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…
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

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**
- HAI reporting to NHSN
- CRE surveillance
- DHSR Infection Prevention Breach reporting
- Outbreak & Exposure management

**Prevention, Education & Training**
- Campaigns
- Drug Diversion
- Antimicrobial resistance & stewardship
- Infection Control, Assessment & Response (ICAR)
- Partnerships

**Monitoring & Evaluation**
- Data validation
- TAP reports
- Identification, evaluation of aberrant data (CLABSI, CDI)

**Communication**
- HAI data reports
- Newsletters
- Monthly webinar updates
- Drug Diversion tabletop
## SHARPPS Program Activities

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<th>Surveillance, Investigation &amp; Response</th>
<th>Prevention, Education &amp; Training</th>
<th>Monitoring &amp; Evaluation</th>
<th>Communication</th>
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<td>Campaigns</td>
<td>Data validation</td>
<td>HAI data reports</td>
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<td>CRE surveillance</td>
<td>Drug Diversion</td>
<td>TAP reports</td>
<td>Newsletters</td>
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<td>DHSR Infection Prevention Breach reporting</td>
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<td>Identification, evaluation of aberrant data (CLABSI, CDI)</td>
<td>Monthly webinar updates</td>
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<tr>
<td>Outbreak &amp; Exposure management</td>
<td>Infection Control, Assessment &amp; Response (ICAR)</td>
<td>Partnerships</td>
<td>Drug Diversion tabletop</td>
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Outbreak Investigations

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

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

*Includes nursing homes, skilled nursing facilities, and assisted living facilities

* Other: Lab-confirmed: GI - Cryptosporidium; Respiratory - Legionella, Measles, Mumps, Pertussis, Parainfluenza; Other - Varicella, CRE, Acinetobacter
Outbreak Investigations

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

>320 outbreaks in 2017
When Should Public Health Be Called?

- Reportable diseases (10A NCAC 41A .0101)

- 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

ONE NEEDLE, ONE SYRINGE, ONLY ONE TIME.

Safe Injection Practices Coalition
www.ONEandONLYcampaign.org
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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Year</th>
<th>Type</th>
<th>No. Incident Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiology</td>
<td>2008</td>
<td>HCV</td>
<td>5</td>
</tr>
<tr>
<td>ALF</td>
<td>2010</td>
<td>HBV</td>
<td>8</td>
</tr>
<tr>
<td>SNF</td>
<td>2010</td>
<td>HBV</td>
<td>6</td>
</tr>
<tr>
<td>SNF</td>
<td>2010</td>
<td>HBV</td>
<td>6</td>
</tr>
<tr>
<td>Dialysis</td>
<td>2013</td>
<td>HBV</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases identified</td>
<td>8</td>
</tr>
<tr>
<td>Mean age</td>
<td>70.6 years</td>
</tr>
<tr>
<td>Hospitalized</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>Died</td>
<td>6 (75%)</td>
</tr>
</tbody>
</table>
## Health Care Exposures

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Exposed</th>
<th>Not exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assisted BGM</td>
<td>8/15 (53)</td>
<td>0/25 (0)</td>
</tr>
<tr>
<td>Injected medication</td>
<td>4/16 (25)</td>
<td>4/22 (18)</td>
</tr>
<tr>
<td>Phlebotomy</td>
<td>4/25 (16)</td>
<td>4/15 (27)</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>0/1 (0)</td>
<td>8/38 (21)</td>
</tr>
<tr>
<td>Catheter device</td>
<td>0/3 (0)</td>
<td>8/37 (22)</td>
</tr>
<tr>
<td>Wound care</td>
<td>1/8 (13)</td>
<td>6/28 (21)</td>
</tr>
</tbody>
</table>
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

| 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

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

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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.
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
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
Highlight – Current Isolation/PPE, MDROs

<table>
<thead>
<tr>
<th>Current isolation precautions* / required PPE (Check, if indicated)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes, specify</td>
</tr>
<tr>
<td>Contact</td>
<td>Droplet</td>
</tr>
<tr>
<td>PPE, specify</td>
<td></td>
</tr>
</tbody>
</table>

| Organisms / infections* |  | Current infection |  | Hx/Colonized |  | Pending result |
|---|---|---|---|---|---|
| None | Yes, specify type/date | Date | Date |  |  |

**Multi-drug resistant organisms (MDROs)**

- 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)
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
Resources

• NC Division of Public Health, SHARPPS Program

• Exposure Investigations
  • NC ADMINISTRATIVE CODE, TITLE 10A, SUBCHAPTER 41A
  • [https://www.cdc.gov/niosh/topics/bbp/guidelines.html](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](https://www.cdc.gov/hicpac/mdro/mdro_toc.html)
  • NC DPH CRE information for Long-Term Care Facilities

• One and Only Campaign / Safe Injection Practices
  • [http://www.oneandonlycampaign.org/partner/north-carolina](http://www.oneandonlycampaign.org/partner/north-carolina)
Thank you!

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