Exercise 1.10
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Influenza Season Staffing: Interim Report

Project Overview:

Motivation – With the Influenza virus being a seasonal occurrence in the United States, people in vulnerable groups are at high risk of complications and possibly fatality. For this reason, hospitals and clinics need additional support to adequately staff these facilities.

Objective – To help hospitals and clinics reduce the fatality rate of the influenza virus by properly staffing hospitals and clinics.

Scope – To staff hospitals and clinics in all 50 states in the United States for this next upcoming flu season.

Hypothesis:

If a person's age is 65+ then they will be more likely to pass away from the flu than a person <65 years of age.

Data Overview:

CDC Influenza Deaths – External document from the CDC that provides mortality count for people with the flu between 2009 and 2017. It is broken down by state and 10-year age groups.

United States Census - External Data collected between 2009 and 2017 by the US Census Bureau. Provides information about the population by state and 5-year age groups.

Data Limitations:

Influenza Deaths Data Set – The data tells us when someone has died and not when they contracted the flu. It also doesn't show if the person had another medical condition that might have contributed to their death. Data is suppressed for the younger population (<5).

Census Data Set - The data could contain manual errors because responding requires manual data input. The numbers in the data are also estimates and not exact as not everyone is surveyed in the population. The data is limited to 2009-2017 but we are staffing for 2025.

Descriptive Analysis:

Influenza Deaths

Age Groups	Mean	Variance	Standard Deviation
< 65	11	2149	46
> 65	275	162261	403

Findings – People < 65 have an increase in mortality when infected with the flu. We also see that variability is higher for ages >65.

Interpretation – People <65 have a more stable mortality rate than the population >65, which varies greatly.

Census Data

Age Groups	Mean	Variance	Standard Deviation
< 65	733529	77214697194	878719
> 65	268996	128529399318	358510

Findings – The lower standard deviation for people >65 lets us know that their population distribution is more consistent across states than the people <65.

Interpretation – It might be easier to get a more accurate account of mortality rate for people >65 than those <65.

Correlation:

Death Rate

Variables	Flu Deaths and Population < 65	Flu Deaths and Population > 65
Proposed Relationship	If the age is less than 65 there is a lower chance of death from influenza.	If the age is over 65 there is a higher chance of death from influenza.
Correlation Coefficient	0.93	0.94

Strength of Correlation	Strong Relationship	Strong Relationship

Results & Insights:

Null Hypothesis: The flu death percentage rate for people 65+ is less than or equal to the flu death percentage rate for people <65.

Alternative Hypothesis: The flu death percentage rate for people 65+ is greater than the flu death percentage rate for people <65.

Interpretation - The analysis confirms that older adults over the age of 65 are more vulnerable and need consideration when making staffing decisions. The states with higher rates of elderly infected by the flu need more staff. We should also take into consideration that the population <5 should be treated as a vulnerable population, because of the lack of data for that age group. Therefore, we should provide further medical assistance for that age group as well.

Remaining Analysis and Next Steps:

Data Visualization Ideas:

Bar Chart - Mortality rates by age group.

Scatter Plot- Population size vs. mortality rate correlation.

Pie Chart – Population size and mortality rate

Final Deliverable:

-Need to compare populations and mortality rates across states for staffing allocation.

-View mortality rate trends to inform or suggest staffing needs.

Conclusion

Recommendations

Spatial and Temporal visualization

Video Presentation

Appendix:

1. Project Brief
2. 1.3_Tak_Project Management Plan
3. 1.4_Data Research and Summary
4. 1.5_Tak_US Census Data
5. 1.5_Task_CDC Influenza Deaths Data
6. 1.8_Task_Conducting Statistical Analysis
7. 1.9_Task_Statistical Hypothesis Testing_Flu and Census