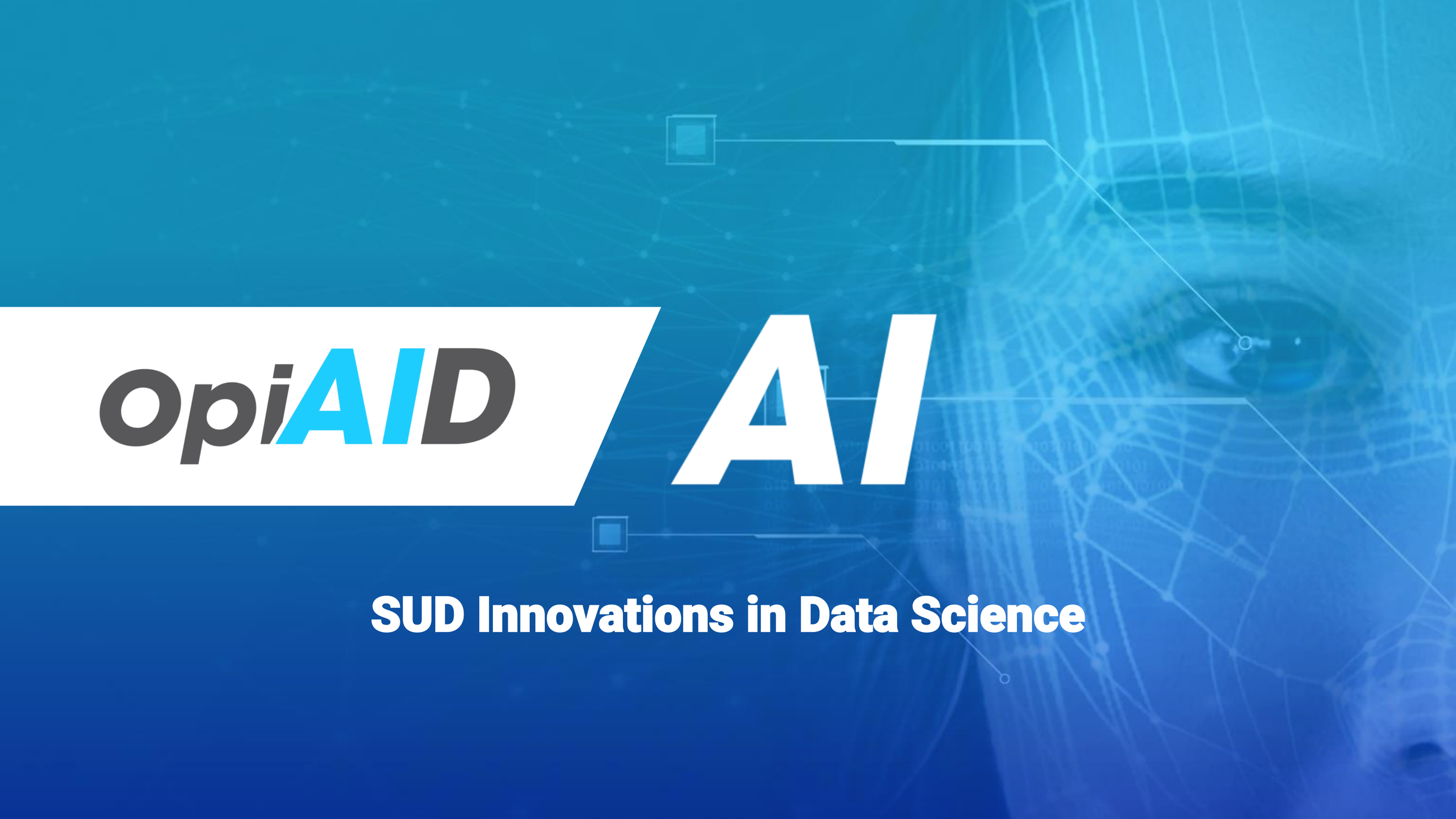

OpiAID
AI
SUD Innovations in Data Science

Disclosures

- The views and content presented in this talk are solely my own and do not represent the views, positions, or endorsements of Samsung, T-Mobile, OpiAID, or any other affiliated organizations.
- *Conflict of Interest: I am the CEO and Founder of OpiAID, a data science company focused on SUD.*

This is our “Why”

Because we love our neighbors in recovery.

Troubling Statistics in the USA

OpiAID

In the **US** someone overdoses every 5 minutes resulting in **107,000 deaths in 2024.**

25,000,000 people in the US are either using or abusing opioids.

2/3 Drop out of treatment in less than 6 months of beginning care.

- The opioid epidemic costs over **$500,000,000,000** to the US per year.
- Each opioid related ER visit is **$10,000 - $20,000** representing **8%** of a hospital's total cost.
- A 28-day program costs **$40,000** with a **98%** failure rate.

*sources provided upon request

The Problem – Poor Retention Leads to Treatment Failure

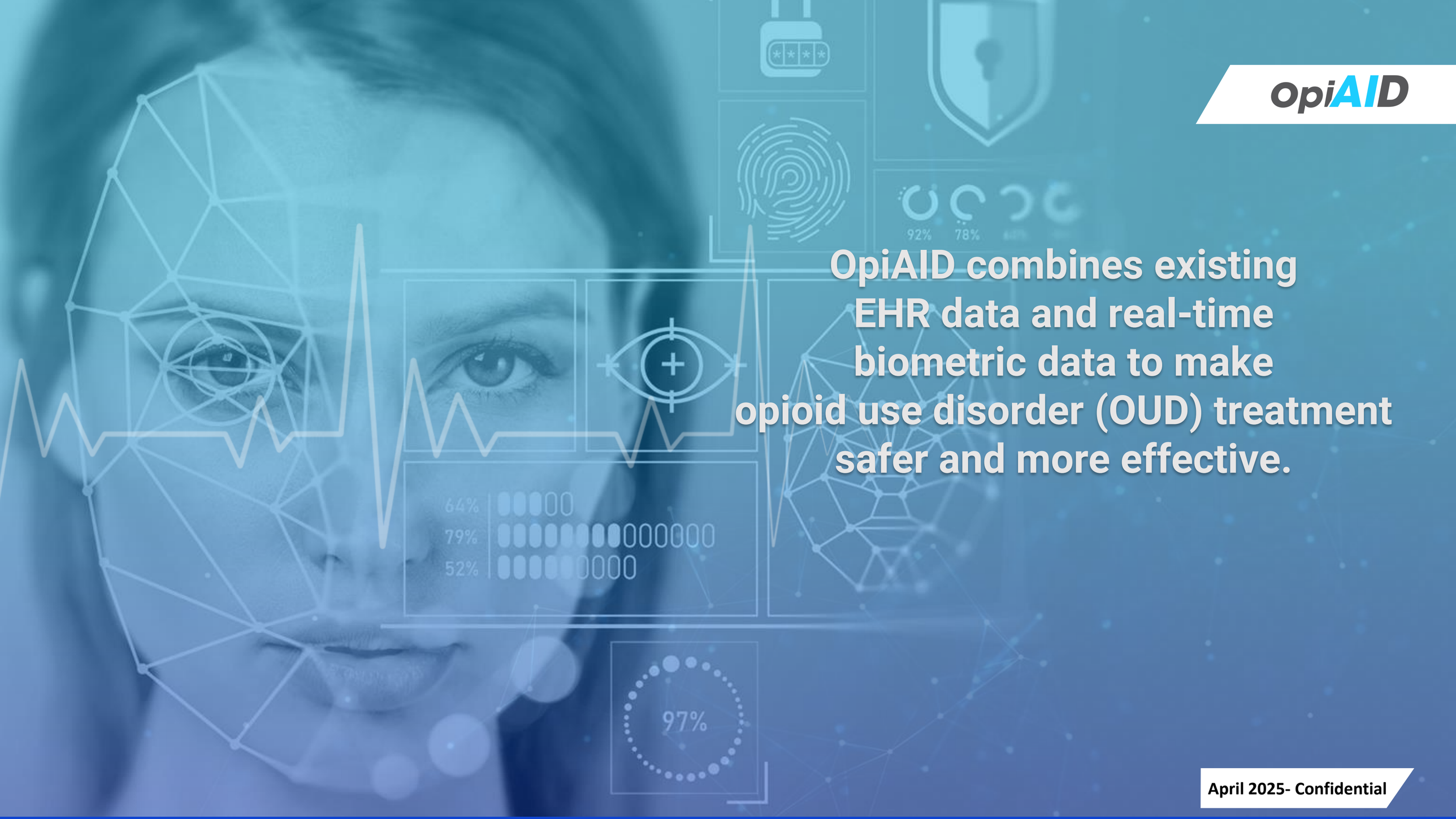
OpiAID

01 **Existing data -** data is siloed and not readily available to support clinical decision making.

02 **Remote insights-** no actionable insights exist on patients outside of the clinic that monitor symptoms indicating a likelihood of relapse.

03 **Objective data-** clinicians lack the objective data needed to distinguish between psychological stress and the symptoms of withdrawal.

04 **Patient engagement-** building trust, empowering patients, and ensuring their full understanding of the recovery process is highly challenging.



OpiAID

OpiAID combines existing EHR data and real-time biometric data to make opioid use disorder (OUD) treatment safer and more effective.

The OpiAID Platform
Biometric and EHR Integration

OpiAID

Biometrics

01

Activity

02

Demographics

03

Drug/Dose

04

The OpiAID Platform
Core Data Assets

OpiAID

Sources


Biometrics


Self-report


Clinics


Assessments

Insights


Stress Score


Sleep Score


Withdrawal


Depression


Temperature


Heart Rate


Activity


SpO2

Calories

Current

- 6.6B sensor rows*
- 95M patient seconds
- 26M patient event features
- 7 foundational wearable sensors
- 8100 Labeled MAT/WTH events

**millisecond precision*

Future


CMS


Illinois


Alaska


Tele-Health

The OpiAID Strengthband

OpiAID

MODE I

Collect/Learn

MODE II

Deploy/React

Research

Platform

Manage devices
Collect raw data
Transfer protocols
Monitor compliance

Insight

Fusion

Biometrics used to produce clinical and machine learning based features then fused with EHR data to produce actionable insights.

Realtime

Analytics

Multiple algorithms on the edge provide real-time information to EHR facilitating event driven messaging and survey delivery.

The OpiAID Platform
The high-level “how’

Collect

01

Consolidate and Simplify data from third-party solutions and wrist worn devices into a unified database in OpiAID’s cloud platform.

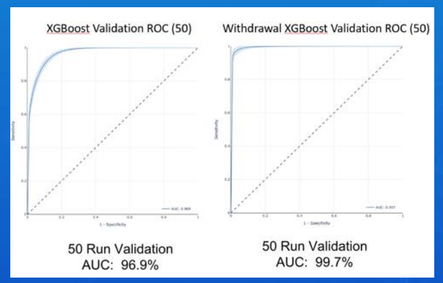
Production

AI

02

Leveraging raw biometric data OpiAID quantifies withdrawal, and detects acute use using commercially available wrist worn devices.

Production

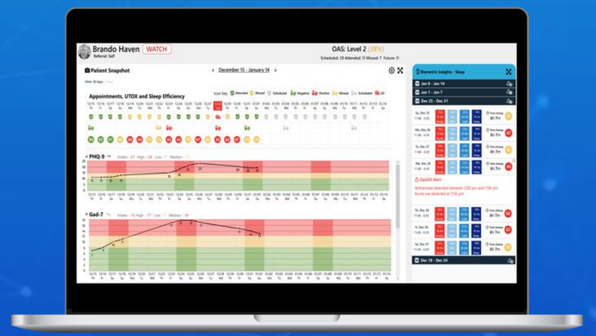


Alert

03

Integrating OpiAID's data aggregation with advanced biometric insights and alerts, empowering clinicians to create personalized treatment plans.

Development

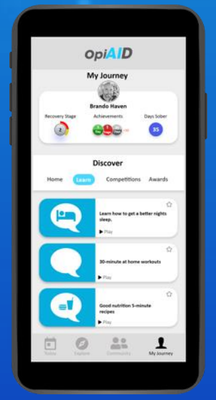


Support

04

Our app will enable family and peer support specialists to actively assist our neighbors in their recovery journey.

Future



Opioid Use Disorder: Addressing Treatment Challenges with MOUD

- **The Problem**
  - A significant barrier to effective treatment is the lack of objective measures to assess withdrawal symptoms.
  - Current reliance on subjective tools like the Clinical Opiate Withdrawal Scale (COWS) can result in ineffective dosing
- **Context**
  - Medications for Opioid Use Disorder (MOUD), such as buprenorphine, methadone, and naltrexone, are highly effective but underutilized due to dosing and access challenges tied to inconsistent withdrawal evaluations.
- **Implications**
  - **Inconsistent or incorrect withdrawal assessment can lead to:**
    - Suboptimal patient outcomes.
    - Reduced treatment adherence.
    - Increased risk of relapse or overdose.
- **Why Accurate Dosing Matters**
  - **Accurate dosing ensures:**
    - Stabilization of withdrawal symptoms.
    - Improved patient retention in treatment.
    - Enhanced long-term recovery success.

SAMHSA Federal Guidelines for Opioid Treatment Programs (2015)

- “Standing orders are defined as orders that apply equally to all persons fulfilling certain criteria. Examples of standing orders in general medical practice are those that allow influenza immunization to be administered to all patients who meet specific criteria.”

- “Standing orders regarding the dose, schedule, or re-administration of methadone are not appropriate because of the unique pharmacologic properties, the well-established potential for fatalities in the induction period, and the risk of relapse during medically supervised withdrawal. In an OTP, an unacceptable standing order is any formulaic policy generically applied to all patients meeting specific criteria or in specific situations without evaluation by a physician or other qualified healthcare provider. ***Common examples are dose adjustments made solely on the basis of a clinical opioid withdrawal scale (COWS).”***

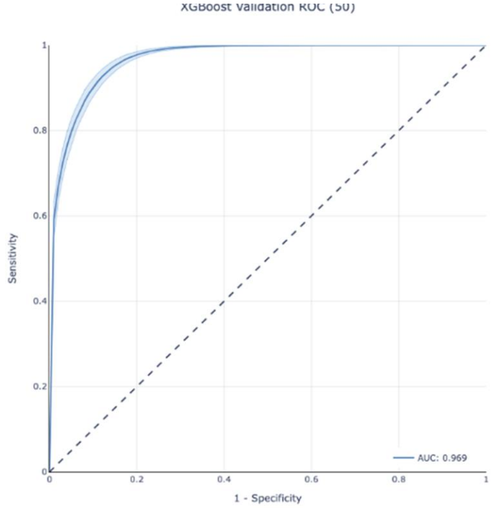
OpiAID

Results from SBIR Phase I:

We can detect acute use with 96.9% accuracy.

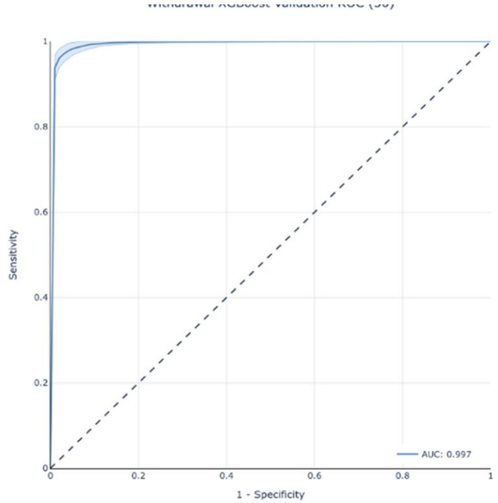
We can quantify signs of withdrawal with 99.7% accuracy.

Detection of Opioid Use



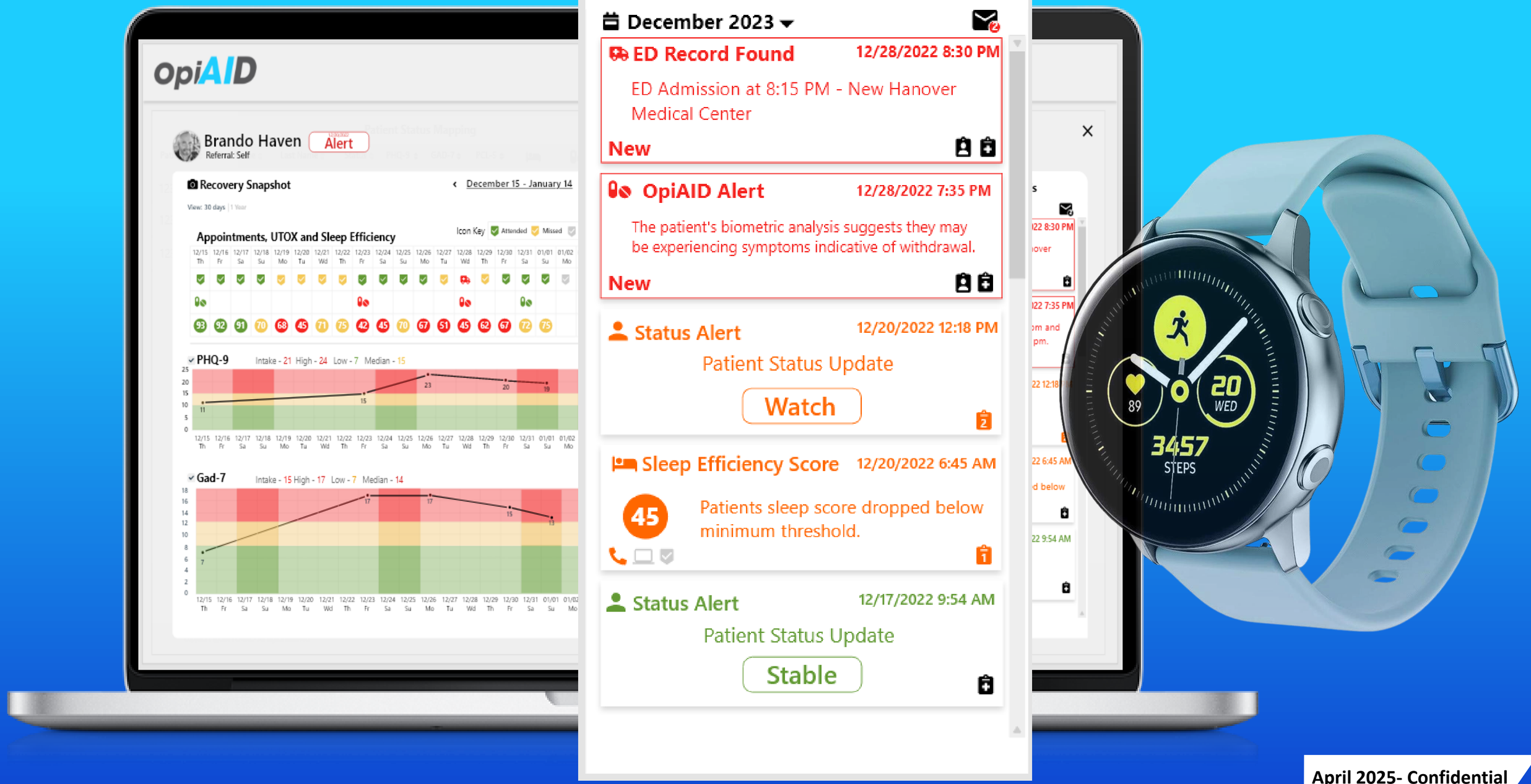
50 Run Validation
AUC: 96.9%

Detection of Withdrawal



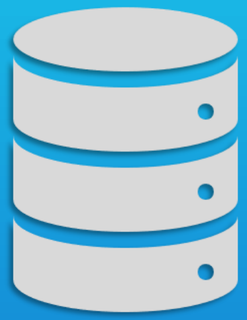
50 Run Validation
AUC: 99.7%

Strength Band Platform



The OpiAID Platform
Getting To AI

OpiAID



Data

Structured
Unstructured
Time Series

+

Machine Learning

Classical
Reinforcement
Ensemble
Deep

=

Automated Decisioning

Classifiers
Forecasting
Image Detection
LLM/GPT

The OpiAID Platform
Getting To AI

OpiAID

DATA

DATA SCIENCE

VALUE

CONSTRAINTS

DATA

Collection

Aggregation

Linking

DATA ENGINEERING

Cleaning

Normalizing

Exploration

Feature Engineering

MACHINE LEARNING

Algorithm

Training

Evaluation

Tuning

OPERATIONALIZING

Deployment

Monitoring

Delivery

COMPLIANCE

Legal

Ethical

Security

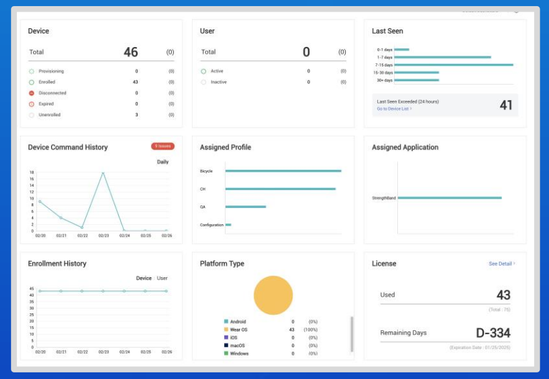
The OpiAID Platform
Operational Control

Device Control

01

Total device hardening and complete remote control. Rapid software and hardware updates with minimal device connectivity.

OpiAID



Device Monitoring

02

Data collection monitoring in near real-time measuring device health, connectivity cadence and wear compliance.

OpiAID

Patient Verification

03

Biometric passport established after two weeks of wear. No location data is ever captured by OpiAID.

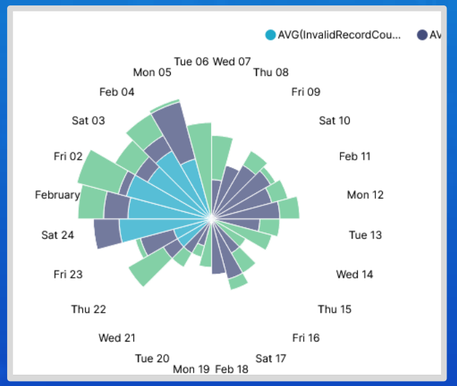
OpiAID

Patient Monitoring

04

Wear compliance, charge compliance and collection success allow clinics to coach and correct participants behaviors for more successful data collection.

Clinic



The OpiAID Platform
Operational Control with AI

OpiAID

Reactive

01 Monitoring dashboard provides metrics and alerts acted on at report time by the information technology team.

Incidence Response

Proactive

02 IT Operations Management Tool (ITOM) forecasts events based on past outages coupled with current utilization trends.

Event Forecasting

Predictive

03 Deep Learning issue detection and data driven Root Cause Analysis. Event data is fed into LMM for interpretation and RCA report creation.

LLM Guidance

Automated

04 LLM guidance automatically trigger common remediation scripts generated by system-specific large language models.

Self-Healing

The OpiAID Platform
Participant Verification

Deep Learning

•**No location tracking:** Compared to using GPS or other location services, this method doesn't track whereabouts, protecting privacy regarding movements and physical location.

•**Physiological data focus:** It only collects data related to heart rate (through PPG) and movement patterns (through accelerometry). This data, on its own, is **less identifiable** compared to location information.

•**Reduced risk of misuse:** Since location data is not collected, there's less risk of someone misusing it for tracking your movements or building a detailed profile of activities.

•**Enhanced anonymity:** Without location data, it might be more challenging to uniquely identify you based solely on PPG and accelerometry data, especially if the data is anonymized or aggregated.

The OpiAID Platform
Vital Insight

OpiAID

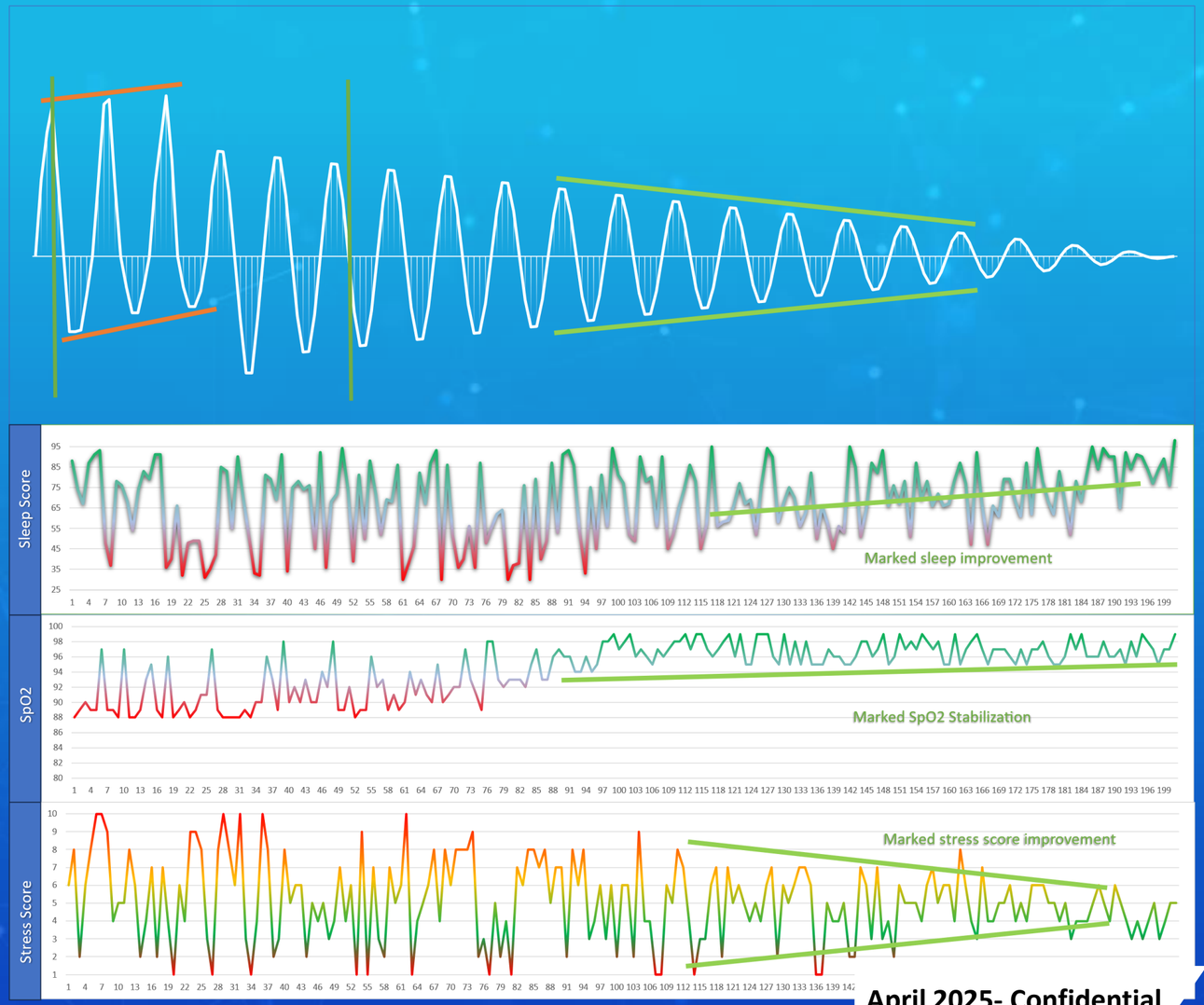
Deep Learning

•**CNN LSTM algorithm:**
This particular combination of neural networks excels at analyzing complex data like PPG, accelerometry, and HRV to understand patterns over time. It can learn subtle changes in your physiology that might indicate your body's response to the medication.

•**Identifying Acute Use:**
The algorithm might be trained to spot signs of illicit substance use to prevent over-dose during treatment.

•**Predicting drug response:**
The algorithm analyzes all the input data (PPG, temperature, accelerometry, sleep score, SpO2, and HRV) to find correlations between these measurements and how your body is responding to the current medication dosage.

•**Identifying withdrawal:**
The algorithm might be trained to spot early signs of withdrawal, such as changes in HRV, sleep disturbances, or specific movement patterns.



Before

Our Mission

After

CONTACT

OpiAID

David Reeser
Founder and CEO at OpiAID

David Reeser, CEO

OpiAID