Economics of influenza vaccine administration timing for children
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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 objectives were to assess the cost-effectiveness of vaccinating a child early in the influenza season and whether it was cost-effective to vaccinate in any particular month. The authors concluded that the trivalent inactivated vaccine was cost-effective until the end of December, and the live attenuated influenza vaccine was cost-effective until the end of November. The methods were adequate and the authors’ conclusions are appropriate for the results, but it was not clear if the best available evidence was used.

Type of economic evaluation
Cost-utility analysis

Study objective
The objectives were to assess the cost-effectiveness of vaccinating a child early in the influenza season and that of vaccinating in any particular month of the season.

Interventions
Influenza vaccination was assessed starting in different months from September to June, using either the trivalent live attenuated influenza vaccine (LAIV) by nasal spray or trivalent inactivated vaccine (TIV) by injection.

Location/setting
USA/community care.

Methods
Analytical approach:
The authors reported that a Monte Carlo decision model was used to determine the incremental cost-effectiveness of administering influenza vaccine to children in different months of the influenza season from September to June. Two analyses were completed: one for LAIV and one for TIV. The authors reported that the two perspectives were those of the third-party payer and of society.

Effectiveness data:
The clinical and effectiveness data were from a number of sources including published studies and national life tables. Wherever possible, the estimates were from published meta-analyses. The main effectiveness measures were the reductions in hospitalisations and mortality with vaccination. These data were from a systematic review of the literature (Jefferson, et al. 2008, see ‘Other Publications of Related Interest’ below for bibliographic details).

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

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained. Future benefits were discounted at an annual rate of 3%.

Cost data:
The direct costs included those of the vaccines, hospitalisation, death, out-patient visits, and vaccine adverse events. The indirect costs included those of productivity lost by parents who missed work to bring their child to clinic or because the child was sick. The vaccine costs were their average wholesale prices. The costs of hospitalisation and death
were from a national US survey on health care costs. The indirect costs were from other studies and the published US median wage. The price year was 2009 and future costs were discounted at an annual rate of 3%. All costs were reported in US dollars ($).

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken by varying all the inputs simultaneously within each parameter’s distribution.

Results
Vaccination in September and October was dominant over vaccination in all other months, as it was more effective and less costly.

Per child, delaying the TIV until November generated a loss of 0.000016 to 0.000018 QALYs and an additional cost to the third-party payer of between $0.08 and $0.16 or a societal cost of between $0.13 and $0.26.

Per child, delaying the LAIV until November generated a loss of 0.000024 to 0.000025 QALYs and costs to the third-party payer of between $0.10 and $0.27 or a societal cost of between $0.18 and $0.37.

At a threshold of $50,000 per additional QALY gained, an investment up to $0.75 for TIV or $1.25 for LAIV per child was cost-effective, in facilitating October vaccination. Vaccination after December was not cost-effective, compared with no vaccination.

Authors’ conclusions
The authors concluded that administration of the TIV was cost-effective until the end of December, and administration of the LAIV was cost-effective until the end of November.

CRD commentary
Interventions:
The interventions were reported clearly.

Effectiveness/benefits:
The clinical and effectiveness data were from published studies. The authors stated that the inputs were from published meta-analyses, wherever possible, but they did not report how these sources were identified, nor if a systematic review of the literature was undertaken. As a result, it is not clear if all the relevant information was included. The authors stated that treatment involved ibuprofen and that adverse events were included, but these events were not described.

Costs:
The two perspectives were explicitly reported and it appears that all the major costs relevant to the third-party payer or society were analysed. The sources for these costs were reported. The price year, discount rate and currency were reported, but the time horizon, over which the costs and outcomes were accrued, was not reported. Both the costs and outcomes were discounted, suggesting that the time horizon was longer than one year.

Analysis and results:
The cost and outcome information was synthesised in a decision-analytic model. Appropriate details of this model were reported, including a diagram. The incremental cost-effectiveness ratio for vaccination versus no vaccination was calculated for each month. Comparing months, vaccination starting in September and October was reported to be dominant over the other months. The absolute costs and benefits for vaccination starting each month and for no vaccination were not presented and would have been useful. The overall model uncertainty was appropriately examined in a probabilistic sensitivity analysis. The authors reported that the main limitation of their study was that the model did not consider every possible influenza or vaccination event and outcome.

Concluding remarks:
The methods were adequate and the authors’ conclusions are appropriate for the results, but it was not clear if the best available evidence was used.
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Other publications of related interest

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