

Motivation/Problem Statement:

This comprehensive analysis is propelled by the urgent need to articulate and quantify the multifaceted impacts of wildfires on the healthcare landscape in West Odessa, Ector County, Texas. Situated in the larger context of Texas, a state that routinely grapples with the critical issue of wildfires, understanding and addressing this challenge takes on heightened importance. Beyond their environmental implications, wildfires significantly affect public health, with repercussions extending from respiratory conditions to broader healthcare challenges. The primary motivation is to empower the local community, city council, and residents with a nuanced understanding of the specific health risks posed by wildfires and to present actionable insights that inform decision-making and policy formulation.

Recognizing Texas as a state particularly susceptible to wildfires adds an additional layer of significance to this analysis. The state's unique geographic and climatic conditions make it prone to recurrent wildfires, elevating the importance of developing targeted strategies to safeguard public health. By establishing connections between wildfires and healthcare outcomes in West Odessa, this analysis contributes not only to local resilience but also to the broader discourse on mitigating the statewide impact of wildfires on public health.

Impact Focus:

The focal point of this analysis strategically centers on respiratory issues, notably asthma and related health challenges, given their susceptibility to exacerbation in the presence of wildfire smoke. This deliberate emphasis provides a tangible and relatable narrative that resonates with both the city council and the broader community. The analysis serves as a tool for advocacy, quantitatively linking the calculated wildfire impact score with tangible health outcomes, especially those related to respiratory health.

This approach goes beyond presenting raw data, weaving a compelling story that underscores the urgency and importance of addressing the healthcare implications of wildfires. The forward-looking component of the analysis, projecting future health outcomes based on wildfire estimates for the next 20 years, adds a predictive dimension. This forecasting capability equips the city council and residents with a strategic advantage, enabling them to anticipate, plan, and implement measures that proactively address evolving healthcare challenges.

Ultimately, the dual impact focus is to illuminate the negative consequences of wildfires on public health and to inspire a collective response from the city council and residents. By presenting a nuanced and actionable narrative, the analysis aims to be a catalyst for informed decision-making, policy formulation, and community engagement, fostering a resilient and health-conscious West Odessa in the face of the increasing threat of wildfires.

Data

1. Premature Deaths Dataset:

- **Description:** This dataset, sourced from the Federal Reserve Economic Data (FRED), spans from 1999 to 2020 and provides the annual number of premature deaths per 100,000 population. The dataset comprises two columns, namely "Observation date" and "Number of premature deaths." It offers a time-series perspective on premature mortality trends, crucial for understanding the broader health landscape over the past two decades.

- **Link to Dataset:** [\[FRED Premature Deaths Dataset\]](#)

- **License/Terms of Use:** The terms of use for FRED data are available on their website, typically falling under standard data usage policies. Users are encouraged to review and adhere to FRED's terms and conditions.

Sr.No	Column Name	Description
1	Observation date	The date when the value was recorded
2	Number of premature deaths	The number of premature deaths for that period

2. Respiratory Diseases Dataset:

- **Description:** This dataset, obtained from the Global Health Data Exchange (GHDX), delineates deaths from various respiratory diseases. The dataset is granular, categorizing deaths into specific respiratory conditions, including Chronic Respiratory Diseases, Chronic Obstructive Pulmonary Disease (COPD), Pneumoconiosis, Silicosis, Asbestosis, Coal Workers Pneumoconiosis, Other Pneumoconiosis, Asthma, Interstitial Lung Disease, and Other Chronic Respiratory issues. This comprehensive breakdown allows for a detailed exploration of how different respiratory diseases are impacted by external factors like wildfires.

- **Link to Dataset:** [\[GHDX Respiratory Diseases Dataset\]](#)

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Sr.No	Column Name	Description
1	Location	Has the county and state
2	FIPS	FIPS Code for identification
3	Mortality Rate, 1980	Average mortality rate over the past 5 years
4	Mortality Rate, 1985	Average mortality rate over the past 5 years
5	Mortality Rate, 1990	Average mortality rate over the past 5 years
6	Mortality Rate, 1995	Average mortality rate over the past 5 years
7	Mortality Rate, 2000	Average mortality rate over the past 5 years
8	Mortality Rate, 2005	Average mortality rate over the past 5 years
9	Mortality Rate, 2010	Average mortality rate over the past 5 years
10	Mortality Rate, 2014	Average mortality rate over the past 5 years
11	% Change in Mortality Rate, 1980-2014	Cumulative change from 1980 to 2014

3. State-Level Data for Texas (1980-2014):

- **Description:** This dataset covers the state of Texas from 1980 to 2014 and includes a comprehensive set of columns such as measure ID, measure name, location ID, location name, FIPS code, cause ID, cause name, sex ID, sex, age ID, age name, year ID, metric, and upper/lower bounds. The dataset offers a broader context for the region, facilitating comparisons and contextualizing the impact of wildfires on healthcare in West Odessa within the larger state scenario.

- **Link to Dataset:** [\[State-Level Data for Texas \(1980-2014\)\]](#)

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Sr.No	Column Name	Description
1	Measure_id	Unique Numeric Identifier for the measure in an IHME database of data dimensions
2	Measure_name	The indicator of the estimate
3	Location_id	Unique Numeric Identifier for the location and stored in an IHME database of data dimensions
4	Location_name	Location Name for which the data is represented
5	FIPS	FIPS (Federal information processing standards code)
6	Cause_id	Unique Numeric Identifier for the cause of injury and stored in an IHME database of data dimensions
7	Cause_name	Reason of disease
8	Sex_id	Numeric representation of gender
9	Sex_name	Gender
10	Age_id	Unique Numeric Identifier for the age group generated and stored in an IHME database of data dimensions
11	Age_name	The group to which the age is assigned
12	Year_id	Year of the estimate
13	Metric	Unit of measure for Mx, Lower, and Upper
14	Mx	Posterior mean estimate
15	Lower	2.5 Percentile
16	Upper	97.5 Percentile

Justification for Data Usage:

- The premature deaths dataset provides a foundational understanding of overall mortality trends, essential for gauging the broader health landscape.
- The respiratory diseases dataset, with its detailed breakdown, allows for a nuanced exploration of specific health conditions, crucial for identifying patterns and correlations with external factors like wildfires on a county level.
- The state-level data for Texas adds a contextual layer, enabling a comparative analysis between West Odessa and the broader state scenario, enhancing the depth and relevance of the findings.

By leveraging these three datasets, the analysis gains a multi-dimensional perspective on the impact of wildfires on healthcare in West Odessa, providing a robust foundation for presenting findings to the city council and residents.

Unknown and Dependencies:

In addressing the impact of wildfires on healthcare in West Odessa, uncertainties arise from factors such as dataset reliability, data timeliness, and the intricate relationship between wildfires and mortality rates. While our focus is on understanding the nexus between wildfires and health outcomes, it's essential to recognize external influences on mortality rates, beyond just wildfire impact. The complexity of socioeconomic conditions, healthcare access, and lifestyle factors makes isolating the specific contribution of wildfires challenging.

The statistical modeling and correlation analysis require careful consideration to accurately capture the relationships between wildfire impact, air quality, and health outcomes. Engaging stakeholders and effective communication are pivotal for community buy-in and successful implementation of recommendations. Resource constraints, including computational resources and time, influence the depth of our analysis.

Crucially, the analysis acknowledges the limitation of attributing higher death rates solely to wildfires. The multifaceted nature of health outcomes in West Odessa demands a cautious approach, acknowledging the presence of numerous contributing factors beyond wildfires.

Completion Timeline

Note: The tasks mentioned are to be completed by the deadline

1. 17-Nov-2023: **Part 2 Submission**
Decide what approach to take for the extension of the project, search for data and submit Project Extension Part 2
2. 23-Nov-2023: **Data Exploration, Mining and Model Building**
Do exploratory data analysis, data preprocessing, looking for any redundancies within the data and do predictive modelling
3. 26-Nov-2023: **Visualizations and Presentation**
Prepare final visualizations and presentation slides
4. 29-Nov-2023: **Presentation Practice**
Prepare the presentation within defined timeline for class
5. 30-Nov-2023: **Presentation Delivery**
Final in class presentation
6. 7-Dec-2023: **Code Submission**
Document the github repository and all jupyter notebook. Ensure everything is understandable and reproduceable.