



2021 Syndromic Surveillance Symposium Program Packet

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Event Overview

The Council of State and Territorial Epidemiologists (CSTE), in collaboration with the Centers for Disease Control and Prevention's (CDC) National Syndromic Surveillance Program (NSSP), will virtually convene the **2021 Syndromic Surveillance Symposium** from **November 16-18, 2021**. The event will be held during the following dates and times:

- Tuesday, November 16, 2021 – 1:00-5:00pm EST
- Wednesday, November 17, 2021 – 1:00-5:00pm EST
- Thursday, November 18, 2021 – 1:00-5:00pm EST

All events will be held on CSTE's Zoom platform. Instructions on how to join and session links are provided in the detailed agenda. All symposium materials, including the schedule and session links can also be found on Microsoft Teams.

CSTE has partnered with Kahuina Consulting to help provide an engaging and interactive virtual forum for the syndromic surveillance community to exchange experiences, share best practices, and take away innovative solutions and strategies for advancing syndromic surveillance practice. Attendees will have opportunities to learn new skills from technical experts, from the basics to latest analytical techniques. There will also be a forum to discuss the future of the NSSP Community of Practice and increasing syndromic surveillance capacity at the state, local, and national levels. Wednesday will conclude with informal sessions hosted by colleagues.

Session Type Descriptions

Breakout – Moderated presentations from several speakers addressing similar topics or themes with short questions and answer period.

Coffee Breaks – Short, informal opportunities to meet new colleagues and discuss specific topics during session breaks.

Roundtable – Facilitated discussion around a central topic with audience participation and dialogue.

Training/Demonstration – Step-by-step instruction to build user skills using NSSP tools.

Daily Block Schedules

Session Track	Description
Data Methods and Integration	Integrating new data sources and variables into syndromic surveillance practice and integrating syndromic surveillance practice and access beyond public health agencies.
Topical Use Cases	Syndromic surveillance applications to priority public health challenges: the overdose epidemic, firearm injuries, climate change, and mental health.
Practical Applications	Expanding jurisdictional syndromic surveillance practice with improved coverage, use cases, data quality, and advanced analytics.

Time (EST)	Tuesday Nov 16, 2021	Time (EST)	Wednesday Nov 17, 2021	Time (EST)	Thursday Nov 18, 2021
1:00-1:15 PM	Logistics and Preview	1:00-1:15 PM	Logistics and Preview	1:00-1:15 PM	Logistics and Preview
1:15-1:30	Welcoming Remarks (CoP, CSTE, and CDC)	1:15-1:30	Training: Advanced ESSENCE	1:15-1:30	Demo: COVID VAE Dashboard
1:30-1:45		1:30-1:45	Roundtable: Urgent! Expanding Syndromic Community Data Quality Metrics to Urgent Care	1:30-1:45	Roundtable: Using Race and Ethnicity Data in Syndromic Surveillance
1:45-2:00		1:45-2:00	Breakout: Querying from Scratch - Cooking Up New Syndromes	1:45-2:00	Roundtable: Defining and Evaluating Mental Health Using Syndromic Surveillance
2:00-2:15	Keynote Discussion (Past, Present and Future of SyS)	2:00-2:15	Breakout: Some is Better than None - Expanding Syndromic Programs	2:00-2:15	Roundtable: Variability in Discharge Diagnoses
2:15-2:30		2:00-2:15	Virtual Coffee Breaks	2:15-2:30	Virtual Coffee Breaks
2:30-2:45		2:15-2:30	Meet the CoP Core Committee	2:15-2:30	CoP Data Quality Subcommittee
2:45-3:00	Break	2:30-2:45	Meet and Greet	2:30-2:45	CoP Technical Subcommittee
3:00-3:15		2:45-3:00	CSTE Workforce Development	2:45-3:00	End-user Training Strategies
3:15-3:30		3:00-3:15	Training: Rnssp Part 1	3:00-3:15	Training: Using Laboratory Data with NSSP ESSENCE
3:30-3:45	Roundtable: Integrating New Data Sources in Surveillance Practices	3:15-3:30	Breakout: Tried and True Syndromic Surveillance Methods for New Data	3:15-3:30	Roundtable: Utility and Challenges in Monitoring Social Determinants of Health
3:45-4:00	Roundtable: Overdose Spike Alert Toolkit	3:30-3:45	Breakout: FASTER Syndrome Refinement - Standardizing Firearm Injury Surveillance	3:30-3:45	Breakout: Measuring Mental Health Exasperation in the Era of Lockdowns
4:00-4:15	Training: Data Integration	3:45-4:00	Breakout: Tracking Infections through Time and Space	4:00-4:15	Breakout: Better Practice through Advanced Analytics
4:15-4:30	Meet and Greet	4:00-4:15	Training: Rnssp Part 2	4:15-4:30	Keynote Address (Public Health Action)
4:30-4:45	Virtual Coffee Breaks	4:15-4:30	Breakout: Syndromic What? Sharing Data Outside of Public Health	4:30-4:45	
4:45-5:00 PM	Breakout: Admitted - Integrating Inpatient Data	4:30-4:45	Roundtable: Severe Weather Surveillance	4:45-5:00 PM	
	Breakout: Overdose Surveillance to Action	4:45-5:00 PM	Breakout: Unreported Case Finding		Closing (CoP, CSTE, and CDC)
			Virtual Happy Hour		

Content by Track

Symposium Opening, Welcoming Remarks, Keynotes, and Symposium Closing

Opening, Logistics, and Welcoming Remarks

[Recording](#) | [Slides](#)

Speakers:

- Janet Hamilton, MPH – CSTE, Executive Director
- Karl Soetebier, MAPW – CDC/NSSP
- Krystal Collier, BA – NSSP CoP Core Committee Chair

Keynote Discussion: Exploring the Past, Present, and Future of Public Health Surveillance

[Recording](#)

Speakers:

- Janet Hamilton, MPH – CSTE, Executive Director
- Karl Soetebier, MAPW – CDC/NSSP
- Sherri Davidson, PhD, MPH – Alabama Department of Public Health, State Epidemiologist, Director of the Office of Informatics & Data Analytics, Director

Keynote Address: Public Health Action

[Recording](#) | [Slides](#)

Description:

The closing keynote address will focus on how syndromic surveillance of behavioral health related emergency department visits, with a particular focus on drug-related visits, can be used to drive public health action. The talk will include a brief overview of New York City's approach to analyzing drug-related syndromic surveillance data, guiding principles for data analysis, and how lessons learned from syndromic surveillance can be applied to public health surveillance more broadly.

Presenter:

- Michelle L. Nolan, MPH, MPhil – NYC Department of Health and Mental Hygiene

Symposium Closing Session

[Recording](#)

Speakers:

- Krystal Collier, BA – NSSP CoP Core Committee Chair
- Yushuan Chen, MPH – NSSP CoP Core Committee Deputy Chair
- Karl Soetebier, MAPW – CDC/NSSP
- Alyaa Altabbaa, MPH – CSTE

Data Methods and Integration Track

Roundtable: Integrating New Data Sources in Surveillance Practices

[Recording](#)

Description: Discuss state and local public health agency challenges, successes, and opportunities to expand SyS by integrating new data sources.

Facilitator: Aaron Kite-Powell, MS – CDC/NSSP

Breakout: Admitted - Integrating Inpatient Data

[Recording](#) | [Slides](#)

Description: Learn how states are using inpatient data to 1) identify resource needs and 2) enhance case finding.

Moderator: Daniel Bedford – State of Wisconsin, Department of Health Services

Presenters:

- Andy Walsh, PhD – Health Monitoring
- Stacey Hoferka, MPH, MSIS – IL Dept of Public Health
- Neha Shanker, PhD, MPH – NC Division of Public Health, NC DHHS

Roundtable: Urgent! Expanding Syndromic Community Data Quality Metrics to Urgent Care Clinics

[Recording](#) | [Slides](#)

Description: The NSSP Community of Practice (CoP) Data Quality Subcommittee, working with the National Syndromic Surveillance Program (NSSP) and other partners, have observed a consensus gap in urgent care data quality metrics regarding:

1. How to identify UCC data
2. What tools to use in onboarding and evaluating UCC data
3. Where to get more UCC information regarding preferences and practices

Thus, this roundtable partner discussion (with NSSP CoP syndromic surveillance, Federal partners like CDC and ONC, and others) is being led to reach consensus on what data quality metrics should be used to evaluate urgent care clinic (UCC) data.

- This will be based on standardized practices agreed upon by partners through a collaborative effort.
- Help us to reach consensus on the right metrics for urgent care data quality.

Facilitator: Krystal Collier, BA – Arizona Department of Health Services

Breakout: Tried and True Syndromic Surveillance Methods for New Data

[Recording](#) | [Slides](#)

Description: Hear how SyS methods enhance surveillance efforts in pre-hospital settings including hot-line call analysis, EMS trip reports, and poison control reports.

Moderator: Jim Nowicki, MBA – Palantir

Presenters:

- Sharmin Hossain, PhD, MPH – Maryland Department of Health
- Karin Hoelzer, DVM, PhD – Maximus
- DeLayna Goulding, MPH – Colorado Department of Public Health & Environment

Breakout: Syndromic What? Sharing Data Outside of Public Health

[Recording](#) | [Slides](#)

Description: Hear about expanding SyS awareness, access, and integration outside of traditional public health agencies.

Moderator: Mayank Modi, MD – Medical University of the Americas

Presenters:

- Gabriel Ann Haas, MPH – Kansas Department of Health and Environment
- Kellie Wark, MD, MPH – University of Kansas Medical Center
- Margaret Nilz, MPH – American College of Emergency Physicians
- Laura Fox, MPH – Maricopa County Department of Public Health and Arizona Department of State Health Services
- Paul Iniguez, B.S., M.A. – NOAA/NWS Phoenix, AZ
- Aaron Gettel, MPH – Maricopa County Department of Public Health

Roundtable: Using Race and Ethnicity Data in Syndromic Surveillance

[Recording](#) | [Slides](#)

Description: Identify analytic use cases and practical considerations for using new calculated race and ethnicity variables in NSSP ESSENCE.

Facilitator: Amanda Smith, PhD, MPH – Centers for Disease Control and Prevention

Panelist:

- Amanda Dylina Morse, MPH
- Jourdan DeVies, MS – Centers for Disease Control, National Syndromic Surveillance Program, ICF Contractor
- Carla Britton, PhD – Alaska Native Tribal Health Consortium
- Rashon Lane, PhD – Centers for Disease Control, Division of Sexually Transmitted Disease Prevention

Roundtable: Utility and Challenges in Monitoring Social Determinants of Health Using Syndromic Surveillance

[Recording](#) | [Slides](#)

Description: Discuss the various SDOH metrics that can be evaluated in syndromic surveillance data, challenges encountered in collecting these data, and tangible next steps to improve data collection.

Facilitator: Lakshmi Radhakrishnan, MPH – CDC/NSSP

Panelists:

- Krystal Collier, BA – Arizona Department of Health Services
- David Swenson, MEd – State of NH Department of Health and Human Services
- Amanda Morse, MPH – Washington State Department of Health

Topical Use Cases Track

Roundtable: Overdose Spike Alert Toolkit

[Recording](#) | [Slides](#)

Description: Discuss recent findings from the CSTE Overdose Spike Alert Advisory Group including innovative ideas and emerging topics in overdose anomaly detection and response.

Facilitators:

- Krystal Collier, BA – Arizona Department of Health Services
- David Swenson, BS, Med – State of NH Department of Health and Human Services
- Sydney Fox, MPA – The Overdose Response Strategy (ORS)

Breakout: Overdose Surveillance to Action

[Recording](#) | [Slides](#)

Description: Hear how public health agencies use SyS to identify overdose clusters and link to prevention interventions.

Moderator: Michael Coletta, MPH – CDC/NCIPC

Presenters:

- Shahnaj Binte Safi, MBBS, MPH – CSTE/NMDOH
- Scott M. Johnston, MPH – Kansas Department of Health and Environment
- Malathi Aarkoti, DrPH, MPH – New Jersey Department of Health
- Mwedusasa Mtenga, MPH – Florida Department of Health

Breakout: Querying from Scratch - Cooking Up New Syndromes

[Recording](#) | [Slides](#)

Description: Learn about creating new syndromes for tracking injuries including emerging drug use trends.

Moderator: Nimi Idaikkadar, MPH – CDC/DDNID/NCIPC/DIP/DAB

Presenters:

- Briana Moreland, MPH – Centers for Disease Control and Prevention
- Julia Dilley, PhD MES – Multnomah Co HD/Oregon Health Authority
- Edward Onyango, PhD, MPH – Office of Informatics and Analytics, Tennessee Department of Health

Breakout: FASTER Syndrome Refinement - Standardizing Firearm Injury Surveillance

[Recording](#) | [Slides](#)

Description: Discover three approaches to validating and refining CDC's Firearm Injury syndrome definition and how the query results correlate with the Social Vulnerability Index.

Moderator: Diksha Ramnani, MPH – Monterey County Health Department

Presenters:

- Erica Bennion, MPH – Utah Department of Health
- Meredith Davis, MPH – Virginia Department of Health
- William Baker-Robinson, MS – HSR&D Center to Improve Veteran Involvement in Care, VA Portland Health Care System
- Miriam E. Van Dyke, PhD, MPH – National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

Roundtable: Severe Weather Surveillance Using Syndromic Surveillance

[Recording](#) | [Slides](#)

Description: Discuss accelerated community response to ongoing emergencies and enhanced preparedness for future emergencies using community-developed weather queries and tools.

Facilitators: Lakshmi Radhakrishnan, MPH – CDC/NSSP

Panelists:

- Fatema Mamou, MPH – Michigan Department of Health and Human Services
- Natasha Close - Washington State Department of Health
- Paul Schramm - National Center for Environmental Health, CDC
- Zachary Stein - ICF International

Roundtable: Defining and Evaluating Mental Health using Syndromic Surveillance

[Recording](#) | [Slides](#)

Description: Share principles, processes, and experiences defining mental health-related syndromes, involving subject matter experts, and implementing mental health surveillance.

Facilitator: Lakshmi Radhakrishnan, MPH – CDC/NSSP

Panelists:

- Lareina La Flair, PhD, MPH – Washington State Department of Health
- Dylan Pell, MSW, MPH – New Mexico Department of Health
- Kayla Anderson, PhD – CDC/NCIPC
- Rebecca Bitsko, PhD – CDC/NCBDDD

Breakout: Measuring Mental Health Exasperation in the Era of Lockdowns

[Recording](#) | [Slides](#)

Description: Hear how states and local public health agencies are 1) identifying populations in need and 2) directing public health interventions for mental health conditions.

Moderator: Hussain Yusuf, M.D., M.P.H. – CDC/DDPHSS/CSELS/DHIS/PEB

Presenters:

- Isabel Chung, MPH – Chicago Department of Public Health
- Mwedusasa Mtenga, MPH – Florida Department of Health
- Katie McDaniel, MPH – Florida Department of Health
- Alan Mai, MPH – Florida Department of Health
- Vasiliki Georgoulas-Sherry, PhD – Washington State Department of Health
- Mary Megliola Franzen, MPH – Washington State Department of Health

Practical Application Track

Breakout: Some is Better than None - Expanding Syndromic Programs in State, Territorial, and Local Public Health Agencies

[Recording](#) | [Slides](#)

Description: Hear how three public health agencies determined the need to establish and grow their SyS programs.

Moderator: Anna Frick, MPH – State of Alaska Section of Epidemiology

Presenters:

- Beda Mundo, AA Liberal Arts, BS Health Studies – Commonwealth HealthCare Corporation, Saipan, MP
- Nate Wright, MPH – Minnesota Department of Health
- Jacob Hojnacki, MPH – Coconino County Health and Human Services
- Sam Packard, MPH – Coconino County Health and Human Services

Breakout: Tracking Infections through Time and Space

[Recording](#) | [Slides](#)

Description: Discover SyS use cases and related public health messaging across prominent infectious diseases.

Moderator: Levi Schlosser, MPH – North Dakota Department of Health

Presenters:

- Courtney Nawrocki, MPH – Centers for Disease Control and Prevention
- Henri Menager, MD, MPH – Kansas Department of Health and Environment
- Cynthia Lucero-Obusan, MD – Department of Veterans Affairs
- Alicia Sloughfy, MPH – New Jersey Department of Health
- Lauren Draftz, MPH – CSTE Epidemiology Fellow: Illinois DPH

Breakout: Unreported Case Finding

[Recording](#) | [Slides](#)

Description: Hear how states use SyS to find otherwise unreported cases and launch public health investigations and action.

Moderator: Lowrie Ward, MPH – Alaska Native Tribal Health Consortium, Alaska Native Epidemiology Center

Presenters:

- Erin Austin, MPH – Virginia Department of Health
- Rene Borroto, BA – Georgia Department of Public Health

Roundtable: Variability in Discharge Diagnoses Received and What Can Be Done About It

[Recording](#) | [Slides](#)

Description: Discuss solutions to improve discharge diagnoses data quality at collection, analysis, and interpretation.

Facilitator: Samantha Spoto – Florida Department of Health

Breakout: Better Practice through Advanced Analytics

[Recording](#) | [Slides](#)

Description: Discover applications of advanced analytics to 1) ease syndrome defining work with machine learning and 2) reducing nuisance alerts in ESSENCE.

Moderator: Sara Chronister, MPH – Maricopa County Department of Public Health (AZ)

Presenters:

- Hannah P. Cowley, Bachelors of Arts in Cognitive Science – The Johns Hopkins University Applied Physics Laboratory
- Michael Sheppard, MS – CDC/NSSP
- Howard Burkom, PhD – Johns Hopkins University Applied Physics Laboratory

Trainings and Demonstrations

Training: ESSENCE 101

[Recording](#) | [Slides](#)

Description: An orientation for new users including 1) a brief introduction to syndromic surveillance and the NSSP and 2) an NSSP-ESSENCE step-by-step live demonstration highlighting how to navigate the tool and run, save, and share a query.

Trainer: Wayne Loschen, MS – Johns Hopkins University Applied Physics Laboratory (JHUAPL)

Training: Data Sharing Step-by-Step Using the AMC

[Recording](#)

Description: Go through step-by-step instructions on how to share data with other jurisdictions through the AMC and discuss how building relationships, defining the purpose of shared-data surveillance, and defining AMC data sharing rules are involved in the process.

Trainer: Christopher Marder – CDC/DDPHSS/CSELS/DHIS/ISB

Training: Advanced ESSENCE

[Recording](#)

Description: Highlights of advanced ESSENCE features for experienced users including race and ethnicity filters and social vulnerability index data.

Trainers:

- Lakshmi Radhakrishnan, MPH – Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention
- Kelly Carey – CDC/DDPHSS/CSELS/DHIS/SDB

Training: Rnssp Part 1

[Recording](#) | [Slides](#)

Description: This training introduces the audience to the Rnssp package, a collection of tools, functions, and Rmarkdown templates that supports the National Syndromic and Surveillance Program Community of Practice.

Trainers: Roseric Azondekon, PhD, MPH, MS – CDC/DDPHSS/CSELS/DHIS/SDB

Training: Rnssp Part 2

[Recording](#)

Description: This training will serve as a supplement to the Rnssp part I demo by giving a deep dive into the Rnssp implementation of ESSENCE algorithms for

temporal anomaly detection and trend classification. Additionally, this demo will give an overview of the Rnssp R Markdown templates that support the National Syndromic Surveillance Program Community of Practice.

Trainer: Michael Sheppard, MS – CDC/NSSP

Training: COVID VAE Dashboard Demo

[Recording](#) | [Slides](#)

Description: Participate in an overview and demonstration of the use of syndromic data to supplement surveillance for vaccine-associated adverse events following COVID-19 vaccination, including the development of VAE syndromes, NSSP's COVID-19 VAE Dashboard, and strategies used to conduct VAE monitoring. Syndromes include a general VAE query as well as a query designed to specifically capture VAE following COVID-19 vaccinations. The VAE Dashboard includes a variety of visualizations, including stratifications by U.S. Department of Health and Human Services Region, age group, sex, and frequencies of key discharge diagnosis and chief complaint terms driven by text mining analytics.

Trainers:

- Abigail Gates, MSPH – CDC/NSSP
- Michael Sheppard, MS – CDC/NSSP
- Zach Stein, MPH – ICF Contractor, BioSense Platform
- Natasha Close, PhD – Washington State Department of Health
- Kathleen Hartnett, PhD – CDC/NSSP

Training: Using Laboratory Data with NSSP ESSENCE

[Recording](#) | [Slides](#)

Description: Demonstration to learn about the clinical laboratory data available inside of ESSENCE, best practices in using the data, additional resources for understanding clinical laboratory data, and ways to integrate syndromic surveillance with laboratory data.

Trainer: Stephanie Dietz, M.Sc., Ph.D. – CDC/DDPHSS/CSELS/DHIS/SDB

[*Coffee Breaks*](#)

Coffee Break: Data Integration

Description: Meet and network with colleagues across the country working on various stages of data integration.

Facilitators: Aaron Kite-Powell, MS – CDC/NSSP and Karl Soetebier, MAPW – CDC/NSSP

Coffee Break: Open to All

Description: Meet and network with syndromic surveillance colleagues across the country.

Facilitators: CSTE and Kahuina 2021 Syndromic Surveillance Symposium planning committee

Coffee Break: NSSP CoP Core Committee Meet and Greet

Description: Geared toward new community members, join the NSSP CoP Core Committee to learn how to become more involved.

Facilitator: Krystal Collier, BA – Arizona Department of Health Services

Coffee Break: Meet and Greet

Description: Meet and network with syndromic surveillance colleagues across the country.

Facilitator: CSTE and Kahuina 2021 Syndromic Surveillance Symposium planning committee

Coffee Break: CSTE Workforce Development Program

Description: Talk with CSTE program specialists and representatives from participating public health agencies to learn more about applying for CSTE's workforce development programs.

Facilitator: Jessica Haupt, MPH – CSTE

Coffee Break: NSSP CoP Data Quality Subcommittee

Description: Informal discussion on the first data quality "one-pager" and what to develop next.

Facilitators:

- Jade Hodge – Kansas Department of Health and Environment
- Krystal Collier, BA – Arizona Department of Health Services
- David Swenson, BS, Med – State of NH Department of Health and Human Services

Coffee Break: CoP Technical Subcommittee

[Slides](#)

Description: An open forum for people to ask questions about the platform or what the subcommittee is working on.

Facilitators: Natasha Close, PhD – Washington State Department of Health and Caleb Weideman, MPH – Tennessee Department of Health

Coffee Break: Training Ideas to Keep End Users Engaged

Description: Join the Florida Department of Health to discuss strategies to keep state and local SyS system end users trained and engaged.

Facilitator: Shelby Fawaz, MPH – Florida Department of Health

ACCEPTED ABSTRACTS

Day 1 – Tuesday, November 16, 2021

3:00 PM EST Roundtable: Overdose Spike Alert Toolkit

Abstract Title: Council of State and Territorial Epidemiologists Overdose Spike Alert Toolkit

Authors: Krystal Collier, BA, David Swenson, BS, Sydney Fox, MPA

Introduction:

Rapid identification and assessment of outbreaks are critical to respond to the epidemic, as are efforts to effectively prevent these events from occurring. The CSTE Overdose Spike Alert Advisory Workgroup was created to develop an Overdose Spike Alert Toolkit, with the purpose to help improve jurisdictional cluster overdose detection and prevention, treatment and recovery services for overdose cases by creating cluster spike alerts that response partners can respond to appropriately.

Method:

Advisory group members will lead a discussion-based presentation focused on recent findings from the CSTE Overdose Spike Alert Advisory Group, innovative ideas, or emerging topics.

Key Objectives:

- Describe CSTE Overdose Spike Alert Toolkit uses for
 - Detecting, defining and locating overdose spikes;
 - Developing a process to evaluate these alerts and notify response partners.
- Discuss follow up actions resulting from a spike and any internal review measures
 - Conduct an investigation or evaluation to inform future prevention activities; and
 - Address lessons learned.
- Present real-life overdose spike alert examples
 - Discuss which community response partners exist to support this work (thresholds, actions); and
 - What barriers are experienced when implemented.
- Engage attendees via developing a maintenance plan to improve and further develop related resources such as
 - Sources to help with overdose cluster alert analysis techniques and
 - Response partner identification.

Summary:

The CSTE Overdose Spike Alert Toolkit is designed to provide syndromic practitioners and their key partners with a comprehensive approach to conducting a timely and effective investigation in response to notable overdose increases in their jurisdiction.

This roundtable will introduce attendees to the developed CSTE Overdose Spike Alert Toolkit and its uses. A facilitated discussion will follow, allowing attendees to share experiences developing and maintaining overdose spike alert protocols in their jurisdictions.

The roundtable will conclude with an opportunity to share resources and identify additional support state, tribal, local, or territorial (STLT) jurisdictions may need in the future to develop and sustain overdose spike alert initiatives.

4:15 PM EST Breakout: Admitted - Integrating Inpatient Data

Abstract Title: Where'd My Data Go? Syndromic Surveillance When EDs Are Empty

Author: Andy Walsh, PhD

Background

Syndromic surveillance was intended to address a global communicable disease pandemic, providing early indications of new and changing transmission trends and overall situational awareness. The primary data source for most syndromic surveillance implementations is emergency department (ED) registrations. Following COVID-19 mitigation orders in mid-March 2020, ED registrations declined by 50% at hospitals reporting to the EpiCenter syndromic surveillance system. Volume only recently returned to prepandemic levels. During that time, hospitals have elsewhere reported inpatient volumes at or near capacity, indicating that ED registrations did not track with overall healthcare usage. To obtain a complete picture of healthcare utilization and COVID-19 burden, additional inpatient information was added to EpiCenter data collection and processing.

Methods

Inpatient information was solicited from hospitals already sending ED registrations to EpiCenter. This included reason for admission, discharge disposition and diagnosis, procedure orders, room & bed assignments and COVID-19 lab results. Facility capabilities were assessed based on data elements received and their interpretability. For intensive care unit (ICU) utilization, facilities were categorized on whether a visit could be associated with the ICU and whether the duration of ICU bed occupancy could be identified. For ventilator usage, facilities were categorized on whether any ventilator-related procedures were identifiable and consistently sent and whether specific initiation and termination procedures were available.

COVID-19 related visits were identified by diagnosis codes. ICU beds were identified by unit or service name or by facility-provided dictionaries. Ventilation and COVID-19 treatment procedures were identified from name and description.

Results

A total of 339 hospitals were able to provide inpatient data. Of these, 227 provided

discharge diagnoses that included COVID-19 diagnoses and 162 provided discharge disposition. Twelve hospitals provided COVID-19 laboratory results. 58 hospitals provided bed information mappable to ICU locations, while another 188 provided patient location. Four hospitals sent ventilator initiation and termination codes, another 61 sent multiple ventilator procedures spanning usage, and a further 39 sent single procedures per visit indicating ventilator use. From this data, estimates of ICU census and ventilator usage were generated on a near real-time basis, stratified by COVID-19 status.

Conclusion

Crisis situations can disrupt normal operating procedures. Surveillance infrastructure which relies on a thin slice of data like ED registrations is not robust to such disruptions. Adding inpatient data to complete the view of hospital utilization can provide better situational awareness. Here we demonstrate a proof-of-concept to provide greater insight into the COVID-19 pandemic than is available from ED registrations.

Abstract Title: Innovative Illinois Data Hub for Expanded Use of Inpatient Syndromic Surveillance

Authors: Stacey Hoferka, MPH, MSIS, Dejan Jovanov, MPH

Introduction: Since 2018, Illinois Department of Public Health (IDPH) has been expanding the hospital visits in syndromic surveillance data to include all inpatient admissions. During the COVID-19 pandemic, this established data source has provided valuable, real-time surveillance on severe, COVID-19 hospitalizations, which was sometimes lagged or incomplete in traditional communicable disease reporting. In addition to serving as an admission surveillance system, inpatient visits have been linked to other data systems at IDPH by leveraging fields in the HL7 message to match patients across databases. The ability to link hospitalization to COVID-19 cases and other conditions is supported by the IDPH Data Hub, an expanding, integrated technology platform with connections to multiple data sources, that hosts a master patient index data and linkage algorithms.

Method: The IDPH, using their data reporting and analytics platform (IDPH Data Hub) implemented a linkage algorithm between syndromic surveillance and communicable disease surveillance systems. Initially in January 2020, matches of ED visits to potential COVID-19 exposed contacts generated an alert to IDPH staff. As the disease burden grew, the linkage was leveraged to match admissions to confirmed case records. All 2020-2021 admissions records are tested for matches to confirmed cases in the I-NEDSS data base using a deterministic algorithm.

Results: From March 2020 to April 30, 2021, 184,140 admissions were linked to a COVID-19 case record from 169 (91%) hospitals in IL. Of those visits 109,936 (60%) were from unique cases and of those 32% had 2 or more admissions. When onset was documented for a case, 76% had a visit within 14 days prior to onset or any time after,

with a median of 12 days for admission following onset. Those with a repeat visit, had a median of 32 days between onset and last admission.

Conclusions: Real-time inpatient data was a critical surveillance component during the pandemic. Trends in hospitalizations were incorporated into policy decisions on mitigation. Patient stratified analysis for demographics, spatial distribution and discharge status helped to clarify the disease burden and hospital stress points. Future improvements include an effort to improve the completion and standardization of ICU information. Full, automated integration updates into the records has not yet been developed.

Abstract Title: Identifying potential post-vaccination COVID infections in NC using HIE data

Authors: Amy Ising, MSIS, Dennis Falls, CISSP, Lana Deyneka MD, MPH, Neha Shanker, PhD, MPH

Background

North Carolina's statewide syndromic surveillance system, NC DETECT, began receiving data from the statewide health information exchange, NC HealthConnex, in the Fall of 2020 and moved these data into the production system in December 2020. NC HealthConnex transmits, on average, over 4,000 inpatient encounters and over 175,000 outpatient encounters daily. These feeds include encounter date, encounter type, healthcare facility, patient age, sex, race, ethnicity, ZIP of residence, patient problems, medication history, immunization history, and encounter diagnoses. These data elements have varying levels of completeness. In addition to establishing a syndrome to monitor weekly trends in COVID-like illness by county, region, age group, race, and ethnicity, we also developed a syndrome to identify potential encounters with a COVID diagnosis that occurred after a patient was fully vaccinated.

Methods

The COVID post vax syndrome searches in the diagnosis code fields for any COVID related diagnosis (B97.2,B34.2,J12.81,J12.82,U07.1). From these encounters, the definition then looks for any documentation of a single Johnson and Johnson COVID-19 vaccination or at least two separate Pfizer or Moderna vaccinations 14 days or more prior to the date of encounter with the COVID diagnosis. Select misspellings of and alternative references to these vaccinations are included in the definitions (pfizer, pficer, moderna, janssen, "J and J", "J&J").

Results

Trends in post-vaccination COVID infections are increasing with the most recent week ending August 28, 2021 showing 11.07% of outpatient encounters with a COVID diagnosis are among those fully vaccinated and 4.70% of inpatient encounters with a COVID diagnosis are among those fully vaccinated. Since March 2021, on average 5.25% of outpatient encounters and 2.62% of inpatient encounters with a COVID diagnosis

have documentation of full vaccination status . The senior age group (65+) constitutes the highest percentages of these “breakthrough” infections at 9.17% for inpatient and 25.38% for outpatient encounters, as seen for the week ending August 28th, 2021.

Limitations

The quality of the HIE data received prevents the identification of all COVID encounters post vaccination. For example, COVID immunization records that do not include the specific type of vaccination given are not included. In addition, if an immunization date or an encounter date is not accurate, then the calculation of fully vaccinated status may also be inaccurate. We cannot confirm that patients with a COVID diagnosis have a lab-confirmed case of COVID.

Conclusion

NC HIE data provide additional information on post-vaccination COVID infections across populations. The post-vaccination COVID infection trends observed in HIE data are comparable to the trends identified in other surveillance systems. Next steps with HIE data analysis include analyzing “breakthrough” infections by co-morbidities as well as specific vaccine type.

4:15 PM EST Breakout: Overdose Surveillance to Action

Abstract Title: Substance Use Among Recently-released Prisoners in New Mexico: May 2019 - April 2021

Authors: Shahnaj Binte Safi, MBBS, MPH, Annaliese Mayette, PhD, Robert Kelly, PhD

Background: Evidence suggests that people released from the prison system are at increased risk for substance use. This risk arises from many underlying factors, including: chronic pain, trauma, suicidality, disrupted social connection, stigma, poverty, PTSD, and interruption to opioid treatment and care. The purpose of the study is to assess relationships between recently-released prisoners and substance use.

Methods: The study population included 2,470 released prisoners who visited the ED for any cause. Data from this study were obtained from New Mexico Corrections Department (NMCD) data on released prisoners (this includes only state prison data; county and federal facilities are not included here), and Emergency Department (ED) syndromic surveillance data. The study period was from May 2019 to April 2021. Chi-square tests were done to compare between groups. Odds ratios were estimated by logistic regression and models were selected by the stepwise model selection method.

Result: Among the study population, 3.4% (n=84) were treated for opioid overdose (compared to 0.1% for the general population) and 15.5% (n=382) were treated for any substance use- opioid/amphetamine/alcohol (compared to 2.1% for the general population); both measures were significantly higher among the released prisoners ($p<.0001$). Those who were fully discharged from the prison had 2.2 times higher odds of ED visits due to opioid overdose ($p=.0001$) and 2.1 times higher odds of ED visit

due to any substance use, compared to those who were released under some kind of supervision (court-ordered, dual supervision, parole, or probation). Substance use related to ED visit was 4.1 times higher among the American Indian population and 1.4 times higher among the Hispanic population, compared to the White population. Among all the ED visits, 342 occurred before the COVID-19 pandemic, and 2,128 occurred during the COVID-19 pandemic. Substance use-related ED visits were 7.6% (n=26) before the pandemic and 16.7% (n=356) during the pandemic ($p<.0001$).

Conclusion: These results suggest that more appropriate prison-based and community-based approaches should be taken to reduce substance use among this vulnerable population.

Abstract Title: Monthly Cluster Analysis of Emergency Department Drug Overdoses in Kansas Utilizing ESSENCE Data

Author: Scott M. Johnston, MPH

Background.

The overdose crisis in the United States has worsened in recent years with significant increases in morbidity and mortality, often attributed to synthetic opioids and psychostimulants. In Kansas, there was an increase in all drug overdose mortality from 346 deaths in 2018, to 393 in 2019, to 477 deaths in 2020. The goal of this project was to develop a methodology for cluster analysis using data pulled from the Electronic Surveillance System for the Early Notification of Community based Epidemics (ESSENCE), and a program called SaTScan. This would allow for periodic analysis to detect hotspots of overdoses at the zip code geographic level which could then be used to maintain situational awareness and rapidly notify local health department of changing conditions in drug overdose morbidity. This would help meet surveillance goals of the Overdose Data to Action CDC Cooperative Agreement to inform prevention efforts.

Methods.

Emergency department cases of drug overdose across the categories of All Drug, All Opioid, Heroin, Benzodiazepine, and Stimulant, were pulled from ESSENCE data to investigate 11 months from September 2020 to July 2021. Patient zip code was converted to zip code tabulation area (ZCTA) and the coordinates and Census population estimate for each location was compiled to provide population and geographic data. A prospective space-time analysis of monthly aggregated cases was performed using the discrete Poisson model in SaTScan to detect clusters of unusually high rate of overdose. Clusters were of variable geographic space with less than 25 km radius and exactly one month in time for each of the 11 months. The least likely to be due to chance clusters were determined through a maximum likelihood ratio statistic and p-values were computed through Monte Carlo replications.

Results.

Across the five drug categories and 11 months of analyses, there were 571 total clusters

identified. Of these, 73 (12.8 percent) were found to be significant at the 0.05 p-value level. Significant clusters were mostly concentrated in the South Central and Northeast regions of the state.

Conclusions.

Locations with unusually high rates of overdose emergency visits can be identified rapidly using syndromic data. Utilizing the geographic level of the patient zip code allows for the potential for narrowly focused prevention efforts. Limitations include the variable nature of ESSENCE data with data quality varying from week to week. Clusters should be viewed as estimates for situational awareness rather than exact counts. This data is also limited to emergency department visits only. Other data sources or increasing the number and consistency of facilities in production could improve validity and provide more insight to the issue.

Abstract Title: Setting the Bar: A New Jersey Overdose Anomaly Threshold Pilot Project

Authors: Sarah Malarkey, B.S., Malathi Aarkoti, DrPH, Stella Tsai, PhD, CIH, Teresa Hamby, MSPH

Background. In the United States, the opioid epidemic continues to be a major public health crisis and has worsened throughout the COVID-19 pandemic. Consequently, local health departments (LHDs) and other major stakeholders need to be notified if there is an overdose spike in their counties. This New Jersey Department of Health (NJDOH) pilot project establishes thresholds for anomaly alerts for overdose visits to Emergency Departments (ED) including all drugs, all opioids, heroin, and stimulants, for counties in New Jersey (NJ).

Methods. Three counties were selected to pilot the anomaly alerts: Atlantic, Camden, and Ocean. By using NJ's syndromic surveillance system, EpiCenter, charts, and threshold levels were generated at the state level and for the three pilot counties. Using ED visits data from 2019 and 2020, the average daily overdose counts were calculated by taking the average daily number of overdoses to establish appropriate constant threshold levels. When visit volume exceeds these constant threshold levels, the county health officials will receive an automatically generated email alert from EpiCenter notifying them that there is an overdose spike.

Results. Comparing data from 2019-2020 for overdoses from all-drugs classifications, there were no major increases in Camden or Ocean County. However, from 2019-2020, Atlantic County had a 52% and 46% increase in the months of February and March, respectively. For opioid overdoses, Ocean had a 94% and 45% increase in the months of February and March, respectively compared to Atlantic and Camden County that had an overall decrease. Furthermore, there were no major increases in average daily overdoses across all counties from 2019-2020. In 2020, the average daily overdoses for all drugs for Camden County was seven, Ocean County was four, and Atlantic was two.

The constant threshold levels were set using these average daily overdose counts in EpiCenter. After setting the constant threshold levels, Epicenter generated charts displaying daily threshold count line and constant threshold level line when the overdoses exceed the set threshold levels for each county.

Conclusion. Use of EpiCenter data will be beneficial to counties to address and prepare for overdose spikes. Camden county has the highest count of average daily overdoses for all drugs compared to Ocean and Atlantic. Other counties such as Essex, would also benefit from receiving alerts, as it averages 10 daily overdoses for all-drug classification. Outreach with pilot counties will continue to be conducted to receive feedback, customize threshold levels, and elect health officials to receive the email alerts. After successfully implementing threshold alerts in these three counties, we plan to coordinate with the remaining 18 counties in New Jersey to establish similar alerting options for monitoring these visits in their jurisdictions.

Abstract Title: Preventing Neonatal Abstinence Syndrome by Identifying Pregnant People at Risk Using Syndromic Surveillance

Authors: Mwedusasa Mtenga, MPH, David Atrubin, MPH

Background:

Neonatal abstinence syndrome (NAS), a condition affecting neonates exposed to opioids, benzodiazepines (benzos), barbiturates (barbs) or other sedatives manifesting in symptoms of drug dependence or withdrawal, is of increasing concern nationally, with the Centers for Disease Control and Prevention reporting an 82% increase of NAS in neonates from 2010 to 2017. From 2014 to 2019, there were nearly 9,000 cases of NAS in Florida. Current NAS surveillance in Florida is passive, involving linking birth records with corresponding records in the hospital discharge billing dataset (BD), then searching for specific diagnosis codes (DC) related to drug withdrawal syndrome in a newborn. BDs are received on a three—six-month delay. The BD lag time restricts the timeliness of NAS surveillance, and the identification of NAS cases after birth limits the ability to identify infants at risk prior to birth. Using Florida’s syndromic surveillance system (SyS), the Electronic Surveillance System for the Early Notification of Community-based Epidemics-FL (ESSENCE-FL), which contains near real-time emergency department (ED) data, visits can be identified for people who are both pregnant and experiencing drug overdose, abuse or dependence disorder (ODADD).

Methods:

Query parameters were set as any visit with indication of current pregnancy, related complication, delivery or labor, along with indication of opioid, benzos, barbs or other sedatives ODADD. Pregnancy and ODADD DC and terms were identified through review of existing queries available within the National Syndromic Surveillance Program-ESSENCE related to pregnancy, opioid ODADD and benzos ODADD. A Web search provided further related DC and terms, as well as an ICD-10 DC for drug use complicating pregnancy (O99.32). Chief Complaint and Discharge Diagnoses fields were queried in

ESSENCE-FL from January–June 2021. Additionally, a random sample of 300 visits was extracted for manual review and analysis.

Results:

Thirty-seven pregnancy-related terms and 121 pregnancy-related DC were identified. Additionally, 350 ODADD DC were identified: 241 for opioids, 32 for benzos, 22 for barbs and 55 for sedatives. Finally, 135 drug-related terms were identified: 75 for opioids, 36 for benzos, 16 for barbs and eight for sedatives. The query resulted in 1,141 visits. From the random sample, 112 visits indicated pregnancy and relevant drug ODADD, seven visits indicated pregnancy but no drug ODADD and six did not indicate pregnancy but indicated relevant drug ODADD. A further 166 visits indicated pregnancy but only included non-relevant substance ODADD.

Conclusions:

Identifying pregnancy and drug-related visits is possible using SyS. As only 40% of visits identified met the definition criteria, further refinement is necessary. The O99.32 DC proved particularly problematic as most of the non-relevant drug type visits were captured due to this DC. Further iterations of the query will include necessary negations.

Day 2 – Wednesday, November 17, 2021

1:15 PM EST Roundtable: Urgent! Expanding Syndromic Community Data Quality Metrics to Urgent Care Clinics

Abstract Title: Expanding Syndromic Community Data Quality Metrics to Urgent Care Clinics

Authors: Krystal Collier, BA, David Swenson, BS, MEd, Sophia Crossen, MS, Karl Soetebier, MAPW, Corey Cooper

Key objectives to be discussed:

1. What partner perspectives do we acknowledge are participating in this discussion?
 - a. The NSSP CoP syndromic surveillance perspective
 - b. The Office of the National Coordinator for Health Information Technology (ONC) and Health Level 7 (HL7) Standard perspective
 - c. Others?
 2. How does UCC data differ from Emergency Department (ED) hospital data?
 - a. Is chief complaint, reason for visit, or admit reason used?
 - b. Should diagnosis codes be used (they may not be used or not as complete compared with ED hospital data)?
 3. What are the data quality metrics used to evaluate UCC today?
 - a. Are Priority1 and 2 data element metrics of completeness, validity, and timeliness used?
 4. What are the data quality metrics that should be used for evaluating UCC?
 - a. Should the 3 categories of Priority1 and 2 data element metrics of
-

completeness, validity, and timeliness be used or should we modify due to UCC differences?

b. Should we lower the completeness, validity, and timeliness expectations for specific UCC Priority 1 and 2 data elements?

5. Where do we draw the line between data quality (DQ) and representativeness regarding UCC and ED data?

a. Need both ED and UCC to increase representativeness.

b. Should we modify the expectations for UCC DQ (due to UCC differences)?

Summary:

The consensus on key data quality metrics from this discussion will support the DQ practices already established for EDs while continuing to expand opportunities to use additional syndromic surveillance data available for public health.

1:15 PM EST Breakout: Querying from Scratch - Cooking Up New Syndromes

Abstract Title: Development of unintentional injury syndrome definitions to describe drowning, fall, and hip fracture-related emergency department visits in the United States

Authors: Briana Moreland, MPH, Tessa Clemens, PhD, Iju Shakya, MPH, Nimi Idaikkadar, MPH

Background: Unintentional injuries are a common public health concern across the lifespan. Among children aged 1 to 4 years, drowning is the leading mechanism of injury deaths. Among older adults aged ≥ 65 years, falls are the leading mechanism of injury deaths. Falls can lead to serious health problems such as hip fractures. Timely surveillance of nonfatal injuries is important for prevention efforts. However, data sources commonly used to describe nonfatal injuries often lack real time data. We created three syndrome definitions to query the National Syndromic Surveillance Program (NSSP) data to provide timely information about emergency department (ED) visits related to unintentional drownings, unintentional falls, and hip fractures.

Methods: The unintentional drowning syndrome definition was based on a previously developed definition and utilizes chief complaint and discharge diagnosis (CCDD) fields.

The falls and hip fracture syndrome definitions were created using ICD-10-CM codes specific to falls and hip fractures and a list of associated chief complaint terms in the CCDD field. These definitions were modified to maximize sensitivity for the falls syndrome and specificity for the hip fracture syndrome. The unintentional falls and hip fracture definitions were limited to older adults aged ≥ 65 years. The percentage of ED visits among older adults related to falls and hip fractures in NSSP were compared to the latest (2018) Healthcare Cost and Utilization Project-Nationwide Emergency Department Sample (HCUP-NEDS) data overall and by demographic characteristics.

Results: The drowning syndrome definition has been piloted in several state and local health departments and is still being refined. The older adult fall and hip fracture syndrome definitions were piloted in a state health department and added to the

Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) platform in May 2021. In 2018, 11.4% of ED visits among older adults in NSSP and 12.3% of ED visits among older adults in HCUP-NEDS met the fall definition.

Additionally, 0.7% of ED visits among older adults in NSSP and 1.1% of ED visits among older adults in HCUP-NEDS met the hip fracture definition. In both NSSP and HCUP-NEDS, a higher percentage of older women's ED visits met the fall or hip fracture definitions compared to older men's ED visits. The percentage of ED visits meeting the falls or hip fracture definitions increased with age in both data sets.

Conclusion: Although a smaller proportion of older adults' ED visits met the falls and hip fracture definitions in NSSP compared to HCUP-NEDS, demographic trends seem to be consistent across the two data sets. Despite these differences, NSSP could be a valuable resource to provide real time information about unintentional injuries. Lessons learned from developing the older adult falls and hip fracture syndrome definitions will be beneficial to refining the unintentional drowning syndrome.

Abstract Title: Cannabis-related Adverse Events in Syndromic Surveillance: validation study from Oregon

Authors: Julia Dilley, PhD MES, Rob Hendrickson, Esther Choo, MD, Melissa Powell, Thomas Jeanne, MD, MPH

BACKGROUND: Oregon legalized retail (non-medical) cannabis in 2014. Sales to adults ages 21 and older began in fall 2015. Evidence about harms from cannabis use is of mixed quality, but sufficient to support need for monitoring population-based adverse health events.

Quality of syndromic surveillance system data and administrative discharge data for monitoring cannabis-related emergency department (ED) visits was assessed in a validation study conducted as a partnership between a Portland area ED and Oregon's State Public Health Division.

METHODS: A question was added to the ED's electronic health record (EHR) system: "Do you think cannabis use was a significant factor leading to today's ED visit?" (yes, no). Clinicians answered this question in real time when completing the record. We applied a previously developed syndromic surveillance query to the ED's data for October 1, 2018-September 30, 2019; returned records included the clinician-provided cannabis question. We also created a dataset of final discharge diagnosis codes per patient that included the clinician question for the same dates. We separately calculated the sensitivity and specificity of both the syndromic surveillance query and discharge diagnosis codes using clinician-provided case determination as the "gold standard."

RESULTS: There were more than 47,000 total ED visits during this period. About 1% (n=484) were identified by clinicians as cannabis-related. Sensitivity was relatively poor (<10%) for the syndromic query. Discharge diagnosis code-based case definitions performed better, but still captured less than half of cases identified by clinicians. When stratifying by patient age, case definitions appear to perform better for youth than

adults. Specificity was very high (>95%) for both syndromic query and discharge diagnosis code case definitions.

CONCLUSIONS: Our findings suggest that syndromic surveillance underestimates the total burden of cannabis-related ED visits; public health systems should instead use discharge diagnosis data for reporting burden. However, syndromic surveillance is useful for cannabis-related public health monitoring of outbreak events, as demonstrated during the EVALI outbreak of 2019.

Abstract Title: Defining diphenhydramine overdoses in Tennessee

Authors: Edward Onyango, PhD, MPH, Sutapa Mukhopadhyay, PhD, Caleb Wiedeman, MPH, Ben Tyndall, PhD

Introduction: Diphenhydramine is an antihistamine used mainly as a sedative, hypnotic, and antiemetic and is available in numerous over-the-counter medications. In September 2020, FDA issued a warning on teen misuse of diphenhydramine “sparked by dangerous “Benadryl Challenge” promoted on social media”. In 2021, in response to a concern from the field on the misuse of Benadryl® and similar products by youth in the state of Tennessee (TN), an exploratory investigation on the extent of the problem in TN was conducted using emergency department (ED) records reported to the TN Electronic Surveillance System on Early Notification of Community-based Epidemics (ESSENCE).

Methods: In formulating the definition for diphenhydramine overdoses, the Chief Complaints (CC) and Discharge Diagnosis (DD) fields in ESSENCE were used to create the definition for diphenhydramine overdoses. Different combinations of queries were developed and used to identify the records in ESSENCE such as Text only, Systemized Nomenclature of Medicine (SNOMED) codes only, ICD-10-CM codes only, “SNOMED or Text”, “ICD codes or SNOMED codes”, “ICD codes or SNOMED codes or Text”, “ICD codes or Text”, “ICD codes and Text”. Data for the various queries was downloaded and analyzed for the period between January 2019 to June 2021.

Results: For the period, January 2019 to June 2021, the “ICD codes or Text” query identified 3,509 records; “Text only” query identified 2,810 records; “ICD codes only”, returned 819 records; “ICD codes and Text” returned 120 records; and “SNOMED codes only” did not return any records. Of all the queries formulated, the most specific and conservative was the “ICD codes and Text” query and was preferred. Utilizing this conservative query, the following findings were obtained. The 0-17 age group contributed at least one third (35.8%) of all the suspected cases for diphenhydramine overdoses. Females comprised three-quarters (75.0%) of the cases. Most of the cases were located in the western part of the state.

Conclusion: A definition that included “ICD codes or Text” identified the most records compared to when “ICD codes only” or “Text only” were included in the query. However, ICD-10-CM codes were not specific for diphenhydramine and the returned

data included overdoses due to other antiallergic and antiemetic drugs. The “Text only” query returns could also include suspected cases that may not have risen to the level of poisoning. In conclusion, the most conservative estimate of diphenhydramine overdoses was obtained when the “ICD codes and Text” query was used. This query could, however, miss out some of the records which may have positive text as chief complaint but had the “ICD-10-CM codes” field blank. The findings of this exploratory inquiry led to alerting of stakeholders about the potential of misuse of diphenhydramine in the 0-17 age group.

1:15 PM EST Breakout: Some is Better than None - Expanding Syndromic Programs in State, Territorial, and Local Public Health Agencies

Abstract Title: Use of technology innovation to expand use of data for public health action in the Commonwealth of the Northern Mariana Islands (CNMI)

Authors: Beda Mundo, AA Liberal Arts, BS Health Studies, Jesse Sablan, Network/PC Pro Certified, Portia Tomokane, AA Health Assisting

Background:

CNMI, a U.S. territory, with three inhabited islands, Saipan, Tinian, and Rota, located in the Asia-Pacific region. The Commonwealth Healthcare Corporation (CHCC) is the lead public health agency and also operates the sole territorial hospital and Emergency Department (ED). Our organizational structure allows for population health programs to partner with hospital and outpatient clinical services. CHCC ELC team leads data modernization efforts to leverage clinical, laboratory, and public health data. This effort includes utilization of syndromic surveillance data to drive public health action to improve the control and monitoring of communicable diseases and other conditions of public health significance in order to rapidly identify disease threats. Given our location and potential outbreak threats, CHCC has implemented enhanced early warning disease surveillance and response activities.

Methods:

For several years, CHCC conducted a manual process for syndromic surveillance through paper reporting from sentinel surveillance sites. Previous practice was to manually document chief complaint data into a log book in the ED, from which the ELC team would manually verify in the ED every week day, and then verify information if cases meet case definition based on the Electronic Health Record (EHR) notes. This manual process creates challenges: 1.) the burden of manual reporting on nurses, 2.) the manual process of verifying patient information from the logbook to the EHR notes, 3.) lack of electronic data acquisition, and 4.) missing other potential cases that were further evaluated beyond the chief complaint through provider assessment and measured vital stats. Beginning 12/2020, ELC shifted from paper reporting to fully electronic EHR data extraction that utilizes data from a clinical visit chief complaint and ICD-10 code.

Results:

By 5/2021, all sites no longer need to manually report total encounter data as this is electronically extracted from standardized data entry processes. SAS 9.1 has been utilized to automatically merge and process data based on syndromes for verification in EHR. This new methodology was created to increase the sensitivity and robustness of our syndromic surveillance reporting. From here, data is transformed using visualization techniques and shared with our stakeholders. On epi week 21 of 2021, a Notifiable Disease Table has been incorporated to include reportable diseases common to the CNMI

Discussion:

Effective use of technology has allowed CHCC to streamline the reporting process and to leverage data for sharing to our healthcare partners. Immediate impact has resulted in an increase in compliance with reporting among providers. Based on this achievement, CHCC is planning to transition to an online data submission form for sites and automatic visuals for stakeholders. Additionally, CHCC will leverage this foundation to support onboarding of CDC NSSP BioSense.

Abstract Title: Building from the ground-up: Rapid expansion of syndromic surveillance as part of the Minnesota Department of Health's COVID response

Authors: Nate Wright, MPH, Heidi Jonson, MPH, Aasa Dahlberg-Schmidt, Stephanie Yendell, DVM, MPH, Melinda Hanson, MPH

Background

The Minnesota Department of Health (MDH) lags other jurisdictions in the implementation and use of syndromic surveillance (SyS). An initial system put in place over ten years ago continues to operate, but in only two hospitals, and these data do not conform to current messaging and SyS standards. Despite efforts to improve and enhance the feed, progress was slow. The COVID-19 pandemic demonstrated the importance of a robust SyS system. As the response to the COVID-19 pandemic picked up, MDH looked to rapidly implement a SyS system to monitor timely trends in COVID and COVID-related visits.

Methods

Infrastructure was in place for SyS as part of the Encounter Alert Service sponsored by the MN Department of Human Services. With a request by the Commissioner of Health, MDH capitalized on these existing connections to receive SyS data. Implementation of SyS included the removal of a filter for Medicaid patients and expansion to all Minnesota hospitals. Meanwhile at MDH, IT quickly built out the infrastructure to receive, process, and make the SyS data available for analysis. SyS reports were then produced and incorporated into MDH and the MN Governor's Office reports. Despite these successes, the system operated with a limitation, as MDH only received filtered visits with COVID or COVID-related diagnoses.

Results

Through a collaborative process, SyS was rapidly developed to produce reports that complemented MDH COVID surveillance efforts. Additional health conditions were added to the filter, which enhanced situational awareness of visits believed to be affected by COVID, such as drug overdose and mental health-related visits.

Development of COVID SyS laid the foundation to expand and further participate in national SyS efforts. In partnership with the MDH Office of Vital Records, MDH also participates in mortality data sharing with the NSSP. MDH is an early adopter of this data source, allowing for incorporation with the growing representation of Minnesota hospital data. Mortality data source in combination with the growing representation of Minnesota hospital data will provide a timely and comprehensive view of emerging public health trends in the state.

Conclusion

Despite interest in SyS by various programs at MDH, individual program efforts made minimal progress on bringing the MDH SyS system up to current requirements. The significant and urgent need for this data source, accelerated by the COVID-19 pandemic, fundamentally changed the landscape, resulting in an active statewide COVID-19 SyS system. With this foundation in place, MDH has now transitioned to expanding SyS to receive data on all visits, and to share data with the NSSP. SyS is also a key piece of the MDH interoperability strategy with external partners. Attention is being given to growing the number of data users within and outside MDH that may benefit from these data. This project will serve as a key data source in the modernization of public health surveillance.

Abstract Title: Are Five Hospitals Better Than One? A Comparison of Single-Site Versus Regional Data to Provide Syndromic Surveillance For COVID-Like Illness In Coconino County, Arizona

Authors: Sam Packard, MPH, Jacob Hojnacki, MPH, Matthew Maurer, MPH

Proportion of emergency department (ED) and hospital admissions presenting with Covid-Like Illness (% CLI) is a syndromic surveillance metric used by health jurisdictions in routine surveillance of COVID-19. In 2020, while Coconino County had access to % CLI data through queries of the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), the only facility in the county reporting data to ESSENCE was a small hospital serving ~7% of the county. Alternatively, data from five hospitals in the broader region were also available. However, neither data from a single hospital nor data from the broader region could be assumed to be representative of Coconino County. Hospital discharge data (HDD), while an accurate and representative data source for hospital and ED admissions, are not produced on a timely basis for on-going surveillance.

A retrospective analysis was conducted using both syndromic surveillance data and HDD to address the following questions: 1) Did syndromic surveillance for % CLI reflect

observed hospital and ED admissions with COVID-19? and 2) Did single-site data or regional data better represent COVID-19 trends at the county level? Weekly % CLI from each source (single-site and regional) was compared to the weekly proportion of hospital admissions and ED visits among county residents coded with a COVID-19 diagnosis (% COVID-19) using Coconino County HDD from the first 42 weeks of the COVID-19 pandemic. Correlation coefficients quantified how well each source of % CLI data (single site or regional) tracked with % COVID-19 over this period. In addition, weekly % CLI data (single-site and regional) and weekly % COVID-19 were categorized as low, moderate, or substantial based on thresholds developed by Arizona Department of Health Services, and both single-site and regional weekly % CLI categories were compared to weekly % COVID-19 categories.

Single-site and regional weekly % CLI correlated with weekly % COVID-19 ($r = 0.83$ and $r = 0.88$ respectively). However, both methods yielded % CLI values that differed enough from weekly % COVID-19 to result in discordant community transmission classifications 31% and 29% of the time for single-site and regional data, respectively. Approximately half of the discordant weeks occurred in the first two months of the pandemic.

In conclusion, syndromic surveillance data strongly correlated with COVID-19 admissions in HDD. However, when data categorized as low, moderate, or substantial produced discordant results, single-site data over-estimated community transmission while regional data were less consistent. The potential for limited sources of % CLI to result in trends which don't reflect the disease dynamics of a particular health jurisdiction highlights the importance of onboarding a sufficient number and variety of facilities to provide reliable data for evidence-based public health decision making.

2:30 PM EST

Breakout: Tried and True Syndromic Surveillance Methods for New Data

Abstract Title: Effects of COVID-19 on Emergency Medical Services (EMS) Utilization in Maryland

Authors: Sharmin Hossain, PhD, MPH, Alice Jackson, PhD, Breanna Swan, PhD, Howard Burkom, PhD, Jessica Acharya, MPH

Background: The opioid epidemic in the United States has devastated the lives of individuals and imposed decades-long opportunity costs on the community. We hypothesized that the emergence of the COVID-19 pandemic and subsequent disruptions in essential services and social safety nets (e.g., housing, healthcare, transportation, and income) would result in an increase in emergency medical services (EMS) calls among patients with opioid use disorder (OUD) in Maryland. We explored how patient volume varied relative to the evolution of the pandemic in Maryland, and how opioid overdose-related incidents were impacted differently than non-opioid-related incidents.

Methods: Maryland's installation of the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) enables daily analysis and reporting of data from all 24 counties in the state. We analyzed ESSENCE EMS data to assess the impact of COVID-19 on EMS call volume and how COVID-19 impacted

patients' decisions to accept transport to a hospital care setting following an EMS call. We examined data from November 2019 through May 2021, split into three phases: "pre-pandemic" (before March 31, 2020), "mid-pandemic" (April 1 - Aug 31 2020), and "reopening" (Sept 1 2020 - May 2021).

Results: At the onset of the pandemic, non-opioid-related EMS call volume declined dramatically, while opioid-related call volume did not show a similar decline, and ultimately increased from approximately 35 calls per day pre-pandemic to approximately 75 calls per day mid-pandemic. The proportion of all EMS calls that were opioid-related increased from approximately 2% pre-pandemic to 4% mid-pandemic, then declined after reopening but did not recover to pre-pandemic levels by April 2021. Transport acceptance declined by approximately 5% for opioid-related (77.9% to 72.2%) and non-opioid-related calls (87.1% to 82.3%) from pre- to mid-pandemic. The "gender gap", such that male patients typically account for a greater proportion of calls, increased mid-pandemic: as the call volume for male patients increased (~20 more calls per day) while the call volume for female patients increased less (~5 more calls per day), and as of April 2021 this gap had not yet recovered to pre-pandemic levels.

Conclusion: Consistent with reports from other states, the pandemic worsened the opioid crisis in Maryland, impacting some populations more than others while also decreasing the likelihood that individuals experiencing an opioid-related overdose would seek further medical care following an EMS call. The breadth of the pandemic's effects disproportionately impacted those with OUD by reducing the availability of health care, social support, and avenues for safe consumption. Understanding the impact of COVID-19 among these vulnerable populations is critical to reducing disparities in access to health care.

Abstract Title: Mining citizen inquiries to public health hotlines for syndromic surveillance and public health action

Authors: Karin Hoelzer, DVM, PhD, Joel Hartsell, MPH, PMP, ACP, Eric M Stewart, BA, MS, David Salvador, BA, MS, Oana Cheta, BS, MA, Elizabeth Smith, BS, MHS

Background: Syndromic surveillance is crucial to public health, providing early warning systems that help detect and respond to pandemics, bioterrorism threats, and other public health emergencies from opioid overdoses to environmental contamination events. Data from emergency departments and other healthcare facilities are central to syndromic surveillance and for instance form the backbone of the National Syndromic Surveillance Program (NSSP). In recent years, syndromic surveillance approaches that incorporate non-traditional data sources such as social media posts have gained increasing interest and shown preliminary promise for selected use cases including the detection of influenza-like illness and foodborne illness outbreaks. Here we explore the potential for using calls to public health hotlines as another non-traditional source of syndromic surveillance data, drawing on Maximus' extensive experience as one of the Nation's largest providers of public health hotline services to federal, state, and local

public health clients.

Methods: Call transcripts were retrospectively analyzed using topic mining, sentiment analysis, and other Natural Language Processing (NLP) approaches to assess the feasibility of this data source for syndromic surveillance. To evaluate the robustness and sensitivity of this data source we evaluated differences in call topics over time and across geographic areas of the United States, as well as their correlations with significant public health events. Statistical, logistical, and operational limitations in using this data source for syndromic surveillance were explored and evaluated.

Results: Our analysis clearly demonstrates the value of this non-traditional data source to complement traditional syndromic surveillance efforts. In addition to detecting clear signatures of public health events and insightful regional and temporal trends, our data provide unique insights into the specific needs, attitudes, and key public health concerns of callers.

Conclusion: Inquiries to public health hotlines represent a valuable, and as-of-yet underutilized, source of syndromic surveillance data and can provide unique insights for public health action.

Abstract Title: Enhancing Cannabis Poison Center Surveillance in Colorado

Authors: DeLayna Goulding, MPH, Elyse Contreras, MPH, Richard Holdman, MD, MPH, Shireen Banerji, PharmD, DABAT

Background

In 2014, retail cannabis products became available for adult purchase in Colorado. Colorado Department of Public Health and Environment's Marijuana Health Monitoring Program (MHMP) performs surveillance on cannabis-related health outcomes. Since 2014, there have been increases in the number of cannabis exposures reported to Colorado's poison center along with the emergence of novel health outcomes associated with evolving cannabis products and methods. The MHMP is piloting an enhanced surveillance system to monitor changes in cannabis products and improve response capacity.

Methods

The MHMP collaborates with Rocky Mountain Poison and Drug Safety (RMPDS) to collect "enhanced data" of cannabis exposures reported to Colorado's poison center. Each day RMPDS sends a dataset of human exposures with at least one cannabinoid generic code, excluding pharmaceutical preparations and synthetic homologs. The data received is "enhanced" because it includes information reported to the National Poison Data System plus additional cannabis-related questions that poison center specialists gathered for Colorado. Data collection has been automated to upload daily datasets into a SQL server that is connected to live Tableau dashboards. Dashboards visualize and monitor exposures on case-based definitions. Volume-based dashboards monitor

increases in the volume of products, type of products, clinical effects, and outcomes reported. This dashboard is stratified by age to monitor health effects specific for pediatric exposures. Volume is assessed weekly compared to a 3-year weekly average of the respective week +/-7 days.

Results

Case-based definitions are currently being piloted for specificity. Case-based dashboards alert MHMP when an exposure meets criteria allowing MHMP staff the ability to immediately follow-up with cases exposed to specific cannabis products, such as Delta-8, or cases with major health outcomes. Volume-based dashboards help MHMP identify anomalies in the frequency of exposures, which could be an indicator of an event occurring. Volume anomaly methodology was utilized during 2020 and identified marked increases in the frequency of cannabis product exposures reported to RMPDS. Time periods with exposures greater than 3 standard deviations compared to the 3-year average corresponded to COVID-19 public health ordinances.

Conclusion

Utilization of Tableau dashboards and alerts has improved Colorado's cannabis surveillance and response. Visualization of reported products has increased awareness of types of products and associated effects. Additional definitions based on clinical effects, volume anomalies, and product type are being piloted for syndromic surveillance and outbreak detection. This enhanced technique could be used by public health for cannabis-related syndromic surveillance.

2:30 PM EST Breakout: FASTER Syndrome Refinement - Standardizing Firearm Injury Surveillance **Abstract Title: Validation of the CDC Firearm Injury V2 definition in Utah from April-May 2020**

Authors: Erica Bennion, MPH, Akanksha Acharya, MS, Stephen Barnes, MPH, Sophie Lockett-Cole, MPH, Ynhi Nguyen, BS

Background

The Utah Department of Health uses syndromic surveillance data from the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) to monitor health trends and guide public health action. We primarily use queries created and validated by the National Surveillance System Program in collaboration with the Centers for Disease Control and Prevention (CDC). The CDC Firearm Injury V2 definition uses chief complaint and discharge diagnosis codes to capture initial encounters for firearm injury of the following intents: unintentional, intentional self-directed, assault, undetermined intent, legal intervention, and terrorism. Our objective was to evaluate the validity of this definition.

Methods

We queried the CDC Firearm Injury V2 syndrome from April - May 2020 by facility location, selecting all onboarded emergency departments. We included additional filters

of “emergency care” for Facility Type and “yes” for Has Been Emergency. We extracted the following fields for manual review: medical record number, facility name, date, all chief complaint fields, all discharge diagnosis fields, clinical impression, triage notes, CCDD (Chief Complaint and Discharge Diagnosis) category, SubCategory Flat, and admit reason. Two epidemiologists reviewed each record, compared results, and sent conflicting determinations to two arbiters. One conflict remained between the arbiters which was determined jointly by the group.

Results

The ESSENCE query captured 88 cases including three duplicates removed from analysis. Of the remaining 85 records, 67 were deemed probable, 19 were ruled out, and two were undetermined, resulting in a positive predictive value of 75.3%. Misleading keywords included “pellet gun”, “airgun”, “nail gun”, “bullet bike”, and “exit wound”. Five instances of gunshot wounds from a previous encounter were erroneously included; for example, “reported gunshot wound about a month ago”, “shot in chest last month”, “gunshot wound checked for aftercare”, and “open heart surgery after gunshot wound”. In five cases a firearm was mentioned but was not the cause of injury; for example, “attempted to take husband’s firearm earlier today”, “hand injury while target shooting”, “pistol trigger caught thumb”, and “cutting open live round”. Four cases had no misleading keywords or reason for inclusion except a seemingly unrelated gunshot wound diagnosis code. Two of these cases came from one facility and two came from a separate facility.

Conclusion

We recommend refining the CDC Firearm Injury V2 definition to exclude non-initial encounters by searching for keywords such as “last month”, “last week”, “a month ago”, “a week ago”, and “aftercare”. Further misleading keywords to negate include “pellet gun”, “airgun”, “nail gun”, “bullet bike”, and “exit wound” when a firearm is not mentioned. We plan to communicate with the facilities that included unrelated gunshot wound codes to prevent future misdiagnoses.

Abstract Title: Validation of syndromic surveillance firearm injury definitions using a hospital trauma registry, Virginia

Authors: Meredith Davis, MPH, Erin Austin, MPH, Stephanie Neal, MPH

Background

Firearm injuries have devastating effects on individuals, families, and communities. In Virginia, there were 1,036 firearm-related deaths in 2019, including 667 suicides and 353 homicides (1). Non-fatal firearm injuries are even more common and can have lifelong impacts for survivors, but timely data on these injuries are limited. The Virginia Department of Health (VDH) is one of 10 sites funded by the Centers for Disease Control and Prevention (CDC) Firearm Injury Surveillance Through Emergency Rooms (FASTER) project to address this gap. One goal of FASTER is to improve surveillance of non-fatal firearm injuries using emergency department (ED) visit data captured through

syndromic surveillance systems.

The CDC developed four syndromic surveillance definitions to identify ED visits for firearm injury: Overall Firearm Injury (FAI) v2 and three intent-based definitions (Assault, Intentional, and Intentional Firearm Injury). VDH partnered with a Level 1 Trauma Center (Hospital A) to evaluate the definitions using the Hospital A Trauma Registry.

Methods

VDH identified ED visits to Hospital A in Virginia's implementation of ESSENCE between June 1 and November 30, 2020 that met one or more of the CDC FAI definitions. Hospital A identified records in its Trauma Registry during the same 6-month period with "GSW" (gunshot wound) listed as the mechanism of injury. Using medical record number and visit date, Hospital A matched ESSENCE and Registry records. Hospital A performed a record level evaluation of matched and unmatched records to assess if each was a true firearm injury. VDH compared intent of injury between ESSENCE and the Trauma Registry among matched records. VDH calculated the sensitivity and positive predictive value (PPV) of the Overall FAI v2 definition to capture true firearm injuries.

Results

In total, 305 true firearm injury records were identified between the two data systems, of which the CDC Overall FAI v2 definition in ESSENCE captured 288 (sensitivity = 94.4%). The PPV of the CDC Overall FAI v2 definition was 80.7% (288 of 357 records); two-thirds of false positive records were duplicates. Among true firearm injury records that matched between the data systems (n=245), 56% did not meet any of the CDC intent-based definitions in ESSENCE and only 20% had an intent of injury aligning with the Trauma Registry.

Conclusion

The ability of the CDC Overall FAI v2 definition to capture true fire injuries in Virginia ESSENCE was very high (sensitivity 94%). Removal of duplicate records from Virginia ESSENCE would improve the PPV from 81% to 93%. Applying intent-based FAI definitions to ED data may misrepresent burden of injuries by intent. External data sources such as hospital trauma registries can be a valuable resource for syndrome definition validation.

1. VDH Office of the Chief Medical Examiner Annual Report 2019.

<https://www.vdh.virginia.gov/content/uploads/sites/18/2021/06/Annual-Report-2019-FINAL.pdf>

Abstract Title: Validation of CDC Firearm Injury Syndrome Definitions Using Triage Notes in Oregon ESSENCE Data

Authors: William Baker-Robinson, MS, Yachana Bhakta, MPH, Danielle Krushnic, MPH,

Dagan Wright, MSPH, PhD, Kathleen Carlson, MS, PhD

Background: It is essential to measure and understand the validity of syndrome definitions that are used to identify records in syndromic surveillance data systems. This study examined the validity of CDC Firearm Injury Syndrome Definitions applied to OR ESSENCE data in Oregon's new CDC-funded Firearm Injury Surveillance through Emergency Rooms (FASTER) program.

Methods: We manually reviewed all OR ESSENCE records identified as firearm injuries by the CDC Firearm Injury V2 Syndrome Definition between April 1, 2017 and June 30, 2021 (n=2,386). Two reviewers coded both the triage notes and chief complaint fields for each record, with discrepancies adjudicated by the study team. These two fields were classified as probable, undetermined, or ruled out for firearm injury according to the CDC's published definition. For records classified as firearm injuries, we then used information from the triage notes, chief complaint, and clinical impression fields, where available, to categorize intent of firearm injury as Intentional (self-harm), Unintentional, Assault, Legal Intervention, or Undetermined, following CDC firearm injury definitions. Using the manually-assigned categorizations of firearm injury, and intent, as criterion standards, we measured positive predictive value (PPV) of the overall CDC Firearm Injury Syndrome Definition (V2) and, among applicable records, the PPV, sensitivity, and specificity of CDC intent-based definitions (V1) for Intentional, Unintentional, and Assault-related injuries. We grouped the manually-assigned categories of Assault and Legal Intervention together in the analysis of the CDC Assault definition.

Results: Of reviewed records, most were deemed true firearm injuries (PPV=87.01%). The overall CDC Firearm Injury definition identified 79.00% of records based on patients' discharge diagnosis. By intent, the Unintentional definition accounted for 1,788 (74.94%) of the injuries detected, and 99.83% of these records were identified by discharge diagnosis; sensitivity was 90.82%, specificity was 30.44%, and PPV was 29.01%. The Intentional injury definition accounted for 42 (1.76%) of injuries detected, with 92.86% identified by discharge diagnosis; sensitivity was 2.30%, specificity was 98.50%, and PPV was 6.06%. Finally, the Assault definition accounted for 74 (3.10%) of the records, with 98.65% identified by discharge diagnosis. The Assault definition had a sensitivity of 2.82%, specificity of 97.12%, and a PPV of 11.30%.

Conclusion: The overall CDC firearm injury syndrome definition performed relatively well; however, the intent definitions performed poorly. Accuracy of discharge diagnosis coding had a large effect on the validity of the intent definitions. Future work should examine the feasibility of incorporating narrative information from triage notes into the syndrome definitions, as well as quantifying the number of false negatives for the overall CDC Firearm V2 Syndrome Definition.

Abstract Title: County-level Social Vulnerability and Firearm Injury Emergency Department Visits, 10 U.S. Jurisdictions

Authors: Miriam E. Van Dyke, PhD, MPH, May Chen, PhD, MPH, Lakshmi Radhakrishnan, MPH, Michael Sheppard, MS, Marissa Zwald, PhD, MPH

Background

In recent years, there have been calls to action for more timely firearm injury data at the local level to monitor the burden of injuries across communities. Using near real-time National Syndromic Surveillance Program (NSSP) data from CDC's Firearm Injury Surveillance Through Emergency Rooms (FASTER) program and CDC/ATSDR's Social Vulnerability Index (SVI), we examined rates of firearm injury emergency department (ED) visits across levels and factors of community social vulnerability. Incorporating the SVI in firearm injury surveillance may help identify relevant county-level social determinants of health and areas and populations disproportionately affected by firearm injuries to inform community-focused firearm injury prevention strategies.

Methods

County-level ED visit data for 2020 were analyzed for 651 counties from 10 U.S. jurisdictions participating in the FASTER program (District of Columbia, Florida, Georgia, New Mexico, North Carolina, Oregon, Utah, Virginia, Washington, and West Virginia). ED visits for initial firearm injuries were identified using a syndrome definition developed by CDC and several state and local health departments. County-level social vulnerability data were obtained from the 2018 SVI. Counties were categorized into groups (low, medium, high) of social vulnerability based on the tertile distribution of ranked scores of the overall SVI and its four themes and the individual indicators comprising each SVI theme. Annual firearm injury ED visit rates (ED visits involving a firearm injury divided by total ED visits and multiplied by 100,000) and associated 95% confidence intervals (CIs) were calculated across groups of social vulnerability. Rates were considered different if the CIs did not overlap.

Preliminary Results

During 2020, compared to counties with low overall social vulnerability, rates of firearm injury ED visits were 31% and 83% higher in counties with medium and high overall social vulnerability, respectively. For the SVI themes of socioeconomic status and racial/ethnic minority status & language, rates of firearm injury ED visits were higher among counties with high social vulnerability than among counties with low social vulnerability; this pattern was consistent for all indicators comprising those themes. Firearm injury ED visit rates were higher among counties with high, compared to low, social vulnerability in the SVI themes of household composition & disability and housing type & transportation, although this pattern was not consistent for all indicators comprising these themes.

Conclusion

Counties with high social vulnerability experienced higher rates of firearm injury ED visits in 2020. These findings highlight the utility of the SVI to characterize variation in county-level firearm injury ED visit rates and the importance of community-focused

prevention strategies and partnerships that incorporate social determinants of health in efforts to reduce inequities in firearm injuries.

2:30 PM EST Breakout: Tracking Infections through Time and Space

Abstract Title: Emergency Department Visits for Tick Bites Consistently Predict Peak Visits for Lyme Disease in Areas of High and Medium Lyme Disease Incidence

Authors: Courtney Nawrocki, MPH, Lakshmi Radhakrishnan, MPH, Alison Hinckley, PhD, Grace Marx, MD, MPH

Background: Syndromic surveillance can be a timely and complementary approach to traditional surveillance of reportable infectious diseases and is currently the only national surveillance system for tick bites. Peak emergency department (ED) visits for tick bites might predict peak ED visits for Lyme disease and could inform timely public health prevention messaging to reduce risk of Lyme disease and other tickborne diseases.

Methods: Using the Electronic Surveillance System for the Early Notification of Community-Based Epidemics, we applied algorithms identifying ED visits for tick exposure and for suspected Lyme disease across three Health and Human Services (HHS) regions with known high (Region 1), medium (Region 5), and low (Region 8) Lyme disease incidence during 2017 – 2019. We then determined average number and incidence of ED visits for both tick bite and Lyme disease, and average time between peak annual ED visits for tick bite and Lyme disease.

Results: In Region 1, the average annual number and incidence of ED visits for tick bites was 8,067 (235/100,000 ED visits) and 3,210 (93/100,000 ED visits) for Lyme disease; in Region 5, it was 2,222 (28/100,000 ED visits) for tick bites and 965 (12/100,000 ED visits) for Lyme disease; and in Region 8, it was 181 (11/100,000 ED visits) for tick bites and 77 (4/100,000 ED visits) for Lyme disease. The average peak MMWR week for tick bite was 22 in Regions 1 and 5 and MMWR week 23 in Region 8. Peak ED visits for tick bite preceded peak ED visits for Lyme disease each year in Regions 1 and 5 (on average, by 6 weeks in Region 1 and by 5 weeks in Region 5); no clear peak in ED visits occurred for Lyme disease in Region 8.

Conclusion: During this 3-year period, syndromic surveillance provided consistent temporospatial trends and was a reliable indicator of healthcare burden of patients presenting to the ED for tick bites and suspected Lyme disease. Peak ED visits for tick bites can be used as an early indicator of Lyme disease risk in regions with high or medium incidence of Lyme disease and might inform public health messaging and clinician awareness.

Abstract Title: Assessing the burden of rabies-related care on Emergency Departments in Kansas in 2020 using Syndromic Surveillance Data

Author: Henri Menager, MD, MPH

Background

Human rabies is a fatal disease yet preventable by early recognition and receipt of postexposure prophylaxis (PEP). Since 1968, no human rabies has been reported in Kansas. However, exposure to reservoir animals of the rabies virus is relatively common, leading to numerous emergency departments (ED) visits for various reasons. During 2020, Kansas EDs received 441 rabies-related visits. This presentation is a descriptive analysis of those ED visits.

Methods

On 6/3/2021, we queried the CDC's National Syndromic Surveillance Program (NSSP) data using a custom query of the chief complaint and discharge diagnostic fields. We retrieved 449 records (<1% of 2020 visits). Ninety-six percent of Kansas ED visits were submitted to the NSSP in 2020. We used RStudio 1.4.1106 for the analysis. Each record was manually reviewed to determine its relationship to rabies, the animal source of the exposure, the patient's body part exposed, and the kind of medical procedure performed. We excluded 8 records (1.8%), that were unrelated to rabies (false positive). Counts, percentages and confidence intervals were then calculated. Patients may visit the ED several times for the same incident.

Results

Persons 18 to 44 years old had a significantly higher percentage of ED visits (41.5%) than the other age groups. Children less than 4 years old had the lowest percentage of visits (4.1%). Women (50.8%) and men (49.2%) were equally likely to visit the ED for rabies care. There were 392 visits (88.9%) for treatment or prophylaxis. Contact with bats represented the most important source of exposure 127 (28.8%). The remaining sources included dogs (16.6%), raccoons (9.3%), cats (8.4%), and rats (0.5%). There were 453 sites (body parts) of exposure to rabies reported. They included upper limb (21.0%), lower limb (6.0%), head and neck (6.0%), torso (1.1%), and unknown sites (64.7%). Exposures may involve more than one site. Sedgwick county had the highest number of ED rabies visits (28.6%), followed by Johnson County (26.1%). In Sedgwick County, the top 4 zip codes were 67217 (10.32%), 67213 (8.73%), 67216 (8.73%), 67204 (7.14%). June through September had the highest percentage of visits (>= 10.0%) while October through May had the lowest percentages (<10.0%).

Conclusion

EDs in Kansas constitute the main point of care for human rabies. In 2020, there were no sex difference in the number of rabies visits. The number of visits picked from June through September. Contacts with bats and dogs were the most frequently cited source of exposure. Upper limb was the most commonly reported site of exposure. Sedgwick county had the largest number of ED visits for rabies care followed by Johnson County. This information may inform decision makers in matters of public education and resource allocation to address human and animal rabies in Kansas.

Abstract Title: Surveillance for Influenza and RSV - Veterans Health Administration (VHA), 2020-2021

Authors: Cynthia Lucero-Obusan, MD, Patricia Schirmer, MD, Gina Oda, MS, Mark Holodniy, MD

Background: VA conducts ongoing surveillance for viral respiratory infections. VA's large elderly population is at higher risk for influenza and Respiratory Syncytial Virus (RSV) complications, including hospitalization and death. CDC reported unusually low influenza activity throughout the 2020-2021 flu season¹ as well as historically low circulation of RSV during April 2020-March 2021. However, increased RSV circulation was reported beginning in April 2021, particularly in parts of the Southern U.S.²⁻³ Herein, we report national influenza and RSV surveillance in the Veterans Health Administration (VHA).

Methods: Electronic influenza & RSV laboratory testing, ICD-coded hospitalizations and outpatient encounters [including influenza-like-illness (ILI) syndrome] were obtained from VHA's Praedico Public Health Surveillance System (through July 31, 2021) and compared to prior seasons. Patients were reviewed for positive results, repeat testing, and demographics. Antibody and rejected/cancelled tests were excluded.

Results: Surveillance metrics for influenza and RSV are presented (Table). Testing for both influenza and RSV increased dramatically during 2020-21. ILI was below average (0.3-0.6% per week). Influenza activity was highest during 2020 Weeks 46-47 but remained low the entire season with no distinct peak seen (Figure 1). RSV activity dropped to very low levels beginning in April 2020 and remained low until April 2021. Increased activity of RSV was observed through July 2021 with more than 2% of tests positive, occurring primarily in Southern and Midwestern states (Figure 2). In 2021, the number of RSV-coded hospitalizations, deaths during an RSV-coded admission and outpatient visits remain below average but an increased percentage of outpatient visits (54%) were in the ED setting.

Conclusion: The COVID-19 pandemic and implementation of mitigation efforts including masking, reduced travel, stay at home orders and physical distancing likely contributed to low influenza and RSV activity during much of 2020 and into 2021. Despite markedly increased testing in recent years via multi-pathogen testing, an unusually low number of influenza positives were observed for 2020-21. We also identified increased inter-seasonal RSV activity beginning in April 2021, which continued through July 2021 and tracks closely with reported national and geographic trends. Circulation of RSV and influenza may increase as pandemic restrictions continue to be relaxed. Providers should be aware of increased recent RSV activity and continue to test for both influenza and RSV along with other respiratory viruses, including COVID-19.

References:

1. 2020-2021 Flu Season Summary www.cdc.gov/flu/season/faq-flu-season-2020-2021.htm

2. Changes in Influenza and Other Respiratory Virus Activity During the COVID-19 Pandemic — United States, 2020–2021 | MMWR (cdc.gov)
3. HAN Archive - 00443 | Health Alert Network (HAN) (cdc.gov)

Abstract Title: COVID-19 Activity Indicators: Assessing the Utility of COVID-like illness

Authors: Alicia Sloughfy, MPH, Stella Tsai, AnnMarie Haldeman, Aaron Rosenbaum

Background. Nationally and worldwide the COVID-19 pandemic has proven itself to be one of the most devastating events in human history. With its influence spanning across all facets of human life, from economics to education, tracking and monitoring COVID-19 has become the utmost priority for public health response and containment.

Anticipating the need for measuring activity, the New Jersey Department of Health (NJDOH) established a COVID-19 Activity Level Index (CALI) in July 2020 which has since been used in many departments of health issued recommendations including long term care facility guidance, school exclusion criteria, and contact tracing. New Jersey's CALI report uses three indicators: case rate, percent positivity and percent COVID-like illness (CLI). The purpose of this presentation is to discuss and reflect upon the utility of percent CLI as one of the three indicators to determine COVID-19 activity.

Methods. NJDOH syndromic surveillance data is collected via Epi-Center Syndromic Surveillance System. Within Epi-Center, CLI is defined as fever and cough or dyspnea (shortness of breath, difficulty breathing, etc.) or the presence of coronavirus diagnosis codes. With the intention to focus on CLI rather than Influenza-like illness the diagnosis of another specified respiratory pathogen (influenza, parainfluenza, and RSV) is excluded. Percentage of total daily emergency department (ED) visits that are associated with CLI is collected and monitored as a 7-day weekly average (Percent CLI). Data for case rate was extracted from the New Jersey Communicable Disease Surveillance System (CDRSS) by specimen collection date. Spearman's correlation was used to determine correlations between case rate and CLI from March 2020 to October 2021.

Results. From March 2020 to October 2021 (n=578), case rate and CLI were found to have a high positive correlation with a Spearman's rho of 0.82 ($p < .0001$).

Conclusion. The high correlation between CLI and case rate supports the utility of using CLI as an indicator of COVID activity during the pandemic. Unlike case data, syndromic surveillance is real-time, so it is likely to precede case data serving as an early warning signal to incoming COVID-19 surges. It is important to note that health seeking behavior and circulation of non-viral respiratory illness, especially influenza, will largely impact the accuracy of CLI as an indicator for COVID-19 activity. Moving forward, we plan to closely monitor the relationship between CLI and case rate in anticipation of a season with the potential of influenza and COVID-19 co-circulation. Understanding the limitations of respiratory illness syndromic surveillance can assist us in best leveraging its strengths to provide a clear picture of the COVID-19 activity.

Abstract Title: Temporospatial Trends in COVID-Like Illness Emergency Department Visits from January 2020 through July 2021 by Health and Human Services Region and Illinois Sub-Geographies

Authors: Lauren Draftz, MPH, Stacey Hoferka Jensen, MPH, MSIS

Background

Since March 2020, Illinois has experienced four COVID-19 surges. Each surge has varied in the geographic region most impacted, and the magnitude and the duration of the elevated trends. A consistent mechanism for tracking the pandemic has been visits to Emergency Departments (ED), using the chief complaint symptoms and diagnosis of patients captured in the Illinois Syndromic Surveillance System (ISySS). Illinois contributes data to the National Syndromic Surveillance Program (NSSP), and as a participant has access to national and Health and Human Service (HHS) regional aggregate data. Evaluating high level surges nationally and across HHS regions can inform the state's understanding of factors that may influence surge trends in subsets of Illinois.

Methods

The weekly percent of Covid-like Illness (CLI) ED visits were queried for Illinois at state, county and eleven COVID-defined regional levels, the United States and HHS Regions 1-10. Consistently measuring pandemic surges through ED visits, avoids the bias associated with testing availability or screening. Surge patterns were characterized by timing and duration for the U.S., HHS regions and IL areas. Associations with weather and travel were analyzed with CLI trends to identify correlations. Weather data was sourced from NSSP, while mobility data came from the U.S. Bureau of Transportation Statistics.

Results

The U.S. has experienced five distinct surges in CLI ED visits since March 2020, with the timing of each surge differing the most between HHS regions during three time periods: Summer 2020, Spring 2021, and Summer 2021. In June through August 2020, HHS Regions 4, 6, and 9 saw a surge in CLI ED visits while the rest of the country saw minimal activity. During Spring 2021, HHS Region 5 saw the most distinct surge in percent CLI ED visits, while most other regions plateaued. During June and July 2021, all HHS Regions began to experience surges in CLI ED visits. Similar to Summer 2020, Regions 4 and 6 saw the highest and most distinct "waves" of CLI ED activity.

Differences in surge patterns prompted investigation into the association between weather, mobility, and CLI ED visits. For most HHS regions and within IL, there was a strong positive correlation ($r \geq 0.5$, $p < 0.01$) between percent CLI ED visits and percent of the population staying at home. Within Illinois, minimum temperature showed a weak negative correlation ($r < 0.3$, $p < 0.01$) with rising CLI ED visits.

Conclusion

As surges in CLI ED Visits differ in timing by region, national sharing of syndromic

surveillance data allows for greater insight into state-level trends. Among HHS Regions, strong positive correlations between CLI ED visits and mobility suggest potential behavior modifications during CLI surges. While the correlation between CLI ED visits and temperature was weak, further exploration into weather's relationship with CLI ED visits is warranted.

3:45 PM EST Breakout: Syndromic What? Sharing Data Outside of Public Health
Abstract Title: A Cross-Sectional Survey to Assess Awareness of Syndromic Surveillance by Emergency Medicine Clinicians: An Opportunity for Education and Collaboration

Authors: Gabriel Ann Haas, MPH, Kellie Wark, MD, MPH

Background: ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) is a national and local syndromic surveillance tool, utilizing de-identified electronic data from emergency room and urgent care electronic health records to rapidly identify emerging health threats. Syndromic surveillance data is directly fed by clinical documentation, and while prior research has been dedicated to informatics, analytics and communications, work needs to be done to characterize awareness or knowledge of syndromic surveillance by clinicians whose data is represented.

Objective: The primary goal of this survey is to evaluate the degree to which frontline clinicians in Kansas are aware that certain deidentified aspects of their documentation are used in public health surveillance. The secondary outcomes are to assess whether improved awareness may influence clinical documentation, and to gauge interest in further education or collaboration with public health to enhance surveillance tools.

Methods: An anonymous survey was distributed to Kansas clinicians beginning in August 2021. Physicians, trainees, and mid-level providers were targeted in a variety of representative urban and rural practice settings. Descriptive statistics were used for analysis.

Results: Of 79 initial responses to the survey from 20 Kansas counties, 86% of clinicians had never heard of syndromic surveillance. Respondents were unsure which aspects of their documentation were visible to public health or how quickly records were received. Regarding documentation, only 51% indicated they felt at least moderately familiar with ICD-10 coding structure and only 50% regularly documented injury or illness context in the chief complaint or reason for visit. Nearly All respondents indicated they may be willing to improve the most pertinent parts of their documentation viewing lack of awareness as a primary barrier. There was near complete agreement on the importance to improve data quality for public health and interest from 90% of respondents in learning more about syndromic surveillance data or viewing trends of interest.

Conclusions: Partnerships with clinicians whose data is represented in syndromic

surveillance systems represent an opportunity for collaboration between Public Health and Medicine. This survey suggests that most clinicians have not heard of syndromic surveillance, and lack of knowledge or awareness is identified as a barrier to enhancing surveillance data quality. Emergency Medicine clinicians agree collaboration is critical and are interested in learning more about syndromic surveillance data. Sharing data back with frontline providers can strengthen the feedback loop between public health and key healthcare staff, by allowing clinicians to both see their documentation at work and provide public health with the frontline insight necessary to best target surveillance efforts.

Abstract Title: Leveraging NSSP Data to Create Emergency Department COVID19 Data Visualization Tool

Authors: Margaret Cullather, MPH, Dhruv Sharma, MS, Sandra Schneider, MD, FACEP, Loren Rives, MNA

Background: Emergency departments saw a dramatic drop in the number of patients presenting for care in the early part of the pandemic. That decrease in volume led to a decrease in revenue. Directors and administrative personnel needed to match staffing to anticipated patient volume in order to be financial stewards. Additionally, as emergency departments are the frontline responders to public health emergencies, increased information around PHE risk in these areas allows for better and more efficient response efforts.

Methods: During this time, the American College of Emergency Physicians (ACEP) established a relationship with the National Syndromic Surveillance Program (NSSP) to acquire aggregate data on country regions. This project was established and funded in part by a cooperative agreement with the Centers for Disease Control and Prevention (grant number 1 NU50CK000570). This data was displayed for our members in a 'data visualization' program on our website. This data was free and open to anyone accessing the ACEP website.

Results: COVID19 dashboard included visualizations of US emergency department (ED) data across three categories: total visits, COVID-like illness visits, and influenza-like illness visits. The data are available at both national and Health and Human Services (HHS) regional resolutions & across several timescales (e.g., 7-day, 30-day, 90-day). Data are obtained from the U.S. Centers for Disease Control and Prevention through the National Syndromic Surveillance Program (01/01/2019-08/31/2021). Data and visualizations were updated weekly. Scroll down below the map to sort by region and time frame. Included below are images from the existing webpage showing the actual visualization for the country. Each visualization can be drilled down to the DHHS region. The data was accessed 5,000 times with 4,000 unique visits since it was placed on the website on January 1, 2021. This data has been beneficial during the recovery period, when visits stabilized, and more recently during the resurgence of cases, particularly the Delta variant. As seen below, data was most frequently accessed during times of

COVID19 surges.

In addition, it is hoped that emergency physicians who utilize this data will be more supportive of the efforts of NSSP going forward.

Conclusion: Rapid utilization of surveillance data in data visualization efforts provides valuable tools for frontline providers to assess public health emergency risk and determine appropriate response actions and resource planning.

Abstract Title: Bolstering Heat-Related Illness Surveillance in Arizona through Data Sharing Partnership with National Weather Service Phoenix Office

Authors: Laura Fox, MPH, Matthew Roach, MPH, Krystal Collier, BA, Paul Iniguez, B.S., M.A., Vjollca Berisha, MD, MPH

From May-September 2020, Maricopa County--home to state capital Phoenix, Arizona--experienced 53 days above 110°F, 145 days above 100°F, and 48 heat warnings issued by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) office in Phoenix, all historical records. The Arizona Department of State Health Services (ADHS) and Maricopa County Department of Public Health (MCDPH) received a data request from NOAA/NWS Phoenix in Fall 2020 for health data for the prior heat season to 1) better understand the timing and magnitude of heat-related impacts as depicted in a near-real time dataset, 2) assess the accuracy of NOAA/NWS forecasts and messaging efforts including issuance of Excessive Heat Warnings (EHW) to capture periods of increased heat impacts, and 3) compare the expected increase in heat impacts with increasing levels of the experimental NOAA/NWS HeatRisk product (which NOAA/NWS Western Region offices utilize to issue heat alerts). This data request required coordination between and within multiple agencies: the Environmental Public Health Tracking Program and Syndromic Surveillance Program at ADHS coordinated with the MCDPH Syndromic Surveillance Program and Climate and Health Program to authorize the use of the data per the NOAA/NWS Phoenix request, including granularity, time span, how the data could be used and shared, and important limitations to consider. The data provided to NOAA/NWS Phoenix were successfully used in all three of the outlined objectives. ED visits exhibited a high degree of variability through the heat season, with pronounced peaks coinciding on days with EHWs in effect. In aggregate, heat-related ED visits displayed a stepwise function in relation to NOAA/NWS HeatRisk (low: 0.2%, moderate: 0.4%, high: 0.6%, very high: 1.0%) indicating HeatRisk accurately conveys increasing severity of negative heat impacts. Since this data request was filled, NOAA/NWS Phoenix has utilized the subsequent findings and results in numerous presentations as part of their holistic approach to forecasting and messaging heat-related impacts. Based on the success of this initial data sharing from 2020, NOAA/NWS Phoenix is coordinating with ADHS and MCDPH to establish a data use agreement to receive ongoing/low latency heat-related ED visit data throughout the heat season in order to continuously improve their services. Predicated on continued success, this collaborative effort can serve as a role model for other locations throughout the United States.

3:45 PM EST Roundtable: Severe Weather Surveillance Using Syndromic Surveillance

Authors: Lakshmi Radhakrishnan, MPH, Zachary Stein, MPH, Paul Schramm, MS, MPH, Fatema Mamou, MPH

This roundtable will facilitate discussion about the use of syndromic surveillance for severe weather conditions, value of data sharing as a component of successful emergency response, and community resources to monitor severe weather events.

Severe weather conditions necessitate timely mechanisms to track complex health impacts. Syndromic surveillance data makes it possible to simultaneously monitor several health conditions in near real-time, functioning as an informative early-warning system during environmental emergencies to alert public health authorities for further action. These data facilitate an understanding of both the proximal and distal health impacts of environmental health emergencies. The community has developed queries, dashboards, customized reports, factsheets, and other tools to track the health effects of disasters including hurricanes, winter storms, flooding, extreme heat, and wildfires. These tools can accelerate community response to ongoing emergencies and enhance preparedness for future emergencies.

Key Objectives:

- Describe key considerations in severe weather surveillance
- Discuss the utility and accompanying challenges of using syndromic surveillance for severe weather surveillance
- Discuss data caveats during severe weather events (among state, local and federal partners)
- Share resources to monitor severe weather events
- Gather input on future needs for tracking the health effects of severe weather

3:45 PM EST Breakout: Unreported Case Finding

Abstract Title: Leveraging ESSENCE Data for Case Finding Using Visits of Interest Email Notifications

Authors: Erin Austin, MPH, Arden Norfleet, MPH, Meredith Davis, MPH

Background

Syndromic surveillance systems have demonstrated utility for trend monitoring, outbreak detection, and case finding. However, local epidemiologists may not access these systems regularly, and therefore may not benefit from timely data about possible communicable disease cases. While communicable disease reporting by healthcare providers and laboratories is required in Virginia, it may be delayed or incomplete (Swann 2018, Overhage 2011). Syndromic surveillance can serve as a supplemental case detection method. The Virginia Department of Health (VDH) sought to facilitate reportable disease case finding by identifying possible communicable disease cases within emergency department and urgent care data and sending email notifications to

ESSENCE users.

Methods

In 2019, VDH created a Virginia-specific Visits of Interest (VOI) syndrome definition for rapidly reportable conditions with input from local health districts. VDH collaborated with Johns Hopkins University Applied Physics Laboratory to implement the VOI definition in Virginia ESSENCE and enable automated email notifications. After pilot testing daily VOI emails with a local health district, VDH revised the VOI syndrome definition before deployment in November 2020. Daily VOI email notifications are accessible to local epidemiologists who are Virginia ESSENCE users. The emails contain limited information to protect patient confidentiality: visit date, chief complaint and discharge diagnosis (CCDD), patient health district, facility name and health district. A link in the email provides access to protected health information in Virginia ESSENCE for further review. In July 2021, VDH conducted a brief evaluation of VOI email notifications to assess usefulness.

Results

In August 2021, 64 Virginia ESSENCE users received daily VOI email notifications. During November 2020 – August 2021, 41 local users utilized the ESSENCE VOI definition a total of 268 times (range= 2-86 per user; median = 8). Twenty-seven respondents participated in the evaluation and reported using VOI emails in the following ways: checking the reportable disease surveillance system to determine whether case investigation was in progress (n=20); reviewing medical records (n=18) or contacting the treating facility (n=12); and logging into ESSENCE for more information (n=17). All respondents found VOI email notifications to be very useful (43%) or somewhat useful (56%).

Conclusion

Virginia local epidemiologists found VOI email notifications to be useful and to facilitate public health action. VDH will continue to refine VOI email notifications based on user feedback. Possible improvements include: adding additional data elements, such as medical record number, to the emails; modifying the VOI definition; and tracking the number of communicable diseases cases initially identified using ESSENCE. Email notifications provide a convenient view of ESSENCE data and may assist in communicable disease case finding for local staff.

Abstract Title: Using Syndromic Surveillance for Early Detection of Covid-19 Outbreaks in Long-Term Care Facilities, Georgia, April 2020 – March 2021

Authors: Rene Borroto, BA, Jessica Pavlick, PhD, Bill Williamson, MSc, Patrick Pitcher, MSc, Cherie Drenzek, PhD

Background. Early detection of outbreaks is a key purpose of syndromic surveillance. Covid-19 has severely impacted residents and staff of long-term care facilities (LTCFs) in Georgia (GA). The objective is to show how syndromic surveillance (SS) can be used for early detection of Covid-19 outbreaks in LTCFs. Methods. We obtained a comprehensive

list of LTCF names and addresses from the GA Department of Community Health. A query was built in SAS Enterprise Guide 9.4 to find Emergency Department (ED) visits matching both of these criteria: First, patients mapped to at least one of these syndromes - Covid-19, Pneumonia, Influenza-Like Illness, Respiratory, or Asthma; Second, Chief Complaint (CC) text string containing an LTCF name. Query results of ED visits meeting both criteria were emailed to the epidemiologists of the 18 GA Public Health Districts (HD) from April 2020 through March 2021. In April 2021, we evaluated these notifications by checking the State Electronic Notifiable Disease Surveillance System (SendSS) Outbreak Management System (OMS) to identify if an outbreak had been reported by these LTCFs before or after the date of each ED visit. We calculated the percentage of notifications that could have detected outbreaks with two levels of timeliness: 1. early detection, when the ED visit had occurred at least one day before the outbreak was reported to a HD, or 2. late detection, when the ED visit occurred on the same day or after the outbreak was reported. Results. A total of 428 ED visits that matched both criteria were sent to HD epidemiologists. 62 ED visits were excluded from the analysis, because of imperfect name-matching. Of the remaining 366 ED visits, 68 (19%) fell in the early detection category, as these visits had occurred before the date of report of 35 Covid-19 outbreaks in LTCFs (median earliness = 17 days: range 1-88). 241 visits (66%) fell in the late detection category and were linked to 34 ongoing outbreaks already reported to HDs. 57 ED visits (15%) were of patients from LTCFs whose outbreak investigations had already been closed or that did not report outbreaks. Conclusions. Covid-19 outbreaks in LTCFs can be detected early by using queries that search for names of LTCFs in the CC field of the syndromic surveillance data set. This text-based query can also play a back-up role for identification of outbreaks already notified to local health departments.

Abstract Title: Enhanced Surveillance for Unreported Multisystem Inflammatory Syndrome Cases in Virginia

Authors: Sabine Pierre-Louis, MSc, Arden Norfleet, MPH, Erin Austin, MPH

BACKGROUND:

Multisystem inflammatory syndrome (MIS) is a rare but serious condition associated with Coronavirus Disease 2019 (COVID-19) affecting children and adults. Concerned about underreporting of MIS by healthcare providers during the early 2021 peak, the Virginia Department of Health (VDH) leveraged emergency department (ED) data to improve surveillance and identify unreported MIS cases using condition-specific diagnosis codes.

METHODS:

In January 2021, VDH developed a syndromic surveillance definition using Virginia's ESSENCE to identify ED visits hospitalized with an ICD-10-CM diagnosis of MIS (M35.81) or other specified systemic involvement of connective tissue (M35.89) paired with a COVID-19 diagnosis. ED patients from ESSENCE were matched to COVID-19 case data reported to the Virginia Electronic Disease Surveillance System (VEDSS) using a

combination of patient name, medical record number, ED visit date, birthdate, or sex. VEDSS was used to determine if an existing MIS investigation was associated with the patient or if a positive SARS-CoV-2 test was reported to VDH within the 6 weeks prior to the ED visit. If a MIS investigation was not found and the patient met recent COVID-19 infection criteria in VEDSS, the local health district was notified to conduct a public health investigation. To assess the performance of the ESSENCE surveillance definition for MIS, sensitivity and positive predictive value (PPV) were calculated.

RESULTS:

Between January and July 2021, VDH identified 64 visits among children 0 to 20 years hospitalized with MIS (MIS-C) in ESSENCE. Of these, 12 were previously identified as MIS cases in VEDSS and 16 did not meet the criteria of a recent COVID-19 infection. The remaining 36 ESSENCE visits were communicated to local health districts for further investigation and resulted in the identification of 22 (61%) unreported cases of MIS-C, 5 classified as not a MIS case, and 9 investigations with an unknown outcome.

Additionally, VDH identified 15 visits among adults 21 years and older hospitalized with MIS (MIS-A) in ESSENCE. Of these, 12 patients did not meet the criteria of a recent COVID-19 infection and three were communicated to local health districts for further investigation; of which, 100% were classified as MIS-A cases. Overall, the syndromic definition successfully identified 37 total MIS cases, 12 (32%) MIS-C cases previously reported through a healthcare provider, 22 (60%) unreported MIS-C cases and 3 (8%) unreported MIS-A cases. The ESSENCE surveillance definition sensitivity was 60% for MIS-C and 100% for MIS-A, with a positive predictive value (PPV) of 53% and 20%, respectively.

CONCLUSIONS:

Syndromic surveillance supplemented traditional reporting methods to identify 25 MIS cases not reported to VDH from January to July 2021. National condition-specific diagnosis codes supported VDH's ability to detect unreported cases using ED data and more accurately assess the burden of MIS in Virginia.

Day 3 – Thursday, November 18, 2021

1:15 PM EST Roundtable: Using Race and Ethnicity Data in Syndromic Surveillance

Authors: Amanda R. Smith, PhD, MPH, Jourdan DeVies, MS, Amanda Morse, MPH, Carla Britton, PhD, Rashon Lane, PhD

The National Syndromic Surveillance Program (NSSP) receives symptom-based free text, diagnosis, and demographic data from 70% of non-federal emergency departments in the United States. Race and ethnicity data can appear in multiple parts of the messages sent to NSSP. In order to enhance the completeness of race and ethnicity data, the NSSP team recently created calculated race (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, Other Race, White, Refused

to Answer, Unknown, Not Reported or Null, Not Categorized, and Multiracial) and calculated ethnicity (Hispanic or Latino, Not Hispanic or Latino, Unknown, Not Reported or Null, Refused to Answer, Not Categorized) variables, which mine multiple data elements to create standardized information with the best available information for each patient's visit. With the original race and ethnicity fields, the same emergency department (ED) visit can be binned into more than one race or ethnicity category when multiple values are reported. As a result, the potential for the same visit to be counted under multiple race or ethnicity categories restricted its analytic use. The new calculated race and ethnicity fields assign ED visits to a single race and ethnicity category, making each category mutually exclusive. The calculated race and ethnicity fields are very useful for analyses comparing across racial and ethnic groups, while the original race and ethnicity fields can be useful for describing trends in specific racial and ethnic groups. Work exploring the trends for various mental health conditions by race/ethnicity using the calculated race and calculated ethnicity variables is currently under way. Efforts are ongoing to further refine the race and ethnicity variables available in NSSP to maximize accuracy and representation in syndromic surveillance data.

Key Objectives:

- Describe the recent addition of and rationale for a "calculated race" and "calculated ethnicity" variable in ESSENCE.
- Identify analytic use cases for race and ethnicity variables to promote dialogue among participants and better understand needs of the Community of Practice.
- Describe considerations around the use of race/ethnicity variables to maximize accurate representation of racial and ethnic minority populations.
- Seek recommendations from community partners about desired future improvements.

1:15 PM EST Roundtable: Defining and Evaluating Mental Health using Syndromic Surveillance

Authors: Lakshmi Radhakrishnan, MPH, Lareina La Flair, PhD, MPH, Dylan Pell, Rebecca H. Bitsko, PhD, Kayla Anderson, PhD

This roundtable will provide a forum to discuss the guiding principles used to define any mental health (MH)-related visit (as well as specific disorders) in syndromic surveillance data, describe the collaborative process of query development, share partner experiences in using these definitions, and discuss next steps for future queries.

State and local jurisdictions, in collaboration with CDC, are increasing their use of syndromic surveillance data to monitor injuries and behavioral health concerns. As part of a broader effort to accelerate near-real time understanding of these prominent public health problems, the NSSP syndrome definition subcommittee recently undertook extensive work to create definitions related to mental health. Subject matter experts from the Centers for Disease Control and Prevention (CDC), in collaboration with the Council of State and Territorial Epidemiologists (CSTE) and state and local partners, recently developed twelve distinct syndrome definitions to better capture emergency

department (ED) visit burden among persons with or experiencing symptoms of mental disorders.

The definitions were crafted to include visits involving acute mental health crises (i.e., the sole or primary reason for the visit was readily determined to be only related to mental health) as well as visits where mental disorders are present (defined as coded in the discharge diagnosis or mentioned as free text) but may not be the sole reason for the visit. Both types of visits (acute crises as well as visits where mental disorders are present and co-occurring with other visit needs) were determined to be important for inclusion because it can be difficult to disentangle the primary cause for a visit in ESSENCE when there are indications of both physical and mental health concerns, and because mental disorders and their symptoms are well known to exacerbate physical health issues.

Key Objectives:

- Describe guiding principles in the creation of syndromes to monitor mental health
- Describe the collaborative process to engage mental health subject matter experts from CDC, CSTE, and state and local health departments to iteratively create and test syndromes for MH
- Share and understand partner experiences in monitoring MH using these definitions and desired future improvements

1:15 PM EST Roundtable: Variability in Discharge Diagnoses Received and What Can Be Done About It

Authors: Samantha Spoto, MSPH, CPH, Krystal Collier, BA, Diksha Ramnani, MPH

Discharge diagnosis is a valuable data element in syndromic surveillance. It is the most suitable field for capturing diagnostic specificity in a standardized form and it is a familiar tool widely used in other areas of public health surveillance through hospital billing datasets. In recent years, there is an increased focus on using syndromic surveillance as a tool for more timely surveillance of health conditions historically monitored using hospital billing data, such as drug overdose, firearm injury and mental health. In Florida, we have noticed multiple data quality attributes that can impact discharge diagnosis-based query results, complicating the interpretation and broad publication of the data. This roundtable discussion will start off by giving a brief overview of different concerns our state has noted when using the discharge diagnosis field and propose discussion questions surrounding distinct parts of the syndromic data flow where improvements may be possible:

- Syndromic surveillance senders are meant to adhere to the Public Health Information Network (PHIN) Messaging Guide for Syndromic Surveillance.¹ Can anyone think of ways to request better standardization of the data received in the discharge diagnosis field? What would the first step need to be to begin investigating each idea as a possible solution?

- Many syndromic surveillance systems already have years of data available with the data quality issues talked about earlier. Are there steps we can take during analysis to maintain our coverage of data over time/geography but also have confidence the results we display are not a data artifact? Which ideas can be built into a syndromic surveillance system versus completed after the fact in another analysis platform?
- Even with work toward all the solutions we have spoken about, syndromic surveillance data are always going to be messy. How can we display our data to our public health partners or the general public in a way that meets their needs and allows for an understanding of the messiness of the data? How can we make clear the differences between syndromic surveillance and hospital billing data when these data sources are used to monitor the same health conditions?

An appropriate follow up to this may be a Community of Practice Data Quality Call where the solutions proposed here are discussed further after people have had time to give them consideration. Discussion could involve a ranking of solutions, what has the best cost/benefit potential and next steps.

Reference

1. PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent Care, Inpatient and Ambulatory Care Settings Release 2.0 [Internet]. Atlanta (GA): Centers for Disease Control and Prevention, Division of Health Information and Surveillance; 2015 April 15 [cited 2021 June 3]. Available from: https://www.cdc.gov/nssp/documents/guides/syndrsurvmsgguide2_messagingguide_phn.pdf

2:00 PM EST Coffee Break: Training Ideas to Keep End Users Engaged

Abstract Title: Data Sharing and Training Strategies Within ESSENCE-FL

Authors: Shelby Fawaz, MPH

Introduction

The Florida Department of Health (Department) hosts a statewide version of the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE-FL), which is available for use by epidemiologists in all 67 Florida counties. ESSENCE-FL houses data from nine different data sources—including emergency department data, poison control data and death record data. During 2020, the Department saw a large increase of new users to ESSENCE-FL. To improve the user experience with the system, the ESSENCE-FL team addressed system needs using the following strategies: 1) an ESSENCE-FL user group is hosted quarterly where updates are shared, 2) a “Tips and Tricks” newsletter was created, providing users information in an easily consumable format, 3) hosting biweekly “ESSENCE-FL Office Hours” where users are encouraged to join and share questions with the broader community, and 4) two workgroups are hosted providing users an opportunity to discuss and share data with community partners. A survey was created to assess user awareness and experience with the four engagement strategies.

Methods

A survey was created using Microsoft Forms and a link to the survey was sent in an email to all ESSENCE-FL users. The survey was anonymous and consisted of six questions, including three questions that had multiple parts, asking respondents to rate on a five-point Likert scale their agreement with a statement. The results were downloaded into a Microsoft Excel format where analysis was performed. The questions were scored based upon a 5-point scale, where strongly disagree correlated with -2 points, disagree with -1 points, neutral with 0 points, agree with 1 point and strongly agree with 2 points. Scores were tallied by adding up the points and then dividing by the total number of responses to the question (range -2 to 2 points).

Results

There were 27 respondents to the survey, a 5.4% response rate. Most respondents found the Tips and Tricks newsletter (score: 1.58), the workgroup meetings (0.90) and the ESSENCE-FL user group meetings (0.62) useful to their work. The Helpdesk office hours (0.55) was not highly attended, but those who did attend were glad for the time and felt that they were able to ask questions. Overall, the ESSENCE-FL team's engagement activities were viewed favorably.

Conclusion

The ESSENCE-FL system has a high learning curve, and it is important to help users bridge that gap. While all the activities have a positive score among the survey respondents overall, the two most highly scored activities were the Tips and Tricks newsletter and the workgroup meetings. Providing engagement activities in multiple formats allows ESSENCE users to learn organically. Requesting feedback from users provides clarity on what could be done better. With an overall low response rate to this survey, it is also important to consider the views of those who did not respond (not addressed in this project).

2:30 PM EST Roundtable: Utility and Challenges in Monitoring Social Determinants of Health Using Syndromic Surveillance

Authors: Lakshmi Radhakrishnan, MPH, Krystal Collier, BA, David Swenson, MEd, Rosa Ergas, MPH, Amanda Morse, MPH

Introduction:

The timeliness of syndromic surveillance and the potential for rich demographic data makes it a valuable and actionable data source for health equity. Changes in ED visit trends by social determinants of health (SDOH) diagnoses, such as the experience of homelessness, incarceration, social exclusion, and employment status, can provide timely insight into changes in health disparities and inform public policy. However, use of SDOH codes are currently too inconsistent to monitor changes in trends over time.

Methods:

This roundtable will discuss the various SDOH metrics that can be evaluated in

syndromic surveillance data, challenges encountered in collecting these data, and tangible next steps to improve data collection.

Key Objectives:

- Present the utility and challenges in monitoring SDOH using syndromic surveillance.
- Discuss collection of social determinants of health (SDOH) diagnoses in medical record data.
- Discuss partner experiences in collecting and evaluating SDOH.
- Develop next steps needed to enhance SDOH data collection.

Summary:

Understanding patterns of use for SDOH diagnoses within states, such as differences in use by vendors and facility types, are important to ensure that these valuable data can be captured during ED visits. Inconsistent code use can be acknowledged as a limitation. However, this problem is largely systemic, and little can be done by the end-user to correct the issue. It is therefore critically important to encourage use of SDOH codes in healthcare settings. Syndromic surveillance data cannot be leveraged for evaluation of health disparities if the underlying data do not exist.

2:30 PM EST Breakout: Measuring Mental Health Exasperation in the Era of Lockdowns
Abstract Title: Trends in Emergency Department Utilization for Mental Health, Substance Use and Violent Victimization in Chicago, IL Before and at the Beginning of the COVID-19 Pandemic in 2020

Authors: Isabel Chung, MPH, Jocelyn Wilder, MPH, Wilnise Jasmin, MD, MBA, MPH

BACKGROUND: From the onset of the Coronavirus Disease 2019 (COVID-19) pandemic, many people experienced worsening behavioral health outcomes such as poor mental health, increased substance use and violent victimization. After the Illinois stay-at-home order issued on March 21, 2020, utilization rates for most types of emergency department (ED) visits dropped by 1.2% in Chicago, IL but behavioral health-related ED visits increased by 17.7%. We categorized 7 syndromes from the National Syndromic Surveillance Program (NSSP) for mental health conditions, suicide attempts, child abuse & neglect, intimate partner violence, firearm assaults, alcohol and drug use into three domains: mental health, violent victimization, and substance use. To measure the change in magnitude of these domains, we compared ED utilization rates before and after the Illinois Shelter-in-Place order which took effect on March 21, 2020.

METHODS: ED visit data for the 7 NSSP syndromes were extracted for 2019 and 2020 in Chicago, IL. To measure changes in ED utilization before and after 3/21/20 (end of MMWR week 12), mean weekly ED visit counts and rates were calculated for two time periods in both years: MMWR weeks 1 to 12 ("T1") and MMWR weeks 13 to the end of the year ("T2"). We then calculated the percent change in mean weekly rates for each time period in 2020 using 2019 as the referent year. Finally, the fold increase in percent change from T1 to T2 was calculated to measure the magnitude of change in ED visit

rates.

RESULTS: Of the 3 behavioral health domains, ED utilization for violent victimization increased the most from T1 to T2 followed by mental health and substance use. Of the seven syndromes, ED visits for intimate partner violence increased the most by 20.0 times and suicide attempts the least by 6.1 times. ED utilization for alcohol use remained the same and drug overdoses slightly decreased by 0.7 times.

CONCLUSIONS: Like other jurisdictions nationwide, overall, ED utilization in Chicago dropped precipitously (-21.5%) after the 2020 stay-at-home order but behavioral health-related utilization increased across all three domains. This change may indicate that the stress of staying at home during the onset of the pandemic contributed to worsening behavioral health among Chicagoans. Syndromes showing the greatest increase in ED utilization may indicate a high prevalence of these conditions among Chicagoans due to lack of adequate support services. Further analyses such as stratifying rate calculations by demographics or geographics may improve understanding of underlying disparities potentially driving increased rates and identify subpopulations needing more support. Syndromes showing less increase in ED utilization may result from a range of contextual factors such as increased support services or decreased access to emergency care. Therefore, ED utilization as a population indicator may provide limited information and caution should be used when interpreting

Abstract Title: Mental Health Related Emergency Department Visits in Florida During the COVID-19 Pandemic

Authors: Mwedusasa Mtenga, MPH, Allison Culpepper, David Atrubin, MPH

Background:

The COVID-19 pandemic, precipitated arguably the greatest societal disruption of the past century, resulting in growing concerns about mental health and increased substance use. Research on the effect that the COVID-19 pandemic has had on mental health in Florida is limited. Available analyses on the impact of the pandemic found increased depression, anxiety, psychological distress, and poor sleep quality in health care workers. Similarly, research on the effect on the general public revealed decreased psychological well-being and higher scores for anxiety and depression compared to before the pandemic. Nationally, increases in suicide and mental health related emergency department (ED) visits have been noted across sex and age. Utilizing the Florida Department of Health (FDOH) Electronic Surveillance System for the Early Notification of Community Based Epidemics (ESSENCE-FL), ED visits prior to and during the pandemic were analyzed to understand the impact of the pandemic on mental health in Florida.

Methods:

ESSENCE-FL chief complaint and discharge diagnosis fields were queried for Florida resident ED visits from January 2019 through May 2021 and corresponding periods in 2020 and 2019 using the Centers for Disease Control and Prevention suicide ideation (SI) and suicide attempt (SA) queries and the National Syndromic Surveillance Program (NSSP)

Syndrome Definition committee Disaster Mental Health (SDC-MH) query with the addition of “baker act” visits. The addition of Baker Act, a state mental health act that allows for involuntary institutionalization and examination, was included to capture specific mental health related visits not captured by the SDC-MH query. ED visits were stratified by year to date and sex.

Results:

There were 192,713 mental health related visits in 2021, compared to 166,518 in 2020, and 128,670 in 2019. There were 44,930 suicide ideation related visits in 2021, compared to 38,673 in 2020, and 38,103 in 2019. There were 9,865 suicide attempt related visits in 2021, compared to 8,039 in 2020, and 9,865 in 2019. In all three years (2021, 2020, and 2019), there were more mental health visits in females (118,387; 102,539; 79,318) than in males (74,306; 63,972; 49,348). There was a similar year to year pattern for suicide attempt with visits in females (6,040; 4,571; 4,218) higher than in males (3,813; 3,461; 2,869). However, suicide ideation visits were higher in males (23,912; 22,466; 21,075) than females (21,066; 16,198; 17,026).

Conclusions:

There was a marked increase in suicide ideation, suicide attempt, and mental health related ED visits in Florida during the pandemic. It is clear from this analysis that mental illness and suicidal ideation and attempts increased from 2019 to 2021. Regardless of stay-at-home orders and overall decreases in ED visits during the COVID-19 pandemic, individuals still sought care for mental health.

Abstract Title: Increase in Emergency Department Visits due to Suspected Suicide Attempt Among Persons Ages 12-17 Years – Florida, January 2019-May 2021

Authors: Katie McDaniel, MPH, Alan Mai, MPH

Background:

In March 2020, Florida issued emergency mitigation measures in response to the COVID-19 pandemic, including stay-at-home orders and physical distancing. Nationally, an increase was observed in the proportion of mental health related emergency department (ED) visits among youth during the widespread implementation of COVID-19 mitigation measures, despite an overall decline in the absolute number of ED visits. Concerns arose that COVID-19 mitigation measures could negatively impact the mental health and well-being of many young people and exacerbate risk factors for suicidal behavior by disrupting daily routines, decreasing social connectedness, increasing stress or anxiety, and limiting access to crucial mental health services.

Methods:

To evaluate the potential effects of COVID-19 mitigation measures on suicidal behaviors among young people in Florida, the Florida Department of Health used syndromic surveillance data to examine patterns in ED visits for suspected suicide attempts among youth 12-17 years of age by sex, race, and ethnicity from January 1, 2019 to May 31,

2021. This time period was chosen to allow for comparisons to corresponding time periods in 2019 prior to the start of the pandemic. ED visits for suspected suicide attempts were identified using a definition comprised of chief complaint terms and administrative discharge diagnosis codes developed by the Centers for Disease Control and Prevention.

Results:

From January 1, 2019 to May 31, 2021, the number of ED visits for suspected suicide attempts among youth 12-17 years of age steadily increased in Florida, with the steepest increase beginning in June of 2020. Compared to corresponding time periods in 2019, the number of ED visits for suspected suicide attempts among Florida youth were 42.6% and 122.4% higher in 2020 and 2021, respectively. These increases were observed by sex, race, and ethnicity. The highest increases were observed among female, White and Hispanic youth.

Conclusion:

The findings presented here align with national trends, suggesting the widespread implementation of COVID-19 mitigation measures may have had unintended consequences for the mental health of young people. Suicidal behaviors are of particular concern in this population. Our findings underscore the importance of using public health surveillance data to identify emergent factors that influence youth mental health and suicidal behavior. Data can be used to inform suicide prevention initiatives, enabling them to quickly enhance approaches and implement evidence-based strategies to meet the needs of youth during times of emergency or disruption.

Abstract Title: Washington State Department of Health's Syndromic Surveillance in Guiding the Behavioral Health Response During the Pandemic

Authors: Vasiliki Georgoulas-Sherry, PhD, Mary Megliola Franzen, MPH, Cody Micah Carmichael, MPH, Lareina La Flair, PhD, MPH

Background: The effect of the novel coronavirus (SARS-CoV-2) pandemic has produced significant health concerns, negatively impacting individuals in a multitude of ways, creating new hardships and barriers for individuals. Even if individuals are not physically affected by COVID-19, the implications for behavioral health remain. As the ongoing and constantly changing nature of the pandemic continues the unique characteristics of this pandemic trend toward anxiety and loneliness as significant behavioral health outcomes. This subsequently has led to behavioral health problems being considered as critical and prevalent public health concerns, especially as the pandemic continues to considerably impact the community. The pandemic has presented uncommon behavioral health impacts like no other, and this requires different mitigation, planning, and response.

Methods: Since April 2020, the Washington State Department of Health (WA DOH) has utilized the Rapid Health Information Network (RHINO) to conduct syndromic

surveillance on five behavioral health syndrome queries that can be detected in emergency department settings: psychological distress, suicidal ideation, suspected suicide attempts, alcohol-related conditions, and suspected all-drug overdoses through deidentified patient records.

Results: Syndromic data evaluating psychological distress, suicidal ideation, suspected suicide attempts, alcohol-related conditions, and suspected all-drug overdoses from 2019 to 2021 has shown that visit volumes appear to be trending back to reflect levels more typical of care-seeking behavior before COVID-19, and therefore, rates may be converging with previous years' rates. While rate (calculated as per 10,000 ED visits) in all five behavioral health indicators peaked in the beginning months of 2021 and were typically higher than the rates in 2019 or 2020, the Summer months show decreases in these rates and remain lower than rates in 2019 or 2020.

Implications: The utilization of syndromic surveillance for behavioral health can show with near real-time data the potential impacts of the COVID-19 pandemic on mental health and substance use issues which can support population-level strategic planning and intervention, mitigate the behavioral health impacts of the COVID-19 pandemic, impact forecasts used by health partners and state agencies for strategic planning and intervention, and help public health partners such as behavioral health providers and response teams respond quickly to potential behavioral health outcomes of the COVID-19 pandemic by creating provider alerts, social media messaging, and other health communications (youth-, regional-, and statewide-focused reports on behavioral health).

2:30 PM EST Breakout: Better Practice through Advanced Analytics

Abstract Title: Applying supervised machine learning to query emergency medical service databases for cases of opioid overdose

Authors: Hannah P. Cowley, Bachelors of Arts in Cognitive Science, Robyn Ellis, MPH, Howard Burkom, PhD

The opioid overdose epidemic is of great public health concern and has dramatically increased during the COVID-19 pandemic. Health departments track opioid overdoses through a variety of data sources including emergency department patient records, ambulance calls, and poison center calls. Tracking the opioid burden requires the selection and aggregation of overdose-related records. However, selecting these records is challenging because of inconsistent and nonuniform data entry, with necessary information often in free-text fields.

Epidemiologists and groups such as the NSSP Syndrome Definition Committee work to develop and test queries for the optimal classification of overdose-related records. The Oregon Health Authority Public Health Division seeks to extract and monitor such records of Emergency Medical Service (EMS) calls. Past query development efforts have been labor-intensive and difficult to validate.

We present a supervised machine learning method for query development and apply it to the problem of extracting opioid overdose-related incidents from EMS records. We hand-annotated a sample set of 1500 records, judging whether the record in question pertained to an accidental opioid overdose. This hand-annotated corpus was used to train and test a random forest classifier. The feature set employed for record classification included provider impressions in pick-list form, medication fields, and the free-text narrative, demographic details, and others. Based on the manually derived labels, we achieved sensitivity exceeding 0.90 and positive predictive value exceeding 0.70 for predicting whether a record is an opioid overdose.

Our machine learning algorithm provides a more efficient and sensitive approach to identifying cases of accidental opioid overdose than less structured query formation, an approach requiring and guided by only limited, well-defined human input. This method may be extended to other data sources involving free-text fields and other health outcomes of public health interest.

Abstract Title: Analytic Discriminator to Reduce ESSENCE Algorithm Alerts Resulting from Abrupt Changes in Data Quality

Authors: Michael Sheppard, MS, Howard Burkom, PhD, Roseric Azondekon, PhD

Background:

Operational surveillance systems are designed to highlight features of current concern in complex streaming data sources such as emergency department data. ESSENCE alerting algorithms serve this purpose by signaling time series anomalies, which may provide an early indicator of increased disease incidence or events of concern. Interpretation of anomalies can be challenging due to the potential of false signals resulting from abrupt changes in data quality. Specifically, we examine the prevalence of superficial alerts caused by substantially higher completeness of discharge diagnoses during test intervals when compared to sliding baselines used by alerting algorithms. To suppress such false alerts, we developed an algorithm to account for changes in discharge diagnosis informative (DDI) percentage between algorithm baselines and test intervals to decide whether to drop specific alerts in standard practice.

Methods:

We developed a parametric spline-based discriminator to accept or reject alerts based on changes in DDI. We modeled baseline DDI time series as a mixture of high- and low-quality percentage levels. Inputs to the discriminator included the mean and standard deviation of the low-quality DDI levels, quality gap between the test interval and mean low level, and the recency of poor quality. Alerts for which the quality gap exceeded a threshold for a given percentage of the baseline were rejected by the discriminator.

To test this method, we collected DDI time series and alerts for the CDC Influenza-like illness (ILI) chief complaint and discharge diagnosis-based syndrome definition from

counties with a median DDI% ≤ 70 and at least 2 alerts per month. We evaluated 1,359 alerts for ILI in 2019, and 1,671 alerts for ILI in 2020. An R Shiny application was developed to visualize county-level DDI time series and alerts to enable rapid annotation of alerts as true or false based on well-established expectations. Due to the discriminator's dependency on the placement of spline knots, 375 sets of knots were evaluated to determine a spline that optimized agreement with the 2 truth sets.

Results:

Annotations were conducted independently by M.S. and H.B. and reconciled to arrive at the 2 sets of accepted/rejected alerts. In the final 2019 ILI truth set, the best discriminator rejected 93.8% of alerts rejected in the truth set (sensitivity), while 42.6% of alerts rejected by the discriminator were also rejected in the truth set (positive predictive value). The optimal set of spline knots showed little variation among the 3 truth sets.

Conclusions:

The proposed discriminator will eliminate a well-known class of nuisance alerts in ESSENCE. DDI% time series and alerts included in the 3 samples exhibited a variety of common patterns seen among counties with generally low completeness of discharge diagnoses, suggesting utility across a broader set of CCDD categories.