Cost-effectiveness of hepatitis A vaccination for individuals with chronic 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 of vaccination against hepatitis A virus for adults with hepatitis C virus (HCV). The authors concluded that vaccination was not cost-effective, except for those who had cleared HCV and were treated within the Veterans Affairs system, and its routine implementation should be reconsidered. The study used conventional cost-effectiveness methods and the conclusions appear to be robust, but key issues were the limited description of the data sources and the selective reporting of the results.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost of a routine vaccination programme against hepatitis A virus (HAV) for adults with hepatitis C virus (HCV).

Interventions
Three immunisation strategies were considered. The test first strategy consisted of testing for HAV immunity and then vaccinating those without immunity at subsequent visits. The vaccinate all strategy consisted of vaccinating everyone without testing for immunity. The test and vaccinate strategy consisted of testing for HAV immunity and vaccinating everyone at the first visit, then recalling for a second vaccination only those who tested negative for HAV antibodies. No vaccination was used as the comparator.

Location/setting
USA/primary care.

Methods
Analytical approach:
The analysis was based on a decision-tree model with embedded Markov models and a lifetime horizon. Separate analyses were carried out for four HCV disease states: individuals who had cleared the virus either naturally or through antiviral treatment; individuals with chronic HCV, but without cirrhosis; individuals with HCV and compensated cirrhosis; and individuals with HCV and decompensated cirrhosis. The authors stated that the perspective of the private sector was adopted in the base case.

Effectiveness data:
The clinical inputs came from a selection of published sources. The key epidemiological data were the HAV incidence for middle-aged adults. Both older and newer estimates were considered because of a rapid decrease in HAV in the authors' setting. The newer estimates were from the Centers for Disease Control (CDC) while the older ones were from a published cost-effectiveness analysis (Jacobs, et al. 2002, see ‘Other Publications of Related Interest’ below for bibliographic details). All estimates for the clinical inputs were reported and most of them came from the Jacobs, et al. (2002) study.

Monetary benefit and utility valuations:
The utility weights came from two published studies.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the benefit measure and they were discounted at an annual rate of 3%.
Cost data:
The economic analysis considered the costs of the HCV test, HAV vaccination, and HAV management (hospitalisations, out-patient care, sudden and severe disease, and transplants). The cost of vaccination was derived from the manufacturer and most of the other costs came from the Jacobs, et al. (2002) study. All costs were in US dollars ($) and the price year was 2006. Future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was carried out on the following inputs: HAV antibody prevalence prior to vaccination, future incidence of HAV, HCV disease stage, age, probability of developing HAV immunity following a full course of vaccinations, proportion of individuals returning for a full course of vaccinations, probability of sudden and severe hepatic failure resulting from HAV, cost of care for those exposed to HAV in the future, and QALYs associated with the consequences of HAV infection. The alternative perspective of the Veterans Affairs (VA) payer, with lower cost estimates, was considered.

Results
The test first strategy had the lowest incremental cost per QALY gained compared with no vaccination, for all HCV disease states. For those who had cleared the virus, it was $184,088 with a low anticipated HAV incidence and $82,022 with a higher anticipated HAV incidence. In the other HCV disease states, higher estimates were obtained. From the VA perspective, for those who had cleared the virus, the estimates were $80,793 with low incidence and $30,296 with high incidence.

The other immunisation strategies were above the thresholds of $200,000 and $100,000 per QALY even when using favourable assumptions on disease incidence for all except those who cleared the virus with a high incidence of HAV for whom test and vaccinate was cost-effective. From the VA perspective, vaccinate all was only cost-effective in the subgroups of patients with compensated cirrhosis and chronic HCV, when using the higher incidence of HAV or the higher cost-effectiveness threshold.

These results did not vary substantially in the sensitivity analyses, although the future incidence of HAV, the percentage of individuals returning for both vaccinations, and the probability of an individual experiencing sudden and severe hepatic failure following HAV exposure appeared to be the most influential parameters.

Authors’ conclusions
The authors concluded that HAV vaccination was only cost-effective for those who had cleared HCV and were treated within the VA system, and its routine implementation should be reconsidered.

CRD commentary
Interventions:
The selection of the comparators was appropriate as a range of possible strategies was considered. These strategies were briefly described.

Effectiveness/benefits:
The clinical analysis was not described in detail. The authors justified their use of two estimates for the disease incidence, given the change in incidence of infection over time. The CDC is generally considered to be a valid source of evidence for epidemiological data, but no information on the other sources of data was provided, limiting the possibility of judging the validity of these clinical inputs. QALYs were a valid benefit measure, given the impact of disease on both survival and quality of life, but the approach used to derive the utility values was not described.

Costs:
The data sources and the methods used to derive them were only partly reported. It appears that most of the values were from a published cost-effectiveness analysis, which was referenced, but further details were not given. The cost of an HCV test was included, but it appears that this should have been the cost of an HAV test. Private sector estimates were used in the base case, with alternative costs from the VA payer used in the sensitivity analysis. The unit costs were reported only for vaccine acquisition, while the disease-related costs were presented as totals. The price year was reported together with the discount rate.
Analysis and results:
The results were presented selectively, as the expected costs and QALYs were not reported and the cost-utility ratios were only presented for one vaccination strategy, with the lowest ratios. The issue of uncertainty was investigated using a deterministic approach, which considered variations in the inputs individually. A more comprehensive approach would have been useful, including alternative scenarios. An interesting point was the analysis by subgroups of patients with different severity of disease, which appears to have been the main objective of the study.

Concluding remarks:
The study was based on conventional cost-effectiveness methods and the authors' conclusions appear to be robust, but key issues were the limited description of the data sources and the selective reporting of the results.

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