Background

In the last decade, opioid-related deaths in Massachusetts roughly quadrupled, rising from 569 deaths in 2010 to a peak of 2,100 deaths in 2016 (MDPH 2016 Data Brief). Recognizing the high human costs of this opioid epidemic in Boston, the City of Boston and local healthcare organizations have joined those stepping forward to address opioid use disorder among Boston citizens.

Using a mobile van to increase patient access, and thus increase retention of patients receiving treatment for opioid use disorder (OUD), has been fully tested in Baltimore (Greenfield et al.) and a mobile van treatment program reduced barriers of stigmatization and cost in New Jersey (Hall et al.). However, the concept of combining mobile treatment, primary care, and harm reduction services was not in a literature search that may be new. On January 16, 2018, CareZONE was initiated just such a mobile source of delivering services and harm reduction outreach specialists once-per-week for the remainder of 2018-2019.

For each visit site, the harm reduction team searches an area within easy walking distance of the CareZONE van. When PWIDs are found, they are offered free substance and overdose kits and clean syringes (Stopka et al., 2017). Contacts are encouraged to come to the van for medical services, referrals, and counseling. The van clinic can prescribe buprenorphine, as an OUD treatment; make methadone referrals; and provide free primary care.

Methods

Data Sources

1. Analyze Boston, the City of Boston’s open data hub: Crime Incident Reports (new system as of February 2019). This analysis employs data from 2016 through 2019. Until September 29, 2019 these codes were used:

1832: Drugs – Sick Assistance
1831: Drugs – Sick Assistance/Opioid
1832: Drugs – Other Harmful Drug

On September 29, 2019 these three codes were consolidated, and, going forward, all sick assistance incidents were reported as “1832: Sick Assistance – Drug Related Illness.” Given that these codes are the only reporting police officers without the benefit of medical diagnoses or drug testing, some of the pre- or post-Sep-tember 2019 data are considered here either unconfirmed or confirmed overdose and are included as general indicators of opioid trends and likely overdose locations for the purpose of this analysis.


The Sharps Collection Team is dispatched based on 311 reports via smartphone app (66%) or voice calls (33%), picking up used syringes from public places. Latitudes and longitudes are currently provided in this database for all NPUs, 2016 to 2019. This is in contrast to when, in a mapping analysis of this data through August 2017, Beaumont et al. found that 22% of the latitudes and longitudes were missing but could be fully geocoded with street addresses provided in the database.

3. Isabel Plakes, Outreach Coordinator, CareZONE: CareZONE parking spots and walking outreach zones and events. Recorded in Google MyMaps and transferred to ArcGIS Desktop 10.7.1 (ESRI, Redlands CA) which was used for all final maps.

Results

Examining the dot density maps for four years of SAI and the 2019 NPUs, it is apparent that both SAI and NPUs were widespread and exist in every corner of Boston and in magenta and yellow.

The Kernel density maps for both indicators show hot spots which are consistent over time and with each other. However, while aggregated two-year totals decreased 18% from 1,124 SAI in 2016/2017 to 921 SAI in 2018/2019, the spatial trend was for North Square/Roxbury (a CareZONE location) and Boston Medical Center loci to become “hottest,” as the CareZONE locations at the Fenway, Downtown Crossing, and Union Station/West End grew “cooler.” These trends can be seen in comparing the 2016/2017 and 2018/2019 yellow/orange SAI maps as well as in the combined map showing the pre-post-CareZONE trends of SAI in dark and magenta.

The NPU Kernel density maps reflect the quadrupling of NPUs in Boston over four years, ranging from 1,998 needle pickups in 2016 to 7,970 in 2019. The area with the most NPUs spread through the city over a wide swath bounded somehow by Nubian Square/Roxbury and North Station/West End. Within this area both the Boston Medical Center neighborhood and Downtown between the North End and Downtown Crossing showed the most increase.

Very close visual examination of the four mapped CareZONE walking zones (in red shadings or outline) did not reveal enough data for reliable temporal analysis of possible trends relative to those zones.

Discussion

The quadrupling of NPUs over the four years from 2016 to 2019 may be attributable to a combination of factors including an increase in use of injected drugs; the high and increased rate of fantasy use in Massachusetts, which, due to fantasy pharmacology (FDC), may lead to many more injections per day that is average for people who inject heroin alone; resources or efficiency of the Boston Mobile Sharps Collection Team; and, finally, less reuse of syringes, and, thus, more discards, as programs like CareZONE and over-the-counter sales make clean syringes easier to obtain.

Data for SAI show an 18% decline during the same four years. This is surprising data given the rapid increase of discarded syringe pickups. With the rise of the fantasy, the use of which can lead to overdoses and EDCs, an increase in SAI would be expected. A possible explanation for this discrepancy is greatly increased distribution by CareZONE, and many NPUs generated by this activity. The result during this period of declining SAI, their concentration around Nubian Square/Roxbury and Boston Medical Center has increased, which is consistent with the increase of NPUs around these areas.

No conclusion can be drawn about the association of CareZONE with the trends seen in NPUs and SAI. SAI declined in three CareZONE areas but increased around Nubian Square/Roxbury. NPUs increased slightly in the Nubian Square area and more in the other three CareZONE areas. However, it is clear that CareZONE, in selecting sites for outreach in 2018 and since, has accessed the most intense zones of opioid use and misuse and injection.

Limitations of this analysis include the lack of certainty regarding overdose diagnoses expressed, or not expressed, in the police codes for sick assist incidents. No data exists to verify the increase in NPUs due to a possible increase in (1) the number of PWIDs in Boston, (2) fentanyl, which might be injected more frequently, (3) City of Boston syringe collecting resources, or (4) other factors. Analysis of the potential effect of a mobile source of intervention such as CareZONE is limited by the challenges of shifting and mobile populations of PWIDs, limited weekly presence, and shifting intervention locations, which take advantage of the mobility and adaptability of PWIDs.

The strength of this study resides in the quantity, accuracy, and timeliness of data for both SAI and NPUs and the mapping of both of these indicators for comparison.

Future work could address why there was a rise in SAI and NPUs increased in Boston and why SAI, which are likely overdoses, have decreased. More information on the effect of naloxone distribution on the rate of overdoses in Boston would be valuable.

References


6. Health at Massachusetts General Hospital, January 16, 2018, CareZONE, a mobile van in Boston, MA, that extends primary care and harm reduction services once-per-week for the remainder of 2018-2019.


