CRE Detect and Protect: the Role of Local Health Departments

March 26, 2014
Agenda

• Featured speaker: Dr. Mike Vernon
  “Role of a Local Health Department in Investigating Outbreaks of CRE”

• XDRO registry overview

• LHD response to CRE calls

• CRE Detect and Protect Campaign

The opinions, viewpoints, and content presented in this webinar may not represent the position of the Illinois Department of Public Health.
Role of a Local Health Department in Investigating Outbreaks of Carbapenem-Resistant Enterobacteriaceae (CRE)

Michael O. Vernon, DrPH
Director, Communicable Disease Control
Cook County Department of Public Health
Presentation Outline

• Background on antimicrobial resistance among Enterobacteriaceae
  – KPC versus NDM-producing organisms
• KPC outbreak investigation at a LTCF (2008)
• NDM outbreak investigation at an acute-care MC (2013)
  – Timeline
  – LHD activities in outbreak response
  – Relationships between outbreak site, other HC facilities, and local, state and federal partners
Antibiotic Resistance Threats in the U.S., 2013

Untreatable and hard-to-treat infections from carbapenem-resistant Enterobacteriaceae (CRE) bacteria are on the rise among patients in medical facilities. CRE have become resistant to all or nearly all the antibiotics we have today. Almost half of hospital patients who get bloodstream infections from CRE bacteria die from the infection.

**Resistance of Concern**

- Some Enterobacteriaceae are resistant to nearly all antibiotics, including carbapenems, which are often considered the antibiotics of last resort.
- More than 9,000 healthcare-associated infections are caused by CRE each year.
- CDC laboratories have confirmed at least one type of CRE in healthcare facilities in 44 states.
- About 4% of U.S. short-stay hospitals had at least one patient with a serious CRE infection during the first half of 2012. About 18% of long-term acute care hospitals had one.

**Public Health Threat**

An estimated 140,000 healthcare-associated Enterobacteriaceae infections occur in the United States each year; about 9,300 of these are caused by CRE. Up to half of bloodstream infections caused by CRE result in death. Fortunately, bloodstream infections account for a minority of all healthcare-associated infections caused by Enterobacteriaceae. Each year, approximately 600 deaths result from infections caused by the two most common types of CRE, carbapenem-resistant Klebsiella spp. and carbapenem-resistant E. coli.

<table>
<thead>
<tr>
<th>Percentage of Enterobacteriaceae healthcare-associated infections resistant to carbapenems</th>
<th>Estimated number of infections</th>
<th>Estimated number of deaths attributed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbapenem-Resistant Klebsiella spp.</td>
<td>11%</td>
<td>7,900</td>
</tr>
<tr>
<td>Carbapenem-resistant E. coli</td>
<td>2%</td>
<td>1,400</td>
</tr>
</tbody>
</table>

For more information about data methods and references, please see technical appendix.

CDC Report released: September 16, 2013
Background: Enterobacteriaceae

- Bacteria in the family Enterobacteriaceae are gram-negative rods
  - *E. coli* and *Klebsiella pneumoniae* are organisms in the Enterobacteriaceae family
  - Normal part of the gastrointestinal flora
  - Common cause of healthcare-associated infections
Background: Carbapenems

- β-lactam antibiotics have been used to treat infections caused by Enterobacteriaceae
- Carbapenems are a class of β-lactam antibiotics with a broad spectrum of antibacterial activity
  - Used as a last resort when other antibiotics are not available
Carbapenem-Resistant Enterobacteriaceae

- Resistance conferred by carbapenem-hydrolyzing β-lactamases
- Two primary classes:
  - **Class A**: Carbapenemases, e.g., *Klebsiella pneumoniae* carbapenemases (KPC)
  - **Class B**: Metallo-β-lactamases (MBL)
    - New Delhi metallo- β-lactamases (NDM)
- Production of KPCs is the major mechanism
- Gene encoding resistance is present on plasmids
Why is Carbapenem Resistance a Public Health Problem?

- Significantly limits treatment options for life-threatening infections
- No new drugs for gram-negative bacilli
- Emerging resistance mechanisms, carbapenemases are mobile
- Detection of carbapenemases and implementation of infection control practices are necessary to limit spread = “Detect & Protect”
KPC versus NDM

**KPC**
- First reported in 2001 in NC; now in 47 states
- First identified in IL in 2007
- Common in Northern IL
- Increasingly found in healthcare institutions
- Long term care is a reservoir

**NDM**
- First reported in US 2009
- First IL isolate in 2010
- 45 patients with NDM identified in IL in 2013
- 96 total cases in US
- Most dangerous CRE
- High mortality
Four Core Actions to Combat Spread of AR

1. Prevent infections from occurring and prevent AR bacteria from spreading
2. Track AR bacteria
3. Improve use of antibiotics
4. Promote development of new antibiotics and new diagnostic tests for AR bacteria
Outbreak #1: KPC-producing CRE at a LTCF

- 11/6/2008 – CCDPH received a call from an astute IP at Hospital A that 3 residents admitted from the same LTCF had infections caused by CRE
  - All 3 cases had clinical CAUTIs
  - KPC was confirmed by the modified Hodge test
  - All cases were ventilator-dependent females with indwelling Foley catheters, multiple comorbidities and a history of long-term therapy with several antimicrobial agents
Outbreak Investigation Timeline

- 11/7/2008 – CCDPH called LTCF A to report culture results on the 3 residents admitted to Hospital A
- The DON at LTCF A confirmed that:
  - All 3 residents resided on the same floor at LTCF A reserved for ventilator-dependent pts
  - LTCF A staff had no knowledge of CRE or KPC
  - No isolation precautions in place
  - No IP on staff; no contract with an IP consulting agency
Outbreak Investigation Timeline

- 11/7/2008 – Hospital A started performing active surveillance cultures for CRE on all patients admitted from LTCF A
  - Perirectal cultures obtained on admission
  - 3 residents identified as CRE-colonized within 1 week
  - All 3 lived on the same floor at LTCF A that housed ventilator-dependent residents
Outbreak Investigation Timeline

- 11/12/2008 – CD staff from CCDPH visited LTCF A to perform a walk-through survey, observe infection control practices, and make IC recommendations
  - 245-bed facility
  - 3<sup>rd</sup> floor used for individuals requiring skilled care
  - Hemodialysis unit in the lower level
  - DON responsible for infection control adherence
  - Major renovation project underway
Floor Plan of 3rd Floor -- LTCF A
Immediate Public Health Recommendations

• Contact precautions for residents infected or colonized with CRE (indefinitely)
• Cohort residents with CRE
• Use dedicated staff and equipment
• Maintain daily log of infected and colonized residents
• Communicate with CCDPH IP specialist daily
• Communicate with IP at Hospital A regarding each patient transfer
Public Health Actions

- All-staff education sessions at LTCF A for all three shifts
- Emphasis on infection prevention including:
  - Hand hygiene
  - Isolation precautions
  - Signage
  - Skin cleansing of residents – 2% CHG
  - Environmental cleaning and disinfection
Outbreak Investigation Timeline

• 11/24/2008 – CDC Epi-Aid assistance requested by CCDPH and IDPH
• 12/3/2008 – Field investigation began (9 cases total)
• Objectives of CDC investigation:
  – Determine scope of the outbreak
  – Identify risk factors for infection and colonization with CRE
  – Identify possible sources of transmission
  – Recommend control measures to prevent additional cases
Components of Epi-Aid Investigation
12/4 – 12/16, 2008

- Active surveillance cultures at LTCF A to identify CRE-colonized patients
- Review charts for a case control study to examine risk factors among patients
- Observe infection control practices
- Record keeping & data analysis
- Daily group meetings to review findings and make plans for next steps
Spot Map of Resident Room Assignments and Case Status: Screening Cultures (12/4)
Case Control Study Findings

• Risk of CRE significantly increased by:
  – Having a urinary catheter: OR=21 (95% CI, 3.8-116)

• Receiving a carbapenem was more frequent among cases than control, but the difference was not statistically significant
  – OR=2.5 (95% CI, 0.7-9.0)
Summary of CRE-Positive Screening Culture Results

Percent Incidence and Point Prevalence

Culture Date

0 10 20 30 40 50 60 70

Point Prevalence
Incidence
Responsibilities of CCDPH

- Guidance on CP for residents in a LTC setting
  - Conditions for participation in group activities
  - Incontinence care
  - Need to maintain CP for asymptomatic (colonized) residents
  - Explanation of barrier precautions to family members
- Recommendations for CP in rooms with multiple residents (screens; HH; dedicated staff & equipment)
- Coordination of specimen collection & testing
- Coordination of communication and outbreak control activities among state and federal HDs, LTCF A and Hospital A
Communication & Coordination Network: KPC Outbreak Investigation

Outbreak Investigation Team

1. LTCF A
   - DON, CMO, LTCF Mgr, Quality Mgr (4)
2. CCDPH
   - Med Epi; CD Director; Epi (3)
3. IDPH
   - CSTE Fellow; State Epi (2)
4. CDC
   - 2 EIS Officers; DHQP Supv (3)
5. Inter-facility communication re patient transfers

HOSP A

Inter-facility communication re patient transfers

1DON, CMO, LTCF Mgr, Quality Mgr (4)
2Med Epi; CD Director; Epi (3)
3CSTE Fellow; State Epi (2)
42 EIS Officers; DHQP Supv (3)
5IP (1)
Communication & Coordination Network: KPC Outbreak Investigation

Outbreak Investigation Team

- LTCF A¹
- IDPH³
- CDC⁴
- HOSP A⁵

Inter-facility communication re patient transfers

¹DON, CMO, LTCF Mgr, Quality Mgr (4)
²CSTE Fellow; State Epi (2)
³2 EIS Officers; DHQP Supv (3)
⁴IP (1)
⁵IP (1)
Final Public Health Recommendations

- Designate an Infection Preventionist
- Staff education
- MDRO surveillance
- Antibiotic stewardship
- Limit device use
- Patient skin cleansing
- Environmental cleaning
- Report to CCDPH – as often as necessary
Outbreak #2: NDM-producing E. coli at an Acute Care Hospital

- CCDPH notified of 1st case in March 2013
- 5 cases identified through April 2013
- 1 case with matching PFGE from a Chicago hospital in May
- 3 more cases identified through July 2013
- Duodenoscope implicated and removed from service in June
- CDC Epi-Aid requested in August 2013
Timeline of Events

March
CCDPH Notified

April
Targeted Screening

May

June
Scope A removed

July

August

September

1 2 3 4 5

6 7 8

9*

*Patient from Chicago hospital with matching PFGE

CDC Epi-Aid
Outbreak Response Activities by Hospital A

• Timely notification
• Highly qualified & experienced IP team
• Lab capacity
• Internal measures:
  – Assessments
  – Screening
  – Interventions
  – Possible source identification
Objectives of the Epi-Aid Investigation

• Describe healthcare exposures of cases
• Identify sites of and risk factors for transmission
• Review IC practices
• Identify possible routes of transmission
• Investigate possible association between cases and procedures
• Conduct full and thorough epidemiologic analyses
• Recommend measures to prevent additional transmission
Activities Associated with the Epi-Aid Investigation

- Team of 3 EIS officers & 1 CSTE Fellow
- Information gathering -- chart abstractions, observations, HCP interviews
- Sampling (persons, environment) for lab analyses
- Shipment of specimens to CDC for molecular typing
- Epidemiologic studies
  - Case control
  - Cohort
- Daily communication among outbreak investigation team
Case-Control Study

- Identify exposures that may contribute to NDM transmission by comparing confirmed cases (patients with NDM) with controls (patients without NDM)
- Controls were randomly selected from a list of individuals who were screened on Rehab Unit at Hospital A between 5/1 – 6/1
- 9 cases; 27 controls
## Case-Control Study Results

<table>
<thead>
<tr>
<th>Procedure</th>
<th>% Cases (N=9)</th>
<th>% Controls (N=27)</th>
<th>Odds Ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duodenoscopy*</td>
<td>67</td>
<td>4</td>
<td>52.0</td>
<td>0.001</td>
</tr>
<tr>
<td>GI Suite</td>
<td>67</td>
<td>11</td>
<td>16.0</td>
<td>0.003</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>89</td>
<td>56</td>
<td>6.4</td>
<td>0.10</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>79</td>
<td>44</td>
<td>4.4</td>
<td>0.10</td>
</tr>
<tr>
<td>Endoscopy</td>
<td>22</td>
<td>11</td>
<td>2.3</td>
<td>0.41</td>
</tr>
<tr>
<td>Operating Room</td>
<td>56</td>
<td>41</td>
<td>1.8</td>
<td>0.44</td>
</tr>
<tr>
<td>CT</td>
<td>79</td>
<td>74</td>
<td>1.2</td>
<td>0.82</td>
</tr>
<tr>
<td>MRI</td>
<td>56</td>
<td>52</td>
<td>1.2</td>
<td>0.85</td>
</tr>
<tr>
<td>Interventional radiology</td>
<td>22</td>
<td>30</td>
<td>0.7</td>
<td>0.67</td>
</tr>
</tbody>
</table>

*Past 6 months
### Surveillance Screening Cultures on Epi-linked Patients: March-July, 2013

<table>
<thead>
<tr>
<th>Facility Type</th>
<th># Screened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A</td>
<td>131</td>
</tr>
<tr>
<td>Other ACHs*</td>
<td>25</td>
</tr>
<tr>
<td>LTACH*</td>
<td>55</td>
</tr>
<tr>
<td>LTCF*</td>
<td>118</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>329</strong></td>
</tr>
</tbody>
</table>

PP surveys and screenings of epi-linked patients conducted at 8 ACHs, 14 LTCFs, and 2 LTACHs.

*CCDPH coordinated sample collection and testing
Communication & Coordination Network: NDM-producing CRE Outbreak Investigation
Conclusions

• Largest known cluster of NDM-producing *E. coli* in the US (still ongoing; March 2013-present)
  – Lab detection key component of investigation
  – No Hx of hospitalization outside of the US
  – Cases highly related by PFGE, suggesting local transmission

• Biologic plausibility
  – NDM-producing *E. coli* and KPC cultured from the elevator channel of the implicated endoscope after reprocessing
Summary of CCDPHs Involvement

- Consultation with outbreak facility
- IC guidance & education to staff (primarily LTCFs)
- Coordination of communication linkages between STACHs, LTACHs, LTCFs, LHDs, IDPH, CDC
- Notification to State HD
- Request for Epi-Aid assistance (if necessary)
- Participation in epidemiologic and environmental investigation
- Coordination of specimen collection & testing
- Co-authorship on publication
CRE Control: What LTCFs can do

• Enforce CP for residents with draining wounds, diarrhea, indwelling devices, etc.)
• Closely monitor residents with incontinence and dementia
• Require use of gown, gloves, and performance of HH by visitors and family members when closely interacting with residents and their environment
• Educate ambulatory residents (w/o devices or draining wounds) about HH and allow participation in group activities
CRE Control: What Acute Care Hospitals can do

• Ask if patients have received medical care overseas
• Follow IC recommendations with every patient, using CP for patients with CRE
• Dedicate room, equipment, and staff to CRE patients
•Prescribe antibiotics wisely
• Remove temporary medical devices ASAP
• Assure manufacturer’s recommendations are followed for cleaning & reprocessing of reusable devices ... e.g., endoscopes
• Consider ASC and empiric CP when necessary
Statewide Public Health Initiatives

• **XDRO Registry**: Effective Nov 1, 2013 all HC facilities and Labs in IL required to report CRE via the IDPH web portal

• **CRE Task Force**: Aim is to identify and develop actionable public health interventions

• **Meeting Forums**: TAG, NIPHC, HAI Advisory Council, LTC roundtable with representation by IP, ID, and micro lab directors
General CRE Recommendations

• Utilize XDRO state registry to identify patients
• Refer to CDC CRE toolkit online for more information
Acknowledgements

- Centers for Disease Control & Prevention (CDC)
  - Division of Healthcare Quality Promotion (DHQP)
- Illinois Department of Public Health (IDPH)
  - Office of Local Health Protection
- Chicago Department of Public Health (CDPH)
  - Communicable Disease Control
- DuPage County Health Department (DCHD)
  - Communicable Disease Control
- Staff affiliated with STACHs, LTACHs, and LTCFs involved in the outbreak investigations
XDRO Registry

Mandatory reporting to the extensively Drug Resistant Organism registry began November 1, 2013

Amendment to the Control of Communicable Diseases Code (77 Ill. Adm. Code 690) Rules

https://www.xdro.org/img/MEMO_XDRO%20Registry_090413_Final.pdf
Carbapenem-resistant Enterobacteriaceae (CRE) are extremely drug resistant organisms (XDROs) that have few treatment options and high mortality rates. CRE are increasingly detected among patients in Illinois.

In response to the CRE public health threat, the Illinois Department of Public Health (IDPH) has guided development of an infection control tool called the XDRO registry. The purpose of the XDRO registry is two-fold:

1. **Improve CRE surveillance:** The first CRE-positive culture per patient stay must be reported to the XDRO registry.
2. **Improve inter-facility communication:** Healthcare facilities can query the XDRO registry to see whether a patient has been previously reported as CRE-positive.

**UPDATES**

CRE are reportable to IDPH via the XDRO registry. Links: [IDPH letter to facilities, September 2013][Reporting rule]

**To report CRE, you need a log-in to the IDPH portal**

Existing INEDSS users: Your existing IDPH log-in will automatically give you access to XDRO registry

New users: Go to the IDPH log-in page and sign up for INEDSS, which will give you access to the XDRO registry

XDRO registry orientation webinar [Slides][Recording]

CDC guidance on control of CRE: [The 2012 Toolkit]

As of November 1, 2013, the XDRO registry is open for CRE submissions and queries.
XDRO Registry

Why?
The XDRO registry addresses 2 critical gaps

<table>
<thead>
<tr>
<th>Gap</th>
<th>XDRO registry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need improved inter-facility communication</td>
<td>Allows for CRE information exchange</td>
</tr>
<tr>
<td>2. Need improved detection</td>
<td>Stores CRE surveillance data</td>
</tr>
</tbody>
</table>
XDRO Registry

Who?
XDRO registry: intended participants

All Illinois hospitals (including LTACHs)
All Illinois intermediate and long-term care
All Illinois laboratories

* Registration through IDPH web portal, request I-NEDSS/ XDRO application

https://wpur.dph.illinois.gov/WPUR
XDRO Registry

When?
XDRO Registry- When does it get reported?

Report 1\textsuperscript{st} CRE event per patient per encounter

within 7 days of lab confirmation
XDRO Registry

What?
Reporting facilities shall report CRE based on laboratory test results:

1. **Molecular test** (e.g., PCR) specific for carbapenemase
   OR

2. **Phenotypic test** (e.g., Modified Hodge) specific for carbapenemase production
   OR

3. **Susceptibility test** (for *E. coli* and *Klebsiella* species only): non-susceptible to ONE of the carbapenems (doripenem, meropenem, or imipenem) AND resistant to ALL third generation cephalosporins tested (ceftriaxone, cefotaxime, and ceftazidime).
What NOT to report to XDRO

- *Pseudomonas species*
  -- NOT an enterobacteriaceae
- *Acinetobacter species*
  -- NOT an enterobacteriaceae
- *E. coli* and *Klebsiella species* that are only resistant to ertapenem
- -- Isolates that are non-susceptible to ertapenem are likely not carbapenemase producers
What NOT to report to XDRO

- *Pseudomonas* species
  -- NOT an *Enterobacteriaceae*

- *Acinetobacter* species
  -- NOT an *Enterobacteriaceae*

- *E. coli* and *Klebsiella* species that are only resistant to ertapenem
  -- Isolates that are non-susceptible to ertapenem are likely not carbapenemase producers
Report Carbapenem-Resistant Enterobacteriaceae (CRE) isolates to XDRO registry at xdro.org

DO NOT REPORT TO REGISTRY: ESBL, VRE, MRSA, other non-CRE isolates

1) Is isolate in the Enterobacteriaceae family? (e.g. *Escherichia coli*, *Klebsiella*, *Enterobacter*, *Serratia*, *Proteus*, others)
   DO NOT REPORT: *Pseudomonas*, *Acinetobacter*, other non-Enterobacteriaceae

2) Is isolate non-susceptible (INTERMEDIATE or RESISTANT) to imipenem, meropenem, and/or doripenem?
   DO NOT REPORT: Isolates that are non-susceptible ONLY to ertapenem

3) Is isolate RESISTANT to all tested third-generation cephalosporins? (e.g. ceftriaxone, cefotaxime, ceftazidime, others)
   DO NOT REPORT: Isolates that are sensitive (or intermediate) to any third-gen cephalosporin

4) Is isolate *E. Coli* or *Klebsiella sp.*?
   **YES:** Report resistance pattern to registry, even if no further lab testing done. Reporting further lab results encouraged.
   **NO:** Report isolate only if further lab testing (below) suggests carbapenemase enzyme (e.g. KPC, NDM, VIM, IMP)
   DO NOT REPORT: CRE isolates other than *E. coli* or *Klebsiella sp.*, unless below lab testing is positive

5) Report CRE laboratory results suggesting carbapenemase production (e.g. likely KPC, NDM, VIM, IMP)
   a) Positive genotypic (PCR) results AND/OR
   b) Positive phenotypic (e.g. Modified Hodge with MBL E-Test) results
XDRO Registry

How is XDRO different from I-NEDSS?
CRE identified

Report

XDRO registry

Query

Patient admit (Unknown CRE status)

Isolation Precautions (Y/N)
Comparison to I-NEDSS

I-NEDSS

Disease identified

Providers
Health Dept
ELR*

Report

I-NEDSS

*ELR: Electronic Laboratory Reporting
**Comparison to I-NEDSS**

**I-NEDSS**

- **Disease identified**
  - Providers
  - Health Dept
  - ELR*

**XDRO Registry**

- **CRE identified**
  - Providers
  - XDRO registry
  - Query
    - Patient admit (Unknown CRE status)
    - Isolation Precautions (Y/N)

*ELR: Electronic Laboratory Reporting*
XDRO Registry: aggregate data
(as of 3/24/14)

- Total number of reports (de-duplicated): 591
- Total number of unique cases identified: 508
- Number of unique cases since November 1st: 377
- Number of unique facilities that have logged in: 292
- Number of unique facilities that have submitted reports: 96
- Number of unique facilities that have ever queried: 77
XDRO Registry: aggregate data (as of 3/24/14)

**Resistance Mechanism**
- Unrepor... 15.9%
- KPC 16.1%
- NDM-1
- Other
- Unknown 57.9%

**Specimen Source**
- Blood
- Body fluid 46.9%
- Other
- Rectal (screeni... 11%
- Sputum
- Unrepor...
- Urine
- Wound/...

**Trend, Last 12 Months**
- Number of patients
- Mar: 0
- Apr: 0
- May: 0
- Jun: 0
- Jul: 0
- Aug: 0
- Sep: 0
- Oct: 0
- Nov: 120
- Dec: 90
- Jan: 60
- Feb: 30
XDRO Registry: accessing data

- Facilities: through XDRO registry
  > Must be approved by IDPH security

- Health Departments: through I-NEDSS AVR (Business Objects Tool)
  > Must sign user agreement form
Creating a Web Intelligence Document
Accessing XDRO data

XDRO universe selected when creating a new Web Intelligence Document
AVR data fields that are currently available
### Data Elements

<table>
<thead>
<tr>
<th>Category</th>
<th>Object</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registry</td>
<td>Facility Name</td>
<td>Name of facility that the user reporting the case is affiliated</td>
</tr>
<tr>
<td></td>
<td>Patient MRN</td>
<td>Medical Record Number</td>
</tr>
<tr>
<td></td>
<td>Date of Admission</td>
<td>Date of admission or seen by facility</td>
</tr>
<tr>
<td></td>
<td>Report Date</td>
<td>Date the case is reported in the XDRO</td>
</tr>
<tr>
<td>Culture</td>
<td>Organism Name</td>
<td>Organism identified (i.e. Enterobacter spp., Klebsiella pneumoniae)</td>
</tr>
<tr>
<td></td>
<td>Culture Acquisition Date</td>
<td>Date the specimen was collected</td>
</tr>
<tr>
<td></td>
<td>Specimen Source</td>
<td>Site of specimen collection (i.e. blood, body fluid, rectal, sputum, tissue, urine, wound)</td>
</tr>
<tr>
<td></td>
<td>Mechanism of Resistance</td>
<td>For example: NDM-1, KPC</td>
</tr>
<tr>
<td></td>
<td>Comment</td>
<td>Free text field with additional case report details, if provided</td>
</tr>
<tr>
<td>Patient Demographics</td>
<td>Includes the following: name, gender, date of birth, race, ethnicity, address (street, city, county, state, Zip)</td>
<td></td>
</tr>
<tr>
<td>Lab/IDPH only Facility Info</td>
<td>Facility Name /Address</td>
<td>The facility that a lab is reporting on behalf of (i.e. long term care facility)</td>
</tr>
<tr>
<td>Measures</td>
<td>Case Count</td>
<td>Case count is based on unique ID in the database. Patients can have multiple cases.</td>
</tr>
<tr>
<td></td>
<td>Patient Count</td>
<td>Patient Count is patient Medical Record Number</td>
</tr>
</tbody>
</table>
Formula for creating Age from Date of Birth and Culture Acquisition Date

\[ \text{Age} = \frac{\text{DaysBetween([Date of Birth],[Culture Acquisition Date])}}{365} \]
Sample AVR Report

SAP BUSINESSOBJECTS INFOVIEW

XDR03

Arranged by: Alphabetic order

Facility Site Code | Case Count | Patient Count
------------------|-----------|---------------
0                 | 1         | 1             
0049             | 3         | 3             
0083             | 2         | 2             
0099             | 1         | 1             
0134             | 2         | 2             
0145             | 7         | 7             
0146             | 8         | 8             
0147             | 1         | 1             
0148             | 2         | 2             
0150             | 6         | 6             
0159             | 8         | 8             
0154             | 10        | 10            
0155             | 9         | 9             
0156             | 6         | 6             
0157             | 12        | 11            

Sample AVR graphics

- Pie chart: Patient Count by Gender
  - Male
  - Female

- Bar chart: Case Count by Report Month
  - December
  - February
  - January
  - March
  - November
Matches pattern query allow for free text searches by finding a string that matches a pattern. Wildcards in pattern can include (*) to replace a set of characters or (?) to replace one character.
When a call comes in...

- Confirm CRE: request actual lab reports
- Immediate infection control guidelines
- Further investigation
  - Microbiology look-back (6-12 mos)
- Inter-facility communication

**Anaerobic bottle is positive**

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MIC</th>
<th>INTRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin/CA</td>
<td>&gt;=32</td>
<td>R</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>&gt;=32</td>
<td>R</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>&gt;=64</td>
<td>R</td>
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<tr>
<td>Ceftriaxone</td>
<td>&gt;=64</td>
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<tr>
<td>Ciprofloxacin</td>
<td>&gt;=4</td>
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</tr>
<tr>
<td>ESBL</td>
<td>Neg</td>
<td>-</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>8</td>
<td>I</td>
</tr>
<tr>
<td>Imipenem</td>
<td>&gt;=16</td>
<td>R</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>&gt;=8</td>
<td>R</td>
</tr>
<tr>
<td>Piperacillin/tazobactam</td>
<td>&gt;=128</td>
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<tr>
<td>Tetracycline</td>
<td>4</td>
<td>S</td>
</tr>
<tr>
<td>Trimethoprim/Sulfadiazine</td>
<td>&gt;=320</td>
<td>R</td>
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</table>

S = SUSCEPTIBLE  I = INTERMEDIATE  R = RESISTANT

**Klebsiella pneumoniae**
When a call comes in…

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5810a4.htm
CRE Toolkit

• Contact precaution guidelines
  – Both acute care and long-term care settings
• Screening guidelines (e.g. epi-linked to CRE colonized or infected patients)
• In facilities with CRE transmission
  – Active surveillance guidelines (e.g. point prevalence rectal surveillance cultures on unit)
  – Patient and staff cohorting guidelines
  – Chlorhexidine bathing information
CRE Toolkit

- Also specific guidance for facilities that have rarely or never previously identified CRE
Laboratory Samples

• In Illinois, CRE isolates OTHER than KPC are highest priority for further testing
• If phenotypic lab testing suggests enzyme other than KPC, lab should submit sample to IDPH
  • In absence of full testing, encourage sample submission from individuals with history of international medical care or epi-links to non-KPC CRE
Illinois CRE Detect and Protect

- Infection prevention
- Surveillance
- Laboratory testing
- Inter-facility communication
- Antimicrobial stewardship
CRE Detect and Protect: IDPH Collaborators

Division of Patient Safety and Quality:
- Mary Driscoll, Division Chief
- Erica Runningdeer, HAI Coordinator
- Angela Tang & Robynn Leidig, CRE Project Directors
- Chinyere Alu, Antimicrobial Stewardship Project Director

Division of Infectious Diseases:
- Craig Conover, Senior Medical Advisor/ State Epidemiologist
- Allison Arwady, Epidemic Intelligence Service officer

Division of Laboratories:
- Matt Charles, Assistant Division Chief
- Roman Golash, Supervisor, Clinical Microbiology Section
Illinois CRE Task Force

**Purpose**
Guide CRE prevention and control efforts

**Leadership**
Dr. Stephanie Black (Chicago DPH) and Dr. Mary Hayden (Rush University Medical Center)

**Membership**
Facilities from across the spectrum of care (infectious disease doctors, infection preventionists, microbiologists, clinical staff), trade associations, state healthcare quality improvement organization, IDPH
CRE Task Force Members

- ACL Laboratories
- Advocate Lutheran General Hospital
- APIC- Central
- CDC Prevention Epicenter
- Chicago Department of Public Health
- Health Care Council of Illinois (HCCI) and Illinois Council on Long Term Care
- Illinois Hospital Association
- ISU/ Mennonite College of Nursing
- Kindred Healthcare
- Lee Manor Rehabilitation and Nursing Center
- Life Services Network
- Loyola University Medical Center

- Lutheran Life
- Metropolitan Chicago Healthcare Council
- NorthShore University Health System
- OSF Saint Francis Medical Center
- RML Specialty Hospital
- Saint Anthony Hospital
- Telligen
- The University of Chicago Medicine-Infection Control
- The University of Chicago Medicine-Microbiology
- UnityPoint Health – Methodist
Campaign Sponsors

Association for Professionals in Infection Control and Epidemiology (APIC)
  - Central IL, Chicago, Southern IL Chapters
CDC Chicago Prevention and Intervention Epicenter
Health Care Council of Illinois
Illinois Critical Access Hospital Network
Illinois Health Care Association
Illinois Hospital Association
Life Services Network
Metropolitan Chicago Healthcare Council
Nanosphere, Inc.
Telligen

The CRE Detect & Protect campaign is funded by an Affordable Care Act (ACA) award through the CDC
Campaign Sponsors (LHDs)

Cook County Dept of Public Health
Chicago Dept of Public Health
DuPage County Health Dept
Henry County Health Dept
Kane County Health Dept
Kendall County Health Dept
Knox County Health Dept
McHenry County Dept of Health
Schuyler County Health Dept
St. Clair County Health Dept
Whiteside County Health Dept
Facility Participants

- Acute Care Hospitals: 88
- Long-Term Care Facilities: 95
- Long-Term Acute Care Hospitals: 3
- Independent Labs: 1

(Signed up as of 3/21/14)
# Upcoming CRE Webinars

<table>
<thead>
<tr>
<th>Target Audience</th>
<th>Topics</th>
<th>Timeline (tentative)</th>
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<tbody>
<tr>
<td>Facility leadership/administration</td>
<td>Campaign overview, How to support staff</td>
<td>April</td>
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<tr>
<td>Infection prevention staff</td>
<td>CRE infection prevention, Using XDRO to your advantage</td>
<td>April</td>
</tr>
<tr>
<td>Target Audience</td>
<td>Topics</td>
<td>Timeline (tentative)</td>
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<tr>
<td>Laboratorians</td>
<td>Reporting to XDRO, CRE testing guidelines</td>
<td>May</td>
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<tr>
<td>Infection prevention staff</td>
<td>Inter-facility communication</td>
<td>May</td>
</tr>
<tr>
<td>Infection prevention staff</td>
<td>CRE case studies, Outbreak response</td>
<td>June</td>
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</table>
Antimicrobial Stewardship

Making Health Care Safer
Antibiotic Rx in Hospitals: Proceed with Caution

Antibiotics save lives, but poor prescribing practices are putting patients at unnecessary risk for preventable allergic reactions, super-resistant infections, and deadly diarrhea. Errors in prescribing decisions also contribute to antibiotic resistance, making these drugs less likely to work in the future.

To protect patients and preserve the power of antibiotics, hospital CEOs/medical officers can:

- Adopt an antibiotic stewardship program that includes, at a minimum, this checklist:
  1. Leadership commitment: Dedicate necessary human, financial, and IT resources.
  2. Accountability: Appoint a single leader responsible for program outcomes. Physicians have proven successful in this role.
  3. Drug expertise: Appoint a single pharmacist leader to support improved prescribing.
  4. Act: Take at least one prescribing improvement action, such as requiring reassessment within 48 hours, to check drug choice, dose, and duration.
  5. Track: Monitor prescribing and antibiotic resistance patterns.
  6. Report: Regularly report to staff prescribing and resistance patterns, and steps to improve.
  7. Educate: Offer education about antibiotic resistance and improving prescribing practices.

- Work with other health care facilities to prevent infections, transmission, and resistance.

See page 4
Want to Learn More? Visit: www.cdc.gov/vitalsigns

Measuring Success of Antimicrobial Stewardship Efforts

Metrics applied to antimicrobial stewardship programs can help drive sustainable improvement within your organization. Join this webinar to learn how to identify pertinent data points and methods for antimicrobial use tracking.

Who Should Attend:
Pharmacists, Physicians, Nurses, Infection Prevention Personnel and Administrators interested in improving antimicrobial use and associated metrics at acute and long term care facilities.

Objectives:
- Compare and Contrast process and outcome metrics
- Identify necessary data points and methods for antimicrobial use tracking
- Identify pertinent outcome metrics when given a systematic stewardship intervention

Presenter:
Alan Gross, Pharm D., BCPS, Infectious Diseases Pharmacist at the University of Illinois Hospital and Health Sciences System and Clinical Assistant Professor at the University of Chicago, College of Pharmacy

Lisa Pellelack, M.D., MPH, Medical Officer at the Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention

For additional information, contact Miriam Grande, Project Assistant at Teallgen

Register Now!

This material was prepared by Teallgen, the Medicare Quality Improvement Organization for Illinois, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy. 1006594-MA-03/14-099
Contact information

- Direct XDRO questions/comments to: DPH.XDROregistry@illinois.gov

- Direct CRE campaign questions/comments to
  Robynn Leidig: Robynn.Leidig@illinois.gov, 312-814-1631
  Angela Tang: Angela.Tang@illinois.gov, 312-814-6226

https://www.xdro.org/cre-campaign/index.html