Influenza Risk by Vaccination Method

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Introduction

Influenza is a seasonal disease that in the United States presents mainly during the winter months. The disease burden caused by influenza is significant, potentially causing severe illness and sometimes even death. To avoid contracting influenza, the Centers for Disease Control and Prevention, as well as other health agencies, recommend that all eligible individuals get vaccinated against influenza. Vaccination can be achieved either by means of an injection, usually given in the upper arm, or by a nasal spray. Children, fearful or uneasy with needles, may prefer to receive the vaccine through nasal spray. Given the significant public health burden that influenza poses, this analysis will evaluate whether there is any significant difference in the protections provided to children by the injected vaccine compared to the nasal spray known as FluMist. Furthermore, the present analysis will evaluate whether the measured associations vary between age groups (i.e., effect modification occurs).

Materials and Methods

To compare the effectiveness of the two influenza vaccine options in children, a case-control study will be conducted. Cases and controls were sampled from the 2012 National Health Interview Survey. This survey is considered to be representative of the United States population, and quantifies several health outcomes including influenza. The inclusion criteria to be considered for this study was to be under the age of 18 and having provided a ‘yes’ or ‘no’ answer to the question regarding having received a flu vaccine in the past 12 months. Additionally, if a ‘yes’ answer was given to this question, the surveyed individual had to provide the method of administration for the last flu vaccine. A case was considered a survey that met all of these criteria and also indicated having presented influenza in the past 12 months. In total, 560 child records were included as cases.

Two controls per case were sampled at random resulting in 1200 controls. The inclusion criteria to be considered a control was the same as with cases, and having not presented influenza in the past 12 months. Sampling was stratified and controls were matched with cases based on age and sex.

Both univariate and multivariate analyses will be done to assess the association between both vaccine methods and the prevalence of influenza. Adjustment for confounding will include variables representative of known sources for exposure, e.g., the presence of other children or elderly (65 or older) in the household, descriptive variables such as age, sex and race, and indicators of long term poor health. Continuous poor health is considered to be a confounder because it could influence antibody production leading some individuals to be more vulnerable to infection than others. The number of school days missed due to illness or injury will be used as an indicator of health.

While cases and controls were selected by matching, this is not a matched case-control study, and a traditional odds ratio analysis will be performed. The difference between odds ratios for both vaccination methods will be compared for statistical significance by observing whether overlap occurs in the confidence intervals.

Results

	Cases (N=560)	Controls (N=1120)
Sex		
Female	276 (49.29)	552 (49.29)
Male	284 (50.71)	568 (50.71)
Age		
[0-8]	228 (40.71)	456 (40.71)
[9-17]	332 (59.29)	664 (59.29)
Race		
Black/African American only	69 (12.32)	181 (16.16)
White only	410 (73.21)	790 (70.54)
Other	81 (14.46)	149 (13.30)
Lives with other children		
No	246 (43.93)	428 (38.21)
Yes	314 (56.07)	692 (61.79)
Lives with elderly		
No	537 (95.89)	1055 (94.2)
Yes	23 (4.11)	65 (5.8)
School days missed *		
Less than 1 week	304 (54.29)	531 (47.41)
Less than 2 weeks	83 (14.82)	74 (6.61)
2 weeks or more	57 (10.18)	41 (3.66)
None	67 (11.96)	376 (33.57)
Vaccination		
Flu shot	208 (37.14)	373 (33.3)
Nasal spray	51 (9.11)	125 (11.16)
None	301 (53.75)	622 (55.54)

Table 1. Characteristics on 1680 study participants by case/control status. Numbers in parenthesis represent percentages.
***** 49 cases and 98 controls did not provide a response.