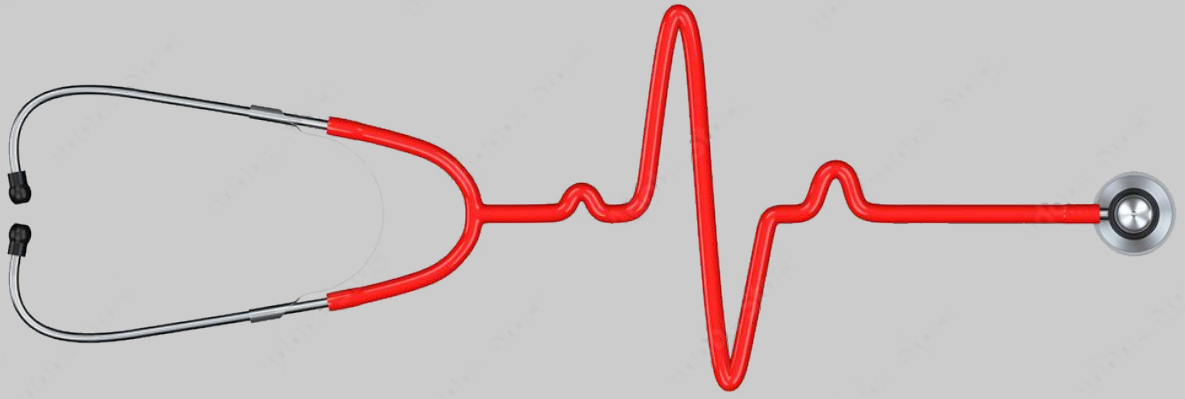


Stroke Mortality Predictor

University of Minnesota Data Visualization and Analytics Boot Camp

Team 2 — Janice Courtois, Alex Norgren, Tom Pankratz, Rachel Rautenberg

June 9, 2022

Team 2

Team 2 members all work at Mayo Clinic.

Janice Courtois

- Works in Healthcare Technology Management
- Lives on horse ranch
- Travels often to visit kids & grandson

Alex Norgren

- Works in a Lab
- Enjoys to golf

Tom Pankratz

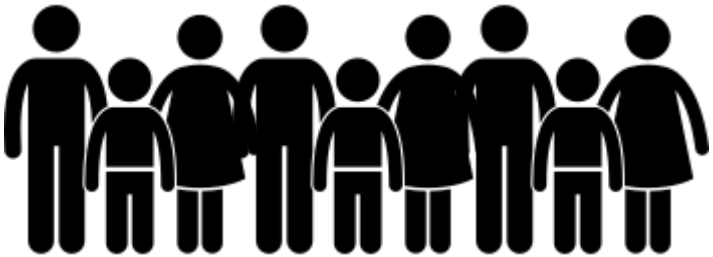
- 19 years at Mayo Clinic
- Manages a digital experimentation team
- Dad of 4

Rachel Rautenberg

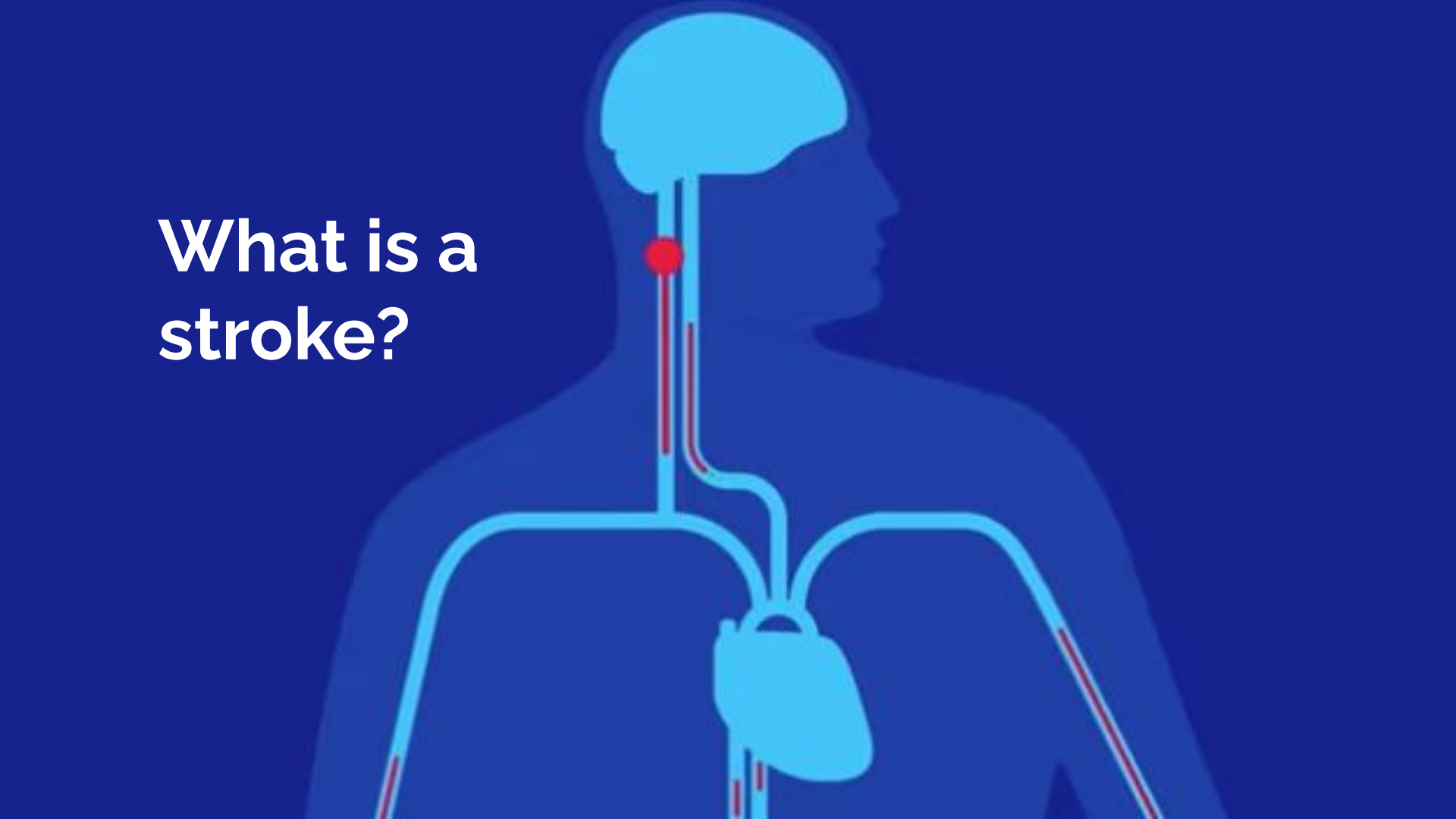
- Holds MHA
- 14 years at Mayo
- Mom of 4
- Enjoys the chaos

Topic: Stroke mortality

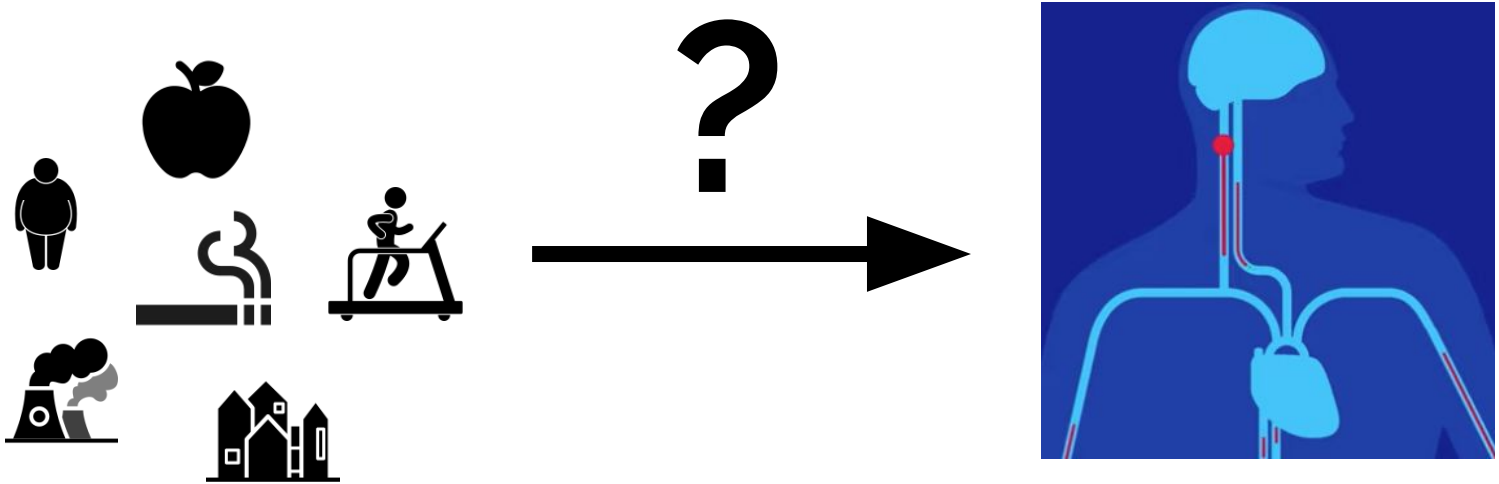
MAYO CLINIC



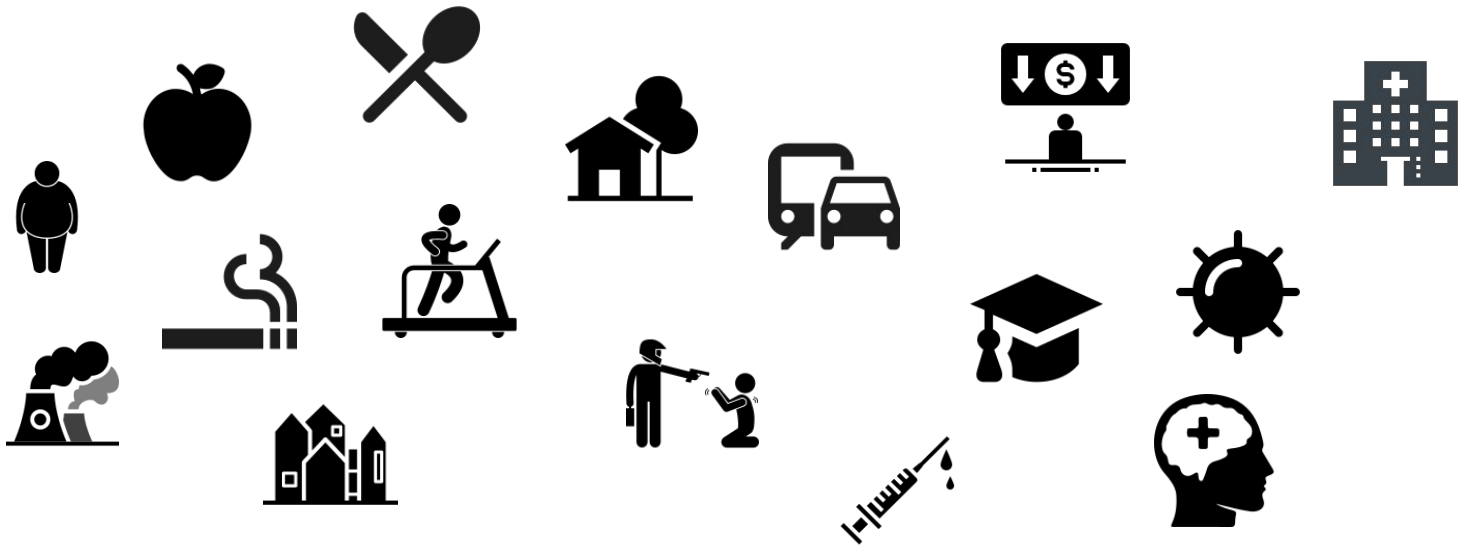
What is a stroke?



Goal of project & questions?



Brainstorming possible factors



Factors we landed on

Health-related:

- Smoking
- Obesity
- Access to healthy foods
- Access to exercise opportunities
- Primary care availability
- Availability of mental health providers

Social-related:

- College education
- Unemployment
- Income
- Violent crime rate
- Air pollution
- Length and type of commute to work
- Urban vs. rural

Source data

Stroke Mortality Data Among US Adults (35+) by State/Territory and County (2018)

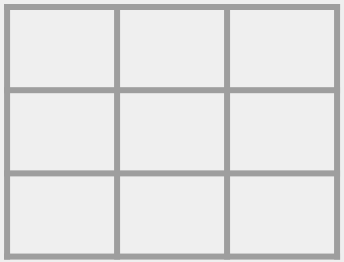
County Health Rankings (2018)

Data exploration and integration

Target: Stroke mortality dataset

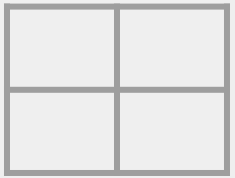
20 columns

59,094 rows



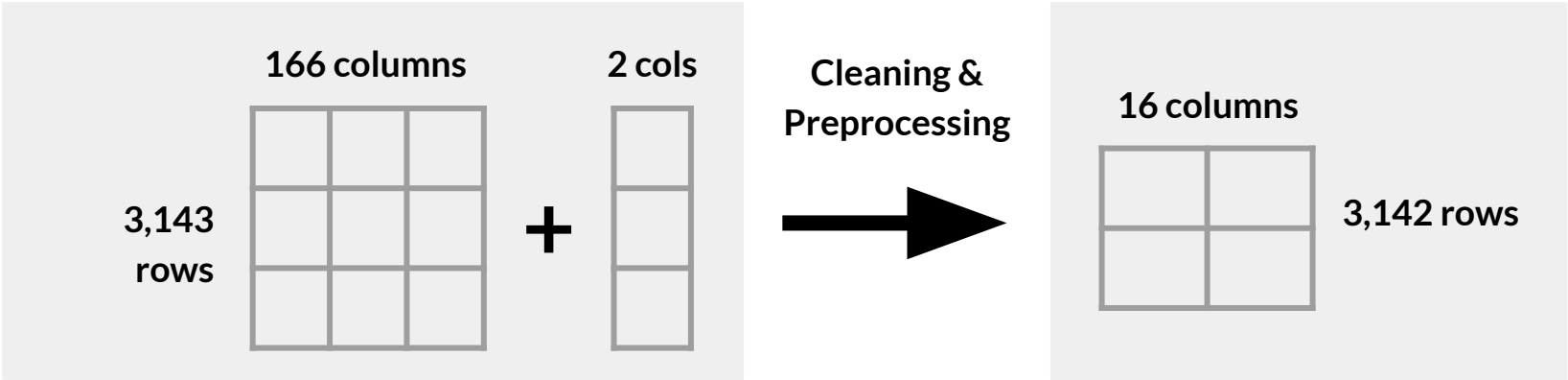
Cleaning &
Preprocessing

2 columns



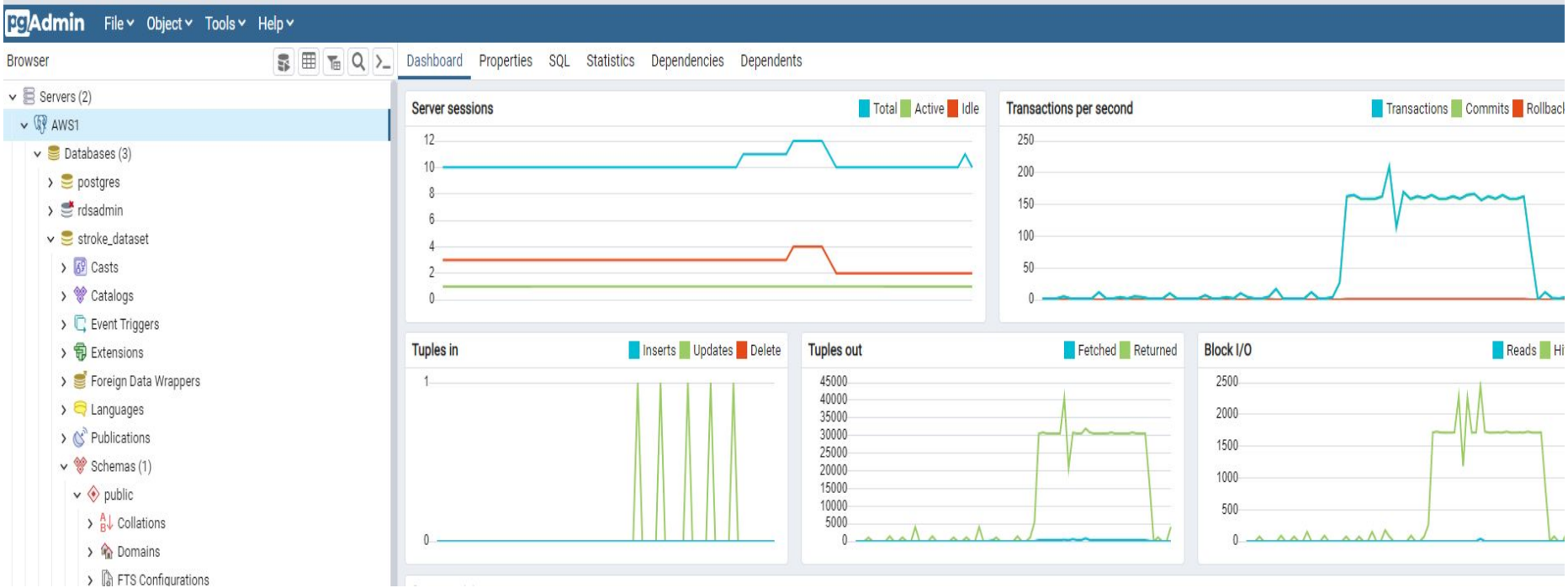
3,142 rows

Features: Health rankings datasets



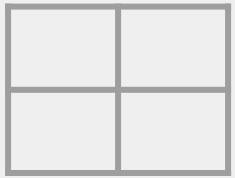
Establish Connection to Database

View of live connection via AWS



Datasets merge via PostgreSQL

2 columns

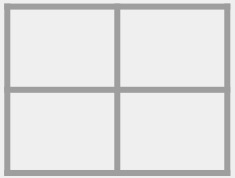


3,142 rows

Stroke Mortality Dataset

+

16 columns

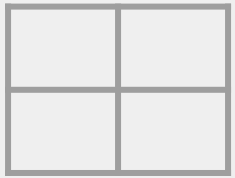


3,142 rows

Health Rankings Dataset

→

17 columns



3,142 rows

Clean Dataset

Ready for Machine Learning!

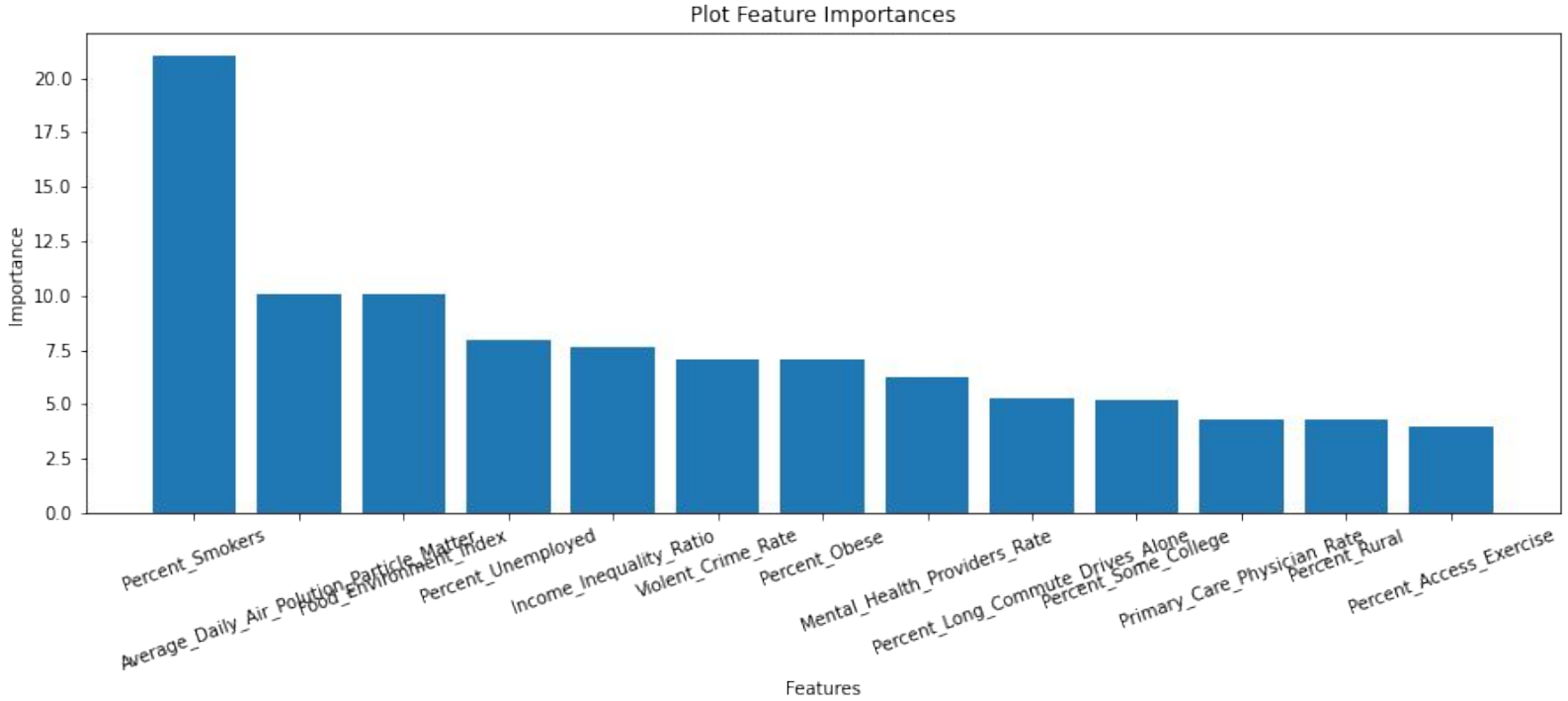
Exploring for Machine Learning

- Decide prediction target
- Research & decide machine learning model
- Build machine learning model

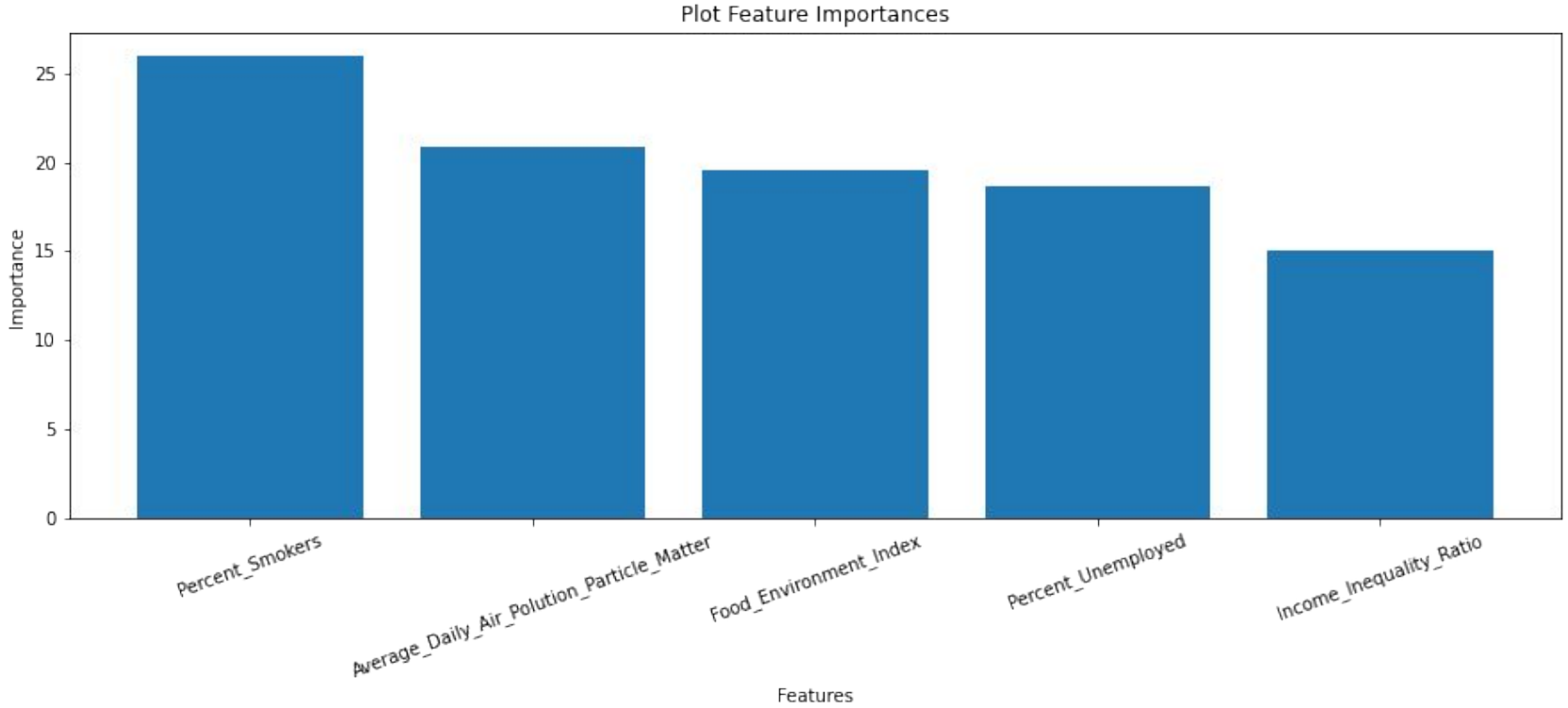
Machine Learning

- Training & testing split
- Optimization

Model importances



Model importances: Top 5



Results

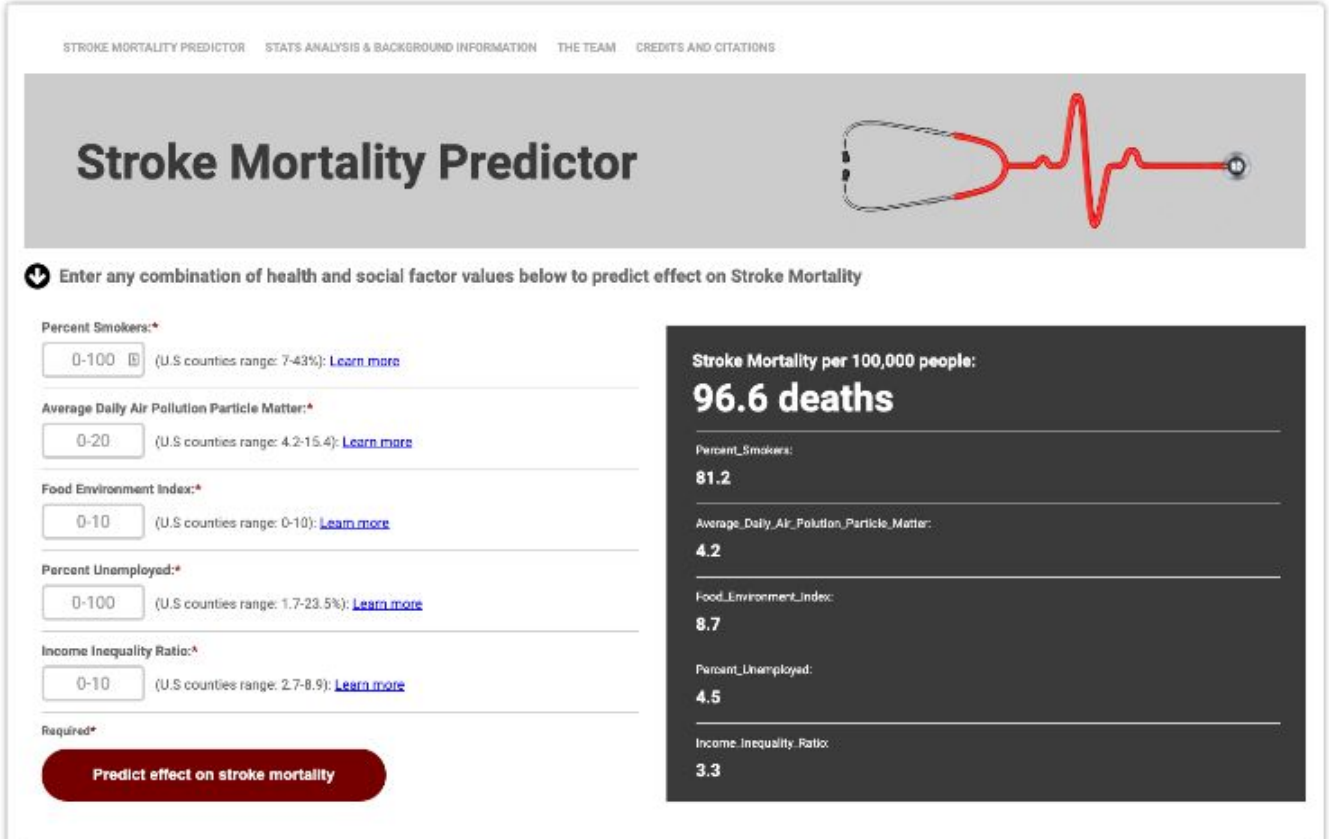
Did the model work?

- All data : *12.13*
- Health features: *13.12*
- Economic/Environmental Features: *13.21*

Model output and usage

Question: Could we input variations of the feature data to determine what sort of effect it would have on stroke mortality?

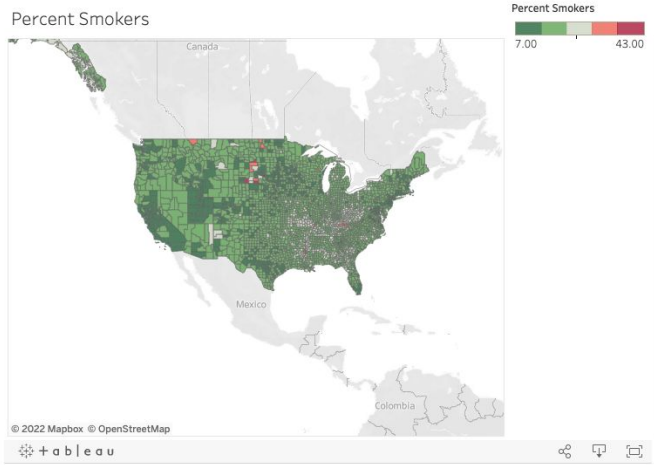
The stroke mortality predictor form



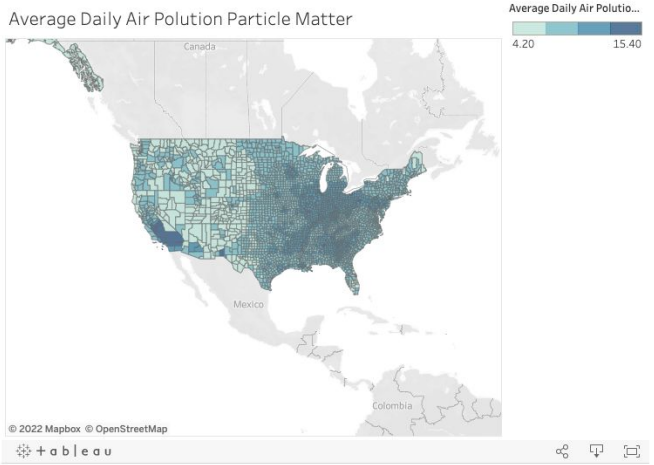
Features data maps dashboard

Factors that could correlate with Stroke Mortality rates

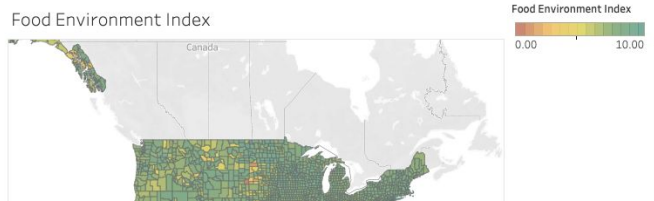
Percent Smokers: Get details from County Health Rankings & Roadmaps



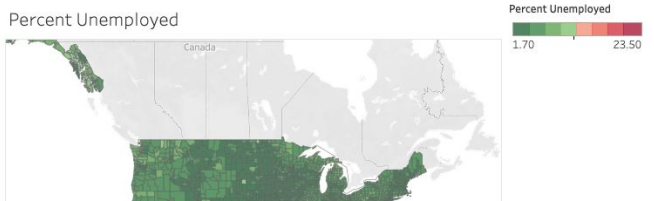
Average Daily Air Polution Particle Matter: Get details from County Health Rankings & Roadmaps



Food Environment Index: Get details from County Health Rankings & Roadmaps



Percent Unemployed: Get details from County Health Rankings & Roadmaps



Result of analysis

- Results following model inputs
- Recommendation for future analysis
- What could we have done differently?

Results

Percent Smokers appeared to have the largest impact on stroke mortality, but beyond that, it was difficult to determine impacts from the other features. It was likely less a matter of machine learning model choice, and more a matter of the choice of features/factors.

Recommendations

Choose features/factors that have already been determined by the health care community to have a larger impact on predicting stroke mortality, as a starting point, and explore the effect of entering lower and higher values. According to Mayo Clinic.org, here are several:

- Physical inactivity
- Heavy or binge drinking
- Use of illegal drugs such as cocaine and methamphetamine
- High blood pressure
- Cigarette smoking or secondhand smoke exposure
- High cholesterol
- Diabetes

Questions?