

HEALTHCARE STAFFING FOR UPCOMING INFLUENZA SEASON

Interim Report, - Brian Avila
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PROJECT OVERVIEW

1. Project 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.*

2. Project Objective

- ✓ *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.*

3. Project 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. The analysis will help plan for influenza season, a time when additional staff are in high demand. The results will examine trends in influenza and how they can be used to proactively plan for staffing needs across the country.*

4. Research Hypothesis

- ✓ *If a person contracts the Influenza virus over the age of 65, then he/she is at higher risk of mortality and medical care.*

5. Data Overview

- ✓ *The following data sets were obtained and used for this analysis:*
 1. *Influenza deaths by geography, time, age, and gender Source: CDC*
 2. *Population data by geography Source: US Census Bureau*

6. Data Limitations

- ✓ *US Census Data: The possible limitations of this particular data set can be due to manual input errors, missing data due to unresponsive households or inaccurate counts.*

CDC Influenza Deaths: The data is collected by state registries and is based on death certificates from residents based on state of residence. This data is not immune to data entry or other manual input errors as well. Also, the data was obtained from 2009 to 2017 so it can be considered dated.

Suppressed data consisting of death counts between 0-9 had to be imputed with a numeric value (5).

7. Descriptive and Statistical Analysis

- ✓ *A statistical analysis was conducted to assess the relationship between population age group and the mortality numbers obtained from the data.*

Null hypothesis

If an individual contracts influenza and is 65 years and older, then he/she is at the same risk or lower risk of mortality as compared to the other age groups.

Alternative hypothesis

If an individual contracts influenza and is 65 years and older, then he/she is at a higher risk of mortality and hospice care as compared to the other age groups.

- ✓ *To determine whether the null hypothesis is true or false, a one-tailed two-sample test was calculated. The p-value computed is less than the significance level, therefore with a 95 % confidence level we can conclude that the null hypothesis is **not true**.*

Significance Level: 0.05

P-value: 2.92E-62

Correlation between Influenza deaths and populations in the 65+ age group:

Correlation		
Variables	Influenza deaths over 65	Population over 65
Proposed Relationship	People over 65 are part of the vulnerable population, since the death rate is expected to be higher for this age group, there should be a correlation between these 2 variables	
Correlation Coefficient	0.94	
Strength of Correlation	There is a strong relationship (strong relationship is between (0.5 and 1.0)	
Usefulness/Interpretation	The correlation between the number of deaths and population age can be used to determine the locations with more need for medical care during Influenza season.	

8. Results and Insight

- ✓ After our statistical analyses we can infer with a 95 % confidence level that the alternative hypothesis is true, If an individual contracts influenza and is 65 years and older, then he/she is at a higher risk of mortality and hospice care as compared to the other age groups.

Also, it was confirmed a strong correlation between the # of Influenza deaths among people over the age of 65 in the various states, and the state's population in the same age group.

9. Remaining Analysis and Next steps:

- ✓ Based on the results obtained from our statistical analysis thus far, the remaining analysis will be to determine the allocation of the medical staff among the states. An examination of trends in Influenza across the country will have to be administered in order to plan staff distribution for the upcoming Influenza season.

The hypothesis tests conducted indicate that people over the age of 65 are particularly vulnerable and at higher risk of mortality or health complications due to the Influenza virus. This will lead us to increase the medical staffing for those states with higher senior populations.

Next steps will be to develop statistical visualizations and present findings via a video presentation

10. Appendix:

Data spread: Mean, variance, and standard deviations were calculated for each researched variable:

Data Spread	Variable 1: Deaths over 65	Variable 2:Population over 65
Dataset name	CDC Influenza Deaths	US Census Population
Sample or Population	Population	Population
Variance	942249.7071	7.85077E+11
Standard Deviation	970.695476	886045.7331
Mean	896.7995643	807003
2 standard deviations	1941.390952	1772091.466
Outliers	2838.190516	2579094
Outlier records	18	30
Total records	459	459
Outlier %	4%	7%

One tailed, two-sample test calculation performed:

t-Test: Two-Sample Assuming Unequal Variances		
	Population 65+	Mortality 65+
Mean	807002.7662	896.7995643
Variance	7.86791E+11	944307.0209
Observations	459	459
Hypothesized Mean Difference	0	
df	458	
t Stat	19.47011316	
P(T<=t) one-tail	2.91778E-62	
t Critical one-tail	1.648187415	
P(T<=t) two-tail	5.83556E-62	
t Critical two-tail	1.965157098	

APPROVAL AND AUTHORITY TO PROCEED

We approve the project as described above, and authorize the team to proceed.

Name	Title	Date

Approved By	Date	Approved By	Date
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