Could a federal program to promote influenza vaccination among elders be cost-effective?

Patel M S, Davis M M

**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.

**Health technology**
The use of a federal programme to promote influenza vaccination in the elderly, patterned after a direct-to-consumer (DTC) advertising programme, was studied.

**Type of intervention**
Primary prevention.

**Economic study type**
Cost-effectiveness analysis.

**Study population**
The study population comprised the US population of persons aged 65 years and older.

**Setting**
The setting was not specified but it was likely to have been the community. The economic analysis was carried out in the USA.

**Dates to which data relate**
Vaccine costs and administration fees were based on data from 2004. Data on DTC advertising costs and sales volume effects were derived from a paper published in 2001 and related to data from 1998 and 1999. The price year was 2005.

**Source of effectiveness data**
The effectiveness evidence was derived from a review of the literature.

**Modelling**
A decision analytic model of a hypothetical cohort of the US elderly population with a baseline influenza vaccination rate of 65% was constructed. The model was used to calculate the number-needed-to-vaccinate (NNV) to prevent one all-cause death due to influenza and to estimate the mortality reduction expected from increased vaccination rates over the period 2006 - 2015.

**Outcomes assessed in the review**
The outcomes assessed were the influenza-related mortality rates, vaccine efficacy among the elderly (with 95% confidence intervals, CIs), and the NNV to prevent one death.

**Study designs and other criteria for inclusion in the review**
Not reported.

Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Approximately 5 studies were included in the review.

Methods of combining primary studies
The primary studies were not combined.

Investigation of differences between primary studies
For the most part, single studies were the source of estimates.

Results of the review
Vaccine efficacy among the elderly was 50%.

Methods used to derive estimates of effectiveness
The authors made assumptions to derive estimates of the effectiveness of the promotion campaign to increase vaccination rates. They were supposed to be based on some historical data.

Estimates of effectiveness and key assumptions
The authors assumed that in the first year the vaccination rate would increase by 6 percentage points. The rate of increase would decline year on year. Overall, in 10 years, it was assumed that the vaccination rate would increase from the baseline rate of 65% to 90%.

Measure of benefits used in the economic analysis
The measure of benefit used in an incremental cost-effectiveness analysis was the number of life-years saved. The benefits were discounted at a rate of 3% per annum.

Direct costs
The costs to the DHHS were used in the analysis. These costs covered DTC advertising, the vaccine and vaccine administration. Discounting was carried out appropriately as the costs were to be incurred during more than 2 years. A rate of 3% per annum was used. The quantities and the costs were not reported separately. The costs of the vaccine and vaccine administration were based on Medicare payments in 2004, inflated each year to offset the discount rate. Advertising costs were obtained from the literature. The prices were adjusted to 2005 US dollars.
Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
One-way and multi-way sensitivity analyses were performed. A range of parameters was used, based on the literature and on plausible assumptions of variance around base-case point estimates of DTC advertising costs, effectiveness of the DTC advertising in increasing vaccination rates, vaccine dosage costs, vaccine administration fees, and vaccine efficacy.

Estimated benefits used in the economic analysis
The NNV for influenza was 1,116 (95% CI: 993 to 1,348) to avert one all-cause death from influenza.

In the first year of the programme, this would correspond to 16,841 life-years saved (95% CI: 8,421 to 25,252) attributable to a 6 percentage-point increase in the national elderly influenza vaccination rate.

Over the 10-year programme, 6,516 elderly lives (95% CI: 5,576 to 7,435) and 69,138 life-years (95% CI: 58,843 to 79,203) would be saved.

Cost results
The costs of DTC advertising were $2,225 million, while the incremental cost of influenza vaccine doses and vaccine administration was $360.9 million.

Synthesis of costs and benefits
Overall, the cost per life-year saved over the 10-year programme was $37,621 (95% CI: 32,644 to 43,939), assuming a 25% increase in the vaccination rate.

Varying estimates of DTC advertising costs, vaccine dose cost and vaccine administration cost changed the estimates of the cost per life-year saved for the overall 10-year programme by less than $6,500 per life-year saved. However, the incremental cost-effectiveness of the programme varied significantly if the increase in vaccination rate was 10% or 15%, instead of 25% as in the base-case analysis.

If the programme yielded only a 15-point increase in vaccination rates, the incremental cost-effectiveness values exceeded $50,000 per life-year saved and fewer than 4,000 lives in total would be saved.

Authors’ conclusions
A promotional campaign using a new public-sector model for inducing demand for influenza vaccine, directed towards elders, may be a cost-effective option for the federal government to pursue.

CRD COMMENTARY - Selection of comparators
The comparator represented current practice in the authors’ setting. You should decide if the comparator represents current practice in your own setting.
Validity of estimate of measure of effectiveness
The authors did not report their search strategy, nor did they state whether a systematic review of the literature was carried out to locate all relevant studies. It is therefore possible that available studies were used selectively, but it is most likely that the authors used whatever evidence was available. There was little comment on the quality of the retrieved studies, making it difficult to comment on the efficiency estimates. Further, it was assumed that DTC advertising targeted at the elderly would be as effective as DTC advertising to increase prescription pharmaceuticals to the general public, but there were no data to suggest that this assumption was correct. The authors carried out several sensitivity analyses relating to their efficacy estimates, and they indicated where the reliability of their estimates might have been affected. These approaches improved the internal validity and generalisability of the study by demonstrating the robustness of the results to changes in the base-case estimates.

Validity of estimate of measure of benefit
The authors used life-years saved as their benefit measure. The calculations were based on life tables providing life expectancy, in 1-year age groups, for the population above age 65 years. This is a well-established and valid approach. The benefits were appropriately discounted.

Validity of estimate of costs
DTC costs used in the model were estimated using data for pharmaceutical sales, yet there was no evidence that the DTC costs for a programme targeting the elderly would be similar. The costs and the quantities were not reported separately, making it harder to reproduce the results. No statistical analysis of the prices was performed. These limitations imply that the cost results should be treated with some caution. The price year was stated and discounting was appropriately performed.

Other issues
The authors did not compare their findings with those from other studies, as they stated that this was the first study to look at the potential benefits of DTC-style advertising in public efforts promoting influenza vaccination for the elderly. However, they did provide a useful discussion of the study limitations, as well as the strengths and weaknesses of a DTC advertising campaign to promote public education. The results were not reported selectively.

Implications of the study
DTC-style promotional campaigns for influenza vaccination among the elderly may represent a cost-effective strategy for the federal government to pursue. There was no recommendation for further research.

Source of funding
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