

Tetanus, Diphtheria, and Pertussis (Tdap) Vaccination Uptake among Pregnant Women: 2010-11 Influenza Season, United States

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National Immunization Conference Online
March 26, 2012

National Center for Immunization & Respiratory Diseases
Assessment Branch/Immunization Services Division



Background-1

- ❑ The incidence of pertussis decreased dramatically from a pre-vaccine average of 200,000 /year to a historic low of 1,010 cases reported in 1976.
- ❑ The occurrence of pertussis has increased steadily since the early 1980s with a peak in 2004 of 25,827 reported cases-the most since 1959.
- ❑ The epidemiology of pertussis suggests a cyclical pattern of disease historically reported every 2-5 years.
- ❑ The cases decreased in 2006 but are steadily on the rise again with significant case increases in California and Michigan in 2010.

Background-2

- ❑ **Compared to other vaccine – preventable diseases, pertussis remains poorly controlled.**
 - Healthy People 2020 goal to reduce, eliminate, or maintain elimination of vaccine-preventable diseases, including pertussis.
 - ACIP recommends a single Tdap dose for 11-64 years regardless of interval since the last tetanus- or diphtheria-toxoid containing use of Tdap, plus certain adults aged 65 years and older, and under-vaccinated children aged 7 through 10 years.

- ❑ **Yet, despite recommendations, 2010 data show that <6% of adults 19-64 years of age reported Tdap receipt (excluding those who did not know their vaccination status).**

Background-3

- ❑ **Pertussis is easily transmitted from mother to infant.**
- ❑ **Serious infant outcomes associated with pertussis include:**
 - Pneumonia
 - Apnea
 - Convulsions
 - Death
- ❑ **More than half of infants under 1 year of age with pertussis are hospitalized.**



Background-4

- Increasing pertussis vaccination among pregnant women is a public health goal.
 - In December 2006, the Advisory Committee on Immunization Practice (ACIP) recommended tetanus, diphtheria, pertussis vaccination (Tdap) for women before or after pregnancy.
 - In October 2011, ACIP recommended Tdap during pregnancy, after 20 weeks gestation.

Objectives

- ❑ **To estimate Tdap vaccination coverage among pregnant women**
- ❑ **To describe the use of an internet panel to collect Tdap vaccination coverage data**
- ❑ **To discuss implications of Tdap vaccination recall on coverage estimates**
- ❑ **To discuss the importance of public health messaging to increase Tdap vaccination**

Survey Methods-1

- ❑ **SurveySpot internet panel was used to recruit pregnant women: <http://www.surveyspot.com>**
 - People opted into the panel.
 - Demographic variables were collected.
 - SurveySpot utilized demographic and geographic information to generate a sample reflective of the population based on the known demographic and geographic information.
 - Once the universe of panelists were identified, a random sample was selected.

Panel Demographics
Age 18-44: 65.0% (945,745 panelists)
College degree or more: 26.0% (380,435 panelists)
White ethnicity: 37.0% (594,958 panelists)
Female: 66.0% (964,574 panelists)

Survey Methods-2

- Internet panel survey was fielded April 4-25, 2011 to estimate influenza vaccination coverage among women pregnant anytime August 2010 through mid-April 2011.
- Women were recruited from the SurveySpot general population internet panel of approximately 1 million members.
- Recruitment:
 - Email method: Link to survey sent directly to women via email
 - Intercept method: Link to survey placed on the internet panel's home page
- Questions also were asked about tetanus vaccination in general, and Tdap uptake in particular.

Survey Methods-3

The panel survey included the following tetanus and Td/Tdap questions:

- Have you received a tetanus shot in the past 10 years? (Yes or No)**
- (If yes) Was your most recent tetanus shot given in 2006 or later? (Yes or No)**
- (If yes) Thinking back to your most recent tetanus shot, which shot were you given?**
 - The Td or tetanus-diphtheria vaccine
 - The Tdap, also known as Adacel™ or Boostrix™, (which includes the pertussis or whooping cough vaccine)
 - Not sure
- (If Tdap) Did you receive your Tdap shot before your most recent pregnancy, during your most recent pregnancy or after your most recent pregnancy? (Before /during/after)**

Statistical Methods

- ❑ **Weighted percentages and 95% confidence intervals calculated**
 - To make the estimates from this sample generalizable to the U.S. population of pregnant women, a post-stratification weight was developed for each responding pregnant woman.
- ❑ **Sensitivity analyses assessed the range of potential effects due to unknown Td/Tdap status.**
 - Upper bound: Estimated rates if all women who did not know vaccination status or type of vaccination had responded “yes” to tetanus and subsequent Td/Tdap questions .
 - Lower bound: Estimated rates if all women who did not know vaccination status or type of vaccination had responded “no” to tetanus and subsequent Td/Tdap questions.

Results-1



- ❑ **Of all eligible pregnant women who started the survey, 1,937 (91.1%) completed the survey.**
 - Due to the nature of the panel survey, a response rate cannot be calculated; the total universe of potential respondents is not known.
 - Instead, a completion rate is calculated as the number of completed surveys out of those that were started online.

Results-2

Panel Demographic Distributions, Sample n and Weighted n

Group	n	Group Sample %	Weighted n	Weighted % (95% CI)
Total	1,937	100.0	6,242,163	
Age (years)				
18-20	221	11.4	724,136	11.6 (10.1, 12.1)
21-24	447	23.1	1,447,051	23.2 (21.2, 25.2)
25-29	614	31.7	1,679,214	26.9 (24.9, 28.9)
30-34	446	23.0	1,368,173	21.9 (20.0, 23.8)
35-39	133	6.9	820,294	13.1 (11.0, 15.2)
40-44	59	3.0	157,272	2.5 (1.9, 3.2)
45-49	17	0.9	46,023	0.7 (0.4, 1.1)
Education				
High school or less	493	25.5	1,629,727	26.1 (24.0, 28.2)
Some college	664	34.3	2,148,477	34.4 (32.1, 36.7)
College graduate	593	30.6	1,866,259	30.0 (27.7, 32.1)
Master's or professional (e.g. law) degree	143	7.4	464,770	7.4 (6.2, 8.7)
Doctorate degree	44	2.3	132,930	2.1 (1.5, 2.8)
Race/Ethnicity				
Hispanic	274	14.1	1,413,449	22.6 (20.3, 25.0)
White, non-Hispanic	1261	65.1	3,401,205	54.5 (52.0, 56.9)
Black, non-Hispanic	284	14.7	1,093,884	17.5 (15.6, 19.4)
Other, non-Hispanic	118	6.1	333,625	5.3 (4.4, 6.3)

Results-3

Of those that completed the survey:

- **60.7% (1,176) reported receiving a tetanus shot in the past 10 years**
- **16.7% (323) did not know if they had been vaccinated**

Of those that reported receiving a tetanus shot in the past 10 years:

- **70.2% (825) reported tetanus vaccination since 2005**
- **11.2% (132) did not know if they had been vaccinated**

Overall, 38.7% of our total sample did not know their vaccination status or did not know the type of vaccine they had received (Td or Tdap)

- **Excluding those women who did not know their vaccination status or the type of vaccination received (38.7%), self-reported Tdap coverage was 20.1% (n=246)**

Tdap vaccination sensitivity ranged from 12.7%-51.4%

Conclusions-1

- ❑ Respondent recall of Tdap vaccination in Spring 2011 improved compared to recall rates published from 2008 NHIS data for adults (41% to 61%).
- ❑ However, an estimated 38.7% of pregnant women in our panel were still unsure of their vaccination history.



Conclusions-2

- ❑ **Tdap vaccination among this sample of pregnant women (20.1%) was higher than the 2010 Tdap vaccination levels of <6% found among all adults 19-64 years.**
- ❑ **However, the coverage level is still low considering the ACIP recommendation that all unvaccinated pregnant women should receive Tdap vaccination (preferably after 20 weeks gestation) to protect themselves and their babies.**



Limitations

- ❑ **The eligible population of pregnant women on the panel excludes those without internet access.**
- ❑ **There could be disproportional representation of some subgroups such as race/ethnicity and age.**
 - Assessment of the representativeness of the internet panel survey results needs to be conducted by comparing these vaccination coverage estimates to that from a gold standard survey such as PRAMS.

Recommendations-1

- ❑ **To improve coverage, public health agencies and providers should focus public health messages on reinforcing the safety and benefits of Tdap vaccination during pregnancy for the health of mother and baby.**



Recommendations-2

- ❑ **Strengthen partnerships between public health agencies and organizations effectively reaching private and public providers serving pregnant women.**
 - Pregnancy Risk Assessment Monitoring System (PRAMS)
 - Text4Baby.org
- ❑ **Improve Tdap vaccination awareness campaigns among both providers and pregnant women.**
 - Women who are pregnant or planning to become pregnant should have their medical history or vaccination record examined for Tdap history; and
 - Tdap should be administered as indicated.

Useful resources

- Immunization coalition:
<http://www.immunizeca.org/resources/pertussis-prevention/pertussisdap-hospital-resource-kit>
- www.soundsofpertussis.com
- <http://www.anthc.org/chs/epicenter/upload/1C-Cocooning.pdf>
- Recommended Adult Immunization Schedule
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6004a10.htm>
- Guide to community preventive services:
<http://www.thecommunityguide.org/vaccines/index.html>

References

- ❑ Centers for Disease Control and Prevention. Pertussis (Whooping Cough). Retrieved February 16, 2012 from <http://www.cdc.gov/pertussis/about/complications.html>.
- ❑ Centers for Disease Control and Prevention. Morbidity Mortality Weekly Report. Preventing Tetanus, Diphtheria, and Pertussis Among Adults: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis. 2006 December 15, 2006/55(RR17);1-33.
- ❑ Centers for Disease Control and Prevention. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine (Tdap) in Pregnant Women and Persons Who Have or Anticipate Having Close Contact with an Infant Aged <12 Months, 2011 October 21, 2011 60(41);11421-1426.
- ❑ Centers for Disease Control and Prevention, Morbidity Mortality Weekly Report. Tetanus and Pertussis Vaccination Coverage Among Adults Aged ≥ 18 Years—United States, 1999 and 2008. October 15, 2010/59(40);1302-1306.
- ❑ CDC. Surveys to Monitor Pregnant Women 2010-11 Influenza Season. Unpublished raw data.
- ❑ Bell GC, Foster SL. 2010 pertussis outbreak and updated Tdap recommendations. Journal of the American Pharmacists Association Volume 51, Number 1 / January-February 2011. p118 – 120
- ❑ Centers for Disease Control and Prevention, National Center for Health Statistics. Estimated Pregnancy Rates for the United States, 1990-2005: An Update. National Vital Statistics Reports, Volume 58, Number 4

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