

Methods and Limitations for 2009-10 Influenza Vaccination Coverage Estimates

Methods

To estimate national and state level influenza vaccination coverage for the 2009-10 influenza vaccination season, CDC used combined data from the Behavioral Risk Factor Surveillance System (BRFSS) and the National 2009 H1N1 Flu Survey (NHFS). The NHFS was conducted from October 2009 through June 2010 to provide national and state-specific estimates of seasonal influenza and influenza A (H1N1) 2009 monovalent (2009 H1N1) vaccination coverage in the United States during the 2009-10 influenza season. The survey was conducted in both English and Spanish in all 50 states and the District of Columbia. The study population was selected using a list-assisted random digit-dial sample of both landline and cellular telephones and was targeted to achieve approximately 44,000 completed interviews from landline households and 10,000 completed interviews from cell-only or cell-mostly households (i.e., approximately 6,000 total interviews per month). Households were screened into the survey based on the presence of a household member aged ≥ 18 years. NHFS interviews were also supplemented by data collected for children under 18 years of age from the National Immunization Survey, the National Immunization Survey-Teen, and the National Survey of Children with Special Health Care Needs with a target of an additional 74,000 child interviews. BRFSS is an on-going state-based monthly telephone survey which collects information on health conditions and risk behaviors from $\sim 400,000$ randomly selected persons aged ≥ 18 years among the non-institutionalized, U.S. civilian population. The 2009–10 BRFSS included respondents from 50 states, the District of Columbia, and two territories.

NHFS respondents aged ≥ 18 years were asked whether they (or their children) had received “seasonal flu vaccination” since August 2009 or “H1N1 flu” vaccination since September 2009 and if so, in which month. BRFSS 2009-10 respondents were asked if they (or their children, in 43 states and DC) had been vaccinated for “seasonal flu” in the past 12 months; and if they (in 49 states and DC) or their children (in 46 states and DC) had been vaccinated for “H1N1 flu” since September 2009, and if so, in which month. The Council of American Survey and Research Organizations (CASRO) NHFS response rates were 34.0% for landline and 25.5% for cellular telephones; cooperation rates were 45% and 57%, respectively. The median state CASRO response and cooperation rates for BRFSS were 54% and 76%, respectively.

The Kaplan-Meier survival analysis method was used to determine the cumulative proportion of persons vaccinated with ≥ 1 dose of seasonal influenza vaccine October 2009-June 2010 and ≥ 1 dose of 2009 H1N1 vaccine November 2009-June 2010 using NHFS and BRFSS monthly data. To improve precision for subgroups within states, particularly for children, the estimates from BRFSS and NHFS were combined. For participants who indicated they had been vaccinated but had a missing month and year of vaccination, this information was imputed from donor pools matched for week of interview, age group, state of residence and race/ethnicity. Results from both surveys were weighted and analyzed with SAS and SUDAAN statistical software to account for the complex survey design.

Limitations

These estimates are subject to the following limitations. Self-reported vaccination was not validated with medical records and is subject to recall bias. As reported previously [1], the number of persons who received seasonal influenza vaccination was most likely overestimated since this exceeds the number of doses distributed (approximately 114 million) in the United States. Misclassification of 2009 H1N1 vaccination for seasonal influenza vaccination, unique to this season, might have contributed to some over-reporting. Response rates for both surveys were low and non-response bias can remain even after weighting adjustments to reflect the national population sub-group distribution and non-response. Both BRFSS and NHFS are telephone-based surveys and do not include persons without telephone service. In addition, BRFSS estimates did not include households with only cellular telephone service. Households with only cellular telephone service are more likely to have younger occupants, minorities and renters [2] whose vaccination levels may be lower than among persons living in other households.

References

1. Interim results: state-specific seasonal influenza vaccination coverage - United States, August 2009-January 2010. MMWR Morb Mortal Wkly Rep 2010;59:477-84.
2. Lavrakas, P.J., Blumberg, S., Battaglia M. et al. AAPOR. 2010. AAPOR Cell Phone Task Force Report. , Available at http://aapor.org/Cell_Phone_Task_Force.htm Accessed November 9, 2010.