

Influenza Vaccination Rates among Rhode Island Adults

HYUN (HANNA) KIM, PhD; TRICIA WASHBURN, BS; DENISE CAPPELLI, AS; PATRICIA RAYMOND, RN, MPH

Influenza (flu) is a contagious respiratory illness caused by influenza viruses.¹ It is a serious disease that can lead to hospitalization and sometimes even death.^{1,2} Each year in the United States, the estimated influenza-related hospitalizations ranged from 140,000 to 710,000, and influenza-related deaths ranged from 12,000 to 56,000 since 2010.² Although most persons who become infected with influenza viruses will recover without sequelae, some people such as older adults, very young children, pregnant women, and those with chronic medical conditions are at high risk for serious influenza complications.^{3,4}

Annual influenza vaccination is the best way of preventing influenza and its complications.^{1,2,3} To reduce the burden of influenza, the Advisory Committee on Immunization Practices (ACIP) recommends routine annual influenza vaccination for all persons aged ≥ 6 months who do not have contraindications to vaccination.³ Optimally, vaccination should occur before onset of influenza activity in the community, that is by the end of October, if possible.³ In addition, the national Healthy People 2020 influenza vaccination goal is to increase the percentage of adults aged 18 and older who are vaccinated annually against seasonal influenza to 70%.⁵

This report examines disparities in influenza vaccination coverage rates among Rhode Island adults by socio-demographic and health-related characteristics. Additionally, it describes the location and timing of influenza vaccination among adults.

METHODS

We analyzed the data from the 2015 Rhode Island Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an on-going, state-based telephone survey of civilian adults aged ≥ 18 years. The survey collects state and national data regarding health-related risk behaviors, chronic health conditions, and use of preventive services, including influenza vaccination.⁶

Influenza vaccination receipt was determined by asking whether the respondents received an influenza vaccination in the past 12 months prior to the survey. If the respondents said “yes”, they were asked which places and what month/year they received their last influenza vaccination. Influenza vaccination rates were analyzed by socio-demographic factors (age; gender; race/ethnicity; education; employment status; disability status; having children under 5 years in the

household) and other health-related factors (health insurance; having a personal doctor; having an annual check-up; having a chronic health condition such as asthma, diabetes or heart disease; current smoking status; obesity status).

The chi-square tests were performed to determine disparities in influenza vaccination coverage rates by select characteristics. All statistical analyses were conducted with weighted data, using SAS 9.4 software, to account for the complex survey design. A p-value of $<.05$ is considered statistically significant. Invalid responses in each variable, such as missing, don't know, or refused, were excluded from the analyses unless the item has imputed data.

RESULTS

In 2015, there were 6,206 completed BRFSS surveys in Rhode Island. However, only 5,380 respondents provided a valid answer to the influenza vaccination question, which became the analytic data for this study ($n=5,380$; weighted invalid response rate for this item is 15.5%).

Overall, 47.8% (95% CI: 45.8-49.7) of Rhode Island adults reported having received an influenza vaccination during the past 12 months prior to the survey (**Table 1**).

Disparities in Vaccination Coverage

The influenza vaccination rates shown in **Table 1** varied significantly by sub-population. Certain adult groups had lower vaccination rates than others including males (42.5%), adults with less than a high school education (41.1%), those who were aged 18-49 years (40.6%), Hispanics of any race (38.3%), current smokers (34.5%), those without health insurance (29.2%), those who were self-employed (29.0%), those who did not have a personal doctor (28.9%), and those who did not have an annual check-up within one year (27.6%).

Conversely, adults who were aged > 65 years (62.9%), were retired (62.5%), had a medical condition such as asthma, diabetes, or heart disease (57.1%), graduated from college (55.9%), were females (52.4%), had an annual check-up within one year (52.2%), had a personal doctor (50.2%), were non-Hispanic Whites (50.0%), were non-smokers (50.0%), and had health insurance (49.4%), were more likely to receive an influenza vaccination. Disability status, presence of children under 5 years in the household, and obesity status were not associated with the receipt of influenza vaccination (not shown in **Table 1**).

Table 1. Percentage of Rhode Island adults who received influenza vaccination by selected characteristics, RIBRFSS 2015

	n ^a	Percent ^b	95% CI ^c	P-value
Overall	5,380	47.8	45.8-49.7	
Age				<.0001
18-49	1,527	40.6	37.3-43.9	
50-64	1,829	49.1	46.1-52.1	
65+	2,024	62.9	60.3-65.6	
Gender				<.0001
Male	2,184	42.5	39.5-45.5	
Female	3,196	52.4	49.9-55.0	
Race/Ethnicity				0.0024
White, Non-Hispanic	4,604	50.0	47.9-52.1	
Black, Non-Hispanic	176	46.2	35.7-56.8	
Other, Non-Hispanic ^d	252	38.6	29.5-47.7	
Hispanic, any race	348	38.3	31.4-45.2	
Education				<.0001
< High school	422	41.1	34.5-47.7	
H.S. grad/GED	1,399	42.8	39.1-46.6	
Some college	1,329	47.4	43.6-51.2	
College grad	2,230	55.9	53.1-58.8	
Employment Status				<.0001
Employed for wages	2,202	46.8	43.8-49.7	
Self employed	349	29.0	22.0-35.9	
Unemployed/Unable to work	729	40.4	35.3-45.5	
Homemaker	234	50.8	41.7-59.8	
Student	114	49.4	37.9-61.0	
Retired	1,704	62.5	59.5-65.5	
Having health insurance				<.0001
Yes	5,127	49.4	47.4-51.4	
No	225	29.2	20.7-37.7	
Having personal doctor				<.0001
Yes	4,969	50.2	48.1-52.3	
No	393	28.9	22.6-35.1	
Annual check-up				<.0001
Within 1 yr.	4,598	52.5	50.3-54.6	
Not within 1 yr.	741	27.6	23.3-32.0	
Having medical conditions (asthma, diabetes, heart disease)				<.0001
Yes	1,358	57.1	53.1-61.1	
No	3,947	45.1	42.8-47.4	
Current smoking status				<.0001
Non-Smoker	4,652	50.0	47.9-52.2	
Smoker	676	34.5	29.3-39.7	

a: Unweighted number of respondents

b: Weighted percentage

c: 95% Confidence Interval

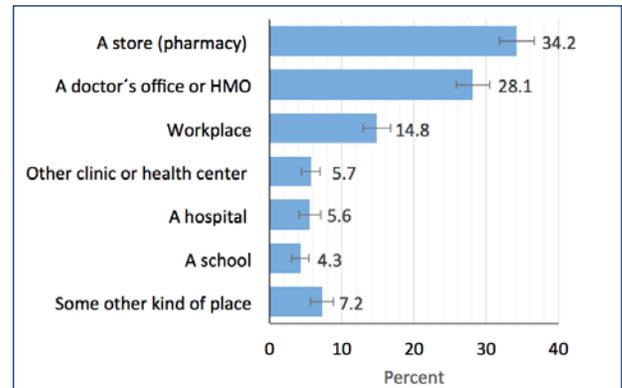
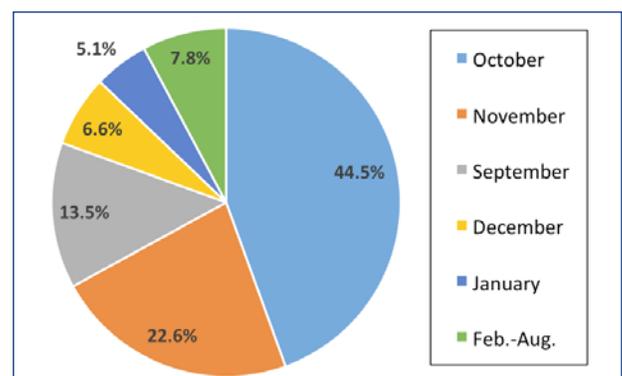
d: Other race includes American Indian, Alaskan Native, mixed race, and other non-white

Location of Vaccination

Among those who reported having had an influenza vaccination in the past 12 months, the most frequently visited place to get vaccinated was a pharmacy in stores (e.g., supermarket or drug store) (34.2%; 95% CI=31.8%-36.0%), followed by a doctor's office or health maintenance organization (HMO) (28.1%; 95% CI=25.8%-30.5%) and workplace (14.8%; 95% CI=12.9%-16.8%). Nearly 6% (5.7%) reported they had received the vaccination from another type of clinic or health center (e.g., a community health center), 5.6% received the vaccination from a hospital (e.g., inpatient), 4.3% from a school, and 7.2% from some other kind of place (e.g., a senior, recreation, or community center, an emergency room, etc.) (Figure 1)

Timing of Vaccination

Figure 2 presents the timing of influenza vaccination by month. Nearly one half of Rhode Island adults reported that they received the influenza vaccination in October (44.5%; 95% CI: 41.7%- 47.2%), which was followed by November (22.6%; 95% CI=20.3%-24.8%), September (13.5%; 95% CI=11.6%-15.4%), December (6.6%; 95% CI=5.1%-8.1%) and January (5.1%; 95% CI=3.8%-6.3%).

Figure 1. Location of influenza vaccination among Rhode Island adults, Rhode Island BRFSS, 2015**Figure 2.** Timing of influenza vaccination among Rhode Island adults, Rhode Island BRFSS, 2015

DISCUSSION

This report demonstrates that less than one half of Rhode Island adults (47.8%) received an influenza vaccination, well below the national Healthy People 2020 goal of 70%. None of the groups presented in **Table 1** met the Healthy People 2020 goal.

Certain groups had particularly low vaccination rates (lower than 30%), including those who are self-employed, uninsured, do not have a personal doctor, and had not had an annual check-up within the past 12 months. People in these groups probably share similar characteristics. For example, people without health insurance may be less likely to have a primary care provider and an annual check-up. Lack of health care access and utilization may also be closely related to other factors, such as age, education, racial/ethnic minority status, and employment status. It would be important to note that although the majority of the respondents had health insurance (93.0%), a personal doctor (88.9%) and an annual check-up in the past year (81.6%), the vaccination rates were still below 50%.

It was also found that Rhode Island adults were more likely to receive an influenza vaccination from non-traditional settings (e.g., supermarkets, drug stores, workplaces, schools, senior centers, and community centers) than traditional clinical settings, and many of them received the vaccination during October and November.

Strategies to Improve Influenza Vaccination Coverage Rates

Recommended strategies for health care providers to improve influenza vaccination coverage rates include: educating patients and staff about the importance of influenza vaccination and providing a strong recommendation for vaccination; offering flu vaccine as soon as it is available and having it available in the office; assessing vaccination status at every encounter; and implementing standing orders and patient reminder/recall systems.^{7,8}

Strategies for public health departments include: public and provider education and outreach; and working with multiple partners to ensure access to vaccination in non-traditional settings.^{7,8}

Since 2007, Rhode Island has managed the purchase and distribution of influenza vaccine to all providers, at no cost, through the state-supplied vaccine program and universal vaccine purchase policy. Since 2009, Rhode Island has implemented school-located influenza vaccination clinics in all the districts across the state, many of which are open to the public, including adults.⁹ The state immunization program works with the Ocean State Immunization Collaborative (<http://osicri.com/>) and other community partners to identify and develop new ideas and programs to address vaccination disparities and improve access to vaccine in a variety of non-traditional settings including pharmacies, senior centers, public events, and a variety of other community settings.

Despite these strategies, adult influenza vaccination coverage remains a challenge in Rhode Island and nationally. According to the 2015–16 flu season data, while Rhode Island ranked second highest in the nation for influenza vaccination coverage rates for adults 18 and older with 50.7% (41.7% for national average)¹⁰, it is still far below the national Healthy People 2020 goal of 70%. Understanding that the number one predictor of vaccination is a strong recommendation from a health care provider, Rhode Island's efforts will be focused on working with providers on quality assurance/improvement initiatives, maintaining a universal vaccine policy, and developing an adult immunization registry.

The results in this report are subject to the following limitations. First, influenza vaccination status was based on self-report and not validated with medical records and thus, is subject to respondent's recall bias. Second, a low response rate for the 2015 Rhode Island BRFSS survey (38.1%) and a large invalid response to the influenza vaccination question (15.5%) might result in non-response bias even after weighting adjustments. Third, some of the groups presented in **Table 1** have small sample size which may limit the reliability of extrapolating this data to the general population. Finally, the 2015 BRFSS data used in this report were collected during the calendar year (January–December 2015), therefore, it may not be comparable with specific influenza season data.

References

- Centers for Disease Control and Prevention (CDC). Key Facts About Influenza (Flu). Available at: <https://www.cdc.gov/flu/keyfacts.htm>
- Centers for Disease Control and Prevention (CDC). Key Facts About Seasonal Flu Vaccine. Available at: <https://www.cdc.gov/flu/protect/keyfacts.htm>
- Grohskopf LA, Sokolow LZ, Broder KR, et al. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2016–17 Influenza Season. *MMWR Recomm Rep* 2016;65(No. RR-5):1–54. Available at: https://www.cdc.gov/mmwr/volumes/65/rr/rr6505a1.htm?s_cid=rr6505a1_w
- Centers for Disease Control and Prevention (CDC). People at High Risk of Developing Flu-Related Complications. Available at: https://www.cdc.gov/flu/about/disease/high_risk.htm
- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2020, Immunization and Infectious Diseases. Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>
- Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System. Available at: <https://www.cdc.gov/brfss/index.html>
- Centers for Disease Control and Prevention (CDC). Flu Vaccination Coverage, United States, 2015–16 Influenza Season. Available at: <https://www.cdc.gov/flu/fluvaxview/coverage-1516estimates.htm>
- The Community Guide. Vaccination. Task Force Findings. Available at: <https://www.thecommunityguide.org/topic/vaccination>
- Rhode Island Department of Health, Office of Immunization. School Located Vaccination Clinic, Rhode Island Annual Report

2015-2016 School Year. Available at: <http://www.health.ri.gov/publications/annualreports/2015-2016SLVFluStateReport.pdf>

10. Centers for Disease Control and Prevention (CDC). Influenza (Flu). 2015-16 Influenza Season Vaccination Coverage Report. Available at: <https://www.cdc.gov/flu/fluview/reportshtml/reporti1516/reporti/index.html>

Authors

Hyun (Hanna) Kim, PhD, is a Senior Public Health Epidemiologist in the Center for Health Data and Analysis, Rhode Island Department of Health, and Assistant Professor of the Practice of Epidemiology, School of Public Health, Brown University.

Tricia Washburn, BS, is the Chief of the Office of Immunization, Division of Community Health and Equity, Rhode Island Department of Health.

Denise Cappelli, AS, is the Adult Immunization Coordinator in the Division of Community Health and Equity, Rhode Island Department of Health.

Patricia Raymond, RN, MPH, is the Center Lead for Preventive Services in the Division of Community Health and Equity, Rhode Island Department of Health.

Disclosures

The authors have no financial interests to disclose.

Correspondence

Hyun (Hanna) Kim, PhD
Rhode Island Department of Health
3 Capitol Hill
Providence, RI 02908-5097
hanna.kim@health.ri.gov