

Wildfire and Smoke Syndromic Surveillance: An Implementation Guide for Public Health Practice

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Overview Summary



How-to implement wildfire and smoke syndromic surveillance:

- Use novel definitions for **wildfire and smoke** and **respiratory** visits
- Use air pollution data (PM_{2.5}) – monitored observations are integrated into ESSENCE
- Understand your climate, geography, and past trends
- Prepare in advance of the season

Introduction



Acknowledgments



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Wildfire Overview



Non-prescribed, non-structured wildland fire

Season varies by location

- Dry landcover
- Low humidity
- High temperatures and winds

Beneficial for healthy ecosystem function

Danger to communities and resources



Wildfire and Health



Direct and indirect health outcomes include:

- Air pollution from smoke
- Occupational exposure
- Potential chemical releases from infrastructure destruction
- Mental health impacts from evacuation, loss, and poorer health

Public health responses usually focus on air pollution from fine particulate matter (PM_{2.5})

Health outcomes associated with PM_{2.5} include premature mortality, respiratory outcomes, and cardiovascular outcomes

Groups of Interest



- Children
- Older adults
- People working and/or spending time outdoors
- People with underlying respiratory and/or cardiovascular conditions
- Pregnant people
- People in marginalized and low-income communities



CSTE Wildfire Syndromic Surveillance Project



Project Goals



Gather and review existing wildfire-related syndrome definitions

Develop recommended definition(s) for wildfire-related health outcomes

Produce a guidance document for use of recommended definitions

Syndrome Collection and Novel Definition Development



Collection

Syndrome definitions from 5 state/local health departments and the National Syndromic Surveillance Program (NSSP)

Topics included:

- Wildfire and Smoke – 7
- Respiratory – 13
- Cardiovascular – 7
- Other – 5



Terms used in 2+ definitions or potentially useful

Novel Definitions

1. Wildfire and Smoke Visits
2. Respiratory Visits of Interest

Novel Definition: Wildfire and Smoke Visits



Inclusion Codes

J70.5	Respiratory conditions due to smoke inhalation
X08.8	Exposure to other specified smoke, fire and flames
T59.81	Toxic effect of smoke
X01.1	Exposure to smoke in uncontrolled fire, not in building or structure
423123007	Smoke inhalation injury (disorder)

Chief Complaint Search Terms

- Wildfire
- Smoke inclusions and exclusions
- Drug exclusions
- Other exclusions (i.e., kitchen, motor vehicle crash)

Novel Definition: Respiratory Visits of Interest



Included Health Outcomes Terms + Codes

- Acute bronchitis
- Emphysema
- COPD
- Asthma
- Breathing problems
- Shortness of breath
- Wheeze + exclusions
- Universal fever exclusion

Structure

- Codes and terms for each health outcome are listed together for easy customization
- `^[:/ ]J20^,or,^acute bronchitis^`

Validation Process

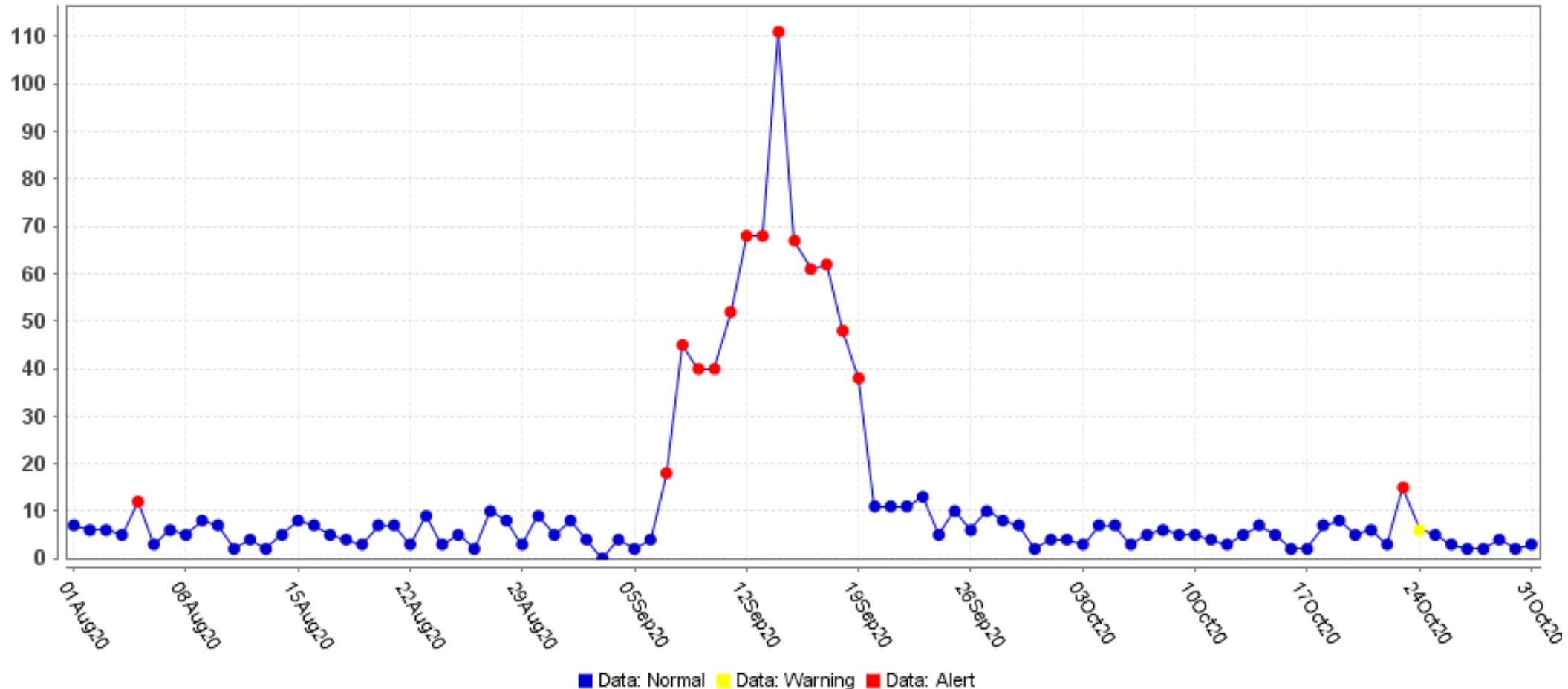


1. Time Series Visualization
2. Compare Definition to Air Quality ($\text{PM}_{2.5}$)
3. Compare Definitions to Each Other
4. Document Final Thoughts
5. Submit Findings

Novel Wildfire and Smoke Definition, NSSP Region 10, Aug - Oct 2020



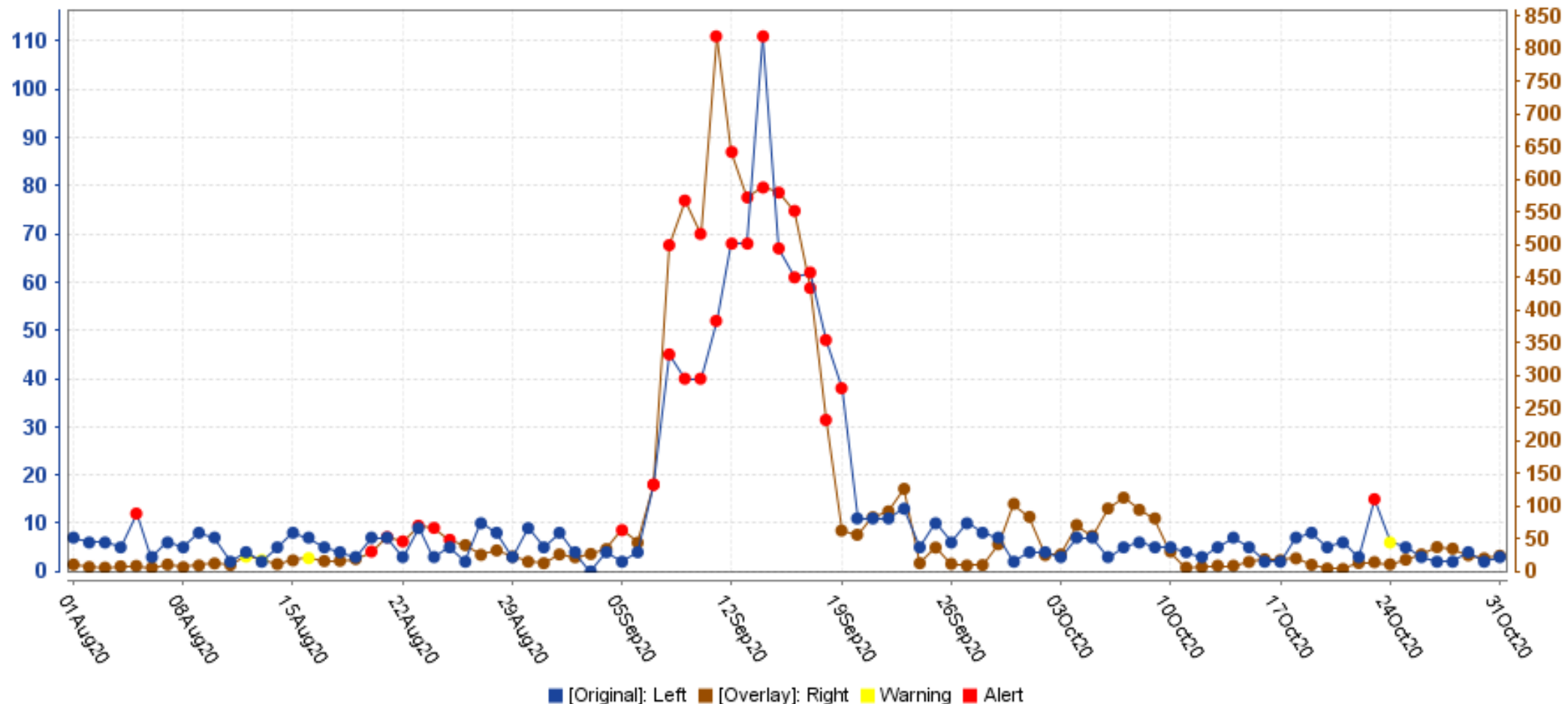
Daily Data Counts



Novel Wildfire and Smoke Definition with Max PM_{2.5} Overlay, NSSP Region 10, Aug - Oct 2020



Time Series With Overlay



Summary Validation Results



Wildfire and Smoke definition worked well and correlated to $PM_{2.5}$ in large and small areas and populations.

Respiratory definition is broad. There may not be a statistically significant signal during a wildfire event, but it is more likely if air pollution is high. Use in combination with other definitions.

Recommendations



Partner early and often

Prepare a wildfire and smoke dashboard (myESSENCE tab)

- Novel **wildfire and smoke** visits
- Novel **respiratory visits** of interest
- More specific health outcomes
- Disaster-related Mental Health v1
- Occupational
- Age group stratification
- PM_{2.5} overlays

Contact Us



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