



# Center for Health Systems Innovation

Transforming Rural and Native American Health

## 2019 OSU Health Data Shootout: Overview, Rules, and What to Expect

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# Agenda

- Overview
- Timeline
- Judging & Prizes
- Rules & Legal Things
- Frequently Asked Questions
- Q&A Session
- Team Formation



# Overview

- What
  - A competition based on using data to develop a product, technology, or solution that can solve a problem
- Who
  - Open to OSU students of all majors, disciplines, skill levels, and backgrounds
  - Expertise in data science NOT required
- When
  - Get up to one month to work together in teams to develop a solution
  - Awards ceremony at the end to celebrate your accomplishments and see what your peers did
- Where
  - Work together either on-site or remotely, you decide (with your team, of course)



# Last, But Not Least: Why?



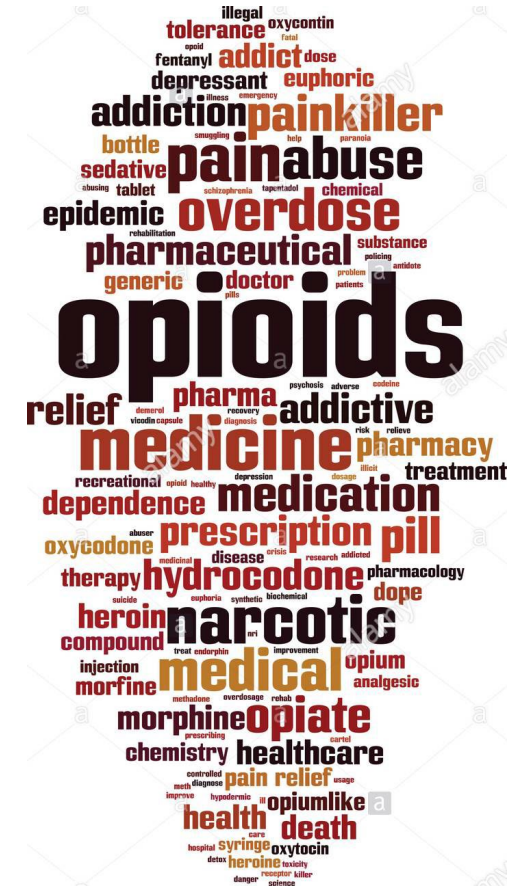
- What's in it for you?
  - Work on real health care data
  - Tackle actual problems in health care
  - Get to know students from other disciplines
  - Apply your expertise and knowledge
  - Network with professionals
  - Win awesome prizes
  - Get exposure to thinking like an entrepreneur
  - Feel good about making an impact on health care

Most importantly...

**Have Fun!**

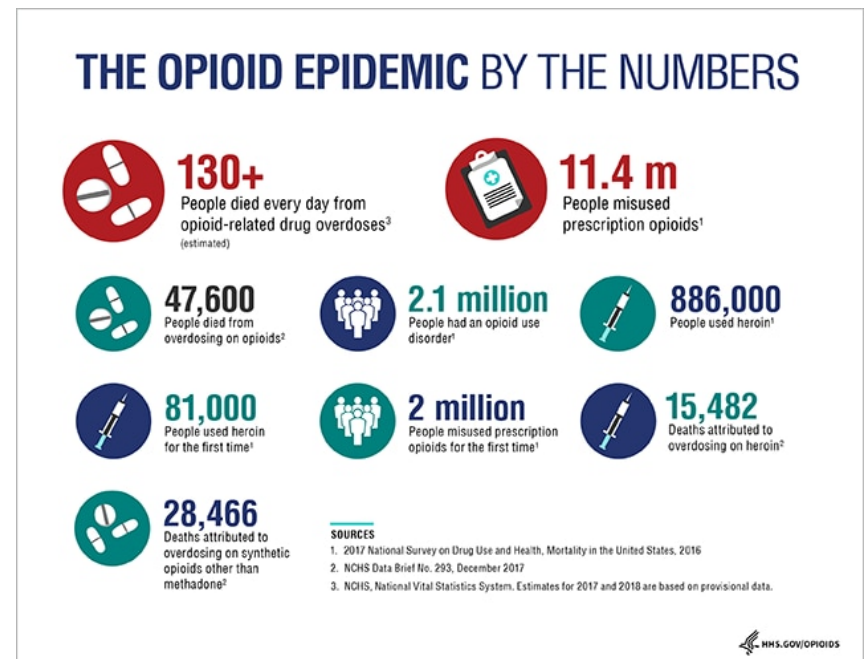
# The Problem Statement: Opioids

- What are opioids?
  - Opioids are prescription drugs used to treat moderate to severe pain
  - Opioid drugs include oxycodone, hydrocodone, morphine, methadone, and fentanyl
- Why are they addictive?
  - Opioids work by interacting with opioid receptors to block pain
  - A dangerous side effect of opioids is that they stimulate endorphins, which are responsible for producing feelings of well-being and pleasure
  - Over time, opioids cause the body to slow its natural production of endorphins, which triggers a dependency on the drug
  - Additionally, as the body builds up tolerance, increasingly larger doses of opioids are needed to produce the same effect
- What is the opioid epidemic?
  - The health crisis caused by the large-scale misuse of and addiction to opioids



# Some Quick Facts

- In 2016, health care providers across the US wrote more than 214 million prescriptions for opioid pain medication—a rate of 66.5 prescriptions per 100 people.
- Roughly 21 to 29 percent of patients prescribed opioids for chronic pain misuse them.
- Between 8 and 12 percent develop an opioid use disorder.
- An estimated 4 to 6 percent who misuse prescription opioids transition to heroin, an illicit opioid
- CDC estimates that the total "economic burden" of prescription opioid misuse in the US amounts to \$78.5 billion a year
  - This includes the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement



Department of Health and Human Services  
(<https://www.hhs.gov/opioids/about-the-epidemic/index.html>)

Source: [7 Staggering Statistics about America's Opioid Epidemic](#)

# Responding to the Epidemic

- In 2017, the US Department of Health and Human (HHS) Services launched a 5-point strategy to help communities combat the opioid crisis



**Better**  
addiction  
prevention,  
treatment,  
and recovery  
services



**Better** data



**Better** pain  
management



**Better**  
targeting of  
overdose  
reversing  
drugs



**Better**  
research

Source: [5-Point Strategy to Combat the Opioid Crisis](#)

Confidential and Proprietary

# The Important Role of Data

- Out of the five strategic points outlined by HHS, data is the 2nd pillar to HHS' approach
- According to the CDC, a public health approach—with more comprehensive and timely data—is needed to respond to the epidemic
  - Data helps us to understand the extent of the epidemic
  - Data allows us to provide resources where needed
  - Data enables us to evaluate success of prevention efforts
- In this competition, we will be using data derived from the Cerner Health Facts® EHR (electronic health records database) database to develop a solution





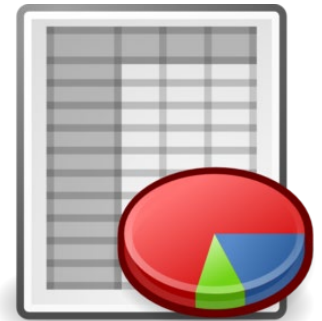
# The Competition

- Your objective:
  - Develop an innovative solution that can be used to improve care or outcomes for patients suffering from opioid dependency
  - The solution can address any problem, but MUST be implementable
  - Although the solution should be based on data or some insight derived from the data, it does NOT have to be a “data” solution
  - The solution can incorporate any strategy including data visualizations, predictive tools, services, apps, process improvements, educational materials, and anything you can think of
  - Think outside the box and aim for the stars!



# The Data

- You will receive a set of data on patients who have been diagnosed with opioid dependence during an encounter in 2013:
  - The data contains information on 53,541 unique patients, with 84,221 visits
  - Note that some patients may have more than one visit!
- The dataset will contain information regarding:
  - Patient demographics
  - Information about the latest encounter (visit)
  - Attributes about the hospital/clinic where the encounter occurred
  - Diagnosis information
  - Medication information
  - Vital sign measurements taken during the encounter (if available)
  - Lab test results from the encounter (if available)
  - History information on number of visits and associated comorbidities
  - Future information on number of visits and related outcomes
- The data is organized into current, past (within one year), and future (one year afterward)



# Dataset Structure

## Current

### Demographics/Visit Information

- Hospital attributes
- Patient demographics
- Visit length
- Visit type (inpatient, outpatient, ER)
- Payer

### Diagnosis Information

- Overdose diagnosis
- Adverse effect from opioid

### Drug Information

- Opioid drug flag
- Benzodiazepine flag
- Naloxone flag
- Drug-assisted therapy flag
- Corticosteroid flag
- Anticonvulsant flag
- Antidepressant flag

### Clinical Events (Averaged)

- Diastolic blood pressure
- Systolic blood pressure
- Heart rate
- Respiratory rate
- Glasgow Coma Score

### Lab Data (Averaged)

- Benzodiazepine urine test
- Cocaine urine test
- White blood cell count
- Mean corpuscular hemoglobin
- Hematocrit

## Past

### Comorbidities (within past 1 year)

- Chronic Diseases
  - Cancer
  - Diabetes
  - Asthma/COPD
  - Hypertension
  - Heart disease
- Mental Health/ Substance Abuse
  - Mental health
  - Alcohol abuse
  - Smoking
- Pain
  - Chronic pain (includes back pain, arthritis, acute musculoskeletal disorder)
  - Abdominal pain
  - Headache/migraine
  - Unspecified/generalized pain
- Hepatitis C (3 months prior)

### Drugs (within past 1 year)

- Number of opioid doses
- Total duration of opioid prescriptions

### Visits (within past 1 year)

- Number of past visits
- Number of ER, inpatient, and outpatient visits

## Future

### Outcome (within one year after)

- Number of ER, inpatient, outpatient, and clinical visits
- Opioid dependence diagnosis
- Opioid overdose diagnosis
- Adverse effects
- Naloxone prescription
- Drug-assisted therapy prescription
- Mortality
- ER visit (within 30 days)
- Inpatient admission (within 30 days)

# So...Much...Data...Where to Start?



- Do **NOT** try to analyze everything at once in hopes of finding something!
  - You will get overwhelmed
  - You will get hopelessly lost
- Instead...
  - Identify a few problems that you'd like to solve
    - The dataset was put together with the intent to allow teams to pursue many different ideas and directions
  - Determine what kind of data or output from the data you would need
  - Review the dataset to see if it has the information needed
    - If not, can you derive it?
  - Analyze the data to see if it allows you to address your problem statement(s)
    - If not, did you identify something interesting or important in the process?
  - Incorporate your findings into an innovation
  - Put together a presentation and share!

# What to Expect



- Today
  - Form teams
  - Designate team lead
  - Start brainstorming!!!
- Next Four Weeks
  - Work together in teams to develop solution
  - Put together a presentation summarizing work
  - Hand in work before deadline on 11:59 PM on March 24, 2019
- Awards Ceremony
  - Meet and network with your peers and other professionals
  - See the top teams present and the winning ideas
  - Enjoy a free lunch in the process
  - Receive a certificate for participating!

# Judging Criteria

- Data Finding/Discovery (30%)
  - Refers to the insight obtained from data and the methodology used
  - The methodology can be based on traditional analytical methods or may incorporate new technologies
  - If incorporating a novel technique, be sure it is backed by literature review
- Innovation (30%)
  - Refers to how novel or radical the solution is in addressing a problem
  - Can apply to either the idea itself, the methodology, creativity of the solution, or uniqueness of output
- Implementation & Impact (30%)
  - Refers to how solution will change health care practices and outcomes
  - Be sure to discuss how the solution would be implemented, the specific problem it addresses, and the anticipated impact/benefits of the solution
- Presentation (10%)
  - Refers to organization and clarity of the presentation
  - Results should understandable, visuals should be appealing, and presentation should be smooth



# Prizes



- Each participant will receive a certificate of participation
- Prize money for the top three teams are:
  - 1<sup>st</sup> Place: \$1,000
  - 2<sup>nd</sup> place: \$500
  - 3<sup>rd</sup> place: \$250

# Let's Review the Rules Before We Start

1. All participants must be OSU students
2. Teams MAY NOT seek for advice or help from professors or outside professionals; let's be fair!
3. Each team may only submit **ONE** solution
4. No late submissions are accepted
5. Submissions must reflect original work; plagiarize and your team will be disqualified!
6. Because the data is real and proprietary data from Cerner Health Facts®, each participant MUST abide by the legal agreements





# Legal Documentation

- **Confidentiality Agreement**
  - Will not release or share data without permission
- **Data-Sharing Agreement**
  - Agree to use data for this competition only (no other uses)
  - Agree to delete data after competition ends
  - Agree not to share or publish findings without first getting approval
  - Agree to acknowledge Cerner and CHSI in any work that is shared with others
- **Code of Conduct**
  - Agree to behave in a professional manner
  - Agree to be honest
  - Agree to respect others
- **Model Release Form**
  - Indicates that you are okay if we take any videos of you and put it online or public



# Frequently Asked Questions

1. Can I use the data for a class project or a conference submission?

Unfortunately, no. This data was heavily modified from the original raw data as extracted from Cerner Health Facts® to fit the format of this competition. Without understanding how the data was manipulated, it is very easy to draw erroneous conclusions.

2. Can I combine the data provided with data from other sources?

Yes, you can. Just be sure to identify the source and make it clear how you are using that data as part of your solution.

3. What tools can I use?

You can use any tool you'd like. We are open to different possibilities. Just be sure to mention what tools you used when you turn in your results.

4. Can I share my findings or results on a website portfolio or through other means?

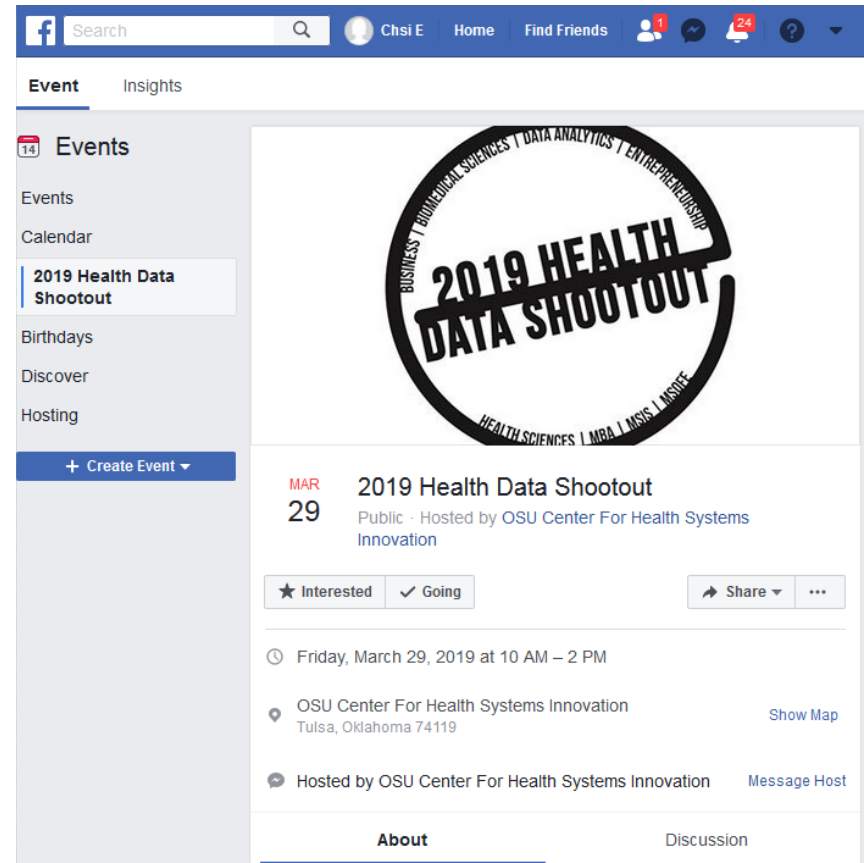
Yes, but make sure to let us know before you share so that we can review. Once we approve, you can definitely share, and we might also make an announcement and link to your work on our webpage.

5. Can I further develop my idea into a commercial application after the event?

Yes, we do encourage the development of ideas into commercial solutions and products. However, it will be necessary to inform us first so that we can work with you to avoid violating any confidentiality and IP agreements.

# Where to Turn for Additional Help

- Email:  
[osuchsi@okstate.edu](mailto:osuchsi@okstate.edu)
- Facebook:
  - Search for “2019 Health Data Shootout”
  - For general questions, use FB, since others may have a similar question
  - Can also use FB as a discussion forum



# Any Questions?

