

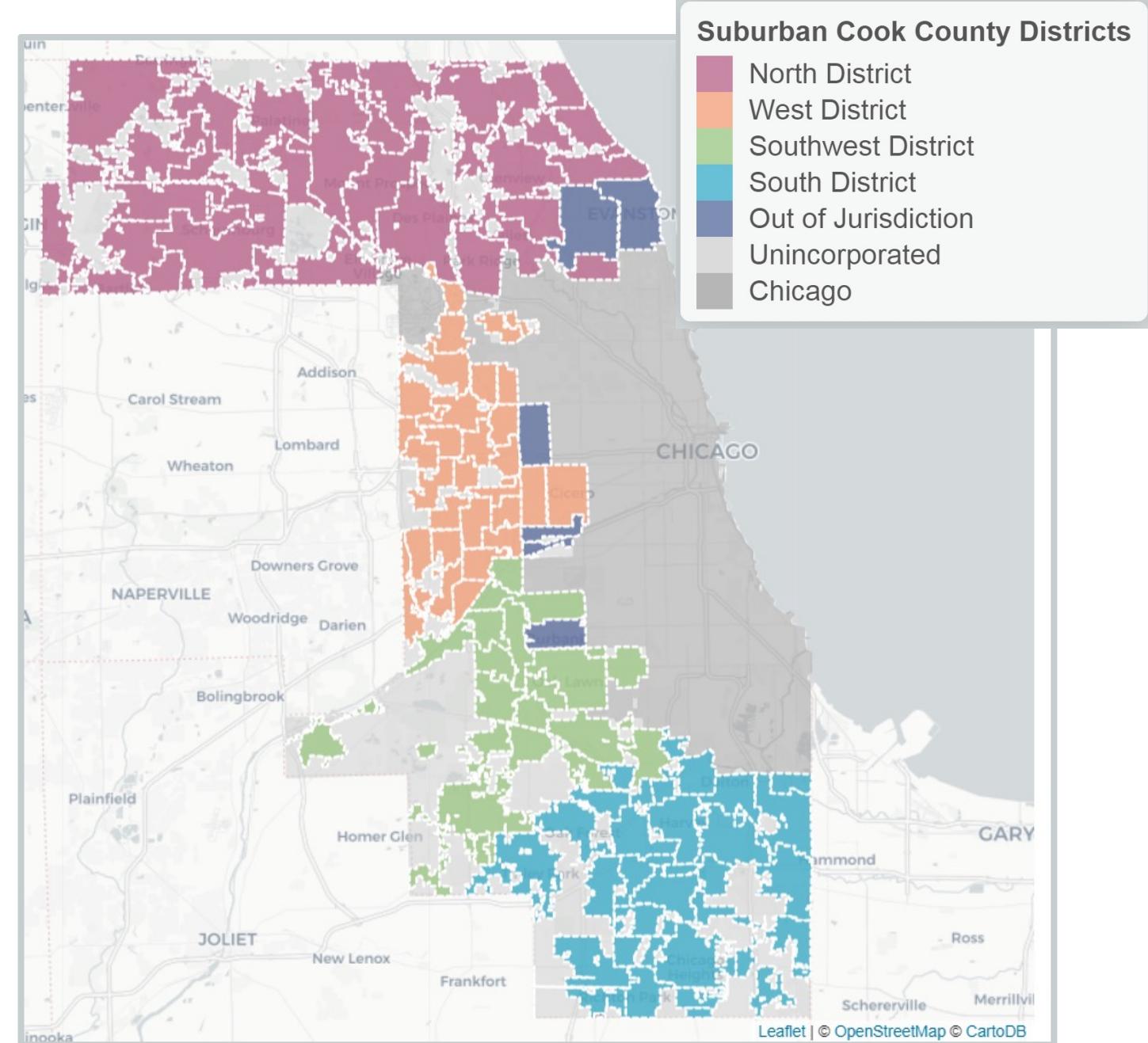


Making Infectious Disease and Health Equity Data Accessible through an Interactive Online Application

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Our jurisdiction

- Suburban Cook County
- 125 municipalities
- 2.5 million people
- 4 districts



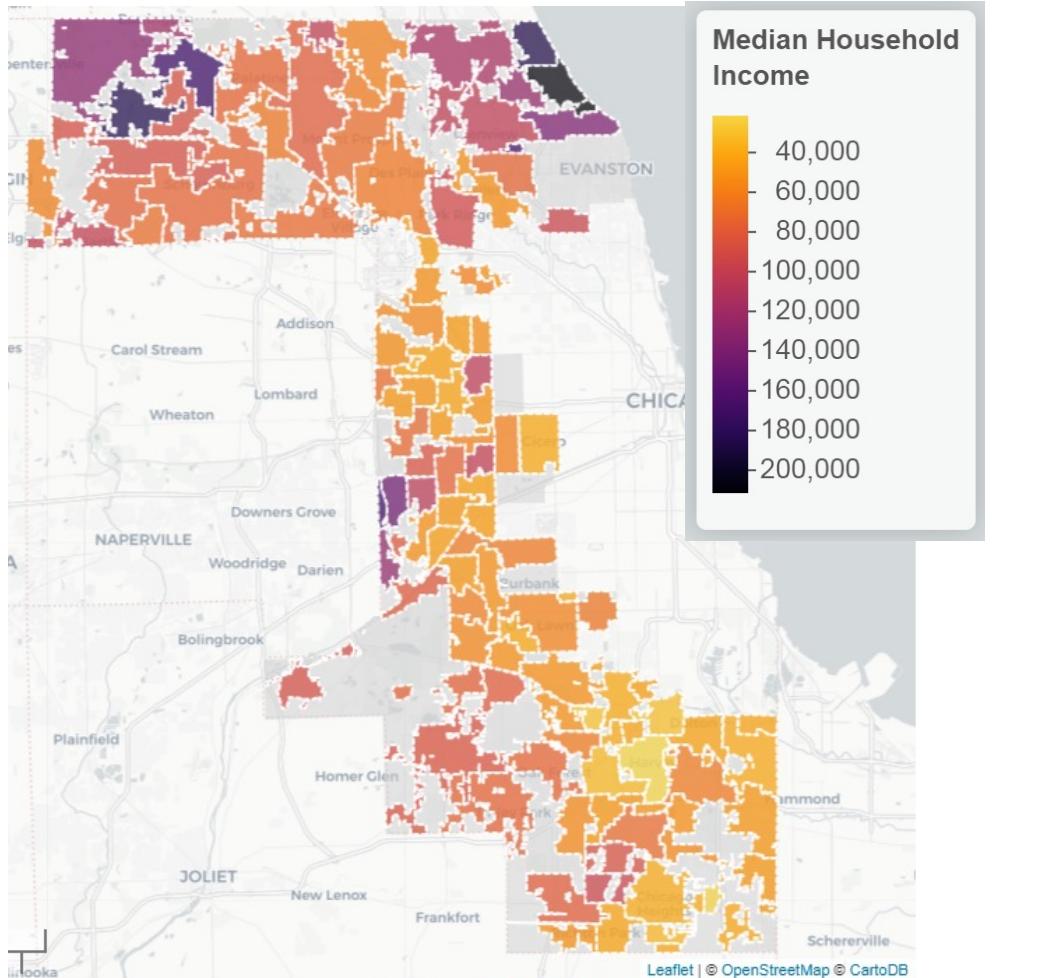
Cook County DEPT.
of
Public Health

Promoting health. Preventing disease. Protecting you.

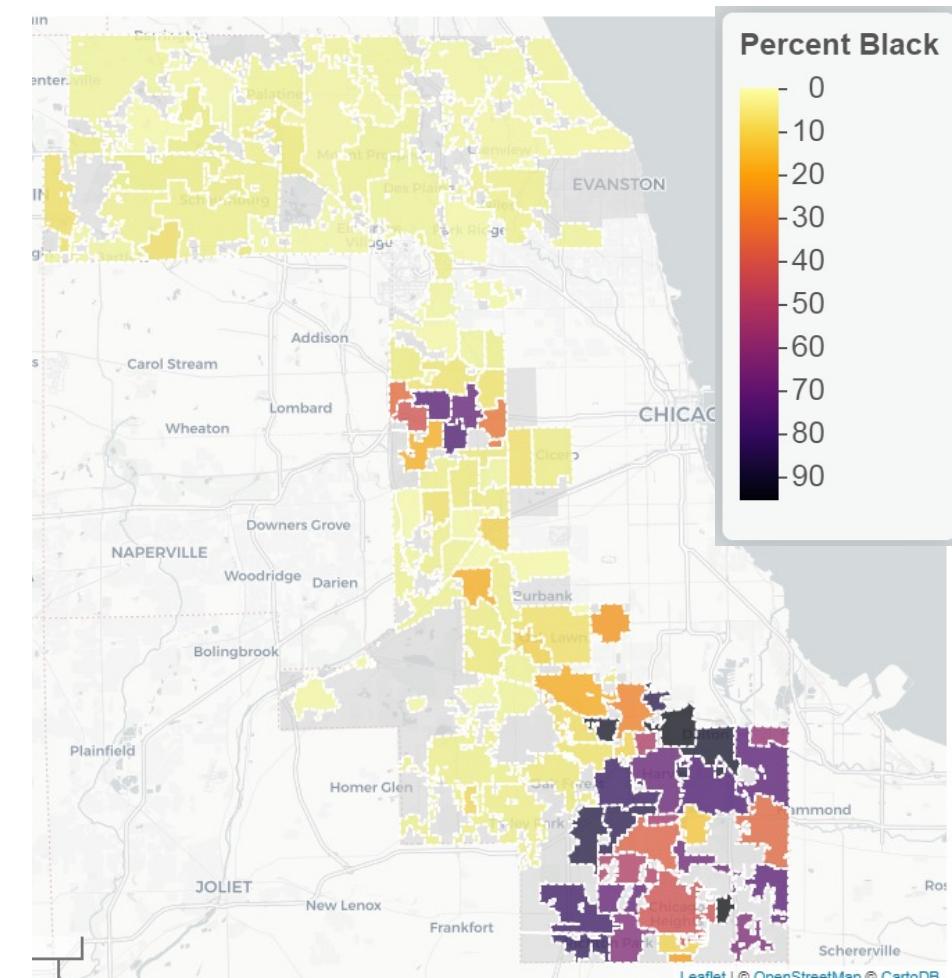
Disparities between municipalities

Median Household Income

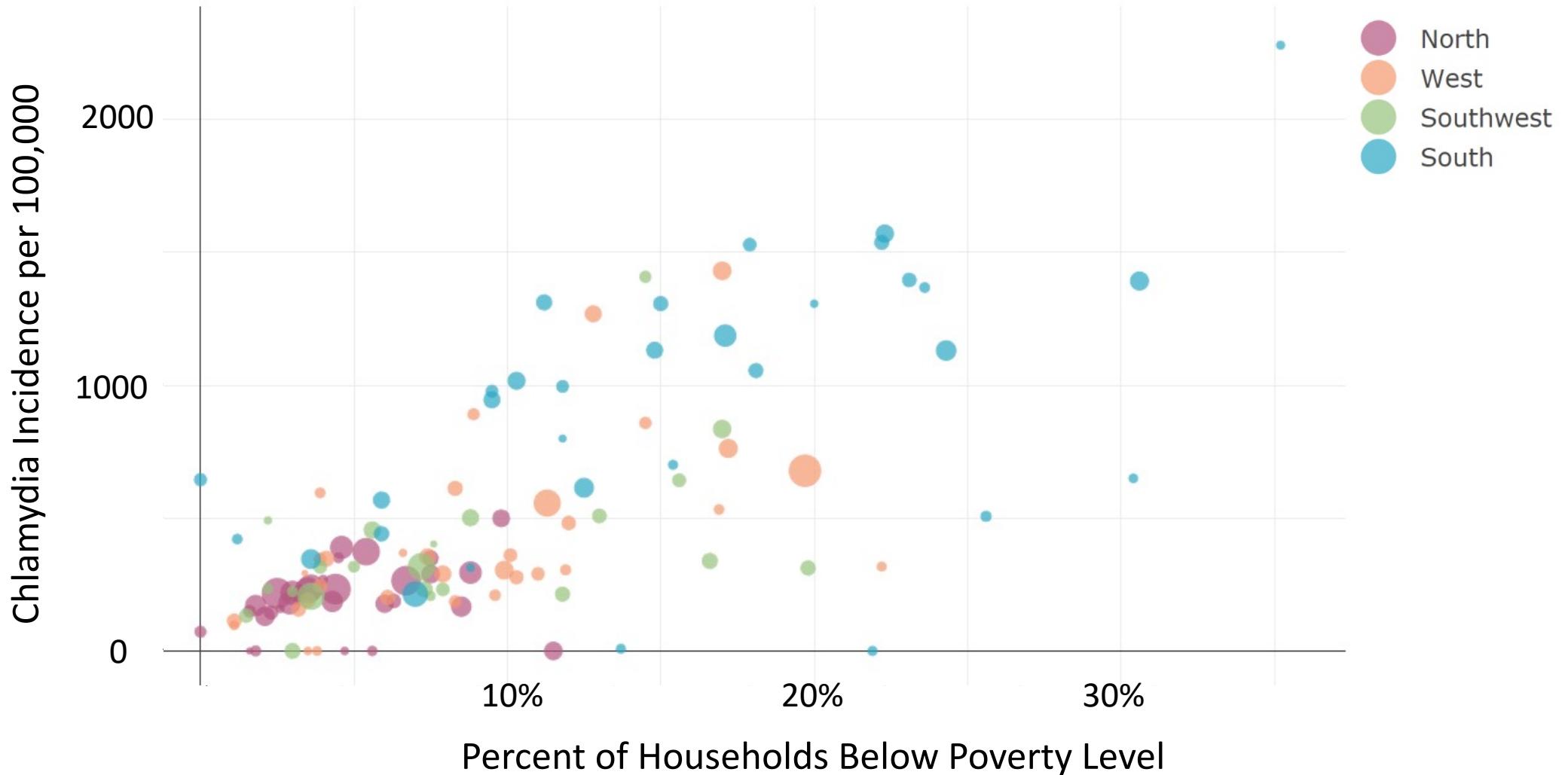
Range: \$22k-\$211k



Percent of Residents that are Black/African American



Social disparities correlate with communicable disease rates



Goals

- Bring health equity lens into our daily work
- Make accessing heath data more flexible and user-friendly

Selected Communicable Diseases	Current extent of data access for some conditions						2018- Q4*
	2013	2014	2015	2016	2017	5-yr Median	
Campylobacteriosis¶¶				308	332	320	301
E.coli O157:H7	11	8	8	30	8	8	7
Hepatitis A	20	9	12	7	12	12	13
Hepatitis C	801	950	962	936	1093	950	809

Data available

- Over 15,000 confirmed or probable cases of communicable diseases a year
 - Enteric illnesses
 - Sexually transmitted infections
 - Vaccine preventable diseases
- Hundreds of place-level variables in US Census & American Community Survey
 - Income
 - Education
 - Insurance status
 - Race
 - Ethnicity
 - Place of birth

R Tools

- **Shiny**- web compatible data visualization
- **Plotly**- interactive graphing
- **Leaflet**- interactive mapping
- Free, approachable & customizable!



Communicable disease & health equity data visualization application

The application interface includes a top navigation bar with tabs: About, Maps, Scatter Plot, Box Plots, Municipality Profile, and District Map. Below the navigation bar are six main content panels, each featuring a large blue callout bubble with its respective tab name.

- Control Panel:** A sidebar on the left containing dropdown menus for Disease (Gonorrhea) and Social Indicator (Unemployment Rate), and a "Find Your Municipality*" dropdown.
- About:** A panel with an "About" section containing text about health equity and Suburban Cook County, and a "How to Use This App" section.
- Maps:** Two choropleth maps showing Gonorrhea incidence and Unemployment rate across Suburban Cook County districts.
- Scatter Plot:** A scatter plot showing the relationship between Mean Annual Gonorrhea Incidence per 100,000 (2015-2017) and Unemployment Rate.
- Box Plots:** Two box plots comparing Gonorrhea Incidence by District and Unemployment Rate by District.
- Municipality Profile:** A panel for Calumet City, IL, displaying population, median household income, and racial/ethnic composition.
- District Map:** A map of Suburban Cook County districts.

Communicable Disease & Health Equity Data Visualization Beta

Control Panel

Disease

Campylobacteriosis ▾

About Campylobacteriosis

Social Indicator

Median Household Income ▾

Find Your Municipality*

Select Municipality ▾

*Municipalities with (pt.) after their names are only partially contained within Cook County. Their population sizes represent the portion of the municipality in Cook County. Disease rates for these municipalities may be over or under estimated due to reporting discrepancies and small population sizes.

[About](#) [Maps](#) [Scatter Plot](#) [Box Plots](#) [Municipality Profile](#) [District Map](#)**What is health equity?**

"Health equity means that everyone has a fair and just opportunity to be healthier. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care." -The Robert Wood Johnson Foundation

Health equity in Suburban Cook County

Suburban Cook County has some of the most affluent, as well as some of the most disadvantaged, municipalities in the county. We see these disparities manifested in various health outcomes in our cities, villages, and towns. Cook County Department of Public Health has made addressing health equity one of its top priorities in its Community Health Assessment and Improvement Plan, [WePlan2020](#). On this site, we allow for the visualization of selected infectious disease rates in Suburban Cook County and their correlations with various social indicators related to income, education, insurance status, place of birth, race, and ethnicity.

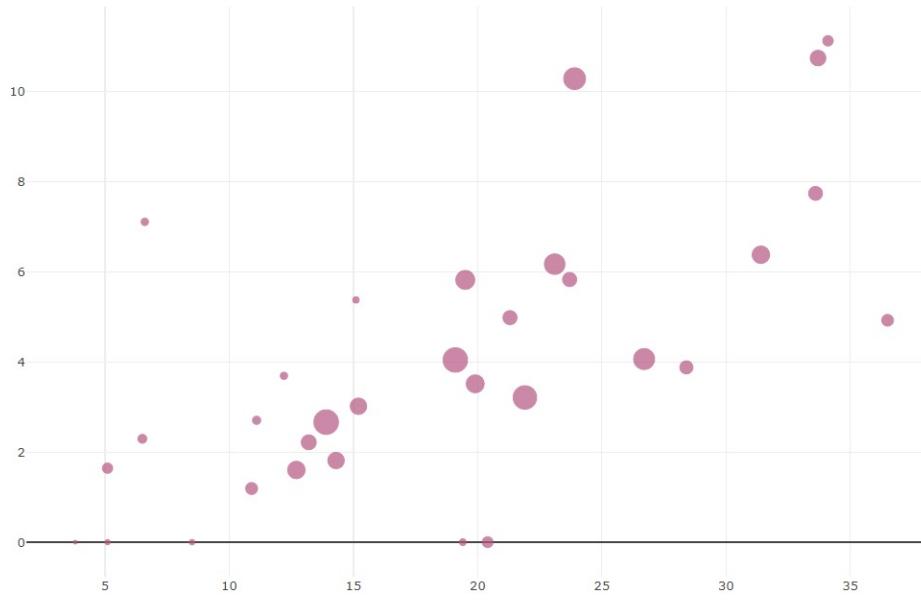
How to use this site

Select a disease and a social indicator of interest from the sidebar control panel. If you are interested in highlighting results from a specific municipality, select one from the 'Find Your Municipality' dropdown menu. Navigate to the Scatter Plot and Box Plot tabs to visualize the correlation between your disease and social indicator of interest. Much of the data is organized by Suburban Cook County Districts, which can be seen mapped out in the District Map tab. To map disease incidence rates and social indicators, navigate to the Maps tab. To learn more about the demographics and disease burdens of a specific municipality, select it in the sidebar control panel, and click on the Municipality Profile tab. All graphs and maps in this app are interactive. Hover over a data point to see more information, and zoom in and out to areas of particular interest.

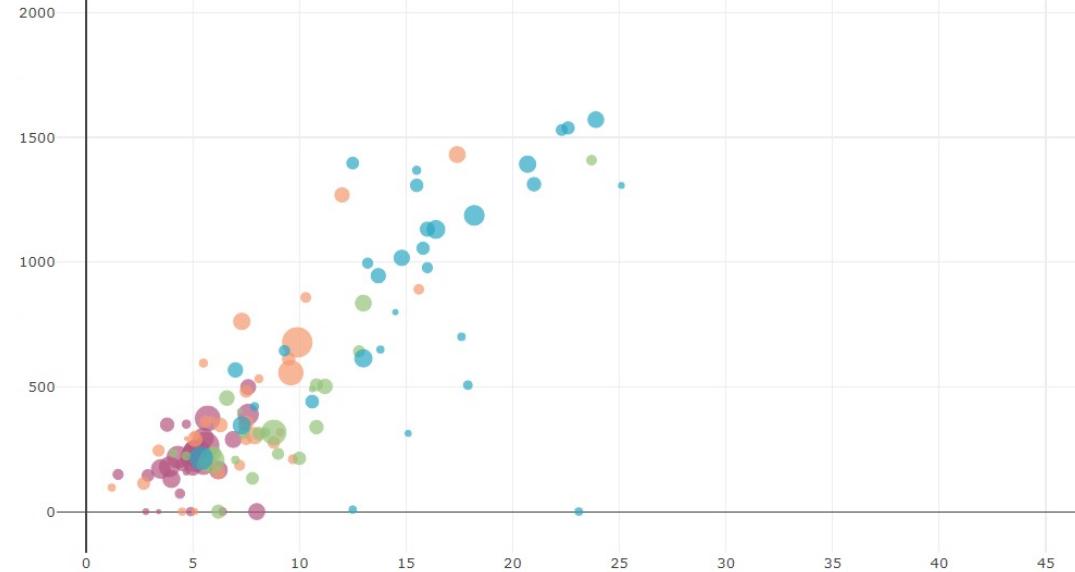
This application is currently in beta testing. Please click [here](#) to send comments, feedback, or technical questions. Source code for this application can be found [here](#)

Some notable correlations

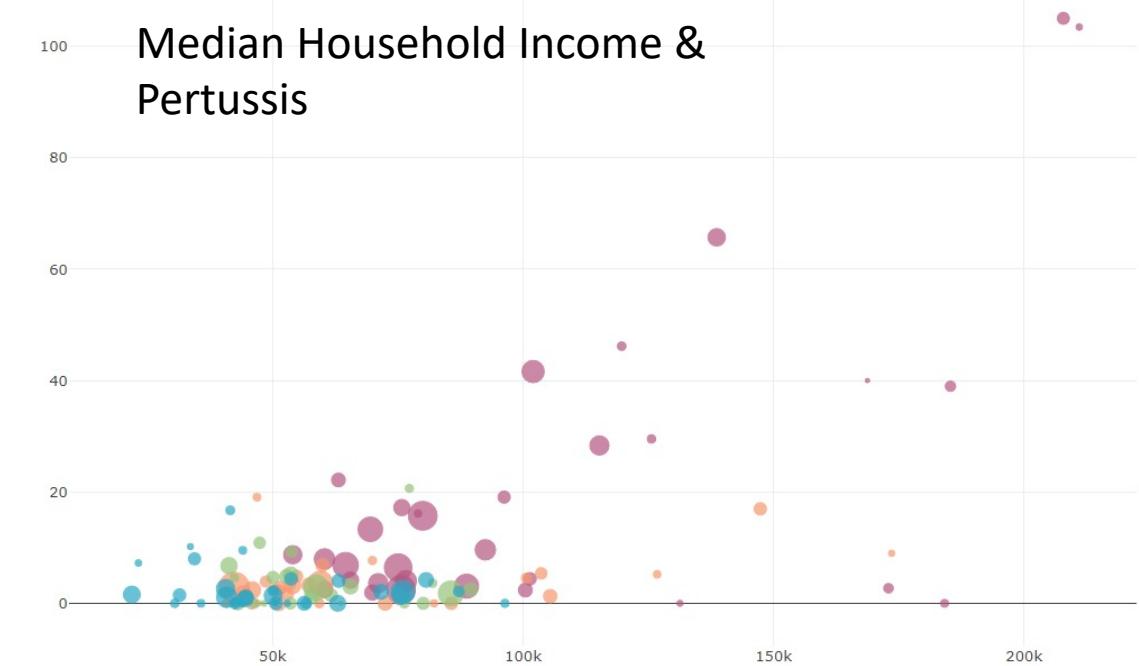
Percent Foreign Born & Tuberculosis in North District



Unemployment Rate & Chlamydia



Median Household Income & Pertussis



You can do it too!

```
library(shiny)
library(plotly)

years = c("2015", "2016", "2017")
chlamydia_count = c(9329, 10192, 10937)
pertussis_count = c(168, 196, 118)
salmonella_count = c(313, 311, 304)

ui <- fluidPage(
  selectInput(inputId = "disease",
              label = "Disease",
              choices = c("Chlamydia",
                         "Pertussis",
                         "Salmonella"),
              selected = "Chlamydia"),
  plotlyOutput("diseasePlot",
              height = "300px",
              width = "500px")
)
```

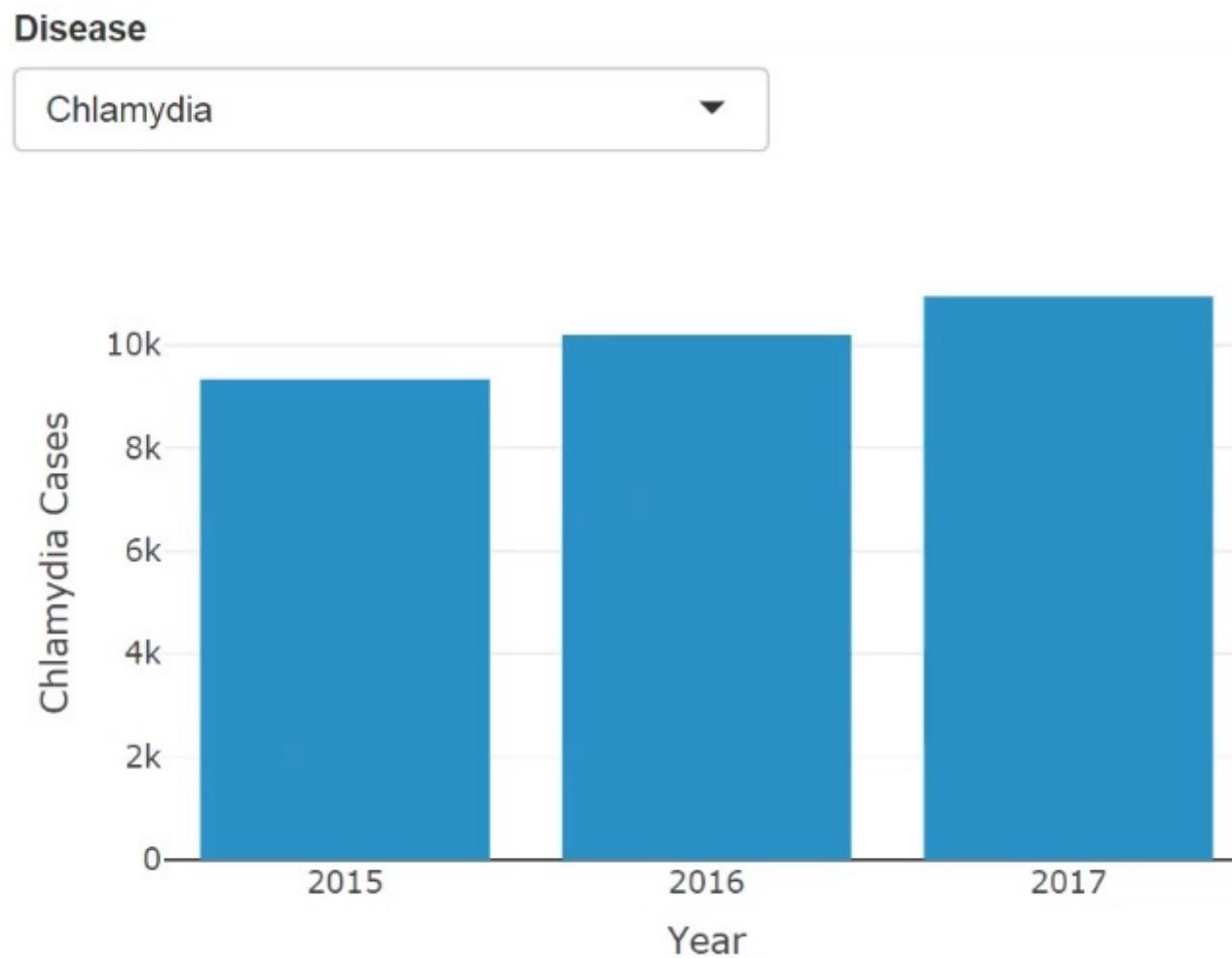
```
server <- function(input, output) {

  output$diseasePlot <- renderPlotly({
    if(input$disease == "Chlamydia"){
      count = chlamydia_count}
    if(input$disease == "Pertussis"){
      count = pertussis_count}
    if(input$disease == "Salmonella"){
      count = salmonella_count}

    plot_ly(x=years, y=count,
            type = "bar") %>%
      layout(
        yaxis = list(title=paste(input$disease, "Cases")),
        xaxis = list(title="Year")
      )
  })
}

shinyApp(ui, server)
```

Basic shiny app



Conclusions

- The Shiny package in R is an approachable, low-cost option for creating interactive data portals
- The CCDPH health equity app puts data into the hands of decision makers and our community
 - Easy to use
 - Relatively simple to understand
 - Interesting to explore
 - Visualize health equity trends and disparities in local communities



<https://ccdphecd.shinyapps.io/healthequity/>



github.com/hsteinberg



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