

Public Health

User

New York City Department of Health and Mental Hygiene, Division of Disease Control

Challenge

Improve understanding of populations at risk of disease, communicate with at-risk populations via local clinics, and learn how to prepare for future outbreaks

Solution

Use ArcGIS® Desktop to identify neighborhoods at risk for local disease transmission and effectively develop routes for canvassing operation

Results

- Better communication with stakeholders
- Educated and communicated with the public and elected officials
- Identified clinics to improve treatment and minimize travel time
- Improved disease analysis and communication between departments

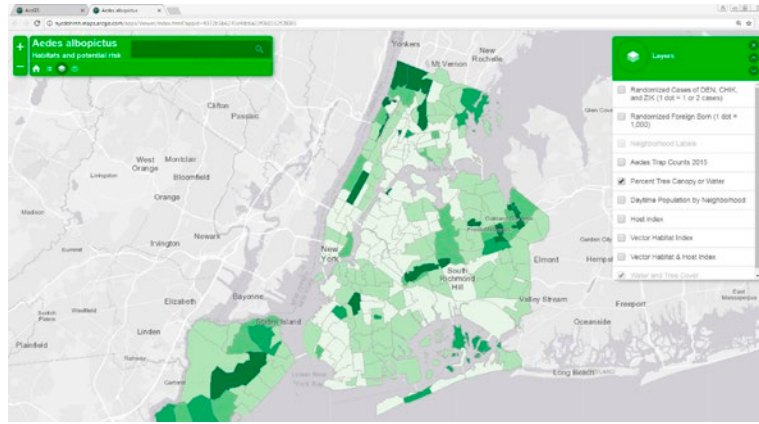
Zapping Zika with GIS

The work of the New York City Department of Health and Mental Hygiene (DOHMH) is broad ranging, from administering inspection grades for dining establishments to mitigating infectious disease outbreaks. With over 7,000 employees serving more than eight million citizens, DOHMH is one of the largest public health agencies in the world. Every year, DOHMH monitors over 70 infectious diseases. As the threat of Zika virus loomed over the United States, DOHMH used geographic information system (GIS) technology to target messaging in potentially at-risk populations in New York City (NYC).

The Challenge

Since NYC is a major travel hub, DOHMH staff knew they had to prepare for potential Zika virus outbreaks—even before local mosquito-borne cases were identified in Florida. To improve provider-to-patient communication regarding





“Now we’re able to interact with the data and connect with the neighborhood, making [residents] more aware of their disease risk.”

David E. Lucero, PhD
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travel recommendations, DOHMH needed to identify populations potentially at risk and reach out to obstetrics and gynecology (OB-GYN) providers in these neighborhoods. To ensure messaging was getting to patients, DOHMH needed to canvass 178 OB-GYN clinics with very limited resources (11 two-person teams in one business day using public transit).

The Solution

DOHMH staff used Esri® ArcGIS technology to identify at-risk neighborhoods. With ArcGIS, they developed a risk index using the following data layers:

- Population density of first-generation immigrants in NYC from Latin American countries where there is local Zika virus transmission—since many New Yorkers traveled to and from there
- Water and tree canopy density in NYC—since mosquitoes, the vector of Zika virus, may aggregate in these areas
- Density of arboviral (infections caused by viruses spread by infected insects) cases for the past three years in NYC

Next, using spatial analysis, clinics were assigned (and, therefore, travel routes optimized) for canvassing teams. The analysis assigned clinics to a team by minimizing travel distance to public transit stations, public transit routes, and at-risk neighborhoods.

The Results

Using ArcGIS, under Dr. David E. Lucero’s leadership, DOHMH staff gained a detailed understanding of NYC neighborhoods at potential risk for Zika transmission. They used the analysis to educate and communicate with elected officials, providers, patients, and travelers. Additionally, they identified OB-GYN clinics that were best suited to inform patients about travel risks and preparedness. They were able to predict which areas were most at risk of local Zika transmission and which clinic locations would likely service at-risk populations. In one business day, 11 teams used public transportation to visit a total of 178 OB-GYN facilities across 10 neighborhoods. A subsequent canvassing operation yielded similarly effective results; in half a business day, four teams visited 70 facilities across five neighborhoods.

Ultimately, GIS empowered DOHMH staff to better understand the spread of disease in their community to respond faster and more effectively.

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