A Statewide Registry for MDROs: Illinois' Experience

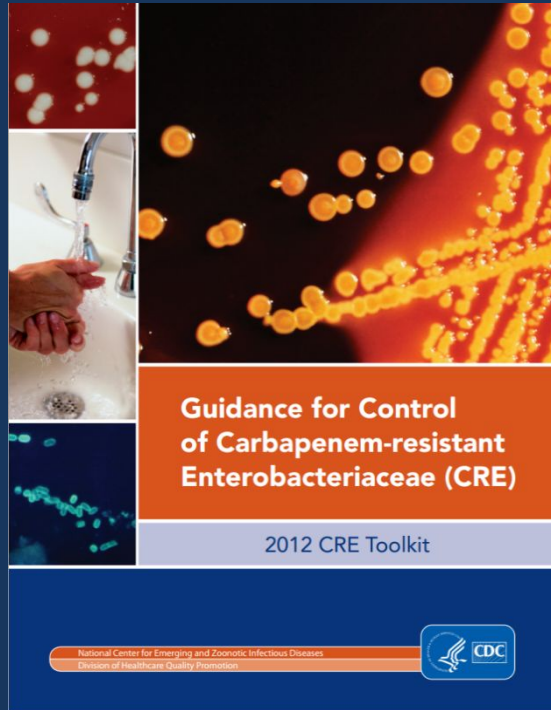William Trick, MD

Chicago CDC Prevention Epicenter

Cook County Health

Rush University Medical Center

Disclosures

- I have no disclosures to report
- Funded by CDC Prevention Epicenters Program
- ELC grant through Illinois Department of Public Health

"Detect and Protect"

Guidance for Control of Carbapenem-resistant Enterobacteriaceae (CRE)

2012 CRE Toolkit

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

- <u>Detect</u>: Identify all patients with CRE

- <u>Protect</u>: Maintain CRE-colonized patients in isolation precautions throughout the healthcare system

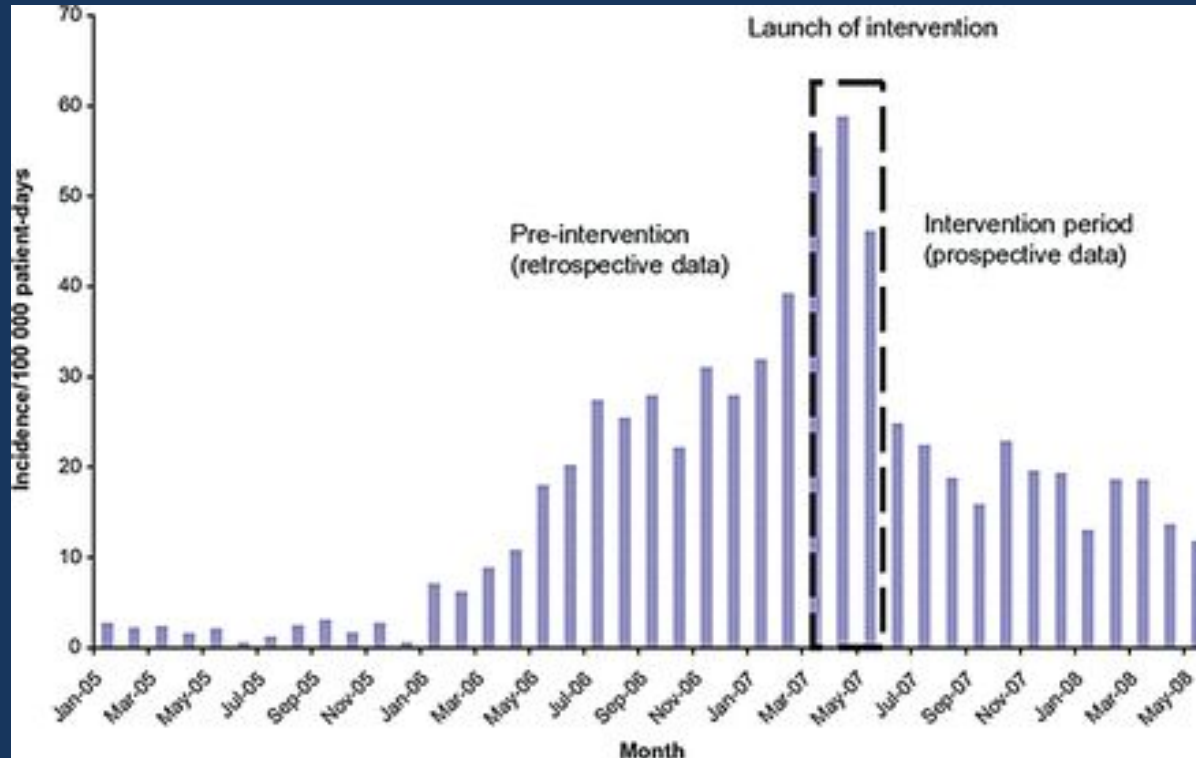# Illinois Sociogram – A dense network

LTACH

Short-term (Chicago)

Short-term
(Non-Chicago)
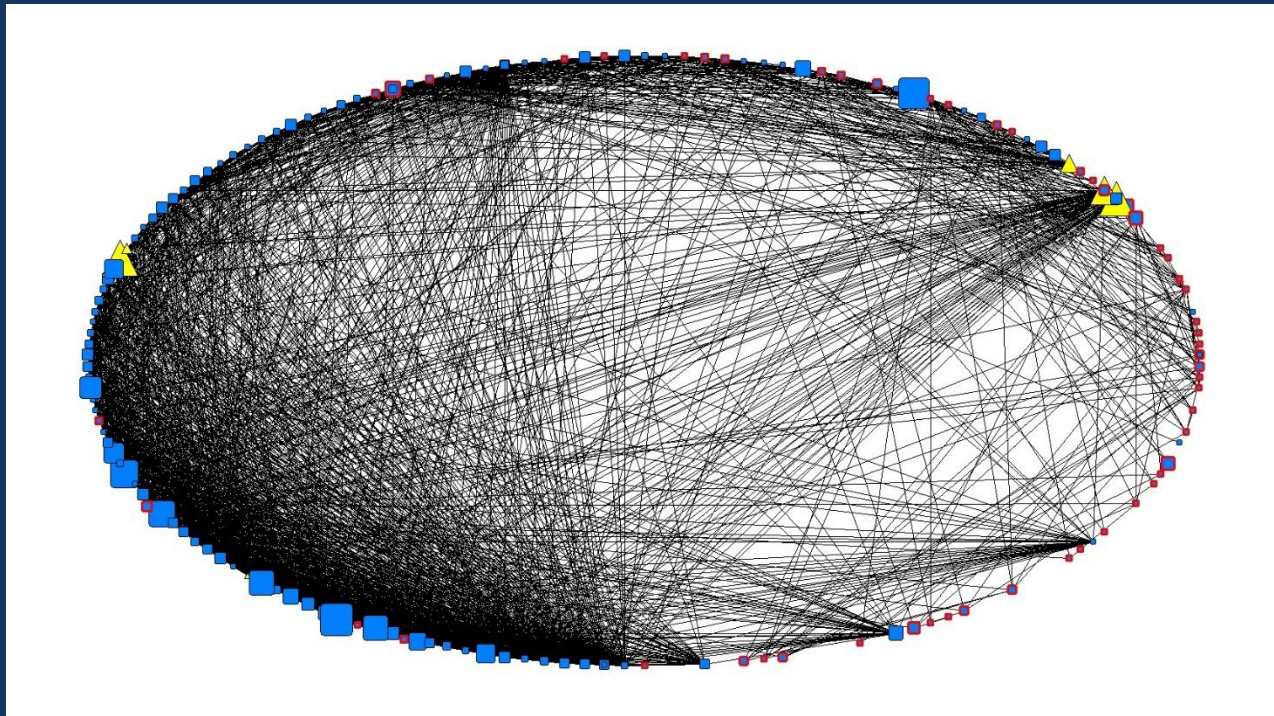
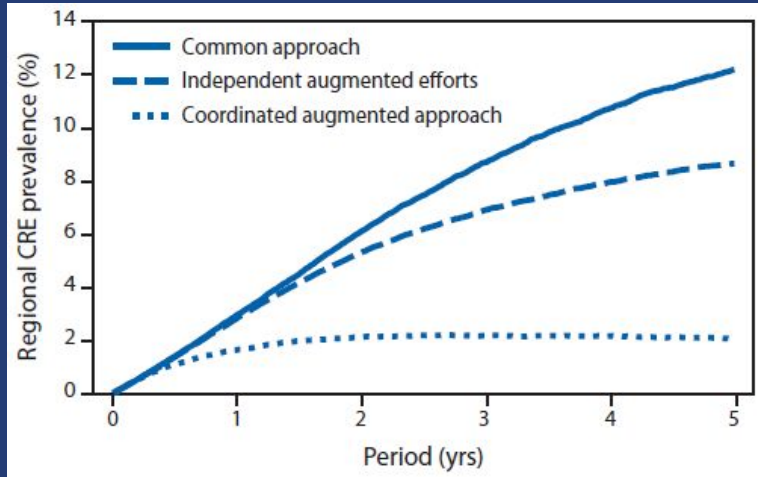*Node size is proportional to CRE rate per 10,000 patient days

National Intervention to Reduce Incidence of CRE:
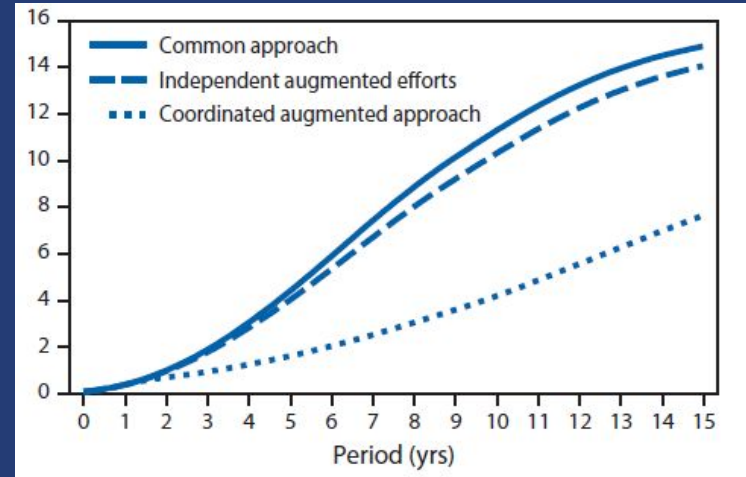
Clinical Cultures at Acute Care Hospitals

Schwaber et al. Clin Infect Dis. 2014

Projected Prevalence of CRE: Three Scenarios

10-Facility Model

102-Facility Model

Slayton et al., MMWR Vital Signs: August 2015

Illinois XDRO Registry: www.xdro.org
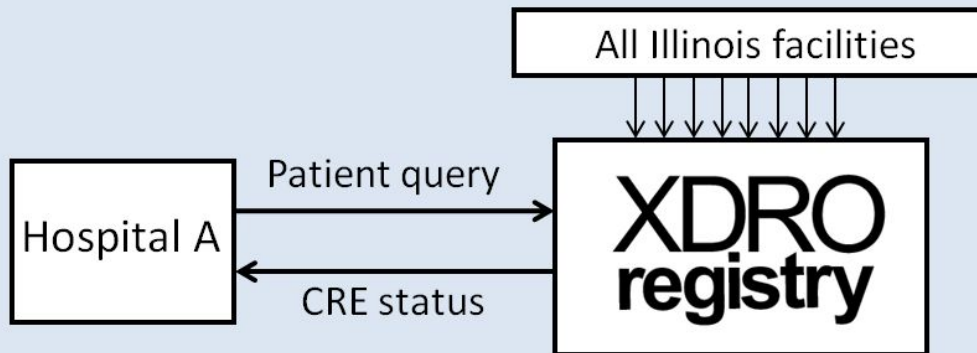
Participants: Illinois hospitals + LTACHs (142); nursing homes (784); laboratories
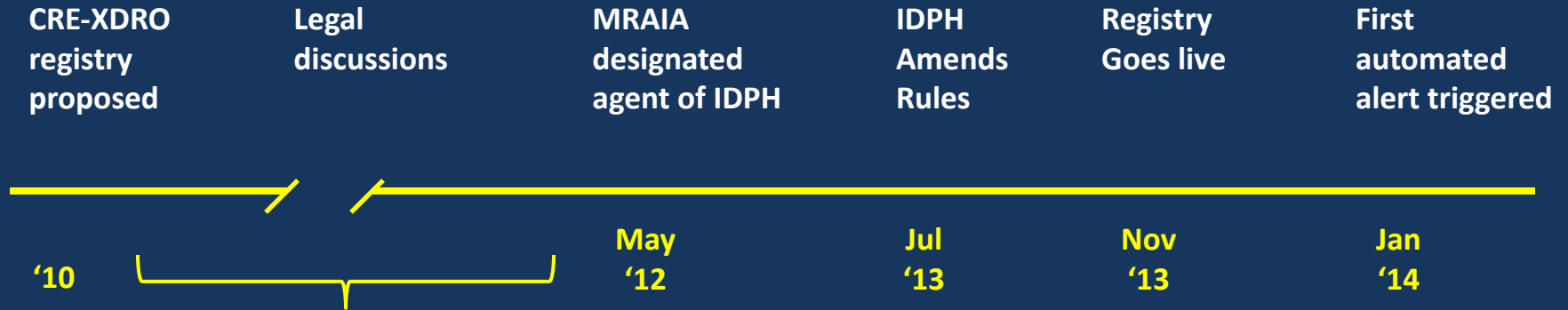
XDRO Registry Decision Nodes

- Can this be performed under public health authority?
- Focus on specific organism?
- Incorporate with ELR?
- How expansive should data collection be?

XDRO Registry Decision Nodes

- Can this be performed under public health authority? **YES**

- Focus on specific organism?   **YES, CRE → No**

- Incorporate with ELR?   **NO**

- How expansive should data collection be? KEEP IT SIMPLE

Registry Timeline

CRE-XDRO
registry
proposed

Legal
discussions

MRAIA
designated
agent of IDPH

IDPH
Amends
Rules

Registry
Goes live

First
automated
alert triggered

'10

May
'12

Jul
'13

Nov
'13

Jan
'14

MRAIA: Medical Research Analytics and Informatics Alliance, 501(c)3

Illinois' Communicable Disease Code

XDROs to be included in the registry include non-duplicative XDROs considered to be of epidemiologic importance due to either severity of clinical disease, potential for transmission of genetic elements, or opportunities for effective control efforts.

The Department requires the following health care facilities to report patient XDRO incident information:

a)   Hospitals;

b)   Hospital-affiliated clinical laboratories;

c)   Independent or free-standing laboratories;

d)   Long-term care facilities; and

e)   Long-term acute care hospitals (LTACHs)

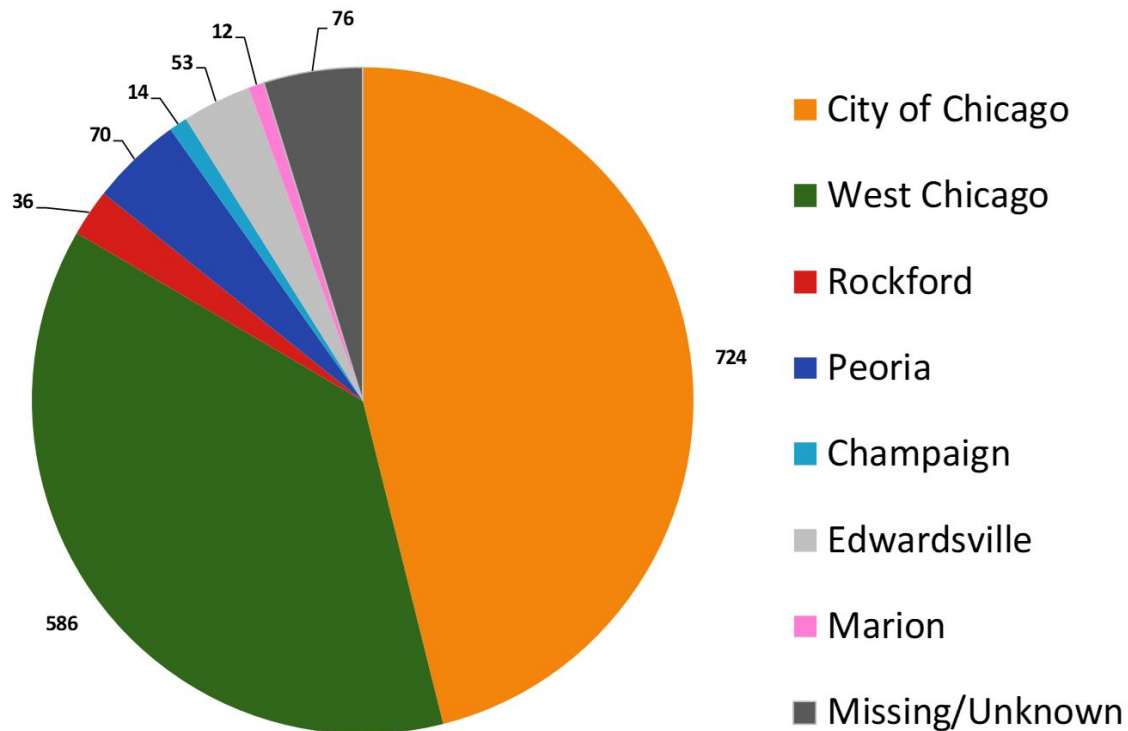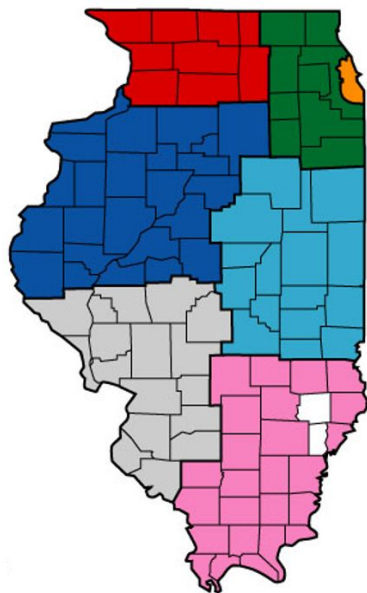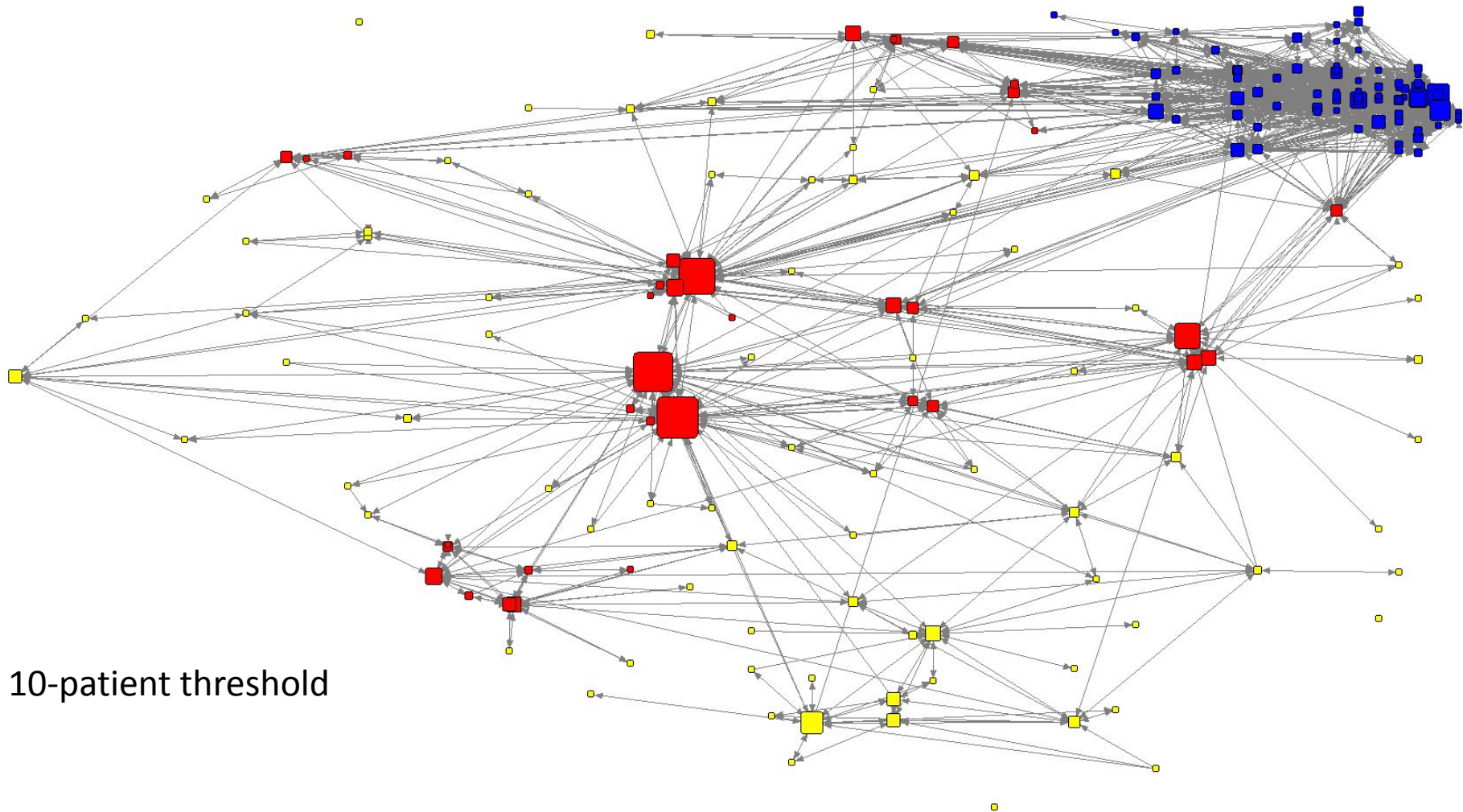# Unique patients with clinical CRE reported to Illinois XDRO registry, 11/1/13 – 12/31/2022 (N=6895)
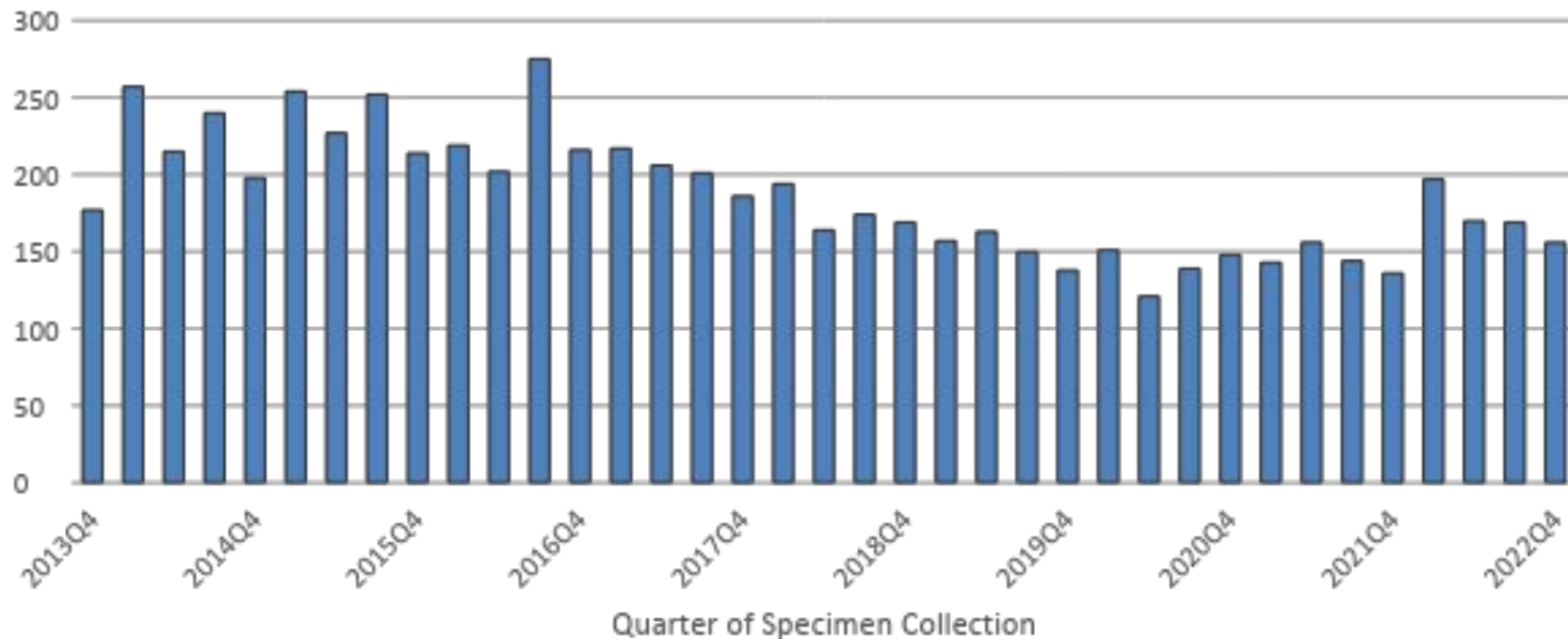
Quarter of Specimen Collection

IDPH
ILLINOIS DEPARTMENT OF PUBLIC HEALTH

Alert Anecdote: IP Testimonial

"… I got a CRE alert last night on a patient …I went to check transfer notes… nothing is there, I don't think the nursing home knows that he has CRE. It was *very exciting* because it was a case we didn't know about…I really, really think this will be a cool system…."

All XDRO reports by region

Legend:
- City of Chicago
- West Chicago
- Rockford
- Peoria
- Champaign
- Edwardsville
- Marion
- Missing/Unknown

Values: 724, 586, 36, 70, 14, 53, 12, 76

Data from IDPH

10-patient threshold

Central Network Position Associated with High CRE Rates

Hospital Characteristic	Rate Ratio	95% Confidence Interval	P Value
Degree centrality, by region[a]			
Chicagoland[b]	1.027	1.002–1.052	.03
Non-Chicago urban[b]	1.025	1.002–1.048	.03
Rural county[b]	1.056	1.030–1.082	<.0001

Ray et al., Clin Infect Dis, 2016
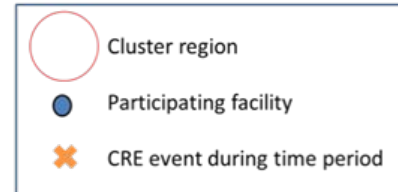
Finding Geographic clusters with SaTScan

- Automated, runs weekly
- 100 km or 10% of population at risk

Legend:

- ○ Cluster region
- ● Participating facility
- ✖ CRE event during time period

www.satscan.org
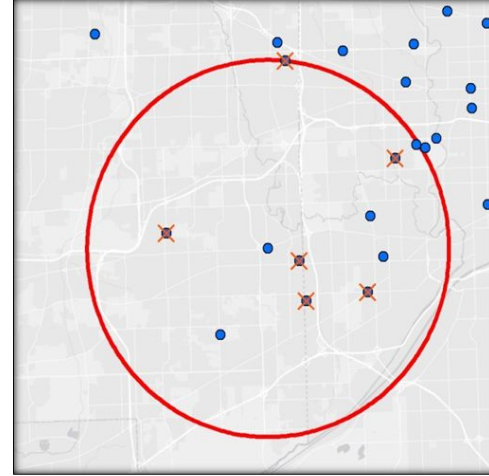
ADT Feeds to Capture Admissions

- Direct feeds from health system   N=58
- CareFusion feeds   N=15
- Syndromic Surveillance   N=30*

  ***Extension to Nursing homes through Medicaid initiative!

Next Steps: High-Risk Patient Alert

Adjusted Predictors of Carbapenem-Resistant *Enterobacteriaceae* Carriage on Admission, 2014–2015 Cohort

Covariate[a]	Case (n = 300)	Control (n = 143 278)	aOR	95% CI	P
Age, y	65	57	1.02	1.01–1.03	<.001
STACH hospitalizations in prior 365 d, No.	3.7	1.4	1.03	1.01–1.06	.02
Mean STACH length of stay, d	8.9	2.5	1.04	1.03–1.06	<.001
LTACH hospitalizations in prior 365 d, No.	0.5	0.02	2.32	1.94–2.78	<.001
Mean LTACH length of stay, d	11.1	0.3	1.02	1.02–1.03	<.001
Prior infection diagnosis, %	74	27	3.03	2.23–4.12	<.001

Model Validation 2016 Cohort
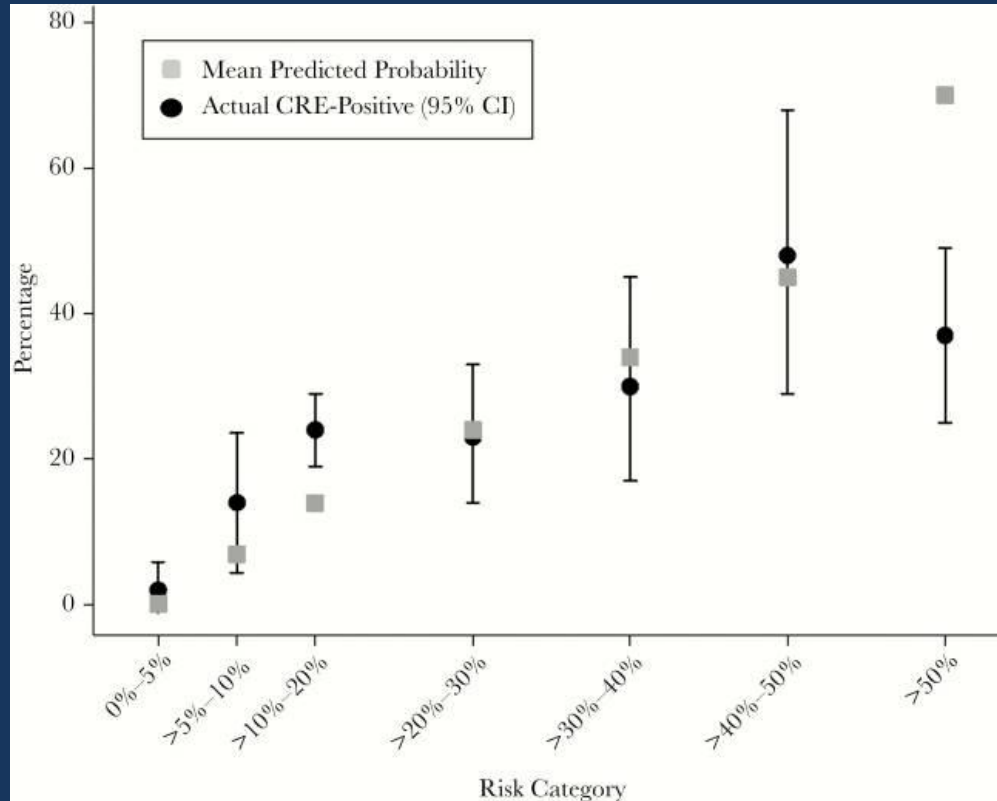
Public Health Reflections

- Guided public health interventions
  - Facility counts
  - Patient address
- Scalability to other organisms: *C. auris*
- Manual query feature, used by LTCFs

Takeaways

- Partnership was critical
  - Public health
  - Non-profit informatics entity (MRAIA) designated agent of IDPH
  - CDC Prevention Epicenter
- Alert generation appreciated