Aim
To evaluate the effectiveness, cost effectiveness, and cost
utility of surveillance of patients with cirrhosis (alco-
holic liver disease [ALD], hepatitis B [HBV], and C
virus [HCV]) using periodic serum alpha-fetoprotein
(AFP) testing and/or liver ultrasound examination to
detect hepatocellular carcinoma (HCC), followed by
treatment with liver transplantation or resection, where
appropriate.

Conclusions and results
No studies were identified that met the criteria of the
systematic review. Based on the assumptions used in the
model, the most effective surveillance strategy uses a
combination of AFP testing and ultrasound at 6-month
intervals. Compared with no surveillance, this strategy
is estimated to more than triple the number of people
with operable HCC tumors at time of diagnosis, and
almost halves the number of deaths from HCC. On
all effectiveness measures and at both testing frequen-
cies, AFP- and ultrasound-led surveillance strategies are
similar. This may be because test sensitivity varied ac-
cording to tumor size, which means that AFP testing
is capable of identifying many more small tumors than
ultrasound. The best available evidence suggests that
AFP tests will detect approximately six times as many
small tumors as ultrasound. Increasing the frequency
of either test to 6-month intervals is more effective
than performing combined testing on an annual ba-
sis. The undiscounted lifetime cost of the surveillance
strategies, including all care and treatment costs, ranges
from 40 300 pounds sterling (GBP) (annual AFP triage)
to GBP 42 900 (6-month AFP and ultrasound). The
equivalent discounted costs are GBP 28 400 and GBP
30 400. Only a small proportion of these total costs
results from the cost of the screening tests. However,
screening test costs, and the cost of liver transplants and
caring for people post-transplant, accounted for most
of the incremental cost differences between alternative
surveillance strategies. The results suggest that different
surveillance strategies may provide the best value for
money in patient groups of different cirrhosis etiologies.
Surveillance in people with HBV-related cirrhosis for
HCC provides the best value for money, while surveil-
ance in people with ALD-related cirrhosis provides the
poorest value for money. In people with HBV-related
cirrhosis, at an assumed maximum willingness to pay
(WTP) for a quality-adjusted life-year (QALY) of GBP
30 000, both the deterministic and probabilistic cost-
utility analyses suggest the optimal surveillance strategy
would be 6-month surveillance with the combination
of AFP testing and ultrasound. See Executive Summary
link at www.hta.ac.uk/project/1494.asp.

Recommendations
In a mixed etiology cohort, the most effective surveil-
lance strategy is to screen each. This may be largely
due to the younger age at diagnosis of cirrhosis in pa-
tients with HBV. This raises the possibility of further
subgroups of ALD and HCV patients diagnosed with
cirrhosis at a younger age, in which more intensive sur-
veillan ce might provide value for money. Implica-
tions for policy: The results show that surveillance strategies
for HCC are effective and can often be considered cost
effective in patients with cirrhosis. We believe that
the implementation of formal surveillance programs
should be considered where they do not currently exist.
See Executive Summary link at www.hta.ac.uk/pro-
ject/1494.asp.

Methods
See Executive Summary link at www.hta.ac.uk/pro-
ject/1494.asp.

Further research/reviews required
See Executive Summary link at www.hta.ac.uk/pro-
ject/1494.asp.