# Cognitive Decline Predictors Project

Elena Svirko

https://www.linkedin.com/in/elena-svirko/

https://github.com/ElenaSvirko/Cognitive_Decline_Predictors_Project

Email : elena.y.svirko@gmail.com

# Cognitive Decline Predictors

This project analyzes data from the Behavioral Risk Factor Surveillance System (BRFSS) to explore factors associated with cognitive decline in adults aged 50 and older, focusing on lifestyle behaviors like physical inactivity and smoking.

Objectives

- Identify actionable factors that could help prevent or slow the onset of cognitive decline symptoms and improve general health.

- Explore how these factor differ across the US.

- Investigate how these factors have changed over time.

Methods & Tools

- Data Wrangling & Cleaning (Python - Pandas, NumPy, Excel).

- Data Analysis (Python - Scikit-learn, Statsmodels).

- Visualization & Reporting (Tableau, Seaborn, Matplotlib, Folium).

- Data Source: U.S. Centers for Disease Control and Prevention (CDC).

# Predictor Correlation Matrix



Cognitive decline and other factors correlation matrix
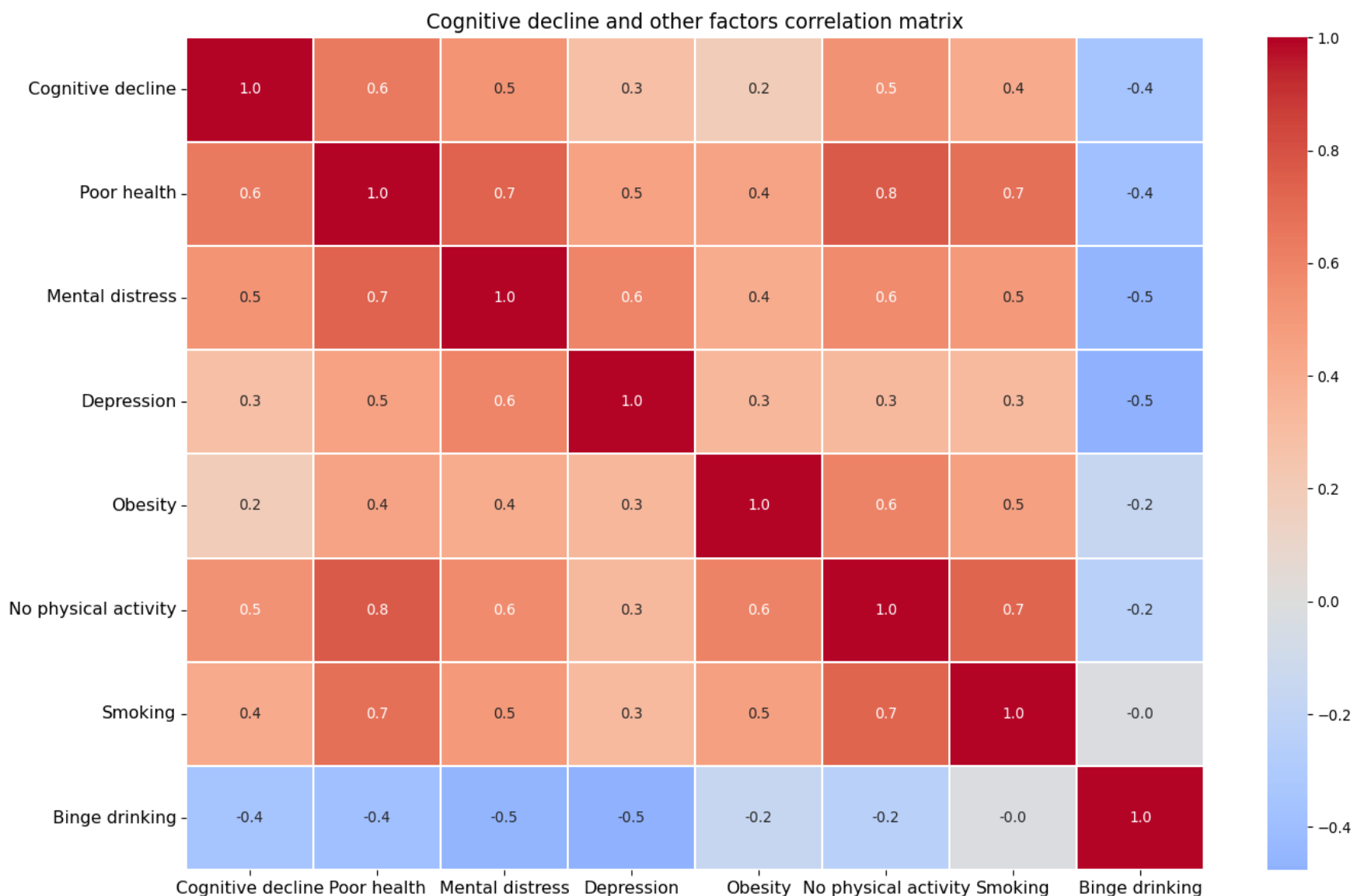
Cognitive decline is moderately positively correlated with:

- Poor overall health
- Frequent mental distress
- **Lack of leisure-time physical activity**
- **Smoking**

Interconnections:

- Strong correlations between poor health, mental distress, and physical inactivity
- Smoking is highly correlated with both poor health and lack of exercise

These relationships are likely to be bidirectional. From previous research and logically, it is likely that reducing inactivity and smoking will help with cognitive decline as well as other factors highly related to them.

# Where to direct intervention efforts?



No physical activity (mean)
19.74 — 39.95
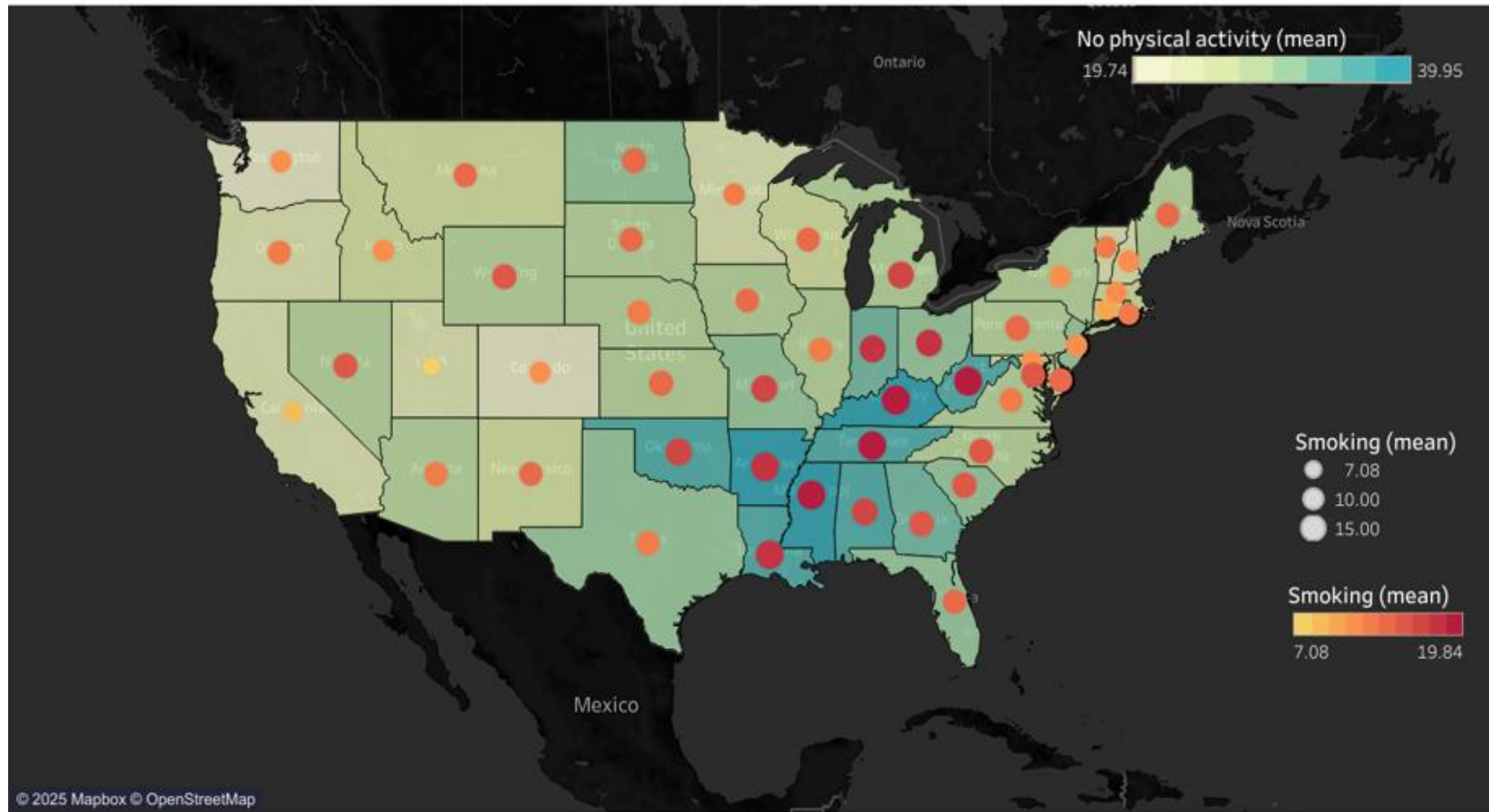
10 States with highest % of older adults reporting lack of leisure-time physical activity:

Mississippi
Kentucky
Arkansas
West Virginia
Oklahoma
Alabama
Louisiana
Tennessee
Indiana
Georgia

10 States with highest % of older adults smoking:

Kentucky
Tennessee
West Virginia
Mississippi
Louisiana
Arkansas
Indiana
Ohio
Oklahoma
Missouri

Smoking (mean)
○ 7.08
○ 10.00
○ 15.00

Smoking (mean)
7.08 — 19.84

Mississippi, Kentucky, Arkansas, West Virginia, Oklahoma, Louisiana and Tennessee are on both lists, so are most in need of targeted interventions.

© 2025 Mapbox © OpenStreetMap

Median % of adults who reported no physical activity showed some fluctuations over the years but not overall trend.

Median % of current smokers has shown a consistent gradual decline after 2011.

Conclusion: While the percentage of adults who smoke seems to be steadily decreasing, lack of physical activity remains a persistent problem in the USA with no signs of improvement.

- BRFSS data for adults in the USA years 2005-2023
- Factors:
  o *During the past month, did you participate in any physical activities: NO*
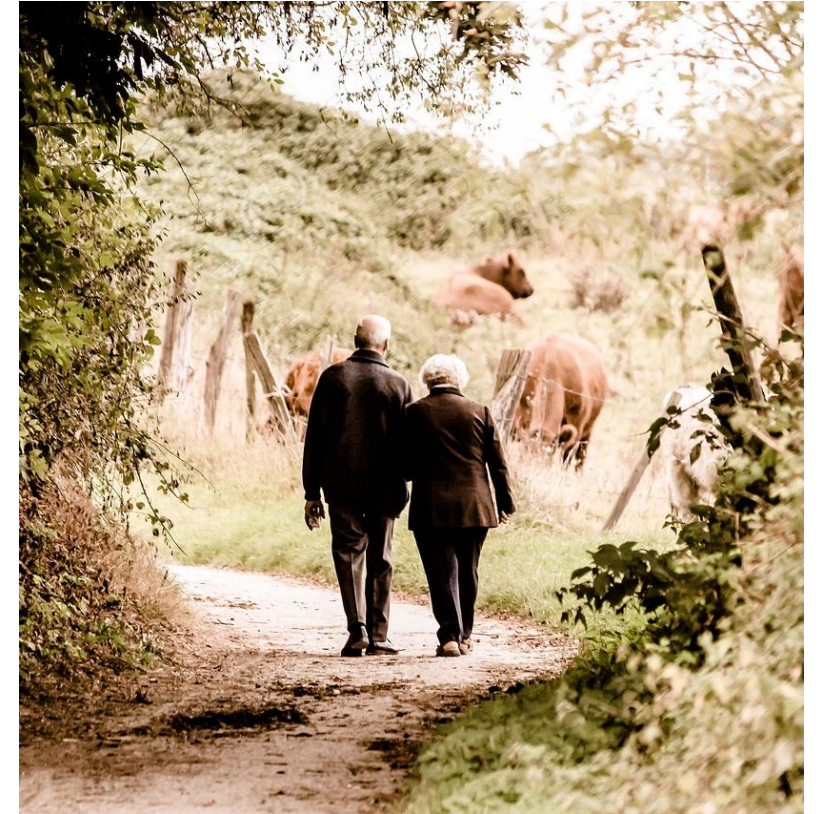  o *Adults who are current smokers: YES*
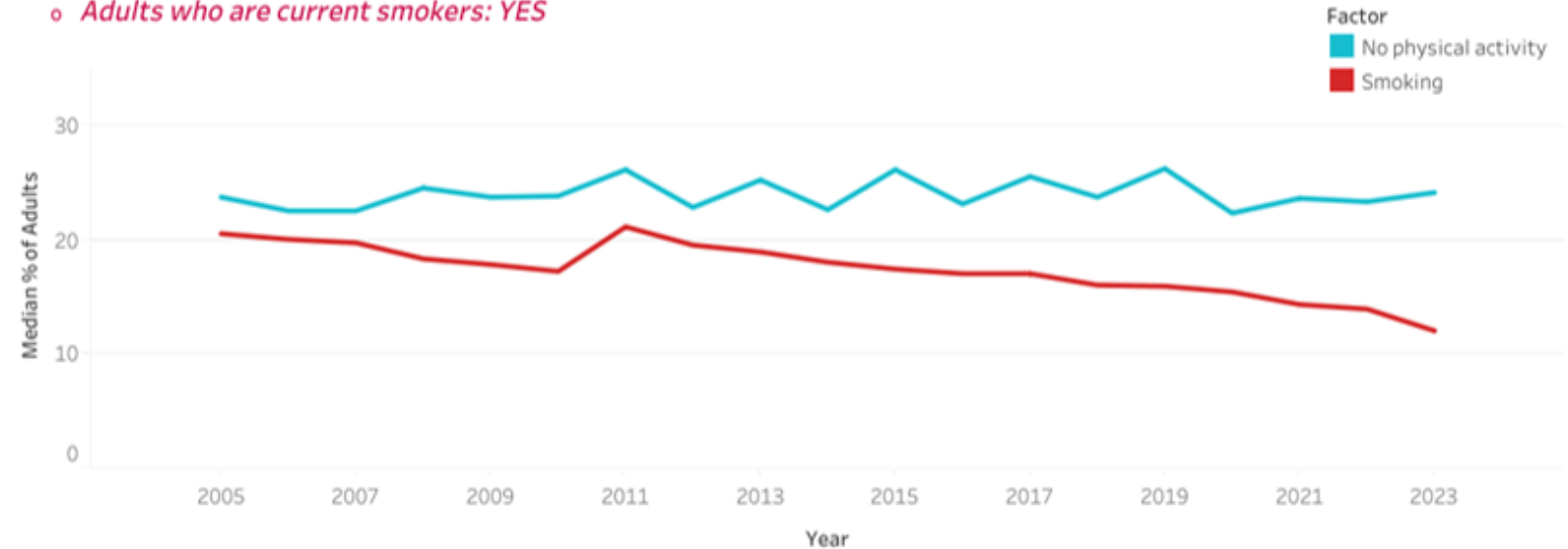


# Is smoking and lack of physical activity a persistent problem?

**Conclusion:**

Increasing physical activity and reducing smoking is likely to improve cognitive health in older adults and have a positive impact on their physical overall health.

**Recommendations & Next Steps**

- **Public Health Interventions:**
  - Promote physical activity through community programs and senior-friendly exercise classes.
  - Expand smoking cessation resources and counseling.
  - Integrate support into healthcare and community settings.

- **Policy & Environment:**
  - Support tobacco control policies.
  - Promote active living through community design and incentives.

- **Ongoing Evaluation:**
  - Track progress and adapt programs to ensure effectiveness and equity.

# Cognitive Decline Predictors