Background

In 2006, the Joint United Nations Program on HIV/AIDS (UNAIDS) and the WHO estimate that AIDS has killed more than 25 million people since it was discovered. [1] It is estimated that 38.6 million people now living with AIDS worldwide [1]. Although there have been some breakthroughs in treating AIDS, such as modern antiretroviral therapy (ART) has resulted in significant improvements in life expectancy of HIV-positive patient [2], there is no effective cure. However, an effective way to prevent people from HIV, which pre-exposure prophylaxis (PrEP). Continuous PrEP has been proven to be effective in lowering HIV resistance. [2]

Previous studies have shown some relationships between willingness to use PrEP and access to PrEP providers. [3,4,5] Spatial availability of health care facilities where provide PrEP has a positive relationship with willingness to use PrEP. [5] The key question in my project is to find out the association between HIV/AIDS new cases and spatial access to PrEP as well as assess current numbers of PrEP providers when preventing HIV infection in six counties in Florida.

Florida is one of the states with the most HIV/AIDS cases in US. [6] Florida was selected to be the state studies in this project. Following are major objectives of this project:

1. Determine the area with highest cases of new diagnoses of HIV/AIDS in FL.
2. Find out the association between new cases and access to PrEP provider in the area with highest cases of new diagnoses of HIV/AIDS in FL.
3. Identify the relationship between users of PrEP and access to PrEP provider in the area with highest cases of new diagnoses of HIV/AIDS in FL.

Results & Discussions

Miami-Dade(1179), Broward(681) and Orange(507) were found to have the highest number of new cases. To analyze association between users of PrEP and access to PrEP providers, Orange was substituted by Palm Beach(312). Six countries, including Miami-Dade, Broward, Palm Beach, Monroe, Collier and Hendry were selected. There were overall 91 providers of PrEP in the six counties, Collier(3), Palm Beach(10) and Miami-Dade (71). Maps presented the relationship between providers of PrEP and new diagnosed HIV/AIDS cases and users of PrEP. In summary, higher new cases of HIV/AIDS were associated with more users of PrEP and more providers of PrEP. Probably because previous HIV/AIDS survey showed that these areas had more cases, and attracted more providers of PrEP. More PrEP users indicated that there might be a high-risk area of new HIV/AIDS cases due to lifestyle, numbers of sex partners and utilization of condoms. [7]. Last, PrEP users also depends on distance from the providers of PrEP, which means that the shorter distance from PrEP providers, the more people used PrEP, which was consistence with previous studies.

Significant limitations existed in this project. First, the address of PrEP providers was manually retrieved from the AIDSVu, so there might be some providers neglected. When geocoding PrEP providers, some providers could not be geocoding due to change of road and errors in address format. Second, the number of HIV/AIDS new cases came from surveillance data, so the number might not be fully representative of true number of cases. Last, majority of Monroe County, west Miami-Dade County, east Collier and was covered by forest, so there should be less HIV/AIDS new cases, users of PrEP and providers of PrEP.

To sum up, this project found out a positive relationship between PrEP providers and HIV/AIDS new cases and users of PrEP, which was consistent with previous research. For policymakers, more providers of PrEP should be built in the area with more new cases to offer more convenient and effective prevention. For future study, it is not a bad idea to carry out study where has no forest with high number of new cases.

References & Acknowledgement


Cartographer: Bo Liu, MPH Epi/Bio
Department: Tufts University School of Medicine
Class: PH 0262: GIS for Public Health
Date: May 1st, 2020
Instructor: Thomas J. Stopka, PhD, MHS;
TA: Shikhar Shrestha, PhD

Data Sources: Centers for Disease Control and Prevention National Prevention Information Network, AIDSVu, Census.gov