Health and economic impact of the seasonal influenza vaccination programme in England

Baguelin M, Jit M, Miller E, Edmunds WJ

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 assess the cost-effectiveness of the existing seasonal influenza vaccination programme, in England. The authors concluded that the seasonal influenza vaccination programme appeared to reduce the disease burden and be good value for money. The results were not fully reported, but the methods were generally good, and the results are likely to be valid. Given the scope of the study, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of the existing seasonal influenza vaccination programme, in England.

Interventions
The influenza vaccination programme, in England, for clinical risk groups and for those aged 65 years or older, was compared with no vaccination.

Location/setting
UK/primary care.

Methods
Analytical approach:
A published age-structured dynamic model of influenza transmission (Baguelin, et al. see Other Publications of Related Interest) was adapted to assess the dynamics of influenza transmission, disease, and vaccination, during the 2006 to 2007 influenza season, in a hypothetical cohort of 100,000 patients. The time horizon was the lifetime of the patient. The perspective was not explicitly reported.

Effectiveness data:
The clinical and effectiveness data were from published studies, including those identified by Baguelin and colleagues for the original model. The main measure of effectiveness was the programme's efficacy in preventing influenza. These estimates were derived for a scenario with good matching to the circulating strain, and another with poor matching. They were from published studies and a systematic literature review (Jefferson, et al. see Other Publications of Related Interest).

Monetary benefit and utility valuations:
The utility estimates were from published sources.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and were discounted at an annual rate of 3.5%.

Cost data:
The direct costs included vaccine acquisition and administration; visits to general practitioners (GPs); and hospitalisations. The rates of visits to GPs for influenza-like symptoms were from reports published by the Royal College of Practitioners. The hospitalisation rates for influenza were obtained by multiplying the number of GP consultations for influenza by the fraction of these that were expected to be hospitalised. This fraction was from the
General Practice Research Database or a published study, which provided a low and a high severity of influenza strain. The costs of vaccination were from the British National Formulary. Hospital admission costs were UK Department of Health estimates, and GP costs were from a previous study. The price year was 2008. Future costs were discounted at an annual rate of 3.5%. All costs were reported in UK £.

Analysis of uncertainty:
Probabilistic sensitivity analyses were conducted, by assigning distributions to all the model parameters, and running Monte Carlo simulations. The results were presented as cost-effectiveness acceptability curves. Scenario analyses were conducted for high and low severity influenza, and for a well-matched and poorly matched vaccine.

Results
The total QALYs gained with vaccination, compared with no vaccination, were: 59 in a high severity, well-matched scenario; 23 in a high severity, poorly matched scenario, 22 in a low severity, well-matched scenario; and 8.1 in a low severity, poorly matched scenario.

The treatment costs (excluding costs of vaccination) avoided with vaccination were: £18,000 in a high severity, well-matched scenario; £6,900 in a high severity, poorly matched scenario, £4,200 in a low severity, well-matched scenario; and £1,600 in a low severity, poorly matched scenario.

The costs, including vaccination, and benefits were combined in an incremental cost-utility ratio (the additional costs per QALY gained). At the accepted willingness-to-pay threshold of between £20,000 to £30,000 per QALY gained, vaccination was likely to be cost-effective in all scenarios, except when the influenza strain was mild and the vaccine was poorly matched to that strain.

Authors’ conclusions
The authors concluded that the seasonal influenza vaccination programme appeared to reduce the disease burden and be good value for money.

CRD commentary
Interventions:
The vaccination programme was described adequately.

Effectiveness/benefits:
The clinical and effectiveness data were from published studies. The evidence for effectiveness was from studies identified by a published systematic review, making it likely that all the relevant information on effectiveness was considered. Other model parameters, such as herd immunity, were identified for the original model.

Costs:
The perspective was not explicitly reported, but seems to have been a health care system perspective. For this perspective, it appears that all the major relevant costs were included. The authors reported the sources for both the resource use and the unit costs. The price year, time horizon and discount rate were explicitly reported.

Analysis and results:
A dynamic transmission model of influenza was used to synthesise the cost and outcome information. The model structure was described, with further technical details provided in an appendix, but no diagram was given. The incremental cost-utility ratios and the total costs were not reported. Uncertainty in the model results was appropriately tested in a probabilistic sensitivity analysis. As the main limitation to their study, the authors reported that the model was based on data from 2006 to 2007, when there was a low incidence of influenza and only one circulating strain, and this could have underestimated the benefits of vaccination.

Concluding remarks:
The results were not fully reported, but the methods were generally good, and the results are likely to be valid. Given the scope of the study, the authors’ conclusions appear to be appropriate.
Funding
Supported by a grant from the Department of Health, UK.

Bibliographic details

PubMedID
22446636

DOI
10.1016/j.vaccine.2012.03.019

Original Paper URL

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Aged, 80 and over; Child; Child, Preschool; England /epidemiology; Female; Humans; Incidence; Infant; Influenza Vaccines /administration & dosage /economics /immunology; Influenza, Human /economics /epidemiology /prevention & control /transmission; Male; Middle Aged; Models, Statistical; Vaccination /economics /methods; Young Adult

AccessionNumber
22012018409

Date bibliographic record published
24/10/2012

Date abstract record published
17/01/2013