

COMBATING THE OPIOID EPIDEMIC



Data-Driven Insights
for Frontline Healthcare
& Holistic Addiction
Management

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PROBLEM: THE OPIOID CRISIS

The opioid epidemic is a national crisis. It affects individuals' health, social and economic welfare, as well as that of families, communities, and the country as a whole. More than 80% of addicts had their initial exposure to the drug when it was prescribed to them for pain management. That suggests that robust, evidence-based guidance to patients and the healthcare system before, during and after an opioid prescription may have the potential to reverse the crisis.

Roughly 
21 to 29%
of patients prescribed opioids
for chronic pain **misuse them.**⁶

Between
8 & 12%
develop an opioid use disorder.⁶

An estimated
4 to 6% who
misuse
prescription opioids **transition**
to heroin.⁷⁻⁹

About **80%**
of people who **use heroin** first
misused prescription opioids.



Source: <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis>

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PREDICTIVE ANALYTICS: A NEW TOOL TO HELP PREVENT & TREAT OPIOID ADDICTION

Predictive Analytics has the potential to be a game-changing addition to the fight against opioid addiction. It can inform the medical community, the policy community and patients themselves about where dangers lie, and how to avoid and overcome them.

What if we could make reliable predictions about patient outcomes? What if we could identify what kinds of interventions work and when they are most helpful? What if we could give the patient an active role in their own management and care? What if doctors could identify less risky prescribing protocols? What if regulators and policymakers had access to big data trends and insights that could improve how they make decisions to combat the opioid epidemic?

We set out to build a predictive analytical capability as a platform for building insight throughout the opioid community - from patients to physicians, medical facilities, agencies, regulators, and policymakers.

Graham Technologies' goal was to leverage predictive technologies to provide:

1. State-of-the-art, real-time healthcare to help patients avoid or recover from opioid addiction.
2. Data-driven trends insight to support the holistic management and eradication of the opioid epidemic.

It starts with obtaining and understanding the data. Patients and medical institutions possess the coveted data needed to analyze and convert actionable information that counteracts the opioid crisis.

We built a solution that curates, integrates, and aggregates this big data from all parties to build event- and data-driven insights. These insights could uncover trends that lead to evidence-based prevention and treatment programs and policy development. Predictive analysis of these trends has the potential to guide and inform everything from pharmaceutical and medical distribution plans to prescription and care protocols to avoid and treat addiction.

While there are many applications for big data analysis of healthcare information, we include the patient in their own health awareness and care. That means that the data we collect is not only intended to help government and healthcare institutions, but also to enable the patient to build awareness of his or her status and become an active and informed participant in their health management. Our goal is to help patients build healthy habits, recognize when they are at risk, establish coping mechanisms, and access appropriate assistance in real-time.

WHAT IS OD INSIGHTS?

The GTECH **Opioid Dashboard Insights (OD Insights)** application offers advanced insight and predictive analysis to enable holistic epidemic management.

OD Insights consists of two main components:

1

A mobile app for patient use:

- Provides patients and their support community with the tools and information they need to manage their treatment effectively.
- Allows them to monitor and report their status.
- Enables patients to work with their healthcare providers and supporters to identify addiction triggers.
- Enables interaction with a coach - live or AI - to help avoid negative events.

2

An enterprise web application to provide trend insights to other stakeholders:

- Enables the healthcare community to collaborate and establish humanitarian aid and regulatory initiatives using predictive technologies against anonymized data from hospitals, clinics and other healthcare support teams.
- Mines data for insights that can improve healthcare protocols and data-driven policy.

With so many variables leading to addiction, one cannot plan for and avoid all addiction or coping scenarios. However, OD Insights offers mechanisms to empower the addicted and closely monitor habits for advanced insight, predictive analysis, and collaboration between healthcare providers, policymakers, and the opioid industry.

Through GTECH innovation, our methodology takes a holistic approach to addiction management, including:

- Patient addiction susceptibility characteristics;
- Symptoms, medication, event history and habits of addiction;
- In-app addiction avoidance mechanisms;
- Trend analysis and escalation; and
- Crisis collaboration and management.

THE INFLUENCERS OF OPIOID HEALTHCARE

OD Insights creates a comprehensive network of users, enabling collaboration amongst the various stakeholders and influencers that impact patients who have been prescribed or become addicted to opioids.

There are many stakeholders within the healthcare community who play a role in supporting a patient's journey, including healthcare providers, guardians, and counselors, as well as regulators. The following stakeholders have either direct access to parts of the OD Insights solution or benefit directly from the trend insights it provides.

Patients

Patients get access to a mobile application that serves as a virtual medical assistance tool to support them as they work through the process of preventing or reducing the impacts of opioid addiction.

The mobile app includes functionality that helps the patient, including:

- Monitor and report on their status
- Record symptoms and set reminders to take prescriptions
- Get real time coaching and assistance

Patient Supporters

A patient has many people in their lives that want to support them through this process, including friends and family, a spiritual leader, advisors, a probation officer, and others. These supporters can play an active role by:

- Recognizing behaviors and risk and reporting them
- Escalating concerns to a life coach
- Providing support and feedback
- Participating with patient's full intentional request

Healthcare Providers

Healthcare providers include professionals and institutions such as physicians, hospitals, clinics, support groups, in-patient care, and community groups. Depending on the role of the provider, different features of the application are available that help them:

- Recognize risk factors
- Check-in at critical moments, such as prescription recommendations
- Identify trends to improve prescribing protocols for pain
- Improve protocols for pain management and prescribing
- Build awareness amongst medical staff

Counselors

Counselors, including life coaches and guardian coaches, provide coaching and assistance to patients in real-time. In addition to real-life counselors, the application provides AI-based coaching that can recognize when a patient may benefit from support, or respond to a patient who requests it. With OD Insights, counselors can:

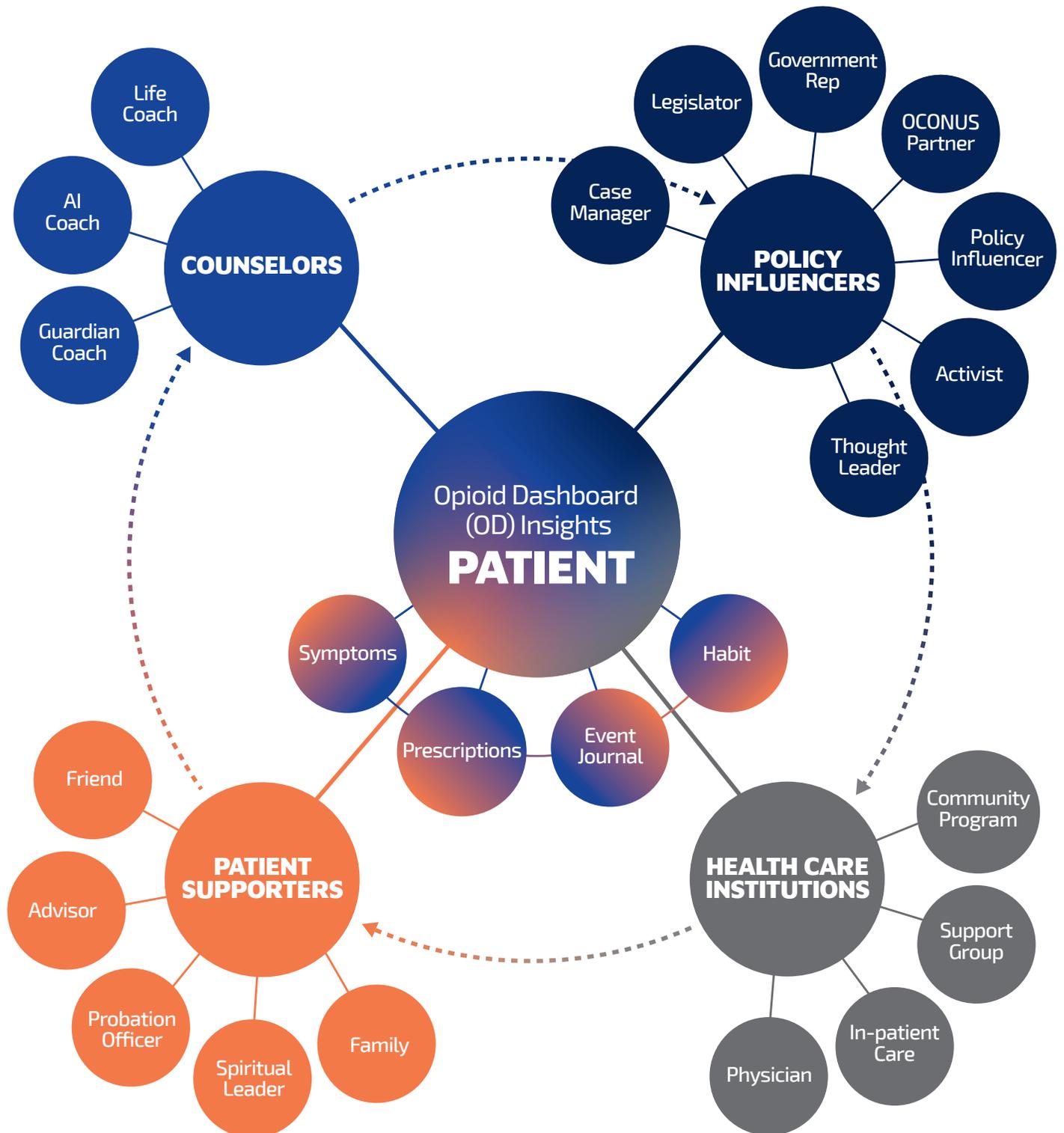
- Understand and recognize individual patient's habits and triggers
- Understand, recognize and escalate effective and timely interventions
- Provide timely interventions, guidance, and support

Policy Influencers

Advocates, regulators, and other influencers are committed to finding ways to control and eradicate the opioid crisis. Influencers include activists, policy influencers, case managers and others, while regulators include legislators and government representatives. With a centralized view of anonymized patient data, they receive insights on trends that can help focus their efforts in the most critical areas and improve policy management, including:

- Recognize community-level risk factors
- Collaborate on challenges, plans, and decisions
- Enable data-driven policy
- Identify trends to alert others

Let's examine how **OD Insights** will help everyone who's ready for a fight in this crisis.



OD INSIGHTS EXTENDS FRONTLINE HEALTHCARE FOR PATIENTS

The OD Insights mobile application acts as a health care coach for patients. It supports direct patient healthcare, while at the same time, generating an anonymized dataset for further analysis.

The application helps patients become aware of their habits and triggers that lead to adverse events and substance use disorder and enables real-time patient care. It also enables real-time monitoring, coaching, and intervention by healthcare professionals or even AI-driven prompts. The mobile app can be a powerful addition to frontline patient care in preventing and treating addiction.

The engagement starts when the patient meets with their physician. Prior to prescribing an opioid, the physician inputs patient information into the OD Insights application. They are prompted to input data such as patient demographics and addiction history. The physician then selects the type of medication, amount, and drug manufacturer they intend to prescribe.

OD Insights compares the patient's information against similar patient data and calculates a probability of addiction

to the medication. The physician uses this information to guide their decision to prescribe the medication or change the amount/type. They work with the patient to determine the best treatment plan to minimize risk while adequately addressing the patient's pain.

Once a treatment plan is identified, the patient uses the mobile app to self-monitor and get support using features such as:

- Tracking prescriptions and habits
- Providing information on symptoms and status
- Setting up reminders
- Getting appropriate prompts from artificial intelligence-based coaches, as well as real life coaches and mentors, and
- Identify new and cutting edge alternative therapies.

Patient supporters such as advisors, friends and family can also access the patient's information on the mobile application by subscribing and getting approval from the patient. Using the mobile app, these supporters can provide support and prevent escalation of risky behavior and communicate concerns to a professional.

PREDICTIVE ANALYSIS AND TRENDS

The OD Insights enterprise application integrates anonymized big data sets from hospitals, clinics, parole officers, social workers, and other sources. This data, along with anecdotal evidence from patients using the mobile application, is analyzed to identify trends that might assist in identifying risk factors and addiction preventative techniques leading to improved patient treatment and reducing addiction risks.

OD Insights predictive analytics helps influencers to make better decisions using empirical data. For example, analysis of the data could:

- Recommend treatment abatement plans, including suggesting certain medications for a patient based on how people in similar situations (background, demographics, and other data) were reacting to the medication.

- Identify trends or issues with a particular area or hospital.
- Discover that certain prescriptions, combinations of prescriptions, or frequency of prescriptions are not bad.

Information on opioid use, addiction, and prevention techniques are typically siloed by the group that captures it. This siloed approach to information gathering doesn't provide the best insights into the opioid epidemic. With OD Insights, the same insights are pushed to physicians, medical facilities, regulators, and other decision-makers, providing a cohesive view of the problem and management recommendations that can help improve policies or guidance.

OD INSIGHTS OUTCOMES AND IMPACT

Together, both the patient mobile app and the enterprise web application provide the following capabilities:

Partnership & Collaboration:

Patients become self-aware through conscientious journaling and system feedback. They can connect with virtual professional life coaches or mentor groups, or utilize OD Insights' AI coaches for real-time support. Coaches, practitioners, and regulators exchange community insights amongst one another, as well as gain insight to assist their patients better.

Discovery, Measurement, & Predictions:

Patients continually gauge progress towards target outcomes with relapse indicators such as GPS boundary alerts and sentiment analysis, patient prestige rankings, plan reminders, and reports. Using anonymized opioid health care records from medical providers, practitioners, and regulator communities can perform predictive analysis, gaining insights that enable them to manage the opioid crisis proactively. The result is a rich, data driven opportunity to help identify new, or alternative treatments and therapies.

Visualization and Tracking:

Customizable dashboards, reports, and geospatial visualizations allow for enhanced insight to understand not only where concerns originate but how they have and may continue to spread. These visualizations help to monitor the effects of preventative and rehabilitation initiatives.

Planning & Management:

Regulator threat abatement plans, community guidelines, crowdsourcing, and opioid budget distribution proposals offer the community and medical institutions guidance for positive change.

Regulation, Improvement & Overcome:

Customizable dashboards provide health insights into frontline root cause analysis for data-driven training materials tuning, adjusting guidelines, and prescription administration practices.

BUILDING OD INSIGHTS: OUR METHODOLOGY

To help understand how the OD Insights Dashboard works, let's review the dataset, analytical framework and key input parameters.

BUILDING THE DATASET

The majority of the data for OD Insights comes from hospitals, clinics, and other sources, such as scientific databases.

The OD Insights application connects to data sources via secure APIs. Data is imported and anonymized to ensure that personally identifiable information is removed before the system analyzes it.

To determine the data the application will use to produce useful trends and insights, we primarily relied on expertise from the healthcare industry, open-source databases, published research, and news reports.

We identified the following groups as key contributors to the data as well as the groups that benefit greatly from the insights and trends that OD Insights provides:

- Regulator support includes HHS agencies, CDC, Medicaid, FDA, and other regulatory influencers with mission responsibilities for combating the opioid crisis.
- Medical facilities and physicians take guidance from federal legislation and perform medical services by diagnosing and prescribing medication (or other symptom reversing methods).
- Manufacturers and Distributors construct opioids and make them available to users.

ANALYTICAL FRAMEWORK

As part of this effort, Graham reviewed the latest report from the Department of Health and Human Service (HHS) on opioid misuse, prevention, and intervention programs from 2006 until today. Their 5-point plan, shown below, serves as the core framework for our efforts.

HHS has a 5-point plan for combating opioids with "Better Data"

 BETTER addiction prevention, treatment, and recovery services	 BETTER data	 BETTER pain management	 BETTER targeting of overdose reversing drugs	 BETTER research
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Source: <https://www.hhs.gov/opioids/about-the-epidemic/hhs-response/index.html>

GTECH sought to accommodate this 5-Point plan in OD Insights with innovative tools, technologies, and strategy:

1

Better addictions prevention, treatment, and recovery services: OD Insights aims to improve access to prevention, treatment, and recovery services by including services that:

- Manage patient consciousness and real-time health care guidance,
- Provide access to real-time counseling, and
- Prevent addiction within six months after an opioid prescription.

2

Better data: Better data strengthens our understanding of the epidemic. The OD Insights application must help improve public health surveillance for timely, specific public health data and reporting, through the use of:

- Customizable dashboards with insights from real-time aggregated health data, and
- Collaboration and escalation prevention mechanisms.

3

Better pain management: OD Insights must help advance better practices for pain management by:

- Increasing the evidence base with tracked behavior for medication, and
- Enabling practitioners to make proactive adjustments for patient habits programs using lessons learned from historical habits, prescriptions, patient demographics, and addiction history.
- Identification of new treatment alternatives.

4

Better Targeting of overdose-reversing drugs: Promote the use of overdose-reversing drugs using predictive analytics that:

- Provide physicians suggestions, based on the probability that a patient may become addicted given a set of prescription parameters, and the probability that an overdosed patient may receive relief if prescribed an overdose-reversing drug.

5

Better Research: Provide support for cutting edge research on pain and addiction that can:

- Inform clinical practices, reduce opioid prescribing, and combat the opioid crisis, and
- Ensure that policies are evidence-based, as regulators collaborate and initiate threat abatement plans using geospatial analysis, dashboard reports, and predictive analysis of aggregate-frontline-big data statistics.

Many factors contribute to opioid addiction. By pulling a wide dataset from multiple sources into a central location, we can analyze the data, predict trends, and provide insights that help the support community and make real the HHS 5-point plan.

A HOLISTIC APPROACH TO MANAGING OPIOID ADDICTION

Typically, once a treatment plan is prescribed, the patient is often left to their own devices to deal with dependency management. Given the history of risk for addiction within six months after completing a prescription, OD Insights offers the tools, techniques, and technologies to lead the patient through this tumultuous and vulnerable time.

With patients, coaches, regulators, and medical institutions collaborating through OD Insights, patients now have access to the resources needed to get them through this difficult period, and practitioners and regulators have a holistic view of the data that feeds predictive analysis and threat abatement plans.

OD Insights is also ideal for relapse or court-appointed probation candidates, as conditions of their program.

The use of the Opioid Dashboard Insights application aims to serve as a mobilized and holistic assistance program that connects the practitioner and management communities for crisis eradication.

CONCLUSION: PREDICTIVE ANALYTICS DRIVE SOLUTIONS

OD Insights offers the tools, techniques, and technologies to lead patients through a tumultuous and vulnerable time. By sending signals and data between a patient, coach, and doctor, patients can become self-advocates, improving their care and reducing the risk of addiction.

The solution also aggregates patient information for medical institutions and policymakers, accelerating data-driven insights that inform care protocols and policies that impact the rest of the ecosystem, including drug companies and prescribers.

NEXT STEPS

For more information on OD Insights or for an OD Insights live demonstration, please contact:

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Terminology Credits:

- Addictioncenter.com
- Drugabuse.gov
- Turningpointtreatment.org
- CDC.gov
- HHS.gov



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