

JULY 30, 2023

PREPARING FOR INFLUENZA SEASON:

INTERIM REPORT

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PROJECT OVERVIEW

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.

SCOPE

The agency covers all hospitals in each of the 50 states of the United States, and the project will plan for the upcoming influenza season.

HYPOTHESIS

If the proportion of age under 5 or age over 65 increases among influenza patients, then the influenza mortality rate will also increase.

DATA OVERVIEW & LIMITATION

POPULATION DATA BY GEOGRAPHY

- SOURCE: US Census Bureau
- CONTENT: This data shows the total population of the US from 2009 to 2017 in terms of state and county. The total population is categorized as male and female, and it consists of 17 age groups from 0 to 84 years old in five-year, plus the group of 85 years old or older.
- LIMITATION
 - INACCURACIES: There are possibilities of errors in this dataset because it is collected by survey through mail or phone.
 - TIME LAG: This data is collected every 10 years.

INFLUENZA DEATHS BY GEOGRAPHY, TIME, AGE, AND GENDER

- SOURCE: CDC, centers for disease control and prevention
- CONTENT: This data shows the number of influenza death in the US from 2009 to 2017 in terms of state by monthly. It consists of 8 age groups from 5 to 84 years old in ten-year, plus the group of under 1, 1 to 4, and over 85 years old.
- LIMITATION
 - INACCURACIES: There are possibilities of errors in this dataset because more than 80% of 'Suppressed' in the column, 'Deaths' which is a key variable of this dataset.

DESCRIPTIVE ANALYSIS

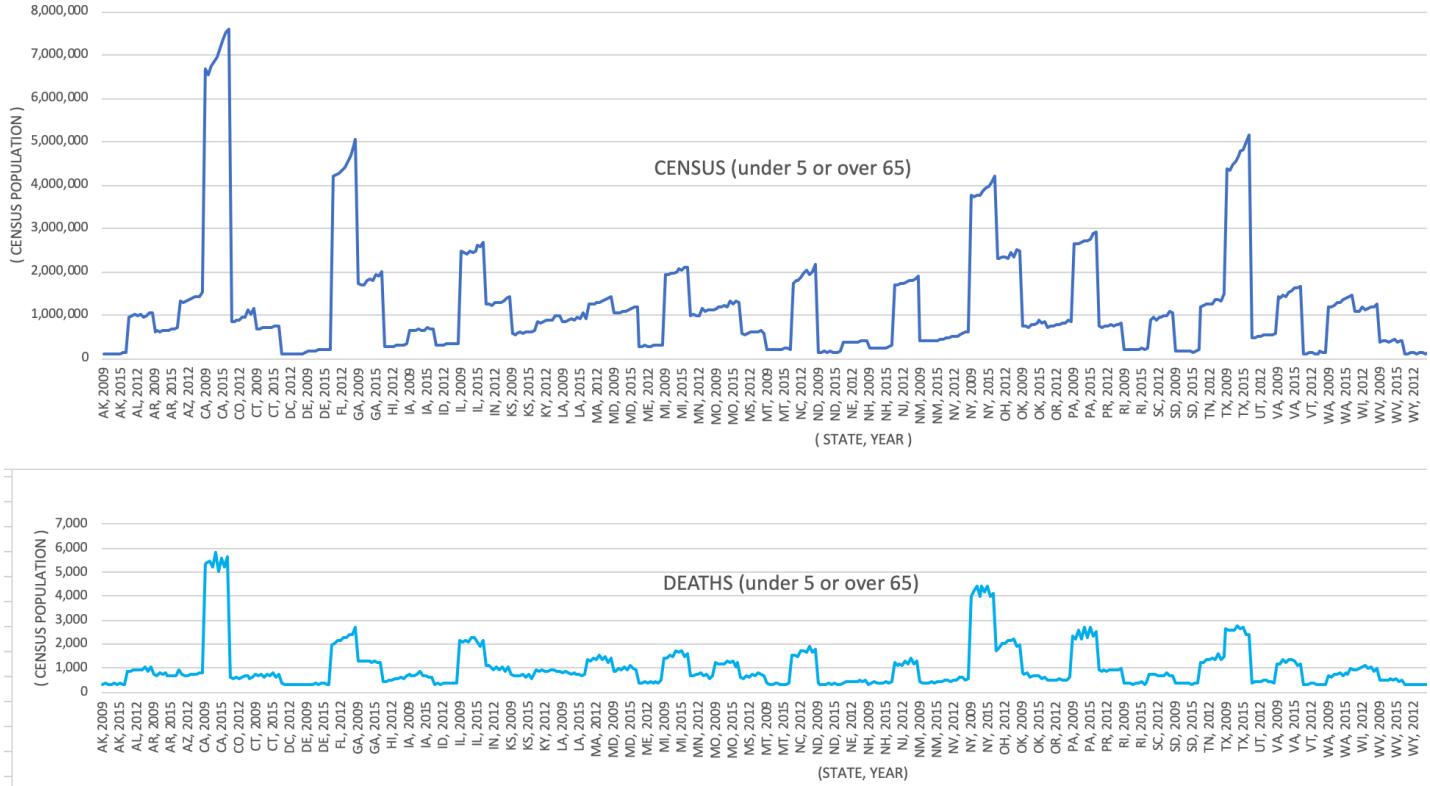
DATA SPREAD AND CORRELATION (TABLE)

	STANDARD DEVIATION	MEAN	CORRELATION COEFFICIENT
CENSUS POPULATION	1,323,686	1,214,964	0.94
INFLUENZA DEATHS	959	1,034	

**** SUBJECTS:** Vulnerable age group, under 5 or over 65 years old.

There is a strong correlation, 0.94, between influenza deaths and the population in the vulnerable age group, under 5 or over 65 years old. This supports my hypothesis that "*If the proportion of age under 5 or age over 65 increases among influenza patients, then the influenza mortality rate will also increase.*"

DATA SPREAD AND CORRELATION (CHART)



While the upper chart shows the movement of the CENSUS population, the lower chart shows the movement of the influenza deaths. Both charts are based on the group of ages under 5 or over 65 by state and year.

As you can see, the movements of both two variables are almost identical.

RESULTS & INSIGHTS

NULL HYPOTHESIS

The rate of influenza death in the population under 5 and over 65 years is equal to or lower than that of the population between 5 and 65 years.

ALTERNATIVE HYPOTHESIS

The rate of influenza death in the population under 5 and over 65 years is higher than that of the population between 5 and 65 years.

P-VALUE

9.54E-26

(= 0.0000000000000000000000000000954 in decimal)

REMAINING ANALYSIS

Based on the results of this analysis, we compare the population under 5 and over 65 years of all states and proceed to a more in-depth staffing plan to prevent death by influenza.

NEXT STEPS

HOLDING MEETING & PROVIDE DETAIL IMPLEMENTATION PLAN [BY WEEK NINE]

- DATA VISUALIZATION
- DATA PRESENTATION
- STORYTELLING

DETERMINE HOW TO COLLECT DATA FOR MONITORING AND EFFECTIVENESS OF THE SOLUTION [BY WEEK TEN]

IMPLEMENT PROGRAM AND BEGIN DATA COLLECTION [BY WEEK TWELVE]

ANALYZE PROGRAM EFFECTIVENESS [WITHIN ONE WEEK OF IMPLEMENTAION]

PRESENT RESULT TO STAKEHOLDERS IN A SCHEDULED MEETING [WITHIN FOUR WEEKS OF IMPLEMENTAION]

APPENDIX

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. The final results will examine trends in influenza and how they can be used to proactively plan for staffing needs across the country.

STAKEHOLDER IDENTIFICATION

- Medical agency frontline staff (nurses, physician assistants, and doctors)
- Hospitals and clinics using the staffing agency's services
- Influenza patients
- Staffing agency administrators

SUCCESS FACTORS

- A staffing plan that utilizes all available agency staff per state requirements, without necessitating additional resources.
- Minimal instances of understaffing and overstaffing across states (a state can be considered understaffed if the staff-to-patient ratio is lower than 90% of the required ratio and overstaffed if greater than 110%)

ASSUMPTIONS

- Vulnerable populations suffer the most-severe impacts from the flu and are the most likely to end up in the hospital.
- Flu shots decrease the chance of becoming infected with the flu.

CONSTRAINTS

- The staffing agency has a limited number of nurses, physician assistants, and doctors on staff.
- There's no money to hire additional medical personnel.

REQUIREMENTS

- Provide information to support a staffing plan, detailing what data can help inform the timing and spatial distribution of medical personnel throughout the United States.
- Determine whether influenza occurs seasonally or throughout the entire year. If seasonal, does it start and end at the same time (month) in every state?
- Prioritize states with large vulnerable populations. Consider categorizing each state as low-, medium-, or high-need based on its vulnerable population count.
- Assess data limitations that may prevent you from conducting your desired analyses.

ADDITIONAL CONTEXT

A count of the historical influenza deaths gives an indication of the severity of flu in an area. Deaths can be prevented with flu shots and adequate medical staff. In the United States, each state has a different population composition, meaning that some states will have more vulnerable populations. In this project, you should pay particular attention to influenza deaths, vulnerable populations, and (optionally) flu-shot rates—particularly in vulnerable populations—to determine medical staffing needs.

STAKEHOLDER QUOTES

- INFLUENZA PATIENT: "I missed work the day they were providing flu shots."
- HOSPITAL NURSE: "The babies really suffer when they have the flu. I just moved to Utah this year, and flu season is so much worse here with the state's high birth rates."
- PHYSICIAN: "Being located in Florida near so many retirement communities, we see a lot of elderly patients during influenza season. These patients have a much higher risk of complications and fatality than normal."
- MEDICAL STAFFING AGENCY ADMINISTRATOR: "We do see a big difference between states. States differ a lot in their populations and their efforts at prevention. We should take these into account for our planning."

COMMUNICATION PLAN

- EMAIL (OR TEXT MESSAGE): Update project progress, shareable materials (presentation files, reports), newsletter, emergency or contingency issues, etc.
- WEEKLY CALLS (OR VIDEO CONFERENCE): Update project status and answer any questions, emergency or contingency issues, etc.
- SCHEDULED ONSITE MEETING: Presentation (using audio and visual component), discussion, answer any questions, etc.7