PREVENTING OVERDOSE USING INFORMATION AND DATA FROM THE ENVIRONMENT (PROVIDENT): PROTOCOL FOR A RANDOMISED, POPULATION-BASED, COMMUNITY INTERVENTION TRIAL

Marshall BDL[1], Alexander-Scott N[2], Yedinak JL[1], Hallowell BD[2], Goedel WC[1], Allen B[3], Schell RC[4], Krieger MS[1], Pratty C[1], Ahern J[5], Neill DB[6,7,8], Cerdá M[3]

1. *Department of Epidemiology, Brown University School of Public Health, Providence, RI, USA*
2. *Rhode Island Department of Health, Providence, RI, USA*
3. *Center for Opioid Epidemiology and Policy, Department of Population Health, Grossman School of Medicine, New York University, New York, NY, USA*
4. *Division of Health Policy and Management, School of Public Health, University of California, Berkeley, Berkeley, CA, USA*
5. *Division of Epidemiology, School of Public Health, University of California, Berkeley, Berkeley, CA, USA*
6. *Center for Urban Science and Progress, New York University, New York, New York, USA.*
7. *Courant Institute of Mathematical Sciences, Department of Computer Science, New York University, New York, New York, USA.*
8. *Robert F. Wagner Graduate School of Public Service, New York University, New York, New York, USA.*

Background:
In light of the accelerating overdose epidemic in North America, new strategies are needed to identify communities most at risk to geographically prioritize existing public health resources (e.g., street outreach, naloxone distribution efforts). We aim to develop PROVIDENT, a machine learning-based forecasting tool to predict future overdose deaths at the census block group (i.e., neighborhood) level. Next, we will evaluate the efficacy of PROVIDENT model predictions to reduce overdose morbidity and mortality.

Methods:
This study is a randomised, population-based, community intervention trial. All persons who reside in Rhode Island during the study period may contribute data to either the model or the trial outcomes. Each of the state's 39 municipalities will be randomised to the intervention (PROVIDENT) or comparator condition. An interactive, web-based tool will be developed to visualize the PROVIDENT model predictions. Municipalities assigned to the treatment arm will receive neighborhood risk predictions from the PROVIDENT model, and state agencies and community-based organizations will direct resources to neighborhoods identified as high risk. Municipalities assigned to the control arm will continue to receive surveillance information and overdose prevention resources, but they will not receive neighborhood risk predictions. The primary outcome is the municipal-level rate of fatal and non-fatal drug overdoses. Fatal overdoses will be defined as unintentional drug-related death; non-fatal overdoses will be defined as an emergency department visit for a suspected overdose reported through the state's syndromic surveillance system. Intervention efficacy will be assessed using Poisson or

negative binomial regression to estimate incidence rate ratios comparing fatal and non-fatal overdose rates in treatment vs. control municipalities.

Results and Conclusion:
The findings will inform the utility of predictive modeling as a tool to improve public health decision-making and inform resource allocation to communities that should be prioritized for prevention, treatment, recovery, and overdose rescue services.

Disclosure of Interest Statement:
All authors have no conflicts of interest in undertaking this research.

Disclaimer: Data from this study was obtained through an approved data request to the Rhode Island Department of Health (RIDOH). Data was obtained from July 2016 through to June 2019. The agency is not responsible for any analyses, opinions, or conclusions contained in this document. The views expressed in this report are those of the authors and do not represent the official positions or policy of the RIDOH.