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
This study assessed the cost-effectiveness of a pneumococcal polysaccharide vaccine against 23 serotypes of disease (PPV23), in older adults in Colombia, a developing country. The authors concluded that vaccination for those over 60 years old could be very cost-effective. The methods were valid and transparent, which supports the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the cost-effectiveness of a pneumococcal polysaccharide vaccine against 23 serotypes of disease (PPV23), in older adults in Colombia.

Interventions
Routine immunisation using one dose of PPV23 for those aged 60 years or older was compared with no vaccination against pneumococcal disease.

Location/setting
Colombia/primary care.

Methods
Analytical approach:
The analysis used a published decision-tree model, with a five-year time horizon. The authors stated that it was conducted from the perspective of the third-party payer, which was the Colombian Health System.

Effectiveness data:
Most of the epidemiological inputs were from official Colombian databases, which reported surveillance data and statistics. Some epidemiological inputs were identified by a literature review in commonly used databases; population-based studies conducted in other Latin American countries were selected where no Colombian data were available. Median values were calculated if more than one estimate was available for a model parameter. The rates of pneumonia and meningitis, with or without vaccination, were the main inputs and these depended on the efficacy of vaccination, which was from a published meta-analysis that included some clinical trials. The adverse effects of the vaccine were excluded.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Life-years, deaths averted, pneumonia cases, and meningitis cases were the summary benefit measures. Life-years were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the costs of vaccination (vaccine acquisition and administration) and the in-patient and out-patient costs of diagnosing and treating pneumococcal disease. The vaccine costs were from a Colombian Ministry
of Health (MoH) communication, and the other costs were from a sample of clinical records for patients of the Bogota Health Service who were admitted with a diagnosis of pneumonia or meningitis. All costs were in US dollars ($) and were discounted at an annual rate of 3%. The price year was 2008.

Analysis of uncertainty:
Univariate and probabilistic sensitivity analyses were carried out to assess the uncertainty around the following inputs: the cost of vaccine, the vaccination coverage, and the effectiveness of the vaccine in preventing cases and deaths. The ranges of values were based on published data. Conventional probability distributions were assigned to the model inputs and cost-effectiveness acceptability curves were constructed.

Results
In the eligible population of 4,151,533 people aged 60 years or older, the discounted costs were $115,599,627 without vaccination and $130,566,196 with vaccination. Total deaths were 61,606 without vaccination and 57,204 with vaccination. Total discounted years of life lost were 138,070 without vaccination and 128,183 with vaccination.

The incremental cost per death averted with vaccination versus no vaccination was $3,400 (range -1,028 to 10,862). The incremental cost per life-year gained with vaccination was $1,514 (range -408 to 5,404).

If only cases of invasive pneumococcal disease were considered the incremental cost per life-year gained was $3,487. Most values were lower than the recommended cost-effectiveness threshold of the Colombian per capita gross domestic product, which was $4,799.

The most influential inputs were the vaccine efficacy against all-cause pneumonia, the cost of administration, the probability of all-cause pneumonia, the in-patient costs of pneumonia, and the probability of death due to all-cause pneumonia. At a willingness to pay of $1,500 per life-year gained, vaccination was cost-effective in over 50% of simulations.

Authors’ conclusions
The authors concluded that vaccination with PPV23 for those over 60 years old could be very cost-effective in Colombia.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the proposed vaccination strategy was compared against no immunisation, which was the usual care in the authors' setting. It was unclear why other conjugate vaccines against 7, 10, or 13 serotypes were not considered.

Effectiveness/benefits:
The clinical inputs were from valid sources. Most of the epidemiological data were from large Colombian databases, and data from other Latin American countries were used if no Colombian estimates were found in a literature search. Conservative assumptions were made where there were no local estimates. The vaccine efficacy was from a meta-analysis of clinical trials, which should have had high internal validity. Uncertain parameters were extensively tested in the sensitivity analysis. A number of benefit measures were used and life-years were particularly valid as they allow cross-disease comparisons to be made.

Costs:
The cost categories and data sources were consistent with the perspective of the public payer in Colombia, as stated. The costs were presented as category totals and were not broken down into individual items. No information on resource consumption was given, limiting the replicability of the analysis. The price year and the discount rate were stated. The impact of variations in the cost estimates was tested in the sensitivity analyses.

Analysis and results:
The projected clinical and economic burden of disease was clearly reported. An incremental approach was used to combine the costs and benefits of the two strategies. Valid approaches were used to investigate the uncertainty, and the results were clearly illustrated. Both discounted and undiscounted results were reported. The authors reported that
economic evaluations of the PPV23, conducted in other countries, had generally shown its cost-effectiveness. Some potential benefits of vaccination, such as herd immunity and its impact on otitis media, were not included, and the results might be considered conservative. The findings appear to be specific to Colombia, but may be transferable to other developing countries with similar epidemiology and relative prices.

Concluding remarks:
The methods were valid and transparent, which supports the authors’ conclusions.

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