The XDRO Registry and CRE burden in Illinois

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Disclosure

- I have no actual or potential conflict of interest in relation to this program or presentation.
Why are we talking about CRE and the XDRO registry at the AMS summit?
CRE Prevention Strategies

1. Hand Hygiene
2. Contact Precautions
3. Healthcare Personnel Education
4. Device use
5. Laboratory notification
6. Inter-facility communication
7. Antimicrobial stewardship
8. Environmental Cleaning

“Multiple antimicrobial classes have been shown to be a risk for CRE colonization and/or infection.”
Potential to reduce MDRO incidence

Recent systematic review and meta-analysis found that ASPs reduced incidence of:

- MDR Gram-negative bacteria (51%)
- ESBL Gram-negative bacteria (48%)
- MRSA (37%)
- CDI (32%)

Baur, D, et al., Lancet 2017
Mandatory CRE Reporting in Illinois

Start Date:  November 1, 2013

Required Reporters:
- acute care hospitals
- long-term acute care hospitals
- long-term care facilities
- laboratories

How to report:  Extensively Drug-Resistant Organism (XDRO) Registry

When to report:  Within 7 days of test confirmation
1. Mandatory CRE reporting

All Illinois Facilities

Query

XDR0 registry

XDRO status

Facility A

2. Information exchange

Adapted from: Trick, WE et al., EID 2015
<table>
<thead>
<tr>
<th>Organism</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>K. pneumoniae</em></td>
<td>2567</td>
<td>(84)</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>180</td>
<td>(6)</td>
</tr>
<tr>
<td><em>Enterobacter spp.</em></td>
<td>170</td>
<td>(6)</td>
</tr>
<tr>
<td>Other</td>
<td>142</td>
<td>(4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanism of Resistance</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPC</td>
<td>636</td>
<td>(90)</td>
</tr>
<tr>
<td>NDM</td>
<td>29</td>
<td>(4)</td>
</tr>
<tr>
<td>OXA-48-like</td>
<td>6</td>
<td>(&lt;1)</td>
</tr>
<tr>
<td>IMP</td>
<td>1</td>
<td>(&lt;1)</td>
</tr>
</tbody>
</table>

1Out of 3059 reports

2Out of 709 isolates with molecular testing
CRE by IDPH Region, 2014-15

**CRE Count**
- <300
- 300-400
- 401-500
- 501-600
- 601-700
- >700

**2014**
- Region highlighted in blue

**2015**
- Region highlighted in deeper blue
- Chicago
- West Chicago
- Peoria
- Champaign
- Marion
- Edwardsville
- Rockford

IDPH - Illinois Department of Public Health
CRE in states bordering IL

KPC, OXA, IMP

KPC, NDM, OXA

KPC, NDM, OXA, VIM

KPC, NDM, VIM

Data reported to CDC as of 1/6/17
https://www.cdc.gov/hai/organisms/cre/trackingcre.html
Unique patients reported to the XDRO registry, by quarter of earliest CRE clinical culture, 11/2013 – 12/2016 (N=2920)
Adding emerging organisms

1. Mandatory CRE reporting
   - All Illinois Facilities

2. Emerging pathogens
   - IDPH

3. Information exchange
   - Facility A
   - Query
   - XDRO status
   - XDRO registry
Candida auris

Clinical Alert to U.S. Healthcare Facilities - June 2016

Global Emergence of Invasive Infections Caused by the Multidrug-Resistant Yeast Candida auris

Summary: The Centers for Disease Control and Prevention (CDC) has received reports from international healthcare facilities that Candida auris, an emerging multidrug-resistant (MDR) yeast, is causing invasive healthcare-associated infections with high mortality.

- Emerging multidrug-resistant yeast
- Potential to cause outbreaks in healthcare settings
- Difficult to detect with conventional lab methods
Carbapenemase-producing *Pseudomonas aeruginosa*

- VIM–PA outbreak detected in Chicago area
- KPC and IMP later identified (very rare)
- Currently only PA with carbapenemase identified are being entered by IDPH
Inter-facility communication

1. Mandatory CRE reporting
   - All Illinois Facilities

2. C. auris, CP-PA
   - IDPH

3. Information exchange
   - ADT Feed/Manual query
   - Facility A
   - XDRO registry
     - XDRO status
Manual searches
Need last name and DOB to conduct query

Search Patient

* Last name
  bird

* Date of birth
  03 / 04 / 2000

First name

Query

Search Instructions

a. Available fields
   Last name (required), first name (optional), DOB (required).

b. Search algorithm
   i. If you enter all 3 fields, then attempt to match (exact; case insensitive) on all 3 fields.
   ii. If no match returns on 3 fields, then attempt to match (exact; case insensitive) on last name and DOB (ignore first name completely).

c. Results display
   i. In general, you will see the search results for exactly how you entered the information. If there are no exact matches for last name and dob, you will see a NULL result.
Patient Match

Search Patient

* Last name
  bird

* Date of birth
  03  /  04  /  2000

First name

Query


<table>
<thead>
<tr>
<th>Name</th>
<th>Date of Birth</th>
<th>SSN</th>
<th>Organism</th>
<th>Culture Date</th>
<th>Last Transaction</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird, Tweety</td>
<td>03/04/2000</td>
<td></td>
<td>Klebsiella pneumoniae</td>
<td>01/01/2017</td>
<td>submitted, 05/31/2017</td>
<td>Sample Hospital</td>
</tr>
</tbody>
</table>

Disclaimer: A match on name and date of birth only may not be 100% accurate. We recommend that you verify XDRO status with the patient or by contacting the facility that entered the result.

Note: As of January 2017, the Illinois Department of Public Health is entering Candida auris cases into the XDRO registry; such patients can be identified through the above search query. Patients with C. auris should be placed on standard and contact precautions and, when possible, in single rooms. More information is available on CDC’s Questions and Answers and Interim Recommendations pages.

As of April 2017, IDPH is entering carbapenemase-producing Pseudomonas aeruginosa cases into the XDRO registry. More information is available on CDC’s website.
Angela Tang

XDRO Report - Sample Hospital

Patient information

Patient name: Bird, Tweety
Date of birth: 03/04/2000
Race: Other
Address: 12345 Main St, Anycity, Cass, IL 60000

MRN: 1234567
SSN (last 4): 
Ethnicity: Not Hispanic or Latino

Admission date: 12/31/2016
Gender: male

XDRO culture information

Organism: Klebsiella pneumoniae
XDRO criterion: Molecular test
Mechanism of resistance: KPC

Culture date: 01/01/2017
Specimen source: Urine

Comments:

Submitted by Vicky Gao, 05/31/2017, Sample Hospital
XDRO Auto Alerts

Hospital ADT feed (Last name, First name, DOB)

XDRO registry

Email, page, text

IP logs in to XDRO

- **Inpatient Admission Feed**: Every 15-30 min
- **Pager/SMS texts (optional feature)**:
  - Real-time alerts from 8 am-8 pm;
  - Off-hours alerts queued until 8 am next day
Sample XDRO alert email

Subject: Alert notification from XDRO registry (AID 123)

The XDRO registry has identified that a patient recently admitted to <hospital name> may carry an organism that is highly resistant to antibiotics. Please log in to the XDRO registry (dph.partner.illinois.gov) for details.
Sample alert text message

Text Message
Today 8:10 AM

webmaster@mraia.org / XDRO registry full match alert: AID(####) /
Log in to the registry to view alerts
Facility Alert Page

Sample Hospital Alert

Please click here to confirm your alert contact information and facility.

<table>
<thead>
<tr>
<th>Acknowledge</th>
<th>AID</th>
<th>Name</th>
<th>Date of Birth</th>
<th>Organism</th>
<th>Matching</th>
<th>Alert Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>By A.T.</td>
<td>323</td>
<td>Submission, Test</td>
<td>01/02/1934</td>
<td>Klebsiella pneumoniae</td>
<td>Full Match</td>
<td>05/23/2016</td>
</tr>
<tr>
<td>By R.I.</td>
<td>3</td>
<td>E, Ds</td>
<td>11/11/1982</td>
<td>Enterobacter aerogenes</td>
<td>Partial Match</td>
<td>03/21/2014</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>2</td>
<td>Bug, Super</td>
<td>01/01/1914</td>
<td>Klebsiella pneumoniae</td>
<td>Full Match</td>
<td>03/20/2014</td>
</tr>
</tbody>
</table>

Disclaimer: A match on name and date of birth only may not be 100% accurate. We recommend that you verify XDRO status with the patient or by contacting the facility that entered the result.

Note: Full match: There was a complete match on first name, last name, and date of birth.

Partial match: There was a match on last name and date of birth; the first name was matched only on the first initial.

As of January 2017, the Illinois Department of Public Health is entering Candida auris cases into the XDRC registry; such patients can be identified through the above search query. Patients with C. auris should be placed on standard and contact precautions and, when possible, in single rooms. More information is available on CDC’s Questions and Answers and Interim Recommendations pages.
Tracking Alert Outcomes

Sample Hospital Alert Tracking

<table>
<thead>
<tr>
<th>Action</th>
<th>AID</th>
<th>Patient</th>
<th>Alert Date</th>
<th>Not Inpatient</th>
<th>Correct Patient?</th>
<th>Known CRE?</th>
<th>Previous positive at our facility?</th>
<th>Communicated by other facility?</th>
<th>Already on contact precautions?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save</td>
<td>323</td>
<td>T.S.</td>
<td>05/23/2016</td>
<td>□</td>
<td>select: ▼</td>
<td>select: ▼</td>
<td>select: ▼</td>
<td>select: ▼</td>
<td>select: ▼</td>
</tr>
<tr>
<td>Edit</td>
<td>3</td>
<td>D.E.</td>
<td>03/21/2014</td>
<td>□</td>
<td>select: ▼</td>
<td>□</td>
<td>select: ▼</td>
<td>select: ▼</td>
<td>select: ▼</td>
</tr>
<tr>
<td>Edit</td>
<td>2</td>
<td>S.B.</td>
<td>03/20/2014</td>
<td>□</td>
<td>Yes</td>
<td>Yes</td>
<td>Unknown</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

a. Sometimes a name and date of birth do not match up to the correct patient, especially if there is a partial match (using date of birth, last name, first initial). Occasionally, you may need to confirm the identity of the patient using additional information (for example, home address).
b. Prior to receiving the CRE alert, did you know that the patient was CRE colonized?
c. If the patient is already a “known CRE”, how did you find out? (Answer only if "Known CRE?" = Yes)
d. At the time you acknowledged (viewed) the alert, was the patient already on contact precautions?
CRE Alert Outcomes, 1/7/15 – 5/28/17

763 alerts at 18 hospitals

- Missing data: 17 (2%)
- Complete data: 746 (98%)
  - Incorrect pt: 5 (1%)
  - Correct pt: 741 (99%)

Notes:
- 2 C. auris alerts were sent. Data not shown here
- 1 hospital has not received an alert yet
Alert Outcomes:
All correct inpatient CRE alerts, 1/7/15 – 5/28/17

741 alerts

**Known CRE at time of alert?**

- Yes: 561 (76%)
- No: 180 (24%)

**In contact precautions at time of alert?**

- Yes: 459 (82%)
- No: 102 (18%)
- Yes: 72 (40%)
- No: 108 (60%)

Adapted from: Mike Lin, Rush University Medical Center/Chicago CDC Prevention Epicenter
XDRO auto alert progress (statewide)

Legend
- ★ Connected
- □ Priority

Credit: Emily Augustini, IDPH
XDRO registry developments

- Registry opens for CRE
- Auto alert pilot
- Pager & text alerts
- Syndromic surveillance feed for alerting

2013: Manual reporting & querying
2014: Auto alert pilot
2015: Auto alert expansion
2016: C. auris
2017: CP-PA
2018+: ELR

CP-PA= Carbapenemase-producing *Pseudomonas aeruginosa*; ELR= Electronic Laboratory Reporting
PI: Dr. Mike Lin, Rush University Medical Center/Chicago CDC Prevention Epicenter
CRE Testing at IDPH – New in 2017!

1) Unusual resistance mechanism
2) Suspected outbreak

Report to XDRO registry

Contact LHD for authorization
## Select CRE Prevention Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Illinois Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Hygiene</td>
<td>Project PROTECT</td>
</tr>
<tr>
<td>Contact Precautions</td>
<td>Project PROTECT</td>
</tr>
<tr>
<td>Healthcare Personnel Education</td>
<td>CRE Campaign</td>
</tr>
<tr>
<td>Laboratory Detection</td>
<td>IDPH Lab Testing</td>
</tr>
<tr>
<td>Inter-facility communication</td>
<td>XDRO registry</td>
</tr>
<tr>
<td><strong>Antimicrobial stewardship</strong></td>
<td><strong>AMS Summit, PDSB Campaign, Facility ASPs</strong></td>
</tr>
</tbody>
</table>
Acknowledgments

IDPH
- Erica Runningdeer
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- Stacey Hoferka
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- Mike Lin
- Vicky Gao
- Shawn Xiang
- Helen Zhang
- George Markovski

BD/MedMined
- Vikas Gupta
- Autumn Langford

MRAIA

IL Hospital IPs

For more information:
www.xdro.org
DPH.XDROregistry@illinois.gov