Investigating Vaccine Efficacy Through COVID-19 Mortality Trends

Topic and Motivation:
As the COVID-19 pandemic unfolded, vaccines were heralded as a pivotal tool to reduce mortality and alleviate healthcare burdens. However, vaccine hesitancy, fueled by doubts about their efficacy, has persisted. Your mission is to explore the data and uncover the truth. Imagine yourself as a data scientist charged with answering a critical question: Do higher vaccination rates correlate with reduced COVID-19 mortality rates?

This task places you in the driver's seat of a high-impact analysis, where your findings could inform public health policies and address vaccine skepticism. In this research project, you will work with weekly COVID-19 death data and vaccination rates from 2020 to 2022.

Deliverables:
The analysis focuses on mortality rather than infection rates, as the primary aim of vaccines is to reduce the severity of the illness, not prevent infections entirely. Using advanced statistical techniques, you will:

- Identify time-lagged correlations with a Cross-Correlation Function (CCF).
- Measure direct relationship with Pearson correlation analysis.
- Test predictive relationships using Granger causality.

You are tasked with developing a clear, evidence-based deliverable that examines the relationship between vaccination rates and COVID-19 deaths. Your work will contribute to understanding vaccine efficacy and could play a role in encouraging vaccine adoption through data-driven insights..

Resources:
Access all resources, datasets, and codes here: https://github.com/MaggieWelch/covid-project