

# Real-world effectiveness of influenza vaccination in older adults in the UK from 1997-2012: a quasi-experimental cohort study

## Background

Ageing is associated with a decline in the normal function of the immune system which may limit the effectiveness of the influenza vaccine. However, the absence of strong evidence from randomised controlled trials and conflicting results from observational studies has led to ongoing debate about the effectiveness of influenza vaccination in the elderly.

## Objectives

To determine the real world effectiveness of the influenza vaccine in UK adults aged 65y and older, and its relationship with age and receipt of the pneumococcal vaccination.

## Method

### Design

Quasi-experimental cohort study of patients in the UK from general practices registered to the Clinical Practice Research Datalink with linkage to Hospital Episode Statistics and the Office of National Statistics databases.

### Setting

Adults aged 65y and over, recruited, starting in September, in annual cohorts from 1997 to 2012, with no record of influenza vaccination in the preceding five years.

### Exposure

Influenza vaccination

### Outcome measure

Hospitalisation for influenza, and prescriptions for antibiotics for symptoms consistent with lower respiratory tract infections.

### Statistical analysis

Application of the pairwise Prior Event Rate Ratio (PERR) method to estimate vaccine effectiveness in each annual cohort after removing the effect of time-invariant unmeasured confounding using outcomes from the year before vaccination. Vaccination effectiveness was also studied by age and pneumococcal (PPV) vaccination subgroups.

## Results

The rates of influenza in the year before vaccination were higher for patients that proceeded to be vaccinated than for patients who remained unvaccinated, indicating the presence of confounding bias. Adjustment for this bias using the pairwise PERR method, showed that influenza vaccination was moderately effective in all cohorts (HR ranging from 0.59 in 2012 to 0.89 in 2001, all significant at the 5% level except 2001). There was no discernible difference in influenza effectiveness between the PPV subgroups, although accuracy was affected by fewer patients in the PPV group. There was also no significant age interaction except for the 2009 cohort, for which effectiveness of vaccination increased with age.

## **Conclusions**

The UK policy of vaccinating older adults is effective at reducing risk of influenza infection. There was no clear evidence to suggest influenza vaccine effectiveness was attenuated by the pneumococcal vaccine and no consistent moderation of effectiveness with increasing age.