HCV screening to enable early treatment of hepatitis C: a mathematical model to analyse costs and outcomes in two populations


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 screening for acute hepatitis C virus infection in two specific patient populations, namely injecting drug users (IDUs) and individuals with surgery (IWSs). The authors concluded that screening was cost-effective in the IDU population, while the current pattern of no screening was the preferred option in the IWS group. The study methodology was not extensively described, especially in terms of details of the economic analysis, thus caution is required when interpreting the authors’ conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
The primary objective of the study was to examine the cost-effectiveness of screening for acute hepatitis C virus (HCV) infection in two specific patient populations, namely injecting drug users (IDUs) and individuals with surgery (IWSs). Two groups of genotypes were considered (1,4 and 2,3).

Interventions
The screening strategy was compared against no screening, which represented the current pattern of care in the authors’ setting. In the IDU cohort, screening included a HCV serology every 6 months lifelong. In the IWS cohort, two tests of serology for each patient were provided at time 0 and after 6 months.

Location/setting
Italy. Primary care/hospital.

Methods
Analytical approach:
This economic evaluation was based on a Markov model that simulated the natural history of disease and the impact of screening. A lifetime horizon was considered. The authors stated that a societal perspective was adopted in the study.

Effectiveness data:
The authors stated that the epidemiological data used in the model were based on official public health reports or published studies, such as the Italian Ministry of Health or the provincial administrative database of diagnosis-related groups in the Veneto region (where the study took place). Data on disease progression were taken from other published evidence, details of which were not reported. Treatment effectiveness was based on the results from randomised clinical trials (RCTs). Some assumptions about the compliance of individuals were also made.

Monetary benefit and utility valuations:
Utility valuations were based on published studies, details of which were not given. Utility weights were associated with each health state of the Markov model.

Measure of benefit:
The summary benefit measure was the quality-adjusted life-years. These were estimated using the decision model. The QALYs were discounted at an annual rate of 3%.
Cost data:
The health service costs included in the analysis were for screening (serology and clinical consultation), hospital stay, orthotopic liver transplant and complications (e.g. cirrhosis and hepatocellular carcinoma). Outpatient services, laboratory tests and diagnostic procedures were not included. The costs were derived from the Italian National Tariffs System, which also included information on resource use. An annual discount rate of 3% was applied to future costs. The costs were in euros (EUR).

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was carried out by varying the prevalence of genotypes 1 and 4.

Results
In the IDU cohort (9,460 patients), the expected costs were EUR 153,165,347 with no screening and EUR 124,860,989 with screening. The expected QALYs were 413,848 (without screening) and 422,884 (with screening), respectively. Thus, the incremental analysis showed that screening was the dominant strategy (both more effective and less expensive). Similar findings were observed in the subgroup of patients with genotypes 1 and 4, while in the subgroup of patients with genotypes 2 and 3, the incremental cost per QALY of screening over no screening was EUR 9,659.

In the IWS cohort (4,738,313 patients), the expected costs were EUR 9,182,575 with no screening and EUR 913,831,278 with screening. The expected QALYs were 189,508,961 (without screening) and 189,509,954 (with screening), respectively. Thus, the incremental cost per QALY gained with screening was EUR 918,147 (EUR 699,991 in the subgroup of genotypes 1 and 4; EUR 2,324,471 in the subgroup of genotypes 2 and 3).

In general, the sensitivity analysis corroborated the base-case finding, suggesting that screening was not cost-effective in the IWS cohort even when favourable assumptions were made. In the IDU cohort, screening was the preferred option at a prevalence of 10% or higher of genotypes 1 and 4.

Authors' conclusions
The authors concluded that screening for HCV was a very cost-effective strategy among IDUs, but the current strategy of no screening was the preferred option among IWSs.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as the proposed strategy was compared against the current pattern of care in the authors’ setting. No screening is also likely to be a valid comparator in other health care systems.

Effectiveness/benefits:
The clinical data were derived from a selection of known relevant studies. However, the authors did not provide details of a review of the literature. Much of the epidemiological data were derived from published international and local reports. The effectiveness of treatment was based on validated sources such as RCTs. Thus, the use of these sources should have ensured the appropriateness of clinical data, although little information was provided on the sources used to estimate disease progression. The selection of QALYs as the summary benefit measure was appropriate, as they capture the global impact of the interventions on patient health and are also comparable with the benefits of other health care interventions. Nevertheless, details of the sources used to derive the utility weights were not reported.

Costs:
The analysis of the costs included only a few items that were relevant to the health care payer rather than society, as the authors stated. Furthermore, some categories of costs were excluded and the authors did not provide a clear justification for this decision. The sources of the costs reflected the Italian accounting system. A further potential limitation of the analysis was the fact that the costs were presented as macro-categories and a detailed breakdown of the cost items was not reported. Moreover, information on resource use was not provided. The price year was not reported and the costs were treated deterministically. These issues tend to limit the validity of the cost analysis.

Analysis and results:
The synthesis of the costs and benefits was conducted appropriately. The issue of uncertainty was not satisfactorily
addressed since the deterministic sensitivity analysis focused exclusively on genotype prevalence. Variations in other model inputs were not considered. This limits both the internal and external validity of the study. The results of the analysis were clearly presented and discussed. The authors stated that their findings resembled those from other publications.

**Concluding remarks:**
The study methodology was not extensively described, especially in terms of details of the economic analysis. Given the limited use of sensitivity analysis, caution is required when interpreting the authors’ conclusions.

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**Bibliographic details**

**Other publications of related interest**


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