

DR. SERGEY KHRAPAK

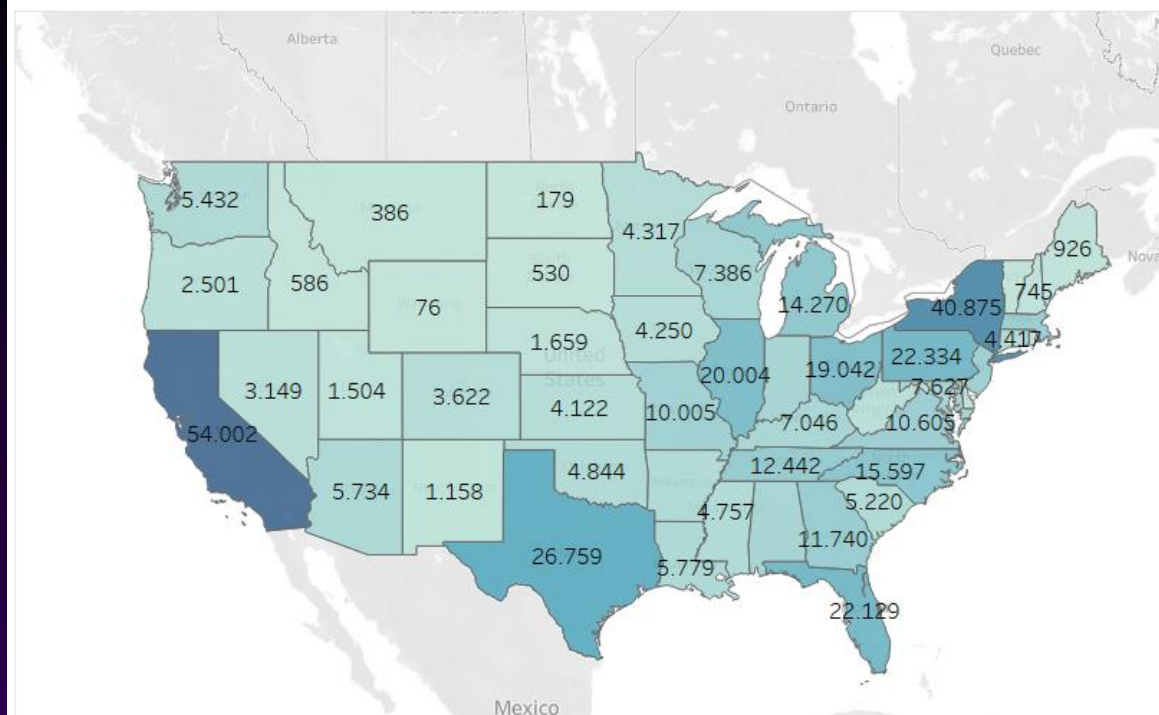
CASE STUDY: INFLUENZA IS COMING

1. INFLUENZA SEASON

- GOAL: To help a medical staffing agency that provides temporary workers to clinics and hospitals on an as-needed basis. The analysis will help plan for influenza season, a time when additional staff are in high demand.
- MOTIVATION: The United States has an influenza season where more people than usual suffer from the flu. Some people, particularly those in vulnerable populations, develop serious complications and end up in the hospital. Hospitals and clinics need additional staff to adequately treat these extra patients. The medical staffing agency provides this temporary staff.
- OBJECTIVE: Determine when to send staff, and how many, to each state.
- DATA: Influenza death geography (CDC), population data (US census)
- TOOLS: Excel and Tableau

DEATHS BY STATE

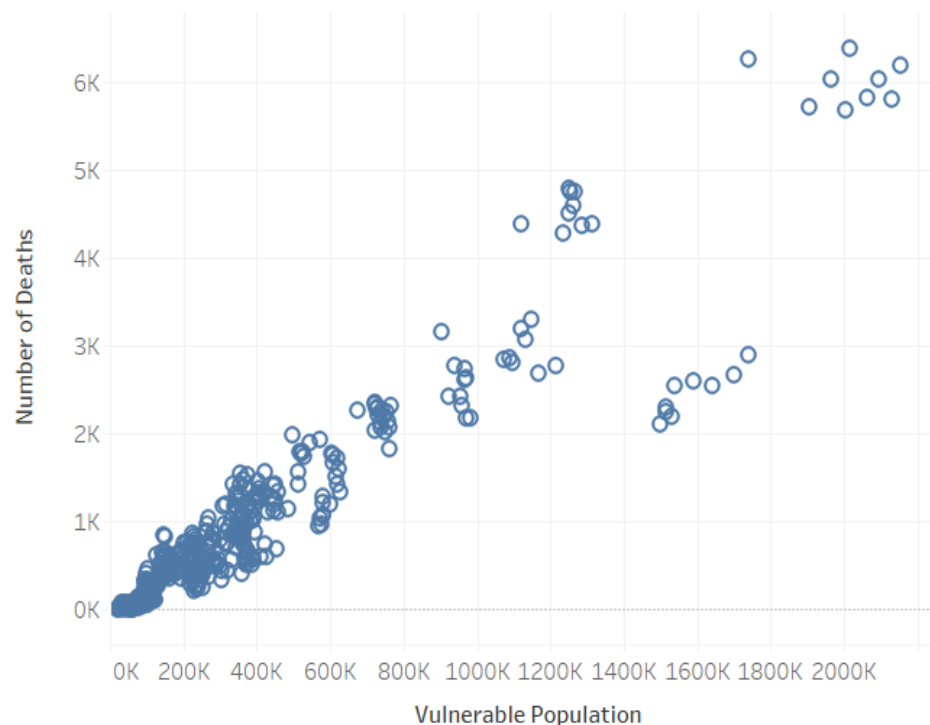
Deaths are unequally distributed over states



- The absolute number of deaths is a characteristic of influenza severity
- The population (especially vulnerable) varies significantly from state to state
- Is there a better metric?

RELATIVE DEATH RATE (RDR)

Correlations between influenza deaths and vulnerable population



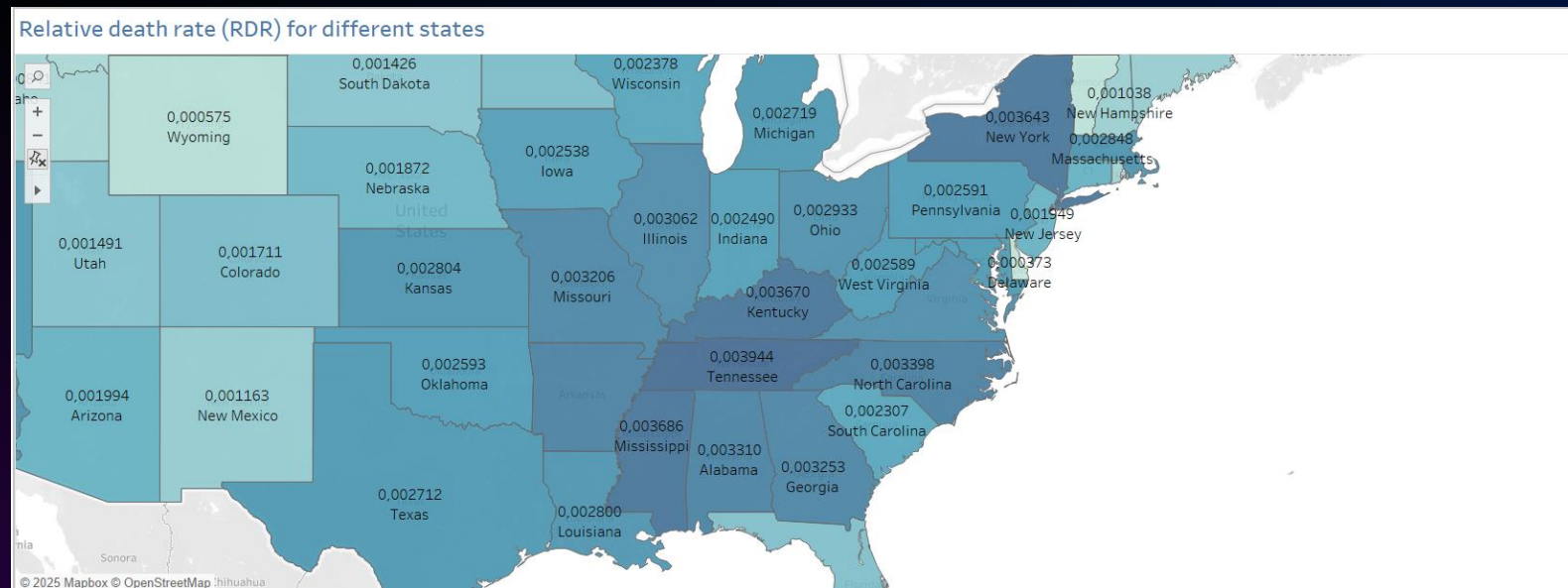
- The number of deaths is strongly correlated with the vulnerable population (75 + years)
- Relative death rate (RDR) can be defined as the number of deaths divided by the size of vulnerable population
- It is this RDR index that can be used to identify problematic states

STATES WITH HIGHEST RDR

12 States with the highest RDR

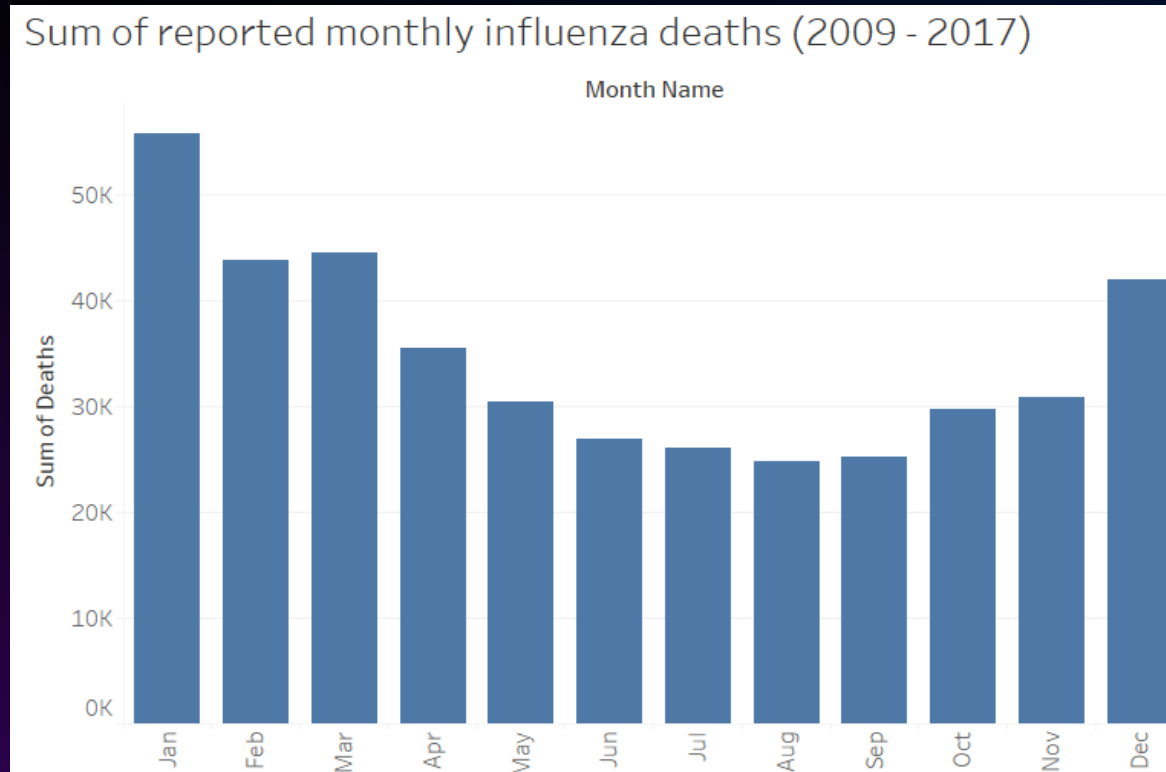
Tennessee 0,0039443	New York 0,0036433	Georgia 0,0032531	Missouri 0,0032059
Mississippi 0,0036859	North Carolina 0,0033983	Illinois 0,0030615	Virginia 0,0030097
Kentucky 0,0036700	Arkansas 0,0033520	California 0,0030022	
	Alabama 0,0033104		

WHERE TO SEND



- A cluster of states with high RDR can be identified: Tennessee, Mississippi, Kentucky, North Carolina, Arkansas, and Alabama + New York (RDR > 0.0033)
- The staff can be easily redistributed among the states according to the needs due to their closeness

WHEN TO SEND



- The highest number of deaths in winter period Dec - Mar and the lowest in summer period Jul - Sep
- From this it can be expected that the additional medical staff would be most helpful in the Oct - Apr period

COMMENTS & RECOMMENDATIONS

- Relative Death Rate (RDR) is a useful metric of influenza severity
- Highest RDR values are recorded for the following states: Tennessee, Mississippi, Kentucky, New York, North Carolina, and Arkansas
- This is where the additional staff is expected to be in high demand
- It is recommended to send the staff in the period from October to April, when highest influenza death numbers are detected

THANK YOU

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<https://github.com/skhrapak>