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**The Public Health Disparity Crisis in Chicago: Project Write-up**

**Introduction**

Public health disparities in urban areas, such as Chicago, often result in unequal access to healthcare services. Seasonal influenza, a highly contagious illness, disproportionately affects vulnerable populations, making equitable access to preventive measures like flu vaccinations critical. In Chicago, the uneven distribution of flu clinics, combined with socioeconomic and racial disparities, leaves minority and low-income communities underserved, contributing to higher rates of influenza-like illnesses (ILI) and poorer health outcomes. This study examines the relationship between flu clinic distribution, ILI activity, and population demographics during the 2019–2020 flu season, focusing on racial and socioeconomic inequities. Our findings aim to illuminate structural barriers and guide actionable strategies to promote health equity.

**Background**

Public health disparities in Chicago reflect historical socioeconomic and racial segregation, with minority neighborhoods on the South and West Sides facing systemic barriers to healthcare. These challenges result in poorer health outcomes and lower flu vaccination rates due to limited clinic access, transportation barriers, lack of insurance, and distrust in the healthcare system. While tools like geographic information systems (GIS) help identify underserved areas, gaps in equitable vaccination coverage persist. This study leverages GIS and demographic data to analyze flu clinic distribution, influenza-like illness (ILI) activity, and population demographics in Chicago neighborhoods, aiming to highlight and address these disparities.

**Methodology and Approach**

To investigate public health disparities in Chicago during the 2019–2020 flu season, we analyzed three datasets:

1. *Flu Clinic Locations in Chicago*: This dataset provided the geographic distribution and count of flu clinics by ZIP code.
2. *Chicago Population Counts*: This dataset included demographic information, such as population size, age distribution, and racial composition by ZIP code.
3. *Influenza Risk Level by ZIP Code*: This dataset contained influenza-like illness (ILI) activity levels, measured on a scale of 1 to 10.

We combined these datasets by matching ZIP codes, allowing us to analyze relationships between clinic availability, ILI activity, and population demographics. Key metrics, such as the ratio of ILI activity to flu clinics, were calculated to highlight disparities in healthcare access. We used choropleth maps to illustrate spatial patterns, such as clinic distribution, ILI activity, and demographic characteristics. Scatter plots with regression lines were employed to explore correlations between clinic counts, ILI activity, and demographic factors, including racial composition. To identify disparities, we specifically analyzed differences in flu clinic accessibility and ILI activity across racial and socioeconomic groups. This included comparing trends for White populations to those for minority populations, particularly African Americans and Hispanics, who historically face greater barriers to healthcare. This approach allowed us to uncover systemic inequities and assess their impact on public health outcomes, providing a basis for targeted policy recommendations.

**Results**

Our analysis, shown by the figures in the appendix, revealed clear disparities in flu clinic accessibility and influenza-like illness (ILI) activity levels across Chicago neighborhoods during the 2019–2020 flu season. While flu clinics were evenly distributed across ZIP codes, neighborhoods on the South Side experienced significantly higher ILI activity levels relative to their clinic availability. In contrast, North Side neighborhoods, with comparable clinic counts, had lower ILI activity levels.

Demographic trends further highlighted inequities. ZIP codes with larger African American and Hispanic populations faced higher ILI activity levels but showed little to no increase in clinic availability. Regression analysis confirmed a stark disparity, with Black populations seeing minimal increases in clinics despite higher health risks. Meanwhile, neighborhoods with larger White populations had better clinic access and lower ILI activity.

These results indicate systemic barriers to healthcare access in minority-dominated neighborhoods, particularly on the South Side. Although the project successfully identified inequities, it also highlighted the need for further research into clinic quality and utilization to fully address these disparities. These findings emphasize the urgent need for targeted public health interventions to improve equity in healthcare access and outcomes.

**Discussion**

This study highlights critical public health disparities in Chicago, showing how inequitable access to flu clinics exacerbates health risks for minority and underserved populations. By linking demographic, geographic, and health outcome data, the findings provide actionable insights for policymakers to address systemic inequities and improve resource allocation. With more time and resources, future work could explore clinic utilization, quality of care, and broader health services. Incorporating qualitative data from residents would deepen understanding of barriers to access. Compared to traditional methods, this approach offers a more targeted analysis by connecting resource allocation directly to health outcomes. It provides a valuable framework for developing evidence-based solutions to improve health equity in Chicago and similar urban settings.

**References**

American Medical Association. "Health Disparities in Chicago and the Work to Solve Them at Rush University." *American Medical Association*, <https://www.ama-assn.org/delivering-care/health-equity/health-disparities-chicago-and-work-solve-them-rush-university>. Accessed 27 Nov. 2024.

City of Chicago. "Flu Shot Locations – 2014-Present." *City of Chicago Data Portal*, 2018, <https://data.cityofchicago.org/Health-Human-Services/Flu-Shot-Locations-2014-Present/w3hg-pyhz/about_data>.

City of Chicago. "Chicago Population Counts." *City of Chicago Data Portal*, 2020, <https://data.cityofchicago.org/Health-Human-Services/Chicago-Population-Counts/85cm-7uqa/about_data>.

City of Chicago. "Influenza Risk Level by ZIP Code." *City of Chicago Data Portal*, 2020, <https://data.cityofchicago.org/Health-Human-Services/Influenza-Risk-Level-by-ZIP-Code/8vvr-jv2g/about_data>.

**Appendix**

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*Fig 1: Choropleth map showing number of flu clinics by ZIP code in Chicago*

*Fig 2: Choropleth map showing the ratio of average ILI activity levels to clinic by ZIP code in Chicago*

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*Fig 3: Ratio of ILI Activity Level to Flu Clinics by ZIP code in Chicago*

*Fig 4: Ratio of clinics per person by ZIP code in Chicago*

A graph with dots and lines

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*Figure 5. Relationship between average ILI activity level and flu clinic location counts per by ZIP code in Chicago*

*Figure 6. Relationship between population and flu clinic counts by race in Chicago*

*Figure 7. Relationship between population and average ILI activity level by race in Chicago*