Influenza and pneumococcal vaccinations for patients with chronic obstructive pulmonary disease (COPD): an evidence-based review

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CRD summary
The author concluded that influenza vaccination was safe and significantly reduced risks of acquiring influenza-related acute respiratory illness in patients with chronic obstructive pulmonary disease. Pneumococcal vaccination showed some reduction in incidence of pneumococcal pneumonia in certain subgroups. The overall evidence base was very limited (two trials) so the conclusions cannot be considered reliable.

Authors' objectives
To assess the effectiveness and safety of influenza vaccination and pneumococcal vaccination in reducing incidence of influenza-related illness or pneumococcal pneumonia in patients with chronic obstructive pulmonary disease.

Searching
MEDLINE, MEDLINE In-Process and other Non-Indexed Citations, EMBASE, CINAHL, The Cochrane Library and IHTA were searched for articles published in English from 2000 to January 2011. The search strategy was reported.

Study selection
Eligible studies were randomised controlled trials (RCTs) that compared the efficacy of influenza or pneumococcal vaccines (approved by Health Canada) versus no vaccine or placebo in patients with chronic obstructive pulmonary disease. The primary outcome for flu vaccine was episodes of acute respiratory illness due to influenza virus; for the pneumococcal vaccine this was time to the first episode of community-acquired pneumonia due either to pneumococcus or of unknown aetiiology. Secondary outcomes included rate of hospitalisation and mechanical ventilation, death and adverse events.

The included trials were conducted in Spain and Thailand. Controls received vitamin B1 or no vaccination but with a follow-up examination. Some patients had comorbid disease such as hypertension, coronary artery disease and diabetes. Some patients had previously had influenza infection. Episodes of acute respiratory illness were defined in the review.

The single author screened studies for inclusion. Where eligibility was uncertain, a second expert in the field or group of experts were consulted until consensus was achieved.

Assessment of study quality
The quality of RCTs was assessed for each outcome according to allocation concealment, randomisation, blinding, sample size, withdrawals and intention-to-treat analyses. The quality of the body of evidence was assessed using GRADE criteria and rated as high, moderate, low or very low (as defined in the review).

It was unclear whether other experts in the field were consulted on the assessment of quality.

Data extraction
The single author extracted outcome data as reported in the original articles.

Methods of synthesis
Data were reported by type of vaccination. Risk ratios (RR) and acute respiratory illness episodes per 100 person-years, along with their 95% confidence intervals (CI), were reported by trial outcomes.

Results of the review
One influenza vaccination RCT (125 patients) and one pneumococcal vaccination RCT (596 patients) were included in the review. Patients who received pneumococcal vaccination were followed up to three years. Quality was considered high for the influenza vaccination RCT for episodes of influenza-related acute respiratory illness and high for the pneumococcal vaccination for the first episode of community acquired pneumonia. Quality was considered low for all
other outcomes.

**Influenza:** The overall effectiveness of the vaccination against flu virus was 76% compared to placebo (RR 0.24, 95% CI 0.09 to 0.67). Effectiveness rates by severity of chronic obstructive pulmonary disease were 84% (mild), 45% (moderate) and 85% (severe). Outcome data were not statistically significant between treatment and placebo groups for hospitalisation or mechanical ventilation.

Statistically significantly more patients who received vaccine compared to placebo experienced local adverse reactions (p=0.002), swelling (p=0.04) and itching (p=0.04).

**Pneumonia:** There was no statistically significant difference in the overall effectiveness between vaccination and control groups in the rate of pneumonia (RR 0.76, 95% CI 0.46 to 1.24). There were statistically significant reductions in incidence of pneumonia of unknown aetiology and pneumococcal pneumonia for some subgroups (as reported in the review). There were no statistically significant differences in hospitalisation or mortality rates. None of the patients reported local or systemic reactions to the vaccine.

Other results were reported in the review.

**Authors’ conclusions**
Influenza vaccination was safe and significantly reduced risk of acquiring influenza-related acute respiratory illness in patients with chronic obstructive pulmonary disease, especially those with severe disease. Pneumococcal vaccination did not significantly reduce the risk of first episode of community-acquired pneumonia but did reduce incidence of pneumococcal pneumonia in certain subgroups.

**CRD commentary**
The review question and associated inclusion criteria were clearly defined. Several electronic databases were searched. Language restrictions were applied so language bias could not be ruled out. As there was only one author, reviewer error and bias could not be ruled out.

Trial quality was assessed using appropriate criteria. The evidence was generally of low quality. Few patient details were reported. Only one trial each was eligible for inclusion for each type of vaccine. Subgroup analyses were undertaken in both trials but patient numbers were small.

The overall evidence base was very limited so the conclusions cannot be considered reliable.

**Implications of the review for practice and research**
The author did not state any implications for practice or research.

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