Drug overdose has become the leading cause of accidental death in the US.

Opioid prescription rates have increased nearly threefold in the last 15 years in the US—alongside an increase in opioid related overdoses and deaths.

Of the estimated 53,404 lethal drug overdoses in 2015, 20,105 were related to the use of prescription pain relievers.

Decision makers have responded to the opioid crisis with new policies and programs that provide resources in some places where there are high rates of opioid overdose, but a timely analysis of communities in Massachusetts that have a rising incidence of opioid fatalities but still lack resources will be useful to the Massachusetts Department of Public Health and municipalities across the commonwealth, to make decisions about where to concentrate resources in Massachusetts.

Where are emerging opioid overdose hotspots in Massachusetts?

Methods: Point data for all opioid overdose fatalities from 2015-2017 (not adjusted for population) were first run through a time-space cube. The cube was used to run local outlier analysis with a 5 kilometer fishnet grid and a 3 month time stamp.

Results: Local outlier analysis run on point data showed persistent hotspots in and around Boston. It also showed many statistically significant high-low spots scattered around the state.

Which communities are experiencing the highest rates of opioid overdose fatalities, have low resources to address Opioid Use Disorder and have high rates of Potentially Inappropriate Prescribing?

Overall Vulnerability: All Variables

Overall vulnerability: Score by Town

Conclusion:

The Hotspot and Local Outlier analyses using counts shows that the Boston area is experiencing high counts of mortalities, whereas the vulnerability analysis, which uses rates, identifies other parts of the state as vulnerable. This experimental combination of results provides a nuanced picture of the problem, although results may not be conclusive.

Further investigation into high risk areas can be guided by the vulnerability scores. Additional burden and variable analyses, as well as statistical analysis of variable interactions would aid further research.