Predicting Heroin Overdose in Cincinnati, Ohio & App Design

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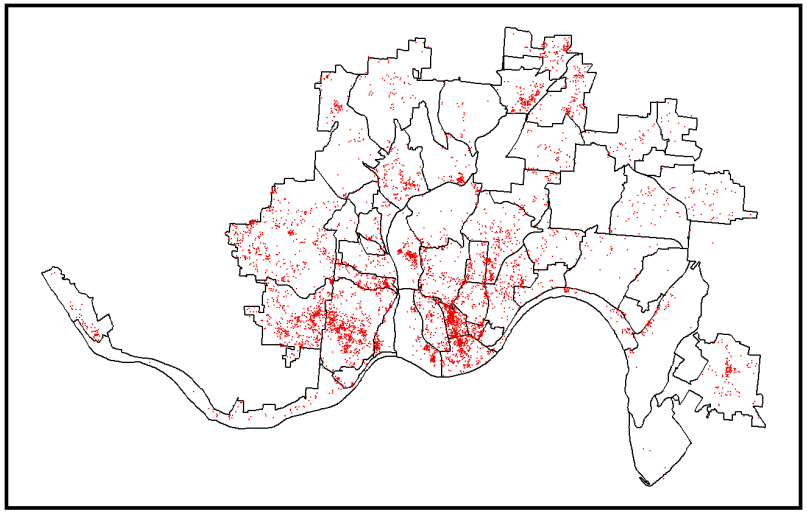
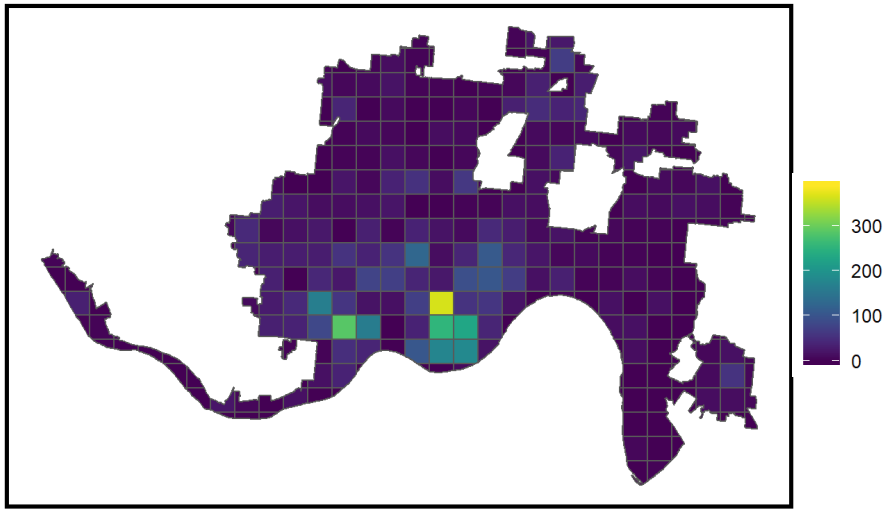
From 2016 to 2017, The City of Cincinnati experienced an unexpected spike in heroin overdose.

174 overdoses in 6 days, reported in August 29, 2016.

The overdose counts from 2015 to 2018…





Many patients take heroin as a painkiller, and this often leads to overdose.

Death from overdose most commonly occurs at home and within 1-3 hours after injection.

What we have proposed…

Trucks: provide legal heroin or other alternatives（i.e. Naloxone）

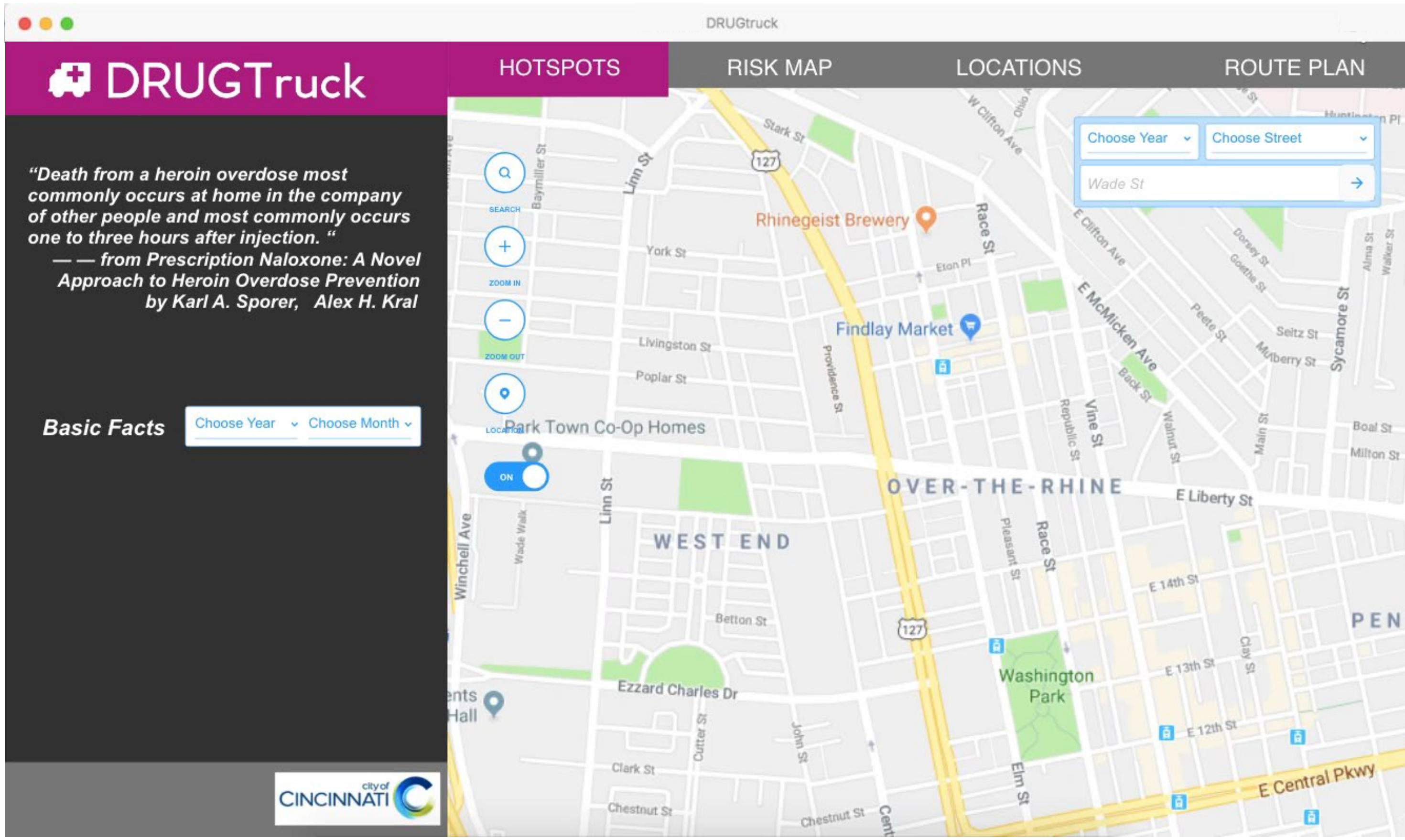
DRUGTruck

App: allocate these trucks

DRUGTruck What will the app do…

[illegible]:

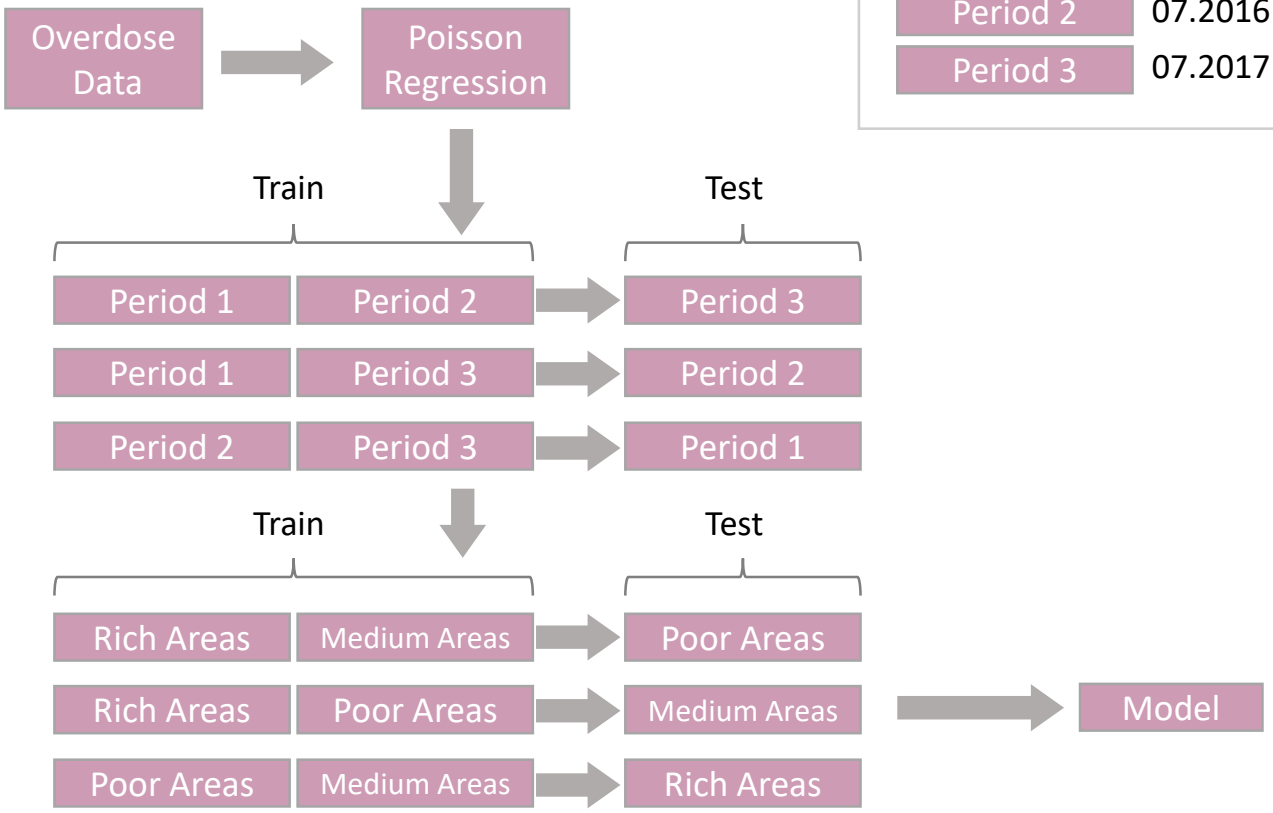
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible] to get the basic information of overdose responses



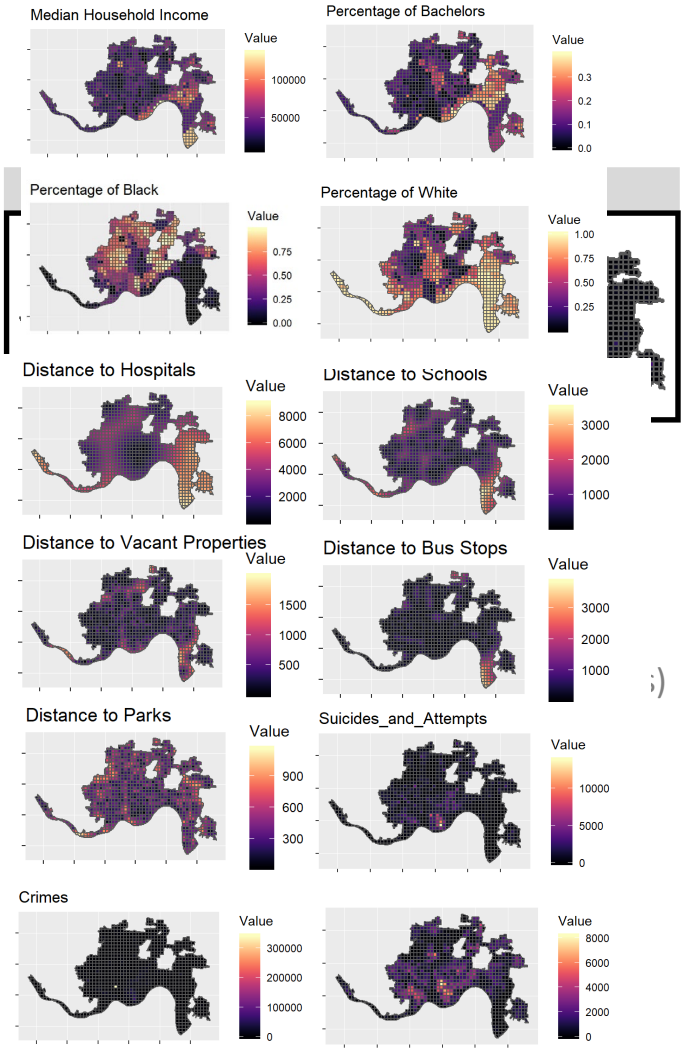
Behind it…

Decision Making Process

Period 1	07.2015 -- 07.2016
Period 2	07.2016 -- 07.2017
Period 3	07.2017 -- 07.2018



Dependent Variable & Predictors



Count in Each Cell

Suicides and Attempts

311 Requests

Crime Records

Vacant and Foreclosed Properties

KNN Distance (K = 2)

Distance to Schools

Distance to Hospitals

Distance to Vacant and Foreclosed Properties

Distance to Bus Stops

Distance to Parks

Continuous Variables

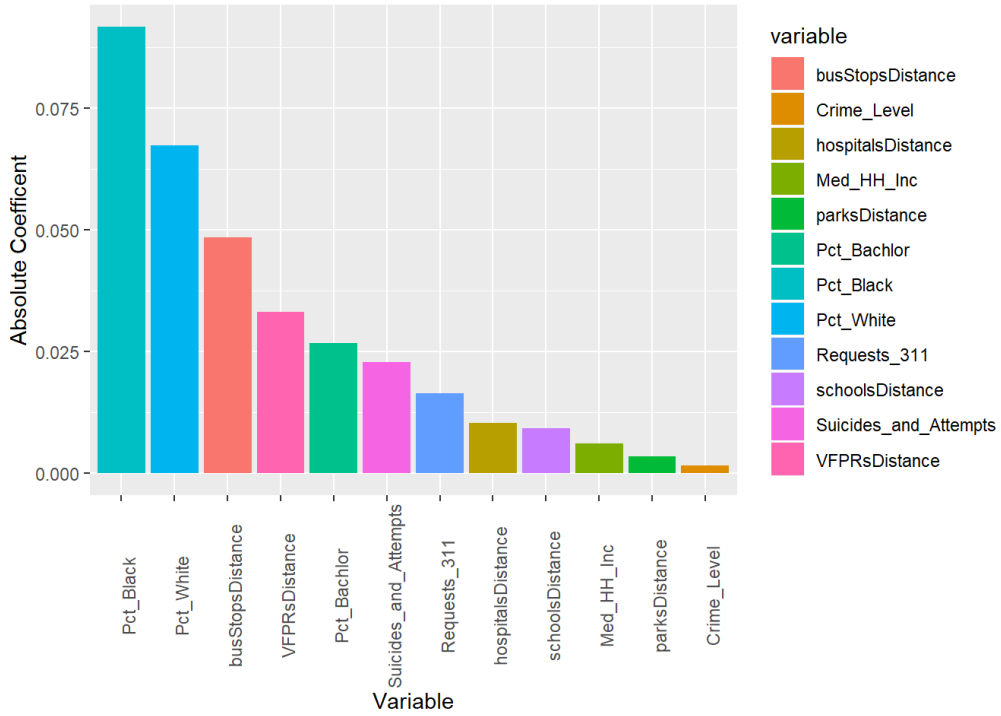
Median Household Income

Percent of Bachelors

Percent of Blacks

Percent of Whites

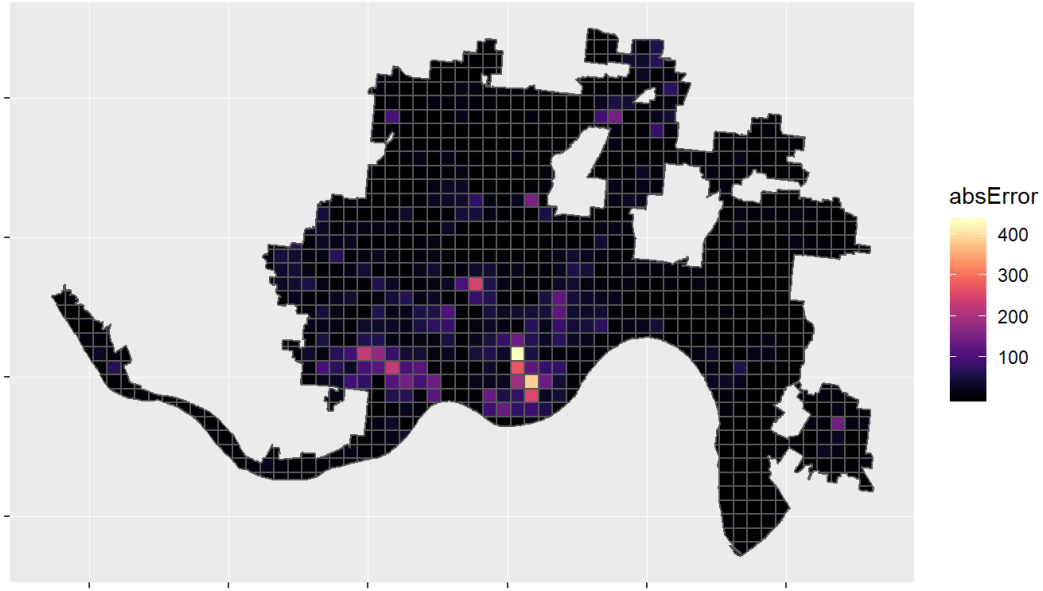
Regression & Goodness of Fit



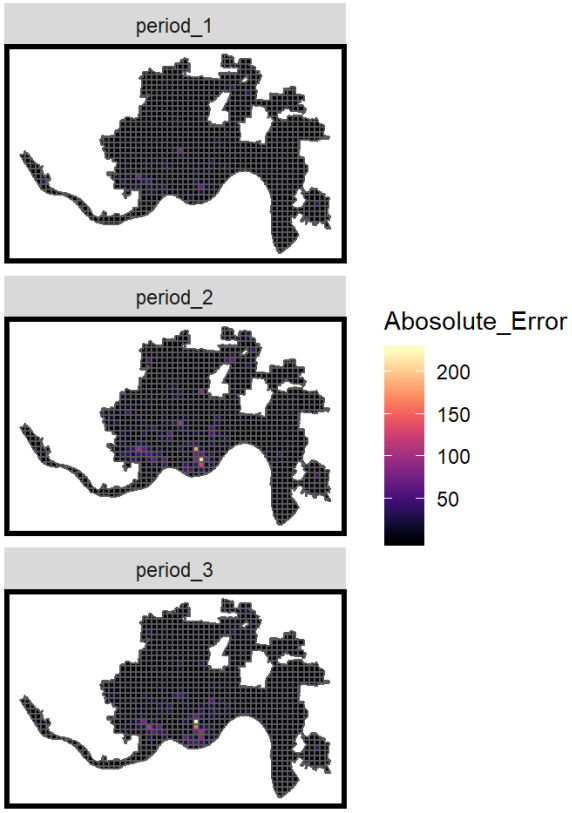
After the Poisson Regression, we put predictors all in the same scale. Therefore, we can get a better understanding of which variables play more important roles in predicting overdose.

Training & Test

Absolute Error from Spatial Cross-Validation



Absolute Error from
Temporal Cross-Validation



We tested the model across different times and areas of different income.
Lower median household income corresponds to more heroin overdose.