Identifying HPV Vaccination Initiation Hot and Cold Spots and Associated Disparities in Texas

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Topic: Financial Toxicity and Disparities

Objectives
Over 90% of HPV-associated cancers are preventable through HPV vaccination. Only 43.5% of Texas adolescents, however, have completed the vaccine series, and the state ranks 47th in vaccination rates across the country. The goal of this study was to examine the geospatial uptake of the HPV vaccine in Texas and the associated disparities.

Methods
HPV vaccine data from 2017-2021 was obtained from the Texas Department of State Health Services. Zip code-level estimates of individuals 9 years and older who received at least one HPV vaccine since 2017 in the Texas Immunization Information System (ImmunTrac2) database were used to create a choropleth map. Through the Environmental Science Research Institute’s (ESRI) ArcGIS Pro Version 2.2.0 software, the Cluster and Outlier Analysis Tool was used to determine a “neighborhood” around each zip code. Zip codes were subsequently demarcated as hot or cold spots (or neither) based off Local Moran’s I score calculations, meaning they had a statistically significant greater or lesser concentration of vaccinations than would be expected from a random distribution. After identifying hot spots and cold spots of vaccine initiation, we explored the demographic neighborhood characteristics.

Results
346 statistically significant hot and 374 cold spot zip codes of HPV vaccine initiation were identified (Figure 1). The remainder of the zip codes (1115) were outliers or not part of statistically significant clusters. Hot spot zip codes, or areas of high vaccine initiation, were found along the Gulf coast, in large cities, and in less developed areas near the Texas panhandle. Cold spot zip codes were in the northern Texas panhandle, along the Texas-Louisiana border, and on the periphery of major cities. Compared to cold spot zips, hot spots had significantly higher percentages of children on public insurance, had higher poverty rates, and had higher percentages of African American and Hispanic residents.

Conclusions
In Texas, areas with higher poverty rates, increased use of public insurance, and higher percentages of minority populations had significantly higher rates of HPV vaccine initiation. This may be due to differences in patient interest in the vaccine, to vaccine access through government insurance, or to outreach efforts that have promoted the vaccine in especially vulnerable populations.

Abstract Table or Graph