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Healthcare worker influenza immunization vaccinate or mask policy: Strategies for cost effective implementation and subsequent reductions in staff absenteeism due to illness

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ABSTRACT

Background: A new policy requiring staff in clinical areas to vaccinate or wear a mask was implemented in British Columbia (BC) in the 2012/13 winter. This review assessed the impact of the policy on absenteeism in health care workers.

Methods: A retrospective cohort study of full-time HCW that worked prior to and during the 2012/13 influenza season in a health authority in BC. The rate of absenteeism due to all cause illness was compared between vaccinated and unvaccinated staff controlling for behaviors outside influenza season.

Results: Of the 10079 HCW, 77% were vaccinated. By comparison to absenteeism rates in the pre-influenza season, unvaccinated staff in winter had twice the increase in absenteeism due to all-cause illness than vaccinated staff.

Conclusion: After controlling for baseline differences between those vaccinated and unvaccinated, influenza vaccination was associated with reduced absenteeism, saving the Health Authority substantial money. Having regular staff in attendance increases the quality of care.

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1. Background

In recent years various forms of mandatory or semi-mandatory enforcement policies have been implemented in health jurisdictions to increase influenza immunization of healthcare workers (HCW) from generally poor levels. While it is accepted that influenza vaccination benefits both the worker and patient, debate has ensued over the extent of the translated benefit from HCW to patients. Influenza immunization is approximately 60% effective in preventing infection in healthy adults, and also reduces the duration and severity of symptoms when infection occurs [1].

Vaccination of HCW is associated with a reduced mortality in chronic care/long term care homes, as shown in randomized control trials [2–5], and with reduced hospital-acquired infections in acute care although these studies are of lower quality [6].

The findings of these randomized trials, have been disputed by review groups [7–9] although the methodology of the Cochrane reviews has been criticized for its selective acceptance of outcomes in coming to its conclusions [10].

In the Fraser Health Authority (FHA) in the Lower Mainland of British Columbia influenza vaccination coverage of acute care staff fell to 31% in 2010. This poor vaccination coverage led in 2012 to a province wide policy of requiring all staff to be vaccinated or wear a mask in patient settings throughout the designated winter period from the end of November through to April.

During the first year the influenza vaccination coverage in FHA in regular health care staff increased to 77%, rising in the second year of implementation to 86% of regular FHA staff.

The estimated cost of the additional clinic and training time over previous campaigns was around \$40,000.

The patient safety aspect of a protected workforce was the impetus for the policy introduction but it was postulated that influenza immunization, could reduce employee absenteeism and improve quality of care by having regular staff in attendance.

Two randomized control have previously assessed the effects of vaccination on absenteeism in acute settings, with one noting a 28% reduction in respiratory related absenteeism [11], while no statistically significant differences were found in the other [12]. An observational study comparing staff before and after implementation of a mandatory policy in Denver found a reduction of 30% in employee absences from 9.14 to 6.15 absences per 100 employees per month.

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Our review assessed the impacts of the new policy on absenteeism due to illness among vaccinated and unvaccinated HCW in FHA.

2. Methods

2.1. Study design and setting

This is a retrospective study of HCWs who worked primarily out of the Fraser Health Authority prior to and during the 2012/13 influenza season. Although covered by the policy, volunteers and contracted staff were not included in analysis as records of absenteeism do not exist for these groups.

Employees vaccinated by occupational health had their immunizations entered directly into the employee database; those vaccinated elsewhere were required to report the vaccination to occupational health for subsequent database entry.

The time period prior to the influenza season was January 1 to September 30, 2012. The flu season was defined as October 1, 2012 to February 28, 2013. Only HCW that worked in both time periods were included in this analysis.

Data prior to the influenza season was examined to allow for the inclusion of potential baseline differences in sickness between these two groups.

All-cause sick hours and productive hours were extracted from an electronic database, Meditech; employee details, such as age, gender, worksite and influenza vaccination status for both the current year and the previous year were extracted from WHITE (Workplace Health Indicator, Tracking and Evaluation database). Vaccination status was determined as of February 28, 2013. Both paid and unpaid sick hours were included in the analysis.

The WHITE data is pulled directly from the employee payroll system and hence is robust. Absence and illness are coded differently to vacation in the payroll system. The SQL database in WHITE is a transcription of the original payroll coding.

Distinctions are made between productive hours and non-productive hours. The latter includes separate categories of sick leave (paid and unpaid), other absence types (occupational injury) and vacation/education and other leave types.

The primary outcome was the difference in the rate of sick hours per 100 scheduled hours between the pre-influenza and influenza periods (defined as the total number of sick hours divided by the total number of paid productive work hours, which includes sick hours and productive hours, multiplied by 100).

2.2. Statistical analysis

Demographics and clinical characteristics of HCWs among those vaccinated and unvaccinated were compared using descriptive statistics. Chi squared, or Fischer exact test when appropriate, were used for analysing categorical variables and *t*-test for continuous variables.

To account for the repeated measurements, it was intended to use the paired *t*-test for analysis. However, the outcome (sick rate) was not normally distributed and attempts to normalize the data were unsuccessful. Non-parametric (i.e. distribution free) paired *t*-test equivalent, the Wilcoxon signed ranked test, was thus used to test if the sick rate differed between the two periods.

Baseline differences existed in illness absenteeism in the pre-influenza season. A linear regression, using the difference in illness absenteeism between the two seasons, was used to determine if this differed significantly for those vaccinated and unvaccinated, when controlling for baseline differences. The potential confounders of age gender and employment category were incorporated in the model constructs, with age included in the final

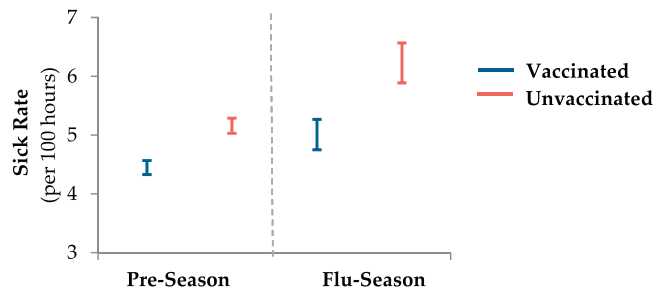


Fig. 1. Mean sick hours for staff employed prior to and during the flu season.

model. This linear regression construct enabled us to thus correct for differences in the previous absenteeism rates in vaccinated and unvaccinated staff prior to the policy.

In a sensitivity analysis, those vaccinated following the start of the influenza season were recoded as unvaccinated. Exclusion of residential care workers was also examined.

3. Results

Of the 10290 full time HCW that worked during the influenza season in 2012/13, 10079 also worked during the period prior to the influenza season forming the population studied. Of these, 23% (2360) were unvaccinated and 77% (7719) vaccinated. The mean age of HCW was 44.9 years of age, and did not differ significantly between those vaccinated or unvaccinated. The majority of HCW were females and the gender proportions again were similar between the vaccinated and unvaccinated groups. Eight percent of workers were employed in a residential care facility. A higher proportion of those employed in residential care were vaccinated (81%) compared to those not employed in residential care (76%), see Table 1.

3.1. Rate of illness absenteeism

During the flu season, there were over 6 million scheduled hours. Fourteen percent of HCW had zero illness absenteeism during this time period. Table 2 summarizes the average hours for both those vaccinated and unvaccinated in the two periods.

The mean rates of illness absenteeism were 5.16 and 6.26 for those unvaccinated and 4.45 and 5.01 for those vaccinated pre influenza season and during influenza season, respectively. The Wilcoxon signed-rank test showed that the rate of sick hours changed significantly between the pre-influenza and influenza periods for both the vaccinated and unvaccinated groups ($p < 0.000$). Similarly, the Man-Whitney test showed that the rate of sick hours were significantly different between those vaccinated and unvaccinated during both time periods ($p < 0.000$), see Fig. 1.

The difference in the rate of illness absenteeism from pre influenza season to influenza season was calculated for each HCW. The mean was 0.69 overall, indicating an absenteeism increase of 0.69 h/per 100 scheduled hours from the pre influenza to the influenza season. The mean difference was 1.10 absenteeism hours/per 100 scheduled hours among those unvaccinated, and 0.56 h/per 100 scheduled hours for those vaccinated.

A linear regression showed that unvaccinated HCWs had an increased rate of absenteeism of 0.5 (95% CI: 0.2–0.9) h/per 100 scheduled hours, compared to those vaccinated. This difference was statistically significant ($p = 0.004$). Age was included in the final model, however this did not alter the estimates.

While plausibly not all excess absenteeism hours relate to influenza associated illness among those unvaccinated, this difference translated to an excess of 3.3 (1.3–6.0) sick hours for each unvaccinated employee, or 7854 (3142–14,137) sick hours total.

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