Inequalities in uptake of influenza vaccine by deprivation and risk group: Time trends analysis

Carol Coupland [a,*], Sally Harcourt [b], Yana Vinogradova [a], Gillian Smith [b], Carol Joseph [c], Mike Pringle [a], Julia Hippisley-Cox [a]

[a] Division of Primary Care, Tower Building, University of Nottingham, University Park, Nottingham NG7 2RD, United Kingdom
[b] Health Protection Agency, West Midlands, 9th Floor Ladywood House, 45 Stephenson Street, Birmingham B2 4DY, United Kingdom
[c] Respiratory Diseases Department, Health Protection Agency, Centre for Infections, 61 Colindale Avenue, London NW9 5EQ, United Kingdom

Abstract

The aim of this study was to investigate influenza immunisation rates in the United Kingdom over a 6-year period and examine trends in uptake by deprivation, ethnicity, rurality and risk group. Influenza immunisation rates were determined from 1999/2000 to 2004/2005 using a large general practice database (QRESEARCH). There was a relative increase of 59.5% in the overall influenza vaccination rate over the study period. In 2004/2005, 70.2% of all patients aged 65 and over were vaccinated, compared with 29.3% of patients in a clinical risk group aged less than 65. Males, patients from deprived areas and from areas with a higher proportion of non-White residents had slightly lower vaccination rates overall. This general practice based study suggests that substantial increases in influenza vaccination rates have occurred across all risk groups, but that increased focus should be given to immunising high-risk patients below the age of 65.
© 2007 Elsevier Ltd. All rights reserved.

Keywords: Influenza immunisation; Risk groups; Time trends; Deprivation

1. Introduction

Influenza and its related illnesses remain a major cause of preventable morbidity and mortality in the elderly worldwide [1]. Influenza can also be a serious health problem to people in high-risk groups who already suffer from chronic diseases such as diabetes mellitus, chronic heart disease, respiratory disease and renal disease.

Immunisation against influenza is an important means of reducing morbidity and mortality amongst patients at high risk including the elderly [2]. Since the late 1960s influenza vaccination has been recommended in the United Kingdom (UK) for patients of all ages from selected high-risk groups, including the elderly with underlying medical conditions as well as those living in long stay residential homes where the spread of influenza is likely to be rapid. In 1998 influenza vac-

cination was recommended for all persons aged 75 years and over regardless of predisposing risk conditions. In 2000 this policy was modified to include all persons aged 65 years and over. The risk group categories in people aged under 65 years have also been expanded over time in an attempt to reduce the morbidity from influenza in these groups. Improvement in the delivery of influenza vaccination is seen as an important aspect of preventive care for primary healthcare teams [3]. A target for uptake of the vaccine in older people was introduced by the Department of Health in 2000/2001. Initially this was set at 60%, rising to 65% the following year and 70% in 2002/2003 and subsequent years.

Studies have been conducted in the UK and Europe looking at the uptake of the influenza vaccine amongst the elderly and in the high-risk groups [4–7]. A rapid reporting scheme was introduced in England to ascertain uptake in people aged 65 and over in the winters of 2000/2001. Monthly data on vaccination uptake showed that Department of Health target rates were met but also showed that there was consider-

able variation in uptake at local levels [2]. Local differences in vaccination uptake may be due to a number of factors including socio-economic deprivation, ethnicity and rurality, if that were the case local and national campaigns to increase uptake may need to take these factors into account. However there has been relatively little research into the effect of socio-economic status, rurality or ethnicity on the uptake of influenza immunisation [8]. A study looking at uptake rates in 73 British practices [4] between 1997 and 2000 found that influenza immunisation uptake was lower amongst women, people aged 85 years and over compared to people aged under 80, and those in most deprived areas compared to the least deprived. However this study was restricted to people aged 75 and over, and only covered a relatively short time period.

This research project used information from 413 practices contributing to the QRESEARCH database to investigate influenza immunisation rates in the UK in patients of all ages over a period of 6 years and examined trends in uptake by sex, deprivation, rurality, ethnicity of area of residence and risk group.

2. Materials and methods

We used the QRESEARCH primary care database to undertake this study. The full QRESEARCH database (http://www.qresearch.org/) currently contains the anonymised primary care clinical records of over 10 million people registered at any time in the last 16 years with 525 UK general practices. Consent to provide data for QRESEARCH was sought from all UK practices using the EMIS medical records system. The consenting practices form a representative sample of 6% of all of all UK general practices, and there are practices in every Strategic Health Authority and each Health Board in England, Wales and Scotland.

The information recorded on the QRESEARCH database includes patient demographic data (year of birth, sex, socio-economic data derived from the UK 2001 Census), characteristics (height, weight, smoking status), symptoms, clinical diagnoses, consultations, referrals, prescribed medications and results of investigations. Detailed analyses have compared QRESEARCH practices with all UK practices and found that practices contributing to QRESEARCH are somewhat larger than UK practices overall but are similar in other respects [9]. The database has been validated by comparing birth rates, death rates, consultation rates, prevalence and mortality rates with other data sources including the General Household Survey, the General Practice Research Database and prevalence data from the new GMS contract for General Practitioners. There was good correspondence for all of these measures, although the QRESEARCH population is slightly older. We used version 9 of the QRESEARCH database for this analysis.

Our study period consisted of the 6 years between 1 April 1999 and 1 April 2005. We included practices with complete data for the entire period from 1 April 1999 to 1 April 2005 in the analysis to ensure practices had complete data prior to the start of the study period. Our study population consisted of all patients registered on 1 April each year who had been registered for the whole of the previous 3 months. Temporary residents were excluded.

We identified patients in each of the risk group categories for influenza vaccination defined by the Department of Health. These patients were defined as those eligible for receiving an influenza vaccination and included all patients aged 65 and over. The clinical risk categories based on medical conditions were identified using the relevant Read codes (list available from the authors). Both practising GPs and health protection epidemiologists selected Read codes which conformed to the risk categories. Given the changes to the risk group categories over the study period of the project we used the risk group categories identified for the 2003/2004 vaccination season (Appendix A) and extended these back through the study period.

The QRESEARCH database contains Townsend scores as measures of deprivation. These have been derived for each patient using data from the 2001 Census based on their output area of residence derived from their postcode. Output areas consist of approximately 125 households and are nested within electoral wards. An ethnicity measure was also derived for each patient which was the percentage of White residents in their output area of residence using data from the 2001 Census. We derived a binary measure of rurality for each patient based on the Countryside Agency rurality index assigned at output area of residence.

Our study outcome was the proportion of patients who received an influenza vaccination during each vaccination interval between 1 September of each year in the study period and 31 March of the following year. We determined the crude vaccination rates for each patient group across each vaccination interval in the study period. We also determined the age–sex standardised vaccination rate for each patient group using the UK Census population in 5-year age–sex bands for 2001 as the reference population.

We undertook a modified Poisson regression analysis [10] to determine relative risks (with 95% confidence intervals) for uptake of influenza vaccination for different patient groups over the study period. We included the following variables in the multivariate analysis: year; sex; deprivation in fifths (with higher fifths representing more deprived areas); ethnicity of the patient's area of residence (four levels: <90%, 90–96.9%, 97–98.9%, 99–100% White); rurality of the patient's area of residence (two levels: urban/rural). We undertook separate analyses of patients in a risk group (including all patients aged 65 and over) and patients not in a risk group. We tested interactions between year and deprivation and ethnicity to determine whether there was any evidence of changing inequalities.