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An Assessment of Intranasal Influenza Vaccination Coverage Data Based on Two National Surveys

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Increasing influenza vaccination prevalence is a top public health priority. In order to obtain accurate estimates of this prevalence, methods of tracking intranasal influenza vaccination may need to evolve as knowledge about the product among the general population and understanding of its use by health professionals increases. The live attenuated influenza vaccine, administered intranasally, was approved for use in the United States in 2003 (1). Advantages of this vaccine include easier and more acceptable administration than injection and possibly the stimulation of a broader immune response in some age groups (2). Questions were added starting in the fourth quarter of the 2003 National Health Interview Survey (NHIS) and in the first quarter of the 2004 Behavioral Risk Factor Surveillance System (BRFSS) to monitor early uptake of the vaccination. Responses to these questions indicate that receipt of intranasal vaccination (NHIS=0.8%; BRFSS=0.9%) and receipt of both types of influenza vaccination (by the same person) (NHIS=0.5%; BRFSS=0.6%) were similar across surveys. Although currently the intranasal vaccine is only licensed for use among healthy people aged 5–49 years who are not pregnant, more than 40% of adults in both surveys who received an intranasal influenza vaccination were over 49 years, indicating the possibility of misreporting of receipt of this type of vaccination. These data raise concerns over self-report of intranasal influenza vaccinations. Additional studies and refinement of influenza vaccination questions could help explain questionable findings.

The NHIS, a nationally representative survey of the civilian noninstitutionalized household population of the United States conducted throughout the year, uses in-person interviews to collect health and demographic information on all eligible members of the sampled households. Information on influenza vaccinations is self-reported by one randomly sampled adult within the household except in rare cases when the selected adult is physically or mentally incapable of responding. To obtain sufficient sample sizes, data for the fourth quarter of the 2003 NHIS were combined with full year 2004 data to yield a sample size of 38,851 adults aged 18 years or over. To increase comparability with the BRFSS (a year-round telephone survey), the NHIS sample was restricted to include only adults who lived in a household with a landline telephone (n=35,141). The impact of eliminating adults without a landline and including the additional quarter of data on the estimates was small (typically a difference of 0.1 percentage point). Among responding households, response rates for the NHIS sample adult component were 84.5% for 2003 and 83.8% for 2004. The BRFSS is a cross-sectional telephone survey that uses a multistage design based on random-digit dialing to select a representative sample of each state's noninstitutionalized civilian population aged 18 years or over. Information was obtained for one randomly sampled adult per household, and proxy responses were not permitted. In 2004, 296,971 interviews were conducted in the 50 states and the District of Columbia. The BRFSS weighted nationwide response rate was 47.2% (3). To assess intramuscular vaccination, the surveys used identical wording: "During the past 12 months, have you had a flu shot?" To assess intranasal vaccination, the NHIS asked the question, "During the past 12 months, have you had a flu vaccine sprayed in your nose by a doctor or other health professional?" The BRFSS asked a similar question: "During the past 12 months, have you had a flu vaccine sprayed in your nose?" Because these questions asked about the 12 months prior to the interview, influenza vaccinations could have been received from October 2002 through December 2004 for the NHIS and from January 2003 through December 2004 for the BRFSS. These reference periods encompass part of or all three influenza seasons (2002–2003, 2003–2004, and 2004–2005); however, the intranasal influenza vaccine was not approved for use until June 2003 (1).

Estimates were generated using SUDAAN software, which accounts for the complex sample designs used by both surveys (4). Estimates were weighted to reflect the U.S. civilian noninstitutionalized adult population. Two-tailed bivariate tests and a critical value of 1.96 were used to assess significance of differences between estimates.

Results from the NHIS and BRFSS indicate that 0.8% (1.5 million) and 0.9% (1.8 million) of adults, respectively, had received the intranasal influenza vaccine in the previous 12 months (Table 1 [PDF – 33 KB]). Both surveys found the prevalence of receiving the vaccine was highest among adults aged 65 years or over (NHIS=1.2%; BRFSS=1.2%). BRFSS found several

differences across groups: men (1.0%) were more likely than women (0.7%) and non-Hispanic whites (0.6%) were less likely than Hispanics (1.5%) and non-Hispanic blacks (1.5%) to have received the vaccine. Although differences for sex and race/ethnicity were not statistically significant using NHIS data, patterns of vaccination were similar for race/ethnicity but opposite for sex. For the BRFSS, prevalence reports were lower in the fourth quarter (0.7%) compared with the third quarter (1.0%). In both surveys, 1.7% of adults who had received an influenza shot in the previous 12 months had also received an intranasal vaccine during that period, which was higher than the prevalence of intranasal vaccination among adults who had not received the shot.

Both surveys found that adults aged 65 years or over (NHIS=1.1%, BRFSS=1.0%) were more likely than those younger than 65 (NHIS: 18–49 years=0.3%, 50–64 years=0.6%; BRFSS: 18–49 years=0.5%, 50–64 years=0.4%) to have received both the intranasal influenza vaccination and influenza shot (Table 2 [PDF – 33 KB]). The BRFSS found that men (0.7%) were more likely than women (0.4%) and non-Hispanic whites (0.4%) were less likely than non-Hispanic blacks (1.0%) and Hispanics (1.1%) to have received both types of vaccination. The NHIS data show that, although not statistically significant, vaccination patterns by race/ethnicity were similar to those in the BRFSS, and patterns by sex were opposite. In the BRFSS, estimates for receiving both types of vaccine were lower during the fourth quarter of 2004 (0.4%) compared with the preceding quarter (0.7%).

Estimates of self-reported intranasal influenza vaccination raise two major data quality issues: the relatively large number of people outside the recommended age group for intranasal vaccine who received this vaccination, and the relatively large number of adults who received both types of influenza vaccinations during the same 12-month period, despite this practice not being specifically recommended. A study conducted during the 2004–2005 influenza season estimated that the number of doses of the intranasal vaccine reported received during that season was at least 35% greater than the number of doses distributed that season by the manufacturer (G.L. Euler, Dr. P.H., written communication, 2006). Some respondents, particularly older adults or those with little understanding about differences in medications may have confused nasal sprays used for treating influenza symptoms with the intranasal vaccine. It is also possible that many people other than those for whom the vaccine was licensed were given the intranasal vaccine by a health professional either in conjunction with, or in lieu of, an influenza shot. Another explanation for the reporting of both types of vaccinations is that a respondent may have received one type in one influenza season and the other type during the subsequent season, but both seasons occurred during the same 12-month reference period.

Limitations of these analyses include both surveys being based on self-reported data. While studies have shown that self-reported receipt of an influenza shot agrees highly with vaccination status on medical records, there may be bias with reporting a new type of vaccine and time-based recall bias depending on when the questions are asked (5–7). Within each survey, comparisons of the prevalence of intranasal influenza vaccination between subgroups could be biased if the tendency to over-report or under-report differed by subgroup. Comparability of the surveys is another limitation. The NHIS analyses used an additional quarter of data; however, the overall estimates were nearly identical. Differing patterns of vaccination among categories of sex and interview quarter that were statistically significant using BRFSS data but not NHIS data may be attributable to the much larger sample size of the BRFSS. Because analyses were based only on adults with landline telephones, results are not generalizable to the total population. Studies show that people without telephone coverage may have poorer health outcomes than those with telephone coverage, though these differences may be minimal (8,9). A study based on NHIS data revealed that adults without a household telephone had lower odds of receiving influenza vaccinations than adults with landline telephones (10). Differences in the wording of the intranasal influenza vaccination question might also have contributed to differences between the survey estimates.

Both surveys now have questions to distinguish the influenza season in which the vaccine was received. These data will provide a means for estimating the number of doses of vaccine received. Intranasal influenza vaccine is a relatively new vaccine, and it is likely to be used more often as health professionals become more familiar and comfortable with its use. Both surveys, despite different methodologies, arrived at similar conclusions about the percentage of adults vaccinated through this method. The study also indicates that there are unresolved questions about how the intranasal vaccine is being used and who is receiving it. Increased public awareness of the intranasal vaccine could lead to an increase in its prevalence, reducing concerns over bias and making estimates of its use more useful to the public health community.

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