EXCERPT

PREPARING FOR INFLUENZA SEASON IN THE U.S.

A medical staffing agency aims to allocate temporary workforces in the most impacted areas to mitigate the influenza outbreak for the coming season. With limited resources to hire new employees, they are determined to support the healthcare system across all 50 states.

OBJECTIVE

Analyze historical influenza trends in the U.S. to assist the medical staffing agency in the deployment of temporary healthcare personnel for the upcoming season.

PROJECT & ALTERED DATA

- Project Brief
- Influenza deaths | *Source from CDC*
- U.S. Population | *Source from U.S. Census Bureau*
- Influenza Visits & Influenza Lab Tests | *Source from CDC (Fluview)*
- Children's Flu shot rates| *Source from CDC*

LIMITATIONS

- Influenza deaths data comprises 82% of death counts below 10 that are suppressed for confidentiality.
- Death records identify a single underlying cause of deaths (influenza-initiated may not be counted).
- Data sets are dated from 2009 to 2017.
- Information on hospital sizes and staffing capacity is unknown.

TECHNIQUES APPLIED

- Designing a Data Research Project
- Data Profiling and Integrity
- Data Cleaning
- Data Transformation and Integration
    - Excel: Pivot Tables and VLOOKUP
- Statistical Analysis and Hypothesis Testing
- Data Visualization and Storytelling (Tableau)

TOOLS

DATA METHODOLOGY

DESIGNING DATA RESEARCH PROJECT

Interpreting business requirements to data questions leads to a research hypothesis that serves as a guideline for the analysis. A project management plan is prepared to keep track of progress.

DATA PREPARATION

Exploring the datasets for information relevancy, integrity, completeness, etc. will help produce valuable insights. Then, transforming and integrating multiple data discloses the influenza case developments that will warrant the planning phase.

STATISTICAL ANALYSIS & HYPOTHESIS TESTING

Performing statistical methods that detect critical age populace targeted by influenza will model the next steps in preparation for the staff distribution. The relations of multiple variables are then confirmed through t-testing.

DATA VISUALIZATION & STORYTELLING

Data results are utilized for a compelling tableau presentation disclosing influenza trends and vulnerable age populations.

STATISTICAL ANALYSIS & HYPOTHESIS TESTING

ANALYTICAL TOOL APPLICATION

According to statistics influenza **mortality rate is much higher** in adults **over 65 years old**, hence susceptible to developing severe cases than in younger age groups.

Research Hypothesis:	If the mortality rate is high among adults over 65, there's an increased demand for medical workers.
Dependent Variable:	Influenza death
Independent Variable:	US Population
Null Hypothesis:	H_O: Influenza Mortality Rate ≤ Adults over 65 years
Alternative Hypothesis:	H_A: Influenza Mortality Rate > Adults over 65 years
P-Value:	1.50984960014892E-130

FIG. 2a

	H_O: Influenza Mortality Rate < Adults over 65 years	H_A: Influenza Mortality Rate > Adults over 65 years
Mean	0.21%	0.63%
Mean Difference	0.42%	
Standard Deviation	0.00219507	0.002149116

t-Test: Two-Sample Assuming Unequal Variances		
Mean	0.002145587	0.006296545
Variance	4.81833E-06	4.6187E-06
Observations	455	455
Hypothesized Mean Difference	0	
df	908	
t Stat	-28.82280638	
P(T<=t) one-tail	1.53E-130	
t Critical one-tail	1.646533511	
P(T<=t) two-tail	3.0583E-130	
t Critical two-tail	1.962580045	

FIG. 2b

The **normalized death rate** shows the correlation by age group and illustrates the **magnitude** of influenza deaths.

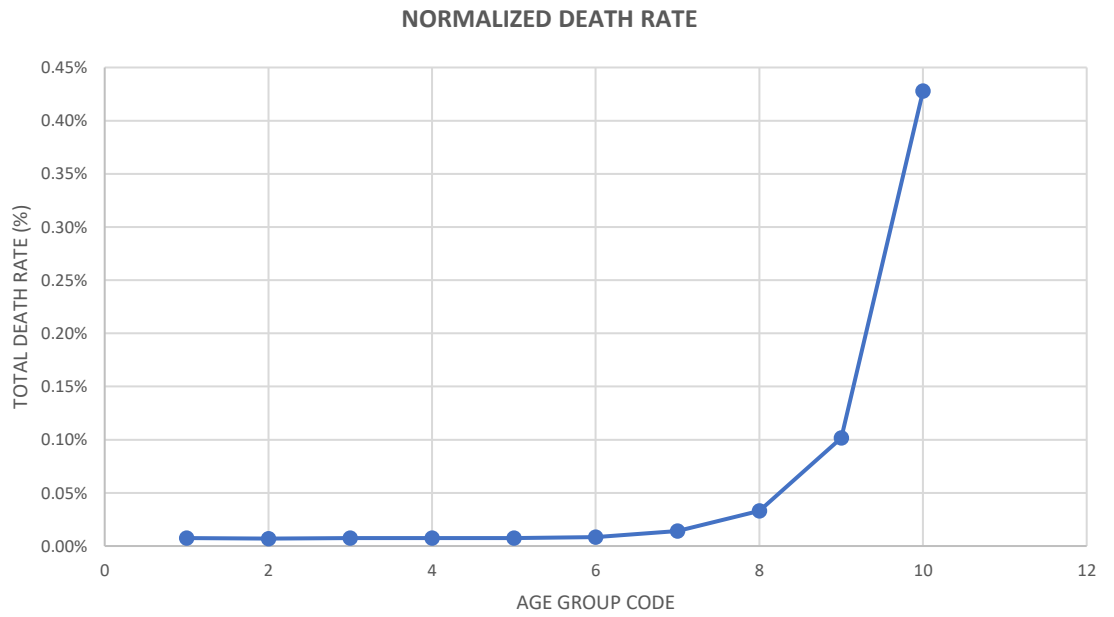

FIG. 2c

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TIME SERIES ANALYSIS

VISUALIZATION TOOL APPLICATION

Influenza transpires all year round, however, it has penetrating effects in **colder climates**.

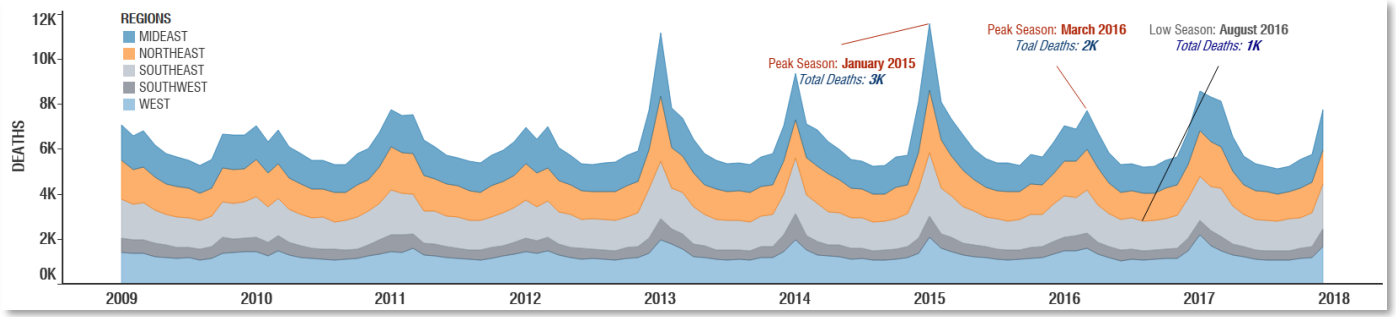

FIG. 2d

The **death ratio** is proportional to population size signifying a substantial impact on regions with **higher concentrations** of vulnerable age groups.

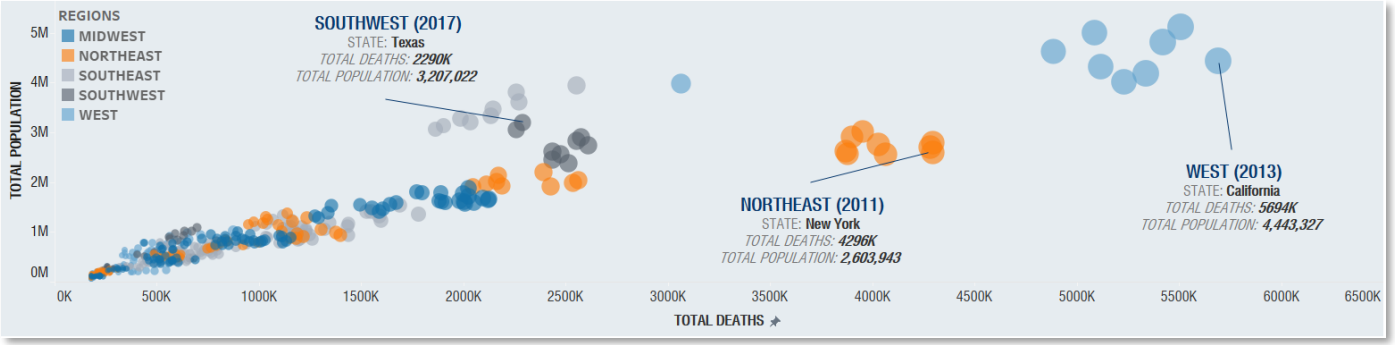

FIG. 2e

California, **New York**, **Texas**, and **Florida** are states with a strong density level of vulnerable populations with **significant death rates**.

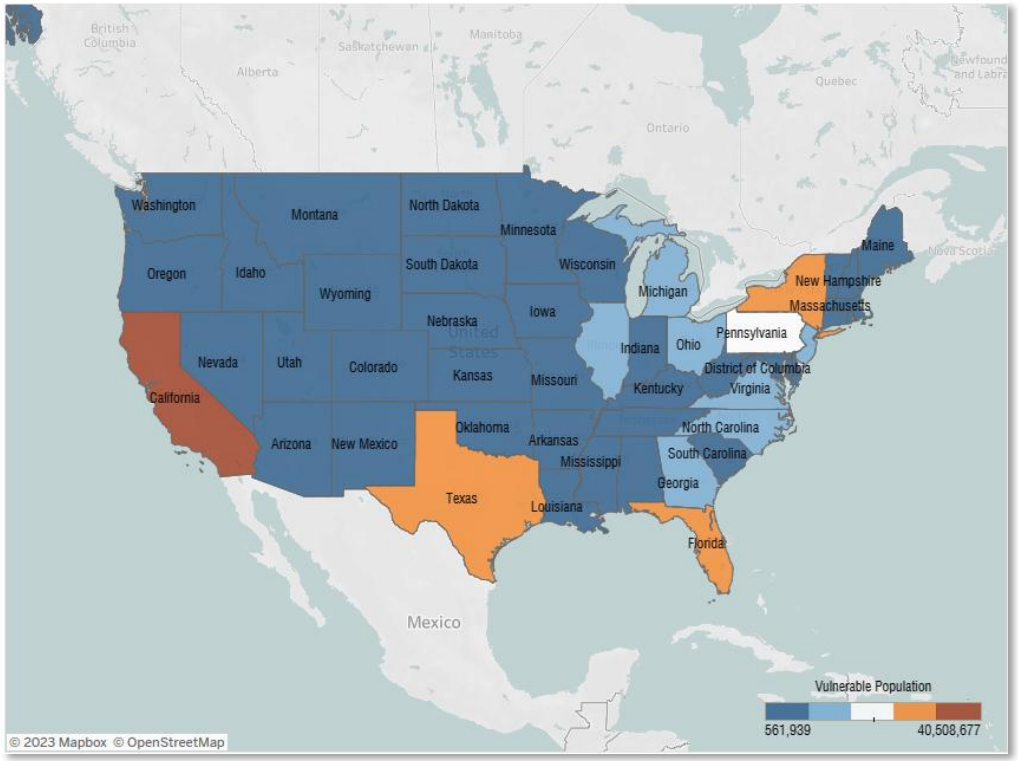

FIG. 2f

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RECOMMENDATIONS

NATIONAL MEDICAL STAFFING

STAFFING DISTRIBUTION

Allocate 32% of medical personnel to high-priority level regions - California, New York, Texas, and Florida arranging the deployment close to the colder weather.

MONITORING PROGRAM

Yearly surveillance of influenza cases should be carefully measured to aid in planning medical staffing for future events.

RESEARCH ANALYSIS

Investigating the hospitals' and clinics' capacities can reinforce actionable numbers to efficiently designate temporary healthcare workers at state and county levels.

PUBLIC AWARENESS CAMPAIGN

Educating the community on the benefits of vaccination is the best defensive measure to mitigate the spread of influenza.

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