

The Opioid Epidemic

Opioids are a class of drug that include prescription pain relievers and the illegal heroin.¹ The prevalence of prescription opioid abuse, as well as the number of overdoses and overdose deaths due to opioids, has increased dramatically over the last decade, causing the United States to declare an “Opioid Epidemic.”^{2,3} In the U.S., drug overdose, which is largely overdose from opioids, is now the leading cause of accidental injury death.⁴ In 2014, the CDC reported that approximately 78 people in the U.S. die each day from an opioid-related overdose.³

Massachusetts, Rhode Island, Connecticut, and New Hampshire all have high rates of drug overdose deaths and each saw a statistically significant increase in drug overdose deaths between 2014 and 2015.⁵ During this year Massachusetts had a 35.3% increase in opioid deaths, Rhode Island saw a 20.5% increase, Connecticut’s opioid overdose deaths rose by 25.6%, and New Hampshire had a 30.9% increase.⁵ In 2015, New Hampshire (34.3 per 100,000) and Rhode Island (28.2 per 100,000) had the 2nd and 5th highest rates of opioid overdose deaths in the country respectively.⁵

The Department of Health and Human Services has identified strategies to address the opioid epidemic, one of which is increasing the distribution of naloxone.^{3,4} Narcan, the brand name for naloxone, is an opioid antagonist that blocks opioid receptor sites in the brain in order to reestablish breathing and consciousness.⁴ Narcan is easily administered, which allows others to intervene during an overdose.⁴



A research team at Boston Medical Center (BMC) was interested in identifying geographic variability patterns of Narcan accessibility in Massachusetts, Rhode Island, Connecticut, and New Hampshire by looking at naloxone filling rates in the years 2014, 2015, 2016, and 2017 using CVS pharmacy naloxone fills. Mapping naloxone accessibility can be used to determine disparities in access and to inform public health interventions.

Methods

Data Sources:

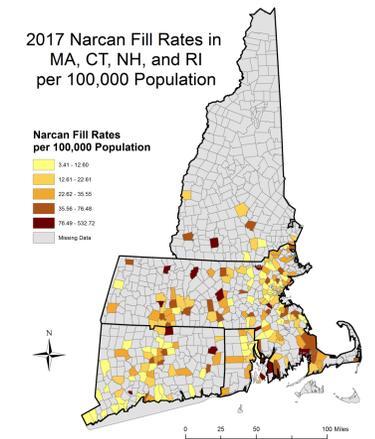
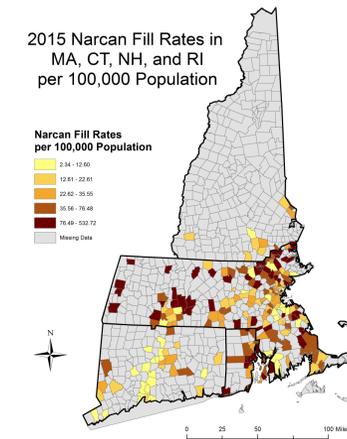
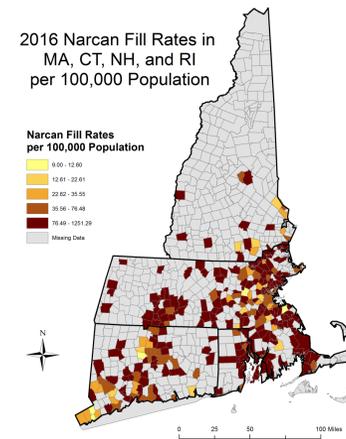
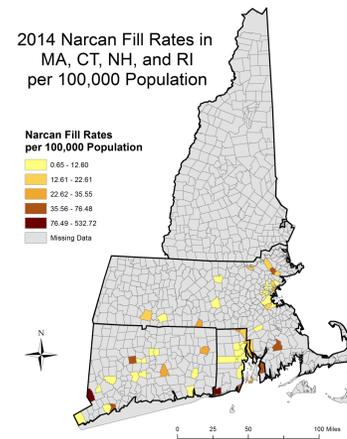
- 1) Dr. Traci Green and her research team at BMC provided these data. These data were collected using CVS pharmacy naloxone fills over the years 2013-2017 by town..
- 2) 2010 US Census data was used to create fill rates per 100,000 people.

Narcan Fills Count Data:

Narcan count data by town was joined with each of the state shapefiles. Boston Medical Center was interested in looking at the number of Narcan fills per town in each of the four states. Quartiles were developed for the 2015 Massachusetts data and then used these cut points for all other states and all other years. This was done in order to make direct comparisons between states and over time. Massachusetts was chosen because it was the middle state on the map and had the largest number of towns. 2015 data was chosen because it was the middle year that had complete data (2017 was only through March). Choropleth maps were developed using fill counts.

Narcan Fill Rate Data:

Narcan count data by town and 2010 US Census data was joined to each of the state shapefiles. Boston Medical Center was interested in looking at Narcan fill rates per 100,000 people in each town, so fill rates were calculated for each town. Quintiles were developed for the 2015 Massachusetts data and then used to



Results & Discussion

Results:

The choropleth maps show the distribution of Narcan fill counts and fill rates over time. Generally, both fills and counts increase over time. 2017 appears to see a decrease, however, that is due to the fact that data for 2017 was only collected for the first few months of the year. There were groups of towns that saw high fill rates, however further analyses must be done in order to draw any conclusions.

Discussion:

Mapping Boston Medical Center’s Narcan fill count and rate data indicated that Narcan fills and Narcan fill rates have increased over time. This may be indicative of increased accessibility of naloxone but may also just be in response to the rising number of opioid overdoses and overdose deaths. Narcan fill rates should continue to be looked at in order to inform future public health interventions. In the future these maps should be used to compare high fill rate towns with maps made for towns with high rates of overdoses and overdose deaths to look at trends over time. It would also be interesting to look at pharmacy locations to determine trends between fill rates and naloxone accessibility.

Limitations:

Projected Coordinate System:

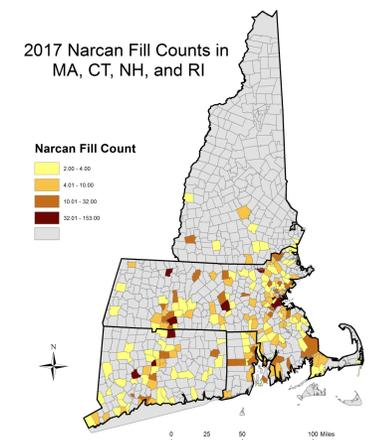
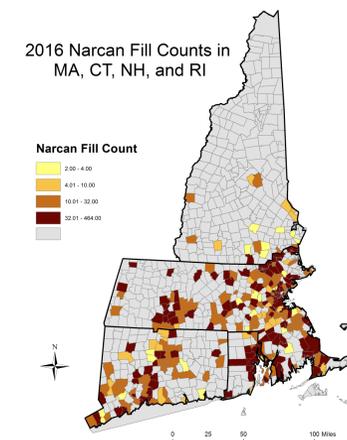
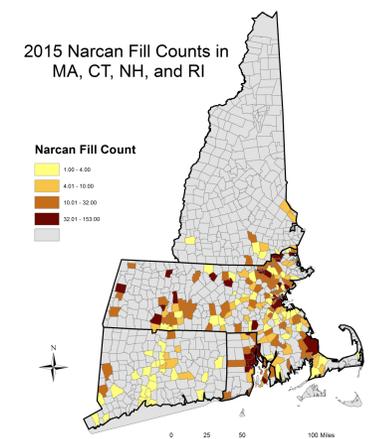
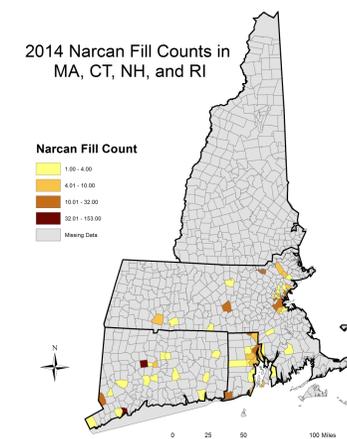
All maps were made in the MassGIS 2011 coordinate system. This may have resulted in some distortion in some of the northern New Hampshire polygons, however, this was chosen because it put all of the states’ shapefiles in the same projected coordinate system. It was not too problematic since all data mapped was descriptive and did not involve complex analyses.

Small sample:

There was very little data for some years, especially 2014, which made the use of quintiles impossible for the naloxone fill count data. Data for 2017 was only through March so very little can be concluded from these graphs.

Shapefiles:

Bringing in data from different states was challenging because some of the states had towns that were the same as other states. This required the use of different shapefiles for different states.



References & Acknowledgments

Cartographer: Alexandra Kiesling
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Data Sources:
Boston Medical Center
US Census Bureau 2010

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1. NIDA. Opioids <https://www.drugabuse.gov/drugs-abuse/opioids>. Accessed April 26, 2017
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4. Lim JK, Bratberg JP, Davis CS, Green TC, Walley AY. Prescribe to prevent: overdose prevention and naloxone rescue kits for prescribers and pharmacists. *Journal of addiction medicine*. 2016;10(5):300.
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