Ohio RecoveryOhio

Innovating with Data to Minimize Risk:
Preventing Drug Poisonings with Predictive Analytics

Contact

Raivo Murnieks

State Chief Data Officer
Ohio Department of Administrative Services

Raivo.Murnieks@DAS.Ohio.gov

Project Dates

Feb. 2024 - Jan. 2025

Agency

Ohio Department of Administrative Services
RecoveryOhio

State

Ohio

Award Category

Data Management, Analytics & Visualization

EXECUTIVE SUMMARY

In Ohio, unintentional drug overdoses kill more than 12 people a day.

The ripple effects of this public health crisis have far-reaching consequences, impacting families and communities regardless of race, ethnicity, or socioeconomic status. Recognizing the urgent need for action, the state of Ohio is committed to addressing this crisis through comprehensive efforts aimed at prevention, treatment, and recovery.

To combat the overdose epidemic, Ohio Governor Mike DeWine created the RecoveryOhio initiative to focus on **reducing the stigma** surrounding mental health and substance use disorders, implementing impactful **prevention education** for children at an early age, and ensuring that individuals who are struggling can **access quality treatment on demand**.

Using a data-driven approach to build a community of support, the state is investing in the **health, safety, and future of Ohioans**. Teams from the Ohio Department of Administrative Services' Office of Data and Efficiency and **InnovateOhio Platform** Data Analytics **partnered with RecoveryOhio to launch** the **Overdose Early Warning Dashboard**.

The dashboard is an innovative, transparent, publicly available online tool that draws upon multiple, cross-agency data sources like emergency medical reports, naloxone administration, socioeconomic indicators, and law enforcement data to **predict when communities may be at heightened risk for a spike in drug overdoses (also called drug poisonings)**, so local leaders can act in time to save lives.

RecoveryOhio stands as a **beacon of hope, fostering a more compassionate and resilient state** for generations to come. This ongoing initiative signifies more than just policy changes—it represents **a promise to the people of Ohio**.

IDEA

PREVENTATIVE ACTION

The Overdose Early Warning Dashboard's **forward-looking approach marks a significant shift** in the state's means of responding to overdose threats.

Historically, drug trends in local communities have evolved so rapidly that alarming patterns were only detected ***after*** coroners reported a rise in fatalities.

This groundbreaking predictive tool equips community leaders, health professionals, and policymakers with timely, accessible data to ***proactively*** direct public health and behavioral health resources where they are needed most, enhancing the **ability to save lives and mitigate the impact of drug overdoses *before* they happen**.

The dashboard offers near real-time data, **enabling coordinated efforts** from public health officials, emergency responders, and treatment providers.

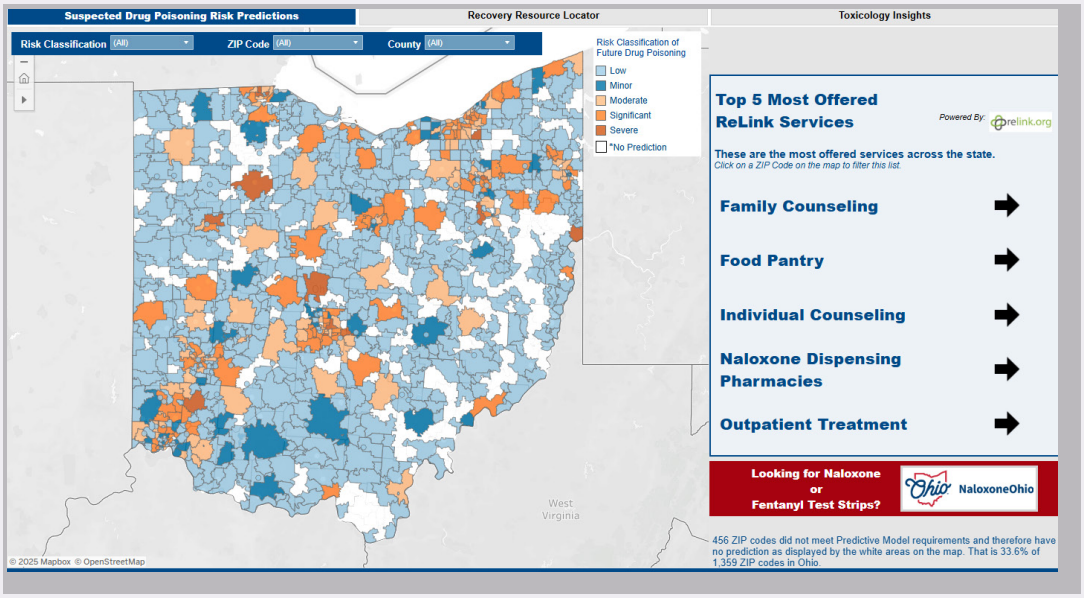
Individuals can use the dashboard to **access location-based recovery resources** such as counseling, naloxone programs, and treatment services. Further, more information about historical drug prevalence across the state can be found on the dashboard.

WHAT PROBLEM OR OPPORTUNITY DOES THE PROJECT ADDRESS?

Problem / Opportunity	Solution / Opportunity
Public and behavioral health data reports can be delayed.	Collect near real-time public and behavioral health data.
Limited to no ability to predict future events.	Predict where future drug poisonings may occur.
Key resources are limited to reactionary activity.	Use predictions to inform public health policy, such as allocating resources and educational programming.

The dashboard draws upon **data source inputs to fuel a refined predictive model that produces a color-coded risk map** of Ohio ZIP Codes. Each Zip Code area is categorized into one of five risk levels: low, minor, moderate, significant, or severe and are accessible on the tool's default tab: "Suspected Drug Poisoning Risk Predictions."

This innovative resource gives community leaders a critical window for intervention, **allowing for a proactive response, rather than reactive one**.



WHY DOES IT MATTER?

Lives will be saved.

At the individual level, people who use drugs and people in recovery **can use the dashboard tool to eliminate the element of surprise and reduce their exposure** when a high risk of overdose exists in their area.

The dashboard affords local partners such as drug abuse coalitions, parole officers, specialty court judges, and behavioral health providers **the opportunity to make sure those most at risk for drug misuse have an up-to-date relapse prevention plan** and know how it should be implemented.

WHAT MAKES IT DIFFERENT?

Where traditional datasets would leave local, state, and community partners with reactive action plans, the **Overdose Early Warning Dashboard**:

- Uses available data to **take near real-time *proactive action* to prevent drug overdoses**;
- **Allows for new and faster insights** regarding the types and geographical dispersion of substance use in Ohio;

- Has the ability to **predict hotspots, optimize resource allocation decisions, and educate** the public about critical trends in substance use; and
- Uses forensic toxicology findings to highlight drug prevalent data—**showing what drugs are being used most** in a specific area.

COMMUNITY PARTNER USE

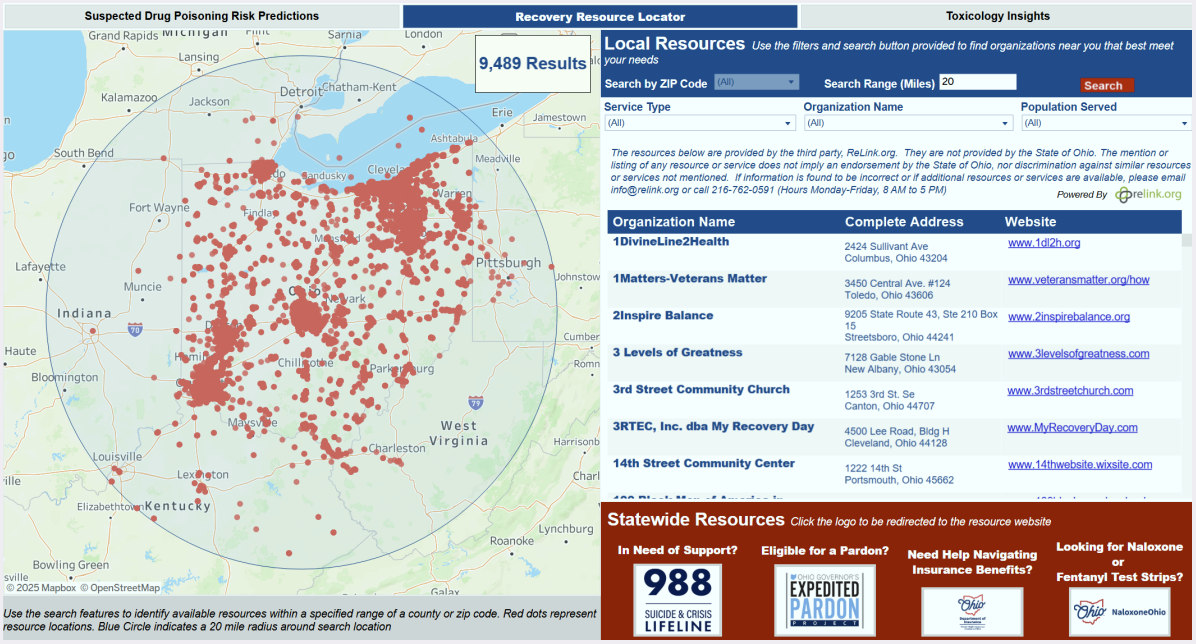
Real-world examples of how this information could inform decision-making include:

- First responders can use this information to **manage the inventory of naloxone and fentanyl test strips in their emergency response vehicles** or medical emergency kits.
- A public defender can use the forecasts to support **advocacy for their clients** to receive tailored treatment, diversion, and intervention alternatives.
- The social worker/case manager/counselor could **assess and identify individuals who might require higher levels of supervision and/or support** from local resources to assist with a variety of socioeconomic barriers and/or a relapse plan.
- Health care professionals/providers will be able to **refer someone to a rehabilitation center and/or other treatment program**; potentially managing long-term health conditions caused by poisoning/misuse.

Each community's needs are unique. **By leveraging the dashboard, professionals can strengthen and customize their addiction and recovery efforts, save lives, and create meaningful change in their communities**.

INDIVIDUAL USE

The dashboard includes a "Recovery Resource Locator" tab which serves as a hub where people can find information and links to community support services, family and individual counseling, naloxone distribution programs, and outpatient treatment programs within their area.



WHAT MAKES IT UNIVERSAL?

The RecoveryOhio Overdose Early Warning Dashboard is a universal tool designed to serve a broad range of users across disciplines and geographies. **It translates complex, near real-time data into actionable insights. Its user-friendly interface ensures accessibility** for both technical and non-technical audiences.

The dashboard's standardized indicators and adaptable design allow it to be **applied across all Ohio communities**—regardless of size, capacity, or resources.

By offering equitable access to critical overdose risk information, the dashboard supports a coordinated, statewide response to substance use and the resources for prevention and recovery.

IMPLEMENTATION

WHAT WAS THE ROADMAP?

RecoveryOhio Overdose Early Warning Dashboard Timeline

WHO WAS INVOLVED?

Governor Mike DeWine's RecoveryOhio initiative worked in collaboration with the InnovateOhio Platform and several state agencies, including:

- Ohio Department of Administrative Services
- Ohio Department of Health
- Ohio Department of Job and Family Services
- Ohio Department of Medicaid
- Ohio Department of Mental Health and Addiction Services
- Ohio Board of Pharmacy
- Ohio Department of Public Safety
- Ohio Supreme Court

HOW DID YOU DO IT?

RecoveryOhio coordinated the work of state agencies, boards, and commissions by **leveraging Ohio's existing resources and seeking new opportunities for additional collaboration**. The RecoveryOhio Advisory Council, consisting of experts from both the public and private sectors, with experience in the fields of treatment, prevention, recovery support, education, criminal justice, and community coalition building provided **additional advice and guidance** on the best ways to improve our state's response to this crisis.

BUILDING AND TRAINING THE DATA MODEL

Training a model involves teaching a computer program to recognize patterns in data by providing it with examples to learn from. **This process requires feeding the program a significant amount of data to identify relationships and patterns**. For example, to train a model to predict stock prices, you would provide it with historical financial data to help it learn the patterns and trends associated with stock price movements over time.

Scoring a model means using the trained program to make predictions or decisions based on new data. In our stock price example, once the stock price prediction model is trained, you can present it with recent financial data, and it will attempt to predict future stock prices. The same is true of this drug poisoning model. **The training and scoring process is essential because it allows the model to improve over time**.

By continuously learning from new data, the model can become more accurate and reliable.

VARIABLES USED (IN THE PREDICTIVE MODEL) TO PROVIDE RISK SCORES

The target variable is the suspected drug poisonings from the Ohio Department of Health (ODH Syndromic Surveillance). The data from ODH's Syndromic Surveillance system contains emergency department visits that have been classified as "suspected" overdoses using a combination of ICD-10 diagnostic fields and chief complaints.

The model captures patterns and dependencies within the target variable over time to make forecasts. It uses external factors that can influence the value. The following are the external datasets included in the predictive model:

Data Being Contributed by Agency

Ohio Department of Health	Ohio Department of Job and Family Services	Ohio Board of Pharmacy	Ohio Department of Public Safety	Supreme Court of Ohio	External Resources
Unintentional Drug Poisoning Deaths Syndromic Surveillance	Unemployment Claims	Ohio Automated Rx Reporting System (OARRS) Dispensations	Toxicology Lab Data* Naloxone Distribution and Suspected Unintentional Drug Encounters Impaired Driving Arrests	Eviction Filings	Dalton Foundation (ReLink.org)*

*Dataset not used in the predictive model

Including external variables alongside the historical data improves the model's accuracy by accounting for the impact of these factors. The variables were determined using a methodical Association Analysis workflow. Based on the results of these tests, thresholds were established. All the variables that pass these thresholds for the ZIP Code in question are then dynamically added to the predictive model workflow.

IMPACT

WHAT DID THE PROJECT MAKE BETTER?

The State of Ohio **uses data to prevent overdoses and drug poisonings**.

Predictive analytics helps identify communities at risk for substance abuse by analyzing seemingly unrelated data. **Patterns emerge, showing that different ZIP Codes have unique factors contributing to high-risk classifications**. Understanding these root causes allows for targeted interventions and treatment strategies.

By efficiently pinpointing risk factors, **officials can connect individuals with the right resources, helping them get into recovery, stay in recovery, and prevent overdoses**. Education and awareness are key in saving lives, reducing stigma, and encouraging early intervention.

Collaboration is crucial—government agencies, community groups, nonprofits, and civic leaders are working together to improve prevention and response efforts. **By using data-driven insights, resources can be directed where they are needed most, ensuring a more effective approach to combating substance abuse and saving lives**.

TESTIMONIALS

"Ohio is taking a forward-looking approach to respond to overdose threats and protect our citizens. This is an innovative tool that uses predictive data and analytics to equip our local leaders daily with a critical information to help their communities address and prevent overdose."

– Ohio Governor Mike DeWine

"The Overdose Early Warning Dashboard reflects Ohio's commitment to using data in real time to save lives. Local health departments, first responders, and community organizations can act faster and more effectively because they have access to the right information when they need it most."

– Erin Reed, RecoveryOhio Director

"The Recovery Ohio Overdose Early Warning Dashboard is an incredible tool for local law enforcement and Quick Response Teams around the state. The dashboard compiles data from multiple resources and makes that available to us in the field so that we can identify potential trends and patterns and respond accordingly. This truly is a groundbreaking tool. We are grateful for all of the hard work that those responsible for making this tool a reality. This will benefit local law enforcement for years to come."

– Commander Scott Duff, South Central Ohio Major Crimes Unit, and Director Project FORT

"The RecoveryOhio Overdose Early Warning Dashboard has been a game-changer for Hamilton County, allowing us to interpret real-time data to identify overdose hotspots and respond swiftly with life-saving measures like targeted community outreach and harm reduction supplies such as naloxone and fentanyl test strips.

This partnership and useful tool have empowered us to track emerging drug trends and implement data-driven strategies that strengthen our addiction response and save lives."

– Meagan Guthrie, Director of the Hamilton County Office of Addiction Response

Soft launched on January 13, 2025, the dashboard has:

- 4,040 views
  - More than 1,000 views/month
- In comparison, the State of Ohio's public facing data website, **DataOhio Portal** averages 12,000 views per month. RecoveryOhio's Overdose Early Warning Dashboard has a significant amount of traffic and will continue to improve with increased efforts to market and educate the public on its availability.

WHAT NOW?

RecoveryOhio aspires to save and improve the lives of all Ohioans impacted by substance use disorders. **Additional dashboard improvements are scheduled to begin in June 2025, and the immediate next steps for the Overdose Early Warning Dashboard, include**:

- Adding additional datasets to feed the model;
- Improving the breadth of forensic data to include more novel drugs and greater geographical coverage;
- Educating the public on the availability and appropriate use of the dashboard;
- Monitoring resource allocation.