Data Access and Integration

2:15PM EST | November 17th, 2020 | 2020 SyS Symposium

Moderated by Caleb Wiedeman, MPH – Tennessee Department of Health

Speakers:

Sara Chronister, MPH – Maricopa County Department of Public Health (Arizona)

Josh Love, MPH – Metro Public Health Department (Nashville-Davidson County, Tennessee)

National Syndromic Surveillance Program
Community of Practice
Advancing the Science and Practice of Syndromic Surveillance

KAHUINA CONSULTING

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Council of State and Territorial Epidemiologists

Sarah Chronister, MPH

Maricopa County Department of Public Health (Arizona)

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Leveraging ESSENCE APIs and R to improve syndromic surveillance workflow to identify suspected Rocky Mountain spotted fever in Maricopa County, Arizona

Sara Chronister, MPH; Melissa Kretschmer, MA; Jennifer Collins, MPH; James Matthews, MPH

Maricopa County
Public Health

Presented by:
Sara Chronister, MPH
Syndromic Surveillance Epidemiologist

RMSF EPIDEMIOLOGY

- Tick-borne bacterial disease
- Symptoms:

Fever	Rash	Vomiting	Muscle pain
Headache	Nausea	Stomach pain	Loss of appetite

- Diagnostic testing takes 2-4 weeks
- Treat with antibiotic doxycycline
  - Most effective if started within 5 days of illness onset

RMSF EPIDEMIOLOGY IN ARIZONA

- Mostly affects communities on tribal lands
- Unique vector: brown dog tick
  - Free roaming dogs commonly found near homes on tribal lands
- Children account for half of all cases
- Rash is not common
- Higher fatality rate: 7-10%

RMSF IN PRACTICE IN ARIZONA

- Severe cases transferred from facilities on tribal lands to facilities in Maricopa County
- Transfer protocol set up to improve communications between jurisdictions
  - Tribe ↔ ADHS ↔ MCDPH ↔ Hospital
  - Ensure continuation of doxycycline
- Monitor ESSENCE as additional check
  - See Success Story in Knowledge Repository

CURRENT RMSF ESSENCE PROTOCOL

1. Use ESSENCE alerts to find new RMSF transfers
    a. Add all identified visits to MCDPH log to track outcomes
2. Medical records review to determine if high suspect case
3. Ensure RMSF is on the differential
4. Recommend treatment with doxycycline—important because of diagnosis timeline and fatality rate if untreated

BOTTLENECKS

1. Checking ESSENCE myAlerts

2. Entering visits into MCDPH log

ESSENCE myAlerts PROCESS

Get myAlert email

Log into ESSENCE

Navigate to myAlerts

Download line list for review

Copy and paste information to log

APPLICATION PROGRAMMING INTERFACE (API)

- Allows applications to communicate with each other
- "Call and response"

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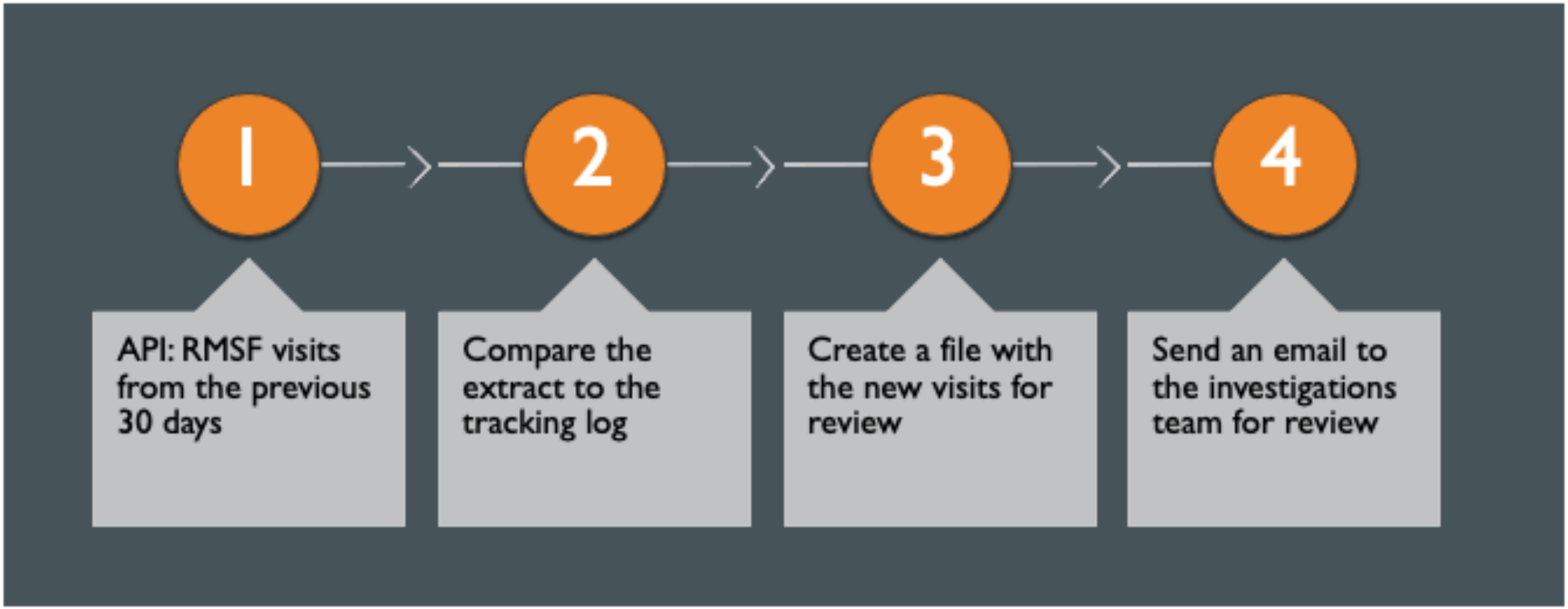

NEW PROCESS: AUTOMATION

API: RMSF QUERY

1

https://essence.syndromicsurveillance.org/nssp_essence/api/dataDetails/csv?ccddFreeText=%5EA77.0%5E,OR,%5EA770%5E,OR,%5ERMSF%5E,OR,%5EROCKY%20MOUNTAIN%5E,OR,%5ERASH%5E,OR,%5EFEVER%5E,OR,%5EMACULOPAPULAR%5E,OR,%5EPETECHIAE%5E,OR,%5ECOUGH%5E,OR,%5EEDEMA%5E,OR,%5EVOMITING%5E,OR,%5ENAUSEA%5E,OR,%5EHEADACHE%5E,OR%5ETHROMBOCYT%5E,OR%5ELOW%20PLATELET%5E,OR,%5EHYPONATREMIA%5E,OR,%5ELOW%20SODIUM%5E,OR,%5ESTOMACHE%20PAIN%5E,OR,%5EMUSCLE%20PAIN%5E,OR,%5ELACK%20OF%20APPETITE%5E,OR,%5ETRANSFER%5E,OR,%5ETRANSPORT%5E,OR,%5E%20TICK%20%5E,OR,%5ETICKBITE%5E,OR,%5EACUTE%20RESPIRATORY%20DISTRESS%5E,OR,%5EDIFFICULTY%20BREATHING%5E,OR,%5ESHORTNESS%20OF%20BREATH%5E,OR,%5E%20ARDS%20%5E%20&endDate=20Aug2020&geography=15903&geography=15910&geography=15916&geography=15899&percentParam=noPercent&ccddFreeTextApplyTo=admitReasonCombo&geographySystem=hospital&datasource=va_hosp&detector=probrepswitch&startDate=21Sep2020&timeResolution=daily&medicalGroupingSystem=essencesyndromes&userId=912&aqtTarget=TimeSeries&refValues=true

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COMPARE TO TRACKING LOG

2

Date (Visit Date)	PIN	ZIP	Investigation Outcome	Incorrect Flag Notes
09/17/2020	15903_	[redacted]	Not a case	[redacted]
09/18/2020	15910_		Not a case	
09/20/2020	15903_		Not a case	
09/27/2020	15910_		Not a case	
09/13/2020	15916_VN		Not a case	
09/16/2020	15916_VN		Not a case	
09/29/2020	15903_		Not a case	
10/01/2020	15899_		Not a case	
10/03/2020	15899_		Not a case	
10/04/2020	15903_		Not a case	
10/05/2020	15899_		Not a case	
10/08/2020	15910_		Not a case	
10/12/2020	15903_		Not a case	
10/13/2020	15899_		Not a case	
10/16/2020	15903_		Not a case	
10/17/2020	15903_		Not a case	
10/20/2020	15903_		Not a case	
10/21/2020	15899_		Not a case	
10/23/2020	15916_VN		Not a case	
10/31/2020	15903_		Not a case	

COMPARE TO TRACKING LOG

2

Pull list of existing PINs in tracking log

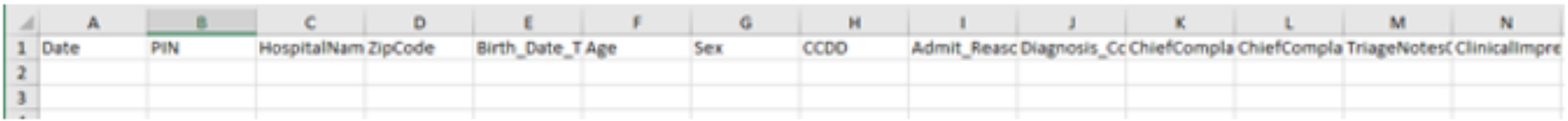
Pull all RMSF visits in last 30 days

Keep only visits where PIN is not in tracking log

NEW VISITS FOR REVIEW

3

- Daily list contains only the new visits for review
- Select fields more relevant to reviewer are placed at the front for easy access
  - Patient and hospital information if a formal medical records request is needed
  - Visit information for quick manual review
  - Visit information to copy/paste into the log



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	PIN	HospitalNam	ZipCode	Birth_Date_T	Age	Sex	CCDD	Admit_Reasc	Diagnosis_Cc	ChiefCompla	ChiefCompla	TriageNotesC	ClinicalImpre
2														
3														

SEND EMAIL FOR REVIEW

4

- Daily from April – October
- Twice weekly from November – March

RMSF Daily Report

SC

Sara Chronister (PHS)

To Sara Chronister (PHS); James Matthews (PHS); Melissa Kretschmer (PHS); Nicole Fowle (PHS)

Good morning,

The RMSF report for 2020-11-06 has successfully completed and shows 0 new visit(s) for your review.

You can find the file to review here.

OUTCOMES

- Reduced time spent checking for RMSF visits

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- Reduced time spent checking for RMSF visits
- Simplified communication about RMSF visits

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- Reduced time spent checking for RMSF visits
- Simplified communication about RMSF visits
- Improved accountability among investigation team members

NEXT STEPS

1. Automate additional steps in the RMSF protocol
2. Identify other protocols that could benefit from automation
3. Improve R code usability for new users

CONTACT ME

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GITHUB.COM/SARA-CHRONISTER

Josh Love, MPH

Metro Public Health Department (Nashville-Davidson County, TN)

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Leveraging Multiple Data Systems to Design and Implement a Drug Overdose Surveillance System in Davidson County, Tennessee

Josh Love, MPH
Epidemiologist
Opioid/Overdose Response & Reduction Program
Metro Public Health Department of Nashville/Davidson County
Nashville, Tennessee

2020 Syndromic Surveillance Symposium
Data Access and Integration
November 17, 2020

Background

- The drug overdose epidemic in Davidson County has been increasing unabatedly for several years.
- Routine monitoring and analysis are crucial in order to detect activity and understand emerging trends.
- Consequently, a drug overdose surveillance system was developed and operationalized in 2019.
- The system integrates multiple data streams in order to monitor fatal/nonfatal drug overdose activity.

Objectives

Develop local drug overdose surveillance system

- Identify available data sources that capture fatal/nonfatal overdose activity
- Integrate to create local drug overdose surveillance system
- Incorporate consistent definitions and metrics to measure activity

Implement local drug overdose surveillance system

- Monitoring
  - Conduct timely and accurate *monitoring* of overdose activity
- Detection
  - Ability to detect increased or unusual overdose activity
- Reporting
  - Deliver timely and comprehensive *reporting* of fatal/nonfatal overdose activity to inform prevention and response efforts

Methods – Develop drug overdose surveillance system

Identify and integrate available data systems

- Nonfatal drug overdoses
  - Nashville Fire Department Emergency Medical Services (EMS)
    - Local suspected drug overdoses requiring EMS response
    - Patient demographics/address
    - Naloxone administration
    - Incident narrative
    - Patient disposition/destination
  - Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE)
    - Syndromic surveillance system maintained by the Tennessee Department of Health
    - CDC definitions for Opioids and Stimulants
    - Capture opioid/stimulant overdoses based on chief complaint/discharge diagnosis
    - Patient demographics/ZIP Code
  - Tennessee Department of Health (TDH) Drug Overdose Reporting (DOR) Project
    - Drug overdose was added as a reportable disease in Tennessee in 2016
    - Nonfatal drug overdoses reported by healthcare providers
    - Drug categories: opioids, benzodiazepines, muscle relaxants, and stimulants
    - Patient demographics/address

Methods – Develop drug overdose surveillance system

Identify and integrate available data systems

- Fatal drug overdoses
  - Davidson County Medical Examiner
    - Suspected fatal drug overdoses occurring in the county
    - Patient demographics/address
    - Injury/death location
    - Toxicology report

Methods – Develop drug overdose surveillance system

Identify and integrate available data systems

- Additional data sources
  - Metro Public Health Department (MPHD) Clinic EHR System
    - Evaluate linkage activities among clinic patients with substance use disorder
  - Local behavioral healthcare partner
    - Post-overdose follow-up initiative
  - Syringe Services Program (SSP)
    - Number of syringes collected
    - Date of collection
  - Metro Nashville Police Department (MNPD) Crime Lab
    - Drug seizure data
  - Tennessee Incident Based Reporting System (TIBRS)
    - Crime data (incident date, drug type)
  - Davidson County Sheriff's Office
    - Linkage between jail population and surveillance system
  - Hospital Discharge Data System (HDDS)
    - Inpatient/outpatient discharges reported by all TN hospitals to TDH
    - Patient diagnoses, services, patient demographics

Methods – Implement drug overdose surveillance system

Data analysis and reporting

- Programs used to integrate and analyze data
  - SAS
    - Data management/analysis
  - Tableau
    - Data analysis/visualization
    - Weekly/quarterly reports
    - Drug overdose threshold calculations
  - ArcGIS Pro
    - Data analysis/mapping
      - XY points
      - Kernel density (heat maps)
      - Hot spot/point cluster/space-time series
    - Identify geospatial trends and hot spots across all data sources
      - Demographics
      - Drug category (toxicology report)

Methods – Implement drug overdose surveillance system

Spike alert system

- Surveillance system leveraged to develop and implement alert system
- Overdose Detection Mapping Application Program (ODMAP)
  - Application programming interface (API) created between Nashville Fire Department EMS and ODMAP system
  - Near real-time data feed
  - Daily fatal/nonfatal overdose threshold set for Davidson County
  - Set to alert program staff/local EMS
- ESSENCE
  - Two alerts set for Davidson County based on location of reporting hospital
    - Opioid CDC v2
    - Stimulant CDC v3
  - Detector: Regression/EWMA 1.2
  - Threshold: 0.05
  - Email sent to program staff when alert is detected

Results

Routine monitoring of drug overdose activity

- Daily analysis of fatal/nonfatal incidents to assess:
  - Number of incidents occurring in the county
  - Temporal and geographic trends
  - Characteristics of affected population (i.e., high-risk groups)
- Identified difference in fentanyl-related overdoses admitted to local EDs compared to toxicology reports

Detection of drug overdose activity

- Capacity to monitor emerging trends and respond to acute increases in activity
- Timely detection and communication of increases in overdose activity via DC-DOSS and acute overdose response plan

Results

Routine reporting to internal/external partners to inform prevention and control efforts

- External partners
  - Local hospital emergency departments
  - Local law enforcement
  - First responders
  - Medical examiner
  - State health department
- Data-to-action initiative with prevention partners for targeted naloxone distribution
- Acute Overdose Response Plan
  - Detection of anomalous activity
  - Data collection and analysis
  - Generate situation report
  - Preliminary review of findings by epidemiologist
  - Review event with internal response team
  - Communication of event to various partners/public
  - Continued monitoring of event

Data inventory

- Summarize data sources utilized by program
- Data dictionary

Conclusion

- Local capacity to monitor, detect, and respond to acute drug overdose activity and emerging trends has improved.

- Situational awareness among multiple internal/external stakeholders is bolstered by understanding person/place/time characteristics of the local drug overdose epidemic.

- Current/future activities
  - Currently upscaling surveillance system to surrounding counties in middle Tennessee to bolster regional response efforts
  - Evaluating the effectiveness of the alert threshold methodology
  - Expanding upon the drug categories being captured
  - Identifying additional data sources to understand public safety/treatment/recovery trends
  - Develop local drug overdose continuum akin to HIV Care Continuum
  - Develop APIs for other data sources to allow direct access

Block Schedule

Training | Methods | Innovation | Data Sharing

1:30-2PM EST	Keynote Address			
	...BREAK...			
2:15 - 3PM EST	Training: NSSP ESSENCE 101	Breakout: Spike, Alert, GO!	Breakout: Data Access and Integration	Breakout: Successful State-led Data Sharing Collaborations
		...BREAK...		
3:15-4PM EST		Lightning: Significant Findings	Roundtable: Bringing New Partners to the Table	Breakout: Can I Do That? Ask a Lawyer.
	...BREAK...			
4:15-5PM EST	Training: Custom Syndrome Definition in NSSP ESSENCE	Breakout: Match Point - Data Matching Across Sources		Roundtable: Establishing a Public Use Shared Data Set
	...BREAK...			
5:15-6PM EST	Virtual Happy Hour			

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