INTRODUCTION
The National Health Service (NHS) faces a significant increase in fragility fractures putting pressure on acute and community services. Vertebral fractures are the most common osteoporotic fracture and the most predictive of subsequent hip fractures (1). The cost to the patient and the health service of hip fractures can be avoided if systems are designed which allow quick identification and management following vertebral fractures.

METHOD
The data has been taken over a 12 month period. All females aged 45 and above who attended Accident & Emergency for plain film imaging (PFI) of their pelvis were considered for this audit. Only patients with positive hip fractures and previous findings of osteopenia/bone demineralisation (BD) or recorded on thoracic and/or lumbar spine plain film were counted. The aim of this audit was to establish how frequently Dual Energy X-ray Absorptiometry (DEXA) scans were carried out as a result of positive findings of osteopenia/BD on PF spinal reports in cases where there was no known history of the disease.

FINDINGS
- Over the 12 month period, 45 patients with previous findings of osteopenia/BD on PF sustained a fracture to their hip (44% right, 56% left).
- The average age of a hip fracture was 85. The youngest patient was 67 and the eldest was 96.
- Only 11% of patients who fractured their hip had a DEXA scan recommended after previous PF findings of osteopenia/BD.
- A DEXA scan was not performed in 60% of patients before or after spinal imaging despite having evidence of osteopenia/BD noted in their report.
- 8 out of 45 patients died after sustaining a hip fracture. Of these 8, 6 did not have a DEXA scan despite having osteopenia/BD noted on their previous spinal imaging.

DISCUSSION
Vertebral fractures are a powerful predictor of further fracture. Over 55% of patients with hip fractures have evidence of a previous spinal fractures. However, as the majority are undiagnosed, the opportunity to intervene and prevent the hip fracture is missed (2). Effective management of patients with osteoporotic vertebral fractures requires a cohesive approach across the entire fracture prevention pathway, with imaging departments being exclusively positioned to bring about extensive improvements (3).

IDENTIFICATION AND REPORTING OF VERTEBRAL FRACTURES
Vertebral fractures are most likely to be under-reported on imaging acquired for non-musculoskeletal indications (4). It is suggested that imaging departments establish local procedures to guarantee that the spine is routinely evaluated (in all relevant modalities) for the presence of a vertebral fracture. Depending on local policies, this may involve:
- Standard sagittal reformattting of images using bone algorithms
- Scrutiny of lateral views of the spine
- Raising awareness among reporting clinicians regarding the importance of vertebral fracture detection
- Training and continuing professional development (CPD) to increase confidence in the recognition of vertebral fractures
- Agreement between diagnostic imaging departments, referring clinical teams and trust management of reliable, fail-safe alert mechanisms in respect to vertebral fractures (3)(4)(5)

REPORTING TERMINOLOGY
Whenever any form of imaging that includes the spine is reported, the report should indicate that the spine has been evaluated. It is essential that the appearance of the vertebral bodies are described unambiguously. A vertebra may be described in one of three ways:

1. Vertebral fracture
   - Additional information should be given describing the vertebra level(s) involved and the severity of the fractures.
   - If previous imaging that includes the spine is available, this should be reviewed and compared to determine the timing of the fracture.

2. Non vertebral deformity
   - If the cause of the deformity is clear, this should be described in the report. Common causes include degenerative change, Scheuermann’s disease and Schmorl’s nodes.

3. Normal (3)(4)(5)

The Royal College of Radiologists recommend actionable reporting. If a vertebral fracture is identified, the report should use alerts which flag to referring clinicians that there is a need for further assessment and management to reduce the patient’s risk of further fracture (6). The presence of severe, multiple or recent spinal fractures indicates that the patient is a very high fragility fracture risk, requiring urgent evaluation. Standard phrases may be saved as short codes and inserted into reports. Examples include:
- Apparences suggest osteoporosis – the patient should be offered assessment in the Fracture Liaison Service.
- Apparences suggest osteoporosis. Further investigation and management to reduce the risk of further fracture is advised.
- Apparences suggest a high risk of fragility fracture – referral for DEXA scan / referral to the metabolic bone clinic is advised (3).

REFERENCES
2. Wedging of the vertebral bodies of the mid and lower thoracic spine. [Image 2. Wedging of the vertebral bodies of the mid and lower thoracic spine (7)]

Fig 1. Basic cervical fracture of the mid and lower thoracic spine.

Fig 2. Wedging of the vertebral bodies of the mid and lower thoracic spine (7)

ADVANCED PRACTICE
Skill-mix initiatives have provided opportunities for radiographers to develop roles and achieve their potential, consequently contributing to radiographer retention rates and increased job satisfaction (10)(11). As radiographer role expansion is well established in other areas, it seems natural to consider opportunities in DEXA. As a result of increasing referrals and service development, there is a clear need to increase capacity for both image acquisition and reporting. It is imperative to ensure systems are in place to deliver the advanced interventions:
- Falls prevention
- Detecting and managing osteoporosis
- Optimal support after a fragility fracture

CCGs should work across the system to ensure that systems are in place to deliver the advanced interventions:
- Targeted case-finding for osteoporosis, frailty and falls risk
- Strength and balance training for those at low to moderate risk of falls
- Multi-factorial intervention for those at higher risk of falls
- Fracture liaison service for those who have had a fragility fracture (8)(9)

CONCLUSION
Around 79,000 people suffer hip fractures in the UK each year. Less than one third of patients make a full recovery and around 20% die within a year. By 2025, this is predicted to cost the UK economy £5.5 billion a year (15). As healthcare professionals we are in an ideal position to identify and respond to both suspected and incidental findings of vertebral fractures. In conjunction with Fracture Liaison Services, this could prompt more referrals for DEXA and potentially reduce the number of hip fractures and subsequent hospital admissions with a huge financial saving.

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