

Application of Spatial Methods to Examine Spatial Access to Vaccine for Children Providers in South Carolina

Radhika Ranganathan, MPhil^{1,3}; Whitney E. Zahnd, PhD^{1,2}; Sayward E. Harrison, PhD^{4,5}; Heather M. Brandt, PhD^{1,7}; Swann Arp Adams, PhD^{1,3,6}; Jan M. Eberth, PhD^{1,2,3}

1. Rural & Minority Health Research Center, 2. Big Data Health Science Center, 3. Department of Epidemiology & Biostatistics, Arnold School of Public Health; 4. Department of Psychology, College of Arts & Sciences, 5. South Carolina Smart State Center for Healthcare Quality, 6. College of Nursing, University of South Carolina; 7. HPV Cancer Prevention Program, St. Jude Children's Research Hospital, USA.

Abstract

HPV vaccination is recommended for 11–12-year-olds in the United States. While the uptake of HPV vaccination has increased since its initial licensure in 2006, rural populations have lower rates of initiation and completion compared to their urban counterparts, particularly in the South. We performed the two step-floating catchment area method to determine spatial access to VFC providers at the ZCTA-level. An optimized hotspot analysis was performed to identify areas of high and low access clustering to identify rural-urban differences in scores for VFC provider types and distance to the nearest VFC provider, respectively. Our findings suggest that lower HPV vaccination coverage rates in rural SC are likely due to factors other than limited spatial access to VFC providers. We found that the majority of rural VFC providers are in FQHCs. Understanding the distribution and diversity of VFC providers across rural and urban areas can inform intervention planning and delivery.

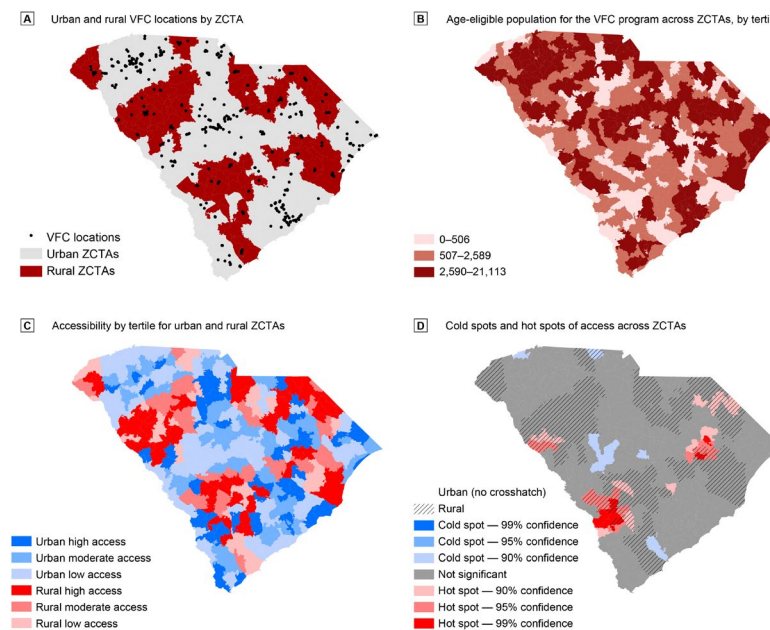
Introduction

- HPV-associated cancers have risen in rural areas in recent years.
- HPV vaccination can prevent HPV-associated cancers, but uptake is lower in rural areas.
- To improve rural HPV vaccination rates, increasing access to the Vaccines for Children (VFC) program is a promising policy approach.
- The VFC program is a federally-funded program that provides free vaccines to eligible children (e.g., uninsured, underinsured, Medicaid-eligible, American Indian/Alaska Native).
- Our objective was to examine spatial access to VFC-enrolled providers across rural and urban areas of South Carolina

Materials & Methods

- We obtained and geocoded addresses of publicly accessible VFC-enrolled providers from the SC Department of Health and Environmental Control.
- We also obtained population estimates of persons under 18 years using ZIP Code Tabulation Area (ZCTA), geographic approximations of ZIP codes, from the 2013-2017 American Community Survey.
- We performed the two step-floating catchment area method to determine spatial access to VFC providers at the ZCTA-level.
- ZCTAs were categorized as rural or urban using Rural-Urban Commuting Area (RUCA) primary codes, with RUCA ≥ 4 categorized as rural.
- We performed optimized hotspot analysis to identify areas of low (cold spots) and high (hot spot) access to VFC providers.

Results



Results

Vaccines for Children (VFC) Provider Type across Rural and Urban Designated ZIP Code Tabulation Areas in South Carolina

	Rural (n=151)	Urban (n=342)	P-Value
Hospitals	10 (6.6%)	24 (7.0%)	<0.001
Private Clinics	41 (27.2%)	190 (55.6%)	
Federally-Designated Healthcare Centers*	62 (41.1%)	71 (20.8%)	
Public Health Departments	27 (17.9%)	28 (8.2%)	
Not Specified	11 (7.3%)	29 (8.5%)	

*Includes federally qualified health centers, rural health clinics, and other community health centers

Conclusions

- Our findings suggest that lower HPV vaccination coverage rates in rural SC are likely due to factors other than limited spatial access to VFC providers.
- Given the demand-related issues, awareness, knowledge, recommendations along with community-clinical linkages to bring together trusted rural resources/leaders who can provide contextually appropriate HPV vaccination information can remove the perception of distance as a barrier.
- We found that the majority of rural VFC providers are in FQHCs.
- Understanding the distribution and diversity of VFC providers across rural and urban areas can inform intervention planning and delivery.

Acknowledgements

This study was supported by the Federal Office of Rural Health Policy (FORHP), Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services (HHS) under cooperative agreement #U1CRH30539

