

Exploitation Evidence Appendix

A healthcare economics model was developed assessing the effectiveness of introducing Trueview into the current care pathway. Trueview is aimed at identifying patients at high risk of osteoporosis, enabling early referral and treatment. The measurement is performed by post-exposure analysis of the standard radiograph, meaning that bone health data can be acquired opportunistically, alongside routine imaging.

A Markov state transition model was developed to assess two strategies at a trust level, the first strategy models the current state-of-the-art care pathway and the second models the addition of Trueview to that pathway. Figure 1 shows the state transitions encoded into the model and Figure 2 shows the pathway for current state-of-the-art care and the addition of Trueview. The model tracks costs, effectiveness, and other patient outcomes on a cohort level over 20 years. Deterministic and probabilistic sensitivity analysis is performed to assess whether the addition of QDR is robustly effective.

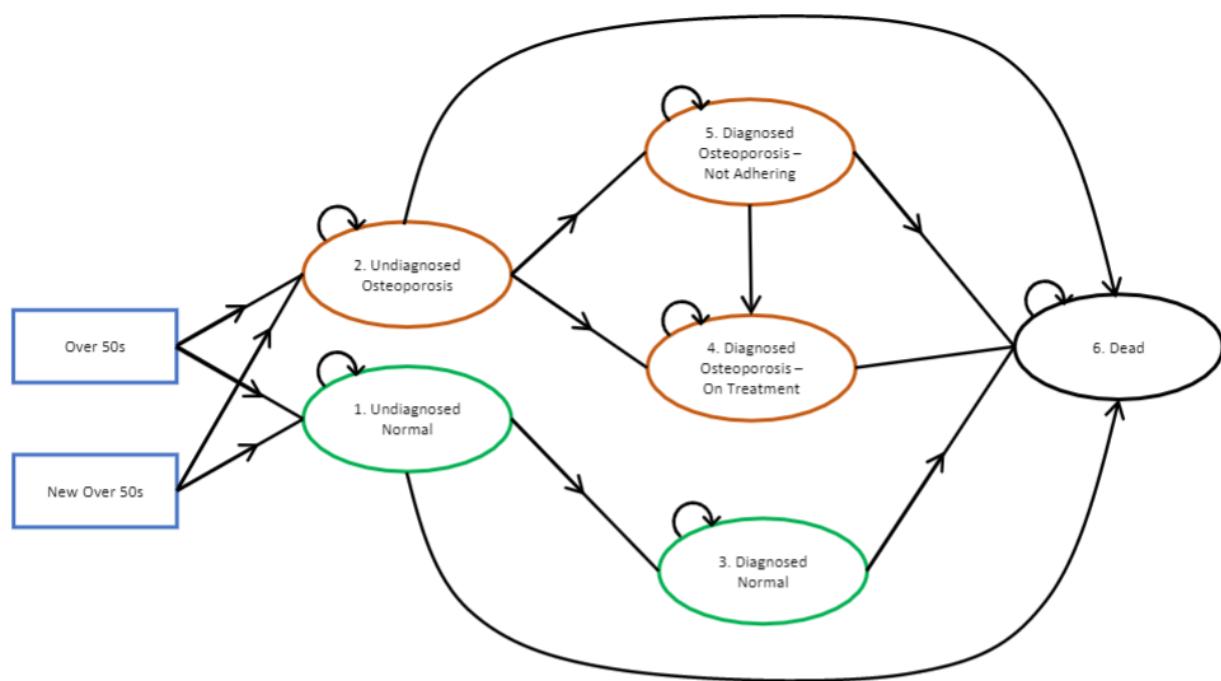


Figure 1: Model structure diagram showing the entrants into the model (rectangular boxes), the health states (ellipses) and the state transitions between them. The closed loops signify the possibility that a patient can return to the same health state at the end of any given Markov cycle.

A run of the model using the base value for each of the variables indicates a trust level cost saving of £9.2 million and 1650 QALY benefit over the first 20 years, derived because of 1923 fewer fractures and 54 fewer deaths. Probabilistic sensitivity analysis, as shown in figure 3, indicates that 99% of runs were cost saving to the NHS, while all runs were cost effective with a willingness to pay of, at most, £301.00 per QALY. Figure 3 shows 10,000 runs of probabilistic sensitivity analysis, although the size of the healthcare cost savings has large uncertainty, all runs indicate the model is cost effective well below the rule-of-thumb willingness to pay threshold of £20,000.00 per QALY.

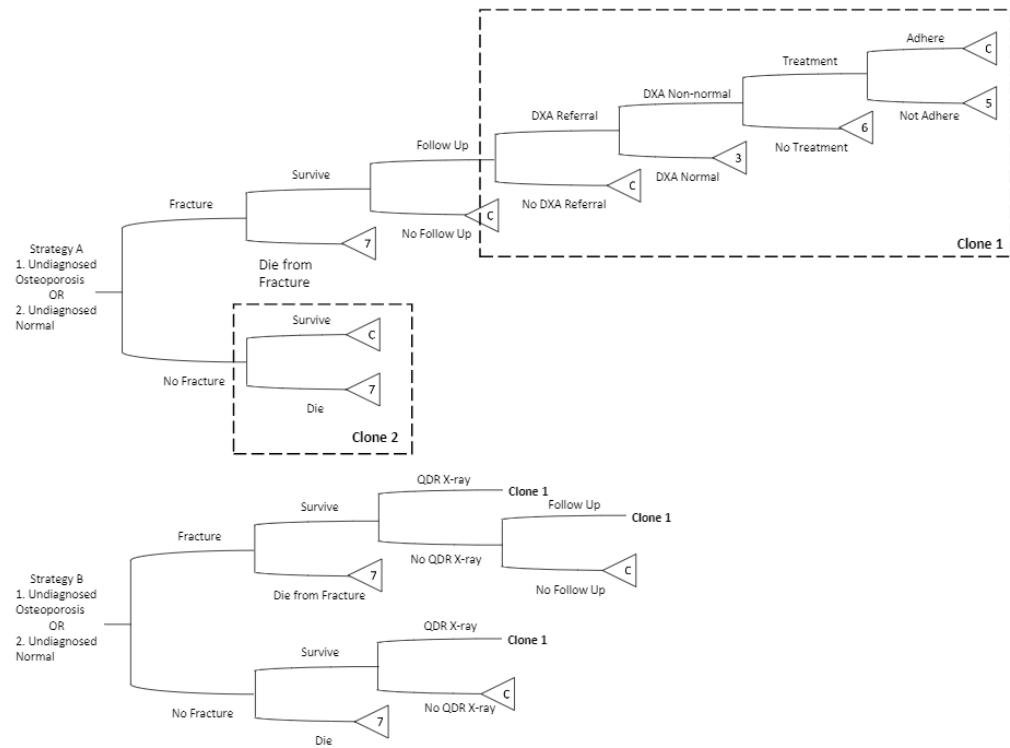


Figure 2: (Top) Markov chain for the undiagnosed health states in strategy A, (bottom) Strategy B modification to the care pathway. Note that Clone 1 replicates the Markov nodes shown in the top figure. Clone 2 is used in subsequent figures. The triangles represent state transitions, where the number relates to the new health state (see Figure 1). The letter C denotes a return to the beginning of the same health state.

The health economics model developed makes it clear that increasing case finding of osteoporosis is cost and QALY effective. This is because preventative treatment is both low cost and effective at reducing fractures. Trueview offers a route to increasing case finding by enabling a fracture risk assessment to be carried out on all compatible X-rays. The model presented was audited and approved by York Health Economics Consortium.

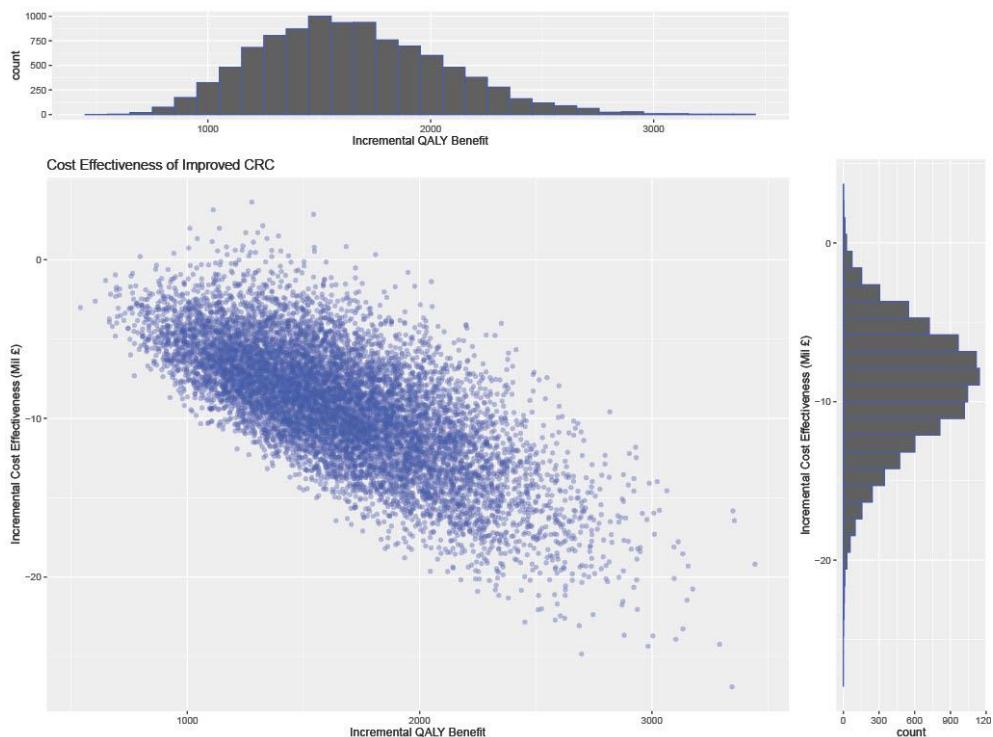


Figure 3 Centre: Scatter plot of incremental QALY benefit against incremental cost effectiveness. Top: Histogram of incremental QALY benefits. Right: Histogram of incremental cost effectiveness.