

Running the Numbers

*A Periodic Feature to Inform North Carolina Health Care Professionals
About Current Topics in Health Statistics*

Pneumococcal Vaccination Status of North Carolina Adults in 2011

Strains of *Streptococcus pneumoniae* (strep) bacteria are a known cause of serious bacterial infections, including meningitis, blood infections, ear infections, sinus infections, and most cases of pneumonia (pneumococcal pneumonia) [1]. Among North Carolina adults aged 18 years or older, there were 18 deaths with an International Classification of Diseases, 10th Revision (ICD-10) mortality code of J13 in 2011, and there were 1,285 inpatient hospitalizations with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) diagnosis code of 481, meaning that those deaths and hospitalizations were attributable to *S. pneumoniae* pneumonia [2, 3]. In 2011 North Carolina's inpatient hospitalization charges related to pneumococcal pneumonia exceeded \$62 million, with an average hospital length of stay of 8.7 days and an average charge of \$48,584 per case [3].

The pneumococcal vaccine can prevent certain serotypes of pneumococcal infection [4], and vaccination of at-risk adults could reduce hospitalizations and deaths due to pneumococcal pneumonia among North Carolina residents. The Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) recommends that all adults aged 65 years or older receive the pneumococcal vaccine. Additionally, the ACIP recently began recommending pneumococcal vaccine for adults aged 19–64 years who have certain chronic conditions or risk factors, including chronic obstructive pulmonary disease (COPD), asthma, cardiovascular disease, diabetes, kidney disease, and cigarette smoking [5]. Increasing the percentage of adults who are vaccinated against pneumococcal disease is an objective of the national Healthy People 2020 program; the goal is that 90% of noninstitutionalized US adults aged 65 years or older and 60% of high-risk adults aged 18–64 years will have received the

pneumococcal vaccine by 2020 [6]. This report examines the prevalence of pneumococcal vaccination among North Carolina adults and the state's progress toward achieving these Healthy People 2020 targets.

Prevalence data for this report were derived from the 2011 Behavioral Risk Factor Surveillance System (BRFSS) survey of North Carolina adults [7]. The BRFSS survey is a random-digit-dial telephone survey of noninstitutionalized adults aged 18 years or older. The survey is conducted annually by state health departments in collaboration with the CDC. The BRFSS survey collects information on health behaviors, chronic conditions, and use of preventive care. The 2011 BRFSS survey included the following question regarding pneumococcal vaccination: "A pneumonia shot or pneumococcal vaccine is usually given only once or twice in a person's lifetime and is different from the flu shot. Have you EVER had a pneumonia shot?" [8]. Those who responded yes to this question comprised the pneumococcal vaccination group; those who responded no comprised the nonvaccinated group. Respondent groups targeted by Healthy People 2020 for pneumococcal vaccination were identified, including respondents aged 65 years or older, as well as respondents aged 18–64 years who reported the following chronic conditions or behaviors that place them at increased risk for pneumococcal infection: COPD, asthma, cardiovascular disease, kidney disease, or cigarette smoking.

A total of 3,525 North Carolinians aged 65 years

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TABLE 1.
Pneumococcal Vaccination Rates for Respondents Aged 65 Years or Older, North Carolina Behavioral Risk Factor Surveillance System Survey, 2011

Respondent characteristic	Total no. of respondents with characteristic	Reported having received the pneumococcal vaccine		Reported not having ever received the pneumococcal vaccine	
		No. (%) ^a	95% CI	No. (%) ^a	95% CI
Total	3,525	2,566 (72.1)	69.6–74.4	959 (27.9)	25.6–30.4
Sex					
Male	1,230	881 (71.8)	67.5–75.8	349 (28.2)	24.2–32.5
Female	2,295	1,685 (72.2)	69.3–74.9	610 (27.8)	25.1–30.7
Race					
White	2,990	2,227 (74.5)	71.9–76.9	763 (25.5)	23.1–28.1
African American	420	274 (62.6)	54.9–69.8	146 (37.4)	30.2–45.1
Native American	54	—	—	—	—
Other minorities	44	—	—	—	—
Ethnicity					
Hispanic	55	—	—	—	—
Non-Hispanic	3,457	2,526 (72.2)	69.8–74.6	931 (27.8)	25.4–30.2
Age in years					
65–74	1,965	1,341 (66.9)	63.5–70.1	624 (33.1)	29.9–36.5
≥75	1,560	1,225 (78.6)	75.0–81.8	335 (21.4)	18.2–25.0
Education					
Less than high school	642	447 (68.6)	62.1–74.5	195 (31.4)	25.5–37.9
High school or GED	1,140	795 (69.5)	65.4–73.4	345 (30.5)	26.6–34.6
Some post-high school	820	634 (76.3)	71.6–80.4	186 (23.7)	19.6–28.4
College graduate	911	684 (75.0)	70.9–78.7	227 (25.0)	21.3–29.1
Household income					
Less than \$15,000	448	314 (71.1)	64.4–77.0	134 (28.9)	23.0–35.6
\$15,000–\$24,999	758	548 (69.5)	63.3–75.0	210 (30.5)	25.0–36.7
\$25,000–\$34,999	426	316 (71.0)	63.3–77.7	110 (29.0)	22.3–36.7
\$35,000–\$49,999	407	316 (78.9)	72.3–84.3	91 (21.1)	15.7–27.7
\$50,000–\$74,999	306	220 (75.9)	67.3–82.8	86 (24.1)	17.2–32.7
\$75,000 or more	320	237 (70.8)	62.4–78.0	83 (29.2)	22.0–37.6
Disability status					
Yes	1,405	1,094 (76.5)	72.5–80.0	311 (23.5)	20.0–27.5
No	2,103	1,461 (69.2)	66.0–72.3	642 (30.8)	27.7–34.0
Veteran status					
Veteran	746	555 (75.9)	70.7–80.4	191 (24.1)	19.6–29.3
Nonveteran	2,779	2,011 (70.9)	68.0–73.5	768 (29.1)	26.5–32.0

Note. CI, confidence interval; GED, Certificate of High School Equivalency obtained by passing General Educational Development tests. Column totals may not add up to the overall total because some values for demographic characteristics are missing. Estimates based on a small number of respondents have been suppressed because they do not meet statistical reliability standards.

^aPercentages shown are weighted percentages, designed to reflect the adult population of North Carolina.

or older responded to the BRFSS pneumonia vaccine question in 2011 (Table 1). Overall, 72.1% of elderly respondents reported having received the pneumococcal vaccine (95% confidence interval [CI], 69.6–74.4). This figure falls well below the Healthy People 2020 target vaccination rate of 90% for elderly individuals. Within this group, the

vaccination rate was higher among respondents aged 75 years or older; this group had a vaccination rate of 78.6% (95% CI, 75.0–81.8), compared with a vaccination rate of 66.9% (95% CI, 63.5–70.1) for respondents aged 65–74 years. Elderly respondents with a disability were slightly more likely to report having received the pneumonia vaccine; in this

group, the vaccination rate was 76.5% (95% CI, 72.5–80.0), compared with a vaccination rate of 69.2% (95% CI, 66.0–72.3) for those who did not report having a disability. The vaccination rate was also higher among elderly respondents who were white; 74.5% of respondents in this group had been vaccinated (95% CI, 71.9–76.9), compared with 62.6% of elderly African American respondents (95% CI, 54.9–69.8). Rates for other racial groups and Hispanic individuals were not calculated because the number of elderly respondents in those demographic categories was too small to meet standards of statistical reliability. Pneumococcal vaccination rates among elderly individuals did not vary significantly by sex, education level, household income, or veteran status.

More than 2,600 North Carolinians (N = 2,624) aged 18–64 years who had chronic conditions or risk factors responded to the BRFSS question on pneumonia vaccination (Table 2). The pneumococcal vaccination rate for nonelderly adults with chronic

conditions or risk factors was 27.7% (95% CI, 25.2–30.3); this rate was significantly lower than the 72.1% vaccination rate for elderly adults (95% CI, 69.6–74.4). Additionally, North Carolina's pneumonia vaccination rate for nonelderly adults with chronic health conditions or risk factors was less than half the Healthy People 2020 target of 60% for that group. Respondents aged 18–64 years who were current smokers had the lowest vaccination rates; only about 1 in 5 people in this group—19.9% (95% CI, 17.0–23.1)—reported that they had received the pneumonia vaccine. Vaccination rates were higher for those with chronic health conditions (ranging from 42.4% to 53.8%), but none of the chronic condition groups achieved the Healthy People 2020 target rate of 60%.

Based on North Carolina BRFSS survey data for 2011, North Carolinians aged 65 years or older and those aged 18–64 years with chronic conditions or other risk factors have pneumococcal vaccination rates that fall well below national targets estab-

TABLE 2.
Pneumococcal Vaccination Rates for Respondents Aged 18–64 Years with Selected Chronic Conditions or Risk Factors, North Carolina Behavioral Risk Factor Surveillance System Survey, 2011

Chronic condition or risk factor	Total no. of respondents with characteristic	Reported having received the pneumococcal vaccine		Reported not having ever received the pneumococcal vaccine	
		No. (%) ^a	95% CI	No. (%) ^a	95% CI
Total	2,624	910 (27.7)	25.2–30.3	1,714 (72.3)	69.7–74.8
Current smoker					
Yes	1,404	348 (19.9)	17.0–23.1	1,056 (80.1)	76.9–83.0
No	1,215	559 (39.7)	35.5–44.2	656 (60.3)	55.8–64.5
History of CVD					
Yes	510	267 (45.4)	38.9–52.0	243 (54.6)	48.0–61.1
No	2,084	631 (24.6)	21.9–27.5	1,453 (75.4)	72.5–78.1
COPD					
Yes	478	265 (53.0)	46.3–59.7	213 (47.0)	40.3–53.7
No	2,133	639 (23.5)	20.9–26.3	1,494 (76.5)	73.7–79.1
Current asthma					
Yes	590	289 (42.4)	36.2–48.9	301 (57.6)	51.1–63.8
No	2,020	617 (23.5)	21.0–26.3	1,403 (76.5)	73.7–79.0
Diabetes					
Yes	708	367 (44.3)	39.0–49.8	341 (55.7)	50.2–61.0
No	1,910	543 (23.1)	20.3–26.1	1,367 (76.9)	73.9–79.7
Kidney disease					
Yes	154	79 (53.8)	42.3–64.9	75 (46.2)	35.1–57.7
No	2,459	824 (26.5)	23.9–29.2	1,635 (73.5)	70.8–76.1

Note. CI, confidence interval; COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease.

Column totals may not add up to the overall total because some values for demographic characteristics are missing.

^aPercentages shown are weighted percentages, designed to reflect the adult population of North Carolina.

lished by the Healthy People 2020 program. These results suggest that the state should increase its efforts to identify and inform vulnerable adults about the importance of the pneumococcal vaccine in preventing hospitalizations and deaths related to pneumococcal pneumonia. **NCMJ**

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