HAI/AR Prevention in Illinois - Updates

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Division of Patient Safety & Quality

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Disclaimers

- No conflict of interest to report
- The IDPH HAI/AR Prevention Program is supported with ELC cooperative agreement funds from the Centers for Disease Control and Prevention (CDC)

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Objectives

- Review state-specific antimicrobial prescribing and resistance data
- List priorities from the ***Illinois Action Plan to Prevent Healthcare Associated Infections and Antimicrobial Resistance***
- Discuss state-specific initiatives to promote and track antibiotic stewardship

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Pretest Question 1

- True or False: In 2015, the number of people treated in Illinois hospitals with *Clostridium difficile* infection would be more than the capacity of the large outdoor concert venue at Millennium Park in downtown Chicago.

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Pretest Question 2

- Which of the following are priorities of the Illinois Action Plan to Prevent Healthcare Associated Infections and Antimicrobial Resistance?
  - A) Infection Prevention Infrastructure, Standards, and Practices
  - B) Assessment/Treatment/Outbreak
  - C) Antimicrobial Stewardship
  - D) Multi-Drug Resistant Organisms
  - E) All of the above.

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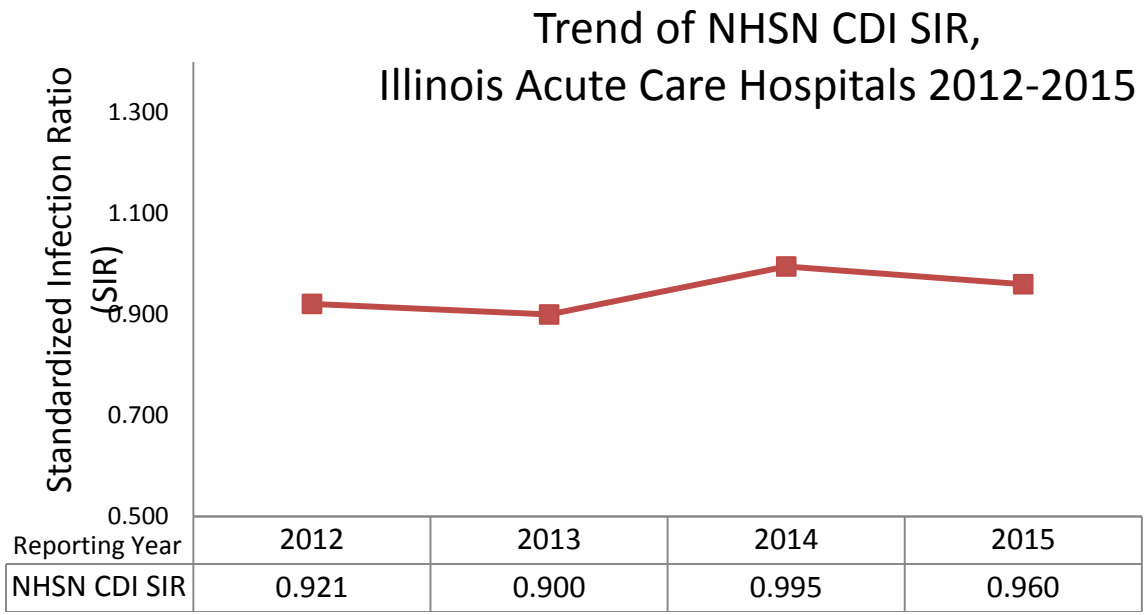
National Healthcare Safety Network (NHSN)
Clostridium difficile



Reporting Year	# of Facilities Reported	Number of CDIs		Standardized Infection Ratio (SIR)	95% Confidence Interval (SIR)		Statistical Interpretation
		Observed	Predicted		Lower	Upper	
2012	179	4620	4994.79	0.925	0.899	0.952	Lower
2013	183	4466	4939.25	0.904	0.878	0.931	Lower
2014	183	4640	4661.34	0.995	0.967	1.024	Similar
*** 2015**	183	4355	4538.26	0.960	0.931	0.988	Lower

*2015 data is preliminary

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National Healthcare Safety Network (NHSN)
Clostridium difficile

Another way to look at these data…

- Recent antibiotic exposure is a primary risk factors for CDI
- A substantial proportion of antibiotic exposures (e.g., prescriptions) are unnecessary
- In 2015, IL hospitals reported 15,476 cases of CDI to NHSN
- Half of these (7,711) were designated as community onset cases
- There are likely more community CDI cases not captured by NHSN

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What does 15,000 people look like?

The Chicago Symphony Orchestra looks out at a capacity crowd during a 2012 concert, c. Todd Rosenberg (98.7wfmt)

Pritzker Pavillion at Millenium Park has a capacity of 11,000 (4,000 seats; 7,000 lawn)

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National Healthcare Safety Network (NHSN) Prescribing Data - Illinois

- NHSN Antibiotic Use (AU) module
  - 12 (of 183) acute care hospitals in IL are reporting

- NHSN facility survey
  - Only 44% of hospitals have all seven core elements of antimicrobial stewardship in place

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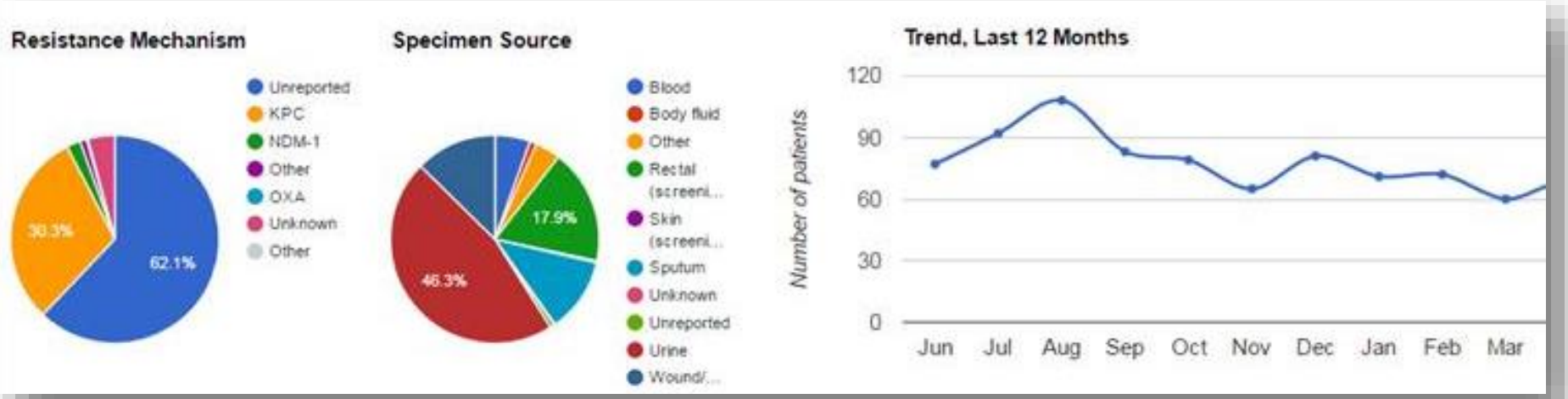
Antimicrobial Resistance Data - Illinois

Extensively Drug Resistant Organism Registry:
CRE reported in Illinois (as of June 6, 2016)

- Number of patients (unique cases): 2745
- Number of reports ever reported: 4308



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National Healthcare Safety Network (NHSN) Resistance Data - Illinois

Antibiotic Resistance Patient Safety Atlas from CDC

http://www.cdc.gov/hai/surveillance/ar-patient-safety-atlas.html

- Geospatial representation of AR data from device and procedure related HAIs reported to NHSN (CLABSI, CAUTI, SSI) by ACHs, LTACHs, and IRFs
- 31 resistant phenotypes (bug-drug combinations)
- Not a national estimate of burden of these infections (only HAIs captured by NHSN)

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National

AR PATIENT SAFETY ATLAS

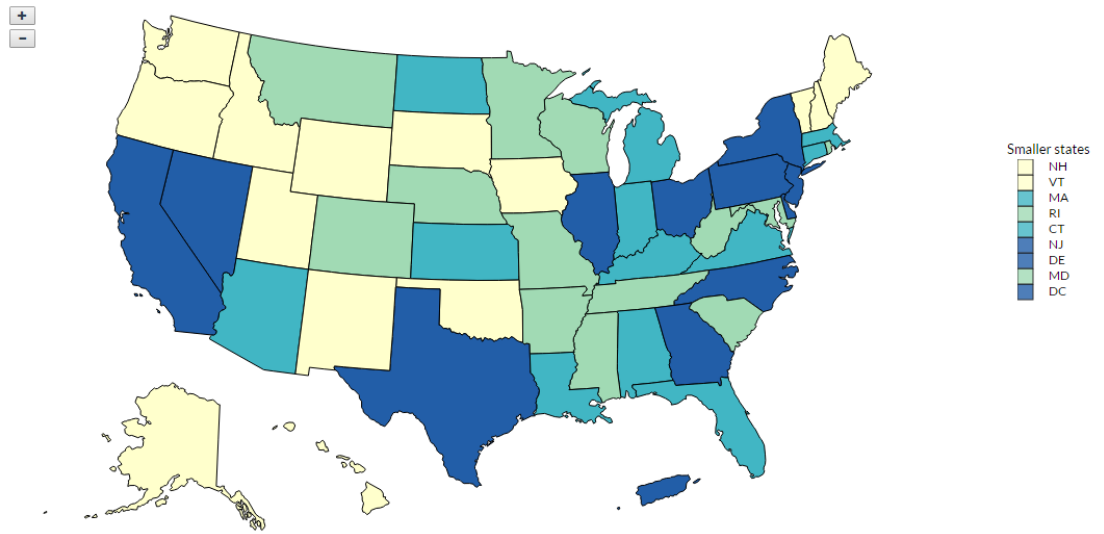
Overview | Map View | State Summary

Show me: CRE for: All HAIs Year: All Years

Carbapenem-Resistant *Enterobacteriaceae* spp. | All HAIs | Combined Years (2011-2014)

CSV JPG

Choose a state or region



% RESISTANT
- Insufficient Data
- 0 - 0.8
- 1 - 1.7
- 1.8 - 3
- 3.4 - 27.9

NHSN All data current as of 12/16/2015

Note: HAIs include Catheter-Associated Urinary Tract Infection (CAUTI), Central Line-Associated Bloodstream Infection (CLABSI), Surgical Site Infection (SSI); these account for about 25 percent of HAIs in acute care hospitals; values exclude some facility types (nursing homes).

National % Resistance

3.5% Resistant

Number Resistant: 2826

Number Tested: 80276

National % resistance over time

Calculated at 95% confidence interva

Precision View

CSV

Year	National % Resistant	Lower 95%	Upper 95%
2011	4.3	3.8	4.6
2012	3.2	2.9	3.3
2013	3.9	3.6	4.1
2014	3.2	2.9	3.4

About this Pathogen

- The three most common types of Enterobacteriaceae causing healthcare associated infections include *Enterobacter* spp., *Klebsiella* spp., and *E.coli*
- These bacteria cause pneumonia, urinary tract infections, and bloodstream infections in patients. Collectively, *Enterobacteriaceae* spp. are the most common group of pathogens causing healthcare-associated infections.
- Emerging resistance to carbapenems makes treating these resistant infections very difficult
- Threat level: Urgent. Find more information on carbapenem-resistant Enterobacteriaceae in the AR Threat Report
- Read more about this bug-drug profile in the Phenotype Definitions document

Footnotes

- **Insufficient Data** - Between 1 and 19 isolates were tested for susceptibility. The percent resistance and accompanying data points cannot be calculated when the number of tested isolates is less than 20
- **Not Defined** - Zero isolates were tested. The percent resistance and accompanying data points cannot be

ata Resources

- Export state specific data in CSV
- Export state specific data in Excel
- Export National data in CSV
- Export National data in Excel

dditional Resources

- Learn about Atlas terms and abbreviations in the Data Dictionary [PDF]
- Read how resistance is threatening future use of the powerful drugs listed above
- See more information on these bug-drug profiles in the phenotype definitions document [PDF]
- Find answers in the Frequently Asked Questions document [PDF]

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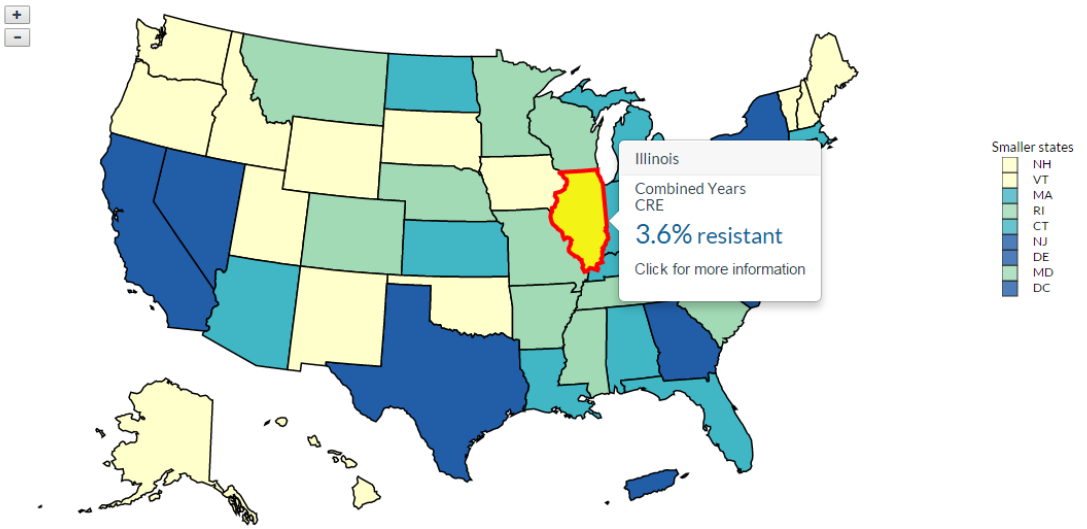
Illinois vs. National

Overview | Map View | State Summary

Show me: CRE for: All HAIs Year: All Years

Carbapenem-Resistant *Enterobacteriaceae* spp. | All HAIs | Combined Years (2011-2014)

CSV JPG IL



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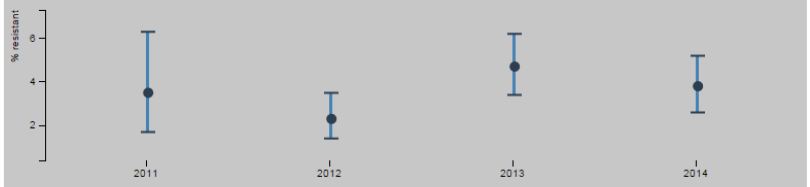
Learn more about other healthcare-associated infections in Illinois

Illinois
3.6% Resistant
99 Number Resistant
2742 Number Tested

National
3.5% Resistant
2826 Number Resistant
80276 Number Tested

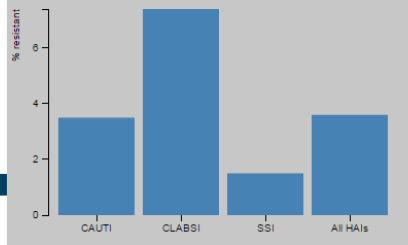
Illinois % Resistance — Include National Average

Resistance Over Time — CSV JPG

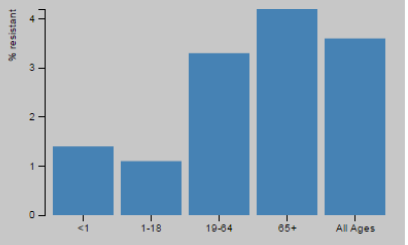


Year	IL %Resistant	IL Lower95%	IL Upper95%	National %Resistant	National Lower95%	National Upper95%
2011	3.5	1.7	6.3	4.3	3.8	4.6
2012	2.3	1.4	3.5	3.2	2.9	3.3
2013	4.7	3.4	6.2	3.9	3.6	4.1
2014	3.8	2.6	5.2	3.2	2.9	3.4

Resistance by Event Type — CSV JPG



Resistance by Age Group — CSV JPG



Event Type	State value	National value
CAUTI	3.5	3.7
CLABSI	7.4	6.9
SSI	1.5	1.4
All HAIs	3.6	3.5

Age Group	State value	National value
<1	1.4	1.3
1-18	1.1	1.9
19-64	3.3	3.3
65+	4.2	4
All Ages	3.6	3.5

Data Resources

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Additional Resources

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National

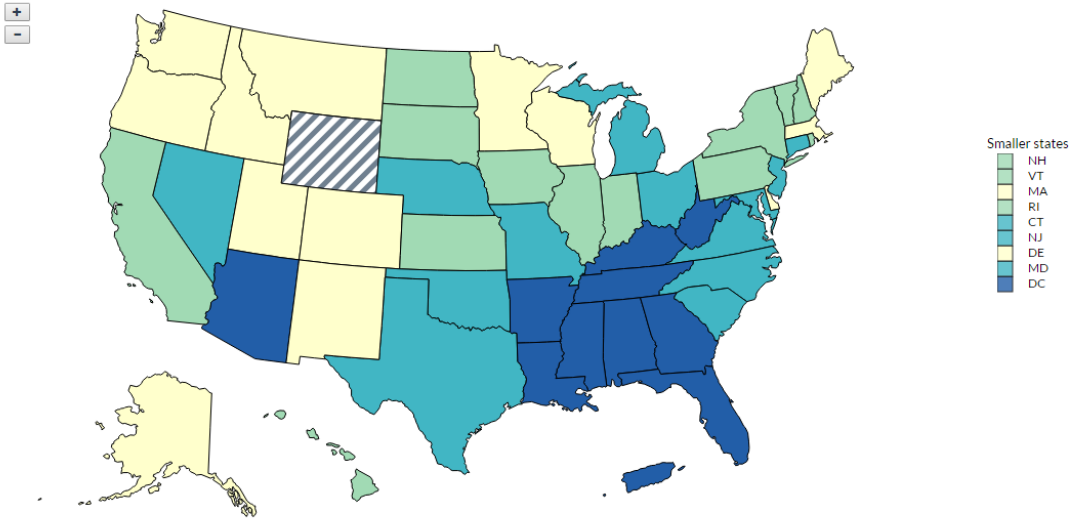
Overview | Map View | State Summary

Show me: MRSA for: All HAIs Year: All Years

Methicillin-Resistant *Staphylococcus aureus* | All HAIs | Combined Years (2011-2014)

CSV JPG

National



% RESISTANT
- Insufficient Data
- 32.5 - 40.6
- 41.8 - 46.9
- 47.5 - 53.4
- 53.5 - 67.8

N-HSN All data current as of 12/16/2015

Note: HAIs include Catheter-Associated Urinary Tract Infection (CAUTI), Central Line-Associated Bloodstream Infection (CLABSI), Surgical Site Infection (SSI); these account for about 25 percent of HAIs in acute care hospitals; values exclude some facility types (nursing homes).

Learn more about other healthcare-associated infections in Illinois

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National % Resistance

46.4% Resistant

Number Resistant: 20104

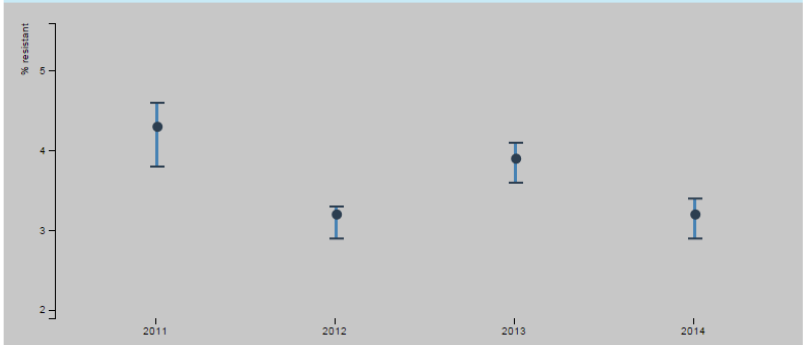
Number Tested: 43331

Calculated at 95% confidence interval

National % resistance over time

Precision View

CSV JPG



Year	National % Resistant	Lower 95%	Upper 95%
2011	4.3	3.8	4.6
2012	3.2	2.9	3.3
2013	3.9	3.6	4.1
2014	3.2	2.9	3.4

About this Pathogen

- *S.aureus* cause a range of illnesses, from skin and wound infections to pneumonia and bloodstream infections that can cause sepsis and death
- Staph bacteria, including those resistant to first-line therapy, methicillin-resistant *S. aureus* (MRSA), are the second most common causes of healthcare-associated infections according to a 2011 national prevalence survey performed by CDC. Less severe infections are common and occur outside the non-acute healthcare settings and in the community
- Threat Level: Serious. Find more information about MRSA in the AR Threat Report.
- Read more about this bug-drug profile in the Phenotype Definitions document

Footnotes

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- **Not Defined** - Zero isolates were tested. The percent resistance and accompanying data points cannot be

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Illinois vs. National

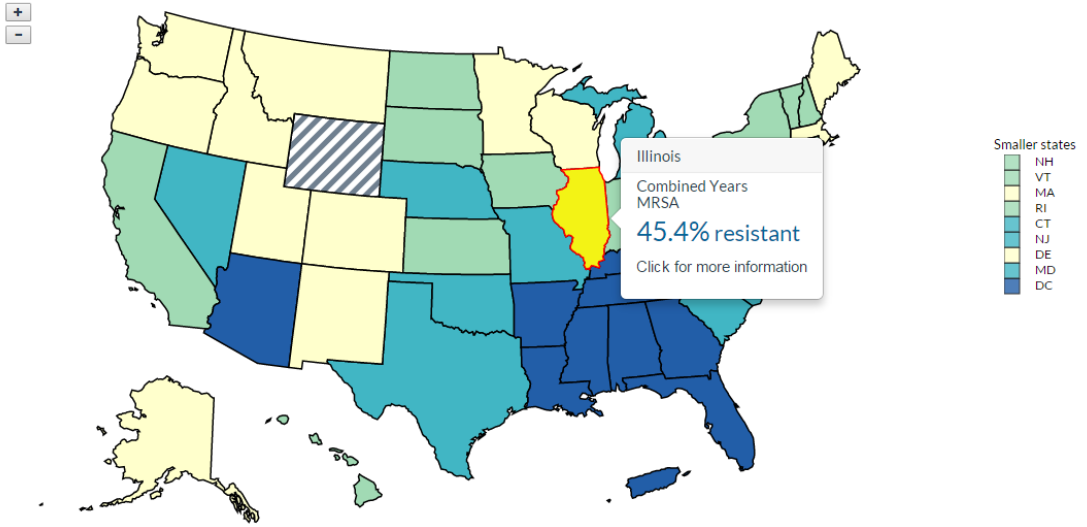
AR PATIENT SAFETY ATLAS

Overview | Map View | State Summary

Show me: MRSA for: All HAIs Year: All Years

Methicillin-Resistant *Staphylococcus aureus* | All HAIs | Combined Years (2011-2014)

CSV JPG IL



% RESISTANT
Insufficient Data
32.5 - 40.6
41.8 - 46.9
47.5 - 53.4
53.5 - 67.8

NHSN All data current as of 12/16/2015

Note: HAIs include Catheter-Associated Urinary Tract Infection (CAUTI), Central Line-Associated Bloodstream Infection (CLABSI), Surgical Site Infection (SSI); these account for about 25 percent of HAIs in acute care hospitals; values exclude some facility types (nursing homes).

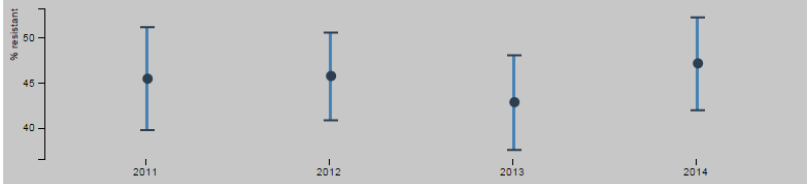
Learn more about other healthcare-associated infections in Illinois

Illinois
45.4% Resistant
630 Number Resistant
1389 Number Tested

National
46.4% Resistant
20104 Number Resistant
43331 Number Tested

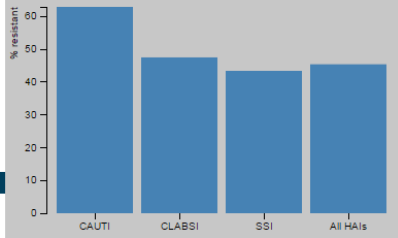
Illinois % Resistance — Include National Average

Resistance Over Time — CSV JPG



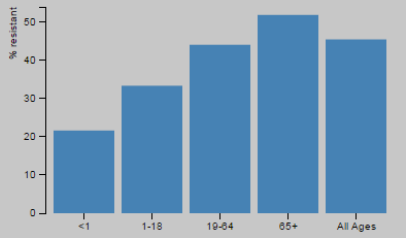
Year	IL %Resistant	IL Lower95%	IL Upper95%	National %Resistant	National Lower95%	National Upper95%
2011	45.5	39.8	51.2	46.7	45.5	47.7
2012	45.8	40.9	50.6	46.9	46	47.8
2013	42.9	37.6	48.1	47	46	47.8
2014	47.2	42	52.3	45.1	44.2	46

Resistance by Event Type — CSV JPG



Event Type	State value	National value
CAUTI	62.9	54.8
CLABSI	47.5	51.7
SSI	43.4	43.6
All HAIs	45.4	46.4

Resistance by Age Group — CSV JPG



Age Group	State value	National value
<1	21.6	30.7
1-18	33.3	30.3
19-64	44	43
65+	51.8	53.9
All Ages	45.4	46.4

Data Resources

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Additional Resources

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National

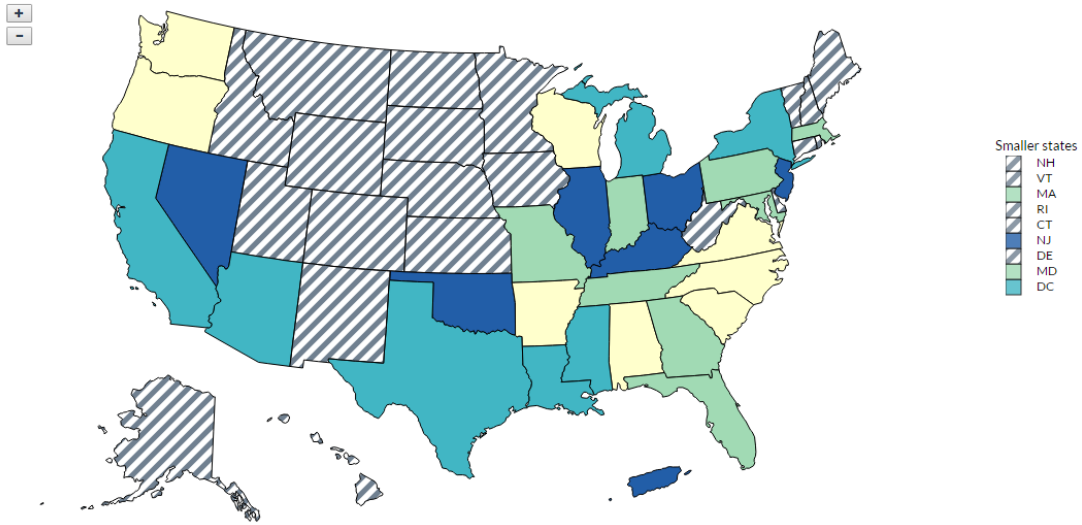
Overview | Map View | State Summary

Show me: Acinetobacter spp. MDR for: All HAIs Year: All Years

MDR *Acinetobacter* spp. | All HAIs | Combined Years (2011-2014)

CSV JPG

National



% RESISTANT
- Insufficient Data
- 5 - 38.3
- 40.5 - 55.9
- 56.1 - 63
- 64.7 - 88.1

NHSN All data current as of 12/16/2015

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Learn more about other healthcare-associated infections in Illinois

National % Resistance

54.8% Resistant

Number Resistant: 2011

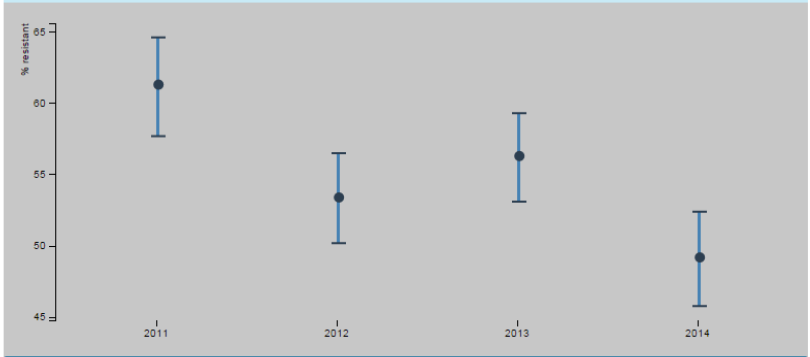
Number Tested: 3668

Calculated at 95% confidence interval

National % resistance over time

Precision View

CSV JPG



Year	National % Resistant	Lower 95%	Upper 95%
2011	61.3	57.7	64.6
2012	53.4	50.2	56.5
2013	56.3	53.1	59.3
2014	49.2	45.8	52.4

About this Pathogen

- *Acinetobacter* is a type of gram-negative bacteria that is a cause of pneumonia or bloodstream infections among critically ill patients
- Fewer than 1 of 10 healthcare-associated infections are caused by *Acinetobacter*; however, according to a 2011 national prevalence survey performed by CDC, many of these bacteria have become very resistant to antibiotics. Some strains are resistant to nearly all, or all antibiotics
- Threat level: Serious. Find more information about *Acinetobacter* spp. MDR in the AR Threat Report
- Read more about this bug-drug profile in the Phenotype Definitions document

Footnotes

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Illinois vs. National

AR PATIENT SAFETY ATLAS

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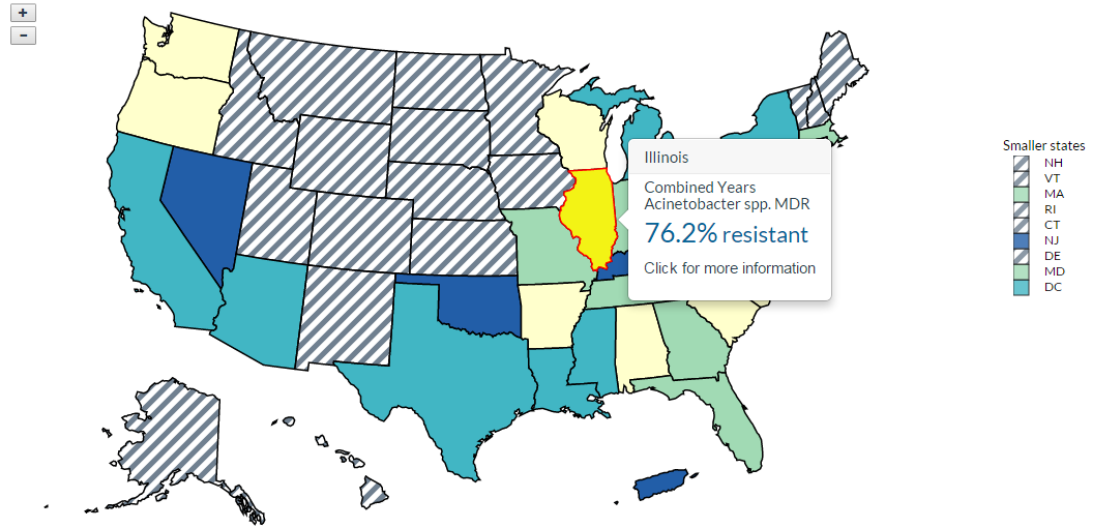
MDR *Acinetobacter* spp. | All HAIs | Combined Years (2011-2014)

CSV JPG IL



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N-HSN All data current as of 12/16/2015

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Learn more about other healthcare-associated infections in Illinois

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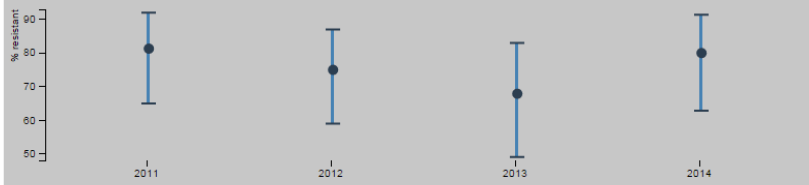
Illinois
76.2% Resistant
96 Number Resistant
126 Number Tested

National
54.8% Resistant
2011 Number Resistant
3668 Number Tested

Illinois % Resistance

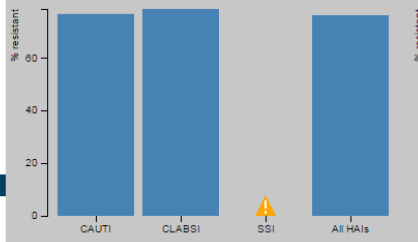
Include National Average

Resistance Over Time CSV JPG



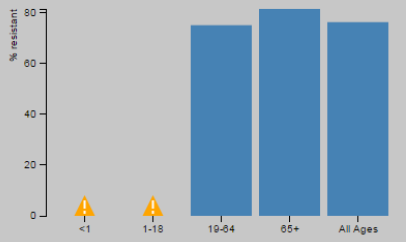
Year	IL %Resistant	IL Lower95%	IL Upper95%	National %Resistant	National Lower95%	National Upper95%
2011	81.3	65	92	61.3	57.7	64.6
2012	75	59	87	53.4	50.2	56.5
2013	67.9	49.1	83	56.3	53.1	59.3
2014	80	62.9	91.4	49.2	45.8	52.4

Resistance by Event Type CSV JPG



Event Type	State value	National value
CAUTI	76.7	70.1
CLABSI	78.6	52.5
SSI	Insuff Data	35.9
All HAIs	76.2	54.8

Resistance by Age Group CSV JPG



Age Group	State value	National value
<1	Insuff Data	16.2
1-18	Insuff Data	14.8
19-64	75	49.9
65+	81.4	69.6
All Ages	76.2	54.8

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Illinois Action Plan to Prevent Healthcare Associated Infections and Antimicrobial Resistance

Priorities:

- Infection Prevention Infrastructure, Standards, and Practices
- Assessment/Treatment/Outbreak
- Antimicrobial Stewardship
- Multi-Drug Resistant Organisms

Key Strategies

- Education & Training
- Policy Development
- Data/Surveillance
- Communication

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Illinois Action Plan to Prevent Healthcare Associated Infections and Antimicrobial Resistance

Priorities:

- Infection Prevention Infrastructure, Standards, and Practices
  - Goal #1: Illinois will implement a comprehensive and effective infection prevention and control system with standards, policies, and practices in place for all healthcare settings.
- Assessment/Treatment/Outbreak
  - Goal #2 Improve detection, investigation and response to infectious outbreaks including community and healthcare associated infections (HAI) and antimicrobial resistant (AR) organisms.
- Antimicrobial Stewardship
  - Goal #3: Improve antimicrobial prescribing practices across all healthcare settings.
  - Goal #4: Raise public awareness about antibiotic use and misuse.
- Multi-Drug Resistant Organisms
  - Goal #5: Slow the emergence of resistant bacteria and *Clostridium difficile*, and prevent their transmission.

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Data for Action

Healthcare-Associated Infections (HAI) Data for Action Report, 2014
Hospital A, City A, County A

Here is your facility's Healthcare Associated Infection Surveillance Report, produced by the Illinois Department of Public Health.
Provide feedback by email to: dph.dpsq@illinois.gov.

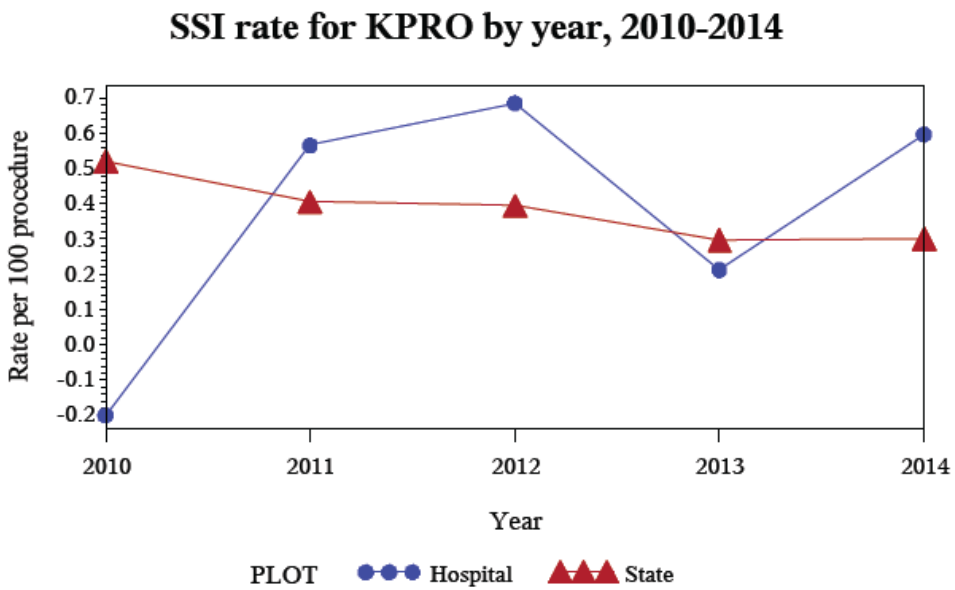
Legend									
The Standardized Infection Ratio (SIR) is a risk adjusted summary measure that compares the observed number of infections to the predicted number of infections based on the national experience. For this report, individual facility SIR will be compared to the state SIR.									
★	Fewer infections (BETTER) than predicted based on the state experience.	=	About the same number of infections (SAME) as predicted based on the state experience	✕	More infections (WORSE) than predicted based on the state experience.	No Conclusion	When the number of predicted infections is less than 1, no conclusion can be made.	☆	Congratulations on achieving ZERO infections!

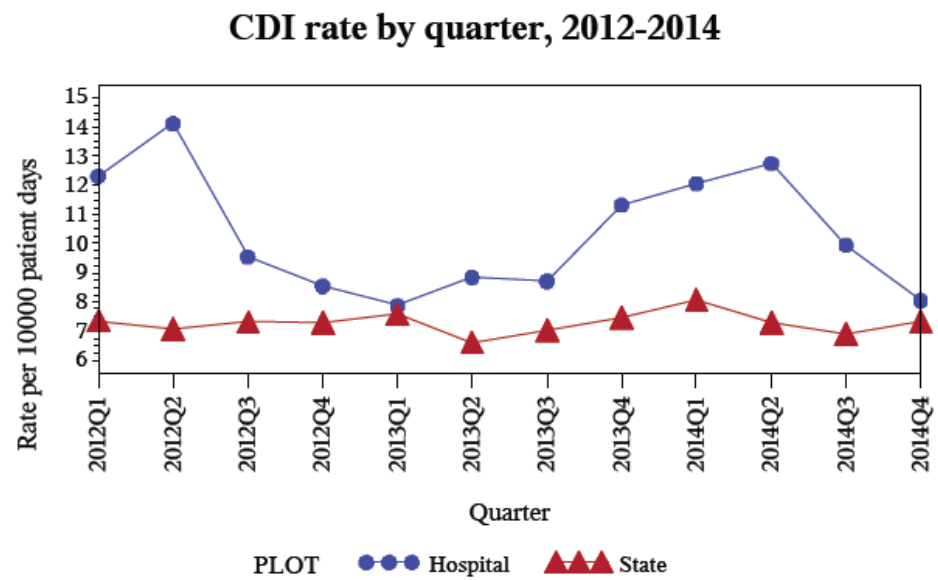
Healthcare-Associated Infections (HAI) Summary by Infection Type, 01/01/2014 - 12/31/2014

			Infections		Standardized Infection Ratio (SIR)		Facility SIR Compared to State SIR		
NHSN HAI	Description	Device Days, # of Procedures, or Patient Days	Observed	Predicted	Facility SIR	State SIR	Facility SIR/ State SIR	95% CI (Ratio)	Interpretation (Facility SIR Compared to State SIR)
CLABSI	Adult ICU	10017	2	19.35	0.10	0.46	0.22	(0.087, 0.947)	★ BETTER
LABID	MRSA Bacteremia	215343	9	17.43	0.52	0.71	0.73	(0.421, 1.509)	= SAME
	C.difficile Infection	192502	215	164.42	1.31	1.00	1.31	(1.153, 1.514)	✕ WORSE
SSI	Coronary Artery Bypass Surgery	324	4	6.31	0.63	0.38	1.66	(0.782, 5.374)	= SAME
	Knee Replacement Surgery	527	4	5.68	0.70	0.47	1.49	(0.731, 4.672)	= SAME

NHSN Data generated 09/23/15

Data for Action





Infection preventionist staffing information

Number of patient beds in this facility: 500

Total number of FTE infection preventionists in this facility: 4

Number of FTE infection preventionists per 100 beds in this facility: 0.8 *

*Infection prevention staff is essential in reducing acquisition and transmission of infections during a hospital stay.The Delphi Project, published in 2002, suggested 0.8-1.0 IP FTEs per 100 occupied acute care beds.The IP's role has expanded significantly since this measure was developed, given increased external reporting mandates coupledwith a more complex patient population and healthcare system. The Association for Professionals in Infection Control and Epidemiology (APIC)are expected to release new guidelines on IP staffing in acute care hospitals which will be included in future HAI Data for Action Reports.

O'Boyle, C., Jackson, M., & Henly, S. J. (2002).Staffing requirements for infection control programs in US health care facilities: Delphi project. American journal of infection control, 30(6), 321-333.

Data for Action

- Reports sent to 182 hospitals: 152 completed follow-up survey
- 49 hospitals were prompted by the report to take action to reduce HAIs, including enhancing antimicrobial stewardship programs
- Future reports may summarize NHSN survey responses re core elements of stewardship

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Initiatives to promote and track antibiotic stewardship & prevent antimicrobial resistance

- Expand reporting to NHSN Antibiotic Use and Resistance Modules
- Precious Drugs & Scary Bugs – outpatient campaign
- LTC pharmacy data on antibiotics via Prescription Monitoring Program (coming soon?)
- Catalyst for Antimicrobial Stewardship Improvement (CASI) Project

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- IP Liaison Program – QI assessments & expert consultations - APIC Consulting & Chicago Dept of Health
- XDRO registry enhancements (e.g., auto alerts, ego network analysis)

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Post-Test Question 1

- True or False: In 2015, the number of people treated in Illinois hospitals with *Clostridium difficile* infection would be more than the capacity of the large outdoor concert venue at Millennium Park in downtown Chicago.

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Post-Test Question 2

- Which of the following are priorities of the Illinois Action Plan to Prevent Healthcare Associated Infections and Antimicrobial Resistance?
  - A) Infection Prevention Infrastructure, Standards, and Practices
  - B) Assessment/Treatment/Outbreak
  - C) Antimicrobial Stewardship
  - D) Multi-Drug Resistant Organisms
  - E) All of the above.

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THANK YOU

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