Inequities in COVID-19 vaccine distribution and vaccination rates across the State of Georgia

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1. Significance/Justification

COVID-19 has disproportionately impacted underserved communities, with significant disparities in vaccination rates across different geographic, racial, and socioeconomic groups. Understanding these inequities in vaccine distribution and uptake is crucial to inform targeted public health interventions. Data from Georgia's vaccination records provides an opportunity to assess disparities in vaccine coverage and identify geographic areas where vaccine access may be limited. This study will investigate the spatial distribution of COVID-19 vaccine providers and vaccination rates across Georgia, focusing on populations that are historically marginalized or have limited access to healthcare services. By examining these disparities, the study will help shape policies and practices that promote more equitable vaccine distribution and address the root causes of vaccine hesitancy.

2. Aims of the Study

- **Spatial Distributions:** Investigate the spatial patterns of COVID-19 vaccination providers and their relationship with vaccination rates across counties and census tracts in Georgia.
- **Racial and Demographic Disparities:** Analyze vaccination rates by race, age, sex, and ethnicity to identify underserved populations and assess the impact of social determinants of health on vaccine access and uptake.

- **Geographic Accessibility:** Evaluate the proximity of underserved communities to vaccination providers and the availability of mobile or pop-up vaccination sites in high-need areas.

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3. Analysis Plan

Data Requests:

- Obtain vaccine administration data, vaccination provider data, and demographic data from the provided dataset.
- Request additional data on healthcare facilities and vaccination clinics from public health agencies to assess vaccine access.

Methodology:

- **Geocoding:** Geocode the vaccine administration data and provider locations to ensure accurate mapping of vaccination sites and vaccination rates.
- **Data Integration:** Integrate vaccination data with demographic and geographic data, including race, age, sex, ethnicity, and census tract-level data.
- **Visualization:** Create heatmaps, cluster analyses, and choropleth maps to visualize spatial disparities in vaccination rates and identify geographic areas with low vaccination coverage.
- **Access to Services:** Analyze the spatial distribution of vaccination providers and assess the proximity of underserved populations to these services.
- **Socioeconomic Factors:** Explore correlations between vaccination rates and socioeconomic variables, including income, education level, and access to healthcare.
- **Buffer Analysis:** Conduct buffer analysis to evaluate how the distance to healthcare facilities impacts vaccination rates in specific areas.

Data Analysis:

- Load and geocode the vaccination data, integrating additional demographic and geographic information (e.g., census data) for analysis of socioeconomic factors.
- Analyze vaccination uptake by race, age, sex, ethnicity, and geographic location to identify patterns and disparities.
- Use spatial analysis tools such as Optimized Hot Spot Analysis and Kernel Density Estimation to identify areas with low vaccine coverage and potential barriers to vaccine access.

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4. Expected Outcomes

This study will provide a comprehensive understanding of the inequities in COVID-19 vaccine distribution and uptake in Georgia. The findings will inform public health efforts by identifying areas with low vaccination rates and underserved populations. Interactive maps and dashboards will be developed to visualize geographic disparities in vaccine access, enabling stakeholders to

design more targeted interventions. The results will support the development of policies aimed at improving vaccine equity, reducing hesitancy, and ensuring that all populations have equitable access to COVID-19 vaccines.