Hepatitis C infection risk analysis: who should be screened? Comparison of multiple screening strategies based on the National Hepatitis Surveillance Program

Lapane K L, Jakiche A F, Sugano D, Weng C S, Carey W D

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.

Health technology
Screening strategies for Hepatitis C virus (HCV).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
13,997 self-referred individuals screened for viral hepatitis.

Setting
Hospital setting. Individuals were screened in 40 urban hospitals in the United States.

Dates to which data relate
Effectiveness data were based on a database of the National Hepatitis Surveillance Program, constructed in September 1992. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness analysis and was carried out prospectively alongside the effectiveness analysis.

Study sample
13,997 self-referred individuals screened for viral hepatitis.9,269 records contained evaluable responses for the purposes of the analysis. Power calculations were not relevant in this context.

Study design
Retrospective cohort study based on effectiveness data collected from 40 hospitals.
Analysis of effectiveness

The analysis of the clinical study was based on the intention to treat principle. The primary health outcomes studied included the optimal cut-off point, sensitivity, specificity, and positive and negative predictive value of the 4 models. Demographic characteristics of the different groups were not reported.

Effectiveness results

When model 1 was employed, the optimal cut-off on the ROC curve was observed at a 65% sensitivity. This corresponds to a predicted probability of HCV greater than 7%.

Model 1 provided 84% specificity, a positive predictive value of 22%, and a negative predictive value of 97%.

Model 2 provided a sensitivity of 69%, specificity of 74%, and positive and negative predictive values of 16% and 97%.

Model 3 provided a sensitivity of 53%, specificity of 77%, and positive and negative predictive values of 14% and 96%.

Model 4 provided a sensitivity of 63%, specificity of 92%, and positive and negative predictive values of 34% and 97%.

Clinical conclusions

Model 2 yielded the highest sensitivity and model 4 provided the highest positive predictive value.

Modelling

Logistic regression models were used to quantify the risk of HCV associated with each of the questions of the risk profile questionnaire. A mathematical predictive equation was constructed using regression coefficients allowing prediction of risk of HCV (ROC curve).

Measure of benefits used in the economic analysis

The measure of benefits used was the number of cases detected per 100 screened.

Direct costs

Costs were not discounted given the short time period of the study (less than 1 year). Quantities and costs were not reported separately. Direct costs included the costs for testing. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Costs for testing were assigned as the mean actual charges of those blood tests from nine academic institutions in the United States. The price year was not stated.

Statistical analysis of costs

Not reported.

Indirect Costs

Not included.

Currency

US dollars ($).
Sensitivity analysis
Not reported.

Estimated benefits used in the economic analysis
The number of cases detected per 100 screened was 4.4 for model 1, 4.6 for model 2, 3.5 for model 3, and 4.1 for model 4.

Cost results
The costs per 100 screened were $1,571 for model 1, $2,020 for model 2, $1,706 for model 3, and $4,292 for model 4.

Synthesis of costs and benefits
If model 3 is taken as the base case, the marginal cost per case detected was $285 for model 2, and $4,310 for model 4. Model 1 dominated model 3 because it identified more cases at a lower cost per case.

Authors’ conclusions
The cost-effectiveness of HCV screening compares favourably with accepted current screening practices for other diseases. Models 1, 2, 3 may be appropriate in certain clinical and epidemiological settings. Selective screening by a risk factor questionnaire is more cost-effective than blood testing with ALT.

CRD COMMENTARY - Selection of comparators
The rationale for the selection of the comparators was clear.

Validity of estimate of measure of effectiveness
The relevant effectiveness measures were included, although the authors acknowledged that the predictive value of the risk factors and selective screening strategies needs to be prospectively validated in different subgroups of the population and in various settings.

Validity of estimate of costs
Direct costs were based on actual charges that do not represent real opportunity costs. Only direct costs were included. No sensitivity analysis was reported and therefore the robustness of the cost results was not tested. No statistical analysis of costs was reported.

Other issues
The main issue left unanswered by this study is the generalisability of the results to other settings or countries.

Implications of the study
Prospective studies should also examine other screening strategies for HCV. In particular the choice of confirmation positive anti-HCV EIA testing (RIBA versus HCV RNA (PCR)).

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Other publications of related interest


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