Cost-effectiveness analysis of influenza vaccination for people aged 65 and over in Japan
Hoshi SL, Kondo M, Honda Y, Okubo I

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 examine the cost-effectiveness of a national influenza vaccination programme, for the elderly, with different subsidy levels. The authors concluded that the current vaccination programme, with a 71% subsidy for all those aged 65 years or older, was cost-effective compared with no subsidy, but a full subsidy for the elderly was more cost-effective. The reporting of the data sources was limited, but the study was generally well conducted and the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to examine the cost-effectiveness of a national influenza vaccination programme, for the elderly, with different subsidy levels.

Interventions
The five strategies for people aged 65 years or older were: no subsidy; 71% subsidy (the current strategy in the authors’ setting); full subsidy; full subsidy only for those at high risk; and full subsidy for those at high risk plus 71% subsidy for everyone else. High risk was defined as people with pre-existing diseases such as cardiovascular disease, diabetes, asthma, or renal disease.

Location/setting
Japan/primary care.

Methods
Analytical approach:
The analysis was based on a decision tree model that described the course of an influenza epidemic season. A lifetime horizon was considered. The authors stated that a societal perspective was adopted.

Effectiveness data:
The clinical evidence came from a selection of known, relevant studies, most of which were carried out in the Japanese setting and reflected the epidemiology in previous influenza seasons. Most of the epidemiological data were from Japanese studies and the data on the vaccine treatment effect were from studies conducted outside Japan. Little information on these sources was provided and some data assumptions were required. The key clinical input was the probability of hospitalisation due to influenza.

Monetary benefit and utility valuations:
Not included.

Measure of benefit:
Life-years (LYs) were the summary benefit measure and were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the direct medical costs, associated with the immunisation programme and the treatment of influenza and borne by the government, vaccinees, patients, and third-party payers. A breakdown of the cost items was only provided for a few items. The indirect medical costs and productivity losses were not included. All
the economic data were derived from the literature, but the details were not reported. They were supplemented with
some assumptions and the immunisation costs were estimated by the authors. All costs were in US dollars ($) and the
price year was 2002.

Analysis of uncertainty:
Both deterministic and probabilistic sensitivity analyses were carried out using published estimates or ranges
determined by the authors (± 30% of the base-case values). The probability distributions assigned to the model inputs
were described.

Results
In the base case, compared with no subsidy, the incremental cost was $12.9 with 71% subsidy, $15.6 with full subsidy,
$5.5 with high-risk subsidy, and $13.9 with high-risk plus 71% subsidy. The LYs saved were 0.00111 with 71% subsidy, 0.00138 with full subsidy, 0.00084 with high-risk subsidy, and 0.00125 with high-risk plus 71% subsidy.

The incremental cost per LY saved was $11,622 with 71% subsidy, $11,729 with full subsidy, $6,548 with high-risk subsidy, and $11,120 with high-risk plus 71% subsidy. Thus, every strategy was cost-effective compared with no programme.

Compared with the current strategy of 71% subsidy, full subsidy and high-risk plus 71% subsidy were both more
effective and more costly, while high-risk subsidy was less effective and less costly. The incremental cost per LY saved
compared with 71% subsidy was $12,273 for full subsidy and $7,143 for high-risk plus 71% subsidy. Thus, both
strategies were more cost-effective than the current programme at the standard threshold of $50,000.

The cost-effectiveness acceptability curves showed that, compared with the 71% subsidy, full subsidy had a 100% probability of being cost-effective at $43,000, while high-risk plus 71% subsidy had a 100% probability of being cost-effective at $26,000.

The most influential model inputs were the ones that changed mortality either directly or indirectly, such as the
probability of hospitalisation, the probability of contracting influenza, vaccine efficacy in reducing death, and the
discount rate applied to LYs. The base-case results were generally robust to input variations. For example, the most
unfavourable cost-effectiveness ratio was for 71% subsidy versus no subsidy and was $16,914.

Authors' conclusions
The authors concluded that the current vaccination programme was cost-effective compared with no subsidy, but a
strategy of full subsidy for all elderly people was more cost-effective.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear and appropriate as a wide range of immunisation strategies
were considered and clearly described.

Effectiveness/benefits:
The selection of the relevant sources of data, without a systematic review, may not have ensured the inclusion of the
most appropriate estimates. The limited reporting of the methods of these data sources means that an objective
assessment of the validity and quality of the clinical inputs is not possible. Japanese sources appear to have been used
for the epidemiological estimates and this was appropriate, but the homogeneity of these sources was not investigated.
LYs are an appropriate benefit measure, given the impact of the disease on survival, especially for elderly people.
Conventional discounting was applied and the use of alternative discount rates, or no discounting, was investigated in
the sensitivity analyses. The authors stated that quality of life was not considered given the short duration of influenza,
but QALYs would have been useful because influenza has an impact on the quality of life.

Costs:
The costs were presented as macro-categories and no breakdown of individual items was provided. The authors
justified the exclusion of some cost categories on the grounds of the acute nature of influenza and the advanced age of
the vaccinees. The sources of data were not clearly described, which limits the transparency of the economic analysis, but it seems that country-specific sources were used.

Analysis and results:
The costs, benefits, and cost-effectiveness ratios were clearly reported. An incremental analysis was appropriate for synthesising the clinical and economic outcomes of the model as it allowed the identification of the most cost-effective strategy. The issue of uncertainty was satisfactorily investigated using various approaches, the results of which were clearly presented and discussed.

Concluding remarks:
The reporting of the data sources was limited, but the study was generally well conducted and the authors’ conclusions appear to be robust.

Funding
Funded by a grant from the Ministry of Health, Labour and Welfare.

Bibliographic details

PubMedID
17681651

DOI
10.1016/j.vaccine.2007.05.067

Original Paper URL
http://dx.doi.org/10.1016/j.vaccine.2007.05.067

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged /statistics & numerical data; Cost-Benefit Analysis; Costs and Cost Analysis; Decision Trees; Endpoint Determination; Humans; Influenza Vaccines /economics; Influenza, Human /economics /immunology /prevention & control; Japan /epidemiology; Life Expectancy; Mass Vaccination; Nonprescription Drugs /economics; Risk Assessment

AccessionNumber
22007001786

Date bibliographic record published
11/10/2007

Date abstract record published
24/02/2010