

Venebio Opioid Advisor™

Personalized. Precise. Predictive.
Algorithms for **Clinical Decision Support (CDS)**



“Supporting Safer
Pain Management”™

Our algorithm-based CDS tool helps busy clinicians to **quickly identify patients at risk for life-threatening prescription opioid-related overdose, supporting safer prescribing and appropriate risk management.**

Confronting the Opioid Epidemic

Prescription opioid use and deaths from overdose or opioid-induced respiratory depression (OIRD) have increased dramatically in the United States. Annual prescription opioid-related fatalities more than quadrupled between 1999 and 2014 and remain a public health crisis.

Several instruments have been developed to assess the risk of opioid abuse and addiction. However, none of them provides useful, real-time, evidence-based information to a healthcare professional regarding *the risk of life-threatening overdose in medical users of prescription opioids*. Our research builds upon our previous work using U.S. Veterans Health Administration (VHA) data, as well as data from a national commercial health plan claims database, to develop a risk index to predict a patient's likelihood of experiencing an OIRD event.^{1,2,3}

Venebio Opioid Advisor is one of a suite of patent-pending, real-time, point-of-care healthcare algorithms designed to improve the treatment of common chronic health conditions.



U.S. Opioid Overdose Facts:

- Prescription opioid-related deaths more than quadrupled since 1999 to **18,893** in 2014^a
- **Over 80%** of these fatalities are considered unintentional^b
- More than **250 Million** opioid prescriptions are written annually – more than one for every U.S. adult^c
- **46 people die every day** from a prescription opioid overdose^c

^a CDC/NCHS, National Vital Statistics System, Mortality File. <http://www.cdc.gov/nchs/deaths.htm>

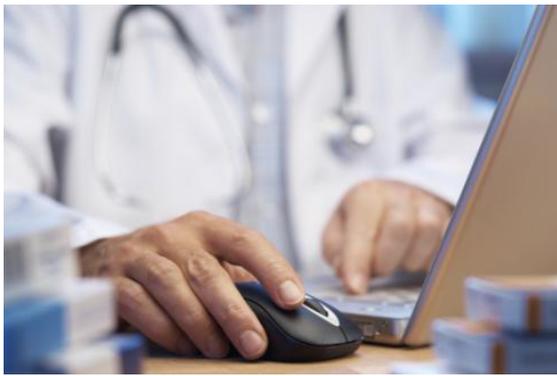
^b CDC: Risk for overdose from methadone used for pain relief—United States, 1999–2010. *MMWR Morb Mort Wkly Rep.* 2012;61(26):493–7

^c CDC Vital Signs. <http://www.cdc.gov/vitalsigns/opioid-prescribing/>

¹ Zedler BK et al. *Risk factors for serious prescription opioid-related toxicity or overdose among Veterans Health Administration patients.* *Pain Medicine* 2014; 15(11):1911-29.

² Zedler BK et al. *Development of a risk index for serious prescription OIRD or overdose in Veterans Health Administration patients.* *Pain Medicine* 2015; 16(8):1566-79.

³ Zedler BK et al. *Validation of a Screening Risk Index for Prescription Opioid Overdose or Serious Opioid-Related Respiratory Depression in a National Commercial Health Plan Claims Database.* Manuscript under review.



How it Works

Venebio Opioid Advisor uses dozens of demographic, clinical and lab variables automatically identified and retrieved from the patient's electronic medical record (or other source).

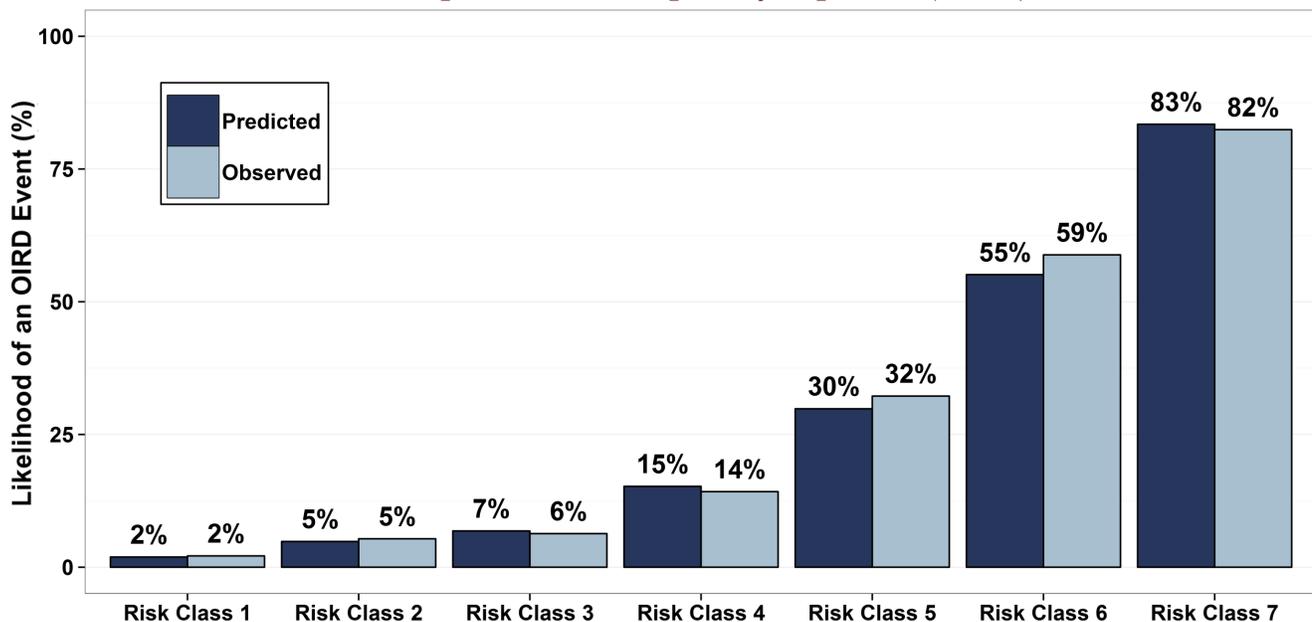
The algorithm uses proprietary logic to create a personalized risk profile for each patient and compares it to reference data gleaned from tens of millions of patients who have previously been treated with opioids. *Venebio Opioid Advisor* then provides the patient's personalized risk factor profile and predicted probability of experiencing OIRD during the next six months.

Venebio Opioid Advisor can integrate directly with electronic medical records, or with other systems such as an analytics warehouse, population health platform, or health information exchange (HIE). Further, the tool can be reliably and accurately operated by trained non-physician healthcare personnel (e.g., PAs, RNs, LPNs), saving valuable time for other clinicians.

Patients identified as high-risk could benefit from proactive risk mitigation measures, such as:

- Patient and caregiver education
- Increased caution in opioid selection and dose escalation
- Consultation with pain management specialists
- Close monitoring
- Prescription of take-home naloxone for administration by family members or caregivers as a potential rescue medication

Predicted Probability (risk classes by percentiles) vs. Observed Incidence of Overdose or Serious Opioid-Induced Respiratory Depression (OIRD)



From a study of 18 million patients who were dispensed a prescription opioid during 2009-2013 in one of the largest U.S. commercial health plan claims databases (*American Academy of Pain Medicine 2015 Annual Meeting, National Harbor MD; <http://www.painmed.org/2015posters/abstract-lb010/>*)