Cost-effectiveness of screening for abdominal aortic aneurysm in the Netherlands and Norway

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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 study assessed the cost-effectiveness of a one-time ultrasound screening programme for abdominal aortic aneurysms in men aged 65 years. The authors concluded that aneurysm screening was a cost-effective intervention from a societal perspective in the Netherlands and Norway. The study used robust cost-effectiveness methods and the authors’ conclusions appear valid.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The study assessed the cost-effectiveness of a one-time ultrasound screening programme for abdominal aortic aneurysm in men aged 65 years.

Interventions
The intervention was a one-time screening programme for abdominal aortic aneurysm with ultrasonography. The comparator was no screening. Men with an abdominal aortic aneurysm below the threshold of 30mm were assumed not to develop abdominal aortic aneurysm. Men with aneurysm diameter from 30mm to 55mm were offered follow-up ultrasound surveillance; the frequency of ultrasound depended on abdominal aortic aneurysm diameter. Men with aneurysm diameter over 55mm were offered an emergency repair, either open or endovascular.

Location/setting
The Netherlands and Norway/Primary and secondary care.

Methods
Analytical approach:
The analysis was based on a Markov model with a lifetime horizon. The authors stated that a societal perspective was adopted.

Effectiveness data:
Clinical inputs for the model were retrieved from the published literature and from primary data collection. Most data on transition probabilities were taken from two published clinical trials: the Dutch Randomized Endovascular Aneurysm Management (DREAM) trial and the Multicentre Aneurysm Screening Study (MASS). Country-specific epidemiological databases were used for age-specific mortality rates. Assumptions were required for some inputs where published estimates were not available. The probability of abdominal aortic aneurysm rupture appeared to have been a key input of the model.

Monetary benefit and utility valuations:
Utility valuations were derived from the Health Utility Index values for men aged 65 years and older and on the basis of the authors’ assumptions.

Measure of benefit:
Life-years were used as the summary benefit measure. Quality-adjusted life-years (QALYs) were calculated but were not combined with costs. The discount rate was 1.5% in the Netherlands and 4% in Norway.
Cost data:
Costs included annual screening, abdominal aortic aneurysm monitoring, hospital care, and follow-up (including management of complications). Non-health care costs, such as travel expenses and productivity losses, were also included. The economic impact of inability to work was considered to be nil due to the advanced age of the eligible patient population. All economic data were derived from official sources in either country. Costs were expressed in Euros (EUR). The annual discount rate was 4% for both countries. The price year was 2010.

Analysis of uncertainty:
One-way and multi-way sensitivity analyses were carried out on model inputs using plausible ranges of values. A probabilistic sensitivity analysis was performed to allow for second-order uncertainty.

Results
In the Netherlands, total lifetime costs were EUR 1,548 with screening and EUR 1,127 with no screening. The expected life-years with screening were 14.772 and 14.675 with no screening. QALYs with screening were 11.554 and 11.484 with no screening. The incremental cost per life-year gained with screening was EUR 4,340.

In Norway, total lifetime costs were EUR 1,530 with screening and EUR 968 with no screening. The expected life-years with screening were 11.829 and 11.772 with no screening. QALYs with screening were 9.321 and 9.274 with no screening. The incremental cost per life-year gained with screening was EUR 9,860.

Cost-effectiveness ratios in both countries were well below the commonly cited threshold for cost-effective interventions (EUR 20,000 per LY gained in the Netherlands and EUR 62,500 per LY gained in Norway).

Given the lower thresholds, the base case findings were robust and screening was the preferred strategy in all sensitivity analyses, except when the prevalence of abdominal aortic aneurysm was 1% or lower in Norway. The results were sensitive to the percentage of incidental detection of abdominal aortic aneurysms. The probability of screening being cost-effective was 70% in both countries.

Authors’ conclusions
The authors concluded that abdominal aortic aneurysm screening was a cost-effective intervention from a societal perspective in the Netherlands and Norway.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear; the proposed screening intervention was compared with no screening, which represented the usual pattern of care in both countries as well as in many other health care settings.

Effectiveness/benefits:
Clinical inputs were taken from several different sources that were probably known to the authors. Most evidence came from randomised clinical trials, which were likely to be characterised by high internal validity, although no details were given. Local databases were used for epidemiological data to represent country-specific estimates. Other sources of clinical data were not reported, but extensive sensitivity analyses were conducted on all items. Life-years were an appropriate benefit measure that captured the impact of the interventions on patients’ health. Quality-adjustments were considered, but QALYs were not combined with costs. However, similar conclusions were achieved regardless of the use of quality-weights.

Costs:
The cost categories were representative of the perspective adopted by the authors. A clear description of the cost items included was provided; some details on resource use were reported with total costs per category. Local sources were used for each cost item, which appeared appropriate. Costs were treated stochastically in the probabilistic sensitivity analysis. The price year and discount rates were reported. Further details on the cost analysis were provided in the online appendix.

Analysis and results:
The expected costs and benefits were clearly presented and were appropriately synthesised using an incremental
approach. Conventional cost-effectiveness thresholds were used to identify the optimal screening strategy. The model was validated using the rates of deaths avoided after screening reported in a published clinical trial. Uncertainty was satisfactorily investigated using deterministic and probabilistic approaches. Confidence intervals were calculated for all model outcomes. The authors acknowledged some limitations of their analysis, mainly related to the need for some assumptions in the case of lack of good quality clinical data. The results should be considered specific to the countries analysed, as the authors stated that important differences in prevalence and prices might exist among different jurisdictions.

Concluding remarks:
The study used robust cost-effectiveness methods and the authors’ conclusions appear valid.

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