

# Does measuring the bone mineral density of patients identified as having an osteopaenic X-ray appearance affect bone health treatment decisions? A real-world retrospective analysis

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## Introduction

Osteoporosis is a disease characterised by low bone mass, defined by the World Health Organization as equalling or exceeding 2.5 standard deviations below the mean for healthy young adult women at any site, and is associated with increased susceptibility to fragility fractures.<sup>1,2</sup> Osteoporotic fractures cause substantial morbidity, mortality and health economic cost, with hip fractures in particular resulting in a 1-year mortality of 20% and permanent disability in up to 50% of cases.<sup>2</sup> Incidence of hip fracture is projected to exceed 100,000 UK cases per year by 2020 as the population ages, with direct health costs alone exceeding £2 billion per annum.<sup>3</sup>

Given this context, identifying those at an increased risk of fracture and targeting effective interventions to the right individuals is a major public health concern. The National Institute for Health and Care Excellence (NICE) advises assessing fracture risk in all women over the age of 65 years and men over the age of 75 years, as well as younger individuals with other known bone health risk factors, using a fracture risk assessment tool, such as FRAX or QFracture, in the first instance.<sup>2</sup> Dual energy X-ray absorptiometry (DEXA) scanning should then be considered for: those individuals whose fracture risk is close to a treatment intervention threshold, people over the age of 50 who have sustained a fragility fracture, those being commenced on treatments known to have rapid effects on bone density like aromatase inhibitors, or individuals under the age of 40 with a major bone health risk factor.<sup>2</sup> The International Society for Clinical Densitometry (ISCD) recommends similar, though not identical, indications for DEXA scanning.<sup>4</sup>

The Royal National Hospital for Rheumatic Diseases (RNHRD), Bath, offers a direct access requesting and reporting service for DEXA scans to local primary and secondary care clinicians, in order to facilitate identification of individuals at increased risk of future fragility fractures. The DEXA reports quote a post-DEXA FRAX

risk score where possible and include an individualised treatment recommendation. The latter is based on locally agreed intervention thresholds, which differ from National Osteoporosis Guideline Group (NOGG) recommendations most significantly in that a fixed intervention threshold (treatment advised if 10-year major osteoporotic fracture risk exceeds 20% or hip fracture risk exceeds 5%) is used across all ages, rather than being age-dependent.

In addition to those indications for DEXA scanning recommended by NICE and ISCD, DEXA scans are also performed when requested due to an 'osteopaenic appearance' being reported on plain X-ray or other imaging modality. Our aim was to identify the extent to which performing a DEXA for this indication alone affected treatment recommendations.

## Methods

A retrospective analysis was performed of DEXA reports issued by RNHRD between 1 October 2016 and 30 September 2018. Reporters included two consultant rheumatologists, with a specialist nurse and several rheumatology specialist registrars also reporting with consultant support.

An initial search was performed of the RNHRD clinical measurement department database in order to identify DEXA scans which were requested with 'osteopaenic X-ray appearance' being offered as the sole indication. A further review was then performed for each patient of their bone health risk factors in order to identify whether the DEXA could in any case have been justified according to current NICE or ISCD guidelines. Patients were excluded from further analysis if an alternative DEXA indication to 'osteopaenic X-ray appearance' was identified at this review.

For the remaining patients, a pre-DEXA FRAX risk score was calculated with the consequent NOGG recommendation recorded. The DEXA reports for these patients were then analysed with the following parameters recorded: age; site of reported osteopaenia (further categorised as axial if vertebral or pelvic, versus peripheral if elsewhere); bone mineral density (BMD) category (osteoporosis, osteopaenia or normal BMD); treatment and follow up recommended by the reporter; whether treatment recommendation strictly adhered to local guidelines; and whether treatment would be recommended according to NOGG. We

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**Table 1. Patients excluded from further analysis due to alternative indication for DEXA**

Alternative indication for DEXA	N
Pre-DEXA FRAX score results in NOGG recommendation for DEXA	36
History of fragility fracture	25
Secondary causes of osteoporosis, not adequately captured by FRAX	6
Follow up after a previous DEXA	2
Osteopaenic X-ray report couldn't be identified	2

DEXA = dual energy X-ray absorptiometry; FRAX = a tool to evaluate fracture risk in patients; NOGG = National Osteoporosis Guideline Group.

then identified those cases where the treatment or follow-up recommendation changed as a result of the DEXA, for example where the DEXA report recommended bisphosphonate treatment whereas NOGG would have recommended reassurance and lifestyle measures based on the pre-DEXA FRAX score.

## Results and discussion

Ninety-one patients were identified by the initial database search as having been referred for DEXA on the basis of 'osteopaenic X-ray appearance'. Overall, bisphosphonate treatment was recommended in 20 of these patients (22%) and a follow-up DEXA was recommended in 22 patients (24%).

Following the subsequent review, we identified that 71 of these could have been justified by existing NICE and/or ISCD guidance, hence were excluded from further analysis (reasons for exclusion detailed in Table 1).

Of the remaining 20 patients who underwent a DEXA scan in this time period (ie those performed for the sole indication of an osteopaenic X-ray appearance), three were found to have osteoporosis, 10 had osteopaenia and seven had normal bone mineral density. In one (5%) case a recommendation was made to treat with a bisphosphonate, on a patient where osteopenia was reported on an ankle X-ray, who was found to be osteoporotic by BMD. A follow-up DEXA was recommended for two patients in total (10%). All other patients in this cohort were recommended bone health lifestyle measures only. In this cohort of patients, there were no discrepancies between the actual treatment recommended in the report with both local and NOGG recommendations, based on the post-DEXA FRAX score.

## Conclusion

This analysis demonstrates that offering DEXA scanning to patients with an osteopaenic X-ray appearance who would not otherwise meet NICE criteria for this test may allow identification of a small number of additional individuals who could benefit from antiresorptive treatment and/or monitoring of bone density. Whether this is sufficient to justify the additional resource utilised remains open for debate. The major limitations of this analysis are its retrospective nature, small cohort numbers and dependence on internal coding of the indication for a DEXA request to identify patients. Future work could include a prospective cohort analysis of the bone health of patients found to have an osteopaenic X-ray appearance. ■

## Conflict of interest statement

None declared.

## References

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