Cost-effectiveness of the national screening program for hepatitis C virus in the general population and the high-risk groups

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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 objective was to evaluate the cost-effectiveness of screening for hepatitis C virus in a high-risk population and the general population. The authors concluded that screening in both the general population and the high-risk group was more cost-effective than no screening. As few details were reported on how the effectiveness data were obtained, it is not possible to assess the internal validity of these estimates, and the appropriateness of the authors' conclusions is hard to assess.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to evaluate the cost-effectiveness of screening for hepatitis C virus (HCV) in a high-risk population and in the general population.

Interventions
This study investigated a systematic strategy for the screening for HCV in the general population and a high-risk group. For the general population and the high-risk group, the screening was every five years from age 40 to 70 years. The high-risk group was defined as those who had a high level of aminotransferase, had undergone a major operation, or had received a blood transfusion during childbirth. The screening strategies were compared against no screening.

Location/setting
Japan/out-patient secondary care.

Methods
Analytical approach:
A published Markov model (Nakamura, et al. 2007, 2008, see 'Other Publications of Related Interest' below for bibliographic details) was modified to assess the cost-effectiveness of HCV screening. The time horizon was 30 years and the perspective was not explicitly reported.

Effectiveness data:
- The authors reported that the number of people screened was derived from a cohort study of 99,001 people from the general population and 42,358 people in a high-risk group, from 2003 to 2006. The authors reported that the transition probabilities between health states, the treatment effectiveness, and HCV prevalence were obtained from published studies.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The benefit measure was life-years gained (LYG).

Cost data:
Only the direct health care costs were included. These costs were: the screening costs for the semi-quantitative HCV
antibody test, the HCV core antigen test, and the polymerase chain reaction test; and in-patient health care costs for treatment of HCV, of hepatitis, after sustained virologic response, and of hepatocellular carcinoma. The screening costs were based on the reimbursement of medical fees in Japan. In-patient health care costs were obtained from a university hospital. The authors reported that the out-patient costs were modelled. The price year was 2007 and all costs were reported in US dollars ($), using exchange rates reported by the Organisation for Economic Cooperation and Development. As costs could be incurred over a 30-year period, future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
A series of one-way sensitivity analyses was performed, to assess the robustness of the cost-effectiveness results, by varying the transition probabilities and infection rates within their 95% confidence intervals, and other variables by between -50% to up to +100%.

Results
In the general population, the LYG, per patient with detected HCV, ranged from 10.89 for 70-year-olds to 14.74 for those aged 40 to 49 years with no screening, and from 12.13 for 70-year-olds to 17.39 for those aged 40 to 49 years with screening. In the high-risk group, they ranged from 12.02 for those aged 60 to 69 years to 14.74 for those aged 40 to 49 years with no screening, and from 13.55 for those aged 60 to 69 years to 17.39 for those aged 40 to 49 years with screening.

In the general population, the overall costs per patient with detected HCV ranged from $37,622 for 70-year-olds to $57,409 for those aged 40 to 49 years with no screening, and from $43,640 for 70-year-olds to $59,657 for those aged 40 to 49 years with screening. In the high-risk group, the costs ranged from $42,948 for those aged 60 to 69 years to $57,409 for those aged 40 to 49 years with no screening, and from $46,456 for those aged 60 to 69 years to $55,425 for those aged 40 to 49 years with screening.

The costs and benefits were combined in an incremental cost-effectiveness ratio (ICER) or the additional cost per LYG when screening was compared with no screening. The ICER in the general population with screening ranged from $848 for those aged 40 to 49 years to $4,825 for 70-year-olds. In the high-risk group, it ranged from the intervention being dominant, which is more effective and less costly, for those aged 40 to 49 years to $2,297 for 70-year-olds.

After varying the treatment effectiveness, transition probabilities, and the infection rate, over plausible ranges, the cost-effectiveness of the screening strategy remained unchanged.

Authors' conclusions
The authors concluded that the screening strategy in both the general population and the high-risk group appeared to be more cost-effective than no screening.

CRD commentary
Interventions:
The interventions were clearly reported and defined.

Effectiveness/benefits:
The authors provided very few details on how the effectiveness and clinical data were derived. In order to obtain the effectiveness of the screening intervention the authors used a cohort study, but very few details were reported, such as how patients' were followed-up, for how long, etc. Supplementary clinical data were derived from published studies, but no information was reported on how these studies were identified. This means it is not possible to determine the internal validity of the effectiveness estimates nor if all the relevant information was included.

Costs:
The authors did not explicitly report the perspective, but it would appear that a health care perspective was taken. All the major relevant cost categories and costs appear to have been included for this perspective. The authors provided adequate details on how the cost information was derived, including their sources. The time horizon, discount rate, and price year were all adequately reported.
Analysis and results:
The costs and benefits were combined using a decision analytic Markov model and adequate details were reported, including a diagram. The impact of uncertainty on the cost-effectiveness results was investigated using a series of one-way sensitivity analyses. This type of analysis evaluates some of the impact of uncertainty in the model parameters, but probabilistic sensitivity analyses are a better way to capture the overall uncertainty. The methods used to identify and obtain the effectiveness data were not reported in full, but the results of the study were adequately reported. The authors reported no limitations to their study.

Concluding remarks:
The methodology was adequate, but the authors reported few details on how the effectiveness data were obtained and identified, which means it is not possible to assess the internal validity of these estimates. The results of the study were reported in detail. Due to the limited reporting, the appropriateness of the authors’ conclusions is hard to assess.

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