Seasonal Influenza Vaccination Coverage Among Women Who Delivered a Live-Born Infant — 21 States and New York City, 2009–10 and 2010–11 Influenza Seasons

Because influenza can be especially severe during pregnancy, the American College of Obstetricians and Gynecologists and the Advisory Committee on Immunization Practices recommend influenza vaccination for pregnant women (1,2). Pregnant women experience increased morbidity from influenza infection, and they were at increased risk for severe disease and mortality from 2009 influenza A(H1N1) pdm09 (pH1N1) pandemic virus infection (3–5). During the 2009–10 influenza season, CDC’s Pregnancy Risk Assessment Monitoring System (PRAMS) began collecting data on pregnant women's vaccination coverage, and 22 areas continued to collect it during the 2010–11 season (6). To estimate state-specific seasonal influenza vaccination coverage among pregnant women for the 2010–11 influenza season, the most recent data available, CDC analyzed data from women who delivered a live-born infant during September 2010–May 2011 (N = 18,522). This report describes the results of that analysis, which indicated that, for the 2010–11 season, overall combined 53.6% were vaccinated (44.2% during pregnancy, 8.8% postpartum, and <1% with unknown time during pregnancy). Among those vaccinated during pregnancy, most were vaccinated during the second or third trimester. Wide state-to-state variation in vaccination coverage was observed, with a range of 32.6% to 75.9% and a median of 54.8%. Compared with the 2009–10 season, coverage was either the same or higher in all areas.

Seasonal influenza vaccination coverage among women with live births varied among the participating areas, and the median coverage among the states increased from 50.1% during the 2009–10 season to 54.8% in the 2010–11 season (Table 1). All states either maintained or increased their seasonal vaccination coverage from the 2009–10 to the 2010–11 season. Eight (36.4%) of the 22 participating areas reported a statistically significant increase. Areas with the highest percentage increases during the 2010–11 season were Louisiana (from 39.6% to 49.8%), Missouri (from 42.8% to 53.6%), and Washington (from 53.3% to 64.5%).

† Questions on the PRAMS influenza supplement included the following: “Since September 2009, did you get a seasonal flu shot? This is different than the H1N1 flu shot.” and “At any time during your most recent pregnancy, did a doctor, nurse, or other health-care worker offer you a seasonal flu shot or tell you to get one?” The question used to assess women’s reasons for not getting a seasonal flu shot included five items with a yes/no response format, and women could select more than one reason: “What were your reasons for not getting a seasonal flu shot during your most recent pregnancy? For each item, circle Y (yes) if it was a reason for you and N (no) if it was not: 1) My doctor didn’t mention anything about a seasonal flu shot during my pregnancy; 2) I was worried about side effects of the seasonal flu shot for me; 3) I was worried that the seasonal flu shot might harm my baby; 4) I don’t normally get a seasonal flu shot; and 5) other reason—please tell us.”

Additional information is available at http://www.cdc.gov/prams.

1 Additional information is available at http://www.cdc.gov/prams.
For the 2010–11 season, the percentage of respondents who reported that their health-care provider recommended vaccination varied by area, ranging from 53.7% to 89.5% (median: 74.3%). Among those who received a provider recommendation or offer of vaccination, median vaccination coverage was 67.1%, ranging from 53.8% in Georgia to 81.9% in Nebraska; among those who did not receive a provider recommendation or offer of vaccination, median vaccination coverage was 18.6%, ranging from 4.0% in Tennessee to 42.4% in Minnesota. Provider recommendation or offer of vaccination was associated with higher influenza vaccination coverage across all areas.

For the 2010–11 season, overall 53.6% of women with live-births reported receiving vaccine, and a majority of these received it during pregnancy (83% [8,715 of 10,533]). Of the women who reported being vaccinated during pregnancy, 4.0% were vaccinated during the first trimester, 17.1% during the second trimester, and 14.4% during the third trimester; the rest were vaccinated during pregnancy, but the trimester could not be ascertained because of missing information. The most common place women reported receiving their influenza vaccination during pregnancy was at their obstetrician/gynecologist’s office (49.3%), followed by the family doctor’s office (14.2%), and work place or school (11.3%) (Table 2). Among women who received an influenza vaccination postpartum, the most common place they reported receiving their vaccination was at the hospital (50.6%), followed by family doctor’s office (15.5%), and their obstetrician/gynecologist’s office (10.5%). Among women who did not receive an influenza vaccination, 71.4% reported the reason was because they “don’t normally get a flu shot,” followed by being “worried about side effect for myself” (53.5%), and “worried that the flu shot might harm my baby” (48.7%) (Table 3). Approximately 41% of nonvaccinated women reported they did not obtain vaccinations because they were “not worried about getting sick from the flu,” and 29% reported they “did not think the flu shot works” (Table 3).

Reported by

Indu B. Ahluwalia, PhD, Helen Ding, MD, Leslie Harrison, MPH, Toyia Austin, MPA, Denise D’Angelo, MPH, Phil Hastings, PhD, Nan Ruffo, MPA, Mary Elizabeth O’Neil, MPH, Div of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion; James A. Singleton, PhD,
TABLE 2. Place where influenza vaccination was received among women with live births — 21 states and New York City, Pregnancy Risk Assessment Monitoring System, 2010–11 influenza season

| Place of vaccination                                  | Sample size | %*  | (95% CI)  | Sample size | %*  | (95% CI) |
|------------------------------------------------------|-------------|-----|-----------|-------------|-----|---------|
| Obstetrician/Gynecologist’s office                    | 4,132       | 49.3|(47.6–51.0)| 198         | 10.5|(8.6–12.8)|
| Family doctor or other doctor’s office               | 1,142       | 14.2|(13.0–15.4)| 332         | 15.5|(13.2–18.2)|
| Health department or community clinic                | 687         | 8.5 | (7.5–9.5) | 157         | 7.2 | (5.6–9.2) |
| Hospital                                             | 494         | 5.7 | (5.0–6.5) | 937         | 50.6|(47.0–54.2)|
| Pharmacy, drug store, or grocery store               | 628         | 9.1 | (8.2–10.1)| 124         | 8.3 | (6.4–10.6)|
| Work place or school                                 | 996         | 11.3|(10.2–12.4)| 90          | 5.0 | (3.7–6.7) |
| Other place                                          | 203         | 2.1 | (1.6–2.6) | 64          | 2.9 | (1.9–4.3) |
| Total                                                | 8,282       |     |           | 1,902       |     |         |

Abbreviation: CI = confidence interval.
* Weighted to adjust for complex survey design and nonresponse.

TABLE 3. Reasons for not receiving influenza vaccination among women with live births who did not receive an influenza vaccination — 21 states and New York City, Pregnancy Risk Assessment Monitoring System, 2010–11 influenza season

| Reason*                                           | Sample size | %*  | (95% CI)  |
|---------------------------------------------------|-------------|-----|-----------|
| Doctor didn’t mention it                           | 6,957       | 26.7|(25.1–28.4)|
| Worried about side effect for myself              | 7,054       | 53.5|(51.6–55.3)|
| Worried that the flu shot might harm my baby       | 7,020       | 48.7|(46.9–50.6)|
| Not worried about getting sick from flu           | 6,910       | 40.7|(38.8–42.5)|
| Do not think the flu shot works                    | 6,816       | 29.4|(27.7–31.1)|
| Don’t normally get a flu shot                     | 7,117       | 71.4|(69.7–73.0)|
| Other reason                                      | 5,117       | 22.1|(20.4–23.9)|

Abbreviation: CI = confidence interval.
* Women were instructed to select all the applicable reasons they did not receive an influenza vaccination. A total of 7,898 women reported that they were not vaccinated. The sample sizes do not sum to the overall sample size because of missing response information.
† Weighted percentage.

Carolyn B. Bridges, MD, Immunization Svcs Div, National Center for Immunization and Respiratory Diseases, CDC.
Corresponding contributor: Indu B. Ahluwalia, iaa2@cdc.gov, 770-488-5764.

Editorial Note

Results from this study indicate that historically high seasonal influenza vaccination coverage levels among pregnant women achieved during the 2009–10 season were either maintained or increased during the 2010–11 season by the 21 participating states and NYC (6,7). Influenza vaccination of pregnant women was a focus of public health efforts during the 2009–10 season, with extensive collaborations and mobilization of resources among local, state, federal, and private sector entities. These efforts might have contributed to higher coverage during the 2009–10 season than was observed for previous seasons (1,2,6–8), and might also have contributed to sustained higher rates during the 2010–11 season.

The 2011 American College of Obstetricians and Gynecologists’ recommendations for influenza vaccination of pregnant women and the updated Advisory Committee on Immunization Practices 2010 guidelines, which recommend vaccinations for anyone aged ≥6 months, might lead to further increases in coverage (1–2). As observed during the 2009–10 influenza season, the proportion of respondents who reported that their health-care providers offered or recommended influenza vaccination for 2010–11 varied substantially among states (6). This variation might relate to state-specific approaches to implementing vaccination efforts, differences in health-care delivery infrastructure, or variation in the proportion of pregnant women seeking vaccination. Among those who reported receiving the vaccination during pregnancy, nearly 50% received it from their obstetrician, and those who received it postpartum reported receiving it in the hospital. This information could be useful for guiding vaccination promotion strategies for pregnant and postpartum women.

Variation in vaccination coverage might also relate to differences in state-level policies on vaccine acquisition or distribution and in prevalence or strength of provider offer or recommendation for influenza vaccination in their practices, given that a high correlation was observed between provider recommendation and vaccination. For women who did not report being vaccinated during the 2010–11 season, although the reasons varied overall and by provider recommendation, worries about adverse effects of the influenza vaccine on the woman and her baby; in addition to not getting the flu vaccine as a normative behavior, predominated. In settings where pregnant and postpartum women seek care, continued efforts are needed to encourage providers to recommend and offer influenza vaccination to build on the gains in influenza vaccination coverage made during the 2009–10 and 2010–11 seasons (6–8).

The findings in this report are subject to at least five limitations. First, PRAMS data were available from only 21 states and NYC and might not be generalizable to all women with live births in the United States. For the same 21 states and cohort of pregnant women, PRAMS data compared with internet panel surveys showed similar coverage for the 2010–11
These findings point to the need for continued education about the safety of being vaccinated any time during pregnancy. Pregnancy, which might suggest a need to reinforce messages among those who reported being vaccinated during pregnancy, did not get vaccinated during the 2010–11 season. Further, the response rates ranged from 53.7% to 85.0% by state over two seasons (median: 69.6% for 2009–10 and 68.2% for 2010–11), the findings might be subject to response bias. Finally, mail and telephone respondents might have different demographic characteristics, and women who participated by telephone might have provided responses they perceived to be more socially desirable, although nonresponse analysis and weighting were used to evaluate and adjust for differential response rates between mothers with different characteristics in the PRAMS survey.

Based on the findings in this report, seasonal influenza vaccination coverage among women with live-births was higher overall during the 2010–11 influenza season than the 2009–10 season, and estimated coverage was the same as or higher in all 21 participating states and NYC. Despite the gains in coverage from 2009–10 season, 46% of women with live-births did not get vaccinated during the 2010–11 season. Further, among those who reported being vaccinated during pregnancy, a majority of vaccinations occurred during the latter part of pregnancy, which might suggest a need to reinforce messages about the safety of being vaccinated any time during pregnancy. These findings point to the need for continued education of health-care providers and pregnant women regarding the risk for severe illness and pregnancy-related complications from influenza to reduce the burden of influenza on pregnant women and their infants (9,10). These results indicate that providers need to understand the risks and potential barriers to vaccination during pregnancy and develop strategies to address these during encounters with women. Partnerships among various stakeholders at the state, federal, and local levels will be necessary to promote increased implementation of evidence-based vaccination promotion strategies (10).

Acknowledgments

Members of the PRAMS working group: Izza Afgan, MPH, Kathy Perham-Hester, Mary McGhee, PhD, Alyson Shupe, PhD, George Yocher, MS, Cynthia Ulysee, MPH, Yan Li, MD, Emily Roberson, MPH, Theresa Sandidge, MA, Amy Zapata, MPH, Tom Patenaude, Diana Cheng, MD, Emily Lu, MPH, Violanda Grigorescu, MD, Judy Punyko, PhD, Brenda Hughes, MPP, Venkata Garikapati, PhD, Brenda Coufal, Lakota Kruse, MD, Eirian Coronado, MA, Anne Radigan-Garcia, Candace Mulready-Ward, MPH, Kathleen Jones-Vessey, MS, Connie Geidenberger, PhD, Alicia Lincoln, MSW, MSPH, Kenneth Rosenberg, MD, Tony Norwood, Sam Viner-Brown, PhD, Mike Smith, MSPH, Rochelle Kingsley, MPH, Tennessee, David Law, PhD, Laurie Baksh, MPH, Peggy Brozicevic, Marilyn Wenner, Linda Kohldefinck, Melissa Baker, MA, Katherine Kvale, PhD, Angi Grotenberg, MA; members of the CDC PRAMS team.

References

1. American College of Obstetricians and Gynecologists Committee on Obstetric Practice. ACOG committee opinion no. 468: influenza vaccination during pregnancy. Obstet Gynecol 2011;118:1006–7.
2. CDC. Prevention and control of influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP). 2010. MMWR 2010;59 (No. RR-8).
3. Neuzil KM, Reed GW, Mitchel EF, Simonsen L, Griffin MR. Impact of influenza on acute cardio-pulmonary hospitalizations in pregnant women. Am J Epidemiol 1998;148:1094–102.
4. Naleway AL, Smith WJ, Mullooly JP. Delivering influenza vaccine to pregnant women. Epidemiol Rev 2006;28:47–53.
5. Jamieson DJ, Honein MA, Rasmussen SA, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. Lancet 2009;374:451–8.
6. CDC. Influenza vaccination coverage among pregnant women—29 states and New York City, 2009–10 season. MMWR 2012;61:113–8.
7. Kennedy ED, Abluvalia IB, Ding H, Lu PJ, Singleton JA, Bridges CB. Monitoring seasonal influenza vaccination coverage among pregnant women in the United States. Am J Obstet Gynecol 2012;207(3 Suppl):S9–16.
8. CDC. Influenza vaccination coverage among pregnant women—United States, 2010–11 influenza season. MMWR 2011;60:1078–82.
9. Moro PL, Broder K, Zheteyeva Y, et al. Adverse events in pregnant women following administration of trivalent inactivated influenza vaccine and live attenuated influenza vaccine in the vaccine adverse event reporting system, 1990–2009. Am J Obstet Gynecol 2011;204:146.e1–7.
10. CDC. Vaccinations to prevent diseases; universally recommended vaccinations. Community Guide systematic reviews, Atlanta, GA: US Department of Health and Human Services, CDC; 2011.