Trend analysis of amphetamine-class overdose deaths in Kentucky
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Introduction
For the first time in 2016, amphetamine was listed among the top 15 most commonly detected substances among U.S. drug overdose decedents, with methamphetamine listed as fourth. From 2011 to 2016, the rate of methamphetamine-involved overdose deaths in the U.S. more than tripled. The purpose of this study is to analyze how increases in amphetamine-salt prescriptions dispensed is related to amphetamine-class involved drug overdose deaths in Kentucky.

Methods
Data from the Kentucky Drug Overdose Fatality Surveillance System, years 2016-2018, were analyzed to identify decedents who tested positive for methamphetamine or amphetamine in their post-mortem toxicology testing. Prescription drug monitoring program data were analyzed to calculate the number of amphetamine-salt prescriptions dispensed to Kentucky residents. These measures were calculated quarterly at the state level. A negative-binomial regression was used to estimate the association between the number of amphetamine-salt prescriptions dispensed in each quarter and the count of amphetamine-class involved overdose deaths. Additionally, counts of amphetamine-class involved overdoses by county were aggregated for the entire study period and a Moran’s I analysis was performed to determine if amphetamine-class involved overdose deaths are clustered geographically.

Results
Counts of amphetamine-class involved overdose deaths per quarter increased 115% from Q1/2016 to Q4/2018. Decedents were majority white (93%), male (62%), aged 35-54 (53%). The count of amphetamine-salt prescriptions dispensed in the state was significantly associated with the count of amphetamine-class involved overdose deaths (p=0.015), with every 1,000 additional prescriptions dispensed associated with a 3% increase in amphetamine class-involved overdose mortality. Figure 1 displays the trend of prescribing while Figure 2 displays the trend of amphetamine-class involved overdose deaths over time. Geographically, the Moran’s I test resulted in a z-statistic of 0.32 with a p-value of <0.001, indicating that similar rates of amphetamine-class involved overdose deaths cluster spatially. Figure 3 displays a choropleth map of amphetamine-class overdose mortality in Kentucky.

Discussion
Amphetamine-class involved overdose deaths have increased substantially over time in Kentucky. This increase is positively associated with the number of amphetamine-salt prescriptions that were dispensed in the same quarter. Further research should be performed analyzing these ecological associations.

Moreover, high rates of amphetamine-class involved overdose deaths are clustered geographically. This finding provides insight into areas that can be targeted for public health interventions to reduce amphetamine-class overdose morbidity and mortality.