# Reducing delays in administration of first dose Denosumab through introduction of ACP led consent process during inpatient stay

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## Aims

**At Wrightington, Wigan and Leigh, we admitted over 400 patients with hip fracture diagnosis in 2023.**

As part of orthogeriatric review, denosumab treatment would be utilised in a cohort of patients where this is appropriate, in line with NOGG guidelines.


Traditional model of delivering first dose after outpatient appointment led to delays in treatment initiation and did not address the significant risk of "imminent fracture" which was recognised in the latest NOGG guidelines.

The aim of this project was to reduce delays in denosumab treatment initiation by introducing consenting process during hospital stay led by orthogeriatric Advanced Clinical Practitioner.

## What is Osteoporosis?

### Osteoporosis is:

*"a progressive systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture"*

**549,000 new fragility fractures.**
**£4.7 Billion per year**

**86,000 vertebral fractures.**

**105,000 hip fractures.**
**£1.1 Billion per year**

**358,000 other fractures.**

**Total direct costs for 2019 were £5.4 billion accounting for 2.4% of healthcare spending.**

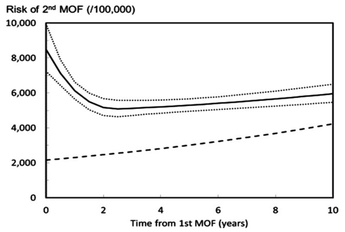
data from NOGG 2021 guideline

## Why Do We Need To Start Bone Protection Early?

**After a fragility fracture, patients are five times more likely to sustain a second major osteoporotic fracture (MOF) within the next 2 years.**

**Broken Bones, Broken Lives: The fragility fracture crisis in the UK**

- Despite this, 49% of women over 50 years of age with osteoporosis do not receive treatment (IOF, 2019).




Risk per 100,000 (95%CI) of a second MOF after a first MOF for a woman at the age of 75 years at her first fracture.

The dashed line represents the risk of first MOF in the age and sex-matched population.

**It is imperative that pathways are in place for starting treatment promptly following a fragility fracture.**

Johansson H, Siggeirsdottir K, Harvey NC, Oden A, Gudnason V, McCloskey E, Sigurdsson G, Kanis JA. Imminent risk of fracture after fracture. Osteoporos Int. 2017;28:775–780. doi: 10.1007/s00198-016-3868-0

## What is Denosumab?

**Denosumab is a fully humanised monoclonal antibody against Receptor Activator of Nuclear factor Kappa B Ligand (RANKL), a major regulator of osteoclast development and activity.**

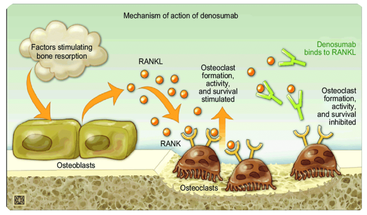



Figure 1 Mechanism of action of denosumab. Note: Copyright© 2012. Nature Publishing Group. Reproduced with permission from Lewiecki EM, Bilezikian JP

### Treatment

- 60mg, subcutaneous inject given 6 monthly for 3 years.
- Followed by Consolidation doses of Zoledronate 6 months after the last dose; this reduces subsequent bone loss

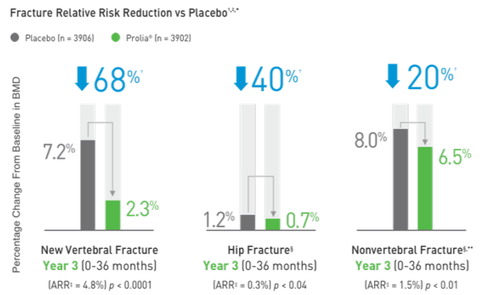
### Contraindications

- in patients with hypocalcaemia
- with hypersensitivity to any of the constituents of the formulation
- its use is not recommended in pregnancy or in those age <18 years.

### Side effects

- Hypocalcaemia
- skin infection
- predominantly cellulitis
- eczema
- flatulence
- Rare adverse effects include osteonecrosis of the jaw and atypical femoral fractures.

## Methods




Cummings et al. Denosumab for prevention of fractures in postmenopausal women with osteoporosis N Engl J Med 2009;361:756-765 DOI: 10.1056/NEJMoa080949

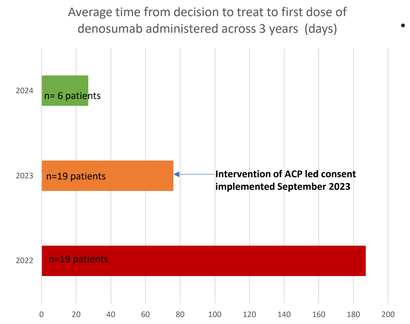
- Utilising hospital electronic records, a sample of patients was selected from cohort reviewed by orthogeriatric team admitted in 2022 (19 patients), 2023 (19 patients) and 2024 (6 patients).
- Time of decision to treat with denosumab to time of first dose administered was used as the outcome measure.
- Alongside this, analysis of time to outpatient appointment was completed which was where the pre-intervention consent was taken.
- Intervention of inpatient consent being taken was implemented in September 2023.

**Primary Endpoint:** Incidence of new vertebral fractures at 3 years
**Secondary Endpoints:** Time to first nonvertebral and hip fracture[1,2]
**Prolia® reduced the incidence of new vertebral fracture in patients with or without a baseline vertebral fracture[1,2]**
In the pivotal phase 3 fracture trial, 1 in 4 patients had a baseline vertebral fracture[2]
No overall differences in the efficacy and safety of Prolia® were observed between younger patients and patients aged 75 or older[1]
Of the total number of patients in clinical studies of Prolia®, 9,943 (76%) were 65 years old, and 3,576 (27%) were 75 years old[1]
*Includes 7,393 patients with a baseline and at least one post-baseline radiograph.[1,2]
†Relative risk reduction.
‡Absolute risk reduction.
§Secondary endpoints were time to first nonvertebral and hip fracture, assessed at 3 years.
**Composite measurement excluding pathological fractures and those associated with severe trauma, fractures of the vertebrae, skull, face, mandible, metacarpals, fingers, and toes.[1,2]

## Results

### Average Time to First Dose

**Implementation of ACP led consent has reduced waiting time for bone protection initiation**

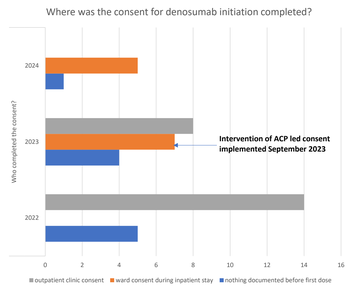



- The average length of time from clinical decision being made to first dose of denosumab being administered was 187 days in 2022 sample, 76 days in 2023 sample and 27 days in 2024 sample

### Who Completed the Consent

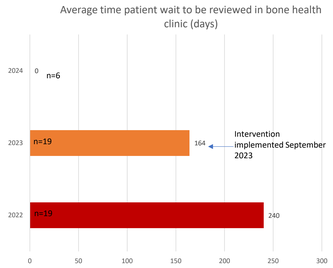
**Standardised format of consenting patients was adopted to improve information provided, allow provision of patient information leaflet and time for discussion.**

- The governance around consent process was established and adopted by the whole orthogeriatric team.




### How long do patients wait to be seen in bone health clinic?

**Imminent risk of fracture means that initiation of treatment should take as soon as possible after sentinel fracture – waiting for outpatient clinic appointment caused significant delays.**

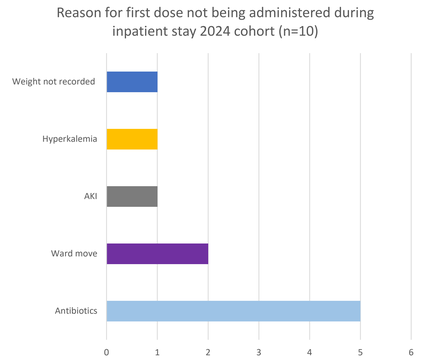



- Waiting times for outpatient bone health clinic were on average 240 days in 2022, 164 days in 2023 and unknown in 2024 cohort.

## Results

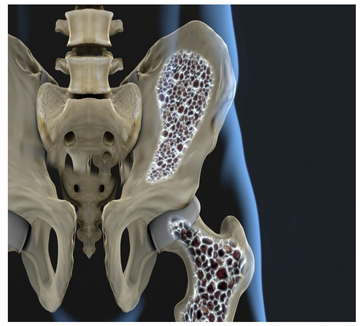
### Reasons for First dose of Denosumab not administered as inpatient

**Where inpatient administration of denosumab did not take place there were either clerical, medical or location reasons for this**




- Further analysis took place of the cohort where first dose was not administered during hospital stay up to end of April 2024

## Conclusion



**Introduction of ward-based consent process for patients who are suitable for denosumab led to significant decrease in delays in time to first dose.**

**This ensures that patients benefit from bone protection in a timely manner, as their risk of refracture is greatest in the immediate post sentinel fracture period.**

**Further involvement of junior doctors from both orthogeriatric and orthopaedic teams as well as Trauma Coordinators to follow the same process of inpatient consent being taken will allow more patients to be treated in a timely manner.**

**Time is bone – consent and offer first dose as inpatient where safe to do so**