



Title	The Cost Effectiveness of Screening for Helicobacter Pylori to Reduce Mortality and Morbidity from Gastric Cancer and Peptic Ulcer Disease: a Discrete-event Simulation Model
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Aim

To develop a discrete-event simulation model to evaluate the cost effectiveness of population screening for *H. pylori* in England and Wales to prevent gastric cancer and peptic ulcer disease.

Conclusions and results

Population screening would screen about 25 million individuals if uptake were 70%, with over 5 million people being treated. The number of deaths prevented falls with increasing age at screening, but so does the present value of costs because of less prevalent screening and deferred costs. In the base case, the cost effectiveness of *H. pylori* screening improves with age and is under £10 000 per life-year saved (LYS) in all age groups. However, this cost/LYS is over an 80-year followup. Screening once at age 40 with a prevalent round for people aged 40–49 appears to be the most pragmatic policy. The effect of eradication of *H. pylori* on gastric cancer (GC) risk is uncertain. Extensive *H. pylori* opportunistic testing of all dyspeptic cases in primary care would reduce the cost effectiveness of *H. pylori* screening.

Recommendations

Population screening for *H. pylori* is likely to be cost effective in the long term (a cost/LYS of under £10 000 for the base assumptions). This compares favorably with other such programs, but more research is needed to clarify uncertainties before introducing population screening.

Methods

A discrete-event simulation model was developed using the 'patient-oriented simulation technique'. In this model, without screening most *H. pylori*-positive cases remained asymptomatic, but some developed dyspepsia and presented to primary care for testing and eradication therapy. *H. pylori*-positive cases were assigned increased risks of developing peptic ulcer disease and GC. Some cases of peptic ulcer disease were fatal, and most GC cases were incurable. In the screening scenarios, the population was invited to screening; the *H. pylori*-positive were offered eradication therapy. In those treated, the risk for peptic ulcer fell immediately to that of *H. pylori*-negative cases. The effect of eradication on GC risk was modeled by assuming a time lag before such risk reverted to *H. pylori*-negative levels. The decline in GC incidence was taken into account by age cohort modeling. Key parameters for the model are presented in the report. UK data were used where available. Costs were NHS costs (2000 prices, discount rate of 6%). The model covered an 80-year period to allow the impact of screening on GC risk to accrue. Sensitivity analyses addressed different scenarios and the estimated values in the model. Both incident and prevalent screening rounds were modeled.

Further research/reviews required

These include: clarifying the relative risk of *H. pylori* and complicated peptic ulcer disease, the efficacy of eradication of *H. pylori* on pre cancerous gastric changes, and the scale of wider opportunistic testing.