



Mandatory CRE Reporting and the XDRO Registry in Illinois

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Hektoen Institute

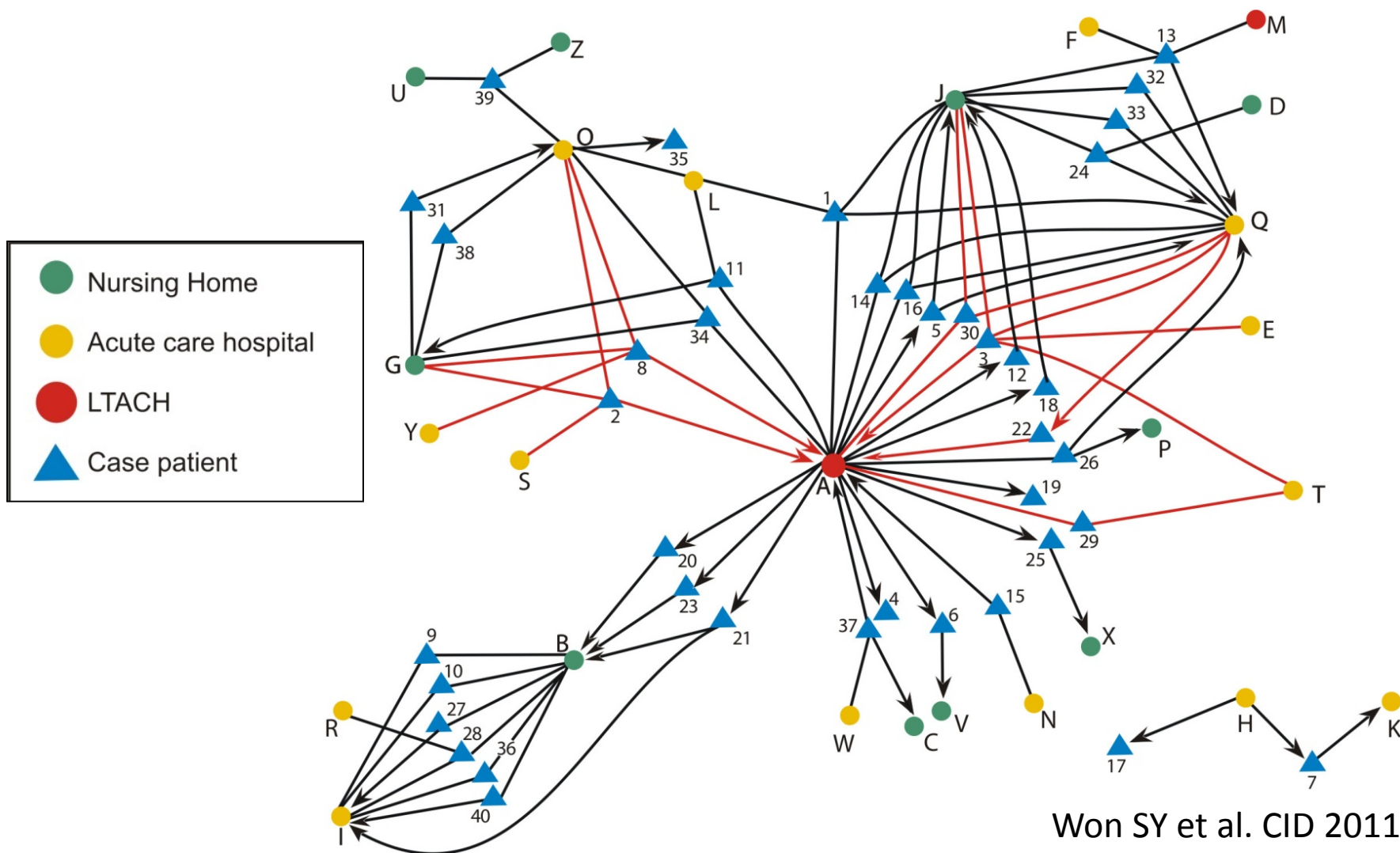
Topics

1. History of CRE in IL
2. Mandatory CRE reporting
3. XDRO registry

First 2 CRE cases, Chicago area, 2007-2008



KPC Outbreak: IL & IN Facilities, 2008



Won SY et al. CID 2011

CRE Point Prevalence Surveys, Chicago area, 2010-2011

Facility type	CRE colonization prevalence
Short stay acute care hospitals (adult ICUs)	3%
Long term acute care hospitals (LTACHs)	30%

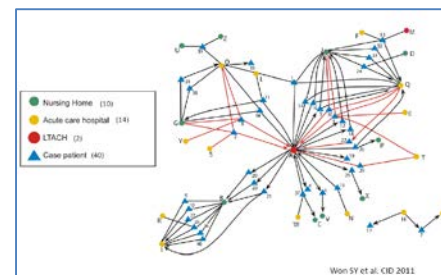
Lin MY, et al. CID, 2013

Need for more CRE data & inter-facility communication

- CRE were relatively common in some Chicago healthcare facilities, particularly LTACHs
- Few CRE data from hospital non-ICU wards, nursing homes, and regions outside of Chicago
- Possibility of mandatory reporting discussed with HAI Advisory Council



Facility type	CRE colonization prevalence
Short stay acute care hospitals (adult ICUs)	3%
Long term acute care hospitals (LTACHs)	30%



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

Illinois CRE Surveillance Definition

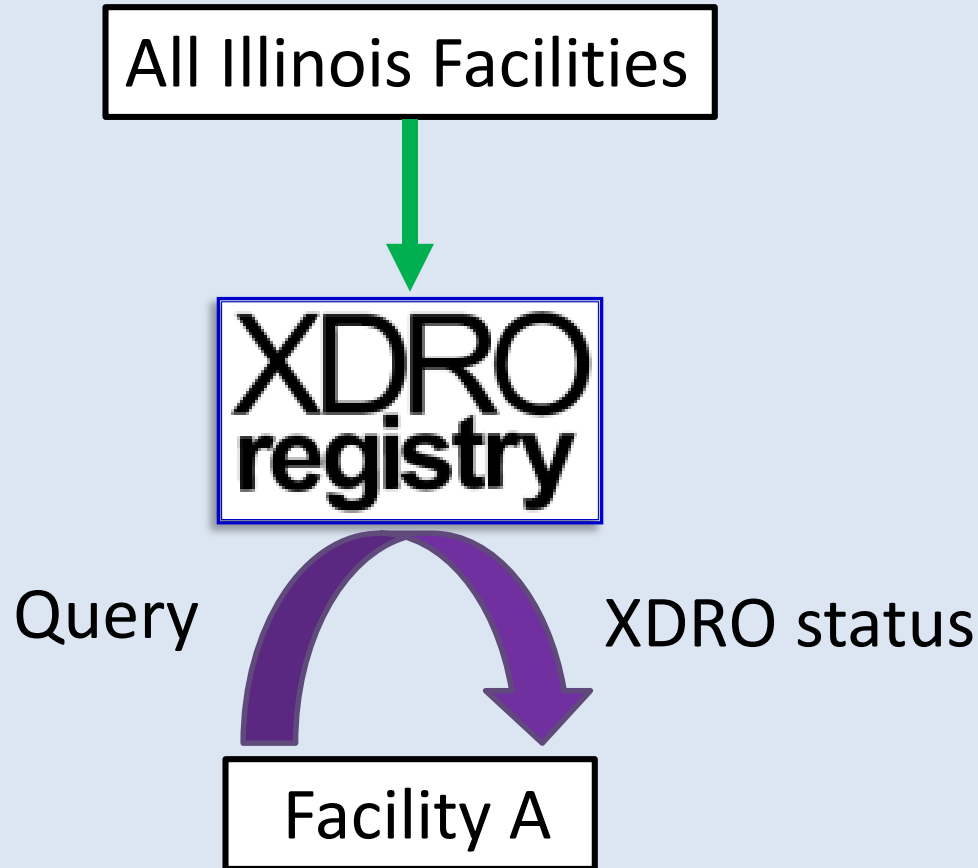
Enterobacteriaceae with one of the following test results:

1. **Molecular test** (e.g., PCR) specific for carbapenemase,
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). *Note: Ignore ertapenem.*

Report 1st positive culture per patient encounter.

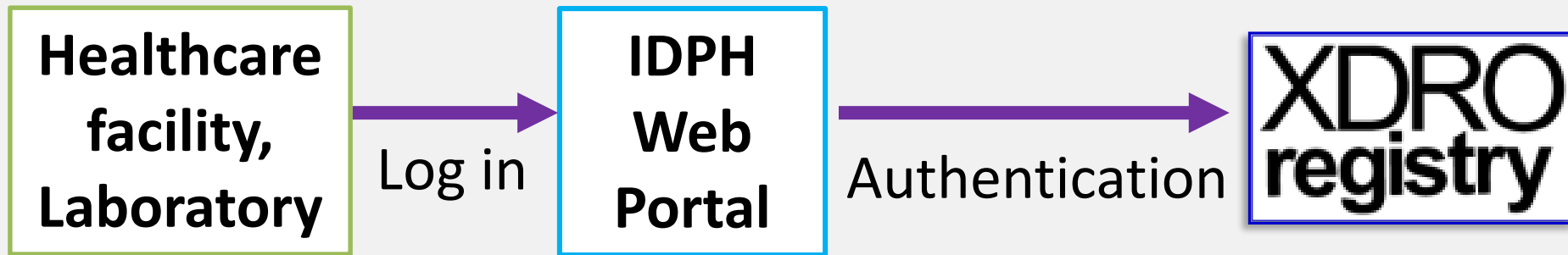
XDRO registry, 2013

1. Mandatory CRE reporting



2. Information exchange

XDRO Architecture




- Collaboration among IDPH, CDC Chicago Epicenter, Medical Research Analytics and Informatics Alliance (MRAIA)
- Built from scratch with input from end user

IDPH Web Portal

State of Illinois External Access

https://dph.partner.illinois.gov/CookieAuth.dll?GetLogon?curl=Z2F&reason=0&formdir=2



State of Illinois
Web Authentication Portal

Security ([show explanation](#))

☒ This is a public or shared computer
☐ This is a private computer

☐ I want to change my password after logging on

****Warning! Unauthorized access is prohibited****

Further access is limited to authorized users only. By accessing or using this system you are consenting to monitoring and recording, which may be disclosed for administrative, disciplinary, civil, or criminal actions, penalties, or prosecution. Users should have no expectation of privacy when accessing or using this system or any of its components.

Domain: DPH Employees

User name: UserID

Password: ••••

[Log On](#)

Don't have an Illinois.gov ID? [Sign up](#)

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IDPH Web Portal



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IDPH WEB PORTAL

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Application Announcements

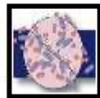
Production Applications



[Business Objects 3.1 - \(NEW VERSION\)](#)



[Business Objects 3.1 - \(NEW VERSION\) - Internal Only](#)



[I-NEDSS](#)



[ORS](#)



[XDRO registry \(extensively drug resistant organism\)](#)

XDRO registry interface

XDRO
registry

Sample Hospital [change facility](#)

Test User1

HomeHelpGo BackLogout

Submit Report


Search Registry

Facility Submission History

Facility Alert History

XDRO Dashboard

Submit report page



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XDRO Report

XDRO culture information

* Organism name (genus/species)

Please Select Organism: ▾

* Specimen source

Please Select Specimen: ▾

* XDRO criteria (select all that apply)

☐

Molecular test (e.g. PCR) specific for carbapenemase

☐

Phenotypic test (e.g. Modified Hodge) specific for carbapenemase production

☐

For E. coli and Klebsiella spp. only:
Resistant to ALL 3rd gen cephalosporins tested and non-susceptible (intermediate or resistant) to one carbapenem. Ignore ertapenem.

* Date (culture acquisition)

mm / dd / yyyy

* Mechanism of resistance

Please Select Mechanism: ▾
(molecular test required)

Facility information

Facility name

Sample Hospital

* Patient MRN

* Date of admission/Encounter Date

mm / dd / yyyy

☐

Culture obtained as outpatient

Patient demographics

* First name

Middle name(if applicable)

* Last name

* Gender

☐ Male
 ☐ Female

Race

Please Select One: ▾

* Date of birth(mm/dd/yyyy)

mm / dd / yyyy

Social Security Number(last4)

Ethnicity

☐ Hispanic or Latino
 ☐ Not Hispanic or Latino

* Street address

* City

* County

Select a County: ▾

* State

Illinois ▾

* Zip code

Comments

Include any information that may help infection preventionists who view your submission. Comments are not routinely monitored by IDPH. To communicate directly with IDPH, please email DPH.XDROregistry@Illinois.gov

CANCEL

SAVE DRAFT

SUBMIT

Culture info

Facility info

Patient demographics

XDRO Report - Sample Hospital

Patient information

Patient name: Bird, Tweety

MRN: 1234567

Admission date: 12/31/2016

Date of birth: 03/04/2000

SSN (last 4):

Gender: male

Race: Other

Ethnicity: Not Hispanic or Latino

Address: 12345 Main St, Anycity, Cass, IL 60000

XDRO culture information

Organism: *Klebsiella pneumoniae*

Culture date: 01/01/2017

XDRO criterion: Molecular test

Specimen source: Urine

Mechanism of resistance: KPC

Comments:

[Submitted by Vicky Gao, 05/31/2017, Sample Hospital](#)

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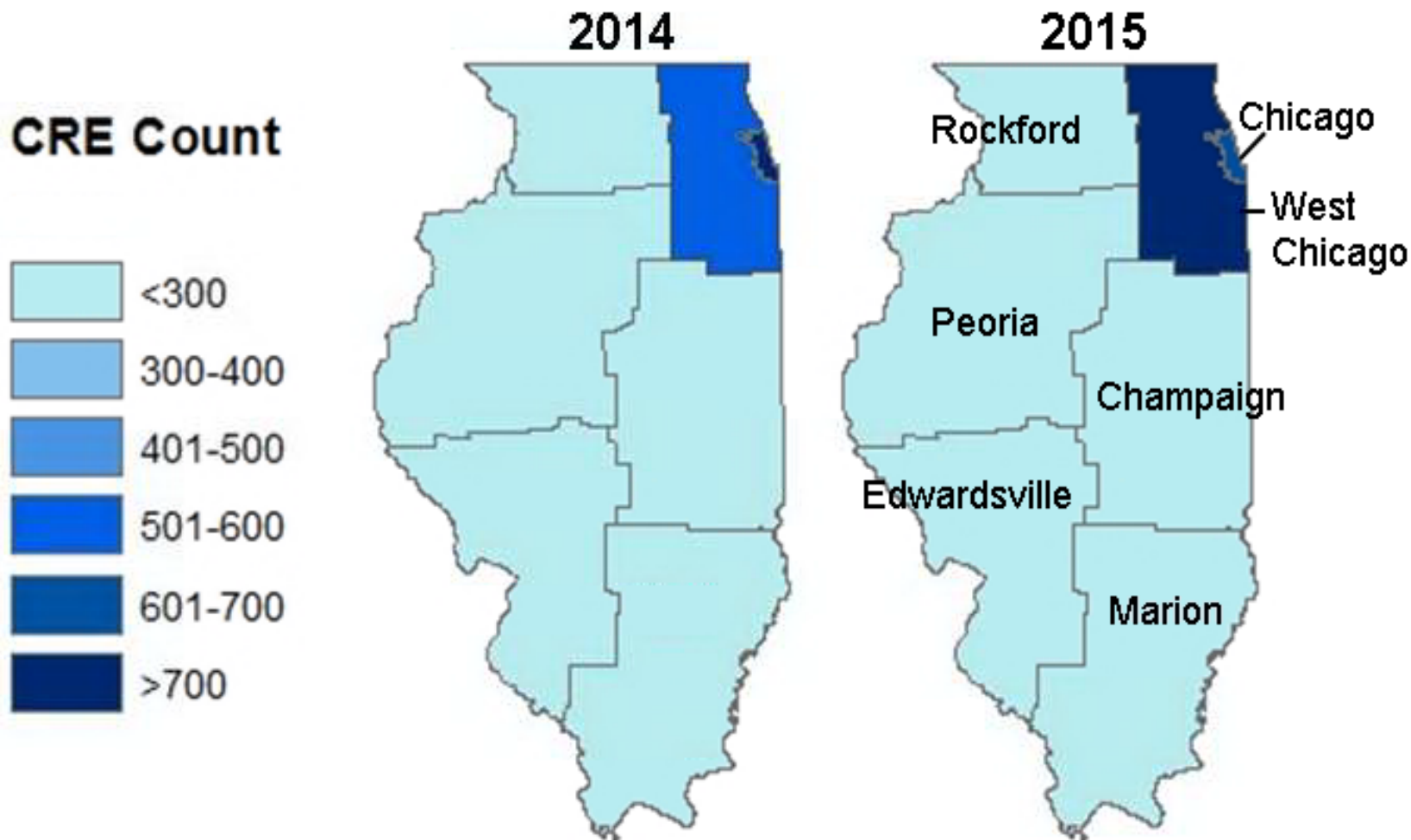
CRE reported to XDRO registry, 2014-15

	n	(%)
Organism¹		
<i>K. pneumoniae</i>	2567	(84)
<i>E. coli</i>	180	(6)
<i>Enterobacter</i> spp.	170	(6)
Other	142	(4)
Mechanism of Resistance²		
KPC	636	(90)
NDM	29	(4)
OXA-48-like	6	(<1)
IMP	1	(<1)

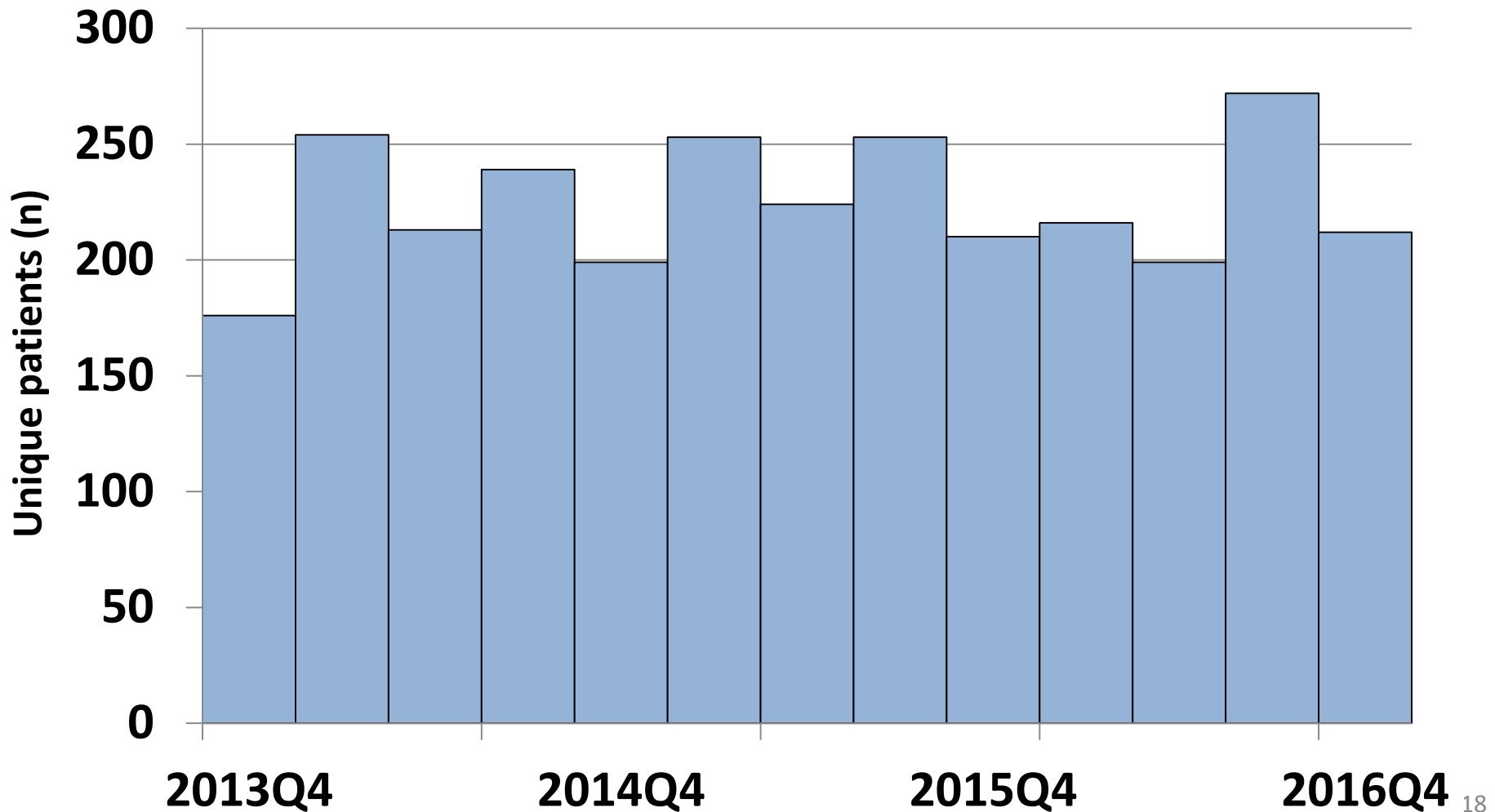
¹Out of 3059 reports

²Out of 709 isolates with molecular testing

CRE by IDPH Region, 2014-15



Unique patients reported to the XDRO registry, by quarter of earliest CRE clinical culture, 11/2013 – 12/2016 (N=2920)




Submit Report

Search Registry

Facility Submission History

Facility Alert History

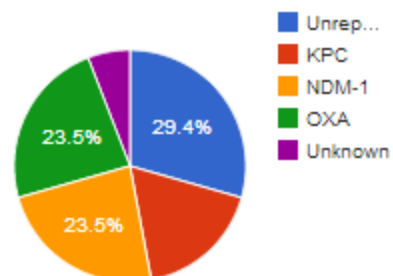


XDRO Dashboard

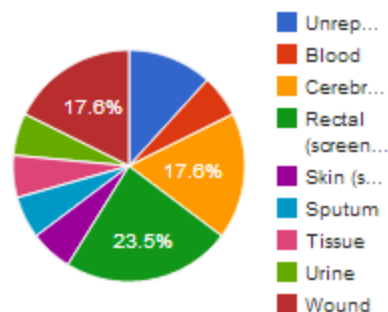
XDRO Report

Facility Data [a]

Resistance Mechanism



Specimen Source



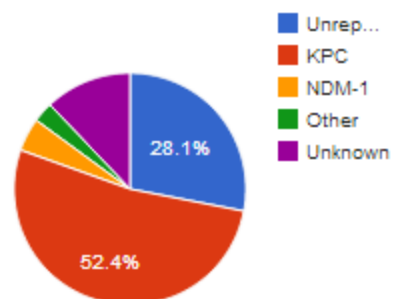
Entire Dataset

Trend, Last 12 Months

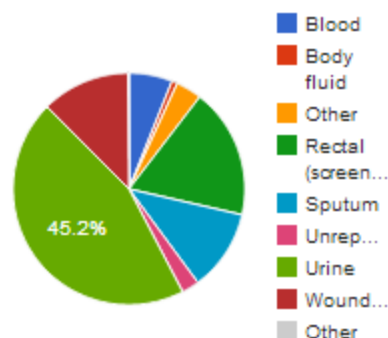


State Data [b]

Resistance Mechanism

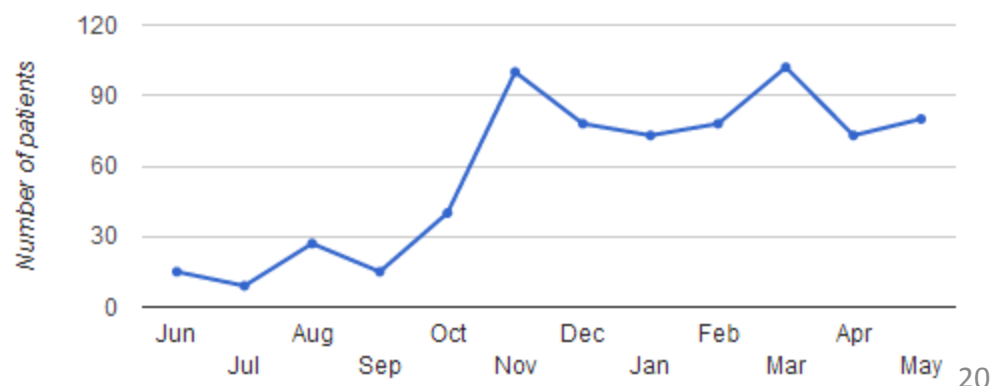


Specimen Source



Entire Dataset

Trend, Last 12 Months



Adding emerging organisms

1. Mandatory CRE reporting

All Illinois Facilities

2. Emerging pathogens

IDPH

**XDRO
registry**

Query

XDRO status

Facility A

3. Information exchange

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.

Morbidity and Mortality Weekly Report

Investigation of the First Seven Reported Cases of *Candida auris*, a Globally Emerging Invasive, Multidrug-Resistant Fungus — United States, May 2013–August 2016

Snigdha Vallabhaneni, MD¹; Alex Kallen, MD²; Sharon Tsay, MD^{1,3}; Nancy Chow, PhD¹; Rory Welsh, PhD¹; Janna Kerins, VMD^{3,4}; Sarah K. Kemble, MD⁴; Massimo Pacilli, MS⁴; Stephanie R. Black, MD⁴; Emily Landon, MD⁵; Jessica Ridgway, MD⁵; Tara N. Palmore, MD⁶; Adrian Zelzany, PhD⁶; Eleanor H. Adams, MD⁷; Monica Quinn, MS⁷; Sudha Chaturvedi, PhD⁷; Jane Greenko, MPH⁷; Rafael Fernandez, MPH⁷; Karen Southwick, MD⁷; E. Yoko Furuya, MD⁸; David P. Calfee, MD⁹; Camille Hamula, PhD¹⁰; Gopi Patel, MD¹⁰; Patricia Barrett, MSD¹¹; Patricia Lafaro¹²; Elizabeth L. Berkow, PhD¹; Heather Moulton-Meissner, PhD²; Judith Noble-Wang, PhD²; Ryan P. Fagan, MD²; Brendan R. Jackson, MD¹; Shawn R. Lockhart, PhD¹; Anastasia P. Litvintseva, PhD¹; Tom M. Chiller, MD¹

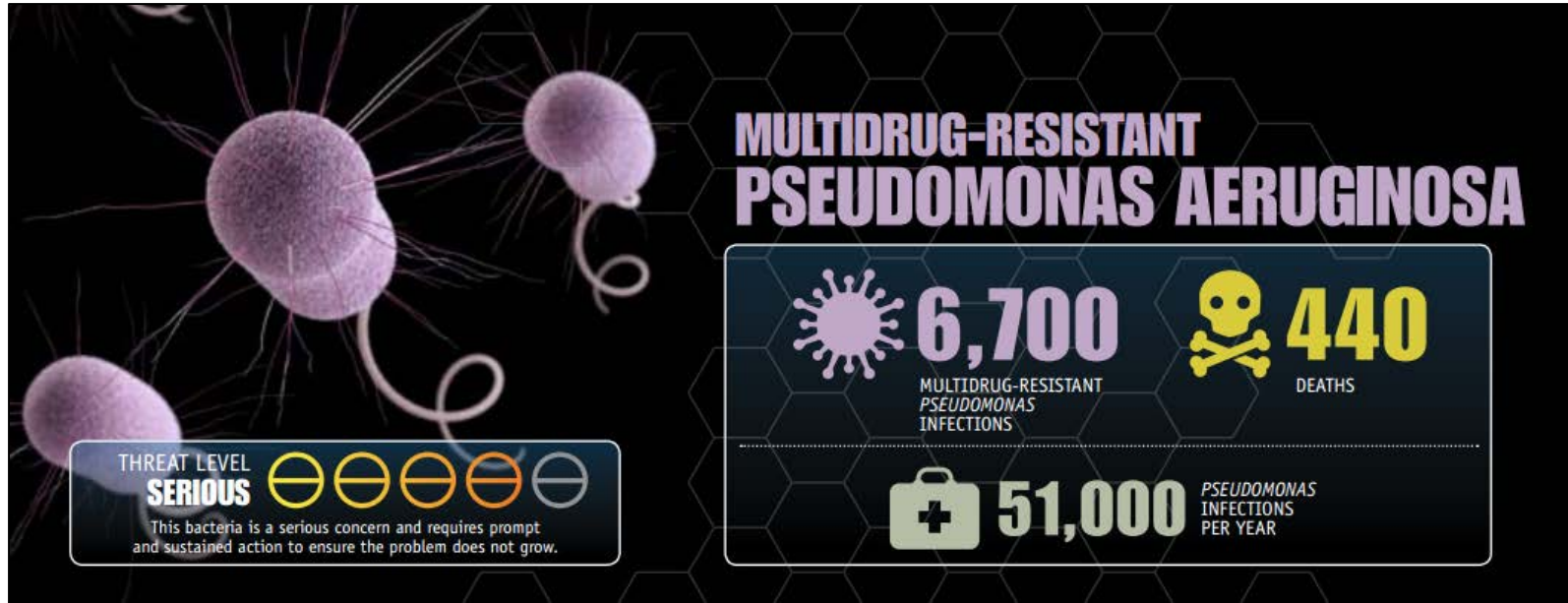
On November 4, 2016, this report was posted as an MMWR Early Release on the MMWR website (<http://www.cdc.gov/mmwr>).

Candida auris, an emerging fungus that can cause invasive

carbapenem-resistant Enterobacteriaceae, but have been uncommon among *Candida* spp.

To determine whether *C. auris* cases were occurring in the United States, CDC issued a clinical alert (8) in June 2016

Carbapenemase-producing *Pseudomonas aeruginosa*



- VIM–PA outbreak detected in Chicago area
- KPC and IMP later identified

Inter-facility communication

1. Mandatory CRE reporting

All Illinois Facilities

2. *C. auris*, CP-PA

IDPH

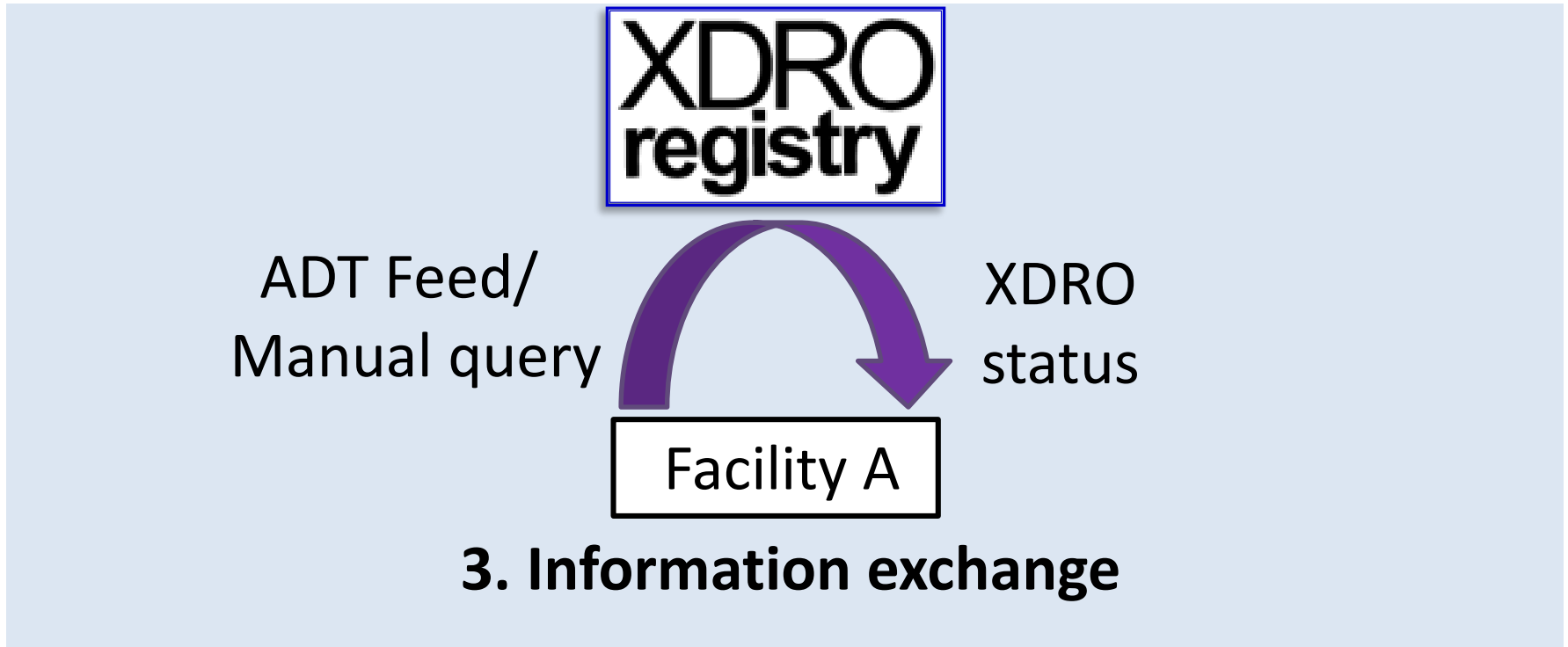
**XDRO
registry**

ADT Feed/
Manual query

XDRO
status

Facility A

3. Information exchange



Manual searches

XDRO
registry

Sample Hospital [change facility](#)

Test User1

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Submit Report

Search Registry



Facility Submission History

Facility Alert History

XDRO Dashboard

Need last name and DOB to conduct query

XDRO
registry

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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

- If you enter all 3 fields, then attempt to match (exact; case insensitive) on all 3 fields.
- 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

- 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



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Search Patient

* Last name

* Date of birth

 / /

First name

Query

Showing results for bird, DOB 3/4/2000 (**FIRST NAME IGNORED**):

Name	Date of Birth	SSN	Organism	Culture Date	Last Transaction	Facility
Bird, Tweety	03/04/2000		<i>Klebsiella pneumoniae</i>	01/01/2017	submitted,05/31/2017	Sample Hospital..

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](#).

XDRO Report - Sample Hospital

Patient information

Patient name: Bird, Tweety

MRN: 1234567

Admission date: 12/31/2016

Date of birth: 03/04/2000

SSN (last 4):

Gender: male

Race: Other

Ethnicity: Not Hispanic or Latino

Address: 12345 Main St, Anycity, Cass, IL 60000

XDRO culture information

Organism: *Klebsiella pneumoniae*

Culture date: 01/01/2017

XDRO criterion: Molecular test

Specimen source: Urine

Mechanism of resistance: KPC

Comments:

[Submitted by Vicky Gao, 05/31/2017, Sample Hospital](#)

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XDRO Auto Alerts



- **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



Log in to the registry to view alerts

XDRO
registry

Sample Hospital [change facility](#)

Test User1

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Submit Report

Search Registry

Facility Submission History

Facility Alert History



XDRO Dashboard

Facility Alert Page

Sample Hospital Alert

Please click [here](#) to confirm your alert contact information and facility

First name

Last name

Date of birth

mm / dd / yyyy

Search

Alerts Tracking

Acknowledge	AID	Name	Date of Birth	Organism	Matching	▼Alert Date
By A.T. 06/01/2016 09:23	323	Submission, Test	01/02/1934	Klebsiella pneumoniae	Full Match	05/23/2016
By R.L. 04/09/2015 15:47	3	E, Ds	11/11/1982	Enterobacter aerogenes	Partial Match	03/21/2014
Acknowledge	2	Bug, Super	01/01/1914	Klebsiella pneumoniae	Full Match	03/20/2014

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 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.

Tracking Alert Outcomes



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Sample Hospital Alert Tracking

AID

Last name

Date of birth

 / /

Search

[Alert History](#)

Action	AID	Patient	Alert Date	Not Inpatient	Correct Patient? ^a	Known CRE? ^b	Previous positive at our facility? ^c	Communicated by other facility? ^c	Already on contact precautions? ^d
Save	323	T.S.	05/23/2016	<input type="checkbox"/>	select: ▼	select: ▼	select: ▼	select: ▼	select: ▼
Edit	3	D.E.	03/21/2014	<input checked="" type="checkbox"/>	—	—	—	—	—
Edit	2	S.B.	03/20/2014	<input type="checkbox"/>	Yes	Yes	Unknown	Yes	Yes

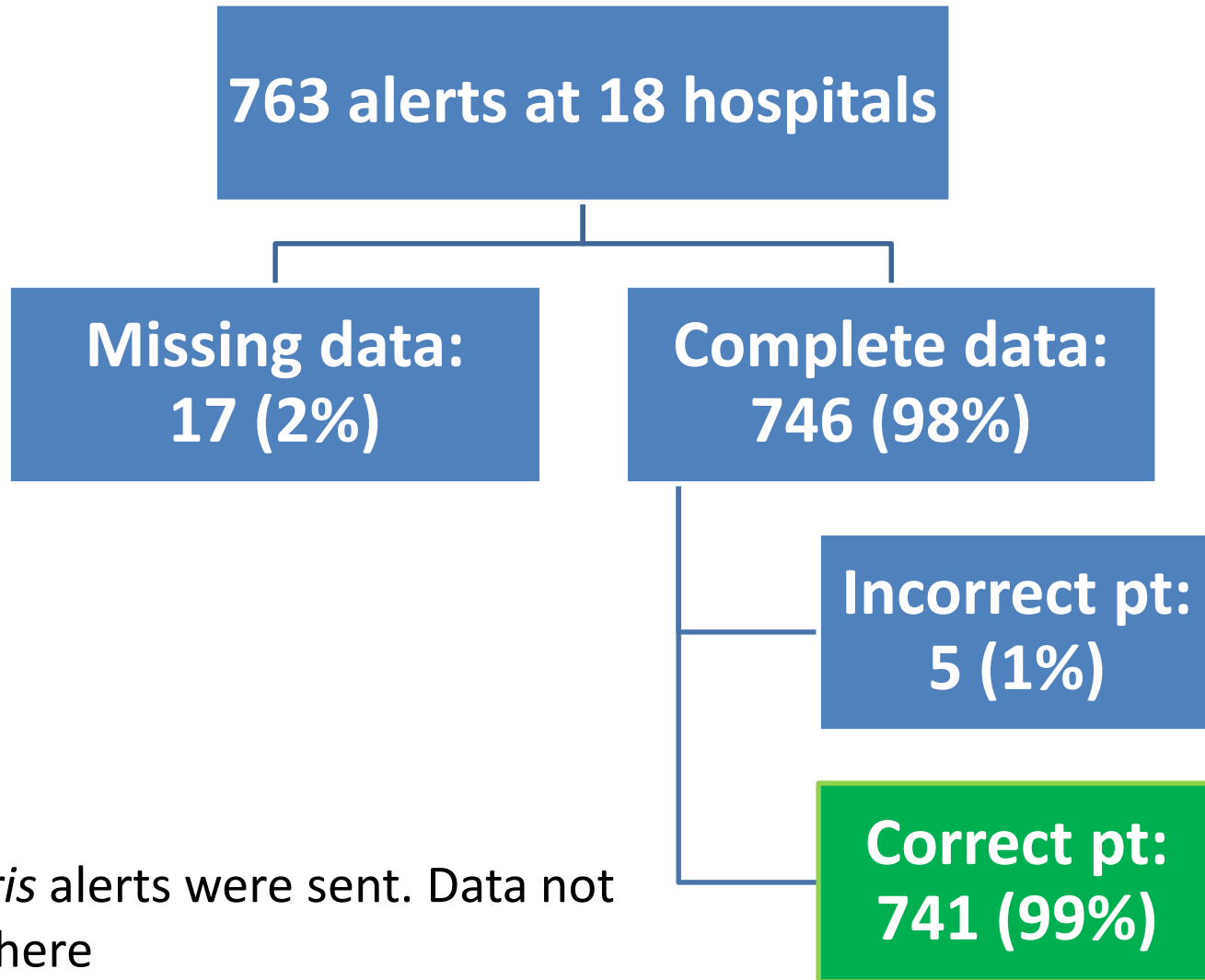
a. Sometimes a name and date of birth do not match up to the correct patient, especially if there is a partial match (using date of birth, last name, first initial). Occasionally, you may need to confirm the identity of the patient using additional information (for example, home address).

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

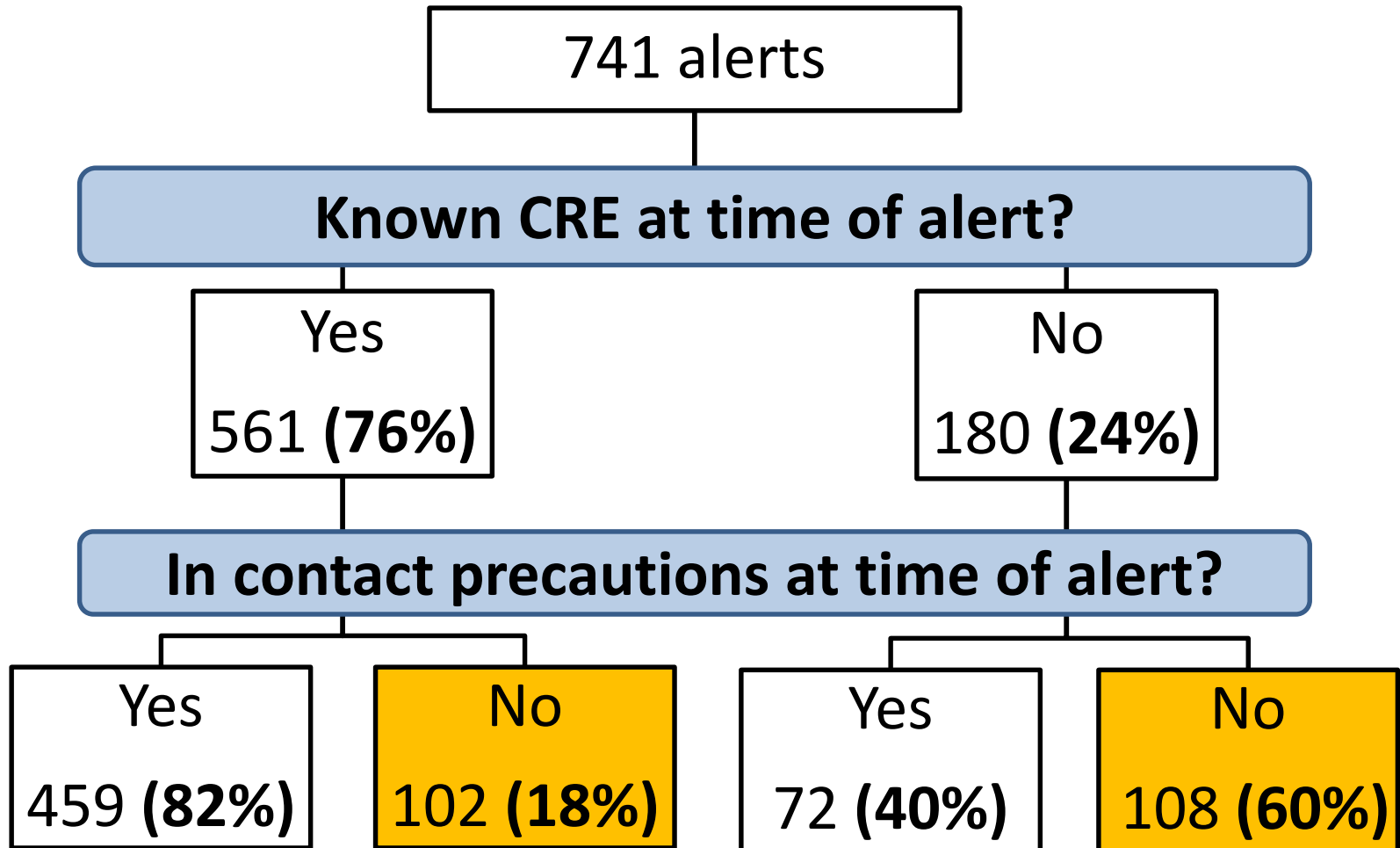


Notes:

- 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



Auto alerts - Additional benefits

Saves time

Manual Searches, 1.5 years	Auto Alert Searches, 1 month
5,744	28,661

Auto alerts - Additional benefits

Saves time

Manual Searches, 1.5 years	Auto Alert Searches, 1 month
5,744	28,661

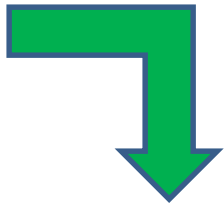
Provides data for quality improvement

Alerts (n)	Alerts/ month	Correct person? n (%)	Known CRE? n (%)	Contact Precautions? n (%)
47	2.8	44 (94)	19 (43)	9 (20)

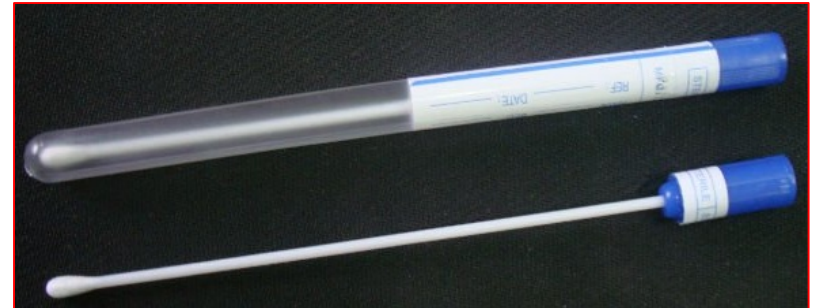
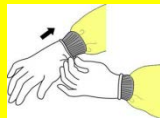
Additional benefits

Timely infection control action saves resources

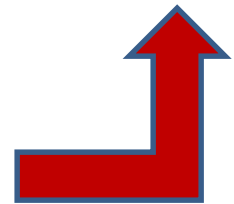
This.....



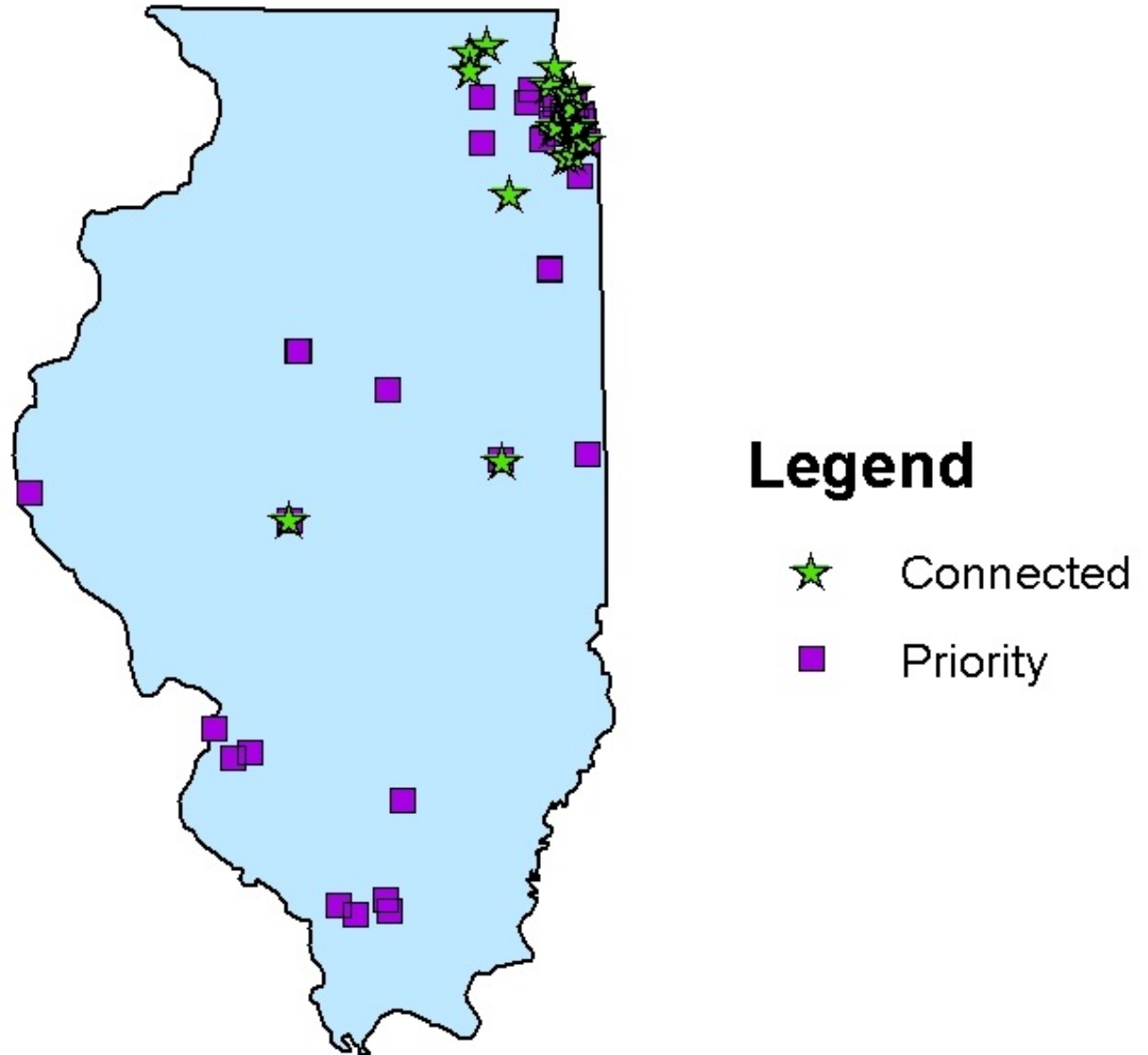
Contact Precautions



Not That...



XDRO auto alert progress (statewide)



Credit: Emily Augustini

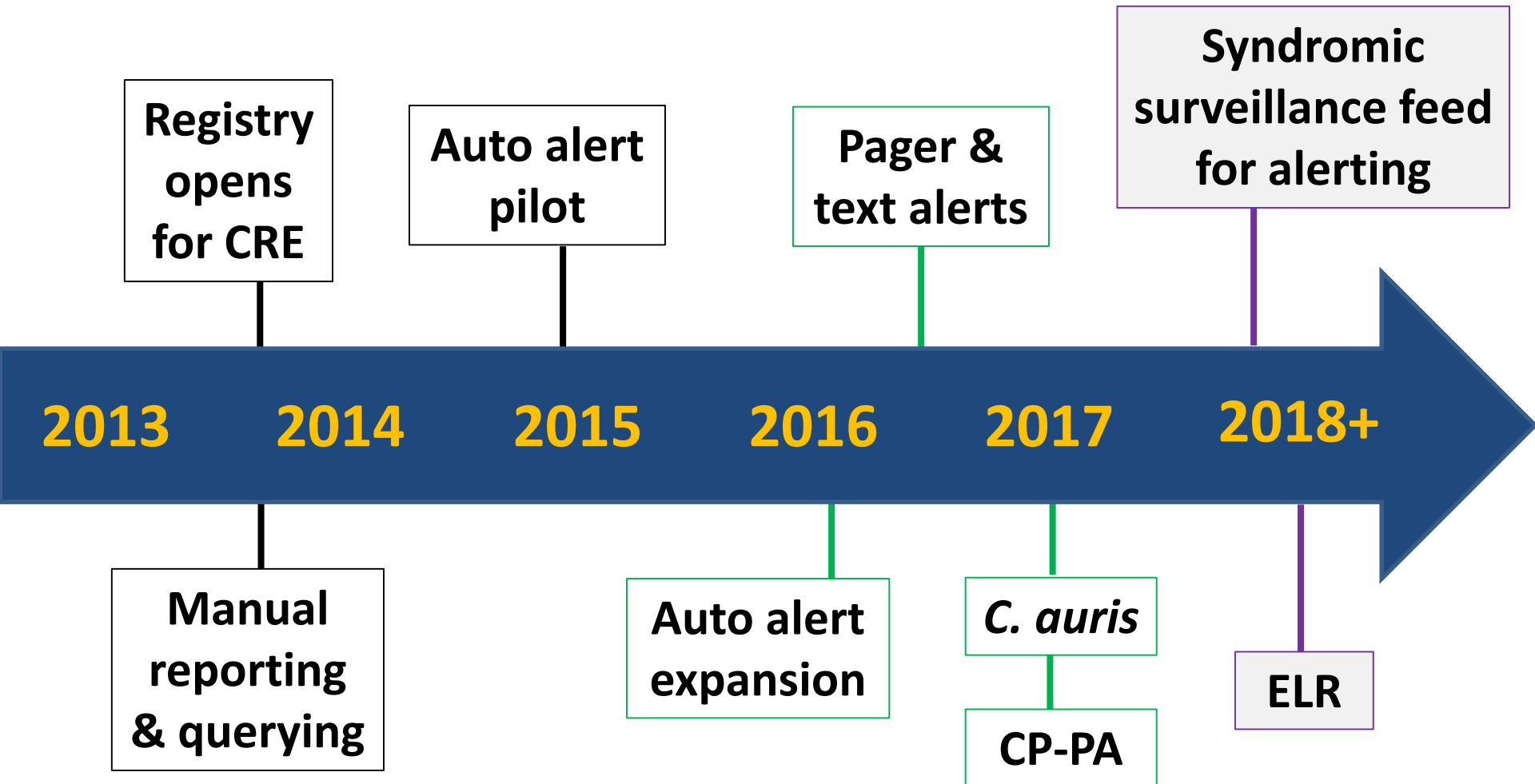
Select Challenges & Solutions

Challenge	Solution
Understanding CRE definition	Educational campaign
Testing capacity at local labs	Lab validation, testing at IDPH Laboratory
Onboarding facilities (esp. long-term care)	Educational campaign, individual assistance
XDRO data quality	Lab validation, Future data validation

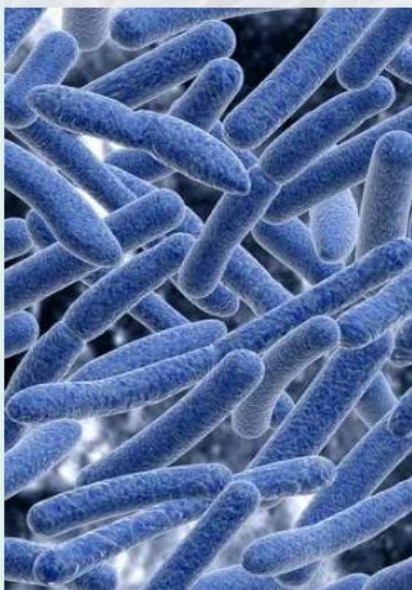
Common Questions

- Why didn't you use NEDSS or NHSN for reporting?
- How did you address HIPAA issues?
- Why doesn't IL follow the CDC 2015 CRE definition?

XDRO registry developments



CP-PA= Carbapenemase-producing *Pseudomonas aeruginosa*;
ELR= Electronic Laboratory Reporting



The XDRO registry is a product of collaboration between IDPH, Medical Research Analytics and Informatics Alliance (MRAIA), and the Chicago CDC Prevention Epicenter.

Carbapenem-resistant Enterobacteriaceae (CRE) are extensively drug resistant organisms (XDROs) that have few treatment options and high mortality rates. CRE are increasingly detected among patients in Illinois, including in acute and long term care healthcare facilities.

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.

For access to the XDRO registry, click [here](#)

UPDATES

As of April 2017, IDPH is entering carbapenemase-producing *Pseudomonas aeruginosa* cases into the XDRO registry. Link: [\[CDC Pseudomonas aeruginosa in Healthcare Settings\]](#)

As of January 2017, IDPH is entering *Candida auris* cases into the XDRO registry. Links: [\[CDC C. auris Questions and Answers\]](#)[\[CDC Interim Recommendations\]](#)

IL CRE Detect and Protect Campaign. [More...](#)

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

XDRO registry orientation webinar [\[Slides\]](#)[\[Recording\]](#)

CDC guidance on control of CRE: [\[Toolkit\]](#)

AHRQ CRE Toolkit: [\[Carbapenem-Resistant Enterobacteriaceae \(CRE\) Control and Prevention Toolkit\]](#)

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

View FAQs: [\[FAQs PDF\]](#)

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Acknowledgments

IDPH

- Erica Runningdeer
- Chinyere Alu
- Stacey Hoferka
- Emily Augustini

CDC Epicenter

- Bill Trick
- Mike Lin
- Vicky Gao
- Shawn Xiang
- Helen Zhang
- George Markovski

BD/MedMined

- Vikas Gupta
- Autumn Langford

MRAIA

Hospital IPs

For more information:

www.xdro.org

DPH.XDROregistry@illinois.gov