Cost-effectiveness and population outcomes of general population screening for hepatitis C

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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
This study examined the cost-effectiveness of testing adults aged 20 to 69 years, once, for the hepatitis C virus, in addition to the usual risk-factor screening. The addition of one-time testing was likely to be cost-effective; targeting those born between 1945 and 1965 was more cost-effective, but this depended on the assumptions. The data were from a variety of sources and expert opinion. Key aspects of uncertainty were investigated and the conclusions seem robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of testing adults aged 20 to 69 years, once, for chronic hepatitis C, in addition to the usual risk-factor screening, to reduce the health and economic burden of chronic hepatitis C disease and deaths.

Interventions
The intervention was screening of the general adult population, aged 20 to 69 years, once, using an enzyme immune assay. This was added to the normal risk-factor screening and compared with risk-factor screening alone.

Location/setting
USA/primary and secondary care.

Methods
Analytical approach:
The analysis was based on a decision analytic model, followed by a Markov model that simulated the natural history of chronic hepatitis C. A lifetime horizon was considered. The authors stated that the analysis took a societal perspective.

Effectiveness data:
Most of the evidence came from published sources. The transition probabilities for the Markov model were from a review of the literature. The clinical inputs were from meta-analyses, reviews, clinical trials, longitudinal studies, nationwide surveys, and the opinion of an expert panel. The percentage of screened patients who attended specialist care was a key input for the model.

Monetary benefit and utility valuations:
The utility values were from published sources. Wherever possible, the estimates were from a systematic review of Short Form (SF-36) health survey data, for patients with chronic hepatitis C.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and they were discounted at an annual rate of 3%.

Cost data:
The economic analysis was restricted to the direct medical costs of screening and the subsequent treatment of chronic hepatitis C disease. The cost data were from official sources, such as Medicare reimbursement rates, average wholesale prices, and Veterans Administration costs, with some published estimates. The unit costs were reported for some items. The costs were in US $ and the price year was 2010. A 3% annual discount rate was applied.
Analysis of uncertainty:
Sub-analyses were carried out, considering different scenarios for screening, for example, with screening restricted to those born between 1945 and 1965, and assuming that the implementation costs, uptake, and median age of diagnosed cases were similar to general population screening. One-way sensitivity analyses were carried out for all inputs, using published ranges of values for most of the parameters. A Monte Carlo simulation was performed by varying all inputs within predefined ranges, using conventional distributions for sets of inputs. A worst-case scenario for general population screening was created by setting all the inputs against screening.

Results
The lifetime costs were $59,938 with risk-factor screening and $60,269 with additional population screening. The QALYs were 13.50 with risk-factor screening and 13.54 with additional population screening.

The incremental cost per QALY gained with population screening, over risk-factor screening, was $7,900. This fell to $5,400 with age-restricted screening compared with risk-factor screening, and age-restricted screening was dominant over population screening, as it was more effective and cheaper.

The incremental cost per QALY gained with population screening was $49,000, in the worst-case scenario. In all other scenarios, the cost-effectiveness of general population screening was reduced or increased only modestly, compared with the main analysis.

The probabilistic sensitivity analysis showed that there was a 95% chance that the cost-effectiveness of population screening would be at or below $13,200 per QALY gained.

Authors' conclusions
The authors concluded that the addition of one-time testing for the general adult population was likely to be cost-effective, compared with screening based on risk factors. Targeting the testing to those born between 1945 and 1965 was more cost-effective, but this depended on the model assumptions.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear. The authors stated that risk-factor screening was the usual care in the USA, where there was a low incidence of hepatitis C virus.

Effectiveness/benefits:
The clinical data were from multiple sources, identified by a review of the literature or selected by the authors. The epidemiological data appear to have been from US studies, but few details were given on other sources. An online appendix contained more information. Expert opinion was used, where there was no good-quality published evidence. Extensive sensitivity analysis was conducted on all the model parameters and this showed that the main findings were robust. QALYs were a valid measure of benefit for patients with chronic hepatitis C, as it has an impact on morbidity and mortality. The utility weights were from sources that used validated instruments.

Costs:
The authors stated that a societal perspective was adopted, but they only included the medical costs of screening and treatment. The unit costs were reported for some items, but other costs were presented as category totals and were not broken down to individual items. The data sources were reported for several costs and most of them reflected the US cost or reimbursement system. The price year was reported, allowing reflation exercises. The key cost inputs were varied in the sensitivity analyses.

Analysis and results:
The results were clearly presented for both the main analysis and the various scenarios analyses. Incremental cost-utility ratios were appropriately calculated to synthesise the costs and benefits of the strategies. Deterministic and probabilistic analyses were used to assess uncertainty and the methods and results of these were reported and discussed. The authors acknowledged some limitations to their analysis, mainly due to the differences in clinical sources and the need for assumptions. The results were specific to the USA and appear to be difficult to transfer to other countries, without changing the cost, clinical and epidemiological inputs.
Concluding remarks:
The model used data from a variety of sources and expert opinion. The key aspects of uncertainty were investigated and the authors’ conclusions appear to be robust.

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