Effectiveness of 2010/2011 Seasonal Influenza Vaccine in Ireland

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Abstract

We conducted a case-control study to estimate the 2010/2011 trivalent influenza vaccine effectiveness (TIVE) using the Irish general practitioners influenza sentinel surveillance scheme. Cases were influenza-like illness (ILI) patients with laboratory-confirmed influenza. Controls were ILI patients who tested negative for influenza. Participating sentinel general practitioners (GP) collected swabs from patients presenting with ILI along with their vaccination history and the patient medical records or by asking the patient directly. Data were entered into EpiData Entry and analysed in Stata 11.0. Univariable analysis was performed to compare the odds of vaccination among the exposed and unexposed. The TIVE was defined as the proportion of ILI patients who were vaccinated against influenza. The TIVE was computed as (1–odds ratio for vaccination by exposure) × 100%. If 60 sentinel GP practices, 22 expressed interest in participating in the study and 17 (28%) recruited at least one ILI patient. In the analysis, we included 106 cases and 85 controls. Seven controls (8.2%) and one influenza patient (1.2%) were excluded from analysis and the final analysis was performed on 106 cases and 85 controls. The TIVE was estimated to be 89.4% (95% CI: 78.3; 95.6%). The TIVE was significantly higher compared to the 2009/2010 study. The TIVE was estimated to be 48.9% (95% CI: 36.4; 60.2%) and 97.7% (95% CI: 89.9; 99.5%) for the 2009/2010 and 2010/2011 seasons, respectively.

Introduction

As influenza viruses constantly evolve, influenza vaccines have to be reformulated every year to contain representative circulating virus strains. Clinical trials can provide data on the efficacy of vaccines but they cannot be conducted yearly and are usually limited to healthy adults. Therefore observational studies are needed to monitor influenza vaccine effectiveness (IEV) annually at population level. Various study designs can be used according to the epidemiology of influenza, available data sources and available resources. In February 2010, the World Health Organization (WHO) recommended the following viruses to be used for influenza vaccines in the 2010/2011 influenza season in the northern hemisphere: an A/California/7/2009 (H1N1)-like virus, an A/Perth/16/2009 (H3N2)-like virus and a B/Brisbane/60/2008-like virus. Following these recommendations, trivalent influenza vaccines were developed by manufacturers. The seasonal influenza vaccination campaign started on 6th October 2010. Two vaccines were marketed, both were non-adjuvanted. Vaccination was recommended for persons aged 50 years and over, adults and children aged over 6 months with underlying medical conditions or morbidity obesity, immunosuppressed individuals, children on long-term aspirin therapy, pregnant women, health care workers, residents of nursing homes and other long stay facilities, and individuals with close contact with pigs or poultry or water fowl. Vaccines could be administered either in general practitioner (GP) practices, occupational health departments or in selected Boots pharmacies.

Methods

We conducted a case-control study between October 2010 and May 2011 within the framework of the Irish College of General Practitioners (ICGP) influenza surveillance scheme. This system has been in operation since October 2000 and comprises 135 sentinel GPs from 60 practices who each week report on influenza-like illness (ILI) consultations. They also take nasal and throat swabs from one to five ILI patients weekly for influenza testing. The group covers 6.2% of the national population (based on the 2006 census). All sentinel GPs were invited to participate in the study. The study population comprised all individuals with no contraindications for seasonal influenza vaccine who consulted a participating sentinel GP practice with ILI. We used the European Union (EU) ILI definition: sudden onset of symptoms and at least one systemic symptom (fever, malaise, headache and myalgia) and at least one respiratory symptom (cough, sore throat or shortness of breath) and at least one systemic symptom (fever, malaise, headache and myalgia) and at least one respiratory symptom (cough, sore throat or shortness of breath).

Results

Of 60 practices contacted, 22 expressed an interest in participating in the study and 17 (28%) recruited at least one ILI patient. The population covered by the 17 practices is estimated at 1.8% of the Irish population (based on the 2006 census). The geographical distribution of the 17 GP practices participating in the influenza vaccine effectiveness study in Ireland, 2010/2011.
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Recruitment of patients
GP practices recruited on average one patient per week (min: 0; max: 9) during the period of high influenza activity (when the sentinel ILI consultation rate was over the baseline threshold). Over the study period, 288 ILI patients were recruited but 97 (34%) did not meet the inclusion criteria and were excluded from the analysis. The main reasons for exclusion were: waiting >14 days before symptom onset, lack of consent, and one with influenza A(H3). The epidemic peak of the ILI consultation rate occurred in week 1-2011 (Figure 2). Of 191 patients, 45 (23.5%) were reported as belonging to a target group for influenza vaccination. Eight patients (4.2%) had received the 2010/2011 influenza vaccine more than 14 days before symptom onset.

Discussion
The 2010/2011 TIVE against any influenza subtype was estimated to be 89.4%, suggesting a protective effect of the vaccine strain. The TIVE point estimate was 89.4% [95%CI: 13.8; 99.8%] against any influenza subtype, 100% [95%CI: -8; 100%] against influenza A(H1N1)2009 and 77% [95%CI: -90.0; 99.5%] against influenza B. However, comparison is limited by the low precision and the fact that no adjustment for potential confounders could be done in Ireland. In all other studies, the adjusted TIVE was lower than the crude TIVE. Major confounders identified were seasonal influenza vaccination in 2009/2010 and age group. The main limitation of the study was the small sample size coupled with low vaccination coverage which decreased the precision of the TIVE estimate and precluded the possibility of conducting multivariable and stratified analysis. The number of participating GP practices recruited on average one patient per week (min: 0; max: 9) during the period of high influenza activity. Some improvements have already been achieved following the 2009/2010 study, in particular the implementation of the EU ILI definition in the influenza sentinel GP surveillance system and the use of systematic sampling to recruit ILI patients. For coming influenza seasons, the priority would be to increase the power of the analyses, by increasing both sample size and vaccination coverage, in order to obtain precise IVE estimates for Ireland. All sentinel GPs are selected from the same population (GP attending patients) and are assumed to have the same health-seeking behaviour and the same chances of being vaccinated. Inclusion criteria should also be better explained and emphasised during the planning phase in order to optimise recruitment.

Acknowledgements
References


