Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to assess the cost-effectiveness of a strategy for diagnosing deep venous thrombosis (DVT) in patients in primary care, compared with hospital-based strategies. The authors concluded that the diagnostic management strategy to exclude DVT in primary care was cost-effective. The methods were appropriate and they and the results were reported adequately. Given the scope of the analysis, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of a diagnostic strategy for identifying deep venous thrombosis (DVT) in patients at first presentation in primary care, compared with hospital-based strategies.

Interventions
The authors evaluated three strategies for diagnosing DVT, which were the Amsterdam, Maastricht, Utrecht Study on venous thromboEmbolism (AMUSE) rule, ultrasound for all, and the hospital decision rule. These three strategies were compared with the usual care, which was a weighted combination of ultrasound for all and the clinical decision rule.

The AMUSE rule was a clinical decision rule, including a rapid point-of-care D-dimer assay, which was applied in primary care, with ultrasound in hospital for patients with a score of four or more. Ultrasound for all was referral to hospital and ultrasound for all patients. The hospital decision rule was referral to hospital for all patients, with ultrasound for those with a score of two or more on the clinical decision rule and an elevated D-dimer result, both measured in hospital.

Location/setting
Netherlands/primary and out-patient secondary care.

Methods
Analytical approach:
A decision analytic model was constructed to simulate the course of events, in a hypothetical cohort of 1,002 patients, who visited a primary care physician and had the signs and symptoms of a DVT. The time horizon was five years and the authors reported that a societal perspective was adopted.

Effectiveness data:
The effectiveness data were from published literature and assumptions made by the authors. The main estimates were the probabilities associated with the three strategies and the consequences of treatment for venous thromboembolism. These were derived from the AMUSE (Buller, et al. 2009, see ‘Other Publications of Related Interest’ below for bibliographic details) and other published studies.

Monetary benefit and utility valuations:
The utility estimates for DVT were from the AMUSE, in which the quality of life was assessed using the European Quality of life (EQ-5D) questionnaire. The utilities for the other health states were from published studies, all of which used the time trade-off approach.
Measure of benefit:
The number of quality-adjusted life-years (QALYs) gained was the measure of benefit. As these could be generated over a five-year period, future benefits were discounted, according to Dutch guidelines, at an annual rate of 1.5%.

Cost data:
Medical care and travel costs were included. Medical care costs were those associated with general practitioner (GP) time and consultations; the D-dimer point-of-care test; visits to the emergency room; and ultrasound and in-hospital laboratory procedures. The travel costs were those of travelling either to the GP or to hospital. The resource use was derived from the AMUSE, the published literature, and expert opinion and unit costs were from the Dutch Cost Manual. They were adjusted to 2004 values, using the Netherlands consumer price index. The currency was the Euro (EUR) and, as the costs could be incurred over five years, future costs were discounted, according to Dutch guidelines, at an annual rate of 4%.

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken, by assigning distributions to the model parameters and drawing values at random from each distribution, for 5,000 Monte Carlo simulations. The results were presented in a cost-effectiveness acceptability curve. One-way sensitivity analysis was performed to test the consistency of the results and the expected value of perfect information (EVPI) was also analysed.

Results
The QALYs gained per patient were 3.8532 with the AMUSE rule, 3.8557 with the hospital decision rule, 3.8562 with ultrasound for all, and 3.8559 with usual care. The average cost per patient was EUR 3,589 with the AMUSE rule, EUR 3,727 with the hospital decision rule, EUR 3,768 with ultrasound for all, and EUR 3,747 with usual care.

When the hospital decision rule was compared with the AMUSE rule, the incremental cost per QALY gained was EUR 55,753. When ultrasound for all was compared with the hospital decision rule, the incremental cost per QALY gained was EUR 89,956. When usual care was compared with the AMUSE rule, the incremental cost per QALY gained was EUR 58,622.

The probabilistic sensitivity analysis showed that at a threshold of EUR 40,000 per QALY the probability that the AMUSE rule was cost-effective was 66%, while at a threshold of EUR 80,000 the probability was 37%. One-way sensitivity analysis showed that neither the discount rate nor the age of the patient influenced the results. The EVPI analysis showed that to obtain perfect information the cost would be EUR 27 million.

Authors’ conclusions
The authors concluded that a diagnostic management strategy to exclude DVT in primary care was cost-effective, compared with hospital-based strategies.

CRD commentary
Interventions:
The interventions were reported clearly and in detail.

Effectiveness/benefits:
The effectiveness data were from a number of published sources, particularly the AMUSE. Appropriate details of this study were reported, including the sample and the main results. No details on how the other studies were identified, such as by a systematic review, were reported and it is not possible to determine if all the best available evidence was used. The sources and methods used for the QALYs were adequately described.

Costs:
The authors reported that a societal perspective was adopted, but it would appear that a combined health care system and patient perspective was taken, as productivity costs were not mentioned, but should have been considered for a societal perspective. The sources, from which the unit costs and resource use were derived, and the price year, time horizon, and discount rate, were all adequately reported.
Analysis and results:
The available cost and outcome data were synthesised using a decision analytic model and appropriate details were provided, including a diagram. The impact of uncertainty in the model's results was thoroughly tested in a probabilistic sensitivity analysis. The authors also undertook an EVPI analysis to assess whether obtaining more information for this analysis was worthwhile. They reported the limitations of their analysis and the main one was that some costs were based on expert opinion.

Concluding remarks:
The methods were appropriate and they and the results were reported adequately. Given the scope of the analysis, the authors' conclusions appear to be appropriate.

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