

Bone – Dr. Nick Harvey

Hello, my name is Nick Harvey and I am a Senior Lecturer and Honorary Consultant Rheumatologist at the Medical Research Council Lifecourse Epidemiology Unit, at the University of Southampton.

My research interest is around what we can do early in life to optimise bone development and reduce the risk of broken bones in older age. I am really grateful to all those who are already part of UK Biobank and have contributed data relating to bone quality. This imaging enhancement offers a really exciting opportunity to study what factors determine the size, strength and density of a person's bones and how these factors might predict risk of future fracture.

Osteoporosis literally means 'porous bones' and refers to the situation whereby there is loss of both bone tissue and its structural integrity. This leads to an increased risk of fragility fracture - that is breaking a bone through a low trauma event such as falling over from standing height. Such fractures cost the UK economy around £3 billion a year with much of the expense resulting from hospital treatment for hip fracture.

Major fractures resulting from bone fragility are associated with reduced lifespan, bringing survival down by about 20% compared with people who do not experience a fracture. Fragility fractures are extremely common, it has been estimated that at the age of fifty years one in two woman and one in five men will experience a major osteoporotic fracture in their remaining life times.

So osteoporosis is clearly a significant public health issue. Although we now have very effective treatments which can reduce fracture risk by around 50%, the scale of the problem means that we desperately need to improve our understanding of what



factors determine fracture risk and how bone density and bone quality might relate to other diseases.

UK Biobank is unique in many ways, not least its scale and assessment of multiple organ systems relevant to a comprehensive range of diseases of middle and older age. The really exciting thing about this imaging enhancement is that we will have the opportunity to study bone mass and determinants of osteoporosis in relation to other common chronic diseases such as diabetes, atherosclerosis, hypertension, dementia, and sarcopenia (muscle loss). This is a unique research opportunity and promises to deliver ground breaking scientific information.

The DXA scan is painless and involves a very low dose of x-rays, comparable to those which might be experienced from the background atmosphere over a few days in Cornwall. The scan will obtain images of your entire skeleton and more detailed images of the lower spine and hips, together with knees. A further scan will assess the whole spine.

These images will allow us to measure bone density at the lumbar spine and hip and also produce detailed images to assess early changes of osteoarthritis and changes in the shape of the back bones. Furthermore, the whole body scan allows us to measure the amount of bone, fat and muscle tissue in the body and can be related to the more detailed measures obtained from the MRI scans.

As our population ages and the number of frail elderly increases, it will be essential to work out ways to help achieve healthy aging. UK Biobank provides a unique opportunity to really understand the determinants and precursors of disease of older age and I am really grateful to all of our participants thus far. It is fantastic to be involved in one of the most exciting scientific projects around in the world today.