ADOLESCENT MATERNAL MORTALITY

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MEXICO

MEX

https://www.sapiens.org/body/indigenous-midwives-mexico/

WHAT FACTORS INFLUENCE THE PERSISTENCE OF YOUNG MATERNAL MORTALITY?

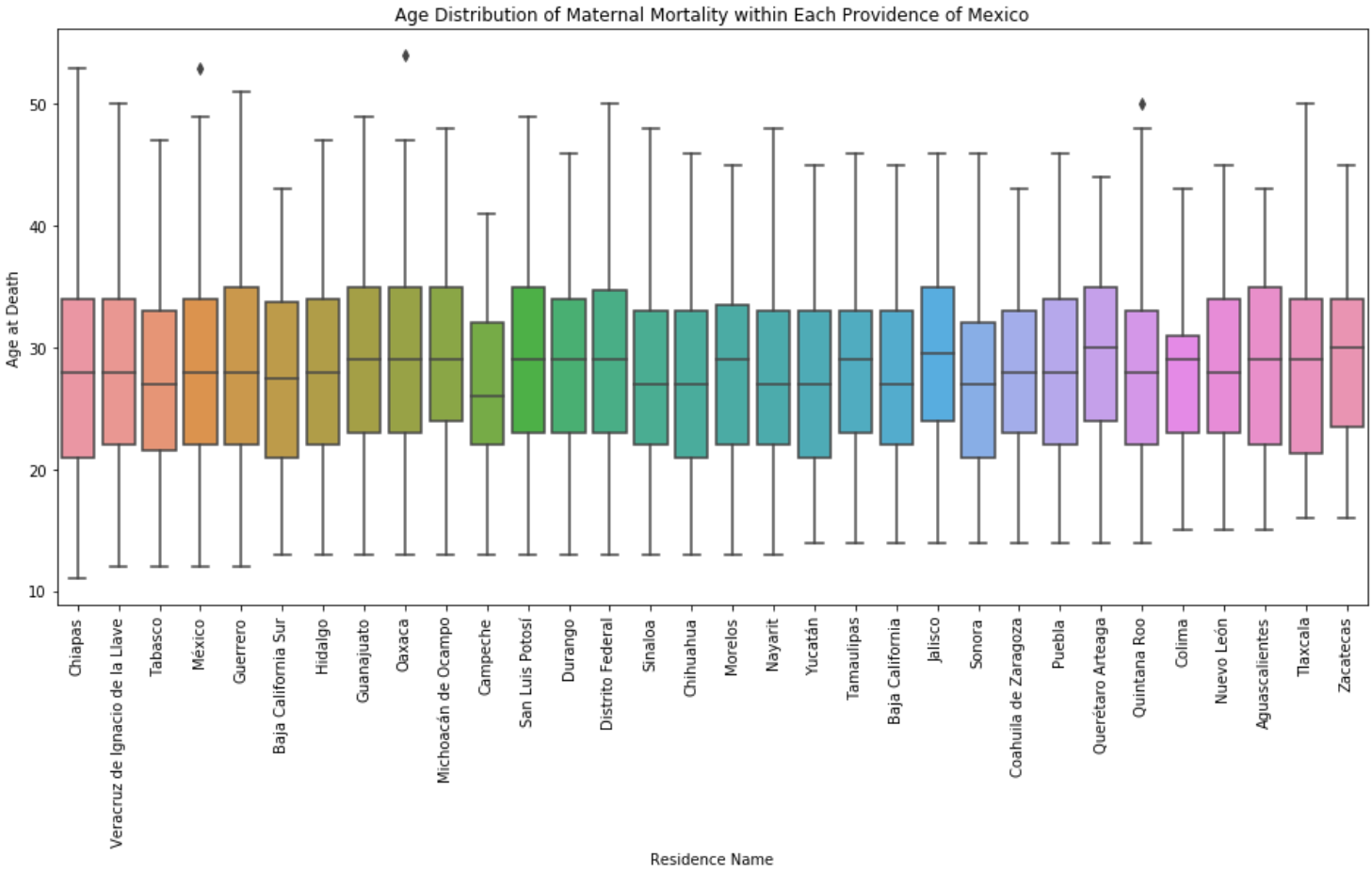
A DATA SCIENCE ANALYSIS BY EMILY SCHOOF

This project addresses a real-world problem that has the potential to directly impact the society of Mexican women and young girls. It is a challenging project, as it entails the collection real-world data various sources, including the World Bank, University of Chicago, and Wikipedia, in order to solve a problem that is less known and not fairly addressed. The objective was not just to investigate the mortality rate, but also uncover the hidden factors that contribute towards its significance. Learning from them, the ultimate pursuit was to REDUCE maternal mortality, especially in adolescents.

PROJECT IN REVIEW

Based of off the factors discussed on the World Health Organization (WHO)'s webpage on Maternal Mortality worldwide, some of the top factors discussed included region and local community population sizes, region GDP, education level, and presence of medical assistance at time of death (ATD). These 5 key features [region population, region GDP, local community size, education level, and presence of medical care] were collected and organized by region to predict if a region of Mexico's likelihood of maternal mortality of adolescents using a Logistic Regression machine learning model.

Prior to analysis, it was statistically proven via ANOVA analysis that the mean age of maternal mortality is statistically different across at least one region.



MODEL SELECTION AND SET-UP

Logistic Regression is a simple, probabilistic algorithm for linear and binary classification that is built on the mathematical logistic sigmoid function, which calculates the probability that a certain sample belongs to a particular class. Since the overarching goal is to identify factors that increase the likelihood of adolescent mortality in Mexico, this model is the natural choice.

TARGET VARIABLE: ABOVE(0) OR BELOW(1) MEX MEAN

To increase the predictive significance of the model, a binary target variable was created based on if a region's mean age of maternal mortality within the dataset was above or below the mean age of maternal mortality in Mexico (dataset mean was verified to be statistically accurate via Bootstrap).

PROJECT CONCLUSION

The resulting model, once scaled, was able to predict the likelihood of a region having above or below the national mean age of maternal mortality based off of the 5 key features [region population, region GDP, local community size, education level, and presence of medical care]. The calculated accuracy score of the logistic regression model was roughly 87.5%. This function, therefore, serves as an excellent preliminary step for identifying areas within Mexico that would benefit the most from government resource intervention.

One suggestions to further this study is to incorporate the level sex education, average distance from the nearest hospital, and number of child-bride instances within each region of Mexico. These additional factors can help provide more detailed information on the likelihood of adolescent maternal mortality more specifically. Assessing these factors can also provide correlation data to potential needed resources (such as increased access to healthcare) and socioeconomic factors (such as child brides) that provide measurable factors to quantify a further reduction the rate of young mother mortality.

By in large, a model that evaluates the specific impact of each feature (and differences in rates of improvement of each feature by region) would provide national and local governments of Mexico, as well as foreign-aid institutions, the ability to accurately identify where intervention funds should be allocated based on which factor of maternal mortality a particular region is struggling with. While computationally dense, this level of analysis will provide the most informative, actionable methodology to eventually eradicate maternal mortality in not just adolescents, but across all age groups and regions in Mexico.