Cancer surveillance and data visualization

GW T32 Cancer Biology Training Program Seminar
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GW Cancer Center

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GW Cancer Center

NIH/NCI PAR-21-321 Cancer Center Support Grants (CCSGs) for NCI-designated Cancer Centers (P30)

Community Outreach and Engagement

"Cancer Centers occupy a unique role in their communities. They are expected to perform research of particular relevance to their catchment area and engage the populations within their catchment area in the research they conduct. To facilitate this, Centers **thoroughly analyze the demographics and cancer burden of their catchment area**. In addition, Centers are expected to engage communities within their catchment area to decrease their cancer burden, particularly among minority and underrepresented populations. To facilitate these activities, Centers establish community advisory board(s) and partnerships with other healthcare delivery systems and state and community agencies and coalitions for dissemination of evidence-based findings."

Surveillance

Ongoing, systematic collection, analysis, interpretation and dissemination of data regarding a health-event for use in public health action to reduce morbidity and mortality and to improve health.

- *Centers for Disease Control and Prevention, 2001*

Centers for Disease Control and Prevention

CDC 24/7: Saving Lives, Protecting People™

CDC engages in surveillance activities in order to:

- Collect data to better understand the extent of health risk behaviors, preventive care practices and the burden of chronic diseases
- Monitor the progress of prevention efforts
- Help public health professionals and policymakers make more timely and effective decisions

https://www.cdc.gov

CDC's Chronic Disease Surveillance Systems

Including:

- National Health and Nutrition Examination Survey (NHANES)
- Behavioral Risk Factor Surveillance System (BRFSS)
- Youth Risk Behavior Surveillance System (YRBSS)
- Chronic Disease Indicators
- Chronic Disease State Policy Tracking System
- National Diabetes Surveillance System
- National Health Interview Survey (NHIS)
- **US Cancer Statistics (USCS)**

https://www.cdc.gov/chronicdisease/data/surveillance.htm

CDC: National Notifiable Diseases Surveillance System (NNDSS)

Local public health departments are required **by law** to report disease data to the CDC on about 120 infectious and non-infectious diseases

Cancer is one of the non-infectious diseases

cdc.gov/nndss/

1935

First population-based cancer registry in the United States established in Connecticut

1956

The American College of Surgeons requires a cancer registry as a component of an approved cancer program

1971

The U.S. National Cancer Act budgets monies to the National Cancer Institute for research, detection, and treatment of cancer

1973

The Surveillance, Epidemiology and End Results (SEER) Program of NCI establishes the first national cancer registry program

1992

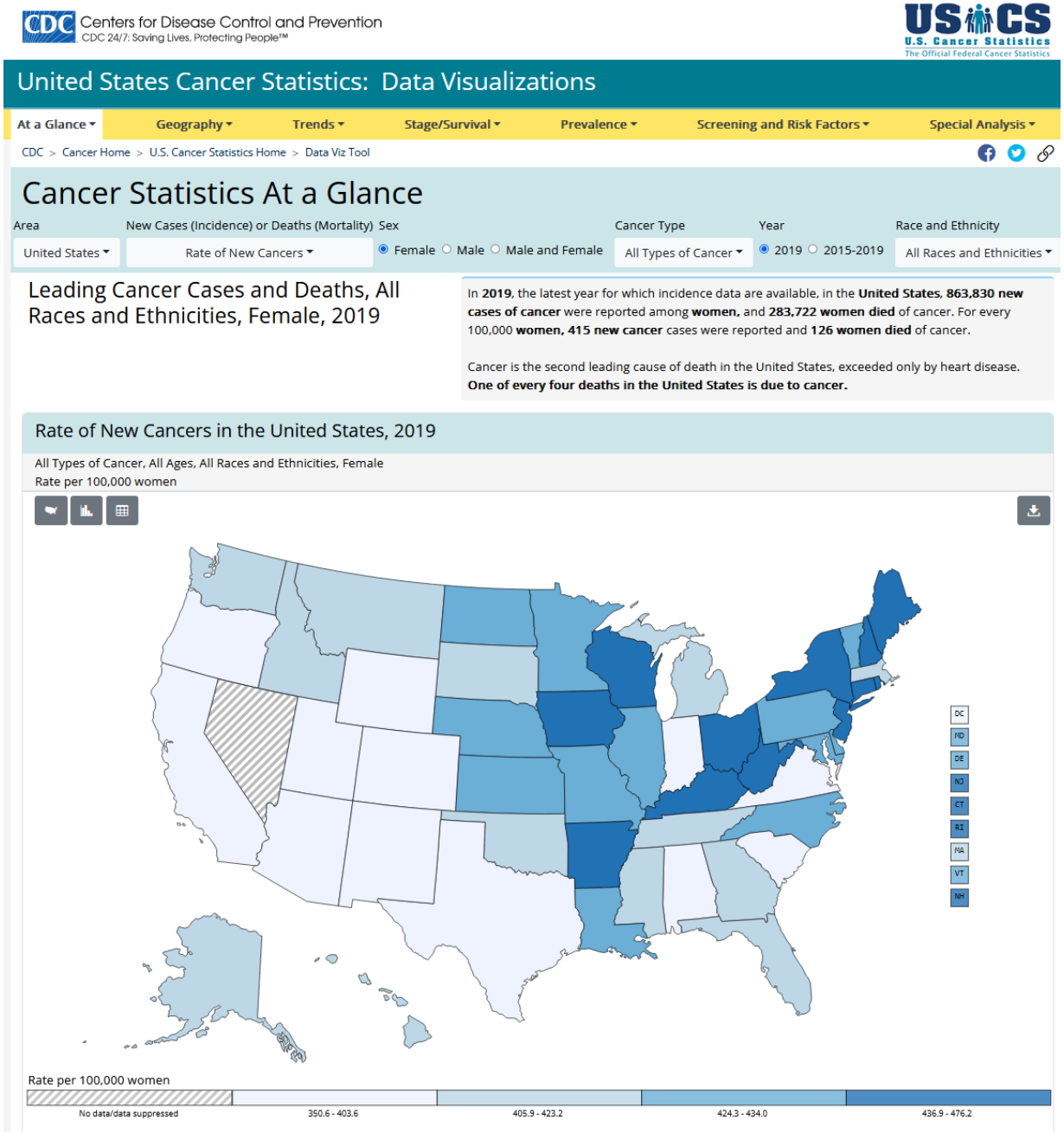
U.S. Public Law 102-515 establishes the National Program of Cancer Registries (NPCR) and is administered by the US Centers for Disease Control and Prevention (CDC)

1993

Many state laws make cancer a reportable disease

Cancer registrars

- data management experts who report cancer statistics for various healthcare agencies
- work closely with physicians, administrators, researchers, and health care planners
- primary responsibility is to ensure that timely, accurate, and complete data is incorporated and maintained on all types of cancer diagnosed and/or treated within an institution or other defined population
- Starting January 1, 2024, the credential name for Certified Tumor Registrars (CTR) will be changing to Oncology Data Specialists (ODS)



https://gis.cdc.gov/Cancer/USCS/#/AtAGlance/

Overview of the SEER Program

About SEER

Program Overview –
- SEER 50th Anniversary
- Goals of the SEER Program
- Fact Sheets & Brochures
- Collaborating Organizations

SEER Registries +

Research Activities +

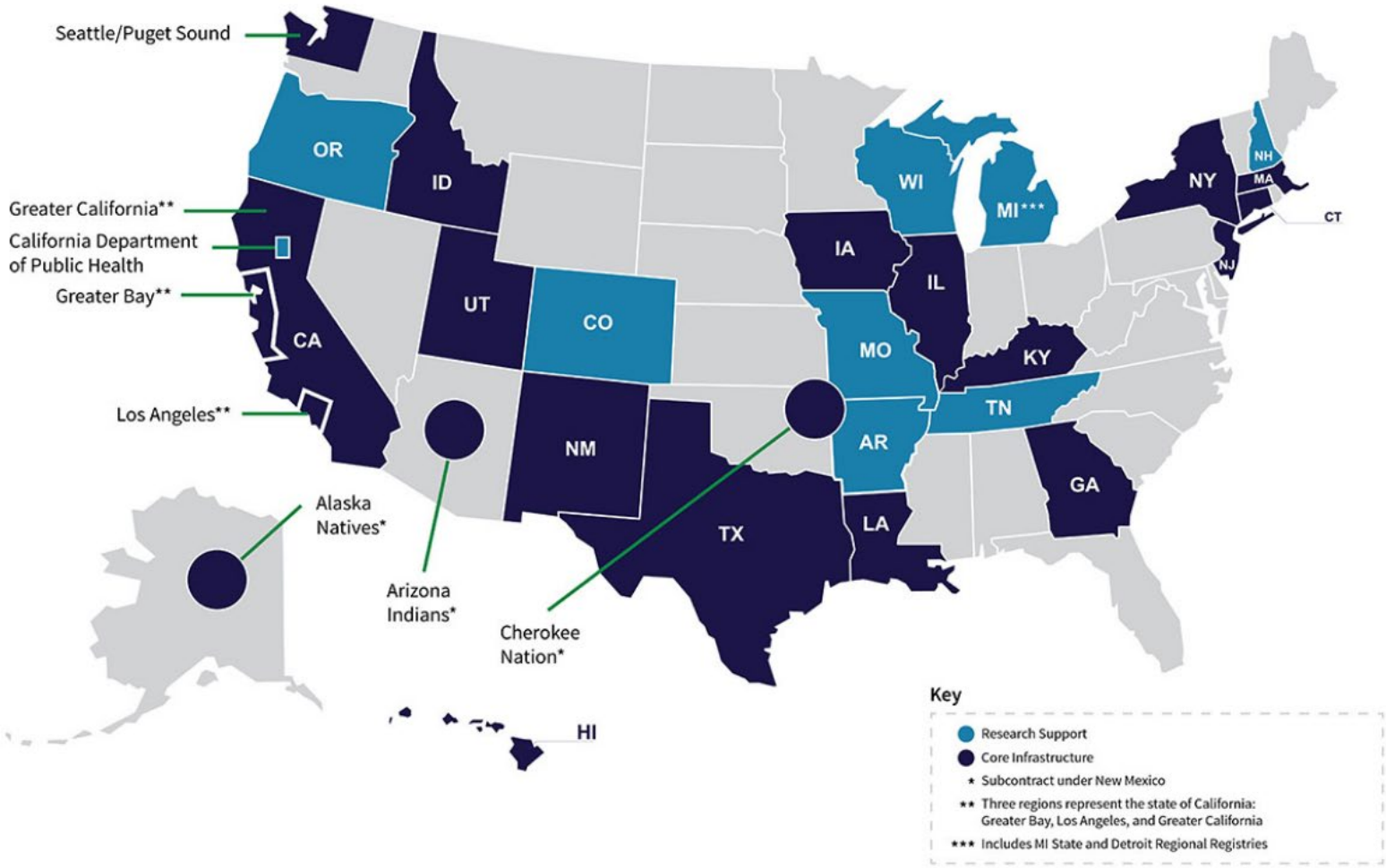
SEER Quality Improvement +

The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI) is an authoritative source of information on cancer incidence and survival in the United States. SEER currently collects and publishes cancer incidence and survival data from population-based cancer registries covering approximately 48.0 percent of the U.S. population. For more information on this, please view the SEER Research Data. SEER coverage includes 42.0 percent of Whites, 44.7 percent of African Americans, 66.3 percent of Hispanics, 59.9 percent of American Indians and Alaska Natives, 70.7 percent of Asians, and 70.3 percent of Hawaiian/Pacific Islanders. (Details are provided in the table: Number of Persons by Race and Hispanic Ethnicity for SEER Participants.)

The SEER Program registries routinely collect data on patient demographics, primary tumor site, tumor morphology and stage at diagnosis, first course of treatment, and follow-up for vital status. The SEER Program is the only comprehensive source of population-based information in the United States that includes stage of cancer at the time of diagnosis and patient survival data. The mortality data reported by SEER are provided by the National Center for Health Statistics. The population data used in calculating cancer rates is obtained periodically from the Census Bureau. Updated annually and provided as a public service in print and electronic formats, SEER data are used by thousands of researchers, clinicians, public health officials, legislators, policymakers, community groups, and the public.

https://seer.cancer.gov

NCI SEER Registries



https://seer.cancer.gov/registries/

Cancer Facts and Statistics

The American Cancer Society projects the numbers of new cancer cases and deaths expected each year in order to estimate the contemporary cancer burden, because cancer incidence and mortality data lag 2 to 4 years behind the current year. In addition, the regularly updated Facts & Figures publications present the most current trends in cancer occurrence and survival, as well as information on symptoms, prevention, early detection and treatment.

Cancer Facts & Figures, Annual Reports

ACS has published Cancer Facts & Figures annually since 1951. This annual report provides the most current information about cancer. A unique feature of these publications is their projections of the number of cancer cases and deaths expected in each state and in the nation in the current year. These widely cited projections serve as a basis for research and are also readily understood by the public. Each edition of Cancer Facts & Figures includes a Special Section of in-depth focus on a specific cancer, group of cancers, or population.

Current Cancer Facts & Figures (PDF)

Current Statistics Article

News Story: Risk of Dying from Cancer Continues to Drop at an Accelerated Pace

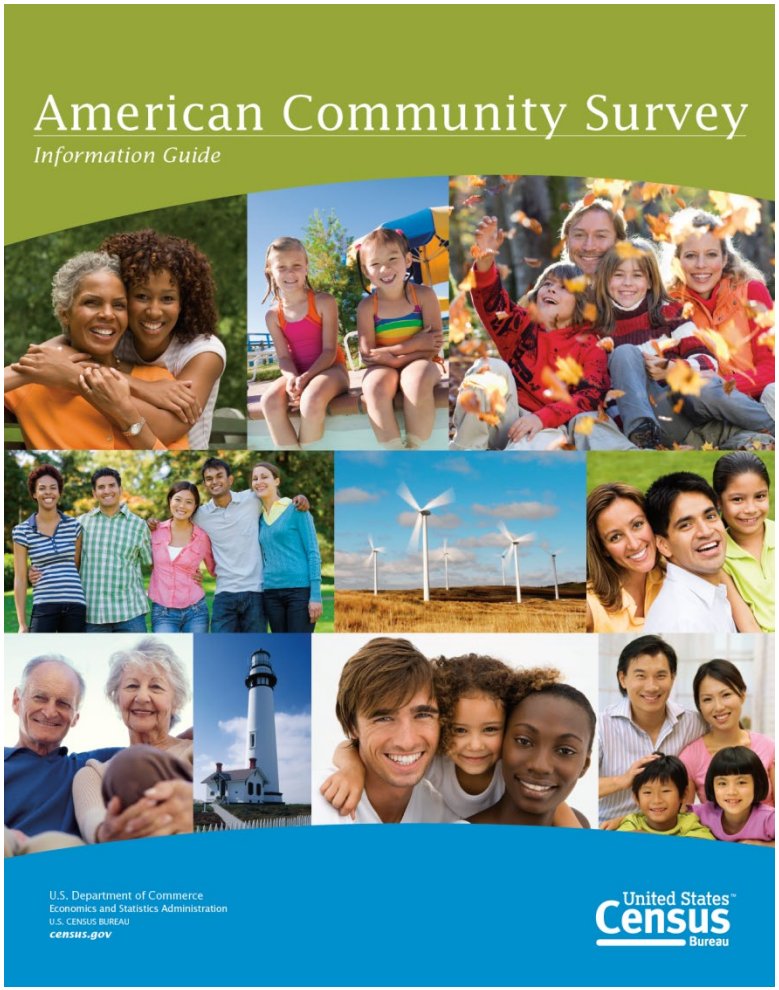
https://www.cancer.org/research/cancer-facts-statistics.html

Additional data needed for cancer control planning

Data type	Definition	Example
Vital statistics	Systematically tabulated information concerning births, marriages, divorces, separations and death based on registration of these vital events	Census data, National Death Index
Demographic data	Socioeconomic information expressed statistically, including employment, education, income, marriage rates, birth and death rates, and more.	American Community Survey
Data on health behaviors	Data on actions taken by individuals that impact their health, such as smoking, physical activity, diet, vaccinations, or being screened for certain types of cancer (e.g. colonoscopy, mammograms, Pap smears)	Behavioral Risk Factor Surveillance Survey (BRFSS)

American Community Survey

- Ongoing survey conducted by the US Census Bureau that provides data every year
- Gives communities the current information they need to plan investments and services
- Samples 3.5 million residences (approximately 1 in 38 US households) each year
- Respondents can complete the survey by paper, internet, telephone, or home visit



Types of data collected by the ACS

Social

- Ancestry
- Citizenship & Year of Entry
- Disability Status
- Educational Attainment
- Field of Degree
- Health Insurance
- Grandparents
- Fertility
- Language
- Marital Status & History
- Place of Birth
- Migration
- Relationship
- School Enrollment
- Veteran Status

Economic

- Employment & Work Status
- Income & Earnings
- Industry & Occupation
- Class of Worker
- Commuting
- Poverty Status
- SNAP Receipt

Demographic

- Age & Sex
- Race & Hispanic Origin

United States Census Bureau

Tables Maps Pages Microdata

Explore Census Data

Learn about America's People, Places, and Economy

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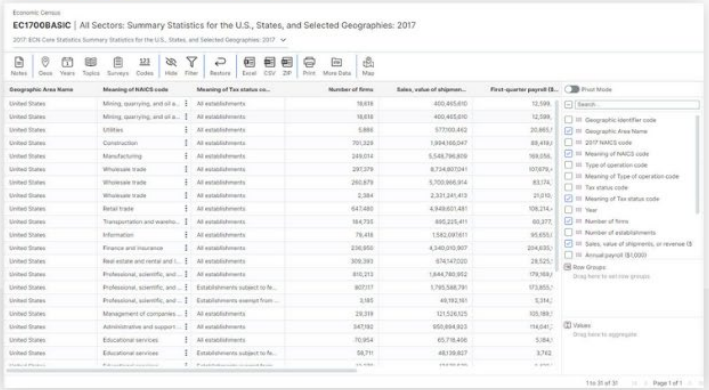
Try searching for poverty in Georgia in 2020

find tables



Explore the thousands of tables we have.
We are adding new tables every week.

Explore Tables

build maps

https://data.census.gov/cedsci/

CDC: Behavioral Risk Factors Surveillance System (BRFSS)

- Collects data on individual level behavioral risk factors from adults.
- First conducted in 1984, it is the largest continuously conducted health survey system in the world.
- Data collected at the state and local level in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and Palau.
- Primary conducted by computer-assisted telephone interviews (CATI) - landline, cell phone. Internet and mail contact for non-responders.
- More than 400,000 interviews are conducted each year
- Set of core questions that are asked each year.
- States can select from a panel of optional question modules.

BRFSS™

https://www.cdc.gov/brfss

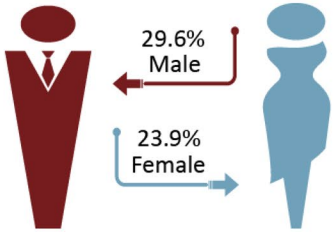
Colonoscopy

Calculated variable from
"Have you ever had a colonoscopy?" and
"How long has it been since you had this test?"

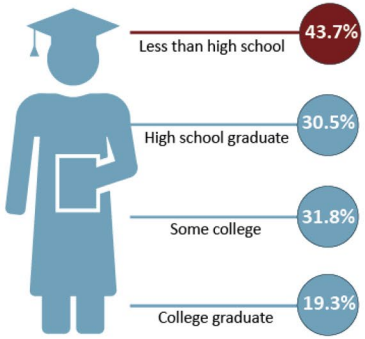
26.6%

District Adults Who Did Not have a Colonoscopy Within the Past 10 Years (Aged 50-75 Years) DC BRFSS 2020

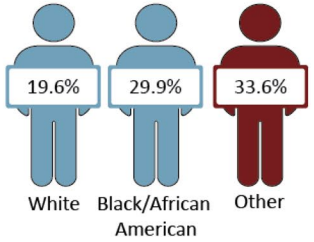
District Adults Aged 50-75 Years Old Who Did Not have a Colonoscopy Within the Past 10 Years by Gender
DC BRFSS 2020



District Adults Aged 50-75 Years Old Who Did Not have a Colonoscopy Within the Past 10 Years by Education
DC BRFSS 2020

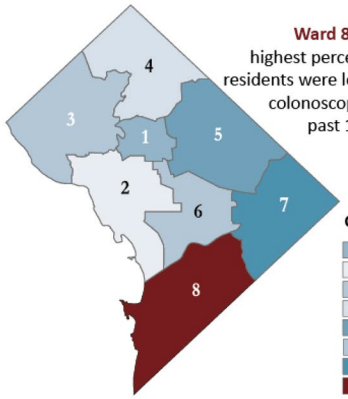


District Adults Aged 50-75 Years Old Who Did Not have a Colonoscopy Within the Past 10 Years by Race/Ethnicity
DC BRFSS 2020



Race/ethnic group Hispanic/Latino suppressed, RSC >3-%

District Adults Aged 50-75 Years Old Who Did Not have a Colonoscopy Within the Past 10 Years by Ward
DC BRFSS 2020



Ward 8 had the highest percentage of adult residents were less likely to have a colonoscopy within the past 10 years

Never Had Colonoscopy, 2020

Ward 1	24.9%
Ward 2	12.1%
Ward 3	23.5%
Ward 4	20.6%
Ward 5	29.7%
Ward 6	23.2%
Ward 7	32.4%
Ward 8	**34.1%**

District Adults Aged 50-75 Years Old Who Did Not have a Colonoscopy Within the Past 10 Years by Income Status
DC BRFSS 2020

DC BRFSS 2020
(DC Health)
https://dchealth.dc.gov/node/1593171

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

A-Z Index

Search

Advanced Search

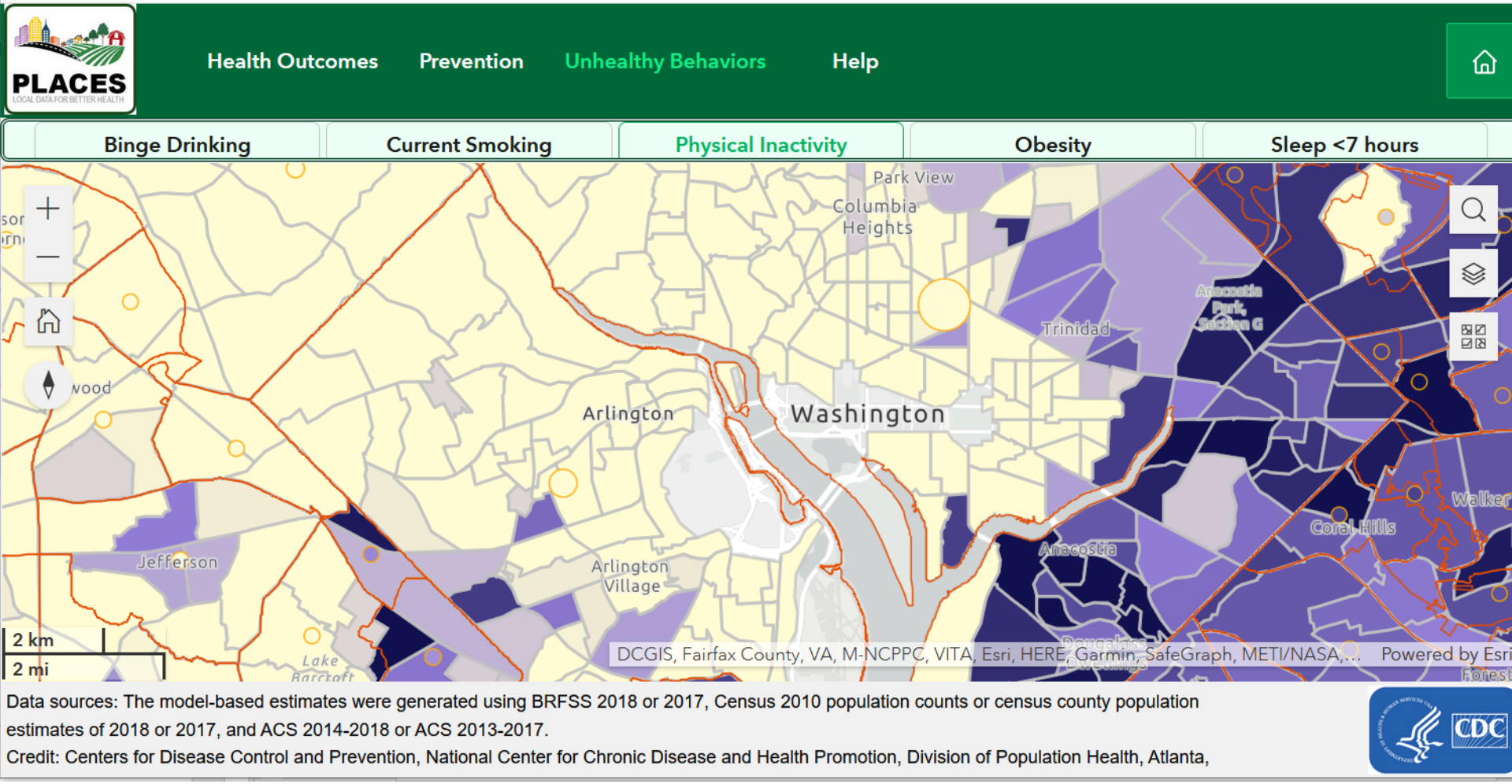
PLACES: Local Data for Better Health

The PLACES Project is a collaboration between CDC, the Robert Wood Johnson Foundation (RWJF), and the CDC Foundation (CDCF). PLACES will allow counties, places, and local health departments regardless of population size and urban-rural status to better understand the burden and geographic distribution of health-related outcomes in their jurisdictions and assist them in planning public health interventions.

Learn more about PLACES

PLACES is an extension of the original 500 Cities Project that provided city and census tract estimates for chronic disease risk factors, health outcomes, and clinical preventive services use for the 500 largest US cities. The PLACES Project provides model-based population-level analysis and community estimates to all counties, places (incorporated and census designated places), census tracts, and ZIP Code Tabulation Areas (ZCTAs) across the United States. See a Notice to Data Users and learn more about the PLACES Project.

https://www.cdc.gov/places/



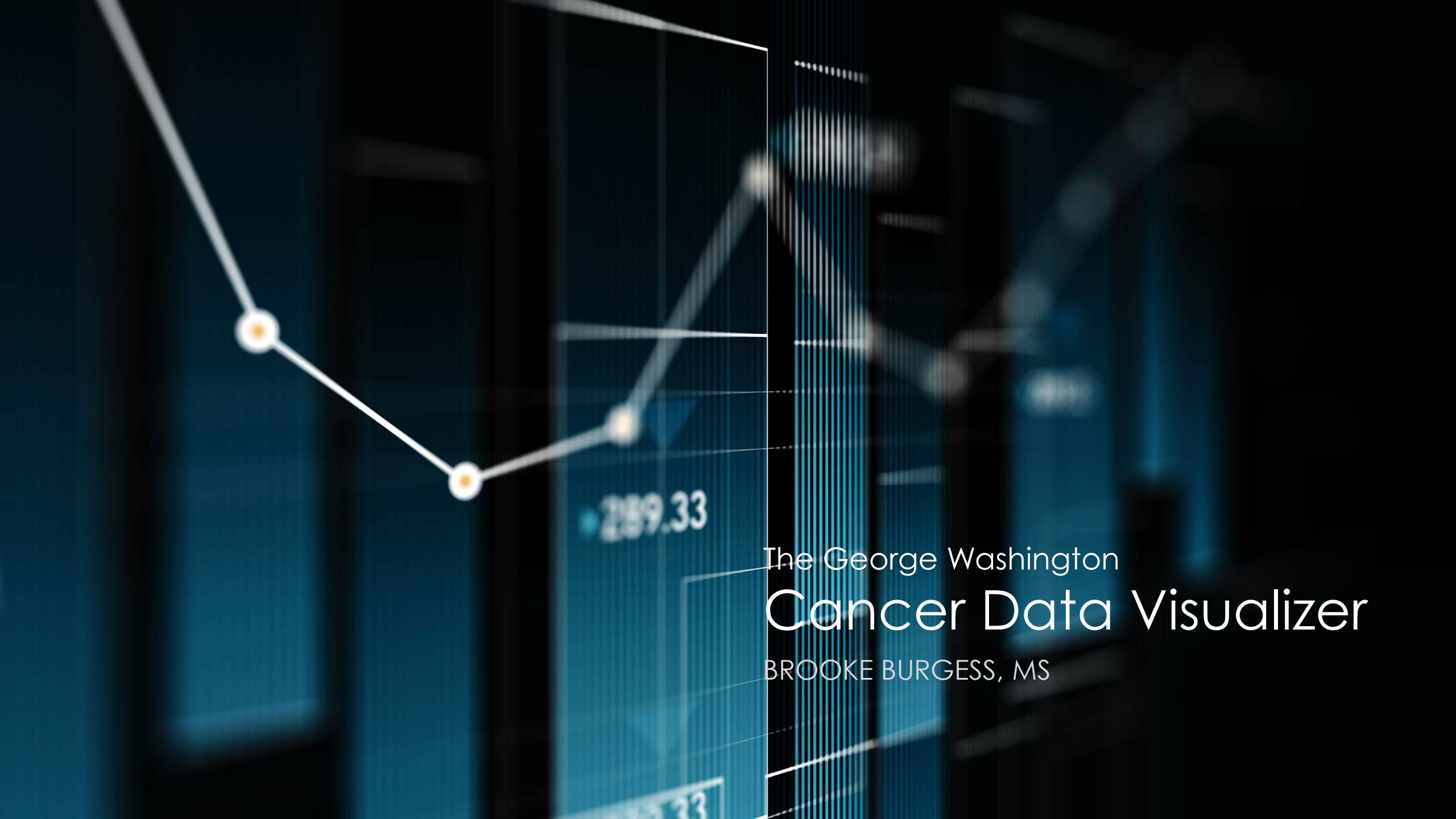
https://www.cdc.gov/places/

Putting it all together for the GW Cancer Center Catchment Area

Data visualization

Presentation of data/information visually, for example, by using charts, diagrams, figures pictures, or maps.

Commonly used data visualization software programs include: Tableau, ArcGIS, R Shiny



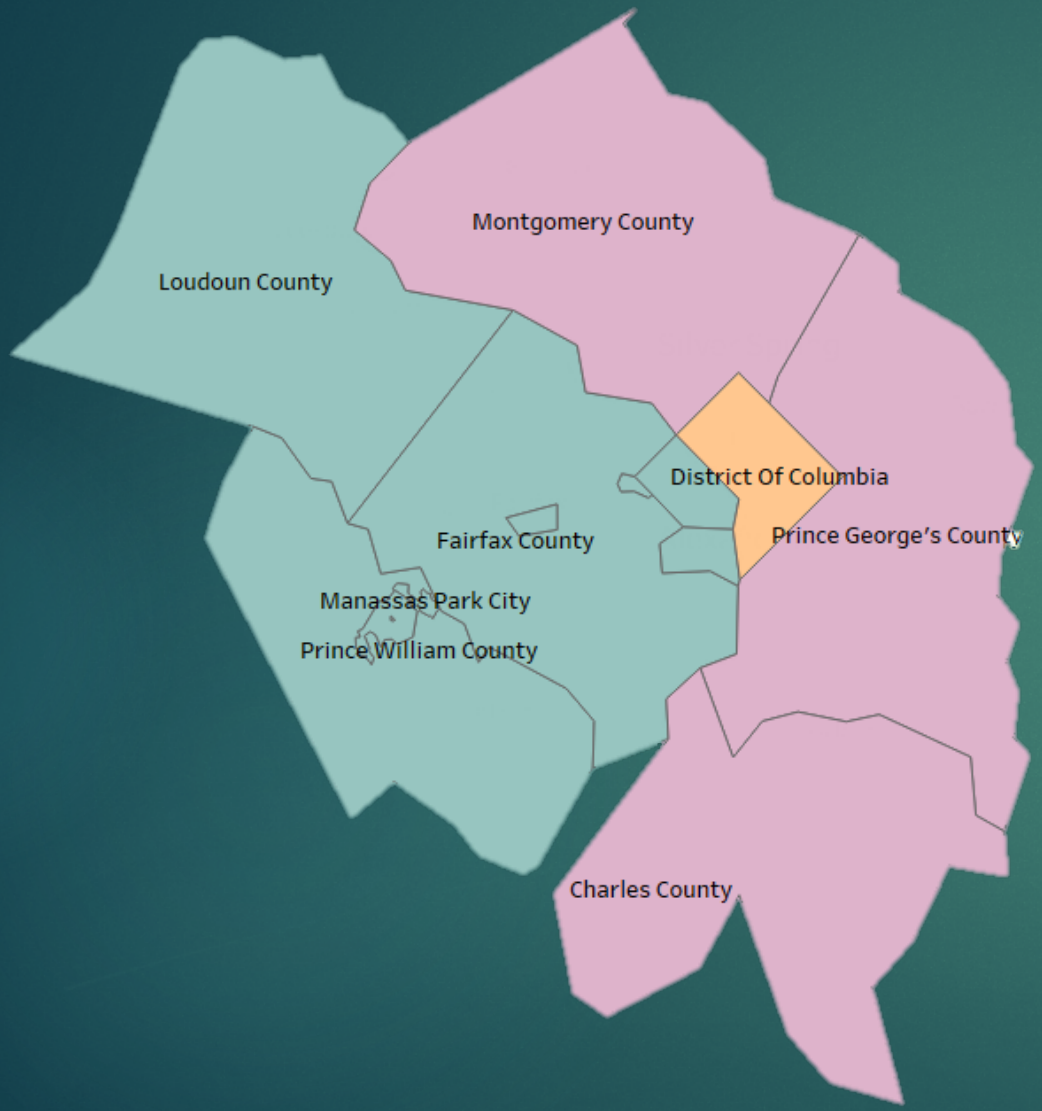
The George Washington

Cancer Data Visualizer

BROOKE BURGESS, MS

NCI GIS Portal for Cancer Research

Why create a new cancer visualizer?



- GW catchment area spans across DC, Virginia and Maryland
- Ability to use multiple data sources and customize for our needs
- Makes it easier for our researchers to identify disparities

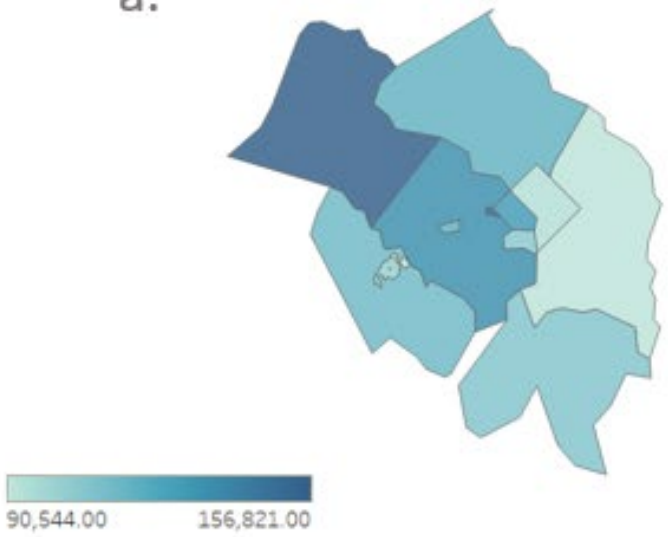

#1
Define Catchment Area
#2
Data Collection
Web scrape publically available datasets for data within catchment area
#3
Data Manipulation
Organize and format data for readability
#4
Create Data Visualization Tool
Build interactive maps and graphs in Tableau
#5
Catchment Area Analysis

NCI Programs That Address Disparities in Cancer Prevention and Care

- NCORP
- CRCHD
- PACHE
- GMaP

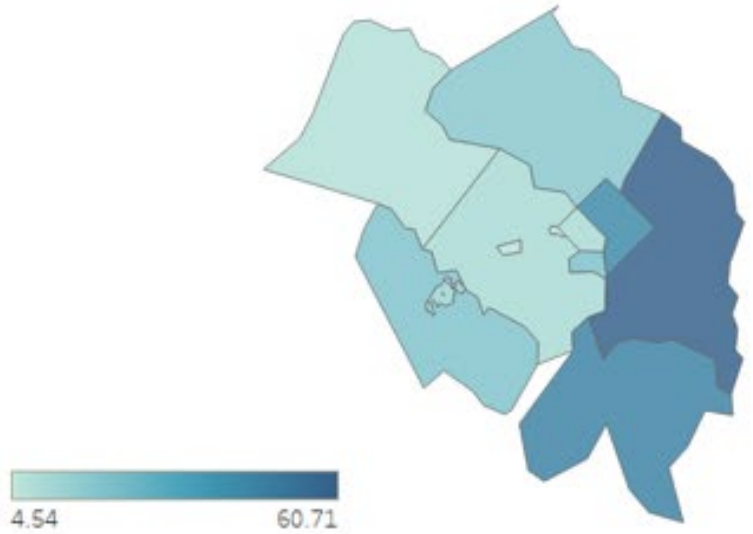
Median Household Income

a.



Black Population

b.



Poor Overall Health

c.

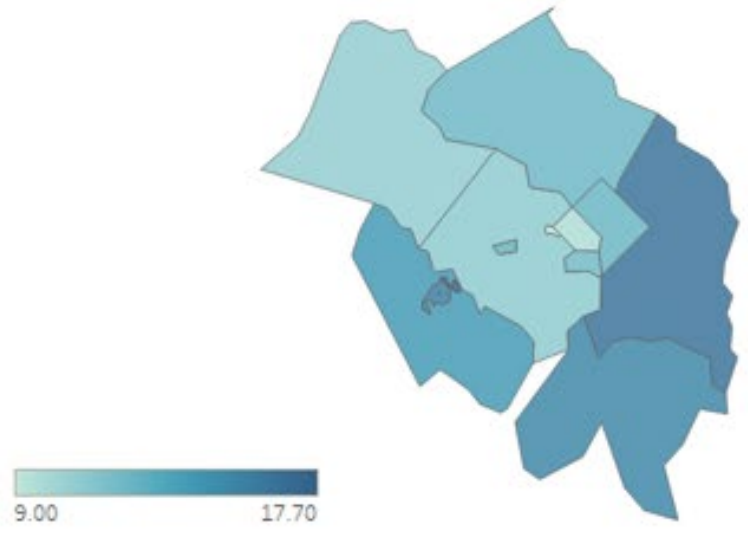


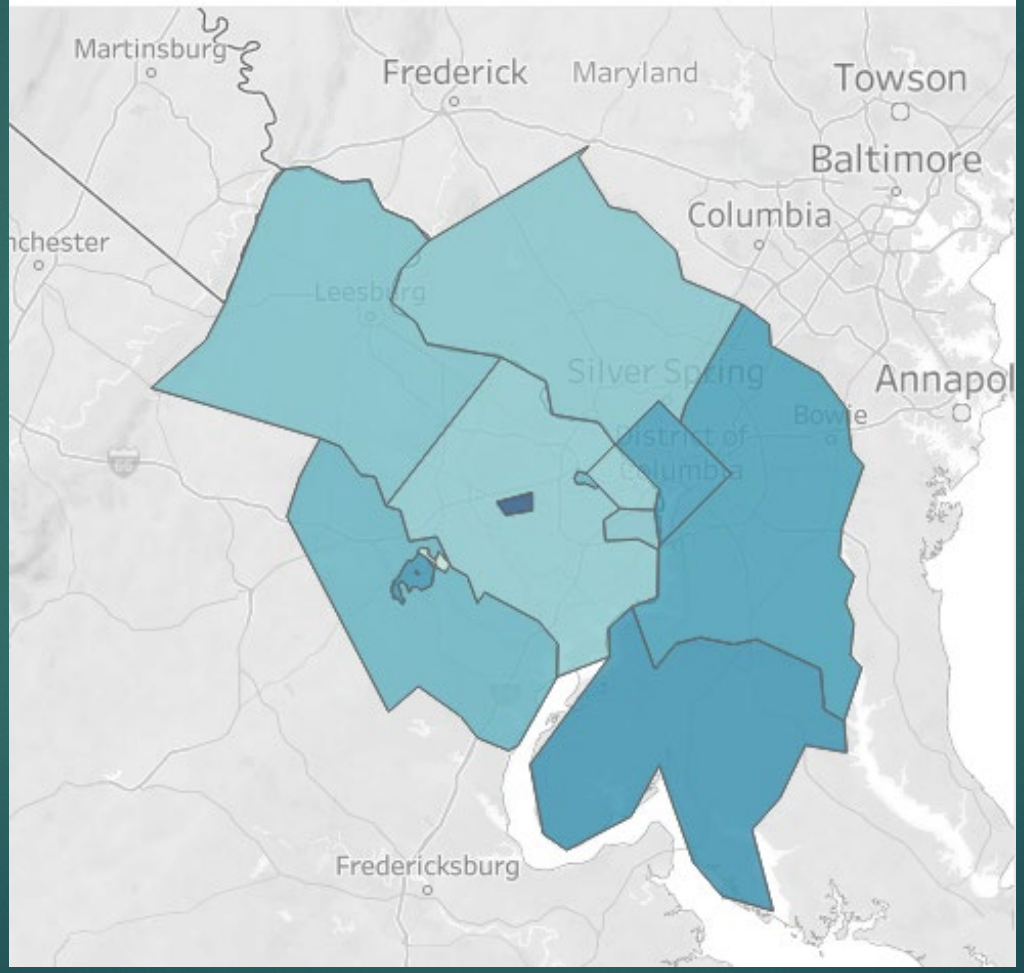
Figure 2. Residents in Northwest counties have a predominately-higher median household income (a). Residents in Southeast counties have a higher percent of population identifying as Black (b) and a higher number of adults who report having poor overall health (c).

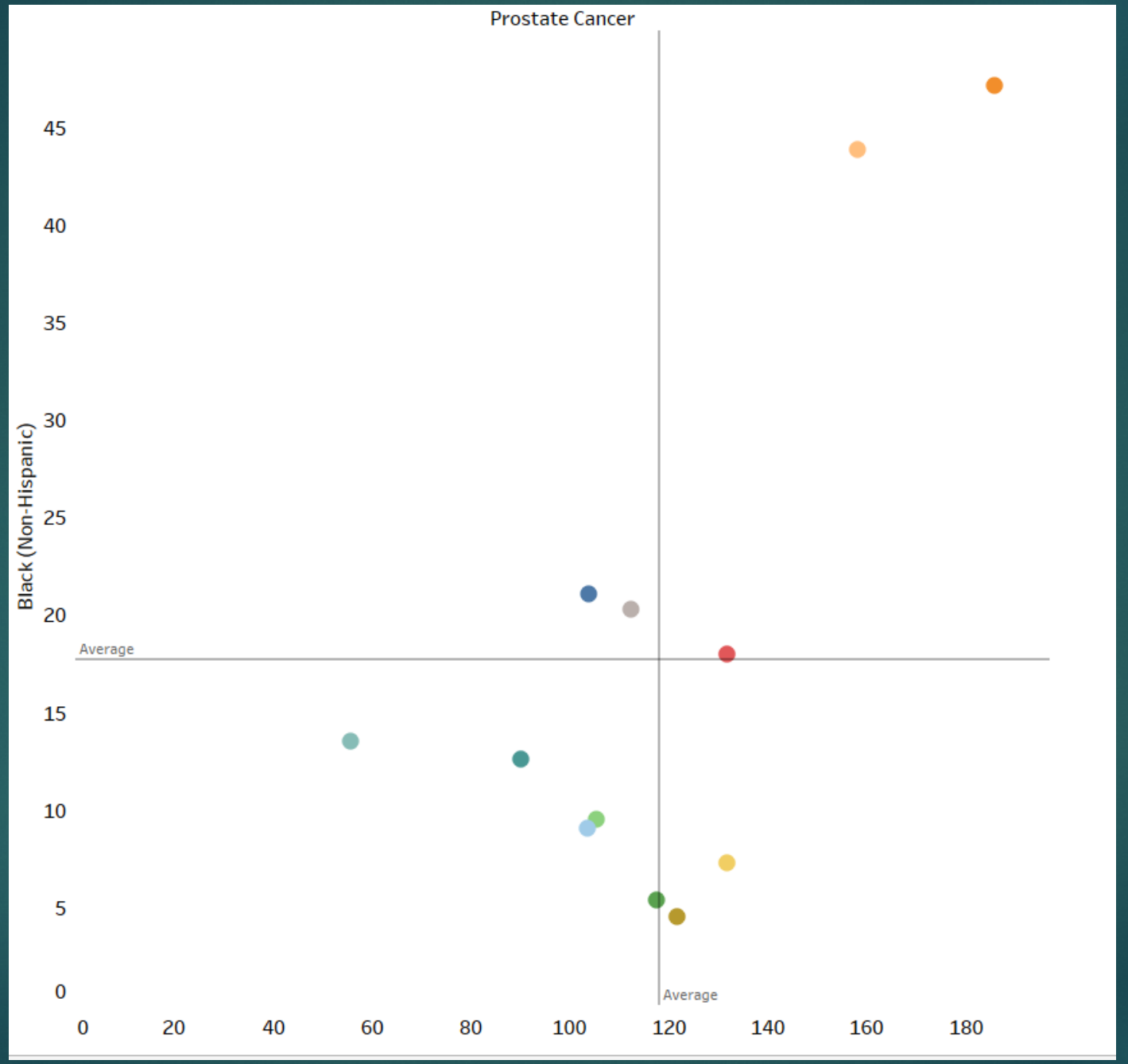
Mortality

Age Adjusted Rate (per 100k)

Cancer mortality rates represent the number of cancer deaths per 100,000 people.

Data Source: State Cancer Profiles (SCP) (2016-2020)




Prostate Cancer
Black (Non-Hispanic)
45
40
35
30
25
20
15
10
5
0
Average
Average
0
20
40
60
80
100
120
140
160
180
County
Alexandria City
Arlington County
Charles County
District of Columbia
Fairfax City
Fairfax County
Falls Church City
Loudoun County
Manassas City
Manassas Park City
Montgomery County
Prince William County