Cost-benefit evaluation of influenza vaccination in the elderly in the Italian region of Liguria


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 study examined influenza vaccination in the elderly.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of individuals older than 65 years.

Setting
The setting was unclear, but it is likely to have been that of the community. The economic analysis was conducted in Italy.

Dates to which data relate
The effectiveness and cost data were derived from a prospective study conducted during the winter of 2000 to 2001. The dates to which the resources related were not reported. The price year was also not reported.

Source of effectiveness data
The effectiveness evidence was gathered from a single prospective study.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same group as that used in the effectiveness analysis.

Study sample
Three surveys were carried out to estimate the effectiveness data. General practitioners (GPs) carried out a clinical-epidemiological survey. They monitored 14,818 elderly individuals to follow the trend in influenza disease. The diagnosis was based on the definition of case given by the World Health Organisation (WHO). A prospective study on vaccinated individuals and those who refused vaccination was carried out to measure the cost-benefit of vaccination compared with no vaccination. Power calculations to determine the sample size were not reported. A total of 512 elderly individuals were enrolled in the study. Using the stratified random sampling method, 304 individuals were allocated to the vaccination group and 208 to the control group. Finally, a telephone survey was carried out to calculate the percentage of elderly individuals vaccinated in the autumn. The 500 elderly participants randomly recruited from...
the clinical-epidemiological survey group were different from the 512 examined for the cost-benefit evaluation.

**Study design**
The evaluation used a randomised controlled study that was conducted in a single centre. A stratified random sampling method was used. The duration of follow-up was unclear, but it is likely to have been the entire influenza season. No loss to follow-up was reported.

**Analysis of effectiveness**
The basis of the analysis, although not reported explicitly, was likely to have been intention to treat. The primary health outcomes used in the analysis were the incidence of influenza and the vaccination efficacy. The incidence was calculated for 1,000 individuals. The vaccination efficacy was measured by calculating the risk that could be ascribed to exposed individuals as the difference in incidence among the non-vaccinated and vaccinated, expressed as a percentage of the incidence among the non-vaccinated. No sociodemographic characteristics were reported. The groups were not compared.

**Effectiveness results**
Depending on the method used, the incidence values obtained were considerably different.

With the system of GP monitoring, the incidence of influenza was 1.06% (95% confidence interval, CI: 0 - 1.25).

With the prospective survey, the incidence was 7.57% (95% CI: 4.59 - 10.53) in vaccinated individuals and 13.94% (95% CI: 9.23 - 18.65) in non-vaccinated individuals.

From the telephone survey, the incidence was 5.8% (95% CI: 3.14 - 8.45) in the vaccinated group and 7.4% (95% CI: 3.80 - 11.00) in the non-vaccinated group.

The vaccine coverage, estimated from the telephone survey, was 63%. It is unclear how the authors obtained this result.

**Clinical conclusions**
Vaccination reduces the incidence of influenza in vaccinated individuals by approximately 6 percentage points.

**Measure of benefits used in the economic analysis**
The authors did not develop a summary benefit measure. The authors reported savings in resources as a measure of benefits. This is methodologically incorrect. Resource savings should not be considered as benefits and must be reported in the cost fields. Therefore, a cost-consequences analysis was performed.

**Direct costs**
The perspective adopted for the economic analysis was not stated. The direct costs were for vaccination and influenza. The vaccination costs included the vaccine, independent health staff, family doctor incentive, preparation, administration and surplus, transport and vaccine-related side effects requiring pharmacological treatment. The influenza costs included pharmacological therapy and hospitalisation. The costs and the quantities were reported separately, except for hospitalisation costs. The sources from which the quantities were obtained were not reported. The price year was not reported. Discounting was unnecessary due to the short time period of the analysis (less than one year).

**Statistical analysis of costs**
No statistical analysis of the costs was carried out.
Indirect Costs
No indirect costs were reported.

Currency
Italian lira (L) and Euros (Euro). No conversion rate was reported.

Sensitivity analysis
A sensitivity analysis on influenza incidence (using CIs) was performed. Two threshold analyses were conducted, in which the incidence among vaccinated and non-vaccinated individuals, respectively, was kept constant.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total vaccination cost was L8,973,955 (Euro 4,634.66).

The total influenza cost was L11,635,401 (Euro 6,009.18) in vaccinated individuals and L58,470,913 (Euro 30,197.71) in non-vaccinated individuals.

It is unclear how the authors calculated the net benefit.

The authors reported a net benefit of L64,848,133 (Euro 33,491.27) and a cost-benefit ratio of 8.2, (it should be noted that the figures reported in table 4 are incorrect).

The net saving per vaccinated person was L213,383 (Euro 110.20). However, the authors did not calculate a cost-benefit ratio but a cost-averted cost ratio.

When considering the most favourable situation for vaccination in the sensitivity analysis (incidence of 18.65% among non-vaccinated and 4.59% among vaccinated), the net saving per vaccinated individual was Euro 167.23.

When considering the most unfavourable situation for vaccination (incidence of 9.23% among non-vaccinated and 10.53% among vaccinated), the net saving per vaccinated was Euro 53.38.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
The study, though carried out during a low epidemic year, confirms the clinical and economic advantage of vaccination in the elderly.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator (no vaccination) was clear and was clearly appropriate in addressing the study question.

Validity of estimate of measure of effectiveness
The study used a randomly stratified allocation study, which was appropriate for the study question. The study sample was representative of the study population. However, the patient groups were not shown to be comparable at analysis.
and no details were given of the sociodemographic characteristics of the study sample. Potential biases or confounding factors were not taken into account. Most of the effectiveness results were reported in the discussion section.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit for use in the economic analysis. The authors used the term "cost-benefit analysis", but they did not calculate the monetary value of the health benefits. Instead, they calculated the savings in resources arising from the vaccination programme. It is, therefore, more appropriate to categorise the analysis as a cost-consequences analysis.

Validity of estimate of costs
The perspective adopted for the economic analysis was not stated and was unclear. Since the direct costs included cost items such as transport, doctor incentives and administration, it is likely that the authors adopted a societal perspective. However, the indirect costs were not explicitly included. The costs and the quantities were reported separately, with the exception of the hospitalisation costs. The sources from which the quantities were obtained were not reported. No sensitivity analysis of the quantities was conducted. This may limit the interpretation of the study findings. The source of the prices was not reported either, but it is likely to have been the authors' setting. No statistical analysis of the prices was performed. The authors also did not report the currency conversion. Discounting was unnecessary since all of the costs were incurred in less than one year. The above limitations hinder the generalisability of the study to other settings. It is likely that more details were given in the study published earlier.

Other issues
It was unclear how the net benefit and the cost-benefit ratio were calculated. Some of the figures reported in the original paper (table 4) were incorrect. The absence of a conventional economic analysis raises strong uncertainties concerning the validity of the findings. The authors compared their findings with those from Nichol et al. (see Other Publications of Related Interest). The issue of generalisability of the results to other settings or countries was not addressed. The authors reported no further limitations of their study.

Implications of the study
The authors recommend that individuals older than 65 years should be vaccinated against influenza. The authors estimate that if the results are applied to the entire population of Liguria (population 408,327) the resulting savings would be Euro 28.34 million.

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Other publications of related interest


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