

Suspected Overdoses during COVID in Kentucky: Analysis of Emergency Medical Services, Syndromic Surveillance, and Vital Statistics Data

Peter Rock
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Data Sources:

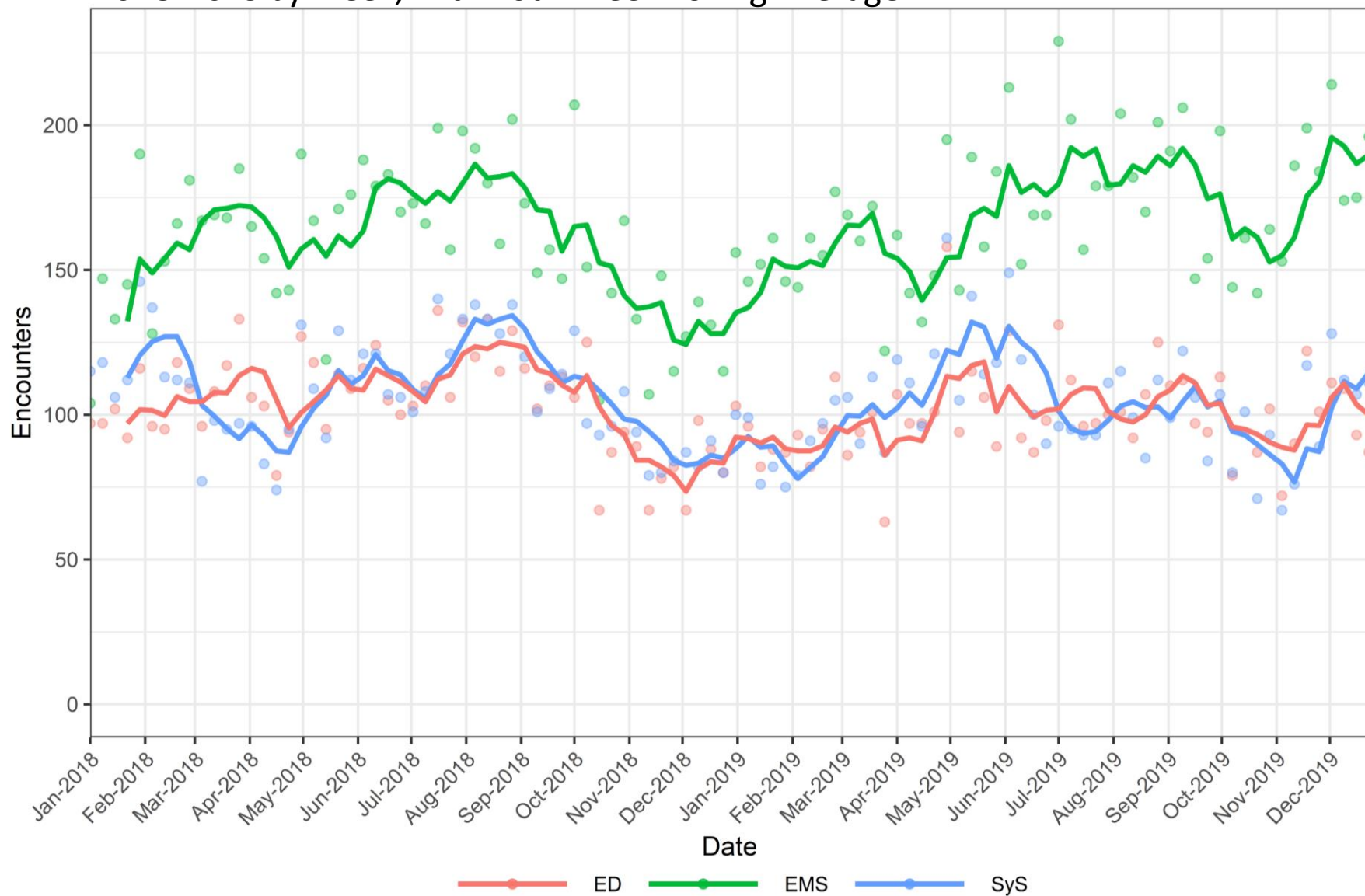
- EMS:
 - A rapid push of preliminary raw data is shared weekly from data owner ahead of policy due dates.
 - Provides secondary data source for comparison to syndromic.
 - Captures some non-emergency department (ED) cases.
- Syndromic:
 - During COVID, total number of ED encounters declined. Also variable hospital participation.
 - Stable hospitals were considered for analysis.
- Vital Statistics (death records)
 - Analysis based on completed/coded fatal **drug** overdoses.
 - As cases approach real time, completeness affects interpretation.

Validation of Rapid Surveillance Systems

- In order to rely on rapid surveillance systems (EMS|SyS); validation of definitions is needed.
- In lieu of a case-record review study:
 - Compare trends
 - Caution on proper techniques as outlined by Dean et al.
 - Stationarity, prewhitening, then apply cross-correlation function

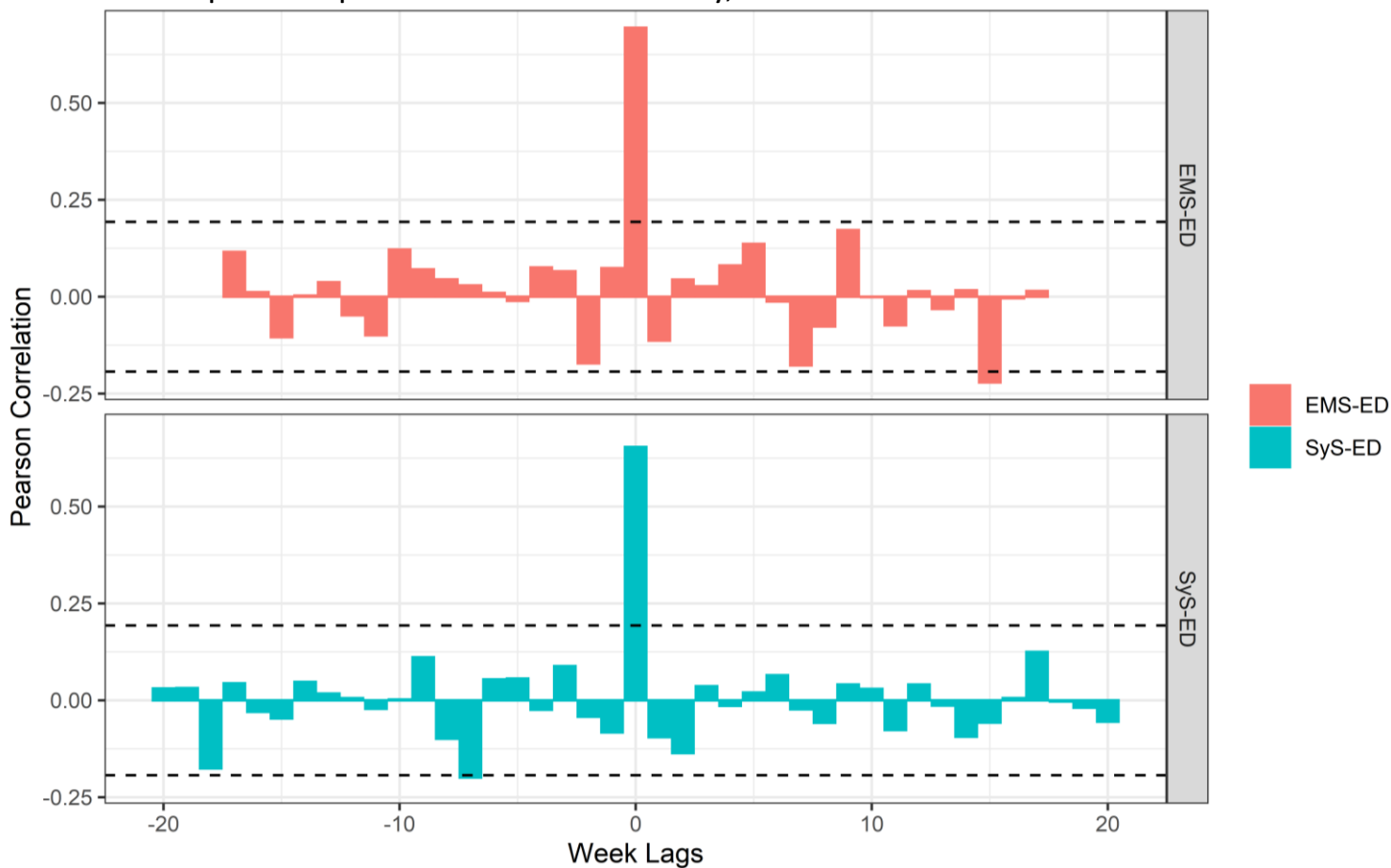
Dean, RT & Dunsmuir, WTM (2016). Dangers and uses of cross-correlation in analyzing time series in perception, performance, movement, and neuroscience: the importance of constructing transfer function autoregressive models. *Behavior Research Methods*, 48(2), 783–802. <https://doi.org/10.3758/s13428-015-0611-2>

Suspected Opioid Overdose Encounters in Kentucky, 2018-2019 by Week, with Four-Week Rolling Average



CCF Results

Cross-Correlation Function Between Syndromic/EMS and ED Discharge Data for Suspected Opioid Overdose in Kentucky, 2018-2019

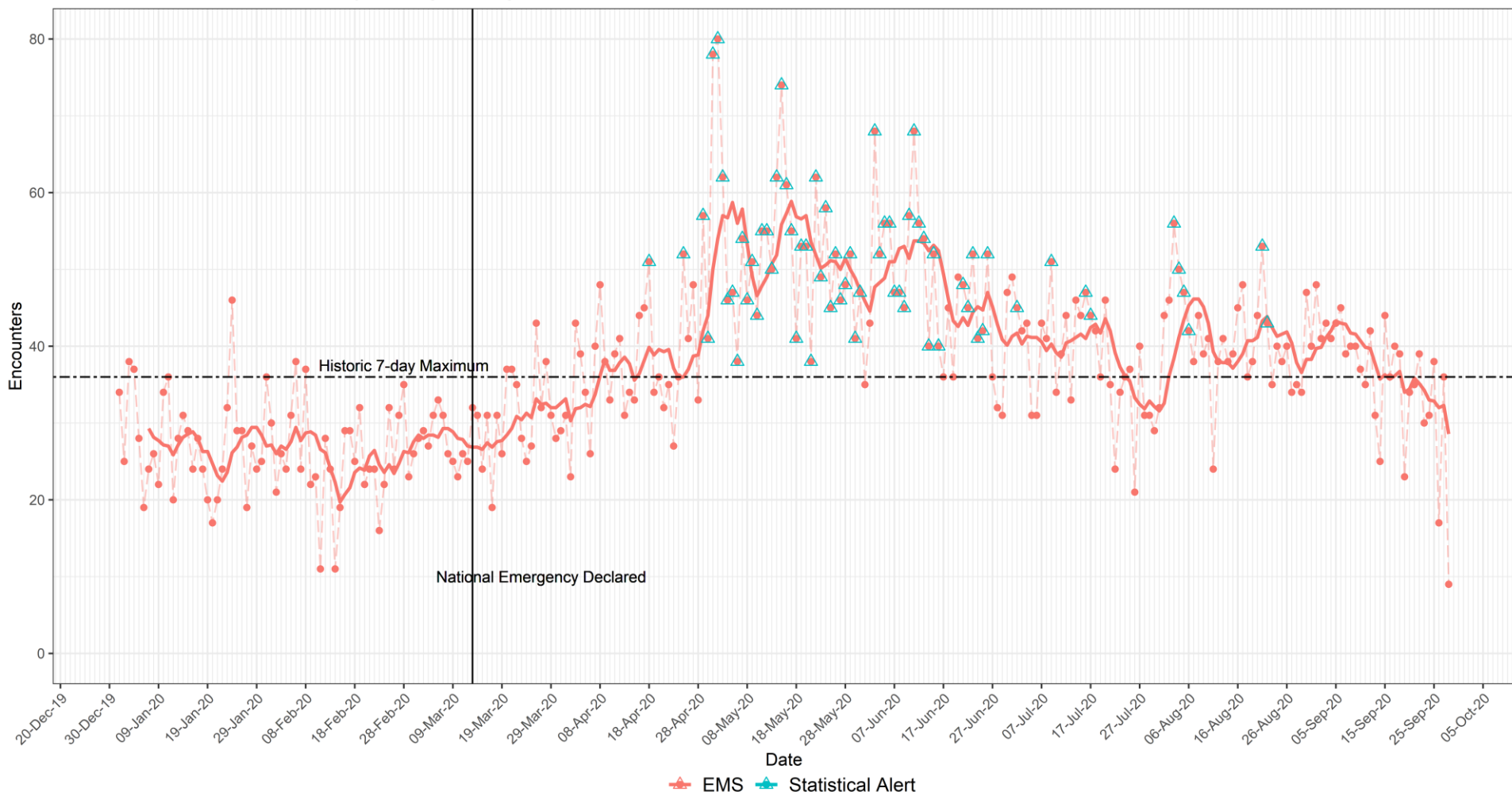


The dashed horizontal lines represent the 95% confidence limits around 0. The graphs visually indicate a moderately strong correlation at lag of 0, i.e. simultaneity.

COVID and Overdose

- Early statistical alerts in EMS daily count of opioid overdose
- Similar pattern shift seen in syndromic
 - Surveillance impacted by drastic shift in all-type encounters (example, rate per 10,000 visits).
- Early death records demonstrated similar patterns, though lagged longer in terms of data availability

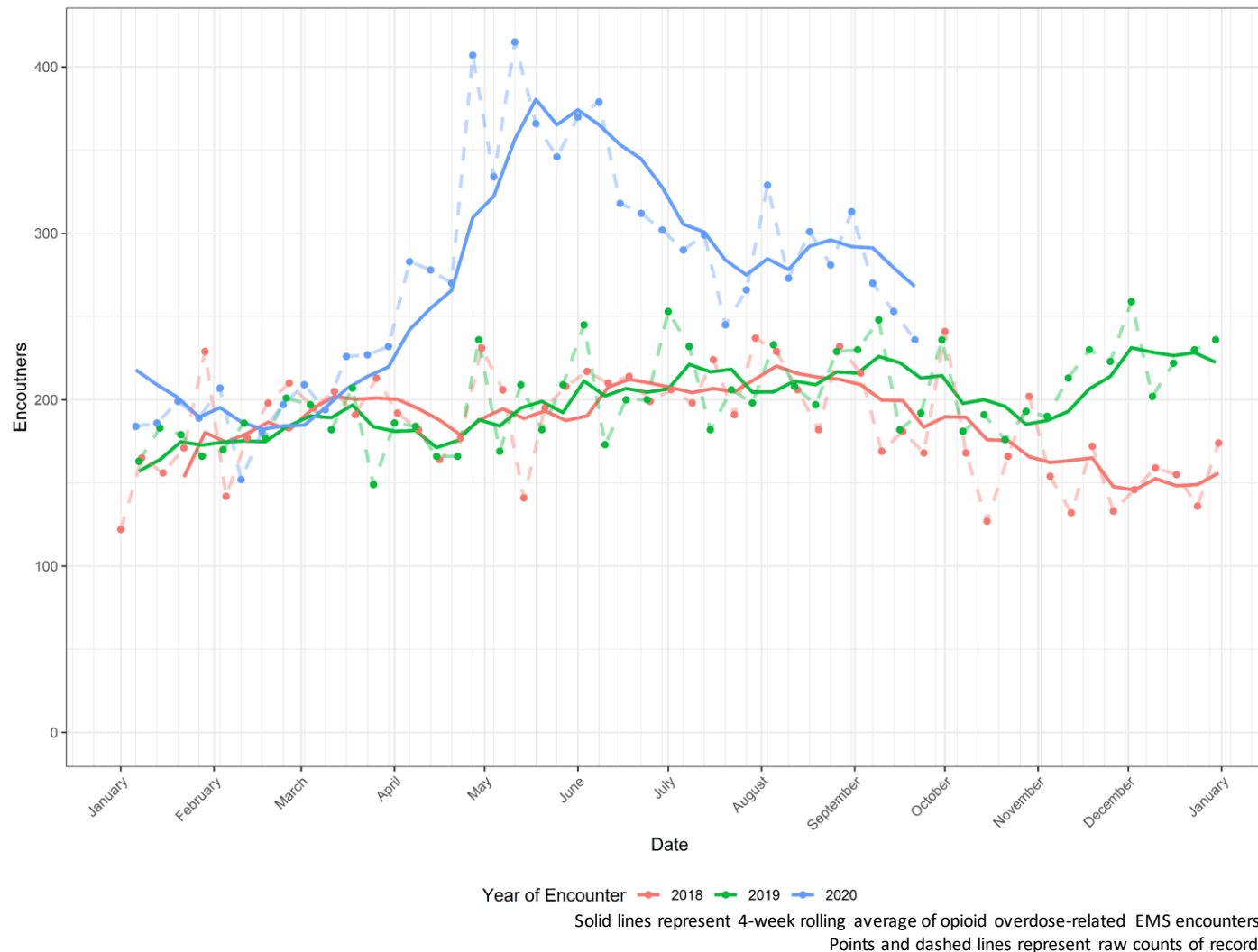
Statewide Suspected EMS Opioid Overdose Encounters, with Statistical Alert* and 7-Day Rolling Average



*Statistical alerts based on method developed for alert detection by the Centers for Disease Control and Prevention (CDC) National Syndromic Surveillance Program. Solid line represents the 7-day rolling average of opioid overdose encounters. Opioid overdose definition based on CDC-developed syndromic definition ("CDC Opioid Overdose v2"). Data from April 1, 2020, onward is based on rapid extract of EMS data and not considered to be final.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. May 2020. Data source: Kentucky Board of Emergency Medical Services, Kentucky State Ambulance Reporting System. Data are provisional and subject to change. Counts represent encounters of care and could be greater than the number of individual patients treated.

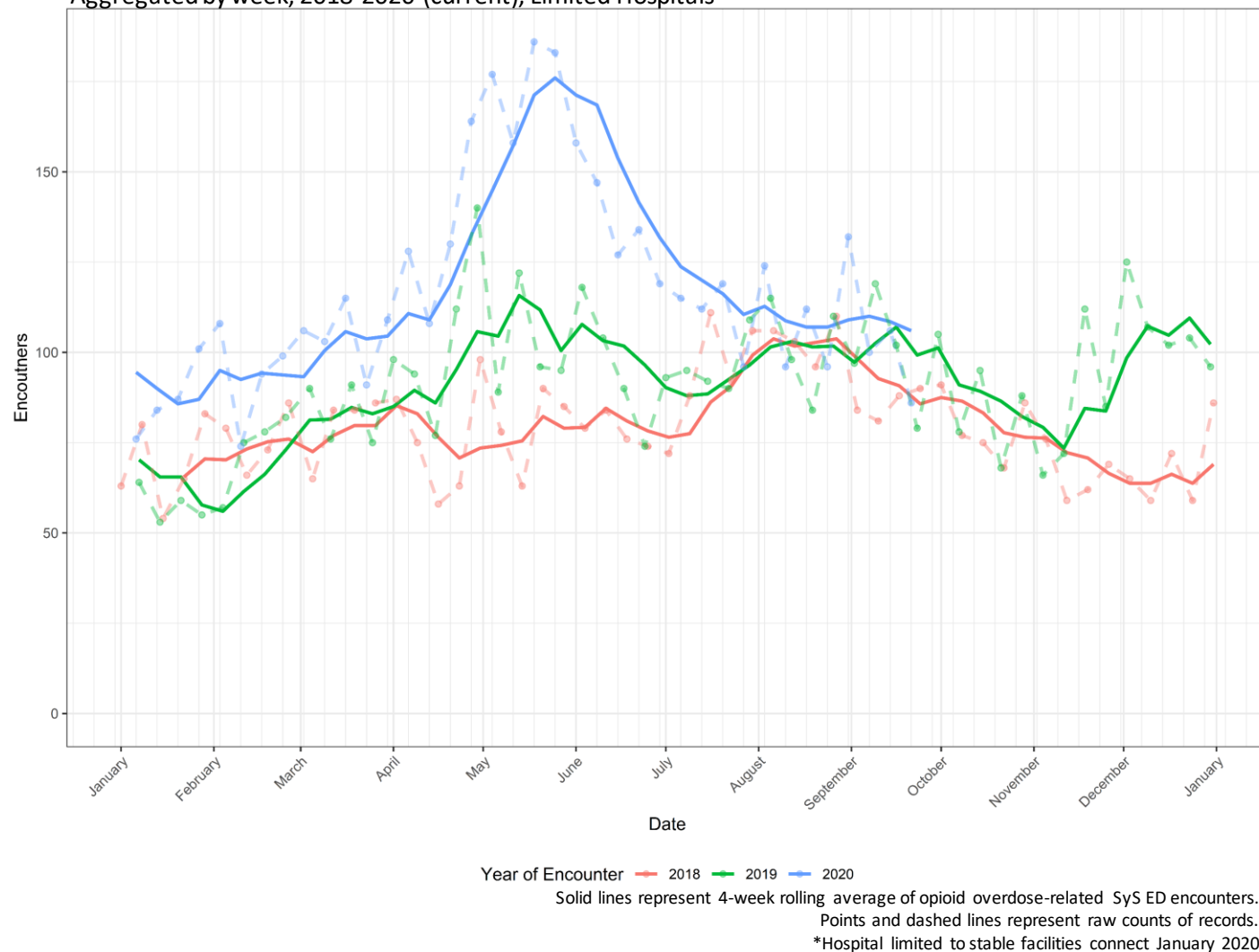
EMS Opioid Overdose-Related Encounters, Aggregated by week, 2018-2020 (current)



Data sources: Kentucky Board of Emergency Medical Services, Kentucky State Ambulance Reporting System. Data are provisional and subject to change. Counts represent encounters of care and could be greater than the number of individual patients treated.

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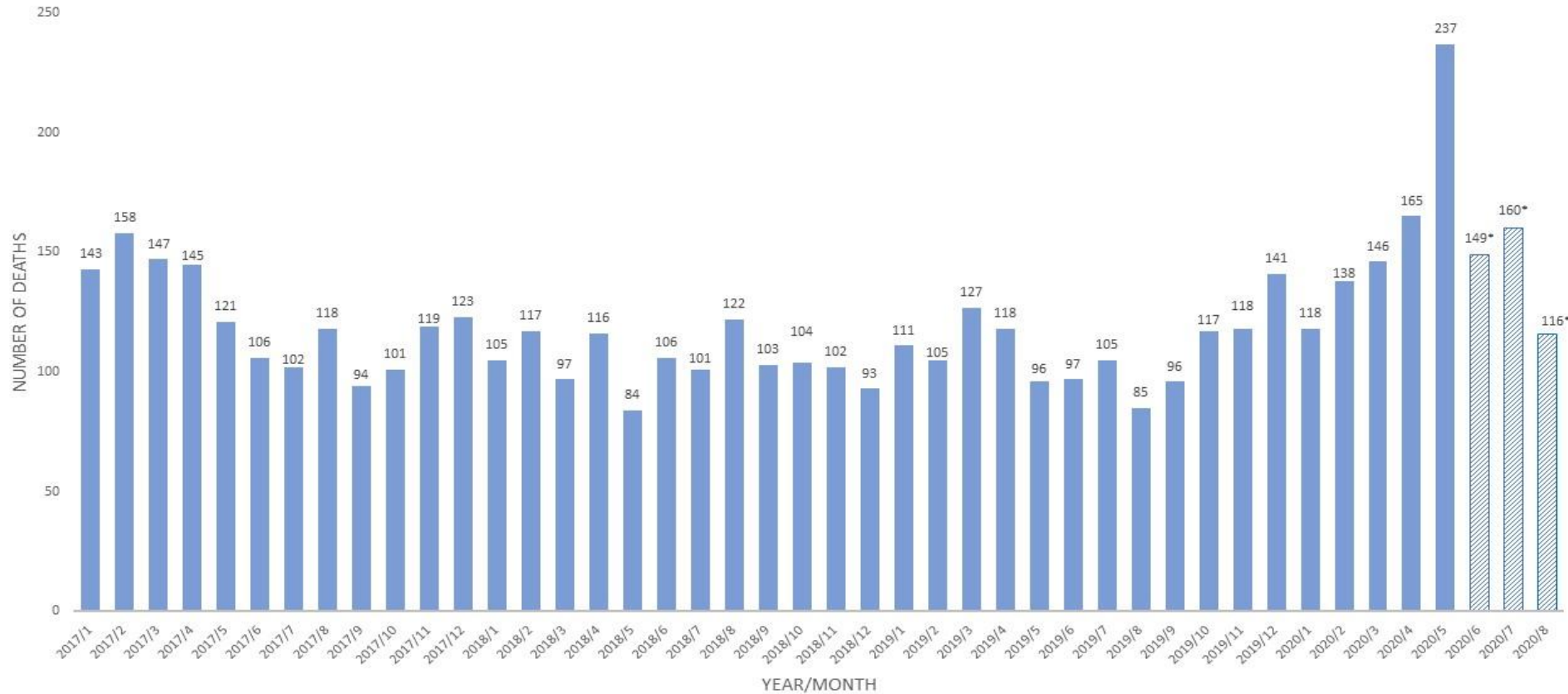
SyS Opioid Overdose-Related Emergency Department Encounters,
Aggregated by week, 2018-2020 (current), Limited Hospitals*



Data sources: Centers for Disease Control and Prevention's Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE). Data are provisional and subject to change. Counts represent encounters of care and could be greater than the number of individual patients treated.

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Drug Overdose Deaths per Month among Kentucky Residents, 2017-Present



Data source: Kentucky Death Certificate Database, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services, 2017–2020. Data are provisional and subject to change.

*Counts for June–August 2020 are incomplete, as death certificates for some Kentucky residents had not been coded and returned from the National Center for Health Statistics by the creation of this graphic.

A drug overdose death was defined as an event that included an underlying cause of death code falling within the following ranges: X40–X44, X60–X64, X85, Y10–Y14.

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General Findings

- Prior to COVID-related overdose pattern changes, EMS and SyS tracked significantly with traditional surveillance data (ED).
- Spikes in EMS and SyS data indicated early warnings of overdose pattern changes well before traditional data.
- Most recent vital statistics records indicate large increase in drug overdose fatalities.
- EMS and SyS tools are very important in the context of such shifts through the lens of timeliness.
- Fatal and nonfatal drug overdose deaths increased significantly during COVID-19 in Kentucky.

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Questions and Contacts



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