

The Art of Surveillance – Data Visualizations

2:15PM EST | November 18th, 2020 | 2020 SyS Symposium

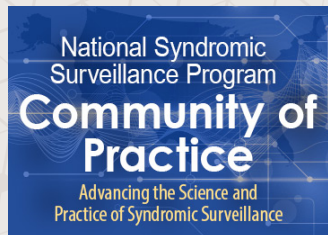
Moderated by Yushiuan Chen, MPH – Tri-County Health Department (Colorado)

Speakers:

Amanda Dylina Morse, MPH – Washington State Department of Health

MisChele Vickers, MPA – Alabama Department of Public Health

Michelle Carr, MPH & Yifang Dang, MS – Houston Health Department (Texas)



Council of State and Territorial Epidemiologists

Amanda Dylina Morse, MPH
Washington State Department of Health





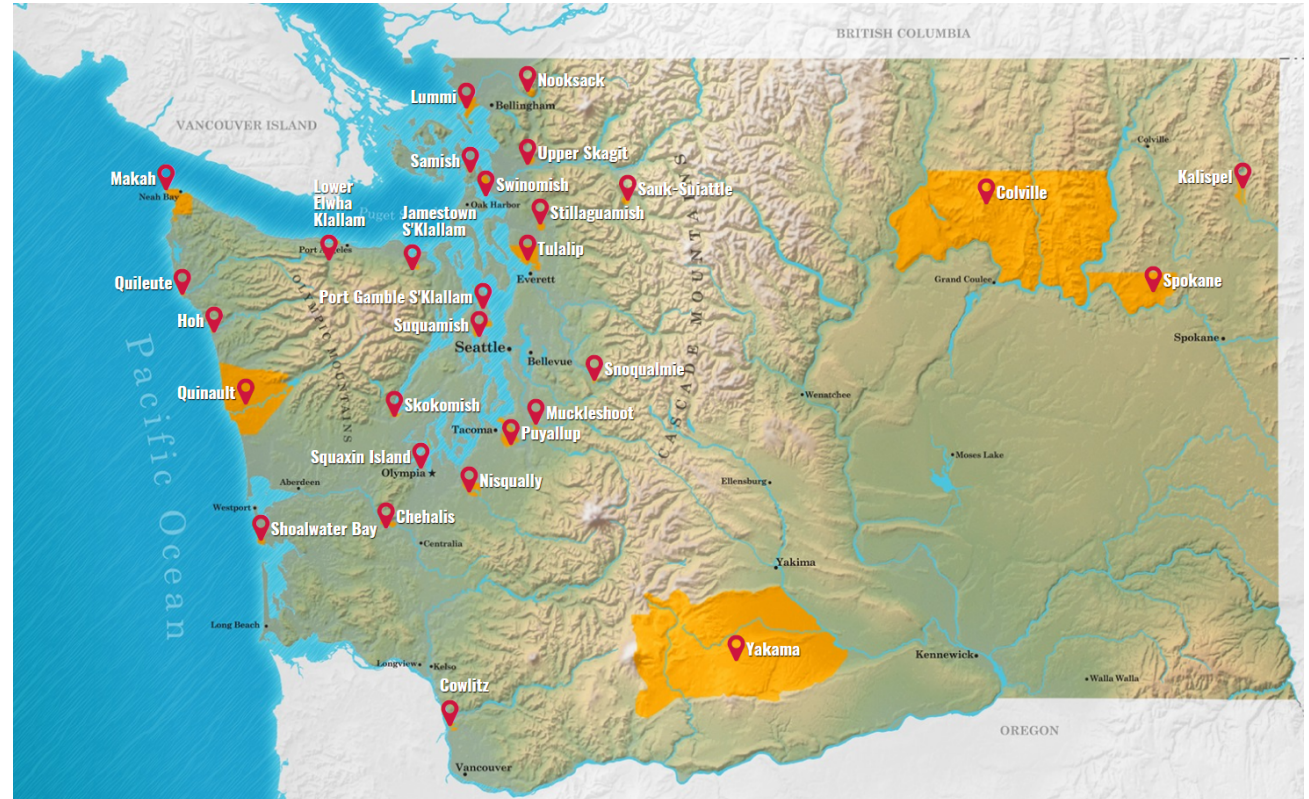
Compelling Data Deserve Vivid Visualization: Helping Partners Communicate with their Communities

Amanda Dylina Morse, MPH
Washington State Department of Health

Territorial Acknowledgement

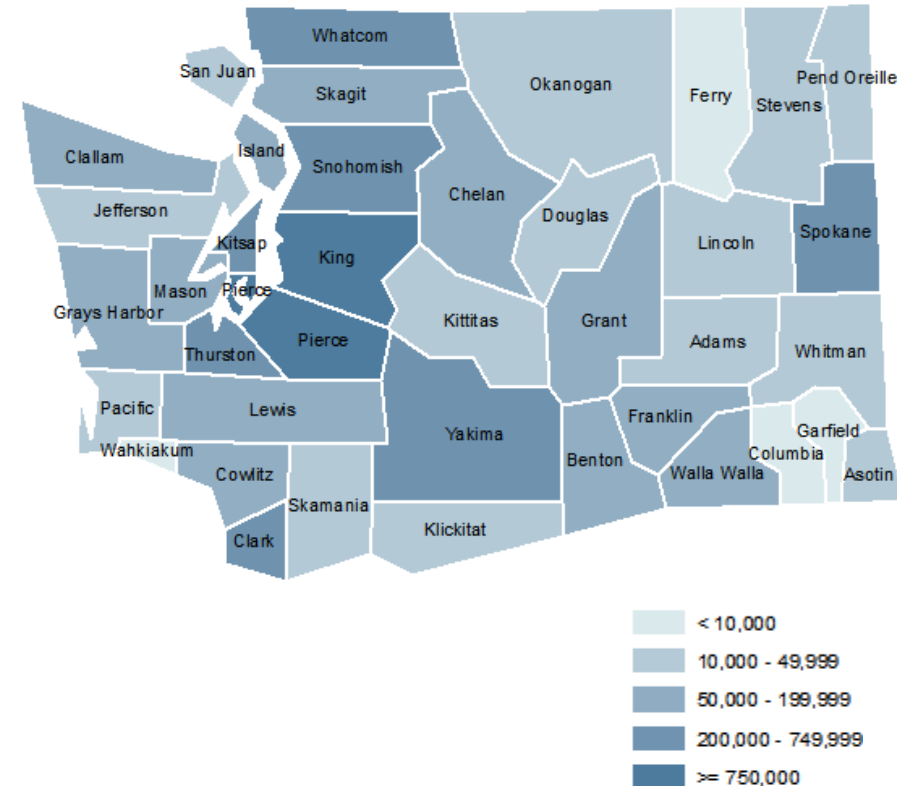
Washington State syndromic surveillance data are gathered in the unceded territories of 29 federally recognized tribes as well as that of the Duwamish Tribe, which is still fighting for federal recognition.

We thank our Tribal and Urban Indian health partners for their work and collaboration to support the health of Washington State.



Helping Partners Communicate Data

- A common request RHINO receives from partners is to have data (and visualizations) which they can use to communicate with members of their community or include in grant applications
- This desire is complicated by the reality that many local and Tribal health partners lack epi staff to analyze, visualize, and interpret the data for them
- The suppression of small numbers is a frequently cited vexation as well, preventing them from accessing data for their specific community
 - Washington State shares syndromic data directly with local and Tribal partners, skirting the need for suppression with internal use
 - Careful masking of small numbers is still necessary for outward publication

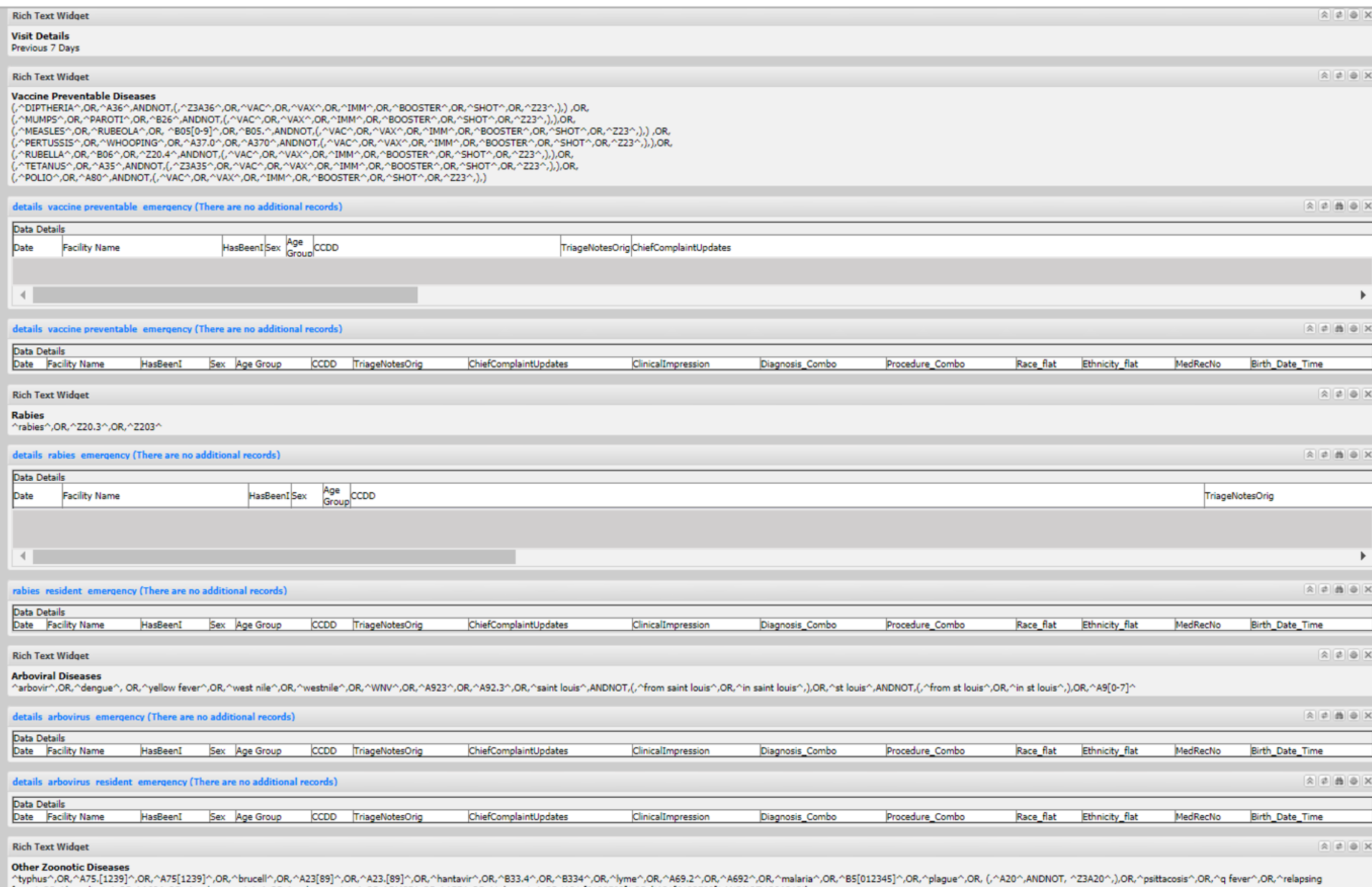
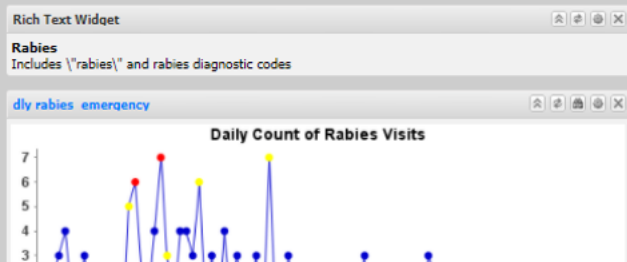
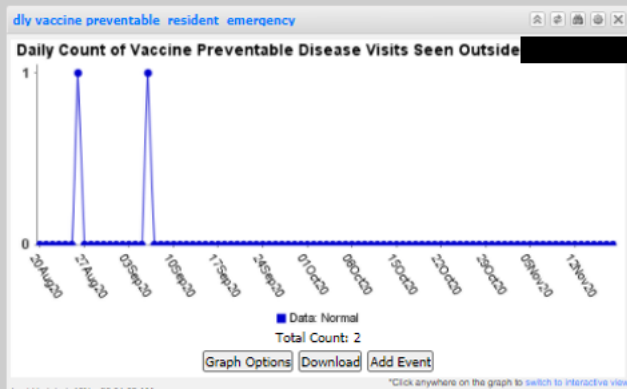
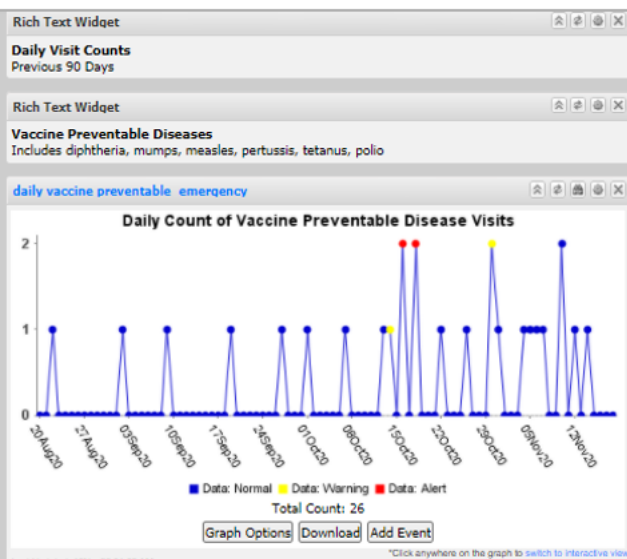


Two Approaches: myESSENCE Dashboards

- For partners who would like to be able to access and interact with data somewhat independently, myESSENCE dashboards are a great way to empower them to do the lift locally
 - Easy to build, easy to share
 - Flexible display options
- It is often helpful to start by asking questions about what their current processes are so that their workflows don't change dramatically
 - Trend analysis vs case-finding
 - Frequency and medium of “reporting up”
- If the dashboard is shared as a managed tab, you will be able to make ongoing modifications for them as their needs change

☰	COVID_LHJ Support
☐	LHU Surveillance Report
☐	COVID-Related Micro Graph Comparisons
☐	LHJ COVID Monitoring
☐	COVID-Related Quick View
☐	COVID-Related_By Age Groups
☐	Coronavirus and Influenza Comparisons
☰	COVID-19
☐	Injury and Violence Indicators
☐	Baseline Indicators
☐	Behavioral Health Indicators
☐	Coronavirus
☐	ED_Stress
☐	Lab Data for COVID-19 Response
☰	LHJ Specific
☐	Conditions of Interest_King County
☐	Lewis County
☐	Skagit County
☐	Yakima ILI

Routine Case-Finding for Communicable Diseases



COVID Surveillance Support

Rich Text Widget

COVID-like Illness

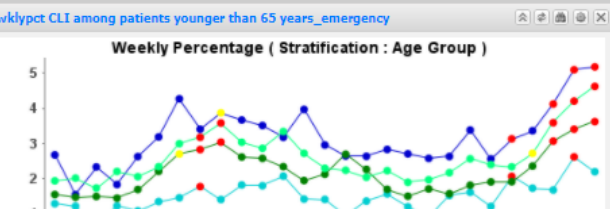
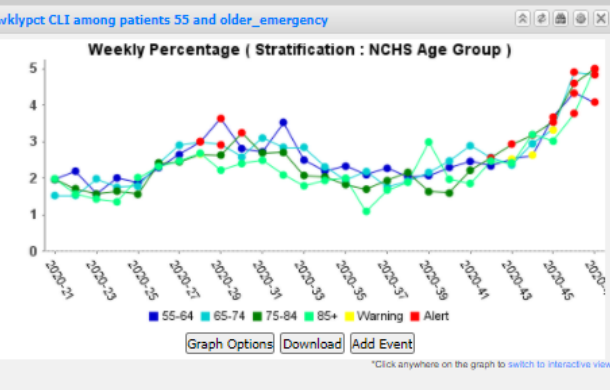
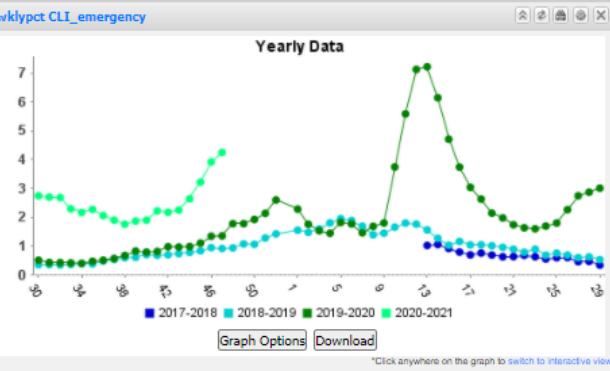
Viewing visits (emergency and inpatient) for FeverOrChills AND (Cough or DifficultyBreathing or ShortnessOfBreath) using CLI CC with CLI DD and Coronavirus DD v1

Updated 3/29 to use CLI CC with CLI DD and Coronavirus DD v1

Rich Text Widget

Weekly Percentage of Emergency Department Visits for CLI

All ages and stratified by age group



Rich Text Widget

Line Level Details for Emergency Department Visits Mentioning Assisted Living, Skilled Nursing, or Other Similar Care Settings and Which Meet Query Criteria for Conditions Associated with COVID-19

Showing previous 7 days

CCDD Category:Pneumonia CCDD v1, or Coronavirus Diagnosis v1, or CLI CC with CLI DD and Coronavirus DD v1

Triage Notes Orig, Clinical Impression, and Chief Complaint Updates: mention of assisted living, skilled nursing, or similar care settings; names of those care settings known to be associated with clusters of COVID-19

Updated 3/29 to use CLI CC with CLI DD and Coronavirus DD v1

mention of LTCF and COVID-adjacent condition emergency (There are no additional records)

Rich Text Widget

Line Level Details for Emergency Department Visits with Indication of Homelessness and Which Meet Query Criteria for Conditions Associated with COVID-19

Showing previous 7 days

CCDD Category:Pneumonia CCDD v1, or Coronavirus Diagnosis v1, or CLI CC with CLI DD and Coronavirus DD v1

Triage Notes Orig, Clinical Impression, and Chief Complaint Updates: Discharge Diagnosis Homelessness v1 criteria

Updated 3/29 to use CLI CC with CLI DD and Coronavirus DD v1

visits for COVID-related conditions and with indication of homelessness emergency (There are no additional records)

Rich Text Widget

Line Level Details for Emergency Department Visits with a Coronavirus Diagnosis

Showing previous 7 days

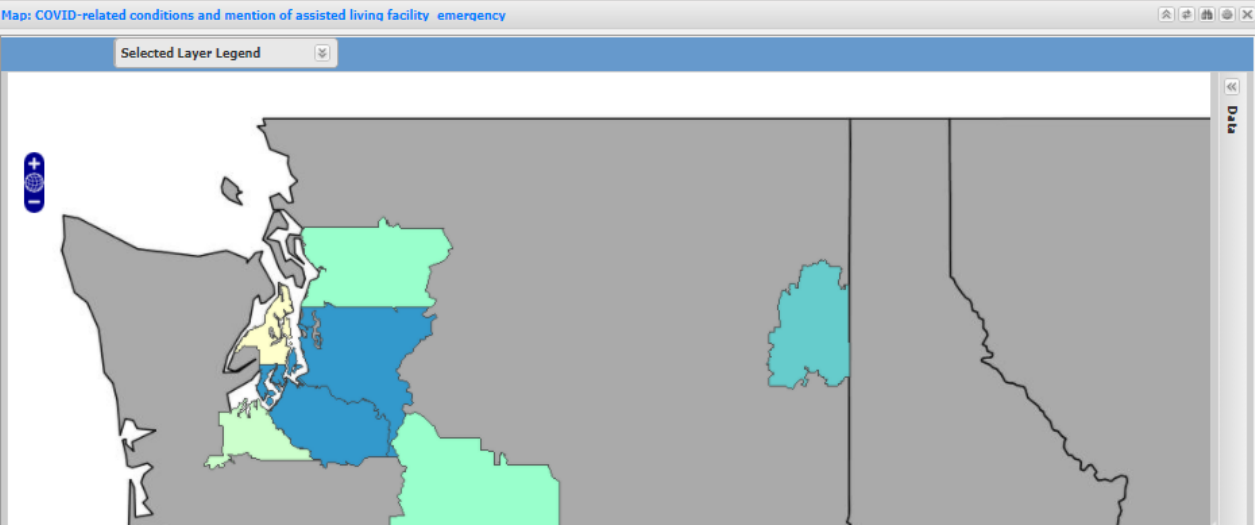
Coronavirus DD: B34.2, B97.2, J12.81

visits with coronavirus diagnosis all visit types (Additional records exist)

Rich Text Widget

Count of Visits Mentioning Assisted Living, Skilled Nursing, or Similar Care Settings and Which Meet Query Criteria for Conditions Associated with COVID-19 in Previous 7 Days by Facility Location

Open data slider to show counts or alerts by region or hospital

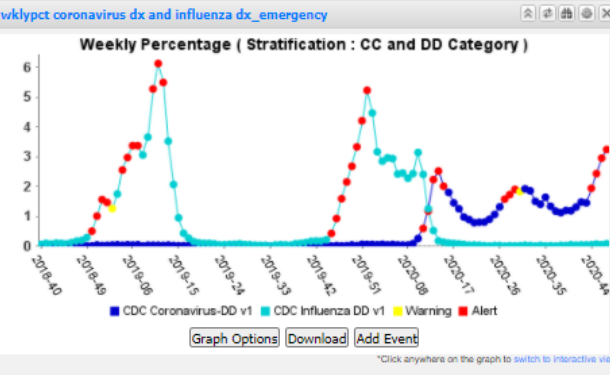


Rich Text Widget

Weekly Percentage of Emergency Department Visits for a Diagnosis of Coronavirus or Influenza

Flu DD: J09, J10, J11

Coronavirus DD: B34.2, B97.2, J12.81

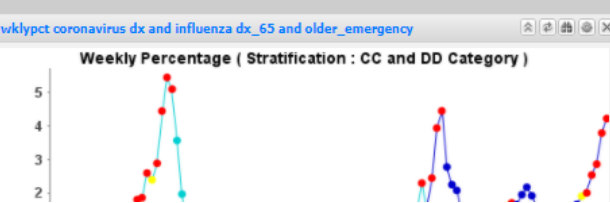
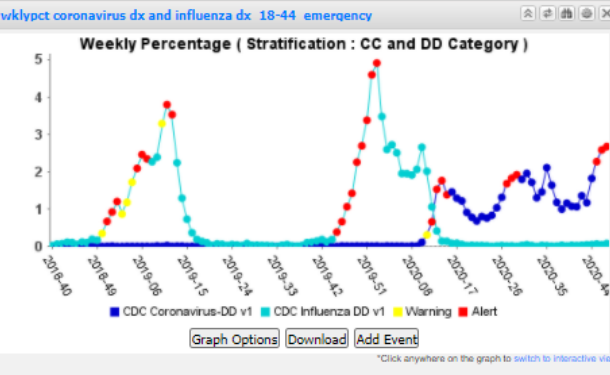


Rich Text Widget

Weekly Percentage of Emergency Department Visits for a Diagnosis of Coronavirus or Influenza Among Patients 18-44 Years and 65+ Years

Flu DD: J09, J10, J11

Coronavirus DD: B34.2, B97.2, J12.81



Two Approaches: Packaged Displays

- There will be times when partners don't have the time or staff skills to build their own visualizations
- In these cases, RHINO leans heavily on Tableau and R Markdown for creating tidy and timely visualizations to help partners view and interact with their local data
 - Mapping and simple graphics
 - Full reports
- As with myESSENCE, it's important to begin with questions about how the displays will be used, who will have access to them, and what ongoing need there will be for updates
 - If frequent updates are necessary, RHINO finds it helpful to automate those processes in R using markdown
 - RHINO is happy to share the code for these products

Washington State COVID-19-like Illness (CLI) RHINO Surveillance

Local Health Jurisdiction

September 10, 2020

Note: Data for Week 37 (ending date 12Sep2020) is incomplete. Caution is advised in interpreting the most recent week data, especially for syndromes that search for discharge diagnoses.

FOR INTERNAL USE ONLY – DO NOT DISTRIBUTE OUTSIDE OF LOCAL HEALTH OR GOVERNMENT ENTITIES.

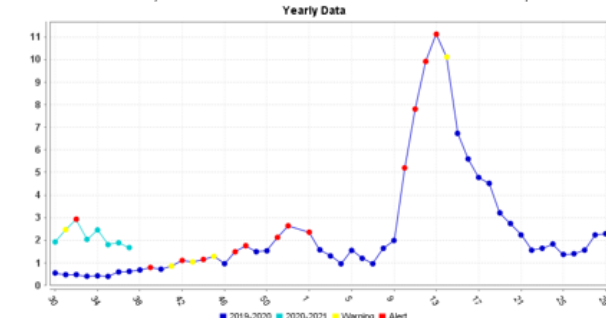
Executive summary

- COVID-19-like Illness (CLI):** CLI includes visits with symptoms or diagnosis of fever/chills AND respiratory symptoms (e.g., cough, difficulty breathing, or shortness of breath) and without an influenza diagnosis. Additionally, it includes any visit with a clinical diagnosis of coronavirus (all kinds of coronavirus, not just COVID-19). Persons who present with CLI might not be diagnosed with COVID-19 and so CLI may capture visits not related to COVID-19.
- Timeframe:** This report contains overlaid time series graphs showing year-over-year trends running Week 30 to Week 29. Trends for 2019-2020 are displayed in dark blue; the most recent weeks are displayed in teal.
- CLI:** Emergency department visits for CLI are not statistically elevated. Visit levels have been higher than what was observed at this time last year for all age groups except among patients 00-04 years. CLI hospitalizations are not statistically elevated. Although hospitalization levels are elevated over what was observed at this time last year, volumes remain low.
- Pneumonia:** Emergency department visits for pneumonia are not statistically elevated. Pneumonia hospitalizations are not statistically elevated. Visit and hospitalization levels remain similar to what was observed at this time last year.
- Influenza and coronavirus diagnoses:** So far in Week 37, 0.90% of emergency department visits have a coronavirus diagnosis and 0.00% have an influenza diagnosis.
- Total visit volumes:** Emergency department visit volumes have not yet returned to what was observed before their drop in the spring.
- Total hospitalizations volumes:** The number of hospitalizations has neared or reached levels previously observed prior to their drop earlier in the year.

CLI Emergency Department Visits

All visits

The percentage of emergency department visits for CLI is not statistically elevated for Week 37. So far this week, visits for CLI represent 1.67% of all emergency department visits and 37 have been reported. Visit levels have been higher than what was observed at this time last year but are lower than what was observed in June and July.



Questions?



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Alabama Department of Public Health



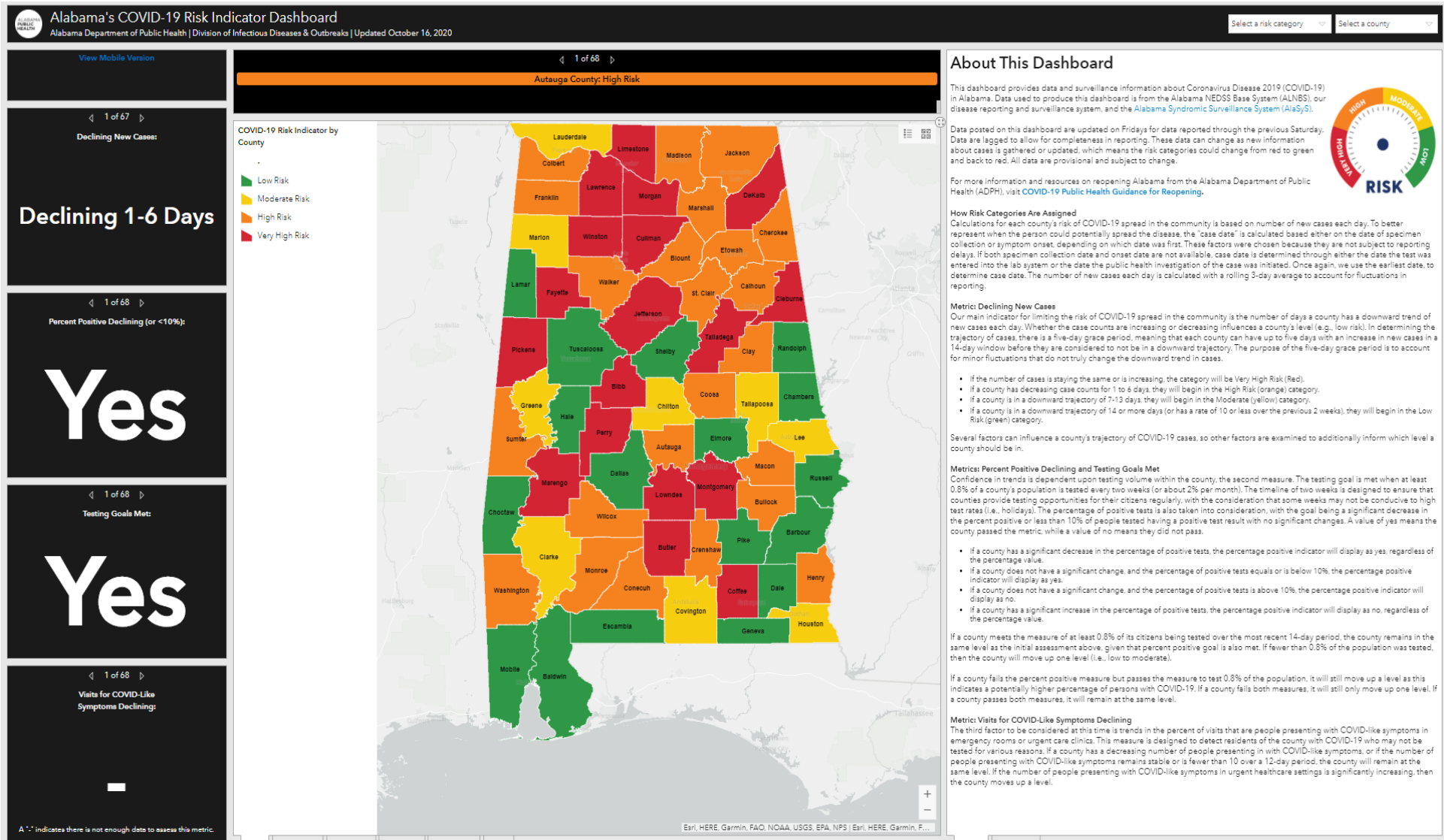
The Art of Surveillance:
AlaSyS Data Visualizations
2020 Syndromic Surveillance Symposium

*Analytics, Statistics, and Visualization
Alabama Syndromic Surveillance (AlaSyS)*

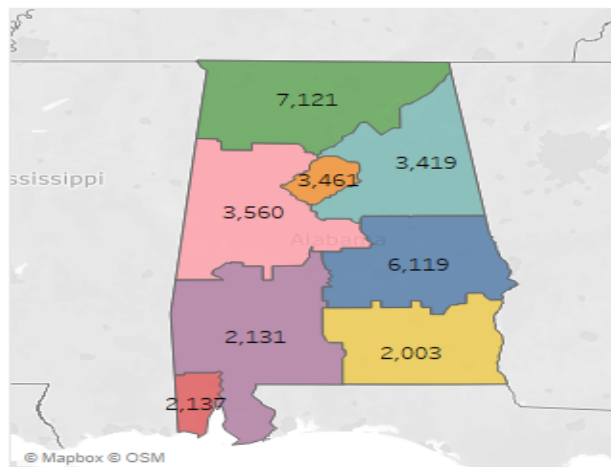
*Epidemiology, Surveillance, & Informatics
Infectious Diseases and Outbreaks Division
Bureau of Communicable Disease*



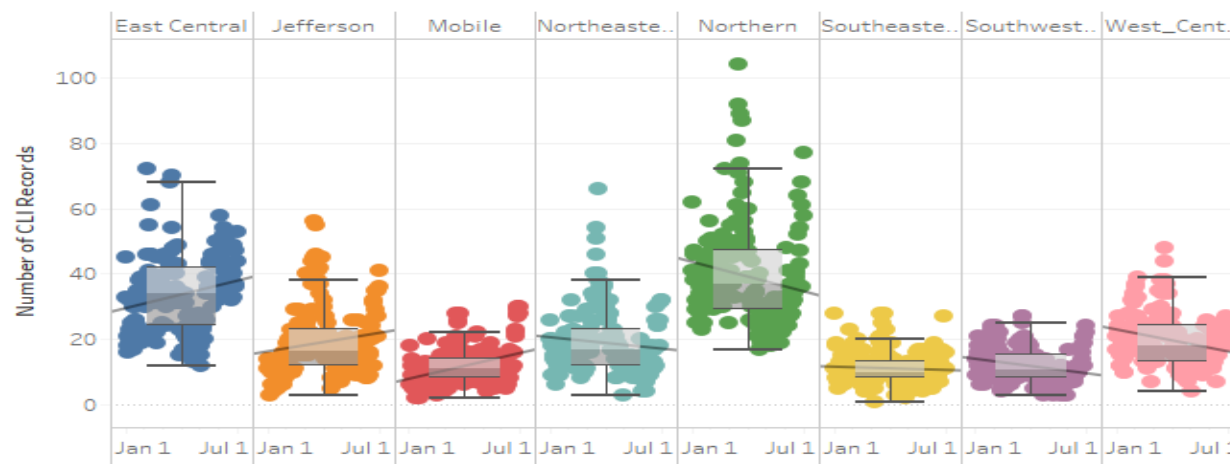
MisChele A. Vickers, MPA
Public Health Research Analyst III



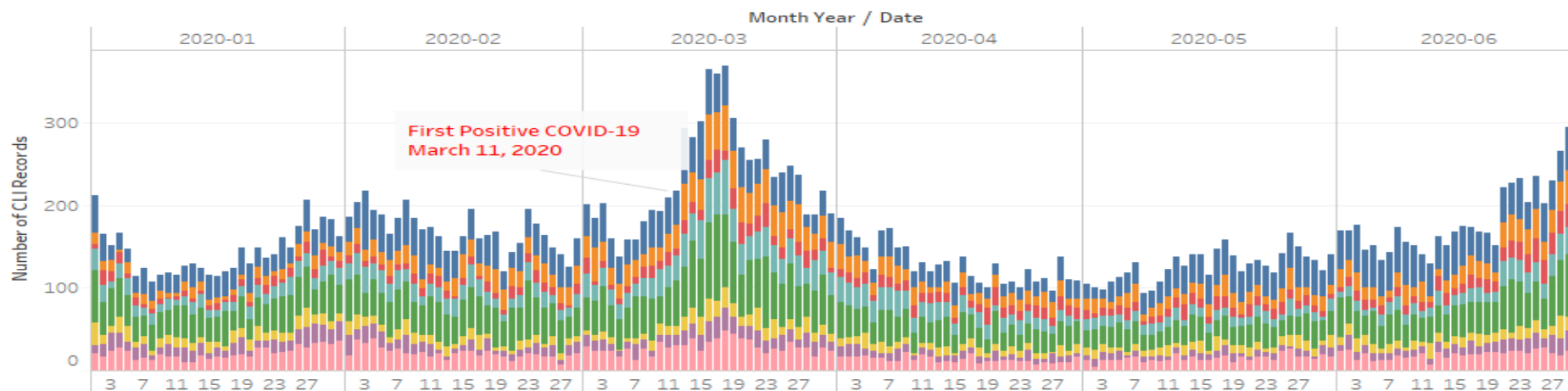
Public Health District Count (Jan to Jun)



Regional Trends ~Jan to June



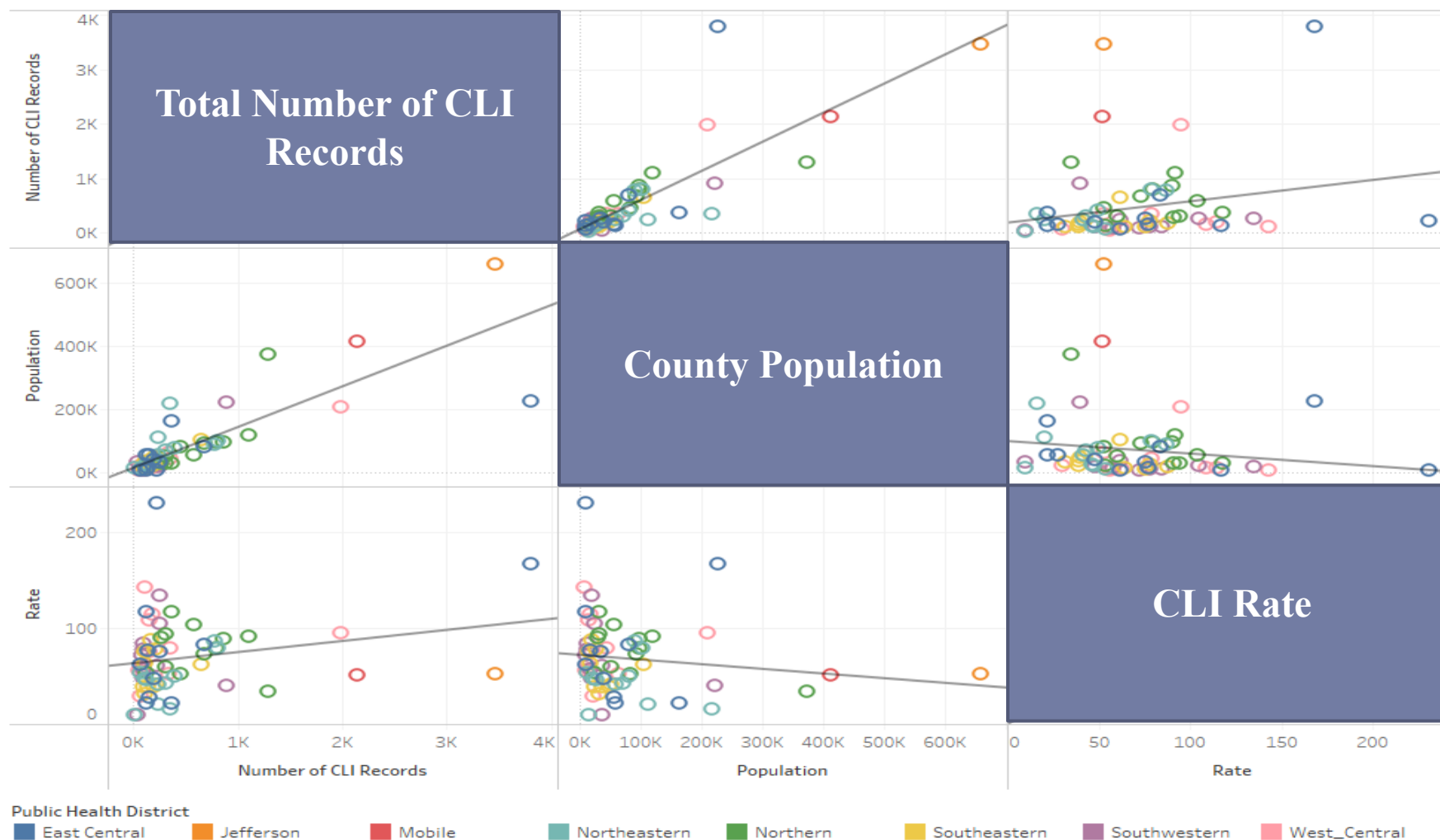
Daily Count Jan to June



Alabama CLI Summary Jan- Jun 2020

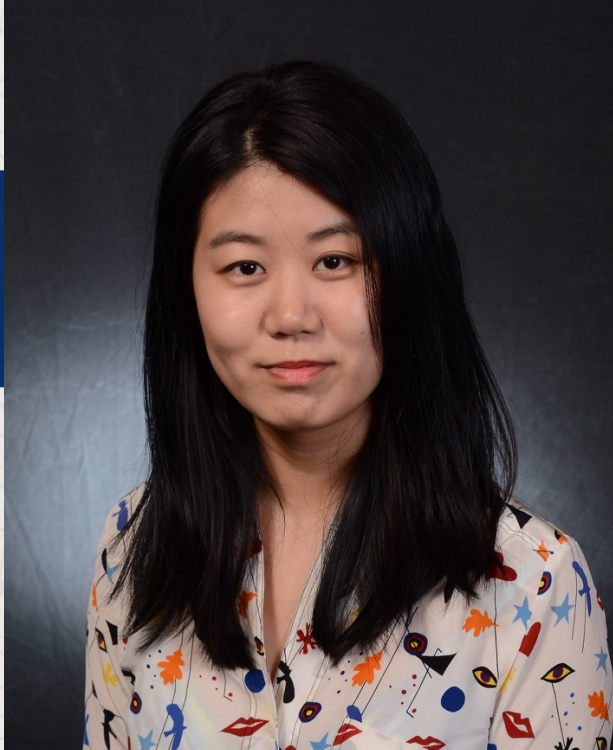


Scatterplot matrix with respect to all three continuous measurements.



Thank You!

- Alabama Department of Public Health
 - Infectious Diseases and Outbreaks Division
- National Syndromic Surveillance Program
 - Community of Practice
- Council of State and Territorial Epidemiologists
- Centers for Disease Control and Prevention



Michelle Carr, MPH & Yifang Dang, MS
Houston Health Department (Texas)





HOUSTON HEALTH DEPARTMENT

HOUSTONHEALTH.ORG



Use of Informatics Visualization Tool Overlaying with Syndromic Surveillance Data in Monitoring Respiratory Health after Deer Park Fire in March 2019

Session Name: Data visualization

Presentation by: Yifang Dang, Michelle Carr, Biru Yang

Authors: Yifang Dang, MS, Imran Shaikh, Michelle Carr, Biru Yang, PhD, MPH, Olubukunola Okulate, MS, MPH, Isaac Desouza, Naomi Macias, REHS/RS, Camden Hallmark, Joann Schulte, DO, MPH and Melanie McNeese

Presentation Date: 11/18/2020 2:15PM-3:15PM (Wednesday)

Presented at: 2020 CSTE Conference, Virtual

Disclaimer: These do not represent the views of the City of Houston



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DEPARTMENT**



To present a novel visualization tool that can be used to effectively share syndromic surveillance analysis

- On March 17 , 2019, a massive petrochemical plant erupted in Deer Park, Texas
- The fire burned for 4 days



Surveillance Data

- Review of syndromic data collected from surveillance systems within the Houston Health Department (HHD):
 - Southeast Texas Syndromic Surveillance System (STSS)
 - Houston Electronic Disease Surveillance System (HEDSS)

Environmental Data

- Air quality data collected from seven Texas Commission for Environmental Quality (TCEQ) environmental sensors

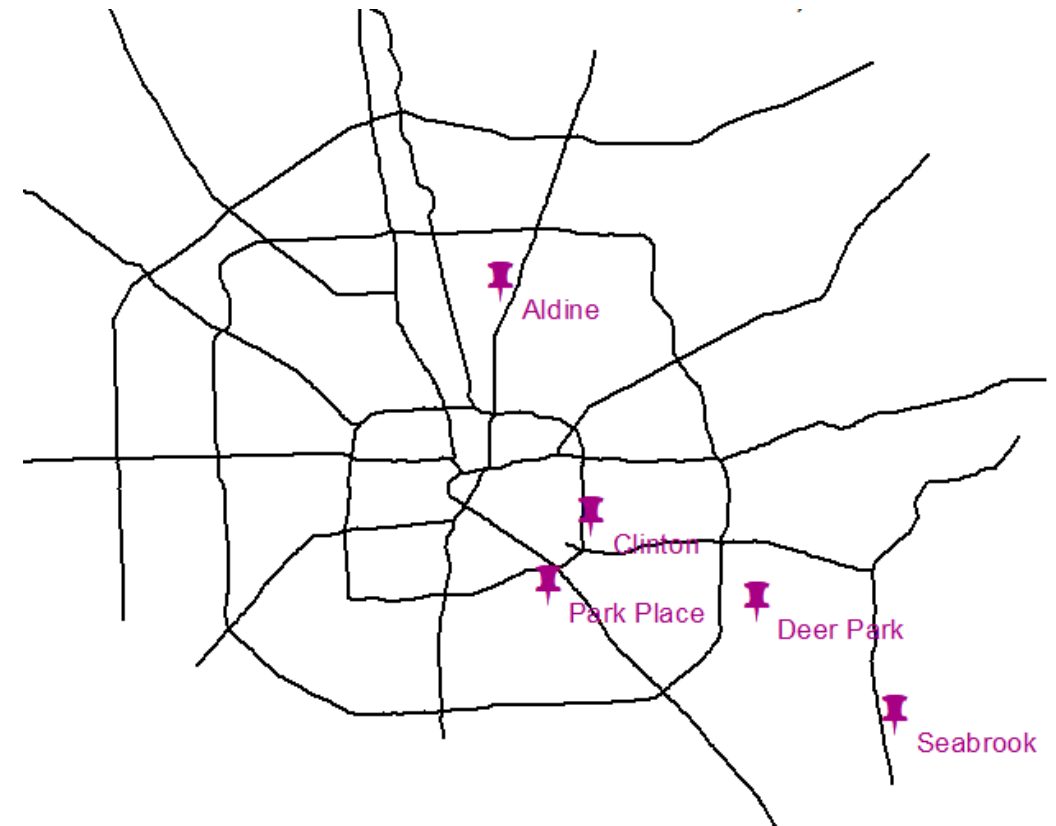
ArcGIS

- Overlay air quality data with STSS data
- Inverse Distance Weighting (IDW) tool

- Inverse distance weighted (IDW) interpolation assumes that measured points with proximity are more alike than those that are further apart.
- Based on power and neighborhood

☐ Method	Inverse Distance Weighted Interpolation
Power	2
☐ Searching neighborhood	Standard
Neighbors to include	15
Include at least	10
Sector type	Full
Major semiaxis	0.245070366577
Minor semiaxis	0.245070366577
Angle	0

- Five sensors were visually displayed
- Air quality on the east side of the incident had the greatest average reading
- Trends in air quality data readings



- Respiratory-related illness complaints were:
 - highest in the first two days
 - day lag
 - long lasting pattern

Trends in respiratory related visits by zip code

Conclusions



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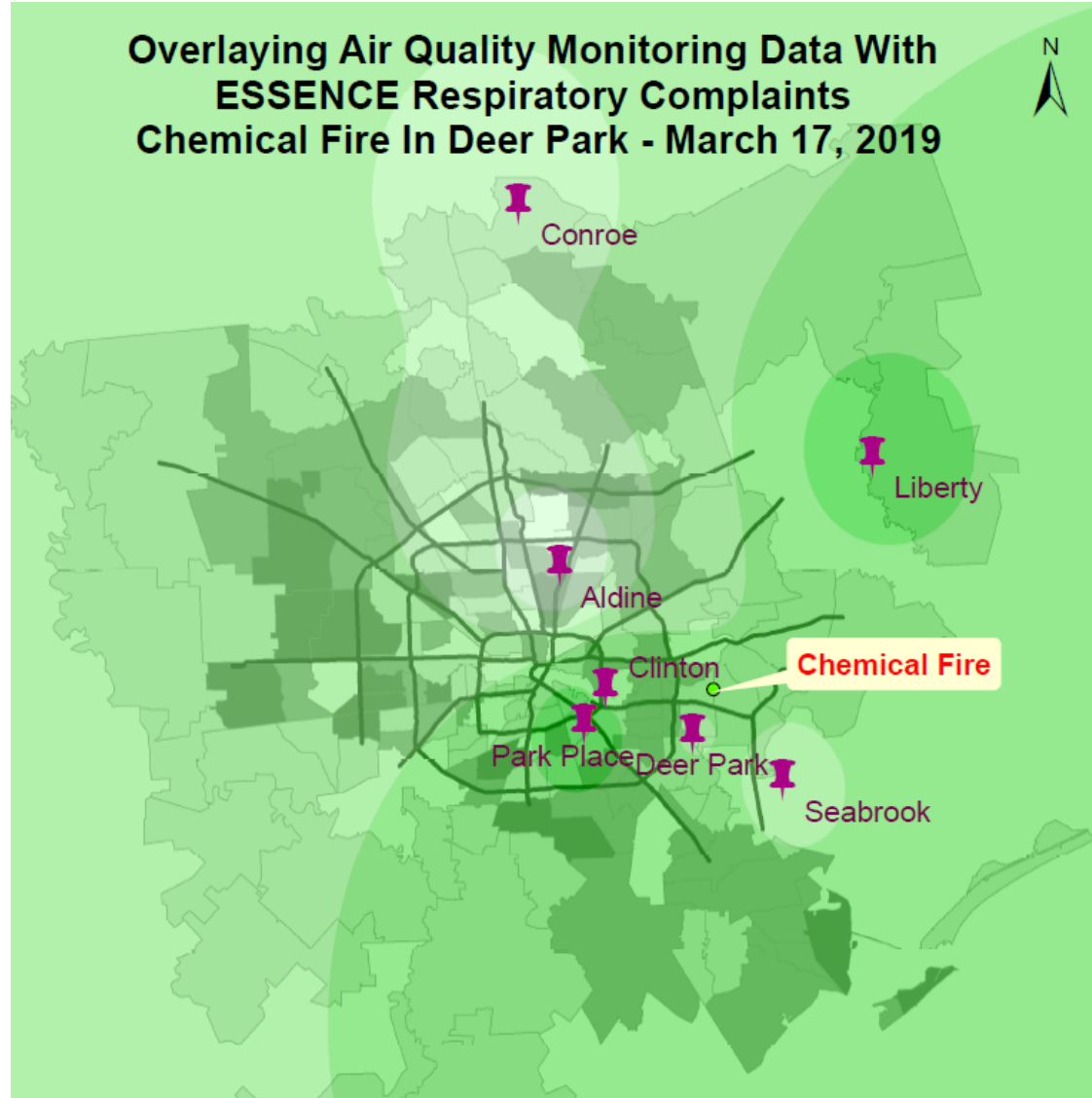
After the Deer Park Fire, air quality had a sharp and narrow tide compared to the dull and long-lasting respiratory complaints tendency.

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints



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Deer Park Chemical Fire, March 17, 2019



Legend

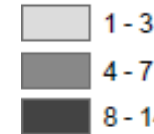


Air Quality Monitoring Sensors

Highway

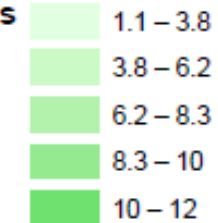
ESSENCE Respiratory Complaints

Count



Air Quality Monitoring Data

Filled Contours

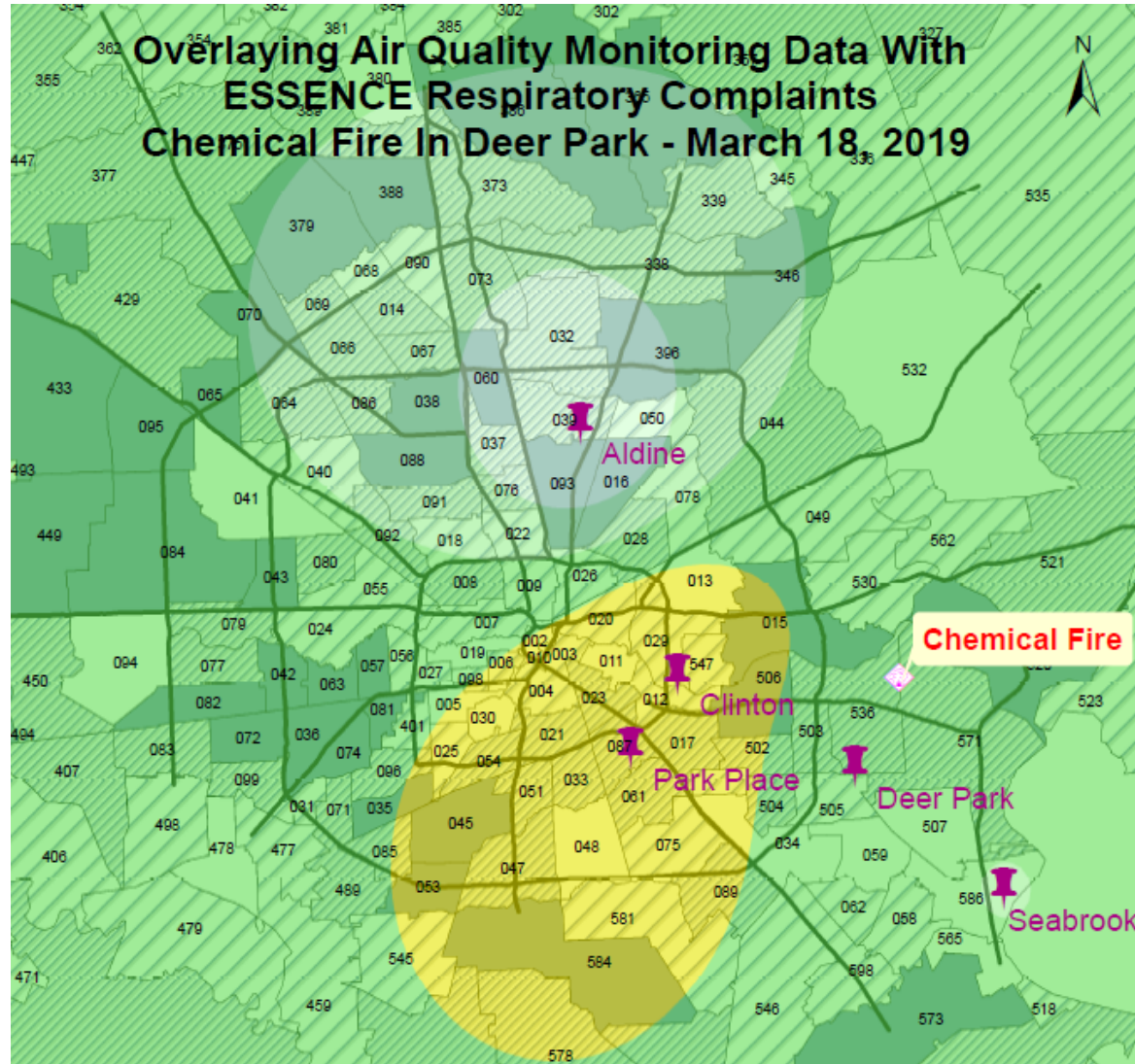


Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints



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Deer Park Chemical Fire, March 18, 2019



Legend

Air Quality Monitoring Sensors

Deer Park Chemical Fire Incident

Highway

ESSENCE Respiratory Complaints

count

1 - 3

4 - 7

8 - 23

none

Air Quality Monitoring Data:

Filled Contours

0 - 4

4 - 8

8 - 12

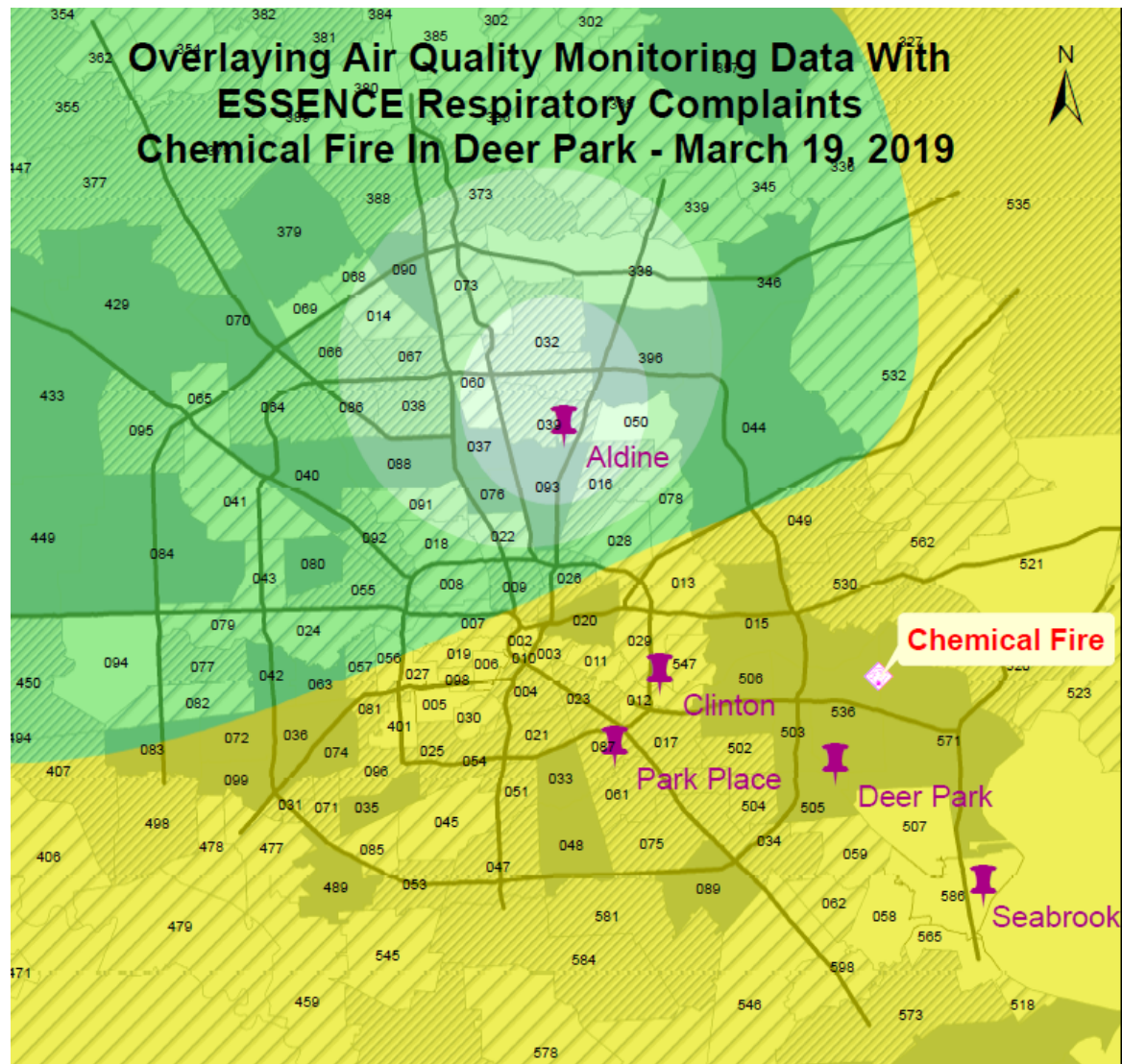
12 - 16.0208333

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints

Deer Park Chemical Fire, March 19, 2019



HOUSTON HEALTH
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Legend

Air Quality Monitoring Sensors

Deer Park Chemical Fire Incident

Highway

ESSENCE Respiratory Complaints

Count

1 - 3

4 - 7

8 - 25

none

Air Quality Monitoring Data

Filled Contours

0 - 4

4 - 8

8 - 12

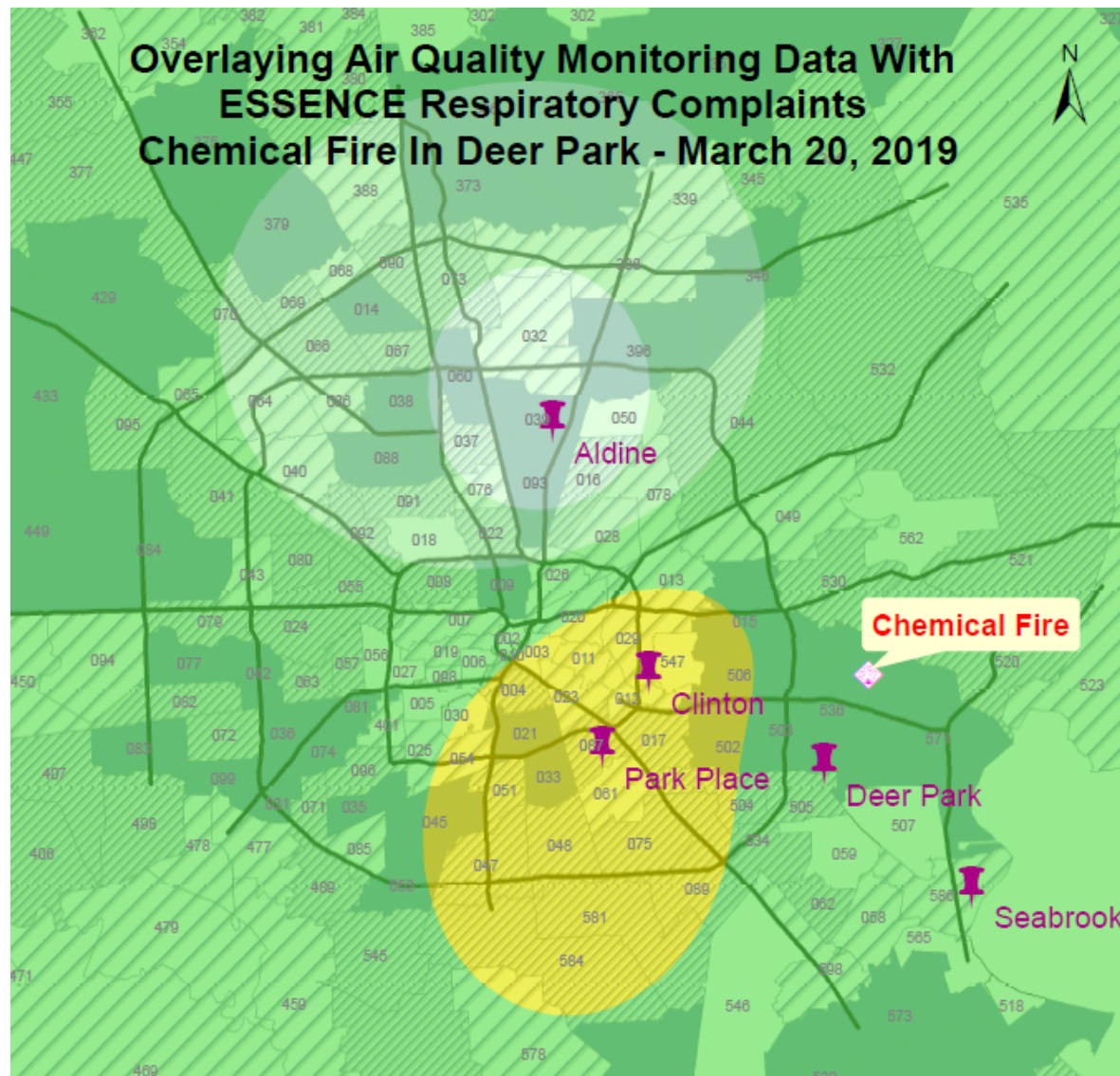
12 - 18.3

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints

Deer Park Chemical Fire, March 20, 2019



HOUSTON HEALTH
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Legend

Air Quality Monitoring Sensors*

Deer Park Chemical Fire Incident

Highway

ESSENCE Respiratory Complaints***

Count by Zip Code****

1 - 3

4 - 7

8 - 19

none

Air Quality Monitoring Data

PM 2.5**

0 - 5

5 - 10

10 - 15

15 - 18.5

* From 12:00 am to 11:59 pm on 3/20/2019, sensors monitored by the state, data collected every hour.

** PM 2.5 is Particulate Matter that measures 2.5 microns or smaller and are likely to enter lungs during respiration.

*** From 12:00 am to 11:59 pm on 3/20/2019, received from 25 EDs in Southeast Texas.

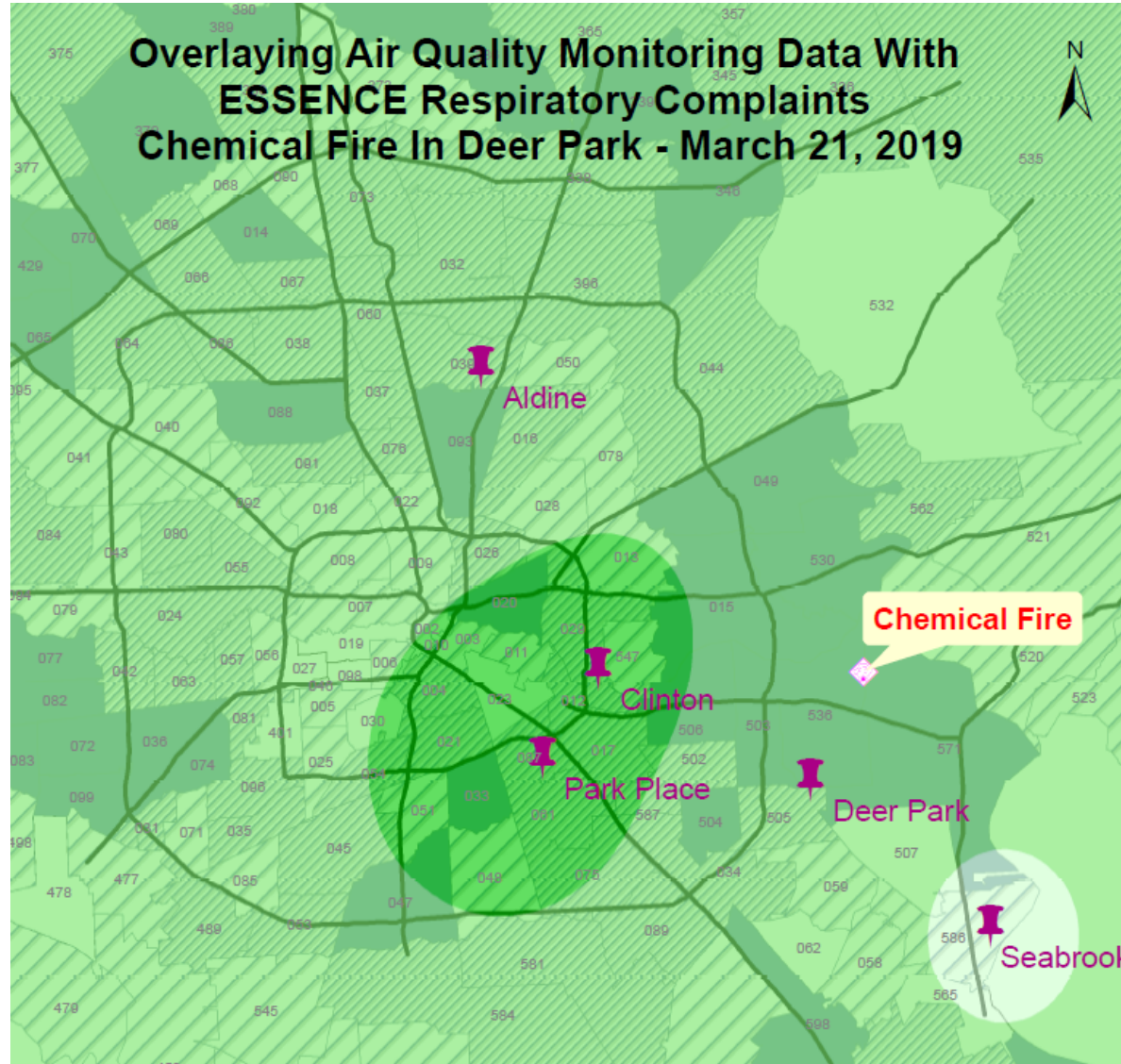
**** Labelled using last 3 digits.

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints

Deer Park Chemical Fire, March 21, 2019



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DEPARTMENT



Legend



Air Quality Monitoring Sensors*



Deer Park Chemical Fire Incident



Highway

ESSENCE Respiratory Complaints***

Count by Zip Code****



1 - 3



4 - 7



8 - 22



none

Air Quality Monitoring Data

PM 2.5**

8.6 - 9

9 - 12

12 - 12.9

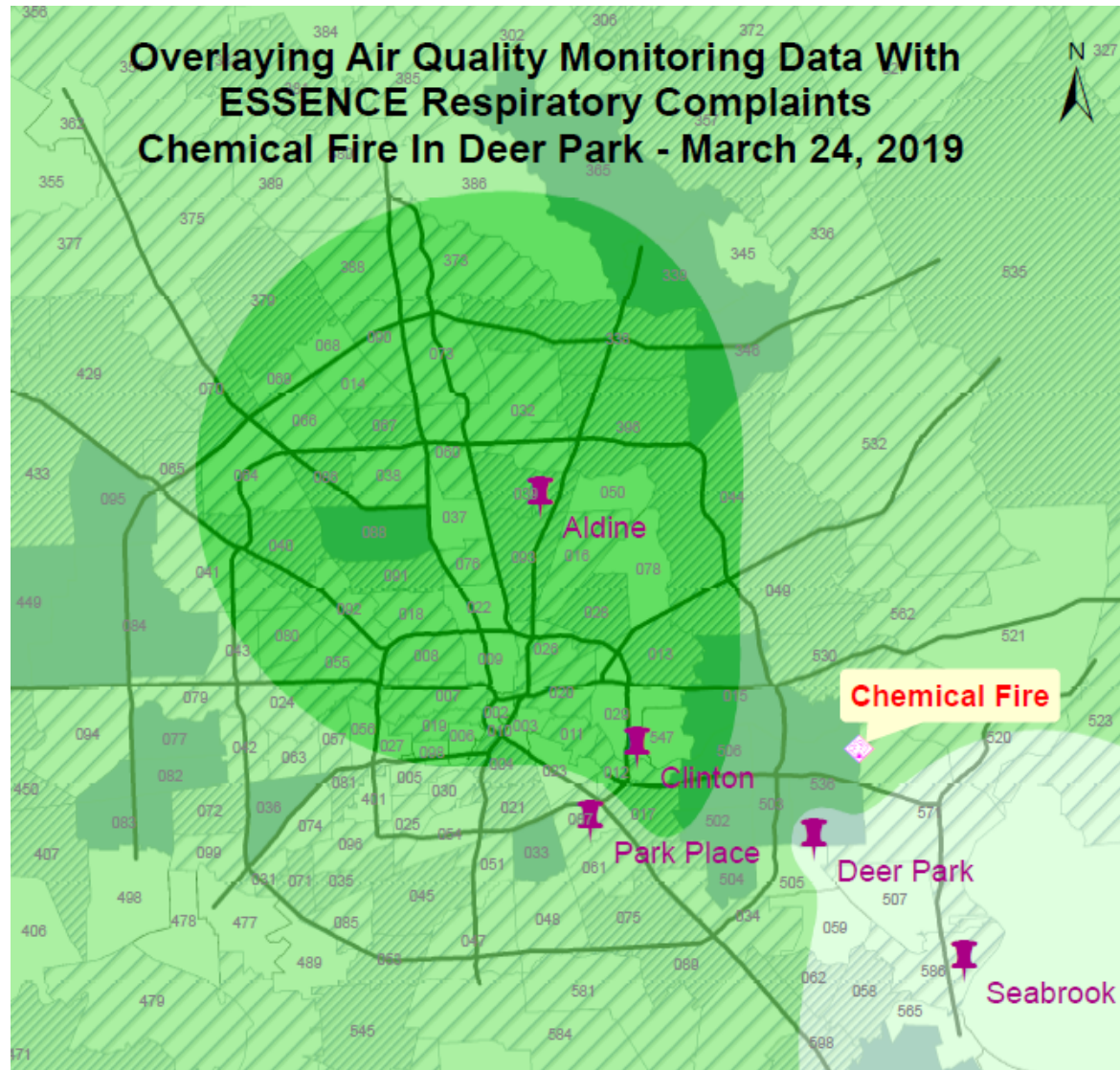
* From 12:00 am to 11:59 pm on 3/21/2019, sensors monitored by the state, data collected every hour.
** PM 2.5 is Particulate Matter that measures 2.5 microns or smaller and is likely to enter lungs during respiration.
*** From 12:00 am to 11:59 pm on 3/21/2019, received from 25 EDs in Southeast Texas.
**** Labelled using last 3 digits.

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints



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Deer Park Chemical Fire, March 24, 2019



Legend



Air Quality Monitoring Sensors*



Deer Park Chemical Fire Incident

Highway

ESSENCE Respiratory Complaints***

Count by Zip Code****



1 - 3



4 - 7



8 - 20



none

**Air Quality Monitoring Data
PM2.5****

6 - 7.2

7.2 - 8.3

8.3 - 9.3

* From 12:00 am to 11:59 pm on 3/24/2019, sensors monitored by the state, data collected every hour.

** PM 2.5 is Particulate Matter that measures 2.5 microns or smaller and is likely to enter lungs during respiration.

*** From 12:00 am to 11:59 pm on 3/24/2019, received from 15 EDs in Southeast Texas.

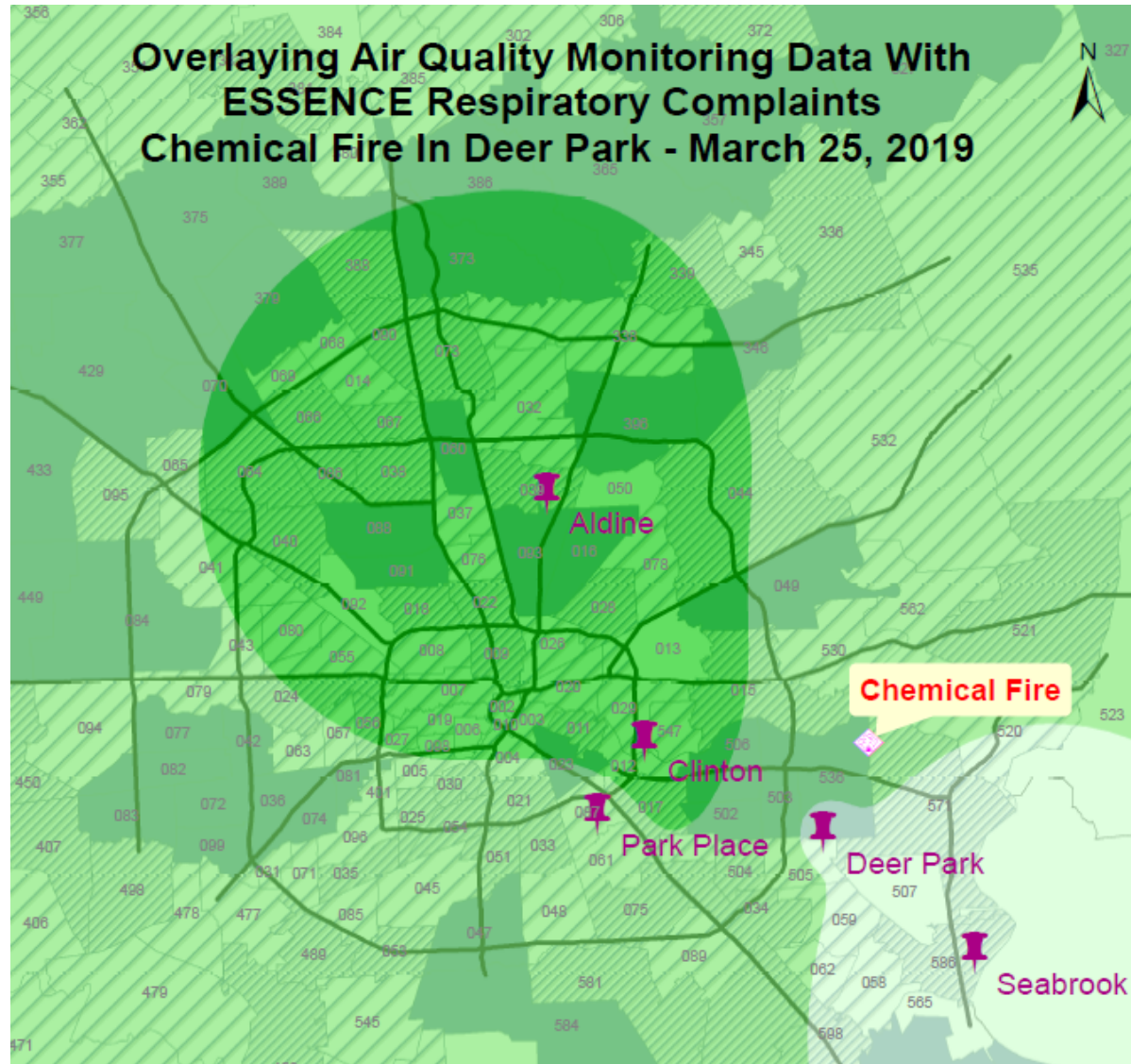
**** Labelled using last 3 digits.

Overlaying Air Quality Monitoring Data with ESSENCE Respiratory Complaints



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Deer Park Chemical Fire, March 25, 2019



- Surrounding ERs have not been fully onboarded to STSS
- Data points were dependent on reporting timeliness and may have been underrepresented
- Observations of 22nd and 23rd were missing
- The Aldine monitoring site was under maintenance and data was unavailable for 3/18-3/25
 - IDW tool interpreted reading as 0
- IDW readings did not consider environmental conditions

- Environmental surveillance data and health surveillance data can be combined for resource allocation purposes
- Standard categorization needs to be established for easy interpretation
- This air quality plus respiratory complaints combination can be applied to other environmental and health issues, such as
 - Wildfire smoke and respiratory symptoms
 - temperature and heat-related illnesses in the summer
 - parasite and parasite-infectious diseases after hurricane

1. <https://www.houstonchronicle.com/business/energy/article/Deer-Park-fire-a-blemish-for-the-image-of-13717661.php>
2. <https://desktop.arcgis.com/en/arcmap/10.3/tools/3d-analyst-toolbox/how-idw-works.htm>

Data was obtained or accessed through the Syndromic Surveillance Consortium of Southeast Texas (SSCSeT); however, any conclusions drawn from use of this data do not represent the official views of any consortium member jurisdiction or the system host site, Houston Health Department.

Thank you!



Acknowledgements:

Imran Shaikh, Epidemiologist Supervisor, Informatics Program

Olubukunola Okulate, Biostatistician, Informatics Program

Isaac Desouza, Engineer

Naomi Macias, Bureau Chief of Public Health

Camden Hallmark, Senior Analyst, Division of Disease Prevention and Control

Melanie McNeese, Epidemiologist Specialist, Bureau of Epidemiology

National Syndromic Surveillance Program

Community of Practice

Advancing the Science and Practice of Syndromic Surveillance



Block Schedule

Training

Methods

Innovation

1-1:15PM EST	Daily Opening, Logistics, Overview		
1:15-2PM EST	Training: Call Up Your Data Using APIs	Breakout: Querying from Scratch - Cooking Up New Syndromes	Training: Data Sharing Step-by-Step Using the AMC
	...BREAK...		
2:15-3PM EST	Training: Telling Your Story - Insights and Tips to Promote Syndromic Surveillance	Breakout: The Art of Surveillance - Data Visualizations	Lightning: New Tactics for Old Problems
	...BREAK...		
3:15-4PM EST	Training: Dashboard Creation in NSSP ESSENCE	Breakout: Making the Best of a Sys Situation - Data Quality for Sys	Roundtable: COVID, Current Events, and More - Discussing Syndromic Surveillance Practices in 2020
	...BREAK...		
4:15-5PM EST	Virtual Happy Hour		