



Overview of Baltimore's Project SOON (Surveillance of Opioid Overdose and Notification), with a Focus on Reporting and Alerts

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October 28, 2020

CSTE Overdose Spike Alert Advisory Group



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BaltimoreHealth 

health.baltimorecity.gov

Presenter Disclosures

Darcy Phelan-Emrick has no personal financial relationships with commercial interests relevant to this presentation.



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Goals of Project SOON

To automate the process of

- (1) conducting non-fatal opioid overdose surveillance, and
- (2) notifying stakeholders of non-fatal opioid overdose “spikes” (i.e., clusters of non-fatal overdose in space and time),
- (3) using EMS data on a 24-hour cycle.

A grant from CSTE supported the development of Project SOON in 2017-2018.



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Project SOON GitHub Website

<https://github.com/bchd/Nonfatal-Overdose-Surveillance>



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Non-fatal Opioid Overdose Definition

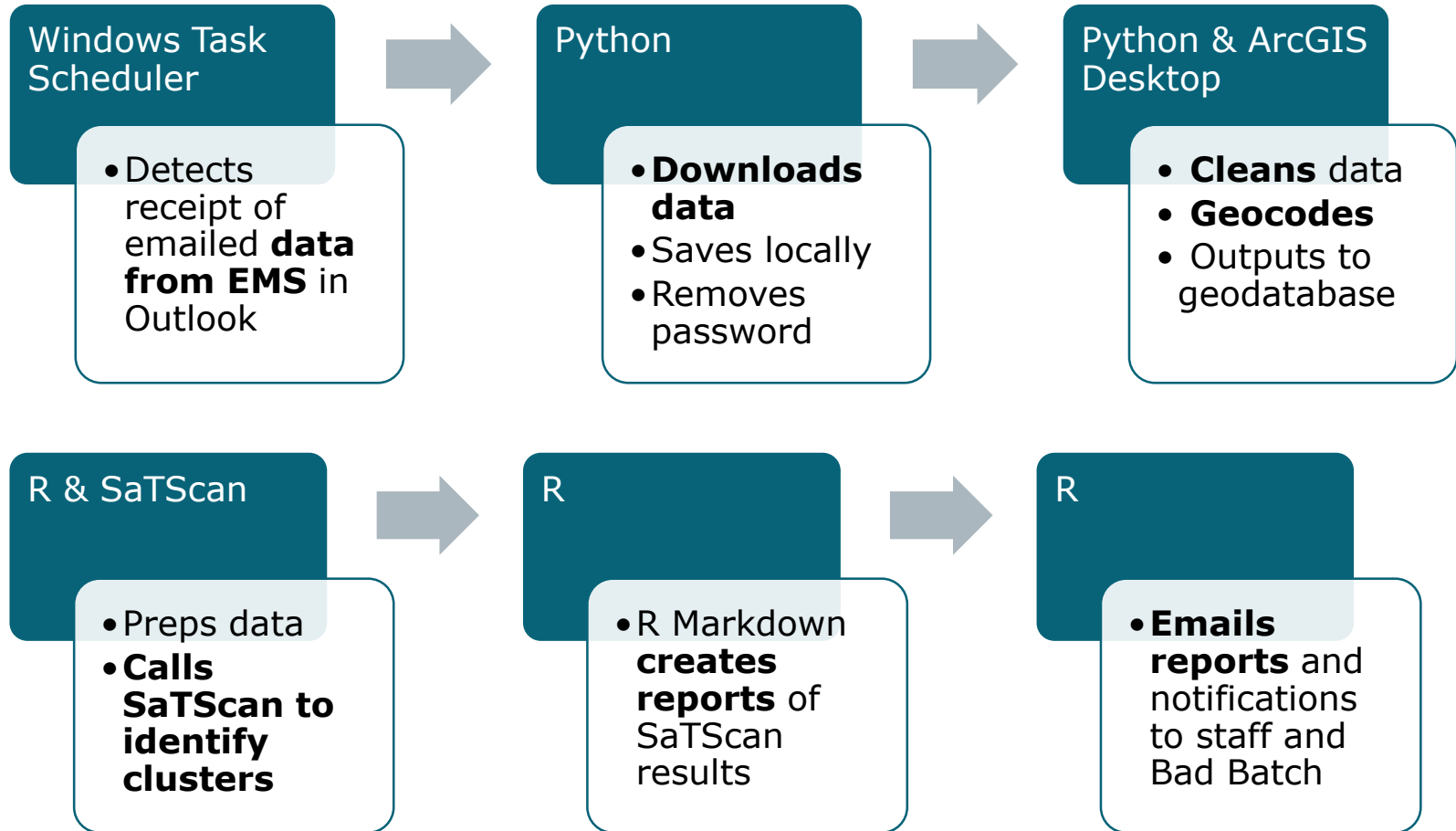
Incident reported by EMS involving:

- EMS patient in the field
- Patient is administered naloxone by EMS
- Patient improves after naloxone administration



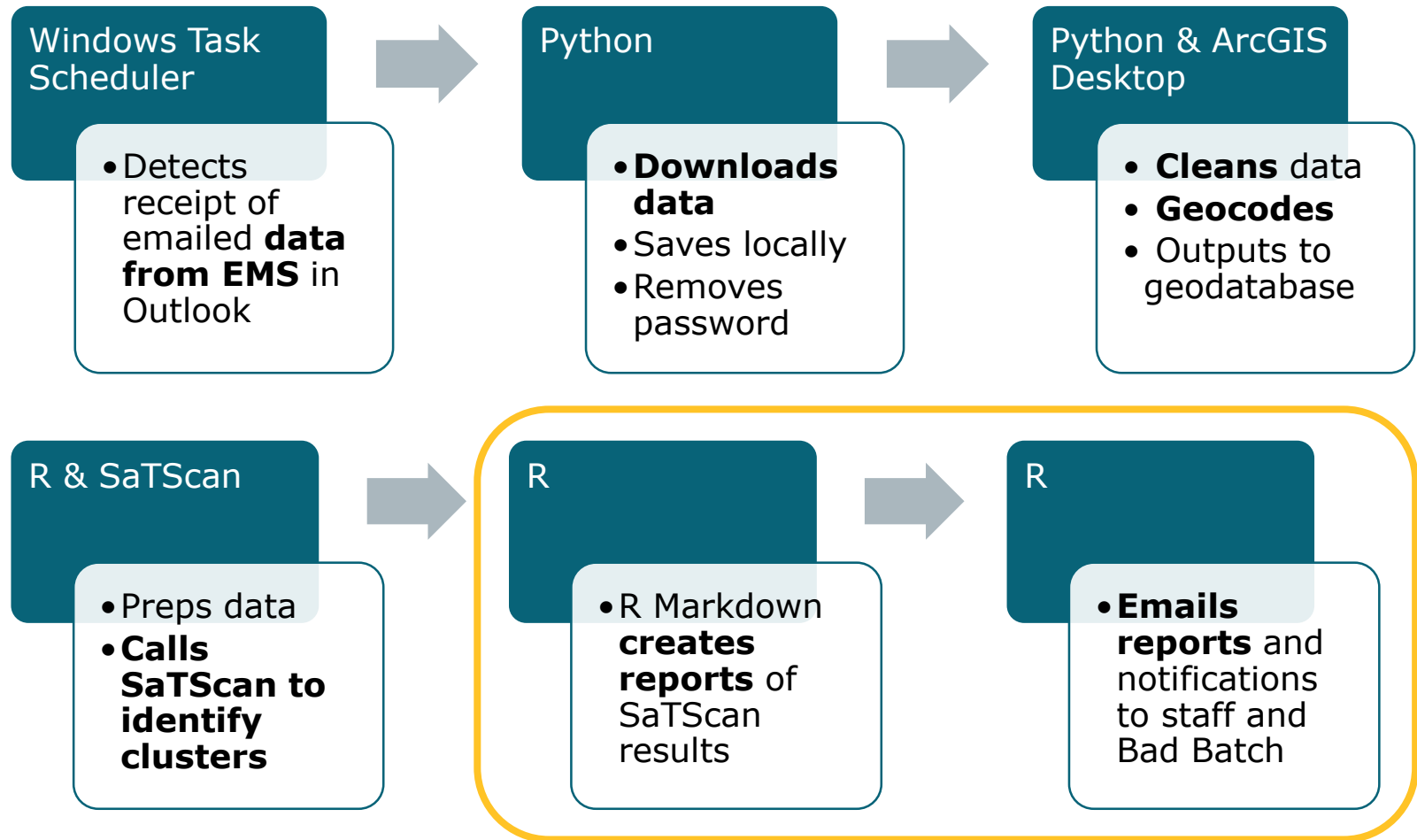
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Work Flow Summary



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Work Flow Summary



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Reporting and Alerts

Reporting Tool

R Markdown package in R to create PDF reports

<https://rmarkdown.rstudio.com/>

“Analyze. Share. Reproduce.
Your data tells a story. Tell it with R
Markdown. Turn your analyses into high
quality documents, reports, presentations
and dashboards.”



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Report Contents

Table of cluster info, including start- and end-date, number of non-fatal overdoses in cluster, number in cluster area in last 30 days, radius

Spatial intensity city “heat map” of non-fatal overdoses in last 30 days, with circle identifying cluster and stat. significance

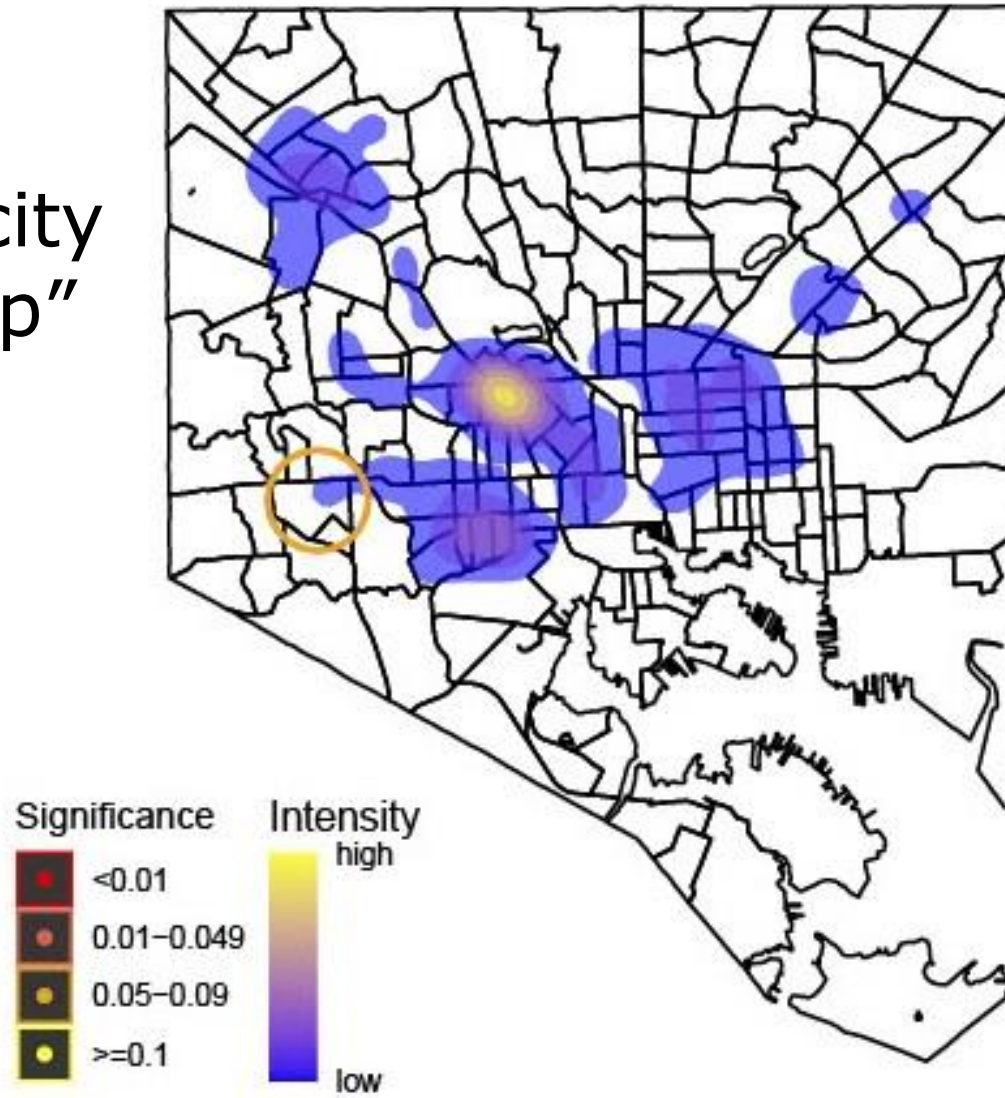
Map of cluster area, with circle identifying cluster



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Figure 1A: Non-fatal Overdose Spatial Intensity, Last 30 days

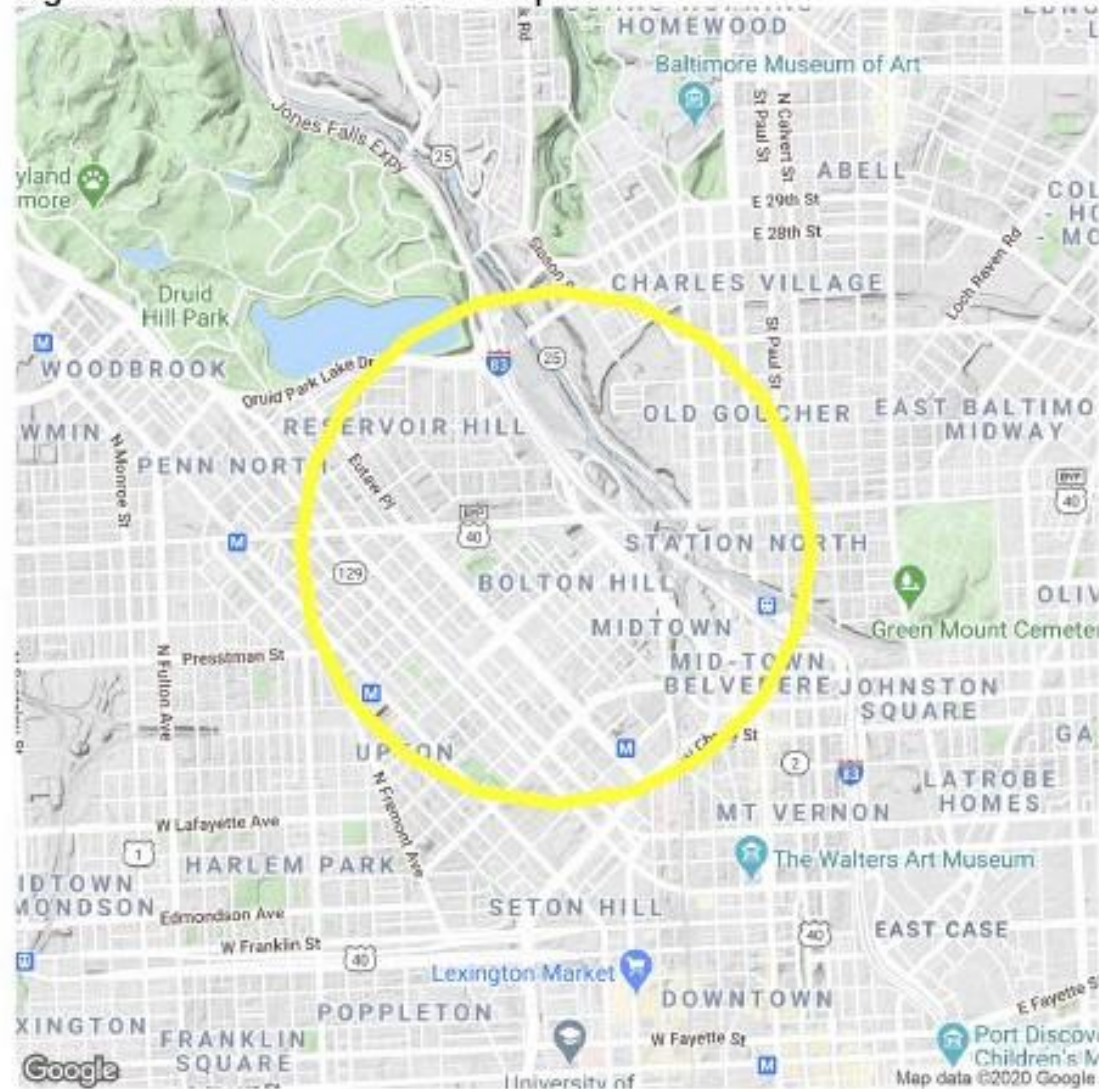
Spatial
intensity city
“heat map”



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Map of cluster area

Figure 1B: Non-Fatal Overdose Spike 1



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Report Contents (continued)

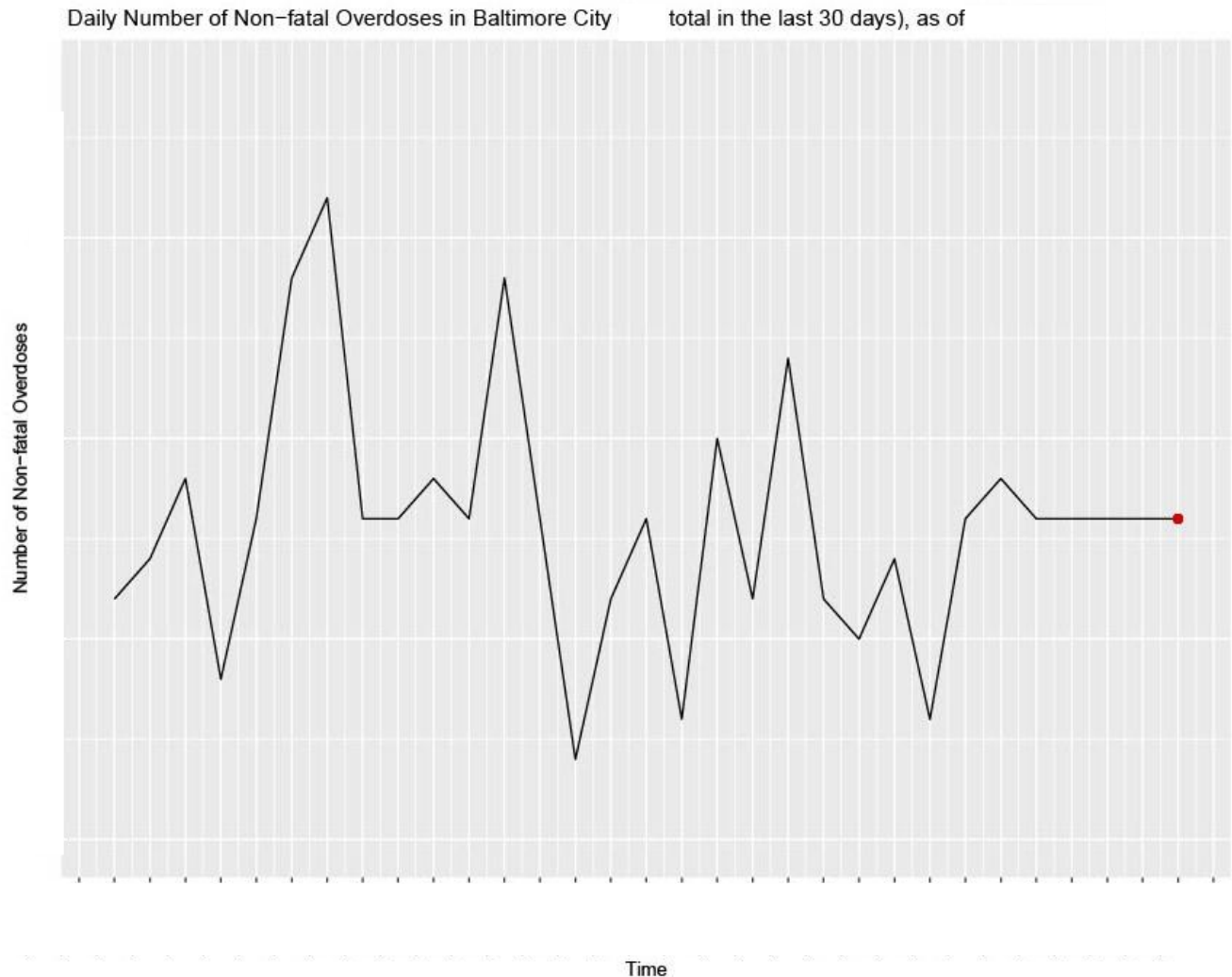
Graph of # non-fatal overdoses in last 30 days, citywide

Graph of # non-fatal overdoses with weekly temporal alerts since start of non-fatal overdose surveillance in 2018, citywide



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Graph of # non- fatal overdoses in last 30 days



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Report Contents (continued)

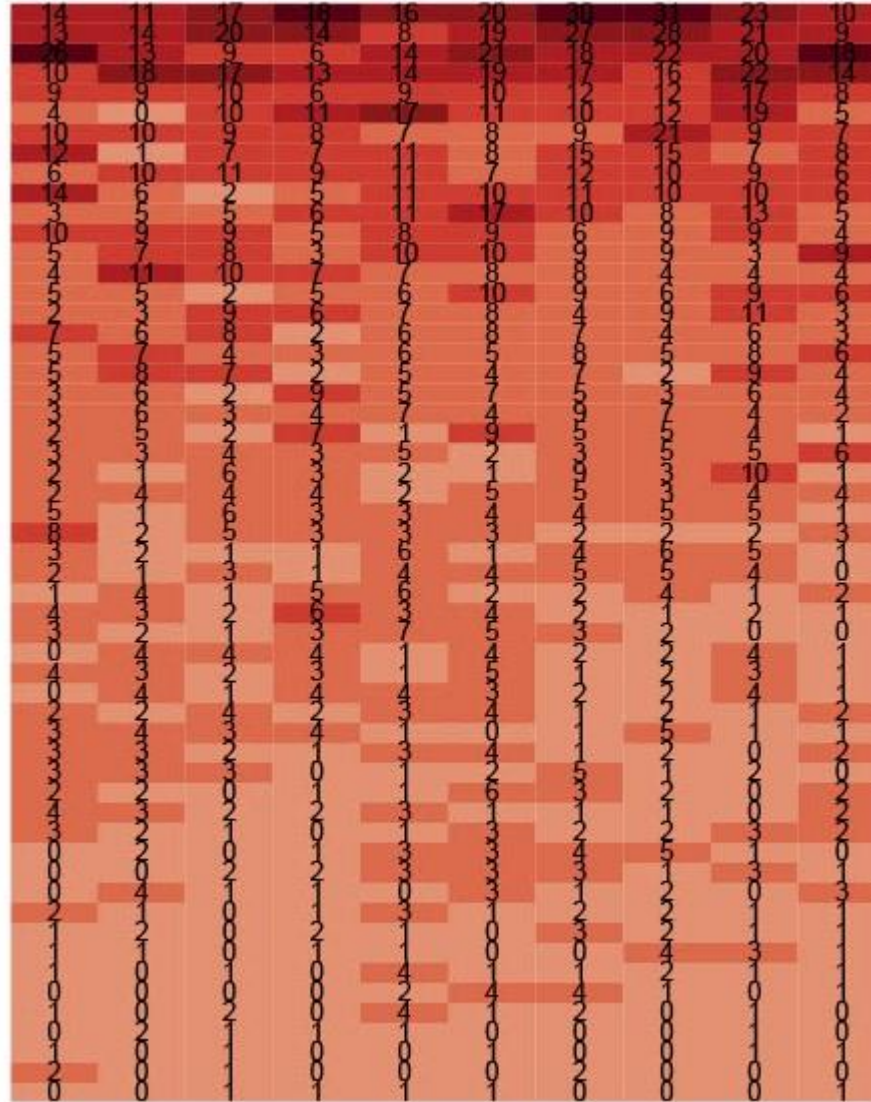
Heat map table of # non-fatal overdoses by month and Community Statistical Areas (i.e., groupings of census tracts that approximate neighborhoods), YTD

Map of last 10 clusters, indicating start- and end-dates and numbers in cluster



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Heat
map
table



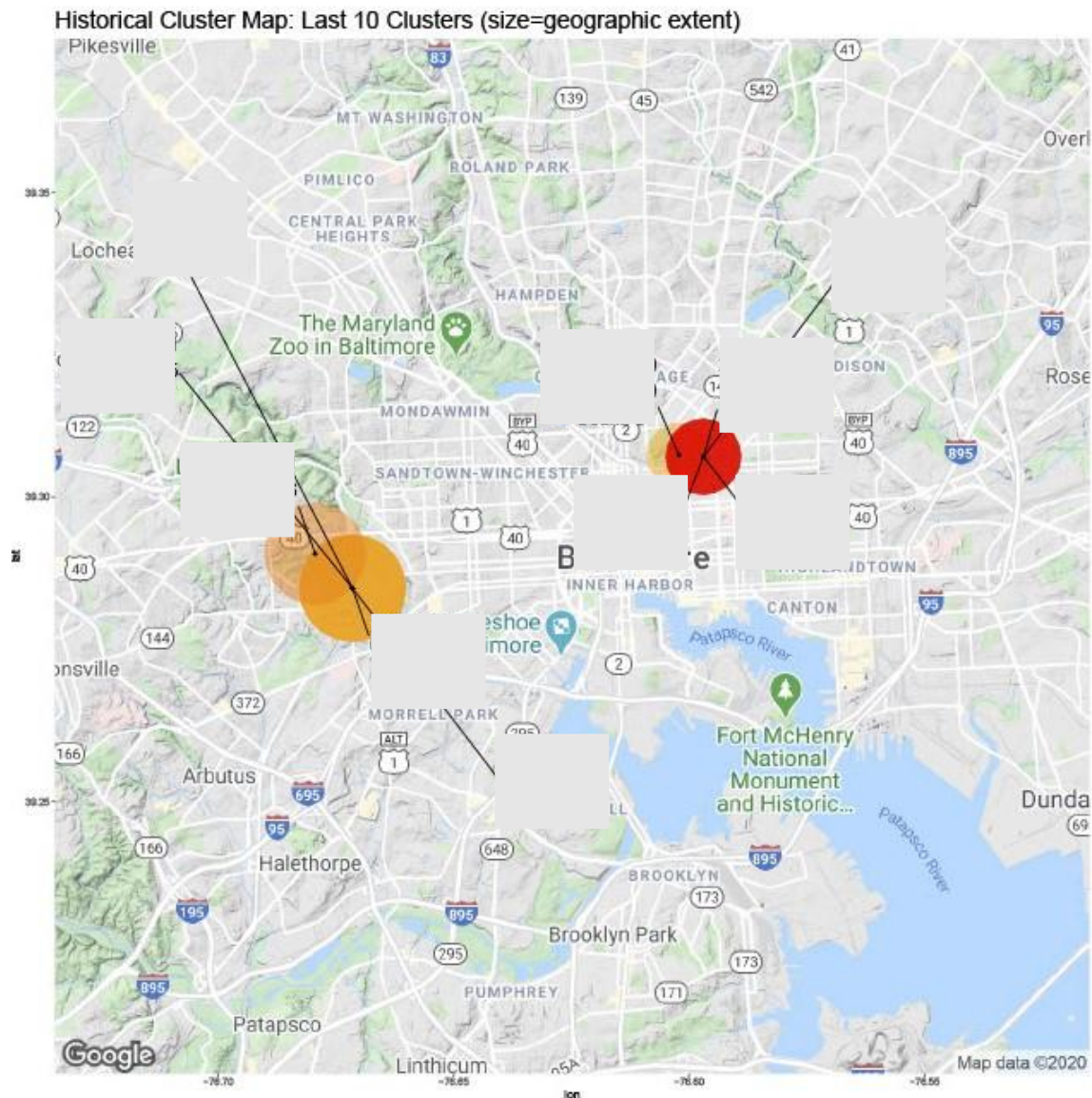
Community
Statistical
Areas

Months



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Map of last 10 clusters



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Staff Alerts w/ Report Attached

From:

Sent:

To:

Subject:

Outreach Team Cluster Report: A Non-fatal Overdose Cluster(s) was Detected

Attachments:

_Outreach_Report.pdf

Colleagues,

A cluster(s) was detected. See attached *.PDF.

When considering outreach, consider:

- 1) The number of non-fatal overdoses in the cluster
- 2) Geographic size of the cluster
- 3) Number of days the cluster has been active. End date is most recent date we have data.

Note: This is an automated report, and my e-mail is typically only checked during business hours.

Thanks,



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Bad Batch Alerts w/ Report Attached

From:
Sent:
To:
Subject: Non-fatal overdose spike alert
Attachments: _Bad_Batch.pdf

Bad Batch, Attached is a spike alert.

Note: When more than 2 regions are involved, this typically means the cluster radius is large/less likely to be an actual true cluster.

This is an automated report, and my e-mail is typically only checked during business hours.

Thanks,



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Bad Batch Report Contents

Table of cluster info, including start- and end-date, number of non-fatal overdoses in cluster, number in cluster area in last 30 days, radius, and affected Bad Batch areas

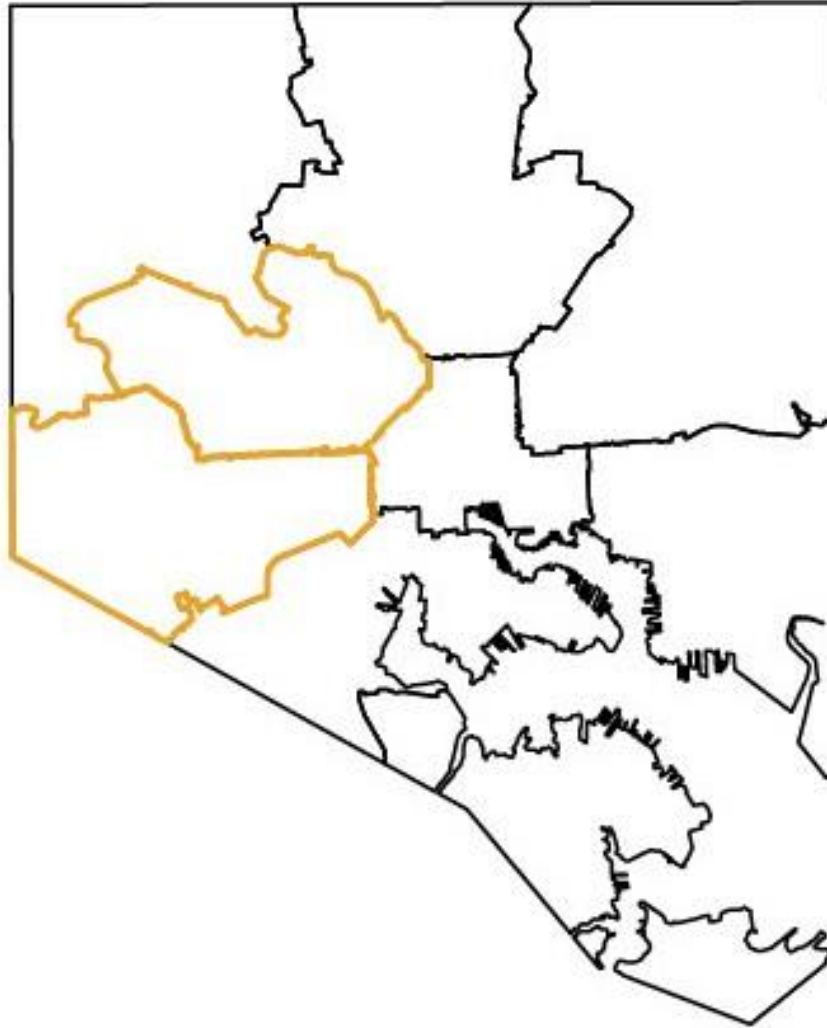
Map of Bad Batch areas with highlight indicating areas affected by cluster(s)



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Bad Batch Areas with Identified Overdose Clusters

Map for Bad Batch



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Bad Batch

- Anonymous free text messaging service
- Goal is to help those struggling with addiction to stay alive in Baltimore City
- Text alerts to areas of the city affected by non-fatal opioid overdose spikes
- Provides support and recovery tools
 - Quick access to city's 24-hour crisis line
 - Real-time notification of needle exchange van's current location
 - Access to naloxone training schedule



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<http://www.badbatchalert.com/>

BALTIMORE
CITY HEALTH
DEPARTMENT

What Happens After Email Alerts Are Sent?

- Health Dept. notifies outreach partner, and partner responds, if there is capacity
- Health Dept. notifies listserv of behavioral health providers
- Bad Batch sends text message alert to users who have signed up to be notified of clusters in specific city regions



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Challenges

- Entire process is dependent on manual data pull at EMS daily
- City IT changes, particularly after ransomware attack in 2019
- Evaluation of surveillance system overall
- Evaluation of response to alerts
- Limited resources for alert response
- Outreach during COVID-19



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Acknowledgments

Baltimore City Health Department
Mike Fried, Jonathan Gross

Baltimore City Fire Department EMS
*Claytonia Everette, Bryan Johnson,
James Matz, William McCarren*

Johns Hopkins School of Public Health
*Frank Curriero, Anton Kvit, Amanda Latimore,
Tim Shields*

Code in the Schools ~ Bad Batch
Mike LeGrand, students who created the app

CSTE funding



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Thank you for your time!
Questions?

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Work Flow

1. Fire Dept. EMS emails data to Health Dept. every 24 hours
Excel format
Password protected

Variables include:

Date

Time

Incident location

Naloxone dosage

Patient Age, Sex, Race



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Work Flow (continued)

2. Windows Task Scheduler checks Outlook for email from EMS w/ Excel attachment
3. Python script downloads the Excel file attachment, saves file to local sharedrive, removes password, and re-saves file



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Work Flow (continued)

4. Python script engages ArcGIS ModelBuilder in ArcGIS Desktop to clean and geocode data with local address locator, to conduct spatial joins, and to output data to geodatabase on local sharedrive
5. R software pulls data from geodatabase and formats to run in SaTScan



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Work Flow (continued)

6. R calls SaTScan to analyze data to identify clusters of non-fatal opioid overdose in space and time
7. R package R Markdown creates reports of SaTScan results
8. R emails reports through Outlook to (a) relevant health dept. staff and (b) partner organization Bad Batch



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