viable in the United States.

We strongly encourage you to share your own experiences through the sharing best practice link, to enable colleagues elsewhere to benefit from your knowledge of how to identify sustainable funding for a service.

United Kingdom: In 2010, the Department of Health for England introduced a financial incentive for delivery of best practice in hip fracture care\(^87\). This ‘Best Practice Tariff’ (BPT) was based upon the core professional standards identified in the ‘Blue Book’ consensus guideline on the care of patients with fragility fracture\(^88\). The BPT for hip fracture offered an increase in payment for hospitals, at the level of the individual patient, which was made possible by the National Hip Fracture Database in the UK. The payment differential for the BPT was £445 for 2010-11, £890 for 2011-12 and £1,335 for 2012-13\(^89\), which has been maintained for 2013-14\(^90\). Eligibility for BPT payment was contingent upon adherence to all of the following criteria for 2010-11 and 2011-12:

- Time to surgery within 36 hours from arrival in an emergency department, or time of diagnosis if an inpatient, to the start of anaesthesia.
- Involvement of an (ortho) geriatrician:
  - Admitted under the joint care of a consultant geriatrician and a consultant orthopaedic surgeon.
  - Admitted using an assessment protocol agreed by geriatric medicine, orthopaedic surgery and anaesthesia.
• Assessed by a geriatrician (as defined by a consultant, non-consultant career grade (NCCG), or specialist trainee ST3+) in the perioperative period (defined as within 72 hours of admission).

• Postoperative geriatrician-directed:
  • Multi-professional rehabilitation team.
  • Fracture prevention assessments (falls and bone health).

From April 2012, an additional BPT criterion was added which required pre- and post-operative cognitive assessments to be completed.

• **United States**: A financial model has been developed to determine the economic viability of orthopaedic-geriatric co-care services. Based on the characteristics and performance of a typical U.S. hip fracture program, the minimum annual case-load of 72 patients is required. The authors of the model conclude that many existing hospitals which offer hip fracture care may be making an overall loss by providing hip fracture care. Accordingly, consolidation of hip fracture care at dedicated hip fracture centres is proposed, given that typical US cities have adequate case volume to support several such centres.

See:


**Business plans**


A key step in the process of developing an orthopaedic-orthogeriatric co-care service is preparation of a comprehensive and costed business plan. The Resources section of the National Hip Fracture Database in the UK provides several examples of business plans. Go to [http://www.nhfd.co.uk/](http://www.nhfd.co.uk/), click on the Resources tab, then Other resources tab, then business cases.

FFN hopes to compile a collection of successful business cases in this section of the website, which can be shared through the sharing best practice link.

**Process metrics**


Key process metrics in the acute care of hip fracture patients include:

• How many hip fracture patients are managed by the hospital/health system annually?
• What proportion of hip fracture patients are aged 60 years and over?
• What is the speciality of the doctor with overall responsibility for the admission of hip fracture patients to the hospital/health system?
• What is the average (mean or median) time to surgery for hip fracture patients?
• How is medical care provided to hip fracture patients? Specifically:
  o What proportion of patients undergo a pre- and/or post-operative assessment of their medical needs by a physician (i.e. as distinct from a surgeon)?
• What proportion of patients receive the following assessments before their final discharge from the hospital/health system:
  o Fracture risk, including osteoporosis?
  o Falls risk?
  o Cognitive function?
• What is the length of stay for hip fracture patients (ideally, broken down into acute stay and subsequent stay in a rehabilitation ward or facility)?
• What proportion of hip fracture patients return to their pre-fracture place of residence by 30 days?
• What proportion of hip fracture patients die during their acute stay?
• What proportion of hip fracture patients are readmitted to hospital within 30 days?

**Role of stakeholders**


A feature common to practically all published descriptions of effective orthopaedic-geriatric co-care services is the formation and involvement of a multi-disciplinary team. Accordingly, from the outset of service development, the Champion(s) needs to convene a group comprised of representatives from all the professional groups that have a role to play in the optimal care of fragility fracture patients. The specialities involved are indicated below.

**Orthopaedic surgeons and geriatricians**

An orthopaedic surgeon and/or a geriatrician is/are likely to champion the development of a new service and will play a leading role in implementation.

**Anaesthetists, radiologists, rehabilitation physicians/physiatrists, general physicians/internal medicine doctors/hospitalists, haematologists**

All of these specialists are likely to be members of the multidisciplinary team involved in care of hip fracture patients. In jurisdictions where access to geriatricians is limited, general physicians/internal medicine doctors/hospitalists could provide the medical component of the co-care model.

Haematologists have an important role to play on account of the issue of pre- and post-operative anaemia.

**Lead Clinicians for osteoporosis, falls and dementia**

Hip fractures are usually the result of a fall in an individual with compromised bone strength. As such, ensuring patients receive a fracture risk assessment – including both bone health
(osteoporosis) and falls risk factors – is a vital component of effective post-fracture care. Furthermore, the prevalence of dementia among this population has been reported to be almost 30%\(^2\), so the opportunity to undertake cognitive assessment should not be missed. Accordingly, the individuals who serve formally or informally as Lead Clinicians for osteoporosis, falls and dementia in the hospital or health system, and their clinical teams, have a key role to play in the care of hip fracture patients.

**Nurses**

Nurses play a vital role in the acute care of hip fracture patients and are an essential part of the multidisciplinary team. An international group of nurse experts have comprehensively examined key aspects of care in the ‘toolkit’ publications below. The first paper considers pain and delirium and the second paper considers pressure ulcers, fluid balance and nutrition, and constipation and catheter associated urinary tract infection.


**Allied health professionals**

Physiotherapists/physical therapists, occupational therapists, dieticians and nutritionists play an important role in the recovery of hip fracture patients.

**Institution management, business development and finance**

Gaining management buy-in for development of an orthopaedic-geriatric co-care service is essential. Hospital or health system administrators have a role to play in the development of the business plan and subsequent decisions to fund the service in the short and long-term.

**Quality improvement professionals**

Hospital or health system quality improvement professionals should be key internal advocates for development and implementation of a service that aims to deliver better hip fracture care and outcomes for patients. Illustrating to these professionals what has been achieved by services elsewhere and how such services feature in national policies in other countries is time well spent.

**Sharing best practice**


The membership of the FFN has immense experience in development of optimal models of care for patients with fragility fractures. Our members include the majority of world leading innovators in service development in this field.
A key objective for the Fracture Care Resources section of the FFN website is to provide a platform for sharing of resources and ideas on best practice. If you have business plans, job descriptions, protocols, service specifications or other resources that you would be prepared to share with other members of the FFN throughout the world, please click here.

Orthopaedic-geriatric co-care in national policy

UK Policy

In 2009, the Department of Health for England advocated adherence to the professional standards for orthopaedic-geriatric co-care presented in the ‘Blue Book’ consensus guideline on the care of patients with fragility fracture. The systematic approach to hip fracture care and prevention described in the policy document is illustrated in the ‘pyramid’ below. The Department of Health subsequently introduced the ‘Best Practice Tariff’ (BPT) for hip fracture, which links a financial incentive to quality of care at the level of the individual patient. Details of the BPT are available from the reimbursement section of this website.

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Surgical treatment

As the incidence of fragility fractures increases with the ageing of the population, the primary challenge facing surgeons is how to obtain secure fixation of an implant to osteoporotic bone\textsuperscript{94,95}. Advances in implant design and surgical technique offer a means to improve outcomes of surgery.

Osteoporotic bone presents several key challenges to surgeons\textsuperscript{88}:

- Fractures are likely to be comminuted so making anatomical reduction more difficult.
- Osteoporosis and ageing slow fracture healing.
- Reduced cancellous bone mineral density and increased cortical porosity adversely affect the holding capacity of screws, and make internal fixation more difficult.

These issues contribute to a dramatic increase in the rate of failure of implant fixation in individuals with osteoporosis\textsuperscript{96}. In response to these challenges, the following major international initiatives have sought to develop best practice and broadly disseminate it to surgical teams throughout the world:

- AO Foundation Clinical Priority Program ‘Fracture Fixation in Osteoporotic Bone’. Link.
- Osteosynthesis and Trauma Care Foundation. Link.

The following reviews provide additional commentaries:


The linked pages below provide a summary of surgical principles relating to hip fracture and links to Cochrane reviews for surgery on hip, humerus and radius fractures. An overview of the biology of fracture healing is also provided.

- Surgical principles
- Biology of fracture healing

Surgical principles

The aims of surgery are to control pain and promote early mobilisation\textsuperscript{88}.

Hip fractures

Delay from admission to surgery causes distress for patients and is associated with increased morbidity and mortality. Accordingly, the standard that surgery should be performed on the day of, or the day after, admission to hospital has been set in UK National Institute for Health and Clinical Excellence (NICE) guidelines on hip fracture care. This standard is being echoed in emerging guidelines from several other countries.

Other key priorities for implementation in the NICE guidance include the following points which provide an evidence-based set of principles on hip fracture surgery:

- **Planning the theatre team:**
  - Schedule hip fracture surgery on a planned trauma list.

- **Surgical procedures:**
  - Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture.
  - Offer total hip replacements to patients with a displaced intracapsular fracture who:
    - were able to walk independently out of doors with no more than the use of a stick and
    - are not cognitively impaired and
    - are medically fit for anaesthesia and the procedure.
  - Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).

Cochrane Database Systematic Reviews

The Cochrane group have undertaken several systematic reviews concerned with surgical issues relating to hip fractures including:

- Extramedullary fixation implants and external fixators for extracapsular hip fractures in adults (2013).
- Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults (2010).
- Arthroplasties (with and without bone cement) for proximal femoral fractures in adults (2010).
Non-hip non-vertebral fractures

Cochrane Database Systematic Reviews

The Cochrane group have undertaken several systematic reviews concerned with surgical issues relating to non-hip non-vertebral fractures:

- Interventions for treating proximal humeral fractures in adults (2012)
- Surgical versus non-surgical interventions for treating humeral shaft fractures in adults (2012):
- Different methods of external fixation for treating distal radial fractures in adults (2008):
- Percutaneous pinning for treating distal radial fractures in adults (2007):
- External fixation versus conservative treatment for distal radial fractures in adults (2007)

Additionally, the following link allows access to the journal "Best Practice & Research Clinical Rheumatology":
http://www.bprclinrheum.com/issue/S1521-6942%2814%29X0002-1

Vertebral fractures

The American College of Radiology Appropriateness Criteria provides the most recent evidence-based guidance on radiologic imaging of vertebral compression fractures and current indications for vertebral augmentation:


For further information, the following link allows access to the journal "Best Practice & Research Clinical Rheumatology":
http://www.bprclinrheum.com/issue/S1521-6942%2814%29X0002-1

Biology of fracture healing


The AO Principles of Fracture Management summarises the biology of fracture healing. Link.

The biology of fracture healing has also been the subject of the following review articles:

Rehabilitation

http://fragilityfracture.org/cug/6-themes-of-the-ffn/rehabilitation/

As described in the impact on sufferers section of this website, fragility fractures, and hip fractures in particular, are a leading cause of disability, institutionalisation and mortality among older people. A key challenge facing healthcare professionals and health systems worldwide is how to improve the prospects of sufferers returning to their pre-fracture level of function and independence. In this regard, provision of effective rehabilitation is a vital component of any system of care for fragility fracture sufferers.

The linked page below provide summaries and links to what is known and highlights areas for research for the various fracture types. As interest grows worldwide, the issue of sarcopenia is also considered.

Please note that the key issue of falls prevention is considered in the secondary prevention section of this website.

- Hip fractures
- Non-hip non-vertebral fractures
- Vertebral fractures
- Sarcopenia

Hip fractures

http://fragilityfracture.org/cug/6-themes-of-the-ffn/rehabilitation/hip-fractures/

Cochrane Database Systematic Reviews

The Cochrane group have undertaken several systematic reviews relating to rehabilitation of hip fracture sufferers:

- **Interventions for improving mobility after hip fracture surgery in adults** (2011): A heterogeneous group of small trials evaluated a range of mobilisation strategies started soon after hip fracture. Whilst individual trials reported improved mobility for a range of interventions, there was insufficient evidence to establish best strategies to enhance mobility.

- **Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people** (2010): A heterogeneous group of small trials using a range of interventions. There was insufficient evidence to recommend practice changes.

- **Multidisciplinary rehabilitation for older people with hip fractures** (2009): Randomised and quasi-randomised trials using multidisciplinary rehabilitation of hip fracture sufferers. The trend towards better overall results for patients receiving multidisciplinary inpatient rehabilitation did not achieve statistical significance.

An editorial, which summarised the findings of these and other Cochrane reviews relating to hip fracture, noted that whilst these results are disappointing, taken in a broader context, the current evidence base does inform how best to manage hip fractures. With regard to mobilisation, the most
successful strategies involve more intensive exercise. However, the authors do appeal for high-quality randomised controlled trials to be undertaken. With regard to multidisciplinary inpatient rehabilitation programmes, the authors stated that ‘there is some rationale to justify its adoption, pending further research’.

**Other reviews**

The following reviews were published after the Cochrane reviews above:

- **Evidence-Based Management in the Rehabilitation of Osteoporotic Patients with Fragility Fractures** (2012): This book chapter provides a comprehensive literature review for hip, vertebral and Colles fractures.
- **Extended exercise rehabilitation after hip fracture improves patients’ physical function: a systematic review and meta-analysis** (2012): This review evaluated all randomised controlled trials which compared extended exercise programmes with usual care for community dwelling hip fracture sufferers. To the author’s knowledge, this is the first meta-analysis to report significant effects on various functional outcome measures for extended rehabilitation.
- **Rehabilitation in patients with dementia following hip fracture: a systematic review** (2012): A significant proportion of hip fracture sufferers are also living with dementia. In 2007, the Scottish Hip Fracture Audit reported that 28% of hip fracture patients in Scotland had a previous diagnosis of dementia. Accordingly, a clear need exists to establish best practice in rehabilitation for this sizeable sub-group of hip fracture sufferers. This systematic review concluded that rehabilitation programmes for people with mild to moderate dementia may improve function and ambulation, and decrease falls risk. More research is required for those with moderate to severe dementia.

**Non-hip non-vertebral fractures**

http://fragilityfracture.org/cug/6-themes-of-the-ffn/rehabilitation/non-hip-non-vertebral-fractures/

The following publications reviewed literature relating to rehabilitation of patients suffering non-hip non-vertebral fractures:

- **Evidence-Based Management in the Rehabilitation of Osteoporotic Patients with Fragility Fractures** (2012): This book chapter provides a comprehensive literature review for hip, vertebral and Colles fractures.
- **Fragility fractures of the distal humerus: What is the optimal treatment?** (2012): This review considers the history of management of distal humerus fractures and emerging trends. Operative fixation and early mobilisation are considered the most common treatment of choice. Comparisons are made between total elbow replacement and internal fixation, in terms of when each approach is indicated and outcomes.
- **Exercise prescription after fragility fracture in older adults: a scoping review** (2011): This review considered the safety, efficacy, or effectiveness of exercise prescription following any fracture in older adults. Studies concerned with upper extremity and ankle fractures focused on fracture healing or structural impairment outcomes. There was insufficient evidence to identify parameters for safe and effective exercise for fragility fracture patients.
Vertebral fractures

The following publications reviewed literature relating to rehabilitation of patients suffering vertebral fractures:

- **Exercise for improving outcomes after osteoporotic vertebral fracture** (2013): This Cochrane review sought to evaluate the benefits and harms of exercise interventions (of ≥4 week’s duration) compared to non-exercise or non-active physical therapy intervention, no intervention or placebo. The primary outcomes measured were the incidence of subsequent fractures and adverse events. Heterogeneity of trial design prevented pooling of data for most outcomes. The authors concluded that no definitive conclusion could be drawn and that a high-quality randomised controlled trial is required to inform exercise prescription for vertebral fracture sufferers.

- **Evidence-Based Management in the Rehabilitation of Osteoporotic Patients with Fragility Fractures** (2012): This book chapter provides a comprehensive literature review for hip, vertebral and Colles fractures.

Sarcopenia

In 2009, the International Working Group on sarcopenia reached a consensus definition:

“Over the age span from 20 years 80 years of age, there is approximately a 30% reduction in muscle mass and a decline in cross-sectional area of about 20%.”

Sarcopenia and fragility fractures

The skeletal and muscular systems are inextricably linked because the strongest mechanical forces applied to bones result from contractions of muscles. Those forces impact on bone density and bone strength. As such, concurrent sarcopenia and osteoporosis has been characterised as a ‘hazardous duet’. The two conditions may share common pathogenic pathways, including:

- Sensitivity to reduced anabolic hormone secretion
- Increased inflammatory cytokine activity
- Reduced physical activity
Identification of individuals with sarcopenia can be readily undertaken by assessment of lower extremity function\(^\text{102}\) and, more recently, by DXA-based measures of body composition\(^\text{103}\). A broad range of approaches to the treatment of sarcopenia are under investigation including:

- Exercise and physical therapy
- Nutritional therapies
- Androgen therapy
- Novel anti-sarcopenic agents

The following publications provide further information:


Secondary prevention

http://fragilityfracture.org/cug/6-themes-of-the-ffn/secondary-prevention/

Systematic reviews have shown that individuals who have suffered a fragility fracture are at significantly increased risk of suffering second and subsequent fractures, as compared to their peers who have not broken a bone\(^\text{33,34}\). Also, a significant proportion of individuals who break their hip have suffered prior fragility fractures\(^\text{104-107}\).

In light of this, reliable delivery of secondary fracture prevention – addressing both osteoporosis and falls risk reduction – is a vital component of post-fracture care for all older fragility fracture sufferers. Tragically, worldwide, the majority of these patients do not receive the secondary preventive care they need, and so are left needlessly at high risk of suffering future fractures\(^\text{108-110}\).

Major international initiatives have been developed over the last decade with the intention of eliminating the secondary prevention care gap, which include:

- **International Osteoporosis Foundation**: The Capture the Fracture Campaign is leading the global drive for implementation of clinically effective and cost-effective systems of care that have come to be known as Fracture Liaison Services (FLS).
- **National Bone Health Alliance (U.S.A.)**: The Fracture Prevention CENTRAL website and associated webinar program and 2Million2Many Campaign are components of the NBHA’s ‘20/20 Vision’ which aims to reduce the incidence of fragility fractures by 20% in the United States by year 2020.
- **Osteoporosis Canada**: The Make the FIRST break the LAST with Fracture Liaison Services initiative calls for all jurisdictions in Canada to implement an FLS by 2015.
Supported by these excellent initiatives, and others like them - from New Zealand to Singapore to London to Boston to Rio to Los Angeles - implementation of FLS is gaining momentum.

The links below provide a summary of why secondary fracture prevention is so crucial, how the FLS model complements orthopaedic-geriatric co-care models, patients’ understanding of fracture risk and links to the major initiatives being led by other organisations. We strongly encourage you to visit the websites of these initiatives and read their campaign publications, as a tremendous suite of resources is available to help you to eliminate the secondary prevention care gap.

- Rationale for secondary fracture prevention
- Orthopaedic-geriatric co-care models and Fracture Liaison Services
- Patients’ knowledge and understanding of fracture risk
- Falls prevention
- Links to major secondary prevention initiatives

**Rationale for secondary fracture prevention**

http://fragilityfracture.org/cug/6-themes-of-the-ffn/secondary-prevention/rationale/

<table>
<thead>
<tr>
<th>Hip fracture is all too often the final destination of a thirty year journey fuelled by decreasing bone strength and increasing falls risk.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fracture begets fracture. Systematic reviews tell us that patients who have suffered a fragility fracture are at double the risk of suffering second and subsequent fractures, as compared to their fracture-free peers.</td>
</tr>
<tr>
<td>• Approximately one half of patients who suffer a hip fracture experienced another fragility fracture before they broke their hip.</td>
</tr>
<tr>
<td>• Estimates suggest that around a sixth of postmenopausal women, and a smaller proportion of older men, have suffered a fragility fracture.</td>
</tr>
<tr>
<td>• Effective drug treatments for osteoporosis are available in a wide range of formulations, including oral tablets and injections, which can be administered at various frequencies, from daily to yearly.</td>
</tr>
</tbody>
</table>

Taken together, these statements underpin the rationale for prioritisation of efforts to respond to the first fracture to prevent the second and subsequent fractures i.e. secondary fracture prevention. The pyramid below illustrates the systematic, top-down approach that is being implemented or advocated for in a growing number of countries. The International Osteoporosis Foundation’s 2012 World Osteoporosis Day Report on the Capture the Fracture Campaign provides more details.

Older patients who present to urgent care services – whether based in hospital or the community – with a fragility fracture present an obvious opportunity for intervention to assess future falls and fracture risk. However, international, national, regional and local audits conducted across the world reveal a pervasive and persistent care gap for these fracture patients. In the absence of a
systematic approach to deliver secondary prevention, it simply doesn’t happen for the majority of patients.

A large group of professionals have a role to play in assessing fracture risk and treating osteoporosis, including general practitioners/family physicians, endocrinologists, rheumatologists and internal medicine specialists, and geriatricians/aged care specialists.

Orthogeriatric-orthopaedic co-care models and Fracture Liaison Services (FLS) play a complementary role in eliminating this care gap. A systematic review from Ganda and colleagues in Australia provides a very useful overview of the organisation of FLS throughout the world and the outcomes achieved:


Orthopaedic-geriatric co-care models and Fracture Liaison Services
http://fragilityfracture.org/cug/6-themes-of-the-ffn/secondary-prevention/ogc-and-fls/

The National Bone Health Alliance (NBHA) in the United States has clearly described the respective priorities for orthopaedic-geriatric co-care (OGC) models and Fracture Liaison Services (FLS) in the delivery of a systematic approach to hip fracture care and prevention in the United States. This description is likely to be applicable in other countries.

‘OGCs focus on delivering professional standards of acute care for patients suffering hip fractures, which includes appropriate discharge planning, including osteoporosis and fall prevention measures. Fracture Liaison Services focus on delivering secondary preventive assessment for patients presenting with fractures caused by osteoporosis at any skeletal site. In units with an established OGC, a FLS program could extend provision of secondary preventive care to those individuals
suffering fractures that are managed in the outpatient fracture clinic setting, and for any patients admitted to hospital on account of a fracture at a site other than the hip, should this patient group fall outside of the scope of the OGC program.

Patients’ knowledge and understanding of fracture risk

Ensuring that patients understand the significance of suffering a fragility fracture is a vital step in engaging patients in their own care. A considerable body of research has been done on this subject by researchers in Toronto. The following recent publications provide valuable insights for those leading Fracture Liaison Services elsewhere:

- Decision to take osteoporosis medication in patients who have had a fracture and are 'high' risk for future fracture: a qualitative study. BMC Musculoskelet Disord. 2011 May 9;12:92. PubMed ID 21554729
- Patient perceptions of the path to osteoporosis care following a fragility fracture. Qual Health Res. 2012 Dec;22(12):1647-1658. PubMed ID 22923385
Falls prevention

Clinical guidelines

FFN considers falls prevention and management of osteoporosis to be the two essential and complementary pillars of an integrated approach to secondary fracture prevention. This approach was strongly endorsed in the U.K. Blue Book on the care of patients with fragility fracture. The ‘Blue Books’ from Spain\textsuperscript{122} and the United States\textsuperscript{123} take a similar view. See:

- **Spain:** Sociedad Española de Fracturas Osteoporóticas (SEFRAOS). Libro Azul de la Fractura Osteoporótica en España. 2012. Link.
- **United Kingdom:** British Orthopaedic Association and British Geriatrics Society. The care of patients with fragility fracture. 2007. Link.
- **United States:** Bukata SV, Digiovanni BF, Friedman SM et al. A guide to improving the care of patients with fragility fractures. 2011. Link.

Fear of falling

Falls are very common among older people:

- One third of the population aged $\geq 65$ years and above fall each year\textsuperscript{124,125}
- One half of people aged $\geq 85$ years fall each year\textsuperscript{126}
- Half of those who fall once will fall again\textsuperscript{127}

Suffering a fall often leads to development of fear of falling which, in turn, may result in older people restricting their activities and suffering social isolation. A review from the United States noted that up to half of residents in long-term care suffer fear of falling\textsuperscript{128}. This review considers the epidemiology of fear of falling and evidence for interventions:


Links to major initiatives
http://fragilityfracture.org/cug/6-themes-of-the-ffn/secondary-prevention/links-to-major-initiatives/

FFN strongly encourages members to visit the websites and read the publications relating to the following major secondary fracture prevention initiatives worldwide:

- **International Osteoporosis Foundation:** The Capture the Fracture Campaign is leading the global drive for implementation of clinically effective and cost-effective systems of care that have come to be known as Fracture Liaison Services (FLS). IOF has also developed the Best Practice Framework which provides globally endorsed standards of care for FLS\textsuperscript{129}. See:

- **National Bone Health Alliance (U.S.A.):** The [Fracture Prevention CENTRAL website](http://www.fracturepreventioncentral.org) and associated webinar program and [2Million2Many Campaign](http://www.2million2many.org) are components of the NBHA’s ‘20/20 Vision’ which aims to reduce the incidence of fragility fractures by 20% in the United States by year 2020. See: National Bone Health Alliance: An Innovative Public-Private Partnership Improving America’s Bone Health. Curr Osteoporos Rep. 2013 Dec;11(4):348-353. PubMed ID 24014197

- **Osteoporosis Canada:** The [Make the FIRST break the LAST with Fracture Liaison Services](http://www.makefirstbreaklast.com) initiative calls for all jurisdictions in Canada to implement an FLS by 2015. The extensive associated appendices include modelling of potential cost savings for all Canadian provinces and a comprehensive analysis of the most effective operational characteristics of FLS.

- **Osteoporosis New Zealand:** Published in December, the [BoneCare 2020](http://www.bonecare2020.org) strategy has contributed to significant progress on development of a New Zealand Hip Fracture Registry and nationwide implementation of FLS. For the financial year July 2013 to June 2014, FLS was identified as an expectation for all District Health Boards in New Zealand. Furthermore, the Health Quality and Safety Commission in New Zealand has highlighted the importance of this strategy in its national quality improvement initiative [Reducing Harm from Falls](http://www.hqsc.govt.nz/)

**Research and education**


The unique multidisciplinary composition of the membership of the FFN, combined with global reach, creates an unparalleled opportunity to address unanswered questions in the management of fragility fractures. The current focus of FFN research activities are development of a minimum dataset for hip fracture audit, optimal case-finding and management of vertebral fractures and rehabilitation research.

The links below provide information on FFN Special Interest Groups which have been established for the hip fracture minimum dataset and vertebral fracture care. Also, the current status of rehabilitation research is described, in addition to links to our colleagues at the International Society for Fracture Repair.

- Hip fracture minimum dataset Special Interest Group
- Vertebral fracture Special Interest Group
- Rehabilitation research
- International Society for Fracture Repair
Hip fracture minimum dataset Special Interest Group

- The international Interim Steering Committee of the Hip Fracture Registry Special Interest Group has worked since early 2013 in a series of Skype meetings with the principal goal of making possible an FFN Hip Fracture Audit Database, provisionally planned for 2015/2016.

- Work commenced with a consensus exercise aimed at delivering a concise FFN Minimum Common Dataset (MCD). This drew on far more detailed and extensive datasets already in use for large-scale audit, and largely derived from the original Swedish Rikshoft dataset.

- Consensus work resulted in a one-page FFN MCD that is both simple and concise, but captures key elements of case mix, care and early outcomes. Two brief appendices cover follow-up and surgical complication and their management. The MCD has already been well received internationally as potentially user-friendly and cost-effective too, taking much less staff time to complete than previous datasets.

- In recent months the Interim Steering Committee has worked with Crown Informatics - the IT provider for the UK National Hip Fracture Database - on the Pilot Phase of the FFN Hip Fracture Database. Five trauma units - in Germany, Malta, Slovenia and Spain - have committed to participation in an MCD-based Pilot Phase. Data collection is now commencing and will continue to the end of 2014.

- A preliminary report on the Pilot Phase will be presented at the 3rd Global Congress in September, along with a proposed report on the use of the MCD as a basis for comparison of historic data from established hip fracture audits using more detailed but compatible datasets. A final report will be prepared in early 2015.

- Evaluation of experience in the Pilot Phase is expected to provide useful lessons in advance of the proposed wider development – yet to be planned and financed – of the FFN Hip Fracture Database. In particular, the challenges of meeting Information Governance standards on data handling within and between the different jurisdictions are already being usefully explored.

- The above work by the Interim Steering Committee and Crown Informatics has paved the way for the launch of the wider Special Interest Group, with participation in MCD-based comparative international hip fracture audit as a major incentive to join.

The following link provides access to the FFN Hip Fracture dataset, with data definitions and a demonstration video illustrating data entry http://web1.crownaudit.org/FFN/info.nsf

If you would like to join the FFN Hip fracture minimum dataset Special Interest Group, please complete the application form and email it to FFN Central Office at ff-network@mci-group.com.
Vertebral fracture Special Interest Group

http://fragilityfracture.org/cug/6-themes-of-the-ffn/research-and-education/vertebral-fracture-sig/

Draft terms of reference for the FFN Vertebral fracture Special Interest Group

- To assemble a multi-disciplinary international special interest group, within the framework of the Fragility Fracture Network, to take a holistic approach to all aspects of diagnosis, management, rehabilitation and prevention for osteoporotic vertebral compression fracture.
- To oversee the development of an evidence-based model of care that would follow the clinical pathway/patient journey for all men and women with osteoporotic vertebral compression fracture.
- To participate in email exchanges and teleconference calls from time to time as needed to further the objectives.
- To disseminate the information to our professional colleagues, patients, policy makers and the wider community.

If you would like to join the FFN Vertebral fracture Special Interest Group, please complete the application form and email it to FFN Central Office at ff-network@mci-group.com

Rehabilitation research

http://fragilityfracture.org/cug/6-themes-of-the-ffn/research-and-education/rehabilitation-research/

Global Hip Fracture Recovery Research Network Special Interest Group

Vision

To improve outcomes from hip fracture by working collaboratively with scientists and clinicians from around the globe committed to advancing knowledge and carrying out studies.

Aims

Create a network of investigators and clinical sites interested in performing collaborative multidisciplinary hip fracture research to determine the underlying science of recovery from hip fracture (from the time of fracture up to 24 months post hip fracture) and to design and rapidly test interventions directed at improving post-hip fracture outcomes.

Activities and outputs

Create a registry of clinical sites that are currently undertaking or interested in performing hip fracture recovery research. The registry would include information such as volume of hip fracture patients at site, site facilities for conducting different types of studies, and experience of investigators in conducting studies of hip fracture patients.
Develop a taxonomy of interventions to allow more standard evaluation of interventions across studies. This would serve to advance understanding of the types and aspects of interventions that are known to produce positive outcomes which can be used in designing new, multi-modal interventions.

Develop a limited set of outcomes that cover major functional and physiological domains affected by hip fracture that are relevant for examining outcomes from hip fracture at clinical and population levels and that can be recommended for use in future trials of hip fracture patients.

**Plans for 2014**

Identify and assemble a registry of investigators globally who are experienced and interested in participating in multi-site studies of hip fracture patients in order to facilitate rapid testing of novel interventions.

We are currently designing and pre-testing a survey and would like to distribute it to FFN members and those who register for the Madrid meeting, so that we can engage those attending in discussion around their interest and commitment to pursuing studies of hip fracture patients.

**Communication**

Attend FFN annual meeting with workshop and/or plenary sessions.

Use FFN or other website for network communication and knowledge dissemination.

- **Study/Site Registry Repository**
  - Current studies underway
  - Sites undertaking or available for research with appropriate contacts and information about the sites and investigator experience
  - Sites seeking collaborators for current or proposed studies

- **Education**
  - Webinars led by SIG members
  - Lectures on relevant topics – live with discussion and stored for future use
  - Discussion boards around topics of interest to SIG members
  - Discussion boards to include patients, providers and scientists

- **Meetings**
  - Conference calls
  - Virtual meetings

**Membership application**

Open to FFN members and others embracing SIG vision and interested in participating.

No additional membership cost to FFN individual members.

Future: Consideration of fee for industry members and those who are not members of FFN
Coordination and SIG Membership

Coordination/Co-Leaders: Jay Magaziner (USA) and Lauren Beaupre (Canada)

Contact details: Jay Magaziner - JMAGAZIN@epi.umaryland.edu
Lauren Beaupre - Lauren.Beaupre@albertahealthservices.ca

International Society for Fracture Repair

http://fragilityfracture.org/cug/6-themes-of-the-ffn/research-and-education/international-society-for-fracture-repair/

The International Society for Fracture Repair (I.S.F.R.) is embodied in an organisation of individuals from around the world who are dedicated to the advancement and interchange of science of fracture repair and its application to improvement of patient care.

http://www.fractures.com/

Physiotherapy SIG

http://fragilityfracturenetwork.org/cug/6-themes-of-the-ffn/research-and-education/physiotherapy-sig/

Vision

To create a collaborative working group of physiotherapists within the FFN that includes clinical practitioners, educators and researchers who are involved in the whole management pathway of care for fragility fracture patients.
To gather physiotherapists around the world involved in the management of the patient with fragility fracture into a collaborative network.

Aims

To discuss the role of physiotherapists in the whole pathway of care for fragility fracture;
To discuss the mobility disability measures/instruments in each stage of care;
To discuss the whole clinical decision making process, including examination, evaluation, plan of care and outcome assessment measures based on the best available scientific evidence and clinical judgment to address the whole pathway of care for fragility fracture patients;
To discuss (review and assess) the role of exercise as a preventive strategy to prevent falls and fragility fractures;

To discuss the role of exercise as a therapeutic intervention to address reduced physical performance, disability, sarcopenia and frailty related to fragility fractures;
To discuss the role of PTs in the multidisciplinary team co-management for integral care of fragility fracture patients.
Current activity: snapshot survey

International evidence-based guidelines for care of people after hip fracture recommend early mobilisation, multidisciplinary care and interventions to reduce the risk of future fractures that include fall prevention strategies. The extent to which these recommendations are followed in routine care around the world is not known.

The Physiotherapy Special Interest Group of the Fragility Fracture Network (FFN) will soon launch a web-based snapshot survey that aims to document current practices in mobilisation of people recovering from hip fracture as well describe aspects of physiotherapy care for people recovering from a hip fracture.

The survey will be launched in Brazil and Australia in July 2014 and in Denmark and Sweden in September 2014. Please contact us if you are interested in leading a survey in your country.

Monica Peracini (monica.perracini@unicid.edu.br)
Cathie Sherrington (csherrington@george.org.au)

Interim co-chairs Physiotherapy Special Interest Group, Fragility Fracture Network.

Changing healthcare policy

http://fragilityfracture.org/cug/6-themes-of-the-ffn/changing-healthcare-policy/

One of the primary aims of the FFN is to drive policy change that will raise fragility fracture higher up the healthcare agenda in all countries. FFN Congresses serve as a ‘market place for ideas’ in relation to changing healthcare policy. The content of presentations and workshops on policy at previous global Congresses has led to sharing of ideas and resources between activists in different countries.

An outcome of such an interaction at the 2nd Global FFN Congress in Berlin was an invitation for colleagues with experience from New Zealand, the UK and the United States to submit a publication on systematic approaches – and how to build national consensus to implement them – to the German journal Osteologie. This is a very tangible example of the FFN in action:


This section of the fracture care resources section of the FFN website provides a complementary channel to the global Congresses to share ideas and resources relating to policy between FFN members. If you have examples of approaches to changing national policy which do not feature in the summary of progress from the world’s regions below, and would like to see your efforts feature, please contact us.

- Europe
- Asia-Pacific
- Middle East
- Africa
North America

Latin America

Europe

http://fragilityfracture.org/cug/6-themes-of-the-ffn/changing-healthcare-policy/europe/

United Kingdom

Actions

- **Consensus guidelines:** In 2007, the British Orthopaedic Association and British Geriatrics Society led authorship of the ‘Blue Book’ on the care of patients with fragility fracture, which was endorsed by many professional organisations and endorsed by the National Osteoporosis Society. The Blue Book called for implementation of orthopaedic-geriatric co-care services throughout the UK National Health Service (NHS) and universal access to Fracture Liaison Services (FLS). Publication of the Blue Book was coincident with the launch of the UK National Hip Fracture Database (NHFD).

- **National Osteoporosis Society Manifesto:** In 2009, the National Osteoporosis Society (NOS) published their Manifestos for England, Scotland, Wales and Northern Ireland. The Manifestos called for specific actions including central funding of the NHFD, universal access to FLS, financial incentives for secondary fracture prevention in primary care physicians’ national contract and national clinical guidelines to support these objectives.

- **Professional and patient groups:** Throughout 2007-2009, a focused program of government influencing was undertaken collaboratively by the professional organisations and the patient societies, which called upon government to develop specific policies and incentives to improve the quality of acute hip fracture care and secondary fracture prevention for all fragility fracture sufferers.

Outcomes

- **Department of Health policy:** Having established a falls and fractures policy team in 2008 which was comprised of expert contributors to the Blue Book, NHFD and other national audit programs, in 2009 the Department of Health for England published a policy document which addressed both acute hip fracture care and secondary fracture prevention.

- **Best Practice Tariff for hip fracture:** In 2010, the Department of Health implemented a quality incentive for hip fracture patients. An uplift in reimbursement for hip fracture care was offered for those patients that received care in accordance with the professional standards proposed in the Blue Book. The NHFD permitted analysis of adherence at the individual patient level. See the reimbursement section of this website for more details. Further, National Institute for Health and Clinical Excellence (NICE) Quality Standard 16 was published in 2012 which defines clinical best practice in hip fracture care.

- **Primary care physicians’ contract:** In 2012, secondary fracture prevention was included in the General Practice Quality and Outcomes Framework. This provides an opportunity for all
UK primary care physicians to receive a financial incentive when fragility fracture patients aged 50 years and over are entered onto a practice-based fragility fracture register and managed according to NICE guidance\(^{134, 135}\).

**Future directions**

- **Falls and Fractures Alliance:** In 2012, the NOS and Age UK established a new **Falls and Fractures Alliance**. A significant number of patient societies and professional organisations have joined the FFA and all committed to specific actions to reduce the incidence of falls and fractures by 2017.

- **Fracture Liaison Service Database:** The **FLSDB** aims to establish the feasibility of matching primary care medical records to those held in hospitals to establish an ongoing audit of secondary fracture prevention for individuals suffering non-hip fragility fractures.

All of these developments are summarised in:


PubMed ID 24026314

**Asia-Pacific**

http://fragilityfracture.org/cug/6-themes-of-the-ffn/changing-healthcare-policy/asia-pacific/

**Australia**

**Actions**

- **Australian and New Zealand Hip Fracture Registry:** In October 2011, an Australian and New Zealand Hip Fracture Registry Steering Group (ANZ HFR) was established. The objective of the group was to establish hip fracture registries in Australia and New Zealand to enable benchmarking of delivery of professionally-defined standards for hip fracture care and prevention. In May 2012, the ANZ HFR was the recipient of a Bupa Health Foundation Award for AU$477,000. The grant will fund production of national hip fracture guidelines, establishment of national quality indicators, development of a ‘consumer manifesto’ and pilot collection of patient level data in all Australian States and Territories. The hip fracture guidelines are likely to be published in mid-2014. See [http://anzhfr.org/](http://anzhfr.org/).

**New Zealand**

**Actions**

- **Australian and New Zealand Hip Fracture Registry:** In October 2011, an Australian and New Zealand Hip Fracture Registry Steering Group (ANZ HFR) was established. The objective of the group was to establish hip fracture registries in Australia and New Zealand to enable benchmarking of delivery of professionally-defined standards for hip fracture care and prevention. In May 2012, the ANZ HFR was the recipient of a Bupa Health Foundation Award
for AU$477,000. The grant will fund production of national hip fracture guidelines, establishment of national quality indicators, development of a ‘consumer manifesto’ and pilot collection of patient level data in all Australian States and Territories. The hip fracture guidelines are likely to be published in mid-2014. The draft guideline is available from http://anzhfr.org/.

- **Osteoporosis New Zealand strategy:** Published in December, the [BoneCare 2020](http://anzhfr.org/) called for implementation of a systematic approach to hip fracture care and prevention in New Zealand. This included development of a New Zealand Hip Fracture Registry with the capability to benchmark standards of acute hip fracture care in all District Health Boards (DHBs) against the clinical guidelines being drafted by the ANZ HFR Steering Group. The draft guideline is available from [http://anzhfr.org/](http://anzhfr.org/). The strategy also called for nationwide implementation of Fracture Liaison Services.

### Outcomes

- **New Zealand Hip Fracture Registry:** In Q1-2014, discussions are ongoing between all relevant government agencies, professional groups and Osteoporosis New Zealand to establish how to finance and develop the New Zealand Hip Fracture Registry.

- **Fracture Liaison Services:** For the financial year July 2013 to June 2014, FLS was identified in the District Annual Planning process as an expectation for all District Health Boards in New Zealand to implement. During Q4-2013 and Q1-2014, the Ministry of Health facilitated FLS workshops across the country to support this goal.

- **Health Quality and Safety Commission:** The Health Quality and Safety Commission in New Zealand has highlighted the importance of the strategy advocated in [BoneCare 2020](http://anzhfr.org/) in its national quality improvement initiative [Reducing Harm from Falls](http://anzhfr.org/).

### Future directions

- **Systematic approach to primary fracture prevention:** Osteoporosis New Zealand’s [BoneCare 2020](http://anzhfr.org/) strategy document called for improvements in the quality and consistency of acute care for hip fracture sufferers, and nationwide implementation of FLS, to be complete by 2015. The focus for the period 2016-2020 is development of clinically effective and cost-effective systematic approaches to primary fracture prevention. The primary intention of this effort is to put systems in place – First Fracture Prevention Programs - to pro-actively identify as many individuals as possible who, in the absence of intervention, will suffer a hip fracture as their first fragility fracture.

### Middle-East


FFN is currently not aware of activities to change healthcare policy in the Middle-East.
If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

Africa

FFN is currently not aware of activities to change healthcare policy in Africa.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

North America

Canada

Actions

- **Osteoporosis Canada strategy:** In 2013, Osteoporosis Canada launched the Make the FiRST break the LAST with Fracture Liaison Services initiative, which calls for all jurisdictions in Canada to implement a Fracture Liaison Service (FLS) by 2015. The extensive associated appendices include modelling of potential cost savings for all Canadian provinces and a comprehensive analysis of the most effective operational characteristics of FLS.

United States of America

Actions

- **U.S. Surgeon General’s Report on Bone Health:** Published in 2004, this comprehensive report evaluated the impact that fractures caused by osteoporosis has on older Americans and healthcare budgets. One key recommendation was for public and private sector stakeholders to work collaboratively to develop a national action plan for bone health.
- **National Action Plan for Bone Health:** In 2008, in response to the recommendation of the Surgeon General’s Report, a national stakeholder meeting brought together 150 representatives or public and private sector organisations to draft a National Action Plan for Bone Health. Priority areas to improve the quality of care across the United States were identified, with the first priority being development of a national bone health alliance.
- **National Bone Health Alliance:** In late 2010, the NBHA was launched as a public-private partnership co-convened by the American Society for Bone and Mineral Research (ASBMR) and the National Osteoporosis Foundation (NOF). By 2014, NBHA’s membership had grown
to 55 organisational participants including 16 private sector members, 35 non-profit members and 4 government agency liaisons (The Centers for Disease Control and Prevention, Food and Drug Administration, National Aeronautics and Space Administration and National Institutes of Health). In 2011, NBHA and Kaiser Permanente launched their ‘20/20 Vision’, which aims to reduce the incidence of fragility fractures in the United States by 20% by year 2020\(^\text{137}\). Pursuant to achieving this bold goal, NBHA has developed two key initiatives:

- **2Million2Many Awareness Campaign**: Launched in April 2012, this award winning campaign highlights the connection between fractures and osteoporosis for the 2 million fractures which occur in the United States every year. ‘2M2M’ encourages individuals aged ≥50 years who break a bone to ask their healthcare professional for an osteoporosis test and gets people thinking about bone health. The centrepiece of the campaign is ‘Cast Mountain’ (picture below), a thought provoking 3.6 metre tall by 3.6 metre wide installation which represents the 5,500 fractures that occur every day in the United States. See [www.2million2many.org](http://www.2million2many.org).

- **Fracture Prevention CENTRAL**: Launched in March 2013, the Fracture Prevention CENTRAL online resource centre was created to help interested sites across the United States implement and maintain a Fracture Liaison Service program. By March 2014, over 1,900 individual users had registered to access the tools and resources available at ‘FPC’. NBHA also used FPC as a platform to deliver a six-part FLS webinar series, freely available for ‘live’ participation and archived as a video-on-demand service, hosted by champions of established high-performing FLS and NBHA staff. During 2013, 600 individuals participated online and a further 1,500 downloaded webinars for viewing at their own convenience. This resource centre is available at [www.FracturePreventionCENTRAL.org](http://www.FracturePreventionCENTRAL.org).

**Outcomes**

- **Fracture Liaison Service Demonstration Study**: In December 2013, NBHA, the National Osteoporosis Foundation (NOF) and CECity.com, Inc. (CECity), the Bone Health Collaborative launched a cloud-based Fracture Liaison Service Demonstration Study (FLS Demonstration) that will provide participating hospitals with the FLS model of care and CECity’s cloud-based MedConcert\(^\circ\) platform, to assess the hospitals’ adoption and implementation of a FLS across their communities. The FLS Demonstration Study, funded by Merck, is designed to demonstrate the ability to scale the FLS in the community setting, while measuring the impact on patient care. See [http://nof.org/news/1774](http://nof.org/news/1774).

- **National quality metrics**: In February 2014, the National Quality Forum Endocrine Steering Committee reviewed three post-fracture osteoporosis measures developed by The Joint Commission. The two measures below were endorsed by the Committee:
  - **Laboratory Investigation for Secondary Causes of Fracture**: Patients with fragility fracture who have had appropriate laboratory investigation for secondary causes of fracture ordered/performed prior to discharge from in-patient status.
Risk Assessment/Treatment After Fracture: Patients age 50+ with a fragility fracture who have either a DXA scan ordered or performed, prescription for FDA-approved osteoporosis pharmacotherapy, and/or seen by or linked to a fracture liaison service prior to in-patient discharge. If DXA not available, other fracture risk assessment method may be ordered/performed.

Reproduced with kind permission of the National Bone Health Alliance.

Most of these developments are summarised in:


Latin America


FFN is currently not aware of activities to change healthcare policy in Latin America.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network
Fragility fracture care guidelines

http://fragilityfracture.org/cug/care-guidelines/

Clinical guidelines relating to the acute care of fragility fracture patients, particularly hip fractures, and secondary fracture prevention are available in many countries. Guidelines relating to acute care are listed below by region and country. With respect to guidelines relating to secondary fracture prevention, the International Osteoporosis Foundation maintains a comprehensive list at http://www.iofbonehealth.org/national-regional-osteoporosis-guidelines.

- Europe
- Asia-Pacific
- Middle East
- Africa
- North America
- Latin America

Europe

http://fragilityfracture.org/cug/care-guidelines/europe/

Spain


United Kingdom

- British Orthopaedic Association and British Geriatrics Society. The care of patients with fragility fracture. 2007. Link.

Asia-Pacific

http://fragilityfracture.org/cug/care-guidelines/asia-pacific/

Australia and New Zealand


**Middle-East**
http://fragilityfracture.org/cug/care-guidelines/middle-east/

FFN is currently not aware of fragility fracture care guidelines from the Middle-East.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

**Africa**
http://fragilityfracture.org/cug/care-guidelines/africa/

FFN is currently not aware of fragility fracture care guidelines from Africa.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

**North America**

**United States of America**

Latin America
http://fragilityfracture.org/cug/care-guidelines/latin-america/

FFN is currently not aware of fragility fracture care guidelines from Latin America. The Spanish ‘Libro Azul’ guideline may be of interest to Latin American members:


If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

Fragility fracture registries
http://fragilityfracture.org/cug/registries/

Fragility fracture registries provide a means to benchmark care against national clinical standards. Registries have been established and in development in several countries. Links to registries are listed below by region and country.

- Europe
- Asia-Pacific
- Middle East
- Africa
- North America
- Latin America

Europe
http://fragilityfracture.org/cug/registries/europe/

Ireland


Spain

- N.B. In development. Spanish Registry of Hip Fractures.
United Kingdom

- National Hip Fracture Database (NHFD). [http://www.nhfd.co.uk/](http://www.nhfd.co.uk/)

Asia-Pacific


Middle-East


Africa


FFN is currently not aware of fragility fracture registries in Africa.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at [web.editor@fragilityfracture.network](mailto:web.editor@fragilityfracture.network)

North America


Canada

- N.B. In development. British Columbia Hip Fracture Registry. [Link](http://www.ownthebone.org/). Also see Bone and Joint Decade Canada’s [National Hip Fracture Toolkit](http://www.ownthebone.org/)

United States of America

Latin America
http://fragilityfracture.org/cug/registries/latin-america/

FFN is currently not aware of fragility fracture registries in Latin America.

If FFN members have new information they would like to share – in terms of actions taken, outcomes of those actions and planned future directions - please contact the FFN Web Editor at web.editor@fragilityfracture.network

Resources and webinars
http://fragilityfracture.org/cug/resources-und-webinars/

FFN has developed a global literature registry structured in accordance with the 6 themes of the FFN. At the launch of the fracture care resources section of the FFN website, the literature registry contains key publications for each theme from the existing literature. Moving forwards, FFN will update the registry as important work is published and so enable FFN members to stay abreast of latest developments and innovations.

During 2014, FFN intends to develop a webinar series to share best practice from individuals who have developed high performing orthopaedic-geriatric co-care models and contributed to the development of national fracture registries and clinical guidelines. FFN is keen to respond to the educational needs of members and so would be pleased to receive suggestions for topics of webinars through the contact us link.

As is evident throughout this fracture care resources section of the FFN website, many organisations in many countries have developed useful resources to support better patient care. Links to such resources are available below. If members are aware of other resources that should feature in this section of the site, please contact us.

- Global literature registry
- Educational webinars
- Links to online resources

Global literature registry
http://fragilityfracture.org/cug/resources-und-webinars/global-literature-registry/
Educational webinars
http://fragilityfracture.org/cug/resources-und-webinars/educational-webinars/

During 2014, FFN intends to develop a series of interactive webinars. If FFN members would like to propose the theme for a Webinar and/or develop content and deliver a Webinar, please contact the FFN Web Editor at web.editor@fragilityfracture.network.

Links to key online resources
http://fragilityfracture.org/cug/resources-und-webinars/links-to-online-resources/

- 3rd FFN Global Congress in Madrid in September 2014
- Established national hip fracture registries:
  - Australian and New Zealand Hip Fracture Registry website – www.anzhfr.org
  - U.K. National Hip Fracture Registry – www.nhfd.co.uk
- Secondary fracture prevention initiatives:
  - International Osteoporosis Foundation - Capture the Fracture Campaign
  - National Bone Health Alliance (U.S.A.) - Fracture Prevention CENTRAL website
  - Osteoporosis Canada - Make the FIRST break the LAST with Fracture Liaison Services
  - Osteoporosis New Zealand - BoneCare 2020
- Multi-sector national coalitions:
  - National Bone Health Alliance (U.S.A.) - http://www.nbha.org/
References


