

Preparing for Influenza Season: Interim Report

Agenda

1. Project overview
2. Hypothesis
3. Data overview and Data limitations
4. Descriptive analysis
5. Results and insight
6. Remaining analysis and next steps
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1. 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.

2. Hypothesis

The older a person is, the higher the risk of dying from Influenza.

3. Data overview and data limitations

- **Population data by geography**

Data Sourcing:

US Census Data, this is an external data source. As a government body, this data can be trusted.

Data Collection

The U.S. Census Bureau provides data about the nation's people and economy. Every 10 years, it conducts a census counting every resident in the United States. The most recent census was in 2020.

Primary sources for additional data are federal, state, and local governments, as well as some commercial entities. These types of data are generally called "administrative data."

Data Contents.

The data contains the total population per US states and counties from 2009 to 2017 in the United States. Counts are broken into two categories: Sex (male and female) and age.

Data Limitations: Its not up-to-date Data, it includes only years 2009-2017. There is usually a significant delay between when the data are collected and the results released. Typically this delay is between 18 months to two years, and means that the census only offers a snapshot of the population at some point in the past.

Data Relevance

This data is relevant to our data analysis because we are going to compare the number of influenza mortality of age groups 65 - 74 and 75 - 84 years old with those age groups population number in each USA state and check the percentage of influenza death, using Population data by geography.

● Influenza deaths by geography, time, age, and gender

Data Sourcing:

The data is provided by the Centers for Disease Control and Prevention (CDC) through their National Center for Health Statistics. As government data, we can verify this as a trustworthy data source.

Data Collection

The data is administrative data collected as part of the National Vital Statistics Cooperative Program. Each of the U.S. states and territories is required to record all births, deaths, marriages, and divorces within their jurisdiction. Death records come from death certificates, in which a doctor codes the primary cause of death as “Influenza” or “Pneumonia”.

Data Contents.

The data contains monthly death counts for influenza-related deaths in the United States from 2009 to 2017. Counts are broken into two categories: state and age.

Data Limitations:

CDC does not know exactly how many people die from seasonal flu each year. There are several reasons for this. First, states are not required to report individual flu illnesses or deaths among people older than 18 years old to CDC. Second, flu is infrequently listed on death certificates of people who die from flu-related complications. Third, many flu-related deaths occur one or two weeks after a person’s initial infection, either because the person may develop a secondary bacterial co-infection or because flu can aggravate an existing chronic illness. Also, most people who die from flu-related complications are not tested for flu, or they seek medical care later in their illness when flu can no longer be detected from respiratory samples. In addition, some commonly used tests to diagnose flu in clinical settings are not highly sensitive and can provide false negative results.

Data Relevance

This data will be relevant to our data analysis because we are going to compare the number of influenza mortality between two age groups: 65-74 and 75-84 years old.

4. Descriptive analysis

t-Test: Two-Sample Assuming Unequal Variances		
	65-74 years group	75-84 years group
Mean	256,193634	531,5464191

Variance	6194120,04	26652704,05
Observations	377	377
Hypothesized Mean Difference	0	
df	542	
t Stat	-0,932853524	
P(T<=t) one-tail	0,175655483	
t Critical one-tail	1,64766985	
P(T<=t) two-tail	0,351310967	
t Critical two-tail	1,964350493	

Correlation Coefficient: 1, strong positive correlation.

Our **p-value** is significantly less than 0.05. It means that we can reject the null hypothesis.

5. Results and insight

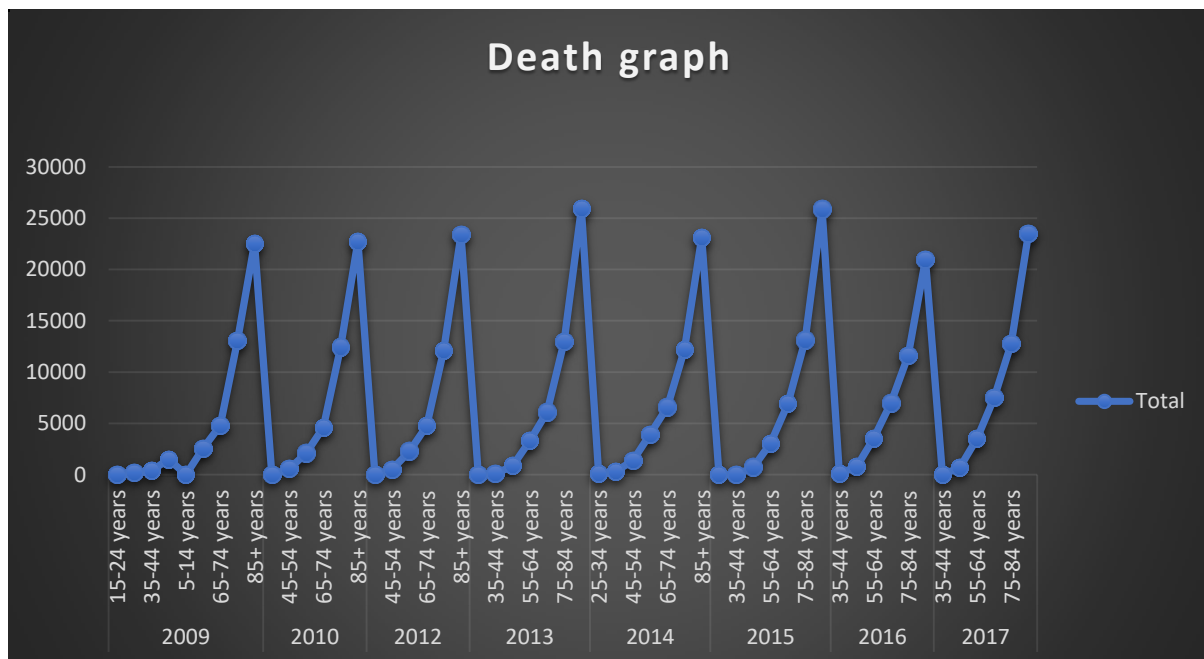
Null Hypothesis: The probability to die from the Influenza is higher for 65-74 years old people than for 75-84 years old.

Alternative Hypothesis: The probability to die from the Influenza is higher for 75-84 years old people than for 65-74 years old.

Our alternative hypothesis is correct.

Strong positive correlation indicates that both variables tend to go up in response to one another. It means, that the higher number of 75 -84 years old people is, higher the number of death.

6. Remaining analysis and next steps



Our hypothesis is correct, and we know that older people are in the risk of death from Influenza. It is important to make a research about how many people get vaccinated each year, especially those, who are over 65. According to CDC data, flu vaccine is produced by private manufacturers, so supply depends on manufacturers. Vaccine manufacturers have projected that they will supply the United States with as many as 173.5 million to 183.5 million doses of influenza vaccines for the 2022-2023 season. Vulnerable groups of people should be vaccinated first.

The U.S. population age 65 and over grew nearly five times faster than the total population over the 100 years from 1920 to 2020, according to the 2020 Census. The older population reached 55.8 million or 16.8% of the population of the United States in 2020. In 2020, about 1 in 6 people in the United States were age 65 and over. In 1920, this proportion was less than 1 in 20.

People at Higher Risk from Flu (CDC)

This includes people 65 years and older, people of any age with certain chronic medical conditions (such as asthma, diabetes, or heart disease), pregnant people and children younger than 5 years, but especially those younger than 2 years old.

To have a clear picture of vulnerable patients, it is important analyze another category of people, for example, younger than 2 years old.

Appendix

Project Management Plan

Step 1

1. Stakeholder Communication:

Meetings:

Week 1. First meeting with the stakeholders

Goal: Establishing a plan that meets the expectations of management, clients and key stakeholders. Spelling out of all the tasks involved and a deadline for each team.

- Introductions
- High-level review of project scope
- Project administration
- How we'll communicate (what is the best way for the communication, how often)
- Potential issues or risks
- Q&A (including Clarifying, Adjoining, Funneling, Elevating Questions)
- Next steps

The focus of this meeting is to establish a new working relationship and expectations for the project. Walk through all the pertinent project details, talk about how we would prefer to work together, and document any major decisions with meeting notes.

9 Week. Online meeting with the stakeholders (via Teams)

Once the team has completed the project deliverables, there are still some essential steps left in the process. Gather feedback from the project team, clients and stakeholders about the project's outcome, assessing what parts

of the project went according to plan and what areas the team could improve in the future.

Week 10. Meeting with the stakeholders. Final Project presentation

Written Communication: Email and Newsletter

Using a weekly digest to inform stakeholders of the top-level information from the week. This can include; budget updates, photos, news of the week, contact information, next steps, top-level project plans and more.

Calls:

During the analysis phase weekly calls with the stakeholders on the status of the project and answer any questions they have (Weeks 3-6).

In case of an emergency, everyone will receive an email, so that we can schedule a call or video conference within 2-3 days.

2.Schedule and Milestones:

Week 1 - 2

Plan assessment, make sure that everyone on the team understands the project deliverables. Tasks delegating among the colleagues. Data collecting, making necessary researches. Create data sets profile, including information on data types, data integrity issues, data cleaning, and summary statistics.

Week 3-4

Data analyzing, Hypothesis making and Hypothesis testing.

Week 5-6

Provide detailed implementation plan for solution. Continue to communicate with the team and stakeholders, asking questions to determine areas where they need more support in order to be prepared to allocate more staff or resources if a project deviates from the plan.

Week 7

Prepare presentation outline. Content development (set standards, create/obtain text and graphic content, supervise creation, editorial quality

control) Visual design and front end prototyping (design, style tiles, working styles, design comps, page mockups).

Week 8:

Prepare storytelling and connect the project data to Tableau. Revising and polishing individual parts to ensure that we are presenting the stakeholders with a clear story.

Week 9

Online meeting with the stakeholders in order to present project outline. Using our research findings, tell a story tailored to our audience.

Week 10

Present results to stakeholders in a scheduled meeting.

3. Project Deliverables:

Verbal presentation: Tableau and PowerPoint.

4. Audience Definition:

Medical frontline staff (nurses, physician assistants, and doctors) The audience is medical professionals with high level of data-proficiency. In this case the results of the analysis will be clearly stated, using accessible language, explaining how the research was done, highlighting our main findings and recommendations. Presentation should not be overloaded with jargon and specialized vocabulary.

Staffing Agency Administrators: Less knowledgeable than the frontline staff. Talk about the most relevant findings, how those findings might affect their work, always make sure we keep the terminology and data on a level they can understand.

Influenza Patients: this group of our audience will not be addressed directly.

Step 2

Hypothesis:

The older a person is, the higher the risk of dying from Influenza. The probability to die from the Influenza is higher for 75-84 years old people than for 65-74 years old.

1. Does age play a role in influenza mortality?
2. Are elderly individuals (aged more than 75 years) considered to be a vulnerable group?
3. In which states there is the highest number of senior people (aged more than 75 years)?

Step 3

Data wish list:

Influenza deaths by geography, time, age and gender data set by the CDC

Population data set by the US Census Bureau

Counts of influenza laboratory test results by state by the CDC