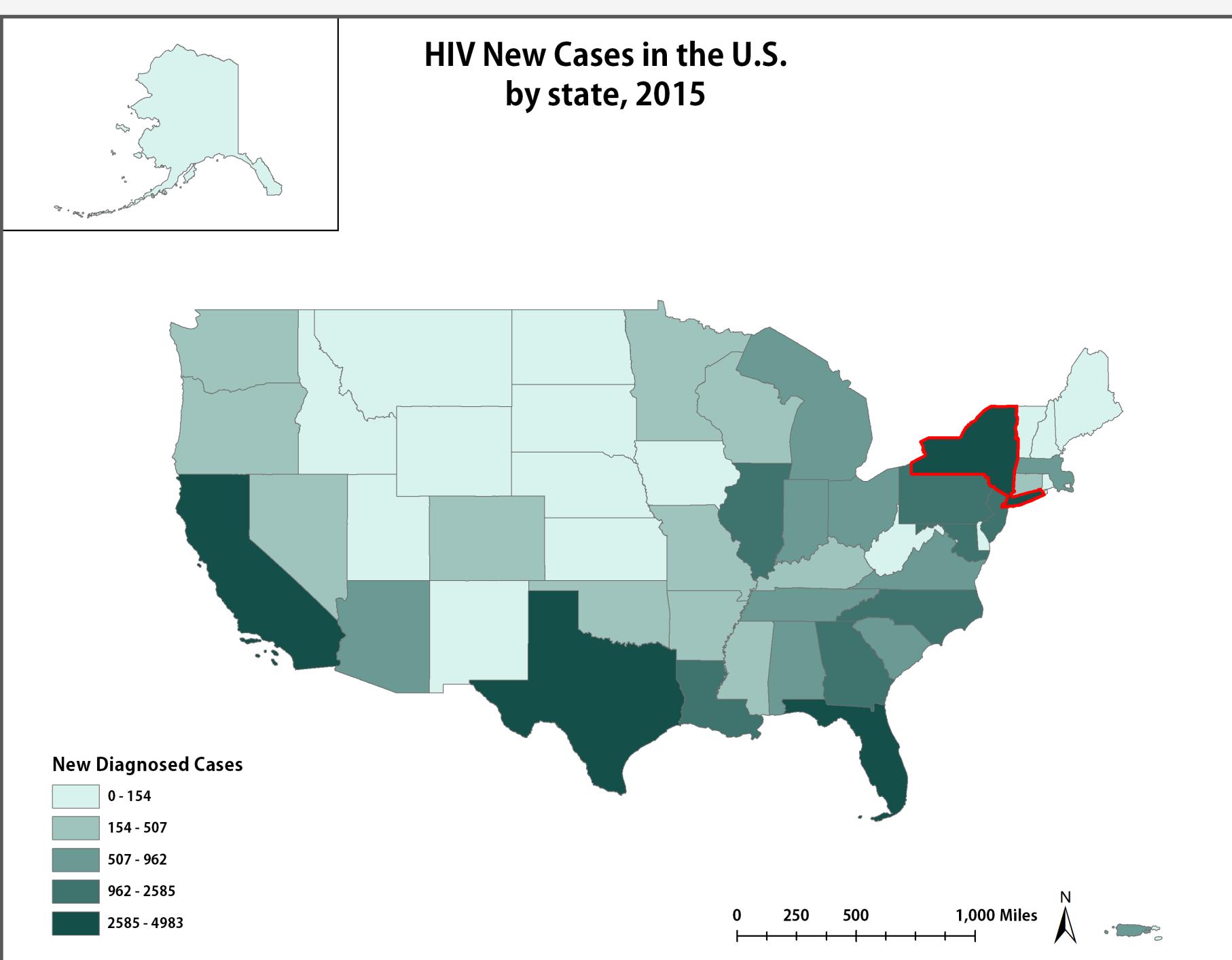


HIV New Cases and Access to PrEP in New York City, NY

BACKGROUND

Human immunodeficiency virus (HIV) has been one of the major public health challenges since it was discovered in the 80s. HIV is a virus that can attack human body's immune system and makes the host vulnerable against infections and certain kinds of diseases.¹ Although there have been several new findings, such as CCR5-delta32 homozygous genotype², suggesting that HIV could one day be cured, no effective cure currently exists for HIV infection. Therefore, many efforts are made to prevent the disease from spreading. Pre-exposure prophylaxis (PrEP) is a preventative approach through the use of a combination of two HIV medicines (tenofovir and emtricitabine) that can substantially lower the chance of getting infected for people at risk.³

Many studies have found an association between the utilization and the spatial access of HIV care.^{4,5} Moreover, a study has found that participants living in areas with high PrEP clinic density were significantly more willing to use PrEP.⁶ Therefore, a better understanding of the geospatial distribution of HIV and access to HIV preventative care services is critical for evaluating the current allocation of resources as well as informing potential areas to expand reach.



New York State (NYS) had the highest prevalence and the 4th highest number of diagnosed HIV infection in 2017 among other states in the U.S.⁷ and was thus selected as the target state of the present project. The objectives of this project will be to:

- 1) Identify the geographic area with the highest number of new diagnosed cases of HIV in NYS,
- 2) explore the geospatial relationship between new diagnosed cases of HIV and health care facilities that provide PrEP,
- 3) as well as the association between the number of PrEP users with the geospatial distribution of PrEP providers within the previously identified area.

METHODS

Data Sources:

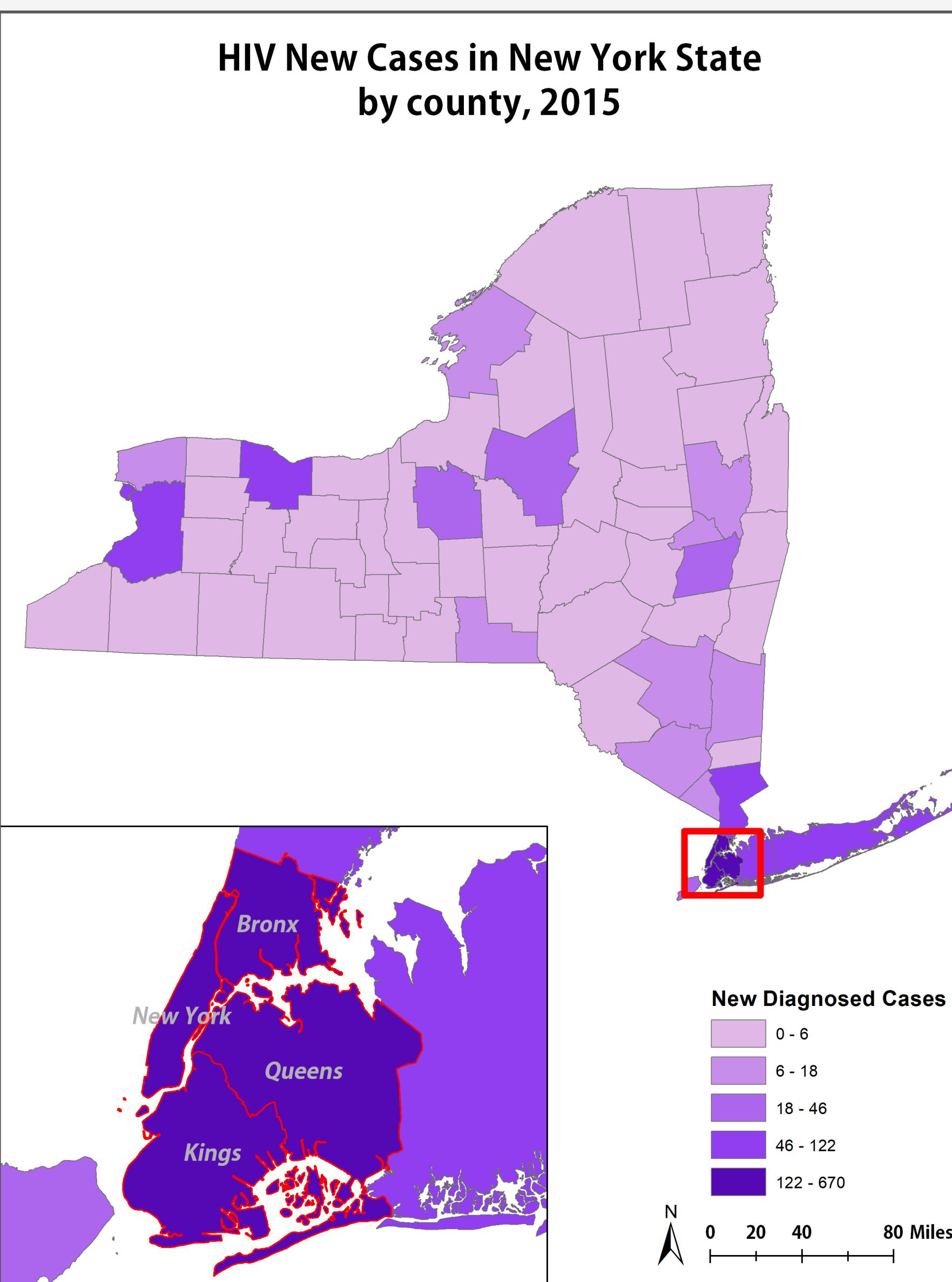
Data on new diagnosed cases of HIV and PrEP users were retrieved from AIDSVu. The 2015 County and 2017 NYC New Diagnoses Dataset was used to assess the new diagnosed cases of HIV in NYS. The 2017 ZIP3 PrEP dataset was used to assess the number of PrEP users in the identified area. The addresses of PrEP providers were extracted from the online service finder (<https://npin.cdc.gov/search/organizations/map>) on CDC's National Prevention Information Network website. Data on NYS including state, county and city boundaries came from NYS Civil Boundaries dataset retrieved from NYS GIS Clearinghouse. Additional data sources used in this project include:

New York City Zip code boundaries retrieved from Data.gov, USA 3-dig Zip Code areas retrieved from ArcGIS.com.

GIS Procedures:

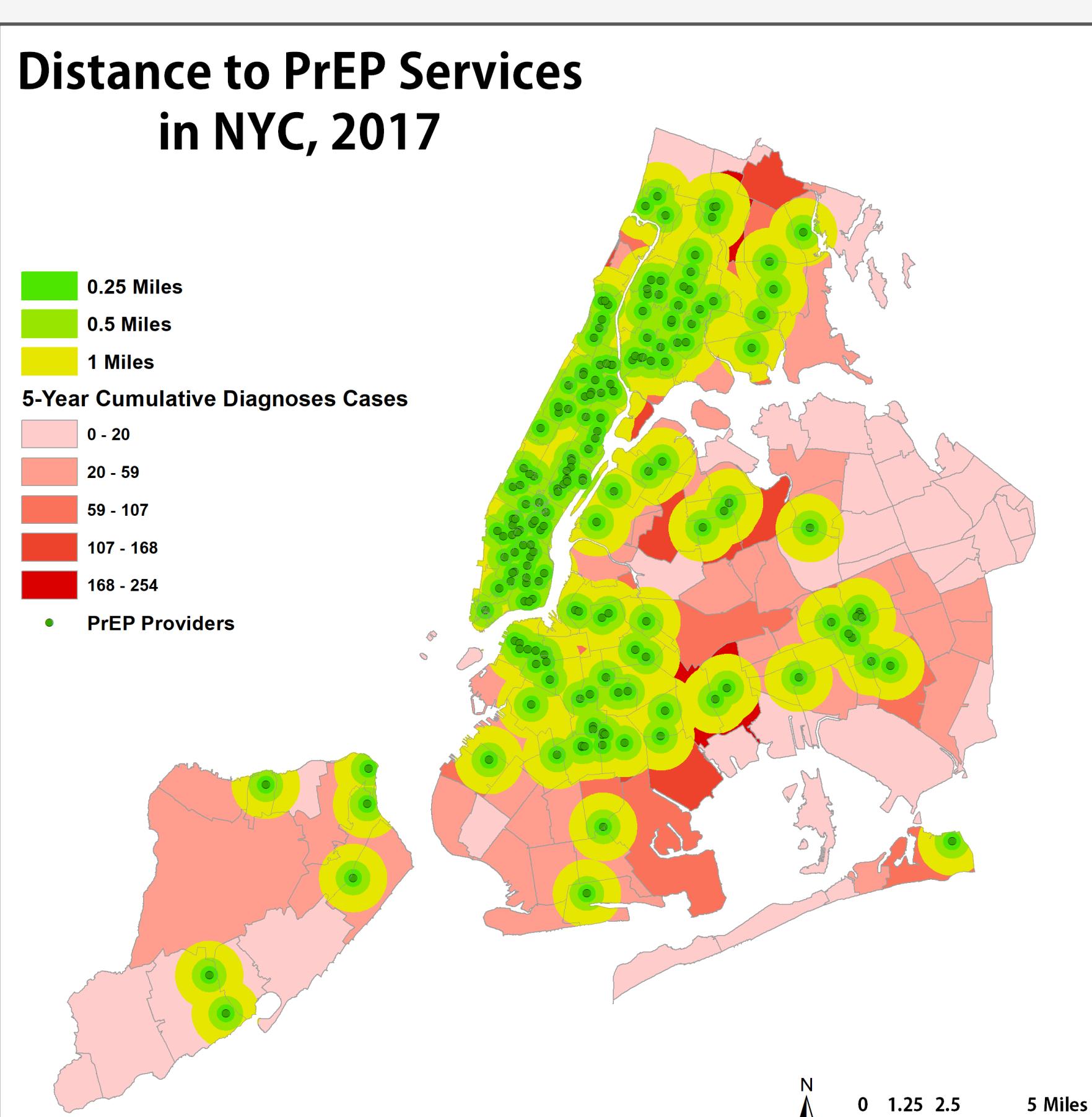
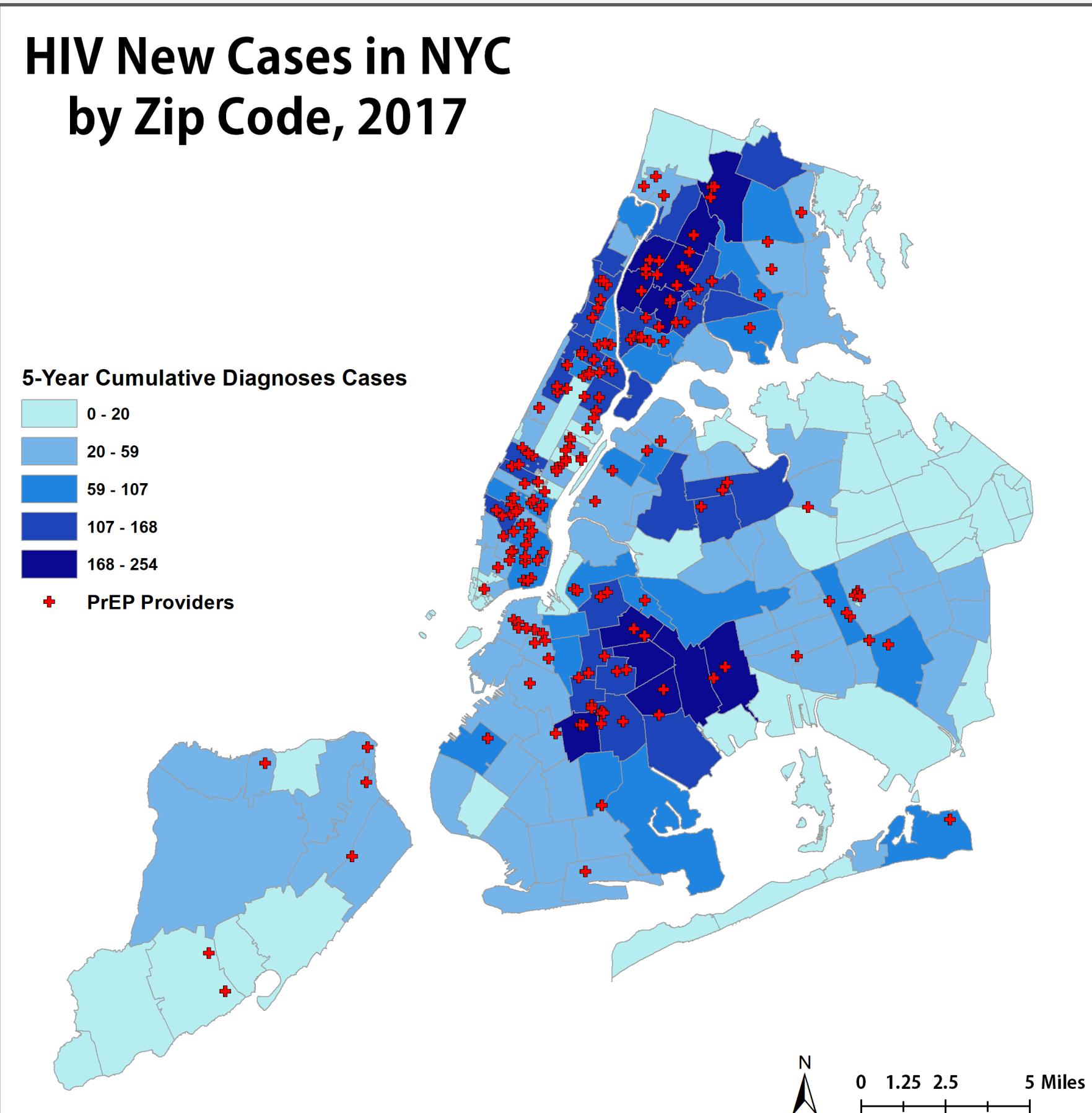
Data were coded as “-1” in the datasets from AIDSVu when number of persons living with diagnosed HIV infection is less than 5. Therefore, all data from AIDSVu with a value of “-1” were recoded to “2” as an estimation for values less than 5.

The data on new diagnoses cases in NYS were extracted from the original dataset and joined with NYS county data by county names after recoding. The data on new diagnoses cases in NYC were extracted from the original dataset and joined with NYC zip code data by zip code numbers after recoding. The addresses of PrEP providers were translated to XY coordinates using the address geocoder services provided on the NYS GIS clearing house website and geocoded into the NYC zip code map. Geographic buffering was used to assess the spatial access to PrEP services. Four choropleth maps were generated to show



the geospatial distribution of new diagnosed cases of HIV, PrEP providers and PrEP users, with one map showing the distance of 0.25, 0.5 and 1 miles to PrEP services in NYC.

RESULTS & DISCUSSION



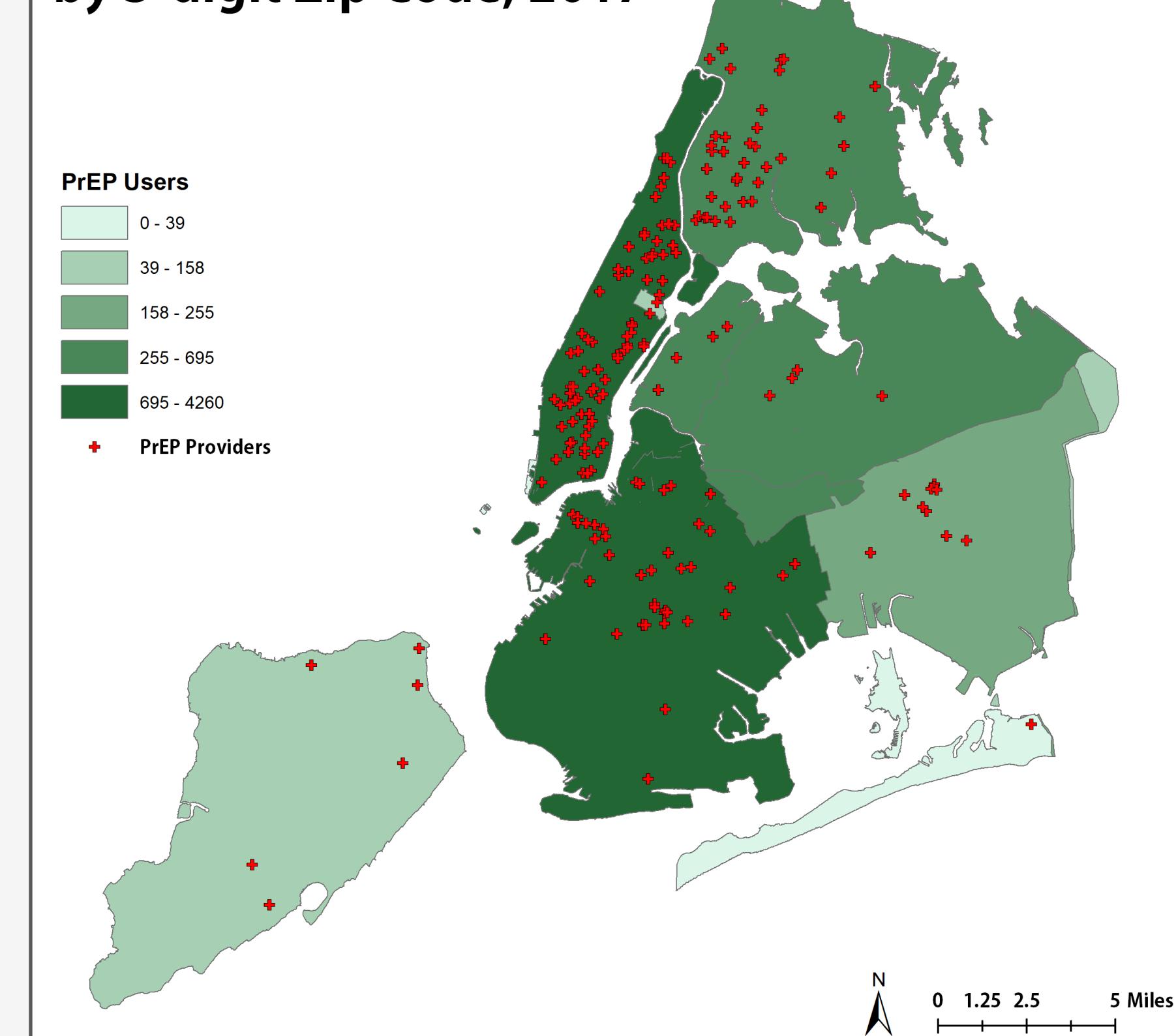
Kings/Brooklyn (670 cases), New York/Manhattan (593), Bronx (540) and Queens (483) were identified as the four counties that had the highest number of new diagnosed cases of HIV in 2015. Since Kings, New York, Bronx and Queens are the 4 out of 5 boroughs of New York City (NYC), NYC was selected to be the target area for the following analysis.

A total of 181 healthcare facilities provided PrEP services in NYC. (New York County:79, Bronx County:37, Kings County:40, Queens County:19, Staten Island:6) A geospatial association of PrEP providers with new diagnosed HIV cases and PrEP users was visualized and observed in the present study. In general, areas with a high density of PrEP providers were associated with a higher number of PrEP users as well as HIV new cases, which were congruent with the previous studies. While the 181 PrEP providers in NYC covered most areas, some areas with a high number of HIV new cases were not within 1 mile of any PrEP services in NYC.

Limitations of the present study include: 1) the new diagnosed cases of HIV were assessed by surveillance data, which might not be accurate to represent the true incidence, 2) the mapping method of geographic buffering was also not accurate for assessing the spatial access to PrEP services because transportation and road availability were not accounted.

In conclusion, the present project discovered a spatial relationship between the distribution of PrEP services and PrEP users as well as HIV new diagnosed cases. However, effort still needs to be made to improve the access to PrEP in NYC.

PrEP Users in NYC by 3-digit Zip Code, 2017



REFERENCES & ACKNOWLEDGEMENT

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Date: May 3rd, 2019

Data Sources: AIDSVu, NYS GIS Clearinghouse, Data.gov, ArcGIS.com, CDC's National Prevention Information Network

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