

Utilization of Syndromic and Keyword Surveillance to Monitor and Respond to the Opioid Epidemic in Maryland

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OBJECTIVE

To examine unintentional non-fatal opioid-involved overdose emergency department (ED) visit trends across Maryland during the years 2014 to 2017.

BACKGROUND

The Maryland Department of Health (MDH) Office of Preparedness and Response (OP&R) Biosurveillance Program utilizes an electronic web-based enhanced syndromic and keyword surveillance system known as the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) for early identification of emerging public health threats. Maryland's ESSENCE is a uniquely robust syndromic surveillance system including data from all emergency departments (46 within acute care hospitals, three freestanding) across the state, receiving chief complaint data within seven hours of the visit date and time from a majority of hospitals reporting to our health information exchange platform.

Increases in drug overdoses and deaths in Maryland since 2010, reflecting the rising trend in the United States, have resulted in a declared State of Emergency by the highest officials (Maryland as of March 1, 2017). Unintentional overdoses and deaths are potentially preventable with substance abuse interventions and outreach. ED syndromic data can serve as an early warning system to alert communities to a rise in opioid overdoses. These emergency declarations highlight the need to improve the timeliness of data, for both fatal and nonfatal overdoses, to inform outreach and intervention efforts targeting Marylanders in need of substance abuse prevention and treatment services.

METHODS

OP&R epidemiologists developed a case definition and corresponding query for syndromic surveillance to monitor ED visits. The case definition and query were developed in collaboration with MDH subject matter experts, the Centers for Disease Control and Prevention, and the Consensus Recommendations for National State Poisoning Surveillance. As a result, the current case definition is the total number of ED visits by unintentional non-fatal opioid-involved overdose due specifically to recent ingestion or exposure to any type of opioid drug, as well as those with medical and non-medical use of a prescription opioid or where the substance is not specified. The query captures data to identify ED visits by chief complaint (CC), discharge diagnosis (DD), and clinical impression (CI) fields including International Classification of Diseases, Ninth/Tenth Revision, Clinical Modification (ICD-9/10-CM) diagnostic codes; and/or free text indicating opioid use, and a word or abbreviation indicating an overdose (e.g. "OD" or naloxone) were classified as a non-fatal opioid-involved overdose. ESSENCE unintentional non-fatal opioid-involved ED visit data were examined from 2014 to 2017 across Maryland.

RESULTS

From January 2014 through December 2017, a total of 47,635 ED visits from across Maryland were suspected opioid-involved overdoses. During this four-year period, the overall percentage change of unintentional non-fatal opioid-related emergency department visits showed a significant increase [approximately 450%] – an average increase of 91% per year [Table 1]. While overdose ED visits continue to increase during this time period, the upward trend appears to be plateauing [Figure 2]. During this time, a total of 19,845 ED non-fatal opioid-involved visits were heroin-related (42%) and a total of 90 ED visits were fentanyl-related (1%). OP&R previously validated heroin-related ED CC data by comparing Hospital Services Cost Review Commission (HSCRC) ICD-9 coded discharge data in 2015 and found data to be accurate based on historical trends between the two data sources.

From January through December 2017, distribution of ED visits by patient resident location were highest in the following four jurisdictions of Baltimore City, Baltimore County, Anne Arundel County, and Montgomery County [Figure 1].

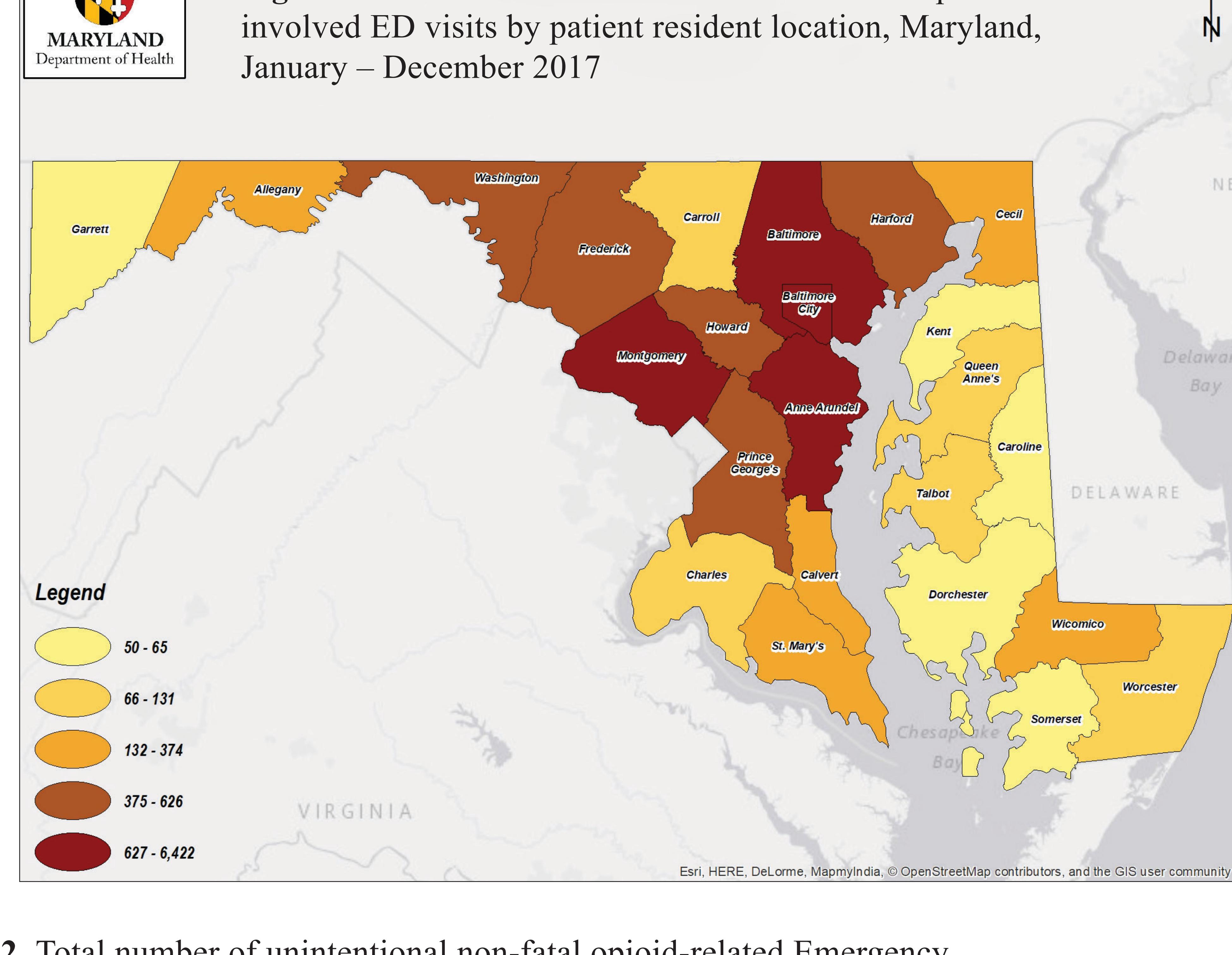
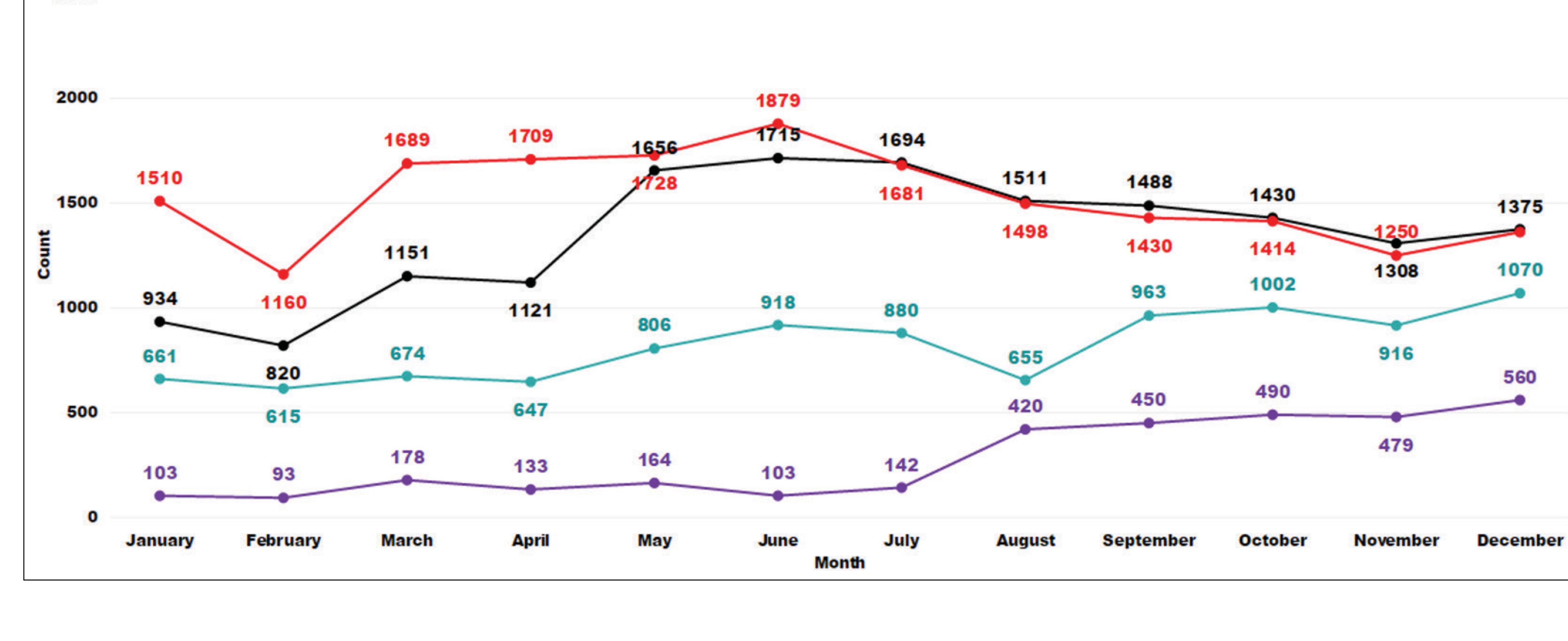


Table 1. Comparison of total number of unintentional non-fatal opioid-related Emergency Department visits occurring in Maryland, January 1, 2014 through December 31, 2017

Year	2014		2015		2016		2017	
	Count	Percent Change	Count	Percent Change [2014 - 2015]	Count	Percent Change [2015 - 2016]	Count	Percent Change [2016 - 2017]
Total Number of ED Visits Opioid-related	3,315	(-)	9,807	196%	16,203	65%	18,332	13%
Total Number of ED Visits Heroin-related	1,395	(-)	3,601	158%	6,750	87%	8,099	20%
Total Number of ED Visits Fentanyl-related	2	(-)	6	200%	26	333%	56	115%

Figure 2. Total number of unintentional non-fatal opioid-related Emergency Department visits occurring in Maryland, January 1, 2014 through December 31, 2017



CONCLUSION

Addressing this nation and statewide opioid crisis requires collaboration and coordination across multi-disciplinary partners. Near real-time, accurate data sharing is one important tool for those partners to not only fight this epidemic, but to also plan and prevent overdoses by anticipating trends. To address this need, OP&R's opioid-involved query enables monitoring of trends in overdose-related morbidity, targeting of interventions, and increased situational awareness, including daily reporting to the Governor and weekly reporting to preparedness partners, including ED hospital planners and physicians. Next steps include ongoing data validation and refinement as well as supporting local health departments in refining case definitions for their jurisdictions using the described methods and integrating them into existing syndromic surveillance systems for a more localized response.

LIMITATIONS

The findings are subject to at least two limitations. First, a three- to four-week delay may occur in the submission of discharge diagnosis codes that affects the ability to detect overdoses when free text information is unavailable or sparse. In addition, availability and completeness of data vary across hospitals and their chosen health exchange platform. Second, conducting syndromic surveillance on fentanyl-related overdoses is challenging given limitations in toxicology testing. Therefore, the counts presented in this report may underestimate the current trend in opioid-related overdoses.

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