

Project Proposal

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What Topic

Spatio-temporal Prediction and Forecasting of Fentanyl overdoses in the United States.

What Data

- Overdose - Deaths by State ([cdc.gov](https://www.cdc.gov))
- Import and Export data and categories (by state and country)
- Population counts by county, birth rates, death rates, divorce rates, etc. (from US government)
- Armed Conflict Location and Event Data (<https://acleddata.com/>)
- Expert Informed Priors

Why Bayesian Models

For this project the data sources are overwhelmed with missing, messy data, and incomplete data. Beyond that, our sample size is relatively small $n_t < 50$.

Why Our Project Warrants Research

We're attacking an on-going and expanding problem, (drug overdose), using the well-validated framework of Epidemiology. This topic space has a lack of subject matter expert diversity that we're addressing by building our study around Bayesian statistics, Epidemiology theory, and Network theory. We're also developing a disease model framework without the use of any disease data, which is an under-represented area of research in Epidemiology.

Possible Audience

While our research could be presented as a proof of concept for a contract proposal with the Federal Government, funding appears to be lackluster at this point in time. In lieu of government contracting, we would target our research to be published in One Health, PNAS, JASA, and/or Nature.