

## Using Hospital Electronic Health Records to Monitor Drug Use Trends in Overdose Patients

### List of Collaborators

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### Background

The Opioid Use Disorders project, a collaboration between the University of Maryland's Baltimore (UMB) and College Park (UMCP) campuses, was launched in mid-2017 to address the opioid epidemic in the state of Maryland. Opioids are a class of drugs that include the illegal drug heroin, as well as synthetic opioids such as fentanyl, and pain relievers available legally by prescription, such as oxycodone, hydrocodone, morphine, and many others. Regular use, even as prescribed by a doctor, can lead to dependence and, when misused, opioid pain relievers can lead to addiction, overdose incidents, and death<sup>1</sup>. The goal of the project is to better understand opioid use disorder, develop treatment strategies, and create recommendations for treatment, research, and education.

### Purpose of the Epic Sub-Study

University of Maryland Medical System (UMMS) hospitals use the Epic electronic health record (EHR) software to track patient information. This sub-study was designed to use this readily available data to conduct an epidemiologic study of the drugs detected in patients presenting to the emergency department (ED) to better understand patterns in drug use and availability. If the pilot study proves to be successful, it may encourage routine analysis of drug toxicology test results stored in EHRs in Maryland and other states.

### Methods

The Epic EHR software contains clinical information about approximately 120,000 ED visits annually at several UMMS hospitals. Routinely collected electronic records of drug toxicology test results are being used to track the types of drugs detected in patients presenting to the ED with a chief complaint and/or diagnosis of overdose or drug-related health problems. The hospitals tested for the following 8 drugs: amphetamines, barbiturates, benzodiazepines, cocaine, marijuana, methadone, PCP, and opiates.

### Sample Characteristics

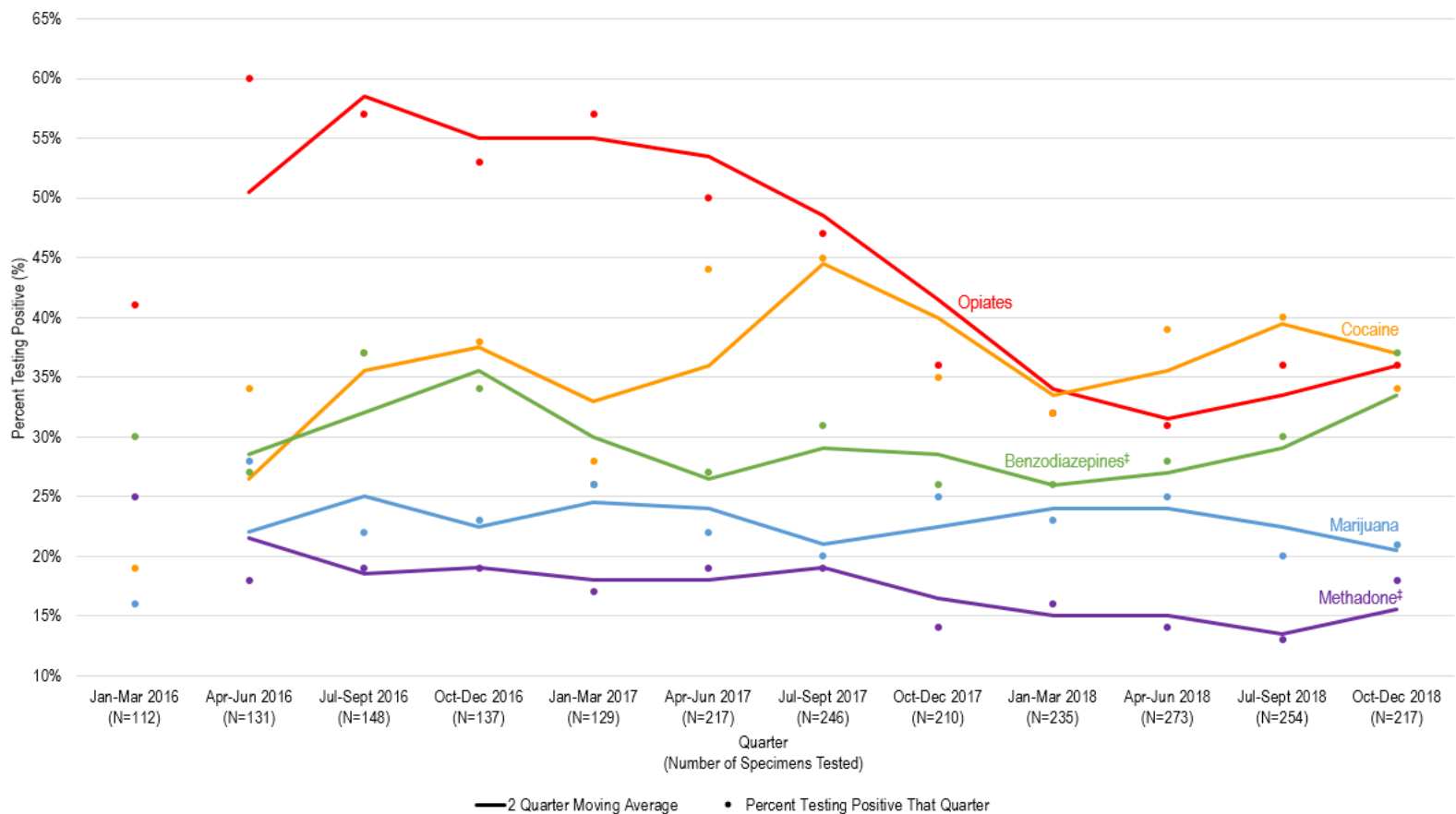
UMB sent de-identified EHR data for 6,607 patients presenting to four Baltimore area EDs from January 2016 through December 2018. Of these, 2,309 had drug toxicology test results. Toxicology screens are typically ordered for suspected drug users, persons with psychiatric illnesses, or persons with an altered mental state.

### Results

Figure 1 shows the percentage of specimens that tested positive for specific drugs each quarter. The percentage of specimens testing positive for opiates peaked at 60% in April-June 2016, hit a low of 31% two years later in April-June 2018, and has now rebounded to 36% in October-December 2018. This trend must be interpreted with caution (see Implications).

## Figure 1: Percentage of Specimens Testing Positive for Specific Drugs<sup>a</sup>, By Quarter

(N=2,309 specimens collected from ED patients from four Baltimore hospitals<sup>b</sup> from January 2016 through December 2018)



Notes: <sup>a</sup>Amphetamines, Barbiturates, and PCP results not shown because <10% tested positive each quarter. 21% of specimens contained none of the drugs tested for. <sup>b</sup>Data from the following hospitals: University of Maryland Baltimore Washington Medical Center, toxicology results available beginning May 2017; University of Maryland Medical Center-Midtown Campus; University of Maryland Medical Center; University of Maryland St. Joseph Medical Center. <sup>‡</sup>N's vary slightly because not all specimens were tested each quarter.

### Implications

The decline in the percentage of specimens testing positive for opiates was not expected. The opiate screen used by the hospitals included in the study primarily detects codeine and the heroin metabolite morphine, but not fentanyl or other synthetic opioids. The decline in opiate positives likely does not reflect patterns of use of synthetic opioids, such as fentanyl, which are not detected by the hospital screen<sup>2</sup>. Expanded testing of a small number of newly collected patient specimens may inform us whether the opiate screen used by the hospitals is missing a larger opioid problem.

In the midst of a statewide emergency stemming from an opioid epidemic, Maryland could benefit from further analysis of existing ED toxicology data to gather more rapid information on the scope and trajectory of the problem. This pilot study could pave the way for Baltimore to acquire a new testing protocol and serve as a model for expansion to other cities across the United States.

### References

1. National Institute on Drug Abuse. (2018). Opioids. Retrieved from <https://www.drugabuse.gov/drugs-abuse/opioids>.
2. Dezman, Z.D.W., Felemban, W., Bontempo, L.J., & Wish, E.D. (2019). Evidence of fentanyl use is common and frequently missed in a cross-sectional study of emergency department patients in Baltimore, Maryland. *Journal of Clinical Toxicology*. <https://doi.org/10.1080/15563650.2019.1605078>

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