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.

Research Hypothesis

People group aged under 65 years did exhibit lower mortality than people group aged above 65 years.

Data Overview

1) Influenza deaths by geography (by CDC)

The data contents number of influenza deaths around the states from 2009 till 2017. The following information can be seen: different states and their code number, years, months, ten-year age groups and number of deaths.

2) Population data by geography, time, age, and gender (by U.S Census Bureau)

The data contents populations number around the states from 2009 till 2017. It provides the following information: county, state, years, total population (including male or female), and population groups starting from under 5 years and finishing by over 85 years.

Limitations

1) Influenza deaths by geography

The data contains only the number of deaths, which is equal or higher than 10. Unfortunately, it is impossible to see the deaths numbers in the range from 0 to 9, that is named as “equal or lower than 9” (previously named as suppressed).

2) Population data by geography, time, age, and gender

We cannot get any data that older than 2009 or fresher than 2017. Moreover, the data collected by U.S Census Bureau can be prone to errors (human factor).

Descriptive statistics

Key Variables =>	**Deaths <65 years**	**Deaths >65years**	**Population <65 years**	**Population >65 years**
Standard Deviation	151,4609754	1014,513189	5947175,478	887310,9441
Mean	78,93668122	828,0917031	5177169,898	808604,3797

Correlations analysis		
Variables	**Deaths <65 years & Population <65 years**	**Deaths >65years & Population >65 years**
Correlation Coefficient	0,933669799	0,942562653
Strenght of Correlation	Strong Correlation	Strong Correlation
Explanation	We can observe a strong positive relationship. It means that the increasing number of younger population is prone to higher deaths number from flu. The staff allocation has to be especially concentrated on more populated areas, however we need to test our hypothesis in order to make final decisions.	We can observe a strong positive relationship. It means that the increasing number of older population is prone to higher deaths number from flu. The staff allocation has to be especially concentrated on more populated areas with older people, however we need to test our hypothesis in order to make final decisions.

Statistical analysis

VARIABLES GROUP 1	
Dependent Variable	Deaths <65 years
Independent variable	Population <65 years
Null Hypothesis	The mortality rate for people under 65 years old is not different from the mortality rate for people over 65 years old.
Alternative Hypothesis	The mortality rate for people under 65 years old is lower than the mortality rate for people over 65 years old.

Significance Level (alpha)	0,05
P-Value	2,42E-58
Conclusion	By having very low p-value, which is close to 0, we can reject our null hypothesis. It denotes that there exist significant difference in the mortality rate between two groups of people (younger than 65 years old and older than 65 years old). It lines up with our hypothesis that the mortality rate for people under 65 years is lower. This result supports our main hypothesis. In this case it is necessary to take a closer look at states, where the older population predominates or exists in larger numbers in order to make a correct staff allocation.

VARIABLES GROUP 2	
Dependent Variable	Deaths >65 years
Independent variable	Population >65 years
Null Hypothesis	The mortality rate for people over 65 years old is not different from the mortality rate for people under 65 years old.
Alternative Hypothesis	The mortality rate for people over 65 years old is higher than the mortality

	rate for people under 65 years old.
Significance Level (alpha)	0,05
P-Value	2,75E-62
Conclusion	By having very low p-value, which is close to 0, we can reject our null hypothesis. It denotes that there exist significant difference in the mortality rate between two groups of people (younger than 65 years old and older than 65 years old). It lines up with our hypothesis that the mortality rate for people over 65 years is higher. This result supports our main hypothesis. In this case it is necessary to take a closer look at states, where the older population predominates or exists in larger numbers in order to make a correct staff allocation.

Next Steps

We have come to conclusion, that our main hypothesis "People group aged under 65 years did exhibit lower mortality than people group aged above 65 years" can be supported. There are some steps we need to do now:

1. It is time to combine the whole information and continue with preparation for reporting process for stakeholders.

2. We need to go back to our “Project Management Plan” and identify aspects, which remain to be done.

3. It is necessary to inform our stakeholders that the data is collected and analyzed.

4. To discuss the results and further steps - we need to plan the meetings.

5. Start preparation for the meetings. Combine the data, illustrations, visualizations and all results that support our hypothesis.

6. Prepare the action plan with steps that are useful for the project objectives and staff redistribution.

7. Present the plan and discuss the results.

Appendix

Stakeholder communication. Audience.

We have the following stakeholders in our project, who represent our audience:

- Hospitals and clinics using the staffing agency’s services. Here would be suitable a written communication via E-Mail and phone. Since there are many hospitals in the country, these ways of information exchange will be efficient and less time consuming.

- Staffing agency administrators. Here an intense communication with constant updates is needed. Therefore we need to organize the meetings, make calls, send E-mails and create emergency plan.

- Medical agency frontline staff (nurses, physician assistants, and doctors). The medical frontline staff is always very busy, especially during the flu season. They do not have enough time to reply E-Mails and visit meetings. In this case we can create some reporting/questionnaire/recommendation/informational E-Mails for them and make the calls only in cases, where we need to precise some moments.

- Influenza patients. E-Mailing and Newsletters will be most effective way of communicating with patients. For example, informing the patients about vaccination events, where flu shots can be made or about measures, how the risk to be infected can be diminished.

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.

Success Factors

The project's success will be based on:

- 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%)

Schedule and milestones.

DURATION: Weeks 1-4
DELIVERABLES: WRITTEN REPORT
WHAT TO BE DONE:
- Understand the scope, project objectives and goals
- Identify sources of data
- Highlight additional limitations which can arise
- Additional requirements from stakeholders (if those exist)
- Deadline and emergency plan setting

DURATION: Weeks 5-8
DELIVERABLES: WRITTEN REPORTS, DYNAMIC REPORTS, CHARTS, DASHBOARDS
WHAT TO BE DONE:
- Data Collection and Research
- Data Cleaning, Sorting, Grouping
- Conducting Data Analysis
- Make Calls and Write E-Mails to Stakeholders
- Building Insights
- Create visualizations
- Prepare explanations/presentations of results

DURATION: Weeks 9-12
DELIVERABLES: MEETING PRESENTATION, WRITTEN REPORTS, DASHBOARDS
WHAT TO BE DONE:
- Plan the meetings

- Prepare E-Mails and Newsletters
- Organize the meetings
- Share the results and discuss the further actions