Cost effectiveness of screening immigrants for hepatitis B
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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 estimate the cost-effectiveness of screening for chronic hepatitis B infection among immigrants to Canada. The authors concluded that a screening and treatment programme targeted at all immigrants to Canada was likely to be moderately cost-effective. The methods were good and reported sufficiently. The results were reported in detail. The authors' conclusions appear to be appropriate for the scope of their study.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to estimate the cost-effectiveness of screening for chronic hepatitis B infection among immigrants to Canada.

Interventions
The three strategies were no screening; screening and treatment; and screening, treatment and vaccination. No screening was the usual care. For the two screening strategies, screening for hepatitis B virus (HBV) infection was offered to patients by their primary care physician, at any visit scheduled for another reason. Treatment consisted of either tenofovir or entecavir. In the vaccination strategy, vaccination was offered to patients who were found to be neither chronically infected nor immune.

Location/setting
Canada/primary care.

Methods
Analytical approach:
A decision-analytic Markov model was used to combine the cost and effectiveness evidence. The time horizon was the lifetime of the patient. The authors reported that the perspective was that of the payer.

Effectiveness data:
The effectiveness data were from published studies, literature reviews, and official Canadian sources. The main effectiveness measure was the effectiveness of antiviral treatment, which was from a systematic review and Bayesian meta-analysis.

Monetary benefit and utility valuations:
The utilities were from an unpublished study of over 400 patients, with chronic hepatitis B infection, in different infection health states. These utilities were based on published Health Utilities Index Mark 3 scores.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained, which were discounted at an annual rate of 5%.

Cost data:
The direct medical costs were those of screening, vaccination, and treatment for each chronic hepatitis B infection health state, including acute and chronic hepatitis B, cirrhosis, liver transplantation, after transplant care, and hepatocellular carcinoma. All costs were from published studies or sources. They were inflated to 2008 prices, using the
Consumer Price Index for health care and personal items. All non-Canadian cost data were converted to Canadian dollars (CAD) at the purchasing power parity. Future costs were discounted at an annual rate of 5%.

Analysis of uncertainty:
One-way and probabilistic sensitivity analyses were undertaken to evaluate the impact of uncertainty on the model results. In the probabilistic analysis, there were 20,000 Monte Carlo iterations and the results were presented in a cost-effectiveness acceptability curve.

Results
The average cost per patient, with tenofovir as the treatment of choice, was CAD 73,246 for no screening, CAD 74,911 for screening and treatment, and CAD 74,992 for screening, treatment, and vaccination. The average cost per patient, with entecavir as treatment of choice, was CAD 73,352 for no screening, CAD 75,380 for screening and treatment, and CAD 75,447 for screening, treatment, and vaccination.

The average QALYs gained per patient, with either treatment, was 16.15 for no screening, 16.17 for screening and treatment, and 16.17 for screening, treatment, and vaccination.

With tenofovir, the additional cost per QALY gained was CAD 69,209 with screening and treatment, compared with no screening, and CAD 3,648,123 with screening, treatment, and vaccination, compared with screening and treatment. With entecavir, it was CAD 101,513 with screening and treatment, compared with no screening, and CAD 241,983 with screening, treatment, and vaccination, compared with screening and treatment.

The one-way sensitivity analyses indicated that the results were most sensitive to variations in the discount rate, the screening age, the effectiveness of antiviral treatment, and the progression rates to complicated liver disease. The probabilistic analysis showed that, at a threshold of CAD 100,000 per QALY gained, screening and treatment, compared with no screening, had a 59% chance of being cost-effective using tenofovir, and a 36% chance using entecavir.

Authors' conclusions
The authors concluded that a chronic hepatitis B infection screening and treatment programme targeted at all immigrants to Canada was likely to be moderately cost-effective.

CRD commentary
Interventions:
The interventions were clearly reported and appear to have been appropriate comparators. The usual care was included.

Effectiveness/benefits:
The effectiveness data were mainly from published studies and literature reviews. The authors appropriately reported all the input parameters, their base-case value, the range of plausible values, and their sources. They did not report a systematic review of the literature to identify these sources, making it impossible to determine if all the relevant evidence was analysed. The measure of benefit appears to have been appropriate as it incorporated morbidity and mortality, but little information on how the utilities were derived was presented, making it difficult to assess their quality.

Costs:
The authors reported that a payer perspective was adopted and it seems that all the major relevant health care costs were included. These costs were from published sources, which appear to have been appropriate. The authors reported the time horizon, discount rate, price year, and currency conversions.

Analysis and results:
Appropriate details of the Markov model were provided, including a diagram. A thorough sensitivity analysis was undertaken, including one-way and probabilistic analyses. The authors reported that the main limitations to their study were that it was based on a case-finding immigrant population, rather than all immigrants; and that it did not capture all the outcomes of vaccination, such as herd immunity.
Concluding remarks:
The methods were good and reported sufficiently. The results were reported in detail. The authors’ conclusions appear to be appropriate for the scope of their study.

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