

Outbreak Response: Detect, Assess, Assist

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Presented to APIC DFW March 2, 2023

Infection Preventionist

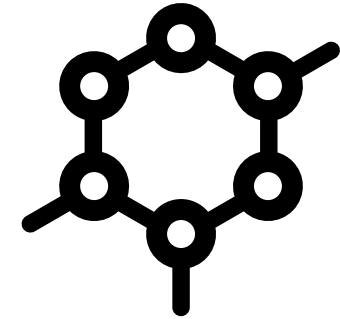
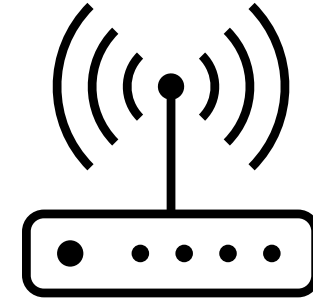
Division of Healthcare Quality Promotion

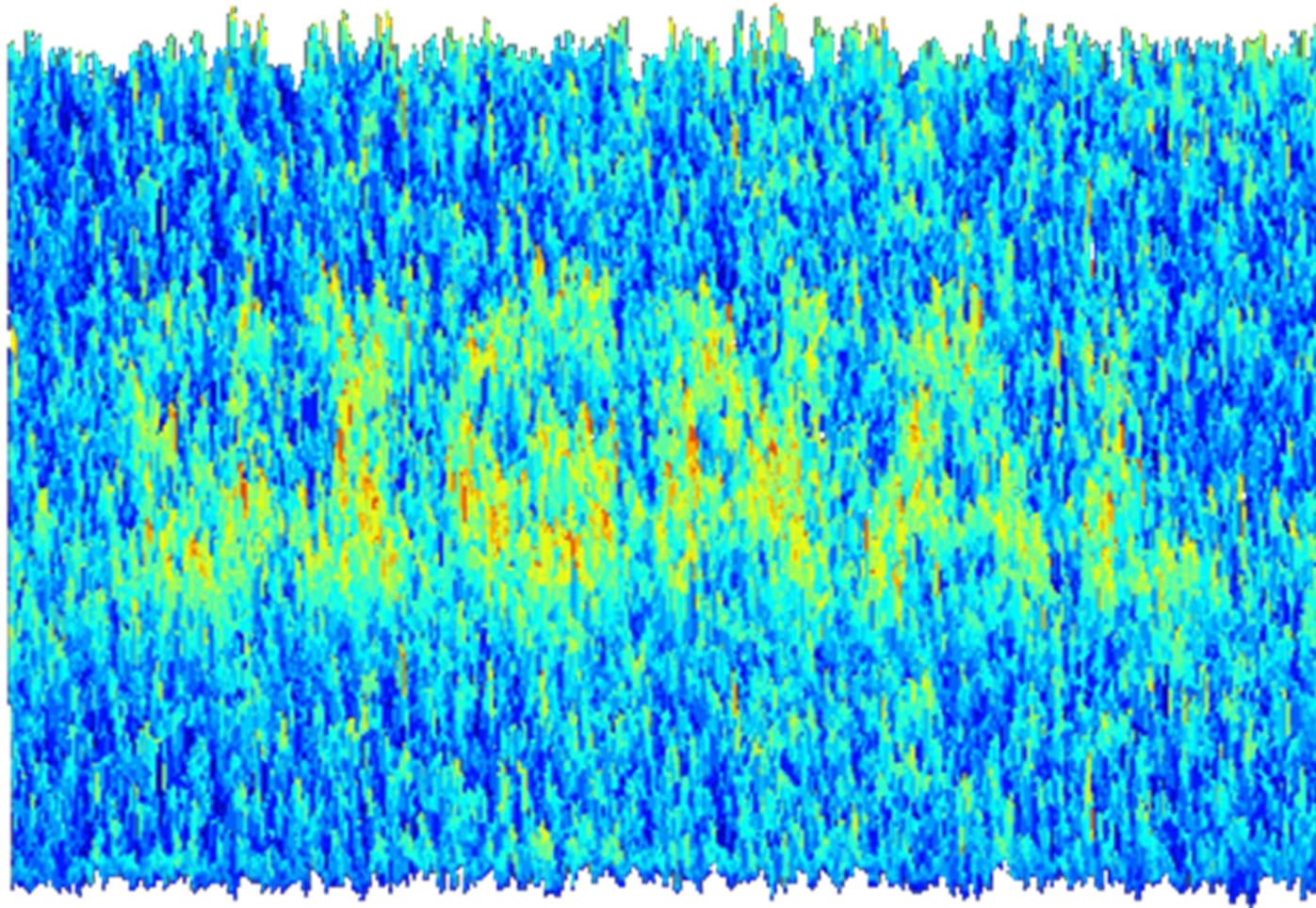
Prevention and Response Branch

OBJECTIVES

Following this presentation learners will:

- 1) Identify sources for outbreak signal detection.
- 2) Determine methods for the initial assessment of various outbreaks.
- 3) Describe the process for obtaining state and federal assistance to evaluate an outbreak.

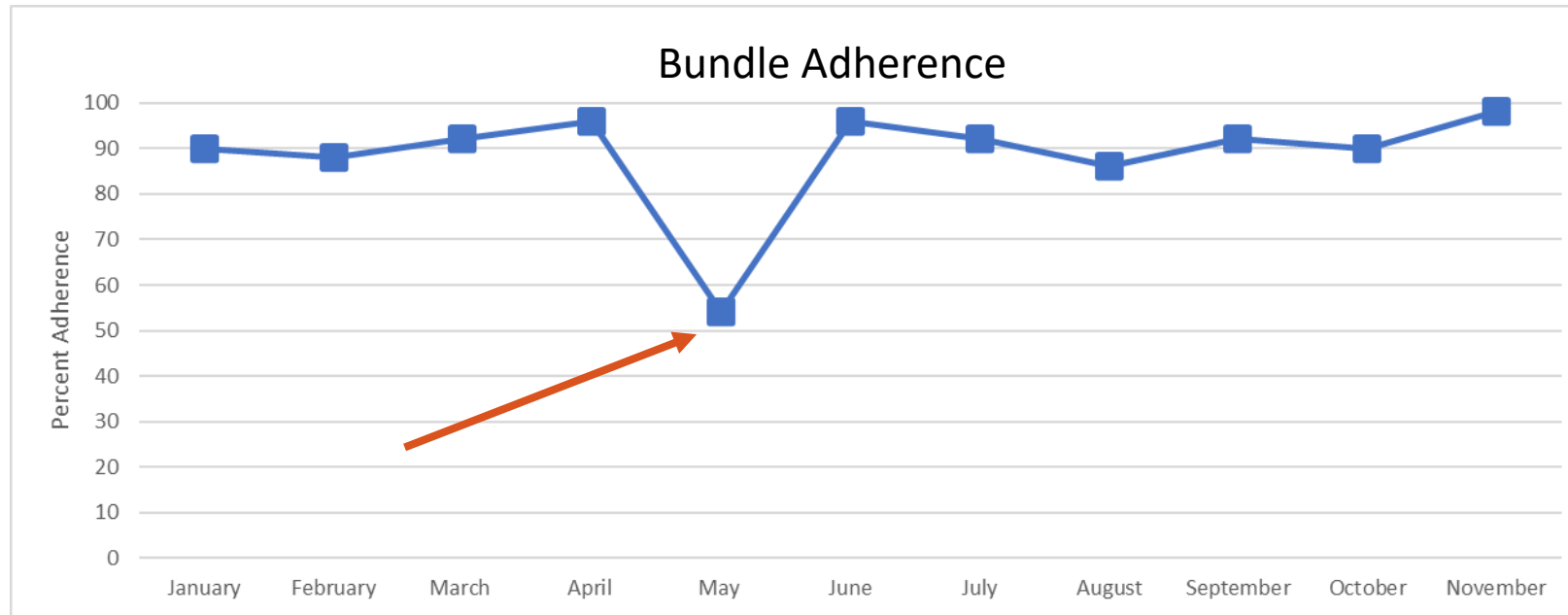




Signal:

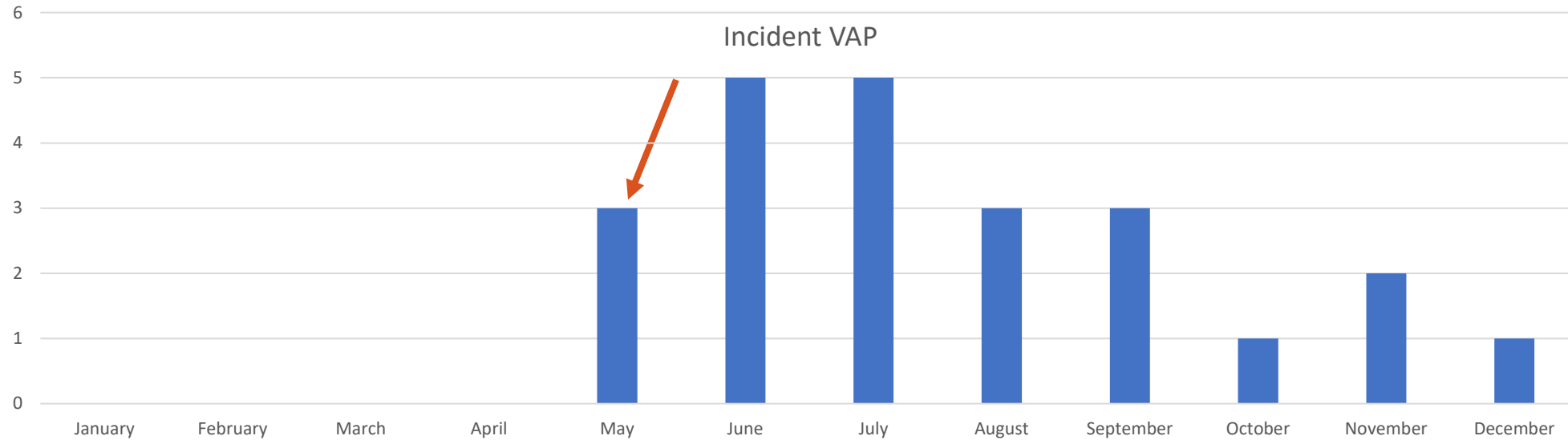
- a) an act, event, or watchword that has been agreed on as the occasion of concerted action.
- b) something that incites to action

Signals from Process Data



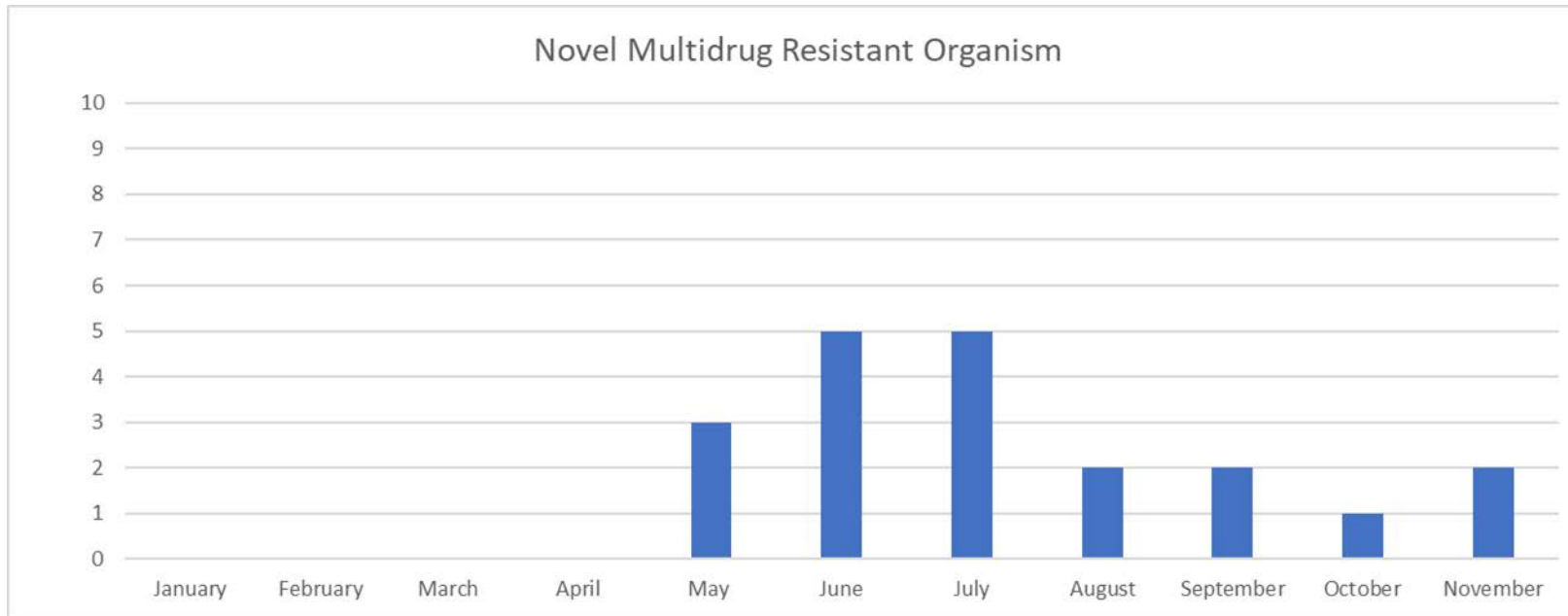
For example, lapses in adherence to a monitored process can signal a need to reinforce measures that are influenced by healthcare personnel behavior.

Signals from Outcome Data



Surveillance data is used to monitor outcomes, VAP might be an example of an adverse outcome signaling a need for action.

A Novel Signal



An unknown process or contaminant leads to unanticipated adverse events

Signals during the pandemic

Noise: any sound that is undesired, interferes with hearing, loud, confused, or senseless....



NAVIGATING CHANGE IN CARE

Outbreak during a pandemic: An IP's worst nightmare

Unanticipated processes, a novel pathogen, staffing shortages, and continual needs for education have disrupted many infection prevention programs.

Outbreak and Response

1. Initial signal
2. Response Teams
3. Actions Taken
4. Lessons Learned

Outbreak detection using a process signal

- Acute Hepatitis C
 - 2 patients both with:
 - no behavioral risk factors
 - receipt of narcotic injections in an Emergency Department
- Process signal
 - 1 Nurse
 - Frequency of access to automated drug dispensing system

Drug Diversion Response Team and Actions taken

- Public Health Investigators – prompt investigation of acute HCV
- Hospital Infection Prevention – access to drug administration records
- Leadership and Public Relations Officers at the Hospital – pt. notification, media notification
- Laboratorians – genetic analysis of virus, testing of exposed
- State Board of Nursing- suspension of offender's license
- Law Enforcement – FDA Office of Criminal Investigation, FBI

Identification, Notification and Testing of Patients

Action	Number affected
Notified of potential exposure	2,762
Presented for HCV testing	1,863
Treated by the nurse	208
Treated by nurse AND tested	175
Treated by nurse AND HCV positive	20
Genetic match	13/20

Lessons Learned

- Small number of cases (**2**) needed to trigger investigation
- All patients in the ED while the nurse was working included as potentially exposed
- No HCP exposed
- IP should be included in all diversion investigations
 - Considerations for patient notification are published in AJIC, June 2020

Commentary

Outbreaks and infection control breaches in health care settings: Considerations for patient notification

Melissa K. Schaefer MD  , Kiran M. Perkins MD, Ruth Link-Gelles PhD, Alexander J. Kallen MD, Priti R. Patel MD, Joseph F. Perz DrPH

Diversion Response Resources

Resources from CDC and the Council of State and Territorial Epidemiologists



Introduction to the Patient Notification Toolkit

A Guide to Assist Health Departments & Healthcare Facilities with Conducting a Patient Notification Following Identification of an Infection Control Lapse or Disease Transmission

Patient Notification Toolkit

- **Introduction**
- Section 1: Developing Documents for a Patient Notification
- Section 2: Planning Media and Communication Strategies
- Writing for Media
- Spokesperson Preparation
- Media & Patient Notification Letters
- Conducting a Successful Press Conference or Media Opportunity
- Section 3: Establishing Communication Resources
- Example Q/A Resources
- Section 4: Best Practices in Conducting Patient Notifications
- Scope/Acknowledgement
- Additional Resources

Outbreak detection using an outcome signal

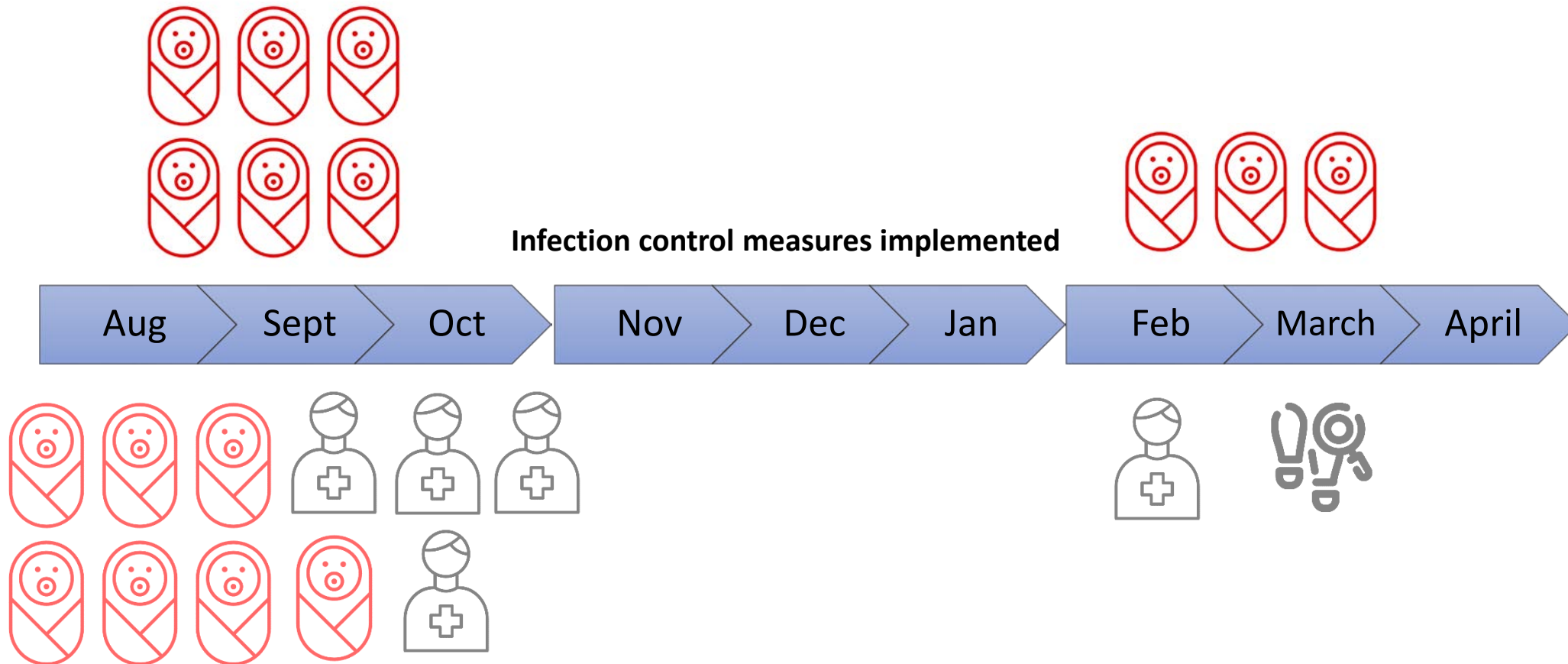
- **Staphylococcal scalded skin syndrome (SSSS)**
 - Blistering skin condition
 - Caused by exfoliative toxin-producing strains of *Staphylococcus aureus* (*S. aureus*)
- 3% of *S. aureus* strains produce exfoliative toxins¹
 - Exfoliative toxin A (eta)
 - Exfoliative toxin B (etb)
- Symptoms include 2-5 days of cutaneous erythema, followed by exfoliation



Nelson's Pediatrics 20th ed.

1. N Engl J Med 2006;355:1800-10.

Illinois NICU SSSS Outbreak – 2017 and 2018 Events

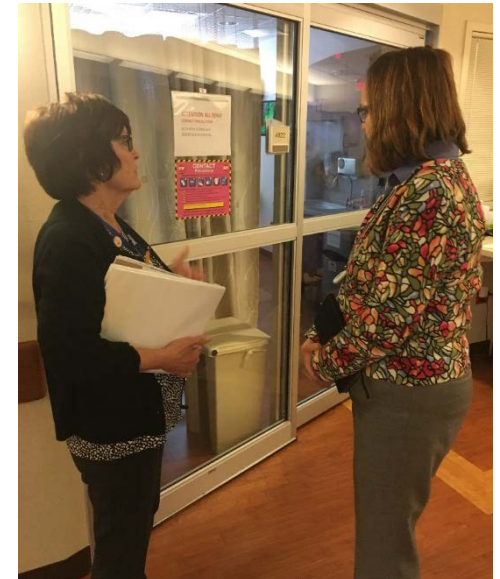
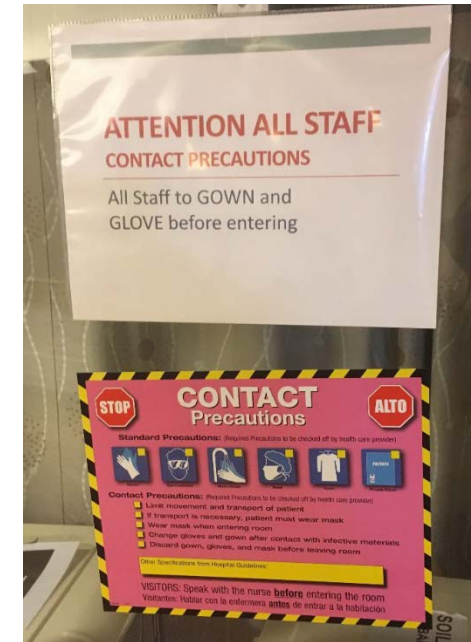


NICU Response Team and Actions

- Infection Prevention
 - provided line lists
 - conducted enhanced observations
 - recommended control measures – cohorting, HCP education and training
- NICU manager
 - implemented policies and procedures
- NICU nurses
 - provided accurate description of behaviors affecting successful control measures
 - promoted adherence
- Laboratory
 - ongoing surveillance, molecular analysis
- Environmental Services
 - ensuring appropriate use of disinfectants

Observations of General IPC

- Personnel were highly engaged
- Universal contact precautions were burdensome and resulted in delays in responding to alarms
- PPE doffing was often performed incorrectly
- HCP incorrectly performed hand hygiene, observed HCP rolling up sleeves of gown and removing gloves improperly
- HCP did not consistently recognize risk of cross contamination
- Inconsistent signage for PPE recommendations posted in NICU



Observations of Environmental Cleaning

- EVS personnel unable to correctly state the contact time for disinfectants
- Significant cross contamination of surfaces likely occurring during cleaning
- Isolette covers not frequently changed or laundered
- Appropriate workflow for equipment reprocessing
- Joint checklist being used by nursing and EVS staff



NICU Lessons Learned

- Build on strengths, close gaps representing weaknesses
- Emphasize hand hygiene during care
- Observations on the unit are key
- Connect with personnel
- Recognize previously undescribed risks



Resource: HICPAC *Staph aureus* NICU Guidelines

Active surveillance for *S. aureus* **colonization**

when there is increased incidence of *S. aureus* infection

Active surveillance for MRSA **colonization**

when there is evidence of ongoing healthcare-associated transmission

Not Routinely Recommended, Consult with Public Health prior to initiating:

Environmental sampling – there is rarely an environmental reservoir for *Staph aureus*

Healthcare worker screening and decolonization – in the absence of an epidemiologic link

Negative environmental cultures **do NOT** indicate a space or unit is free from contamination

Positive surveillance cultures **do NOT** infer directionality of transmission

A signal related to medical devices or products

An increase in the incidence of an environmental pathogen

- Invasive *Burkholderia cepacia* complex
- Low prevalence among clinical cultures
- Often found in soil or in water systems
- Naturally resistant to preservatives
- Outbreaks have been associated with non-sterile drugs and medical devices
- Related cultures may come from a variety of body sites

[CORHA Potential Medical Product-Related Infection/Outbreak: Assessment Questions](#)



***B. cepacia* complex outbreaks associated with medical products**

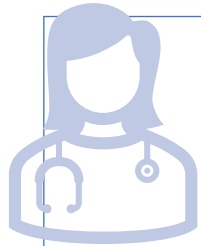
Product	Blood	Sputum	Urine	Other Sterile Site
Docusate sodium	X	X	X	X
Saline Flush	X			
Ultrasound Gel	X			X

FDA advises drug manufacturers that *Burkholderia cepacia* complex poses a contamination risk in non-sterile, water-based drug products

[Outbreak Investigations in Healthcare Settings | HAI | CDC](#)

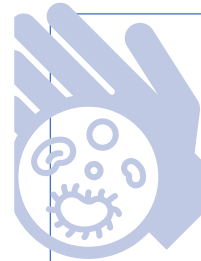
[FDA Advisory](#)

The Medical Device Response Team and Actions



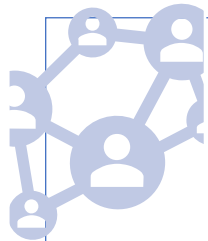
Clinical personnel

Understanding how the product is used



Laboratories

Initial identification, molecular analysis.



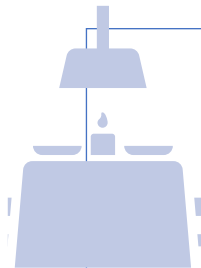
Supply chain personnel

Lot numbers for items
Removal and quarantine of affected products



Pharmacists

The National Drug Code
Removal and quarantine of affected products



External agencies: State and local health department, CDC, FDA

Call for cases, recall of products

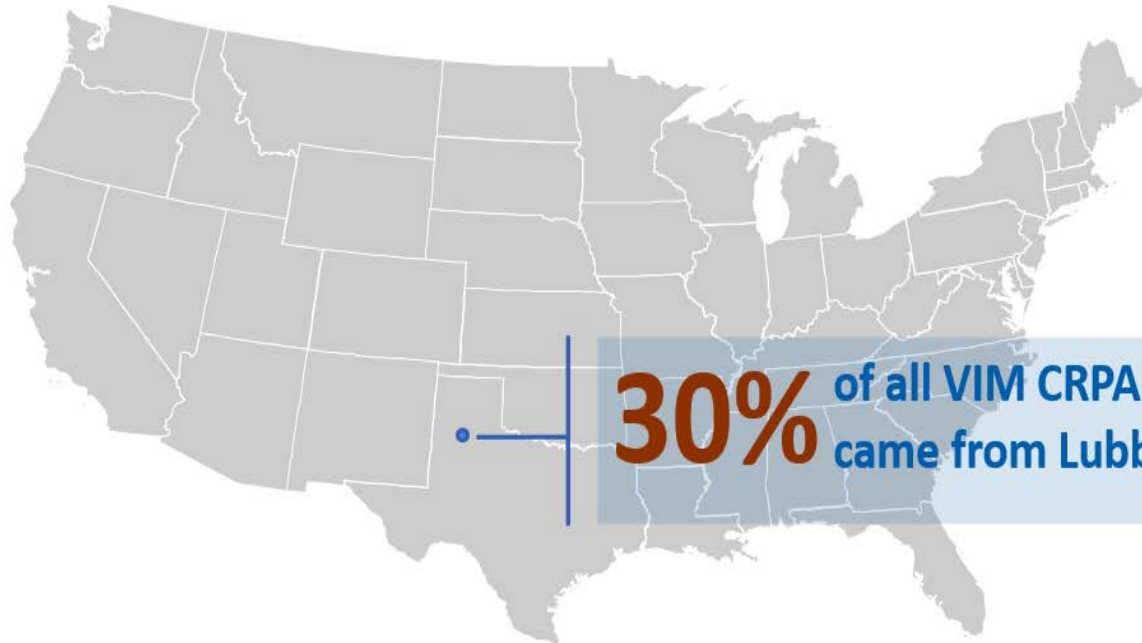
Medical Product Lessons Learned

- Non-sterile drugs and water-based non-sterile devices are subject to different quality assurance tests
- FDA has issued multiple warnings about *Burkholderia cepacia* complex related to nonsterile water-based products
- Molecular analysis, done by a highly experienced lab is important when working with *B. cepacia* complex
- Considerations for use of ultrasound gel were developed
- *Always report suspected adverse events to FDA Med-Watch*

[Outbreak of Burkholderia stabilis Infections Associated with Contaminated Nonsterile, Multiuse Ultrasound Gel — 10 States, May–September 2021 | MMWR \(cdc.gov\)](#)

A novel signal: geographic clustering of unusual isolates

110 cases of VIM CRPA in the US through 2018



Healthcare Facility
Labs

Public Health
Department Labs

Regional Labs &
National TB Center

CDC

The AR Lab Network process enhances collaboration for a more rapid response to detect resistance.

The Antibiotic Resistance Laboratory Network (ARLN) accepts isolates from state health departments to test unusual resistance mechanisms.

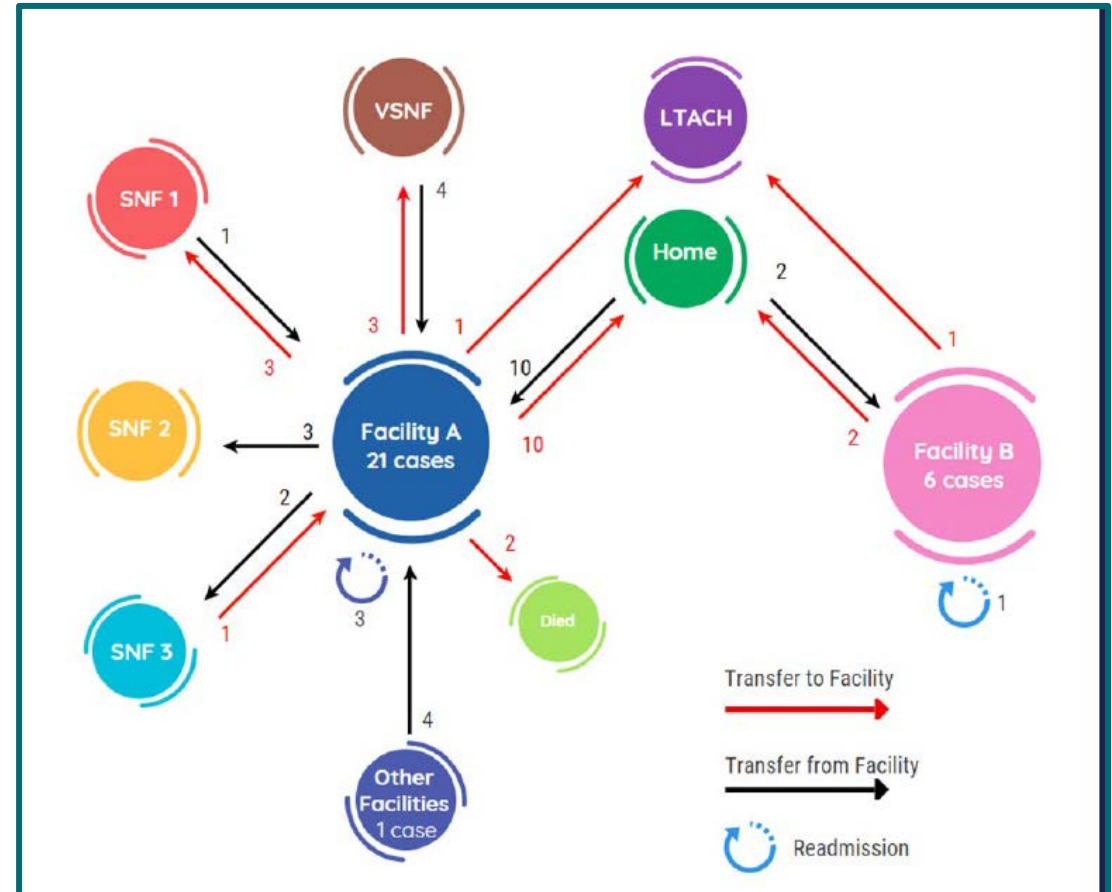
The Regional Response Team and Actions

- **Nursing home administrators and Infection Preventionists**
 - Conducted IP assessments, participated in improvement collaboratives
- **Ambulatory care center IPs**
 - Conducted IP assessments, ensured proper reprocessing
- **Long Term Acute Care IPs**
 - Hired a full time IP to monitor improve ongoing infection prevention
- **University and Community Hospital IPs**
 - Retrained ALL personnel on use of PPE and documented competencies
- **Wound Care Providers**
 - Revised reprocessing and environmental surface disinfection
- **Individuals responsible for transfers: Case Managers**
 - Coordinated care across settings

A Regional Assessment and Response



- Be Prompt (Rapid Investigation)
- Obtain Isolates
- Optimize Infection Prevention
- Transfer using notification processes



Team Actions: Interfacility Transfers

- Processes for transfers were created with regional collaboration
- Forms for local use were approved independently by hospitals and long-term care facilities
- Exchange of information was monitored by the local health department



Inter-Facility Infection Prevention Transfer Form

This form must be filled out for transfer to accepting facility with information communicated prior to or with transfer.
Please attach copies of latest culture reports with susceptibilities if available.

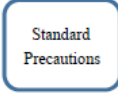




Sending Healthcare Facility:

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number
		___/___/___	

Name of Sending Facility	Phone Number	Address

Sending Facility Contacts	NAME	PHONE	EMAIL
Case Manager/Admin/SW			
Infection Prevention			

Personal Protective Equipment for Safe Patient Contact and Infection Prevention Please check what is needed:

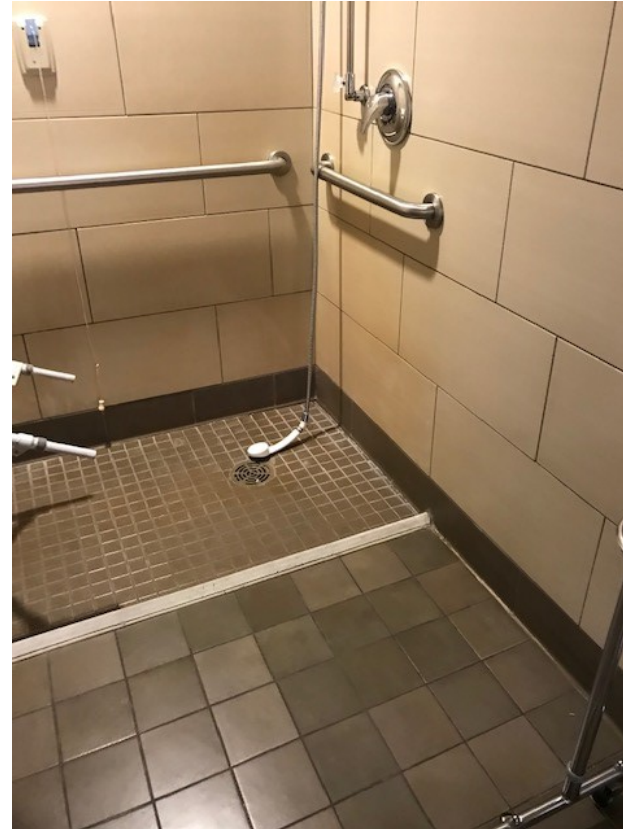
				
<input type="checkbox"/> Standard	<input type="checkbox"/> Gown	<input type="checkbox"/> Gloves	<input type="checkbox"/> Surgical (Droplet Mask)	<input type="checkbox"/> Fit-Tested N95

Does patient currently have an infection, colonization OR a history (in the last 12 months) of a positive culture of a multidrug-resistant organism (MDRO) or other organism of epidemiological significance?	History (Last 12 months) Check if YES	Current Check if YES
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)		
Vancomycin-resistant <i>Enterococcus</i> (VRE)		
<i>Clostridium difficile</i>		
<i>Acinetobacter</i> , multidrug-resistant		
<i>E. coli</i> , <i>Klebsiella</i> , <i>Proteus</i> , etc. w/ Extended Spectrum β -Lactamase (ESBL)		
Carbapenem-resistant Enterobacteriaceae (CRE)		
Carbapenem-resistant <i>Pseudomonas aeruginosa</i> (CRPA)		
Other:		
Cultures pending:		

SYMPTOMS: Check any that currently apply:		
<input type="checkbox"/> Cough/uncontrolled respiratory secretions <input type="checkbox"/> Incontinent of urine <input type="checkbox"/> Vomiting <input type="checkbox"/> Acute diarrhea or incontinent of stool	<input type="checkbox"/> Draining wounds <input type="checkbox"/> Other uncontained body fluid/drainage <input type="checkbox"/> Concerning rash (e.g. vesicular)	<input type="checkbox"/> None of the symptoms listed present

Person completing form: _____
 Role: _____ Date: ___/___/___

VIM within the healthcare environment



VIM-*Pseudomonas montelli*
KPC-carbapenem resistant *Enterobacteriaceae*
OXA-24-*Acinetobacter baumann*



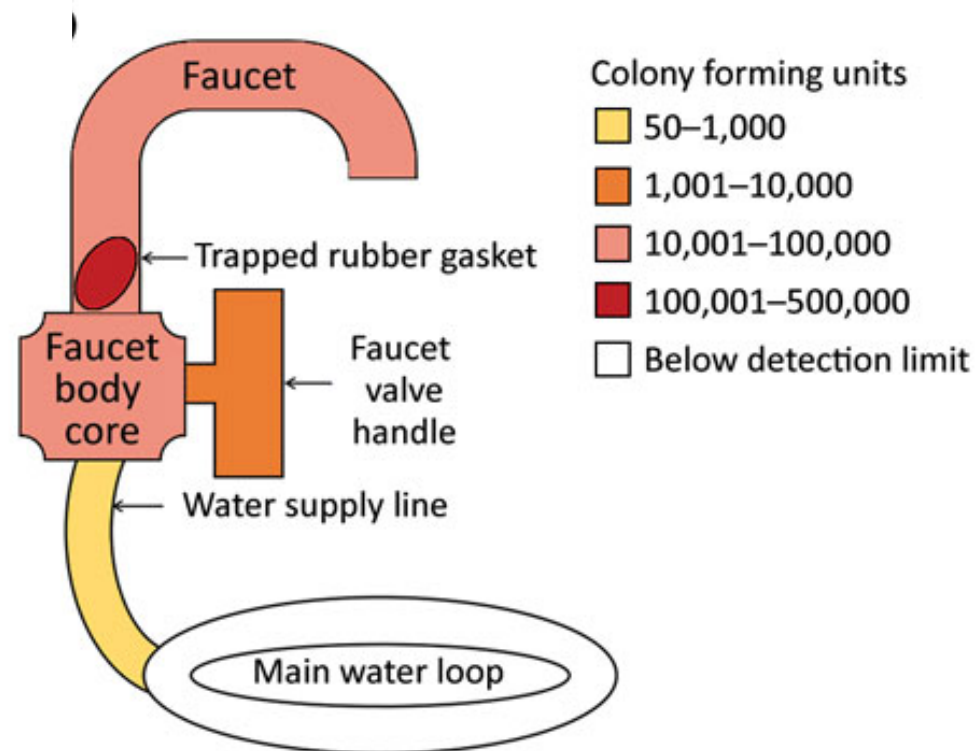
KPC-*Enterobacter cloacae*



Pseudomonas aeruginosa (VIM-)
OXA-24-*Acinetobacter baumannii*

VIM CRPA contamination of a dialysis water supply faucet

- Contamination of sink drain may have led to contamination of the faucet
- This faucet could have spread VIM CRPA to other faucets through mobile dialysis equipment



Do not dispose of nutritive waste in hand hygiene sink drains

From Plumbing to Patients

Actions to reduce risk:

- Clean and disinfect surfaces near the drain at least daily
- Avoid placement of patient care items on counters next to sinks
- Prevent faucets from discharging directly above the drain
- Use sinks with adequate depth and maximum water flow to prevent splashing

Potential Transmission Routes from Water to Patients



<https://www.cdc.gov/hai/prevent/environment/water.html>

Assistance begins at your state or local health department

How CDC Helps Resolve Outbreaks in Healthcare Facilities

Milestones in an Epi-Aid Investigation



CDC reviews the situation for lessons learned and takes steps to prevent similar outbreaks



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Summary

- **Signals come from a variety of sources**
- **A low threshold for notification of the health department can result in early and appropriate action**
- **CDC and local health departments are not regulatory agencies**
- **CDC supports infection preventionists and can amplify/verify the IP findings**
- **Communication across the healthcare continuum and transparency with the public are vital to public trust**

Thank you:

Washington Department of Health

Patricia Montgomery RN, MPH

Illinois Department of Health

TX DSHS/City of Lubbock Department of Health

CDC Outbreak and Response Team

Kiran Perkins MD

Joe Perz PhD

Isaac Benowitz MD

Matthew Crist MD

Caitlin Biedron MD, CDC

Maroya Walters PhD

Chris Prestel MD

All those that have worked to develop HAI response resources

