Infection Prevention, Outbreaks, and the Role of Public Health

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Centers for Disease Control and Prevention

NC Division of Public Health

Objectives

- Describe legal framework for communicable disease surveillance, investigation, and response
- Describe the SHARPPS Program
- Discuss when to call Public Health
- Review outbreak data
- Describe two outbreaks
- Discuss role of Public Health in infection prevention and outbreak response

Public Health: Legal Framework

- Public Health Laws and Rules:
  - General Statutes
  - NC Administrative Code rules

- Health Director's Authority (State & Local)
  - Surveillance
  - Investigation
  - Control Measures

Public Health Law

General Statutes §130A-144: Investigation and Control Measures

(a) The local health director shall investigate… cases of communicable diseases and communicable conditions reported to the local health director

(b) Physicians, persons in charge of medical facilities or laboratories, and other persons shall… permit a local health director or the State Health Director to examine, review, and obtain a copy of medical or other records…

(d) The attending physician shall give control measures… to a patient with a communicable disease or communicable condition and to patients reasonably suspected of being infected or exposed to such a disease or condition.

(e) The local health director shall ensure that control measures… have been given to prevent the spread of all reportable communicable diseases or communicable conditions and any other communicable disease or communicable condition that represents a significant threat to the public health.

(f) All persons shall comply with control measures, including submission to examinations and tests…

Public Health Law

10A NCAC 41A .0103: Duties of local health director: report communicable diseases

(a) Upon receipt of a report of a communicable disease or condition… the local health director shall:

> (1) immediately investigate the circumstances… [to] include the collection and submission for laboratory examination of specimens necessary to assist in the diagnosis and indicate the duration of control measures;
>
> (2) determine what control measures have been given and ensure that proper control measures… have been given and are being complied with;

(c) Whenever an outbreak of a disease or condition occurs which is not required to be reported… but which represents a significant threat to the public health, the local health director shall give appropriate control measures… and inform the Division of Public Health

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Public Health Law

10A NCAC 41A .0101: Reportable diseases and conditions

- 74 reportable diseases and conditions
  - Timeline of reporting varies between immediately and within 7 days
- Laboratory reporting requirements

Resource: North Carolina Division of Public Health Communicable Disease Manual

Public Health Law

- **10A NCAC 41A .0201**
  - General Control Measures
- **10A NCAC 41A .0202 - .0205**
  - Control Measures for HIV, Hepatitis B, STDs, TB
- **10A NCAC 41A .0206**
  - Infection Prevention – Health Care Settings; 1992

Surveillance for Healthcare Associated and Resistant Pathogens Patient Safety (SHARPPS) Program

Jennifer MacFarquhar
Program Director

James Lewis
Medical Director

Heather Dubendris
Epidemiologist

Katie Steider
Epidemiologist

Kristin Pridgen
Health Educator, Campaigns Coordinator

Savannah Carrico
Epidemiologist

Coming Soon!
Epidemiology Program Manager

NC SHARPPS Program

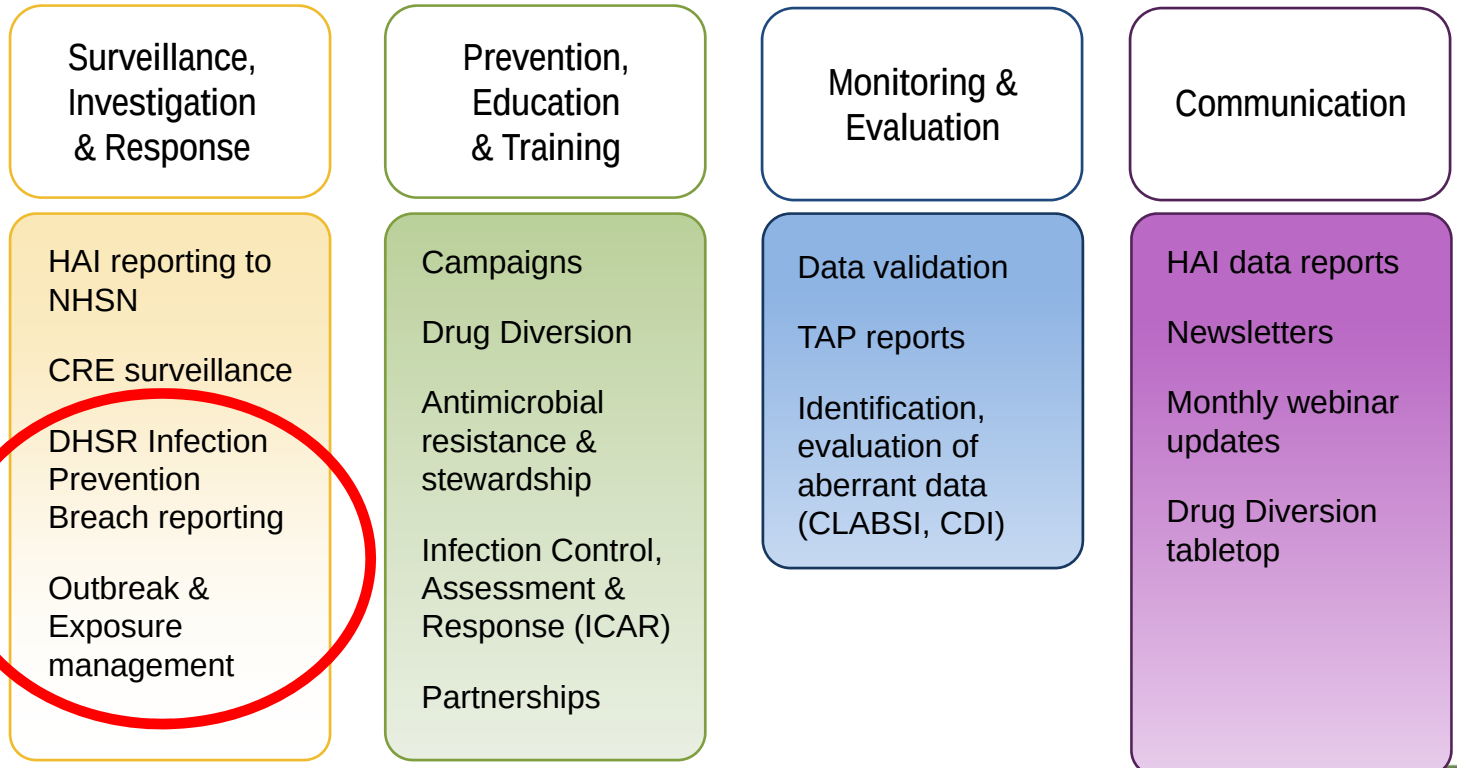
Mission

To work in partnerships to prevent, detect, and respond to events and outbreaks of healthcare-associated and antimicrobial resistant infections in North Carolina.

SHARPPS Program Activities

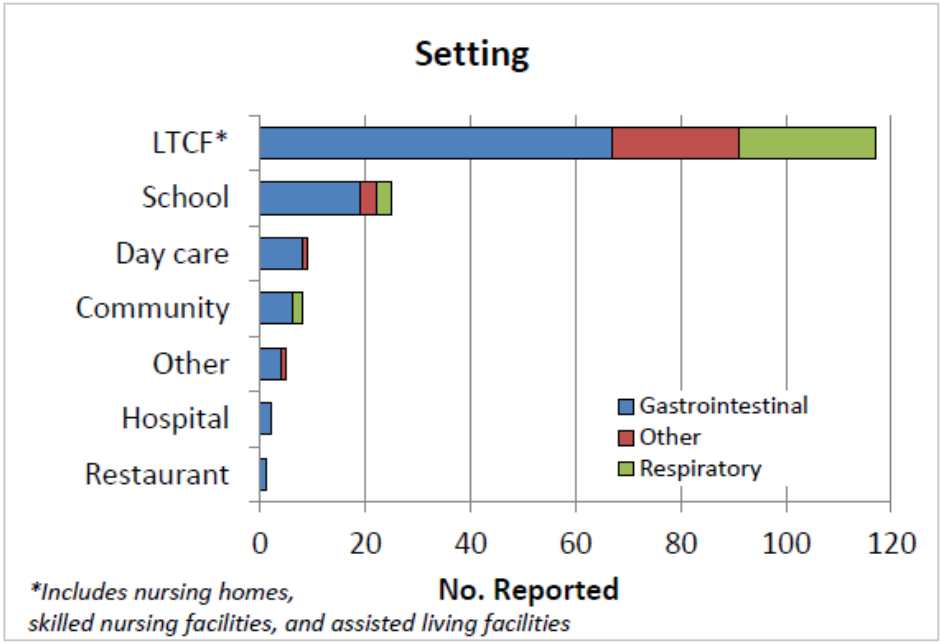
Surveillance, Investigation & Response	Prevention, Education & Training	Monitoring & Evaluation	Communication
HAI reporting to NHSN CRE surveillance DHSR Infection Prevention Breach reporting Outbreak & Exposure management	Campaigns Drug Diversion Antimicrobial resistance & stewardship Infection Control, Assessment & Response (ICAR) Partnerships	Data validation TAP reports Identification, evaluation of aberrant data (CLABSI, CDI)	HAI data reports Newsletters Monthly webinar updates Drug Diversion tabletop

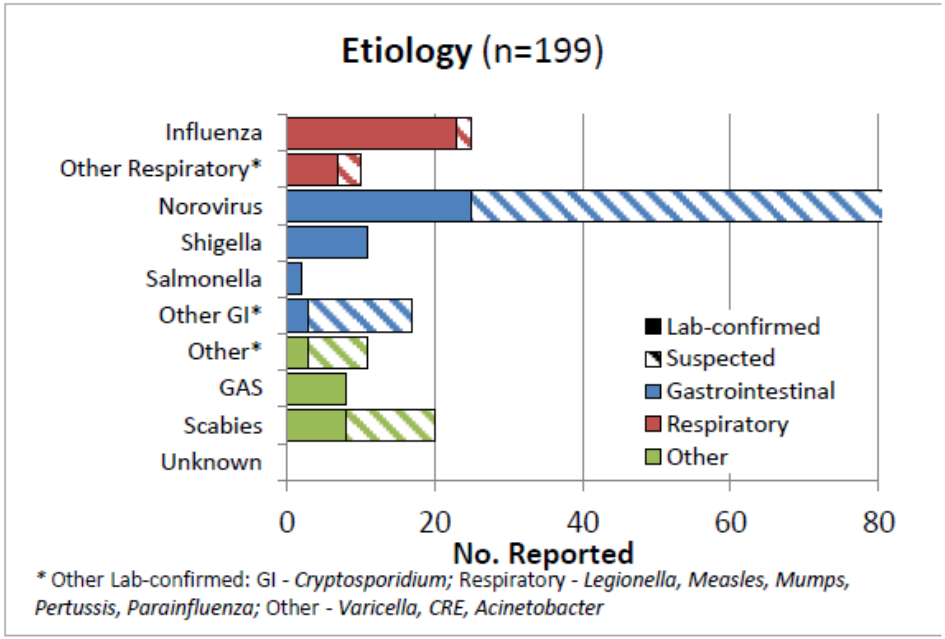
SHARPPS Program Activities



Outbreak Investigations

- Primary responsibility of Public Health
- 199 outbreaks reported to NC DPH in 2016
  - 4,302+ outbreak-associated cases identified





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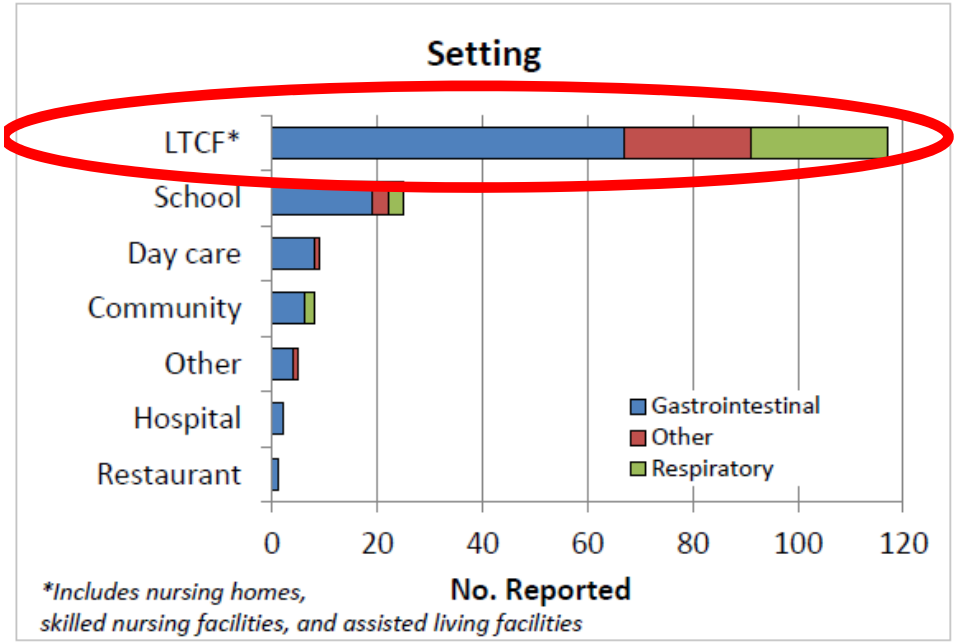

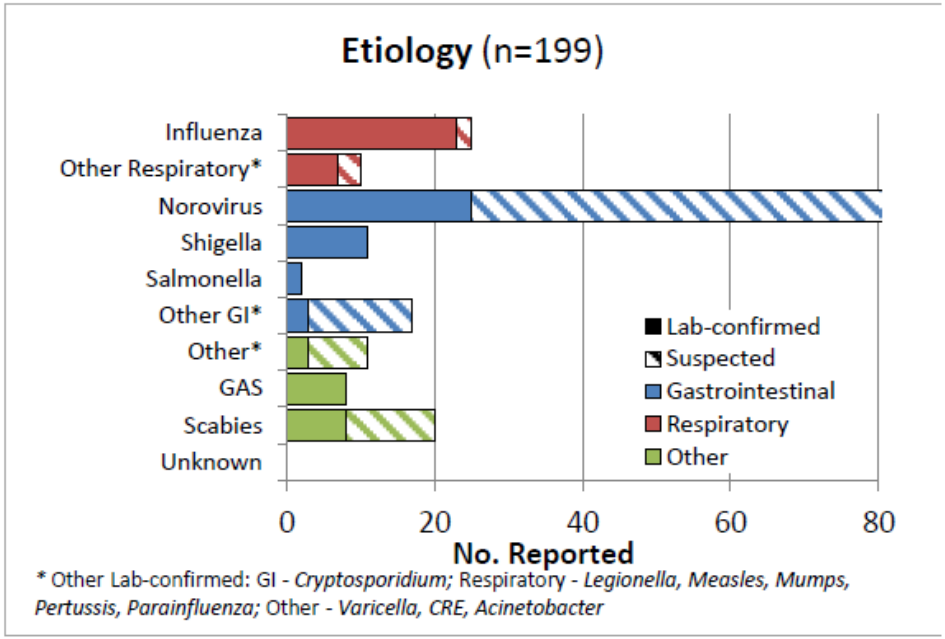

Outbreak Investigations

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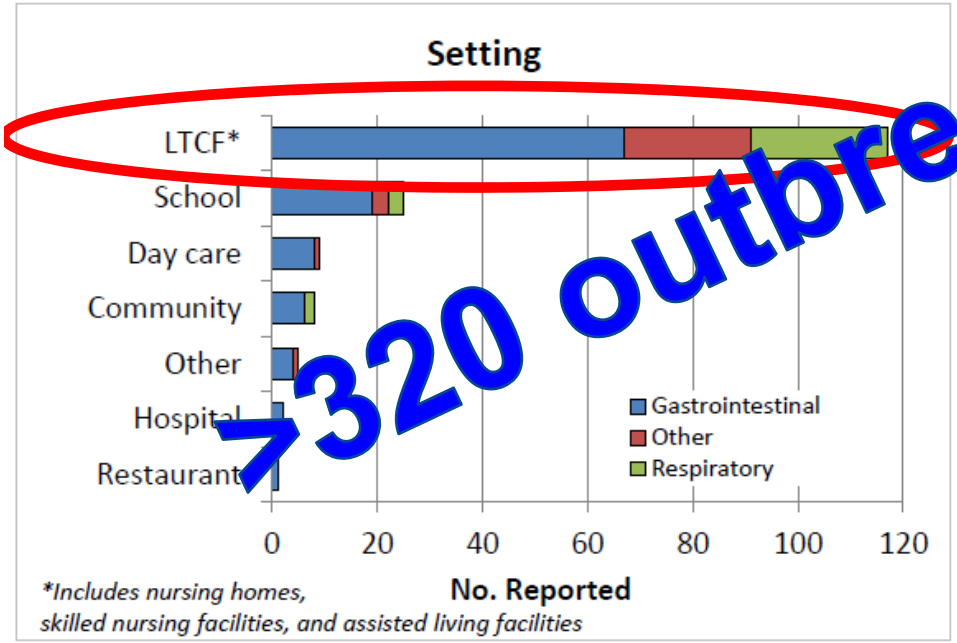
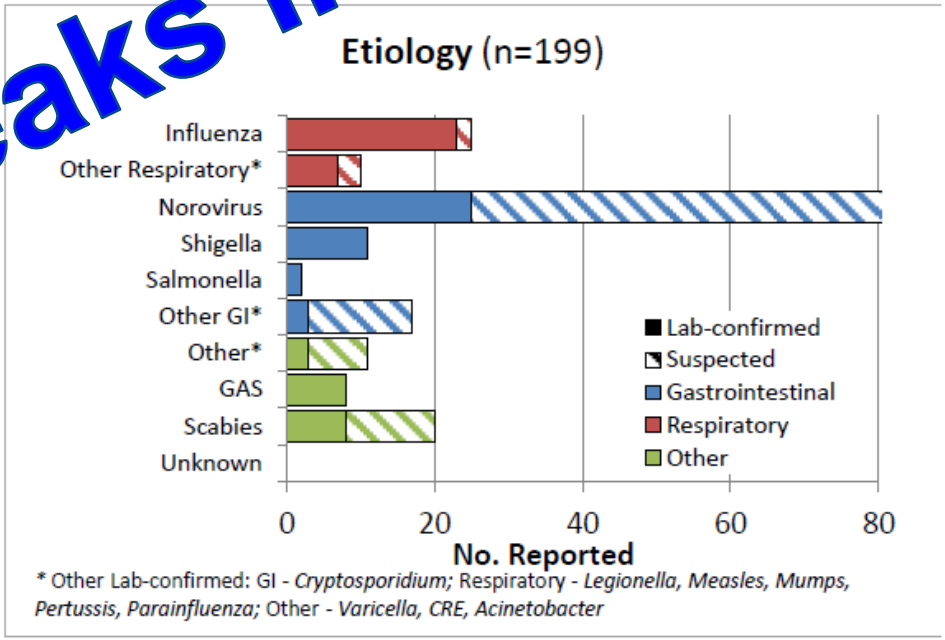
>320 outbreaks in 2017





When Should Public Health Be Called?

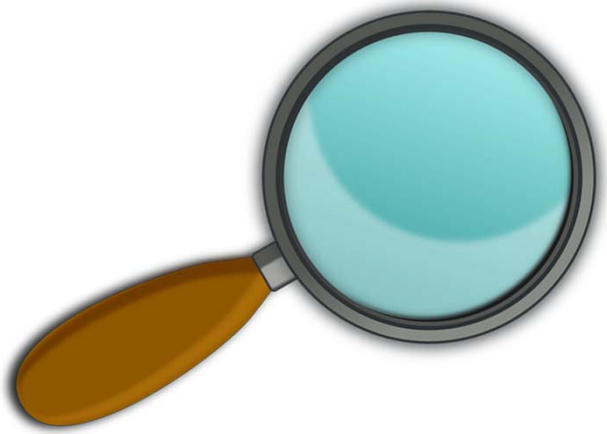
- Reportable diseases (10A NCAC 41A .0101)
  - http://epi.publichealth.nc.gov/cd/docs/dhhs_2124.pdf
- When **any** disease is above normal baseline (i.e. an “outbreak”)
- Report suspected infection prevention breach

When Is It An Outbreak?

- Anything above what is normally seen for any given time period
- If you aren't sure, call Public Health!
- In a facility setting, an outbreak is generally defined as two or more individuals with the same illness
  - **Caveat to this rule:**
    - One case of certain diseases = Outbreak
    - Disease not normally seen (Avian Flu, SARS, Ebola)

What Happens After Public Health Is Called?

- Data review
- Clinical investigation:
  - Case finding – looking for others who are or who have been ill
  - Interviews, specimen collection, testing
- Environmental investigation
- Control measures
- Assist with patient/family/public information if needed



Public Health Role in Safe Injection Practices

Safe Injection Practices

- Measures taken to perform injections in a safe manner for patients and providers
- Prevent transmission of infectious diseases from:
  - Patient to provider
  - Provider to patient
  - Patient to patient
- Bloodborne pathogens
  - Hepatitis B (HBV)
  - Hepatitis C (HCV)
  - Human Immunodeficiency Virus (HIV)

http://www.cdc.gov/injectionsafety/

Public Health Role in Safe Injection Practices

- Raise awareness of safe injection practices and eradicate outbreaks resulting from unsafe injection practices
  - Collaborative efforts
  - Forging new partnerships
  - Safe injection education for licensed professionals

- Investigate outbreaks of disease related to unsafe injection practices

Unsafe Injection Practices: Causes

1. Syringe reuse (direct and indirect)
2. Misuse of single-dose/single-use vials
3. Failure to use aseptic technique
4. Unsafe diabetes care
5. Drug Diversion

North Carolina Hepatitis Outbreaks, Non-Hospital Settings

Setting	Year	Type	No. Incident Infections
Cardiology	2008	HCV	5
ALF	2010	HBV	8
SNF	2010	HBV	6
SNF	2010	HBV	6
Dialysis	2013	HBV	1
Total			**26**

Drug Diversion

- When prescription medicines are obtained or used illegally
- Becoming so pervasive that CDC has formally labeled it an "epidemic"

- 6 HCV outbreaks linked to drug diversion by infected health care providers, 1983–2015
  - 5 hospitals and 1 ambulatory surgery center
  - >144 new infections linked to these outbreaks
- 4 bacterial outbreaks
  - 63 infections

http://www.cdc.gov/injectionsafety/drugdiversion/

Outbreak: Tuesday, October 12, 2010

- County health department notified by infection preventionist at local hospital
- 4 cases of acute hepatitis
- Residents of the same assisted living facility

Investigation Methods

- Evaluated infection control practices
  - Observations
  - Interviews
- Searched for additional cases
  - Serologic testing of all residents
  - Hospital records, surveillance databases
- Epidemiologic study
  - Potential healthcare exposures, risk factors

HBV Outbreak in Assisted Living Facility

Cases identified	**8**
Mean age	**70.6 years**
Hospitalized	**8 (100%)**
Died	**6 (75%)**

Health Care Exposures

Exposure	Attack rate (%)	
	Exposed	Not exposed
Assisted BGM	**8/15 (53)**	**0/25 (0)**
Injected medication	**4/16 (25)**	**4/22 (18)**
Phlebotomy	**4/25 (16)**	**4/15 (27)**
Blood transfusion	**0/1 (0)**	**8/38 (21)**
Catheter device	**0/3 (0)**	**8/37 (22)**
Wound care	**1/8 (13)**	**6/28 (21)**

Infection Control Observations

- Glucose meters:
  - Used for more than one resident
  - Not disinfected between uses
- Adjustable lancing devices:
  - Used for more than one resident

Recommendations to Facility

- Use single-use disposable lancets
- Purchase and use individual glucose meters for each resident
- Vaccinate all susceptible residents

Direct Communication to Providers

- Sent to all licensed facilities and providers statewide

North Carolina Department of Health and Human Services
Division of Public Health • Epidemiology Section
Section Office
1902 Mail Service Center • Raleigh, North Carolina 27699-1902
Tel 919-733-3421 • Fax 919-733-0195

Beverly Eaves Perdue, Governor
Lanier M. Cansler, Secretary

Jeffrey P. Engel, MD
State Health Director

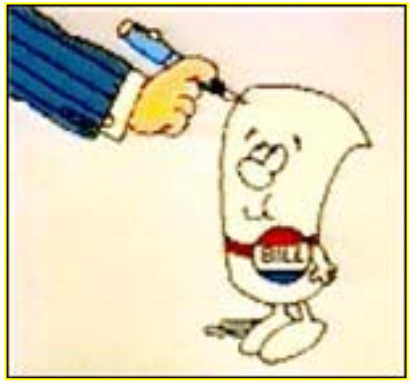
December 2, 2010

TO: All North Carolina Health Care Providers

FROM: Megan Davies, MD, State Epidemiologist

WARNING: **SPREAD OF HEPATITIS B THROUGH UNSAFE DIABETES CARE**

"Act to Protect Adult Care Home Residents"



- Signed into law May 31st, 2011

- Requires:
  - Stronger infection prevention policies
  - Inspection and monitoring of infection prevention activities
  - Reporting of suspected outbreaks
  - Increased training and competency evaluation for medication aides, adult care home supervisors

New Reporting required by CMS

Center for Clinical Standards and Quality/Survey & Certification Group

Ref: S&C: 14-36-All

DATE: **May 30, 2014**

TO: State Survey Agency Directors

FROM: Director
Survey and Certification Group

SUBJECT: Infection Control Breaches Which Warrant Referral to Public Health Authorities

Memorandum Summary

- ***Infection Control Breaches Warranting Referral to Public Health Authorities:*** If State Survey Agencies (SAs) or Accrediting Organizations (AOs) identify any of the breaches of generally accepted infection control standards listed in this memorandum, they should refer them to appropriate State authorities for public health assessment and management.

- ***Identification of Public Health Contact:*** SAs should consult with their State's Healthcare Associated Infections (HAI) Prevention Coordinator or State Epidemiologist on the preferred referral process. Since AOs operate in multiple States, they do not have to confer with State public health officials to set up referral processes, but are expected to refer identified breaches to the appropriate State public health contact identified at: http://www.cdc.gov/HAI/state-based/index.html

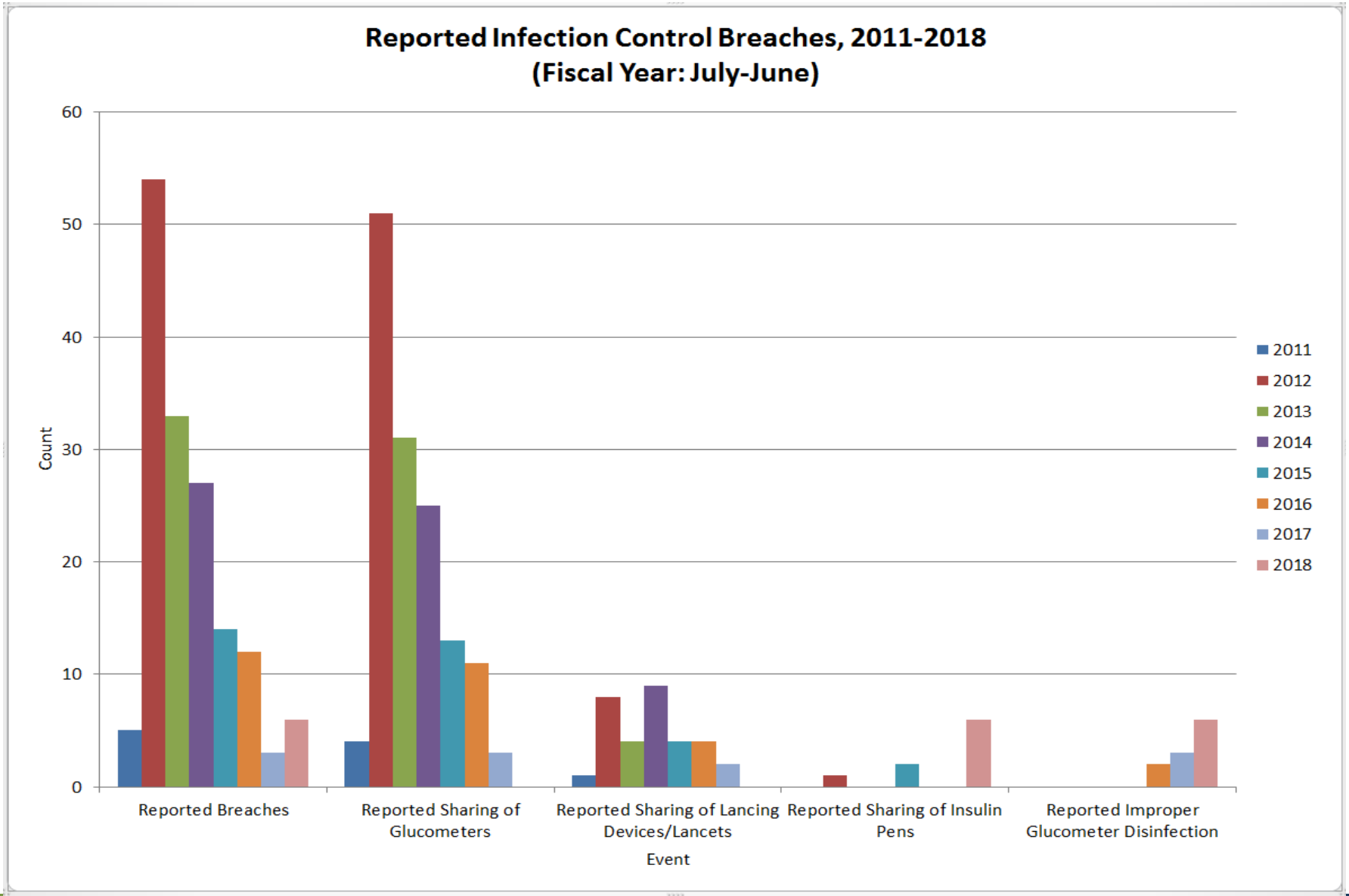
Surveyors must report to State

Breaches to Be Referred

When one or more of the following infection control breaches is identified during any survey of a Medicare- and/or Medicaid-certified provider/supplier, the SA or AO should make the appropriate State public health authority aware of the deficient practice:

- Using the same needle for more than one individual;
- Using the same (pre-filled/manufactured/insulin or any other) syringe, pen or injection device for more than one individual;
- Re-using a needle or syringe which has already been used to administer medication to an individual to subsequently enter a medication container (e.g., vial, bag), and then using contents from that medication container for another individual;
- Using the same lancing/fingerstick device for more than one individual, even if the lancet is changed.

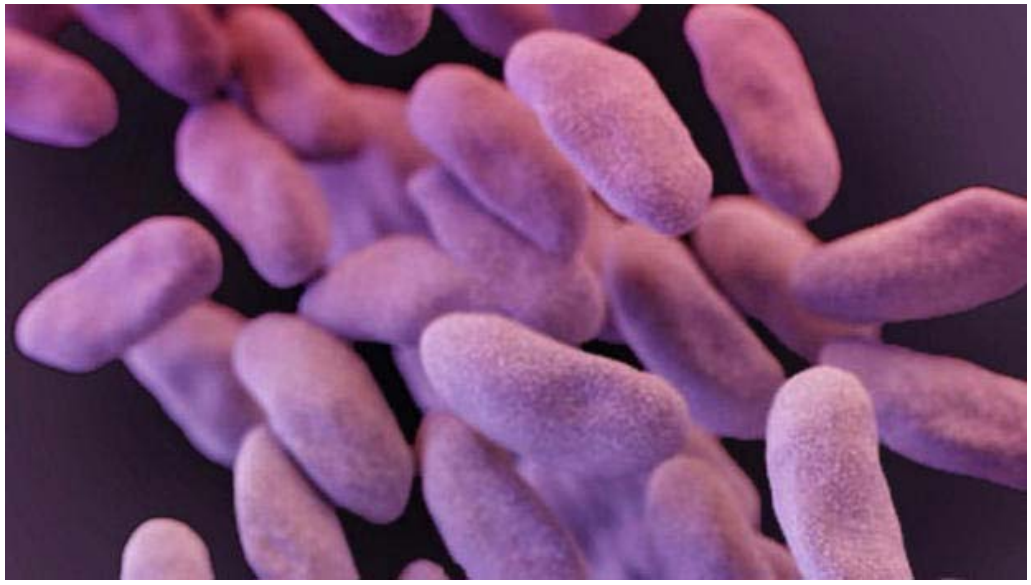
Infection Prevention Breaches



Public Health Role in Multidrug-Resistant Organisms (MDROs)

Multidrug-resistant Organisms (MDROs)

- Resistant to several kinds of drugs
- Intra- and inter-facility spread
- Vulnerable patients at risk for infection
- Infections are difficult to treat and can be associated with high mortality rates
- Examples: MRSA, CRE, ESBL



Public Health Significance

- Spread facilitated by interfacility transfer of patients
- Affects vulnerable patient populations
- Difficult to treat
- Improper treatment → some organisms may produce another enzyme that makes it easier to transmit resistance

Investigation

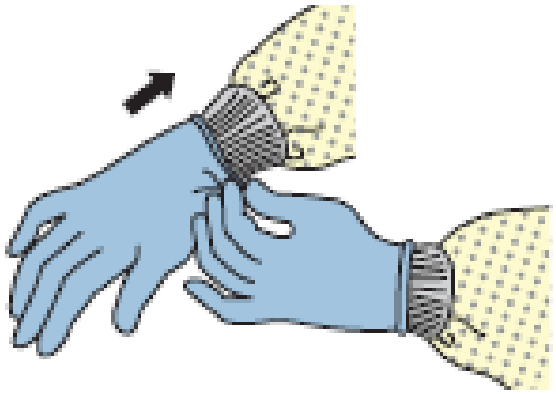
- Notified by LHD on April 21, 2017 (a Friday!)
  - Increase in the number infections caused by a specific MDRO among patients admitted to local hospital between October 16, 2016 and April 13, 2017

- Majority of cases were residents of three long-term care facilities (LTCFs)

- Coordinated an investigation to:
  - **assess infection prevention practices among these LTCFs, and**
  - **prevent further intra- and inter- facility spread of disease**

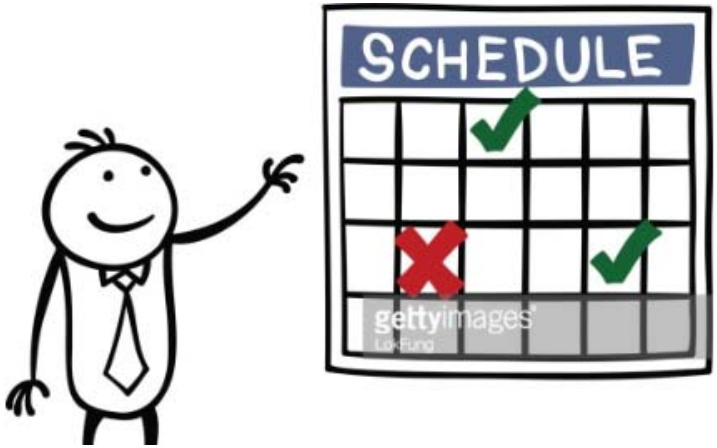
- 4 cases were discussed on Friday but > 40 positive labs were waiting for us on Monday morning!

Initial Control Measures



Gown and gloves

Hand hygiene



Prevent opportunities for transmission

Site Visit Findings

- **Hand hygiene:** inconsistent ✘
- **Wound care:** reusing scissors, interruptions in flow from clean to dirty ✘
- **OT/PT:** contact precautions not adequately maintained, lack of dedicated equipment ✘
- **Contact precautions:** implemented to varying degrees ✘
- **Lack of inter-facility notification** ✘
- **Outdated policies** ✘

Control Measures

1. Staff Education
2. Laboratory notification
3. Cohort infected residents
4. Contact precautions for colonized and infected individuals at higher risk for transmission
5. Hand Hygiene
6. Environmental cleaning
7. Communicate MDRO status to transferring and receiving facilities
8. Review infection prevention policies and procedures
9. Antimicrobial Stewardship

CRE alert

Communication between Healthcare Facilities

- Useful
  - Patient status/needs
  - Care plan

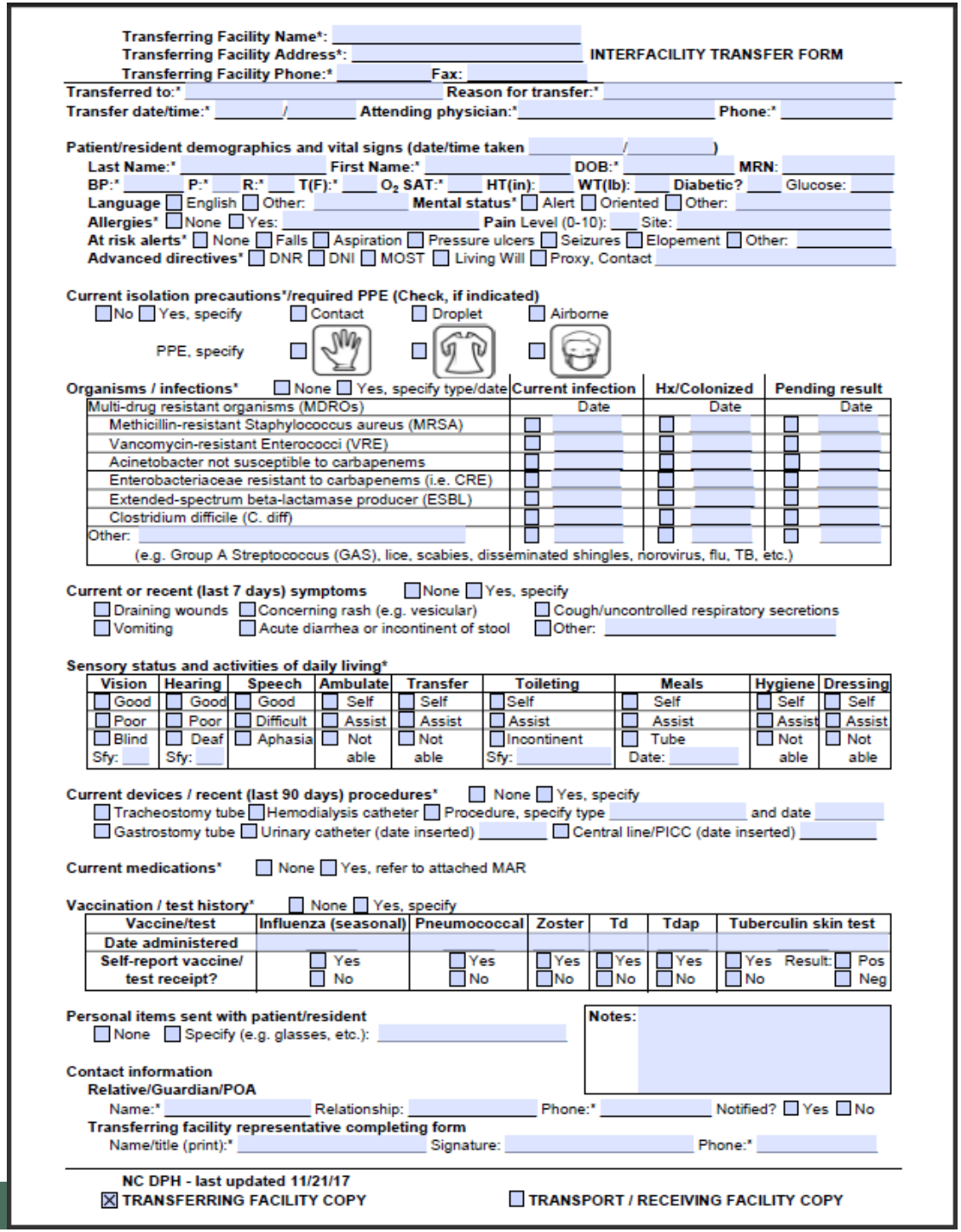
- Required by CMS
  - Reform of Requirements for Long-Term Care Facilities
  - (proposed) Revisions to Requirements for Discharge Planning for Hospitals, Critical Access Hospitals, and Home Health Agencies

Benefits of Interfacility Communication Re: MDROs

- Protects patients/residents
- Contains healthcare costs
- Prevents the spread of MDROs

Sections

- Transferring facility info
- Transfer info
- Pt. demographics and VS
- Current isolation precautions
- Organisms/infections
- Current/recent sx.
- Sensory status and ADLs
- Current devices/recent procedures
- Current meds
- Vaccination/test hx.
- Personal items
- Contact information



Transferring Facility Name*: _____
Transferring Facility Address*: _____ **INTERFACILITY TRANSFER FORM**
Transferring Facility Phone:* _____ Fax: _____
Transferred to:* _____ Reason for transfer:* _____
Transfer date/time:* ____/____ Attending physician:* _____ Phone:* _____

Patient/resident demographics and vital signs (date/time taken ____/____)
Last Name:* _____ First Name:* _____ DOB:* _____ MRN: _____
BP:* _____ P:* ___ R:* ___ T(F):* ___ O_2 SAT:* ___ HT(in): ___ WT(lb): ___ Diabetic? ___ Glucose: ___
Language ☐ English ☐ Other: _____ Mental status* ☐ Alert ☐ Oriented ☐ Other: _____
Allergies* ☐ None ☐ Yes: _____ Pain Level (0-10): ___ Site: _____
At risk alerts* ☐ None ☐ Falls ☐ Aspiration ☐ Pressure ulcers ☐ Seizures ☐ Elopement ☐ Other: _____
Advanced directives* ☐ DNR ☐ DNI ☐ MOST ☐ Living Will ☐ Proxy, Contact _____

Current isolation precautions*/required PPE (Check, if indicated)
☐ No ☐ Yes, specify ☐ Contact ☐ Droplet ☐ Airborne
PPE, specify ☐ ☐ ☐

Organisms / infections* ☐ None ☐ Yes, specify type/date

	Current infection	Hx/Colonized	Pending result
Multi-drug resistant organisms (MDROs)	Date	Date	Date
Methicillin-resistant Staphylococcus aureus (MRSA)	☐	☐	☐
Vancomycin-resistant Enterococci (VRE)	☐	☐	☐
Acinetobacter not susceptible to carbapenems	☐	☐	☐
Enterobacteriaceae resistant to carbapenems (i.e. CRE)	☐	☐	☐
Extended-spectrum beta-lactamase producer (ESBL)	☐	☐	☐
Clostridium difficile (C. diff)	☐	☐	☐
Other: _____	☐	☐	☐

(e.g. Group A Streptococcus (GAS), lice, scabies, disseminated shingles, norovirus, flu, TB, etc.)

Current or recent (last 7 days) symptoms ☐ None ☐ Yes, specify
☐ Draining wounds ☐ Concerning rash (e.g. vesicular) ☐ Cough/uncontrolled respiratory secretions
☐ Vomiting ☐ Acute diarrhea or incontinent of stool ☐ Other: _____

Sensory status and activities of daily living*

Vision	Hearing	Speech	Ambulate	Transfer	Toileting	Meals	Hygiene	Dressing
☐ Good	☐ Good	☐ Good	☐ Self	☐ Self	☐ Self	☐ Self	☐ Self	☐ Self
☐ Poor	☐ Poor	☐ Difficult	☐ Assist	☐ Assist	☐ Assist	☐ Assist	☐ Assist	☐ Assist
☐ Blind	☐ Deaf	☐ Aphasia	☐ Not able	☐ Not able	☐ Incontinent	☐ Tube	☐ Not able	☐ Not able
Sfy: ___	Sfy: ___				Sfy: ___	Date: ___		

Current devices / recent (last 90 days) procedures* ☐ None ☐ Yes, specify
☐ Tracheostomy tube ☐ Hemodialysis catheter ☐ Procedure, specify type _____ and date _____
☐ Gastrostomy tube ☐ Urinary catheter (date inserted) _____ ☐ Central line/PICC (date inserted) _____

Current medications* ☐ None ☐ Yes, refer to attached MAR

Vaccination / test history* ☐ None ☐ Yes, specify

Vaccine/test	Influenza (seasonal)	Pneumococcal	Zoster	Td	Tdap	Tuberculin skin test
Date administered						
Self-report vaccine/ test receipt?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No Result: ☐ Pos ☐ Neg

Personal items sent with patient/resident
☐ None ☐ Specify (e.g. glasses, etc.): _____

Notes:

Contact information
Relative/Guardian/POA
Name:* _____ Relationship: _____ Phone:* _____ Notified? ☐ Yes ☐ No
Transferring facility representative completing form
Name/title (print):* _____ Signature: _____ Phone:* _____

NC DPH - last updated 11/21/17
☒ **TRANSFERRING FACILITY COPY** ☐ **TRANSPORT / RECEIVING FACILITY COPY**

Highlight – Current Isolation/PPE, MDROs

Current isolation precautions*/required PPE (Check, if indicated)

☐ No ☐ Yes, specify ☐ Contact ☐ Droplet ☐ Airborne

PPE, specify ☐  ☐  ☐ 

Organisms / infections* ☐ None ☐ Yes, specify type/date	**Current infection**	**Hx/Colonized**	**Pending result**
Multi-drug resistant organisms (MDROs)	Date	Date	Date
Methicillin-resistant Staphylococcus aureus (MRSA)	☐	☐	☐
Vancomycin-resistant Enterococci (VRE)	☐	☐	☐
Acinetobacter not susceptible to carbapenems	☐	☐	☐
Enterobacteriaceae resistant to carbapenems (i.e. CRE)	☐	☐	☐
Extended-spectrum beta-lactamase producer (ESBL)	☐	☐	☐
Clostridium difficile (C. diff)	☐	☐	☐
Other: _____ (e.g. Group A Streptococcus (GAS), lice, scabies, disseminated shingles, norovirus, flu, TB, etc.)	☐	☐	☐

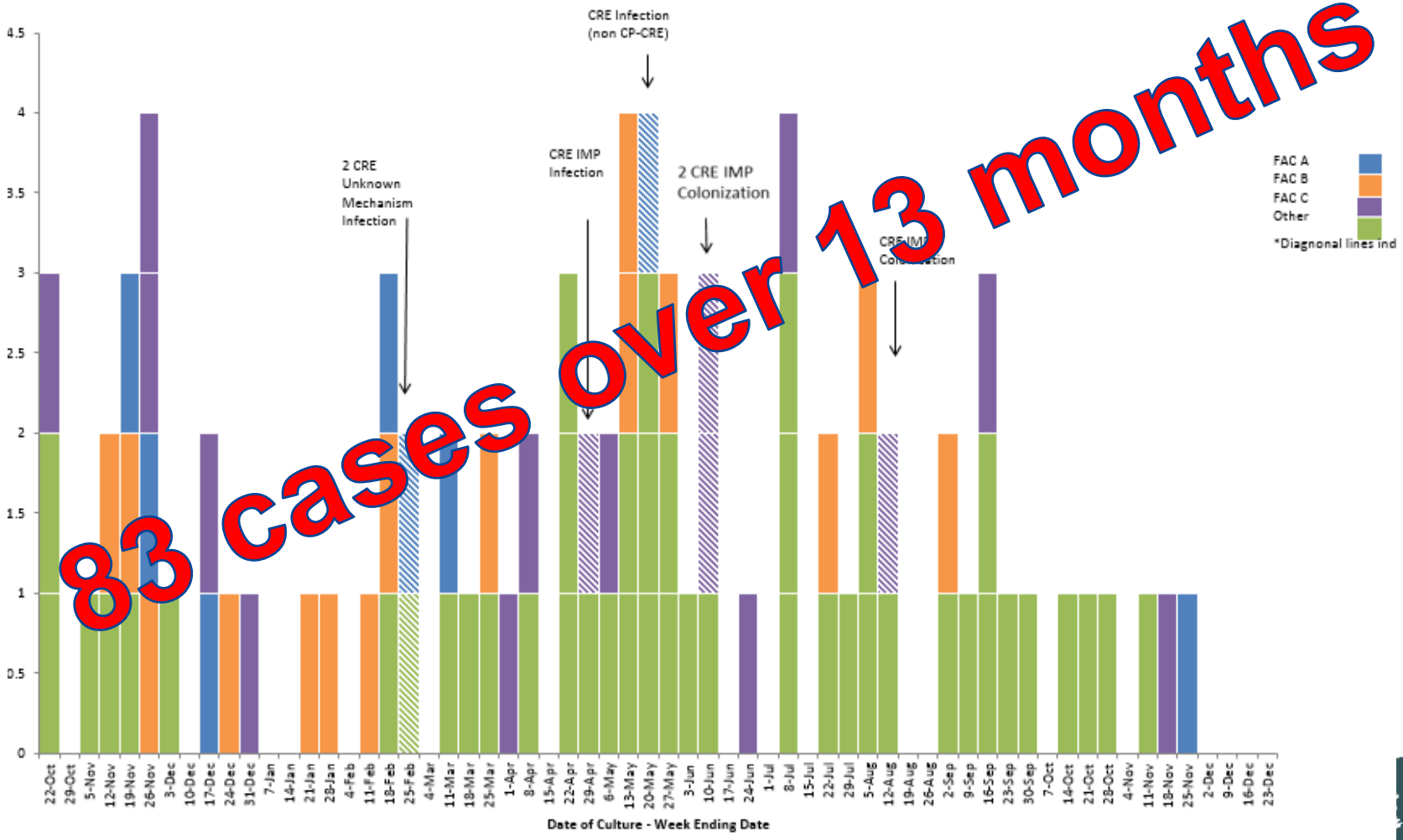
NC DPH Interfacility Transfer Form

Benefits

- Standardized format for interfacility communication of patient MDRO status during transfer
- Information needed/desired during transfer all in one place
- Complies with Reform of Requirements for Long-term Care Facilities (CMS)

MDRO Cases by Week of Culture, County A, October 22, 2016–November 30, 2017 (n=83)*

**excluding repeat cultures (same patient/same organism)*



83 cases over 13 months

Why Involve Public Health?

- Investigations require communicable disease / infection prevention expertise and experience
- Uniquely qualified to assess patient risk
- Complex problem
- Threats to public's health

Public Health
Prevent. Promote. Protect.

NC

Resources

- NC Division of Public Health, SHARPPS Program
  - http://epi.publichealth.nc.gov/cd/diseases/hai.html
- Exposure Investigations
  - NC ADMINISTRATIVE CODE, TITLE 10A, SUBCHAPTER 41A
  - https://www.cdc.gov/niosh/topics/bbp/guidelines.html
- MDROs
  - Management of Multidrug Resistant Organisms in Healthcare Settings, 2006 https://www.cdc.gov/hicpac/mdro/mdro_toc.html
  - NC DPH CRE information for Long-Term Care Facilities http://epi.publichealth.nc.gov/cd/hai/docs/CREinfoLTCfacilities.pdf
- One and Only Campaign / Safe Injection Practices
  - http://www.oneandonlycampaign.org/
  - http://www.oneandonlycampaign.org/partner/north-carolina
  - http://www.cdc.gov/injectionsafety/drugdiversion/index.html

Thank you!

Jennifer MacFarquhar, MPH, BSN, RN, CIC
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