Established osteoporosis is the preferred term for those with osteoporosis (a T-score less than -2.5 at the hip or spine), and one or more fragility fractures. Recognized fractures for this definition include Colles’, hip, vertebral and low-trauma fractures at the ankle. (While various other terms, such as ‘severe,’ ‘advanced’ or ‘frank’ osteoporosis appear in reports, they have no specific meaning and should not be used).

A first fragility fracture doubles the risk of a further fracture. Having a second fracture increases the risk five-fold, while those with two previous fractures have a 12-fold increased risk (versus those with the same T-score and no fracture). Because of this increased risk, current guidelines indicate treatment of those who have had a fracture if the T-score is below -1.5. In other words, the diagnosis of osteoporosis is not required to treat these individuals. We therefore recognize three groups:

- Those with a fracture and low bone density who should be treated
- Those with a fracture and osteoporosis, called ‘established osteoporosis’, who also should be treated
- Those with osteoporosis but low risk otherwise, in whom treatment may not be necessary yet.

For many, their risk of having osteoporosis is only recognized when they suffer their first fracture. Two-thirds of vertebral fractures do not present clinically (sudden sharply localized back pain perhaps with radiation around the chest or abdomen). Herein lies the first hurdle – how to recognize those at increased risk due to a vertebral fracture.

The radiation dose incurred in obtaining lateral thoraco-lumbar spine radiographs is too high, preventing their use as a screening tool. Those with a classic history, or a significant height loss in the context of risks for low bone mass are appropriately referred for imaging.

Those who have sustained another fragility fracture are best assessed by considering other risk factors (see below), as the majority will be recommended therapy without knowledge of vertebral fractures.

A new type of analysis can be carried out during the DXA scan. The procedure is called lateral vertebral assessment, and uses a low radiation dose image obtained on the DXA machine. However, the patient has to be turned onto their side. This additional image will be most appropriate in those in whom the presence of a vertebral fracture will alter the treatment decision (i.e., a T-score in the range -1.5 to -2.5 at age 60 or more). For the present, the decision to carry out LVA remains at the discretion of the DXA provider, and its use has not been incorporated into published guidelines.

At the time of presenting with a non-vertebral low trauma fracture, many other risk factors are present that highlight the person’s cumulative fracture risk. In our audit of those attending a fracture clinic, over 50% at high risk of further fracture were identified on the basis of a clinical risk factor assessment alone. Such risks include:

- Age (risk increase of 1.4 per five-year interval over 50)
- Maternal history of hip fracture (2.2-fold increased risk)
- Alcohol consumption > two units/day (1.7-fold increase)
- Body mass index (1.4 if BMI less than 20).

However, almost half of those attending a fracture clinic with their first (apparent) fragility fracture did require DXA to make the most appropriate, evidence-based, treatment decision. Thus, access to DXA is essential if cost-effective treatment is to be offered.

To aid treatment decisions, many risk factors are present when a fracture is sustained: age, past fractures, smoking, alcohol consumption, family history of fractures, and others.

Effective treatment is available for those who sustain a fracture due to osteoporosis, writes Dr Donncha O’Gradaigh.
The second hurdle to be overcome is ensuring that each person who presents with a fracture is assessed in the way outlined above. The published experience of fracture clinics reflects our own audit, where the vast majority (more that eight in 10) leave the fracture clinic without any intervention or onward referral to reduce future fracture risk. The final hurdle is to effectively communicate the need for treatment to those who will be most involved – the individual and the primary care providers. Until the patient understands the need for treatment, its purpose, risks and benefits, compliance will remain poor (currently little more than 50% at one year).

Fracture liaison service

A fracture liaison service dramatically improves on the management of established osteoporosis. An experienced nurse can assess each person’s risk and can refer patients for a DXA scan. This can be obtained at the same centre or the test can assess each person’s risk and can refer patients who are being offered any other intervention, whether provided through generic or Fosavance (with added vitamin D) and risedronate (Actonel) are well-known, and each has strong evidence of fracture-risk reduction at all sites. This evidence is particularly convincing in those at highest risk, such as the individual with established osteoporosis (ie. DXA T-score < -2.5 plus a fracture). Of note, studies recruited women with one or more vertebral rather than peripheral fractures.

Ibandronate (Bonviva) was recently launched with the distinction of once-monthly dosing. However, fracture risk reduction has been limited to the spine in studies to date.Raloxifene (Evista) is an effective anti-resorptive drug acting via the oestrogen receptor. It, too, has only demonstrated efficacy in reducing vertebral fractures, despite studies being adequately powered to assess risk at non-vertebral sites. Thus, with the caveat above about the individual risk profile and preferences, this drug is suitable only in those younger women (as a guide, below aged 65 or so) who still have a relatively low risk at non-vertebral sites.

Strontium ranelate (Protelos) has a unique method of action, with fracture risk reduction at vertebral, non-vertebral and hip sites. Taken as daily treatment, upper GI tolerance is reported to be high. This treatment is a valuable option, particularly in those who have not tolerated a bisphosphonate. Indeed, the data in older patients (over 80 years) indicated a high efficacy and tolerance, making it a good first choice if daily dosing is not problematic.

The anabolic drug teriparatide (Forsteo) is unique in its method of action and in its use as a daily subcutaneous injection for a maximum of 18 months, after which an anti-resorptive is strongly recommended. Fracture risk reduction in the spine is marked (90% relative risk reduction) and rapid. However, bearing in mind its cost, and the patient characteristics in the main study, it is best reserved for those with very low bone mass (below -3 as a guide) and at least one vertebral fracture (in addition to any peripheral fracture). The pivotal study was underpowered to detect a statistically significant reduction in hip fractures, which may cause concern in treating patients in the age group most at risk (75 years and older).

Recent controversy

Finally, there has been recent controversy following the publication of two studies on vitamin D and calcium in fracture risk reduction. Both vitamin D and calcium are essential bone nutrients, not bone-acting treatments.

As such, they should be prescribed in all patients who are being offered any other treatment, unless there is strong evidence of adequate calcium intake and sunlight exposure.

In older patients (over 75 years) even this may not suffice, as vitamin D and calcium metabolism become inefficient. In this group, supplementation is recommended for all to prevent secondary hyperparathyroidism, itself a significant cause of bone fragility in the older person.

In contrast with the older studies demonstrating fracture risk reduction with vitamin D and calcium alone, the recent studies were in patients with previous fractures. It is not realistic to expect nutrients to reduce fractures in such a high-risk population. These studies do not contradict the value of vitamin D and calcium supplements, but rather serve to emphasise the need for adequate treatment with bone-acting drugs in those at greater risk.

In summary, effective treatment is available for those who have sustained a fracture due to osteoporosis. The integration of risk assessment at the first point of contact, treatment in primary care, and of community or hospital-based falls prevention is essential if we are to reduce the burden of morbidity and mortality associated with bone fragility.

Donncha O’Gradaigh is consultant rheumatologist at Waterford Regional Hospital