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# Update: Rural/Urban Disparities in Pneumococcal Vaccine Service Delivery Among the Fee-for-Service Medicare Population, 2012-2015

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## Update: Rural/Urban Disparities in Pneumococcal Vaccine Service Delivery Among the Fee-for-Service Medicare Population, 2012-2015

Joseph Vanghelof, PharmD, MS; Aric Schadler, MS; Patricia R. Freeman, PhD; and Jeffery Talbert, PhD

### Overview of Key Findings

- Between 2014 and 2015, the number of pneumococcal vaccine services delivered to fee-for-service (FFS) Medicare beneficiaries increased by 380% as a result of uptake of PCV13 vaccine.
- Continued disparities in delivery of pneumococcal vaccine services to FFS Medicare beneficiaries in rural and urban communities are noted, with a 63% higher vaccination rate observed in urban areas.
- The majority of pneumococcal vaccine services delivered to FFS Medicare beneficiaries were provided by primary care providers, although pharmacy providers delivered close to one-fourth (24.2%) of these services.
- Pharmacy providers in rural communities play an increasing role in pneumococcal vaccine service delivery, providing one-third (33.5%) of vaccines in 2015.

### Purpose

This *Policy Brief* is the second report from the Rural and Underserved Health Research Center assessing rural/urban disparities in pneumococcal vaccine service delivery among the fee-for-service (FFS) Medicare population. This report is an update of the initial report<sup>1</sup> and was conducted to specifically assess uptake of the 13-valent pneumococcal conjugate vaccine (PCV13) following revised vaccination recommendations released in 2014.

### Introduction

Pneumococcal disease remains a significant public health concern in the U.S., especially for older adults where mortality from invasive pneumococcal disease (IPD) ranges from 20% at age 65 to 40% at age 85.<sup>2</sup> Current recommendations from the Advisory Committee on Immunization Practices (ACIP), in place since September 2014, call for all persons age 65 and older to be vaccinated with a 2-dose vaccination series; 1 dose PCV13 at age 65 and 1 dose 23-valent pneumococcal polysaccharide vaccine (PPSV23) at least 1 year later.<sup>3</sup> The previous recommendation for persons age 65 and older was to receive 1 dose of PPSV23, with PCV13 reserved for those considered high risk. Recommendation for the 2-dose series was made following evidence showing that up to 25% of IPD and 10% of community acquired pneumonia in older adults are caused by PCV13 vaccine serotypes.<sup>4</sup> Despite these recommendations, vaccination rates remain low for either vaccine individually (<50%) and for the complete 2-dose series (<20%), with racial and geographic disparities in pneumococcal vaccination uptake noted.<sup>4</sup>

In a previous RUHRC report assessing pneumococcal vaccine service delivery in the FFS Medicare population, we documented a significant disparity in pneumococcal vaccination rates between rural and urban areas across the nation, with a 40% lower mean vaccination rate observed in rural communities in 2014.<sup>1</sup> Overall, pneumococcal vaccination service rates were low and varied considerably by state. Although primary care providers delivered a majority of pneumococcal vaccine services to adults age 65 and older in the Medicare FFS population, a significantly greater proportion of pneumococcal vaccine services was delivered by pharmacy providers in rural areas, and regression models indicated that pharmacy providers had a significant impact on pneumococcal vaccine delivery in rural areas.

Our previous report evaluated overall pneumococcal vaccination service delivery in the year 2014, without assessing the contribution of the individual pneumococcal vaccines (PCV13 and PPSV23). The objective of this study was to evaluate trends in pneumococcal vaccination service delivery for the years 2012 through 2015, and to specifically assess uptake of the PCV13 in 2015, the first full year following the revised vaccination recommendations in September 2014. A secondary objective was to determine the relative contribution of community pharmacies as an alternate site vaccine service provider to PCV13 uptake in rural communities.

## Methods

Vaccination service data were obtained from the Medicare Physician and Other Supplier Public Use File, which reports the services and number of FFS beneficiaries treated by physicians and other providers.<sup>5</sup> Services were restricted to the following: administration of any pneumococcal vaccine via Healthcare Common Procedure Coding System (HCPCS) G0009, PCV13 administration via Current Procedural Terminology (CPT) 90670, and PPSV23 administration via CPT 90732. Providers were classified as either: 1) primary care provider (e.g., nurses, physician assistants, and family practice physicians); 2) pharmacy provider; or 3) other providers (e.g., physician specialists). Provider county was estimated using provider zip code, then linked to Rural-Urban Continuum Codes (RUCC) and the Medicare Geographic Variation State/County table Public Use File. RUCC classifies counties on a scale of 1 to 9, with 1-3 designated as urban, and 4-9 as rural.<sup>6</sup> The Medicare Geographic Variation table reports for each county: the number of FFS enrollees; average age; average Hierarchical Condition Category (HCC) score, a composite risk score reflective of chronic disease burden; and percent male, white non-Hispanic, eligible for Medicaid, and using inpatient or outpatient services.<sup>7</sup> Descriptive statistics on vaccine services by rural-urban designation, provider type, vaccine type, and year were calculated. A logistic regression model of the estimated rate of pneumococcal vaccination in 2015 was created using the parameters from the Medicare Geographic Variation table, rural-urban designation, the percent of vaccines provided by pharmacists, and the interaction of rural-urban designation with percent of vaccines provided by pharmacists.

## Findings

The number and rate of pneumococcal vaccination services delivered by FFS Medicare providers to eligible beneficiaries increased annually between 2012 and 2015. In 2015, pneumococcal vaccine services were delivered by providers to approximately 5,353,000 FFS beneficiaries representing 16% of the FFS population nationwide, a 380% increase over that reported in 2014.<sup>1</sup> Consistent with our previous findings, continued disparities in pneumococcal vaccine service delivery are noted between rural and urban communities with an

estimated 10.7% of FFS beneficiaries receiving pneumococcal vaccination services in rural communities compared to 17.4% in urban communities, signifying a 63% higher vaccination rate in urban communities.

Prior to 2015, the vast majority of pneumococcal vaccine services provided were for PPSV23, as expected based on ACIP recommendations for adults 65 and older (Table 1). In 2015, following the revised recommendations for the 2-dose vaccination series with PCV13 followed by PPSV23 at least 1 year later, PCV13 comprised over 90% of all pneumococcal vaccine services. The increase in the rate of pneumococcal vaccination service delivery noted in 2015 was driven by uptake in the rate of PCV13 vaccination services.

**Table 1. Total Number of PPSV23 and PCV13 Vaccination Services, in Thousands, 2012-2015**

Year	PPSV23	PCV13
2012	1,067 (97.7%)	25 (2.3%)
2013	1,077 (92.3%)	90 (7.7%)
2014	1,025 (66.9%)	507 (33.1%)
2015	445 (8.4%)	4,852 (91.6%)

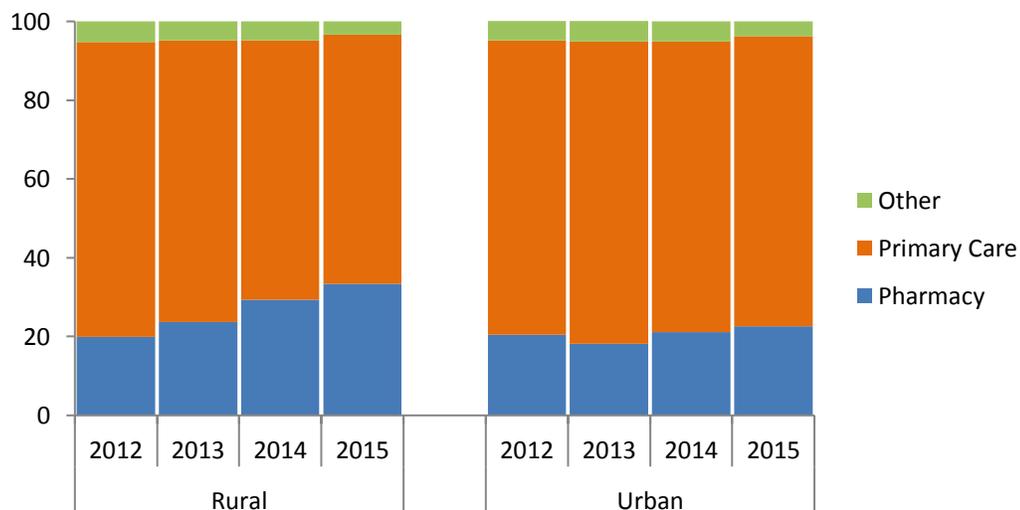
**Table 2. Number of Pneumococcal Vaccination Services by Provider Type and Rural-Urban Designation, in Thousands, 2015**

Provider Type	Rural Vaccination Services	Urban Vaccination Services	Combined Vaccination Services
Pharmacy	247 (33.5%)	1,049 (22.7%)	1,296 (24.2%)
Primary Care	465 (63.1%)	3,398 (73.6%)	3,863 (72.2%)
Other	25 (3.4%)	168 (3.6%)	193 (3.6%)
Total	737	4,615	5,353 (100%)

As shown in Table 2, in 2015, primary care providers delivered the majority (72.2%) of pneumococcal vaccination services to FFS Medicare beneficiaries while pharmacy providers accounted for one-fourth. In rural communities, pharmacy providers delivered one-third of pneumococcal vaccine services, suggesting the important role of rural pharmacies in vaccine access.

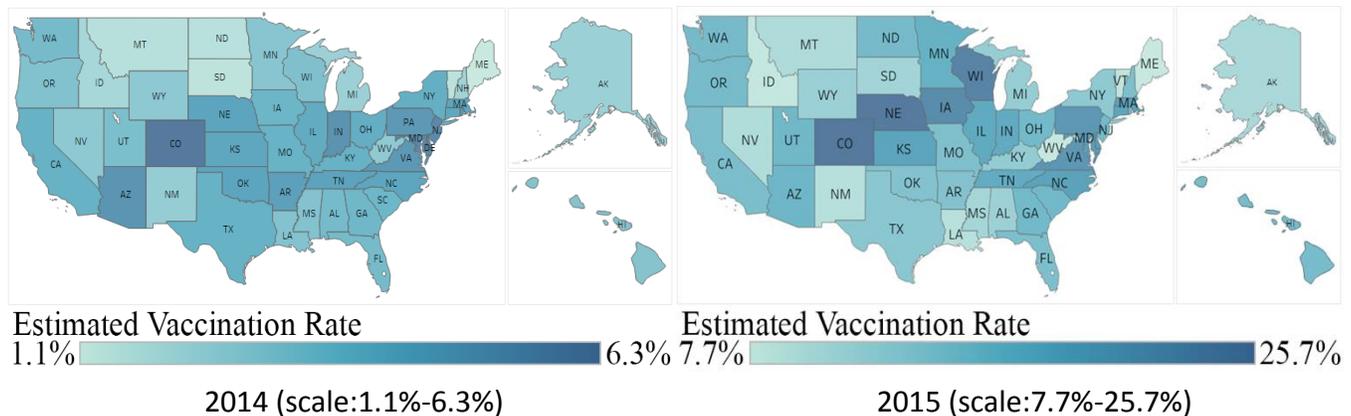
To further assess the contribution of rural pharmacies to vaccine access, we assessed trends in pneumococcal vaccine delivery by provider type in rural and urban communities from 2012 to 2015 (Figure 1). The proportion of pneumococcal vaccines provided by pharmacists in rural areas increased from 19.9% in 2012 to 33.5% in 2015 but has only modestly increased in urban areas (20.4% to 22.6%).

**Figure 1. Percent of Pneumococcal Vaccination Services Delivered by Provider Type and Rural-Urban Designation, 2012 to 2015**



In 2015, pneumococcal vaccination service rates among FFS beneficiaries varied by state and ranged from 8% in Maine to 26% in Colorado (Figure 2, right panel). In comparison, the range during 2014 was 1% to 6% (Figure 2, left panel). Although overall pneumococcal vaccination rates in the FFS Medicare population have increased, a widening gap between highest and lowest vaccination rates in states (5% in 2014 vs 18% in 2015) is noted. Further county-level pneumococcal vaccinating service visualizations are available at our website: <https://ruhrc.uky.edu/infographics/>.

**Figure 2. Rate of Pneumococcal Vaccine Service Delivery per Eligible Population, 2014-2015**



Logistic regression indicates that increasing age of beneficiaries, greater proportion of female beneficiaries, and greater proportion of white non-Hispanic beneficiaries were positively associated with uptake of pneumococcal vaccine services, while rurality, greater use of outpatient services, and lower overall health status were negatively associated with uptake of pneumococcal vaccine services. The interaction between rurality and percent of vaccines provided by pharmacists was significant ( $P < .0001$ ), and when interpreted with the finding from Figure 1 that pharmacists provide a greater proportion of vaccines in rural versus urban areas, suggests that community pharmacies play an important role in access to pneumococcal vaccinations in rural areas.

### Conclusion/Discussion

We assessed pneumococcal vaccination service records for FFS beneficiaries from 2012, the first year during which PCV13 was recommended for high-risk adults age 20 and older, through 2015, the first full year during which PCV13 was recommended for all adults 65 and older. Among FFS beneficiaries from 2012 to 2015, the number of pneumococcal vaccination services increased greatly, and providers shifted from principally administering PPSV23 to PCV13. We estimate that in 2015, 16% of FFS beneficiaries received pneumococcal vaccination, with 92% administered PCV13. During years prior to 2015, there were lower rates of pneumococcal vaccination and much less frequent use of PCV13. Therefore, as of 2015, the majority of FFS beneficiaries remained to be vaccinated with PCV13 and it is likely pneumococcal vaccination services after 2015 will remain elevated. Overall, rural areas experienced a lower rate of pneumococcal vaccination, and primary care providers were the most frequent contributors to pneumococcal vaccination. As primary care shortages in rural areas continue to grow, however, pharmacists appear to play an increasing role in providing vaccines in rural areas and have consistent importance in urban areas.

***In summary***, following recommendations for administration of PCV13 to all adults 65 and older in September 2014, pneumococcal vaccination rates increased almost 4-fold between 2014 and 2015. Continued disparities in

pneumococcal vaccination rates between rural and urban areas are noted, with community pharmacies serving as an important access point for pneumococcal vaccine services in rural communities. Given that the population of rural areas has a greater proportion of older adults than urban areas,<sup>8</sup> continued support of rural service providers, including both primary care providers and pharmacists, is needed to ensure older adults have access to recommended vaccines.

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