Nebraska Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program Update 2024

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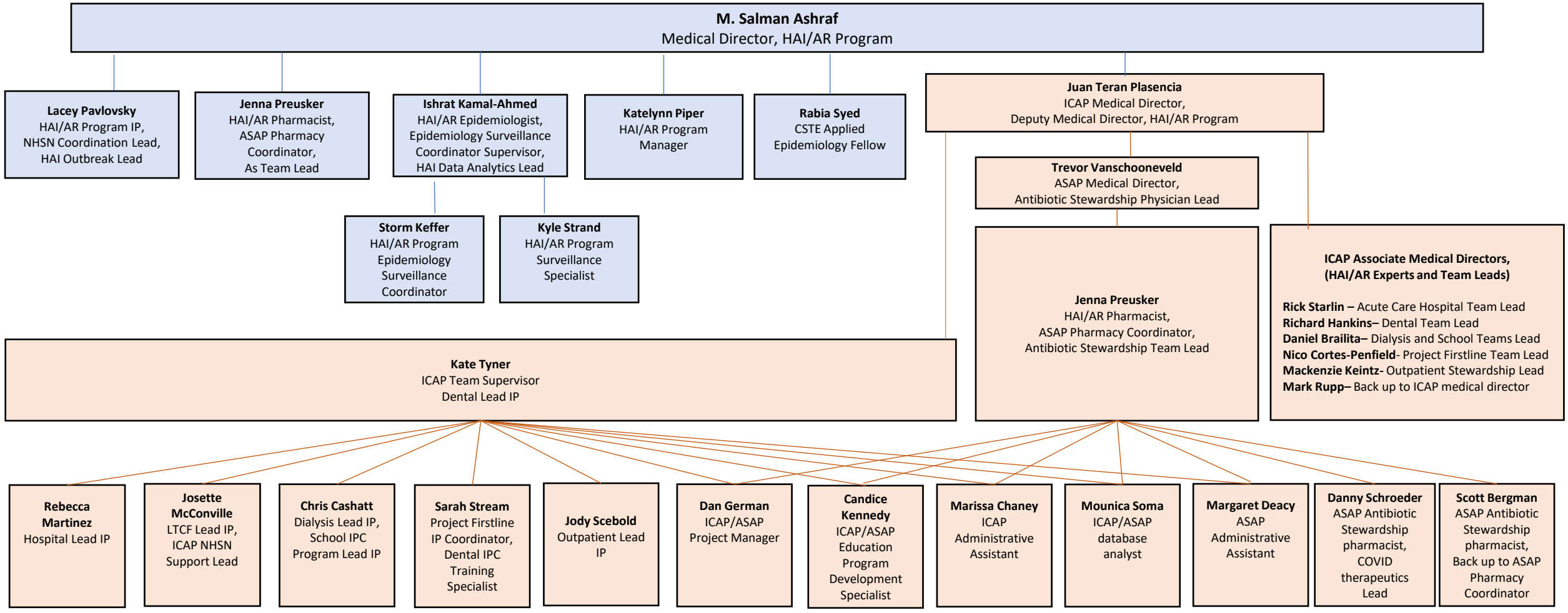
Disclosure

- Merck & Co. Inc – Principal Investigator for an investigator-initiated research grant focused on training consultant pharmacist in antibiotic stewardship implementation in LTCF

Objectives

- Review trends in healthcare-associated infections and antimicrobial resistance (HAI/AR) in Nebraska
- Identify opportunities for improvement in healthcare-associated infections and limiting spread of antimicrobial resistance
- Discuss upcoming and ongoing projects focused on assisting healthcare facilities with their program improvements

Nebraska DHHS HAI/AR Program



Notes:

1. This chart outlines the roles of HAI/AR program team members and represents day-to-day workflow. It does not reflect organizations' administrative reporting structure.
2. Administrative leaders for this collaboration are Matt Donahue, Robin Williams and Felicia Quintana-Zinn at NDHHS, Mark Rupp at UNMC ID-Division and Angie Vasa at Nebraska Medicine
3. The chart only describes the primary responsibilities of the staff within HAI/AR program. Many staff members have secondary responsibilities of assisting other team members in their roles or may have additional responsibilities outside the HAI/AR program
4. Blue colored boxes identify staff with NDHHS credentials and orange color boxes identify staff with primary responsibilities either at ICAP, ASAP or both
5. HAI/AR Program IP also assist with some ICAP activities
6. HAI/AR Pharmacist /ASAP Pharmacy Coordinator is a split position with primary responsibilities at both DHHS and ASAP

Nebraska HAI/AR Advisory Council

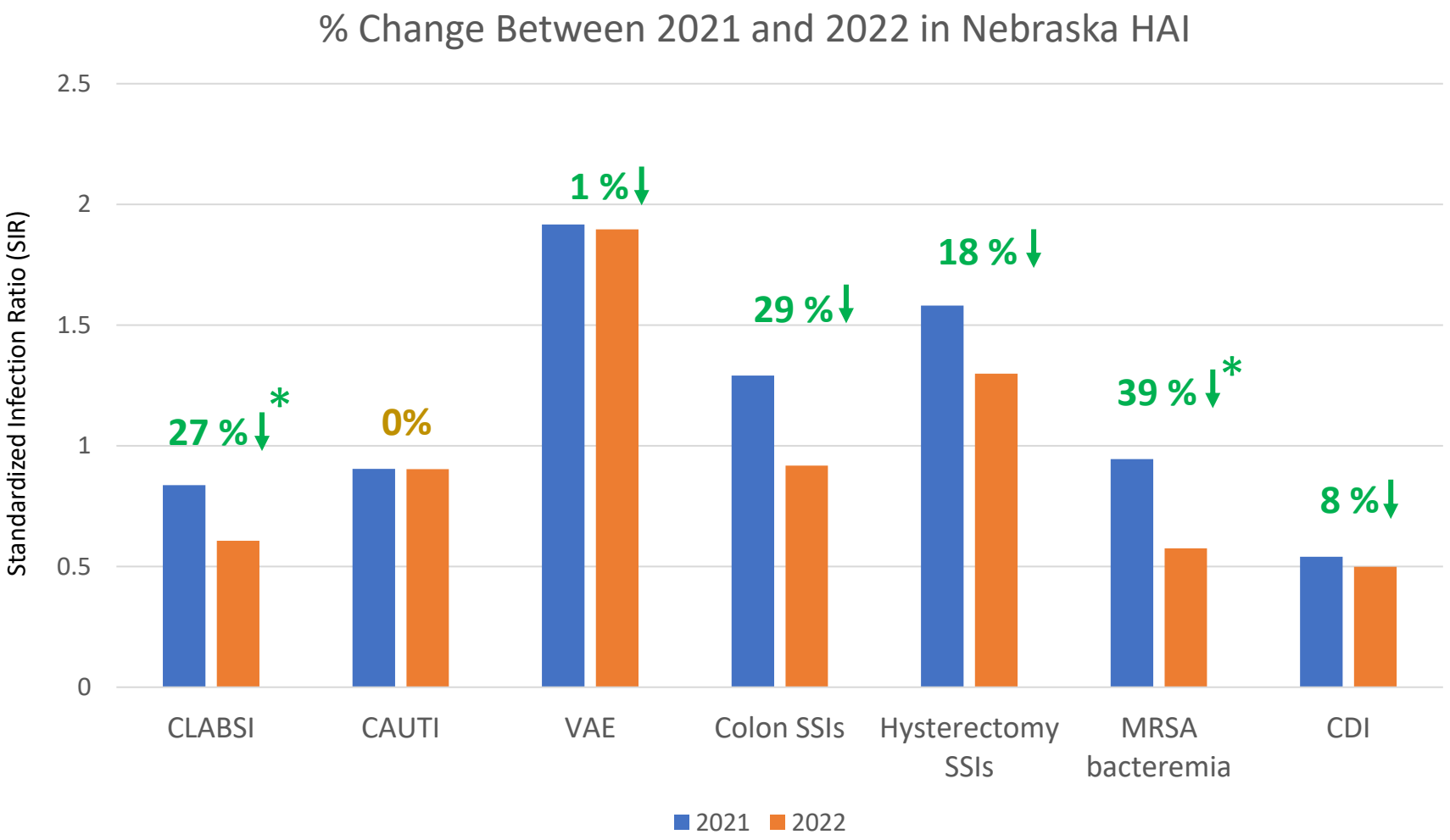
- Group of representatives from various partner organizations focused on guiding state HAI/AR program efforts
- Currently chaired by Dr. Renuga Vivekanandan, CHI Health/Creighton University
- Members represent the following group of organizations/services:

- Nebraska Department of Health and Human Services, Division of Public Health
  - State HAI/AR Program Director
  - State Epidemiologist
  - State Infection Preventionist (non-voting)
  - State HAI/AR Epidemiologist (non-voting)
  - DHHS Epidemiology Surveillance Coordinator (not-voting)
- TMF Quality Innovation Network
  - HAI Task Lead and/or Quality Improvement Director
- Nebraska Hospital Association
- Nebraska Medical Association*
- Nebraska Pharmacists Association
- Nebraska Infection Control Network
- Association for Professionals in Infection Control and Epidemiology (APIC) Nebraska Chapter
- Board-certified infectious disease physicians
- Nebraska Public Health Laboratory

- Infection Control Assessment and Promotion Program (ICAP)
- Antibiotic Stewardship Promotion and Assessment Program (ASAP)
- Healthcare Association of Nebraska
- Qsource ESRD Network 12 Representative
- Critical Access Hospital Representative/Rural Health representative
- Long-term Acute Care (LTAC) Representative
- Pediatric Representative
- Consumer representative
- Ambulatory or Outpatient Care Representative *
- Antimicrobial Stewardship representative
- Emergency Preparedness representative
- Long-term care association representative
- LHD (Local Health Department) representative
- College of Public Health Epidemiology representative
- Dental representative*
- Veterinary representative*

*position vacant

2022 National and State HAI Progress Report



* Statistically significant change

HAI	% Change Nationally
CLABSI	9% decrease
CAUTI	12% decrease
VAE	19% decrease
Colon	No significant change
Hysterectomy	No significant change
Hospital onset MRSA bacteremia	16% decrease
Hospital onset CDI	3% decrease

https://www.cdc.gov/nhsn/datastat/progress-report.html#anchor_1700850695274
https://arpsp.cdc.gov/profile/geography/nebraska

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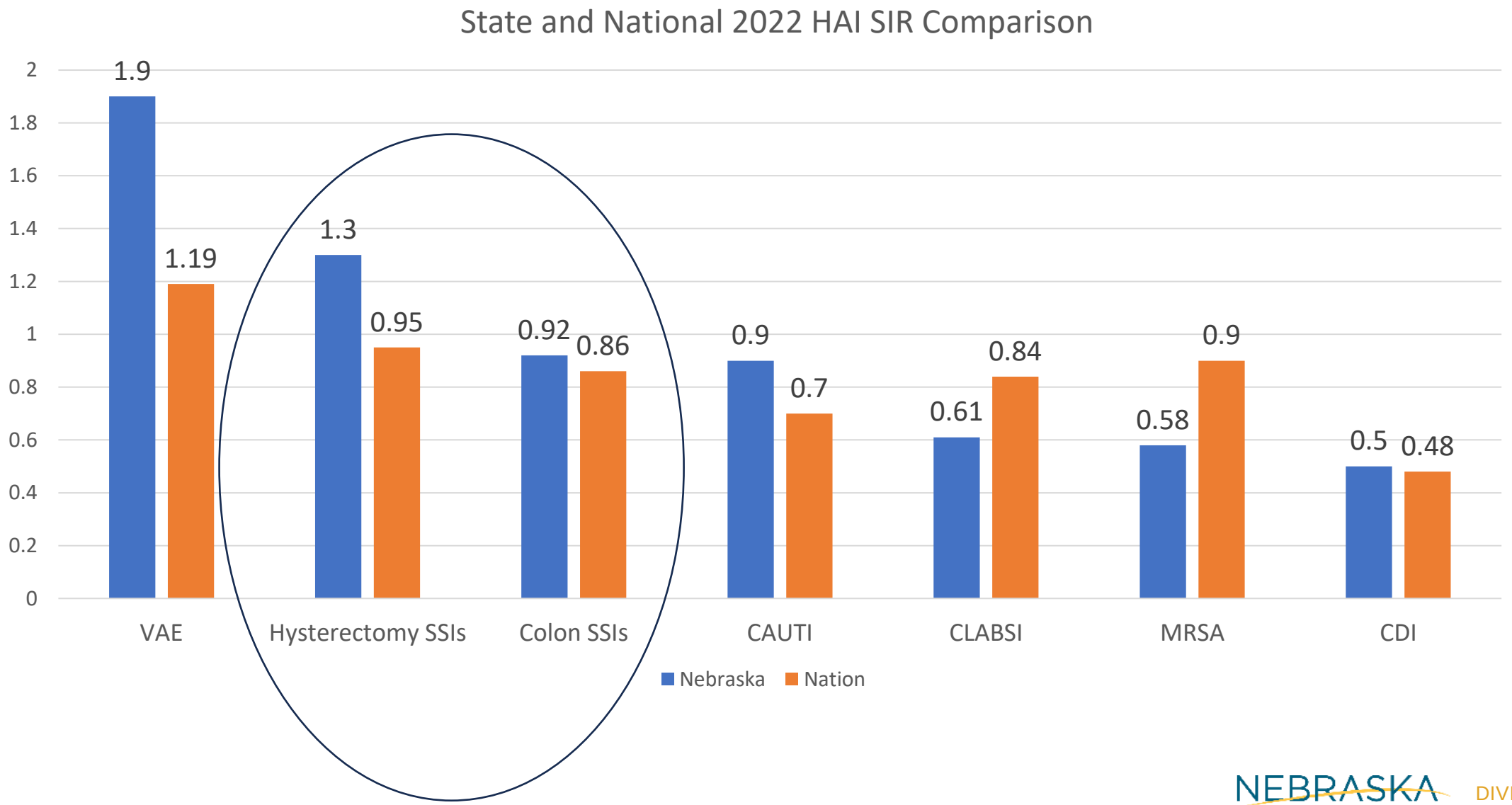
2022 HAI SIR: Nebraska Versus Nation



https://arpsp.cdc.gov/profile/geography/nebraska?year-select-common-hais=haiYear2022

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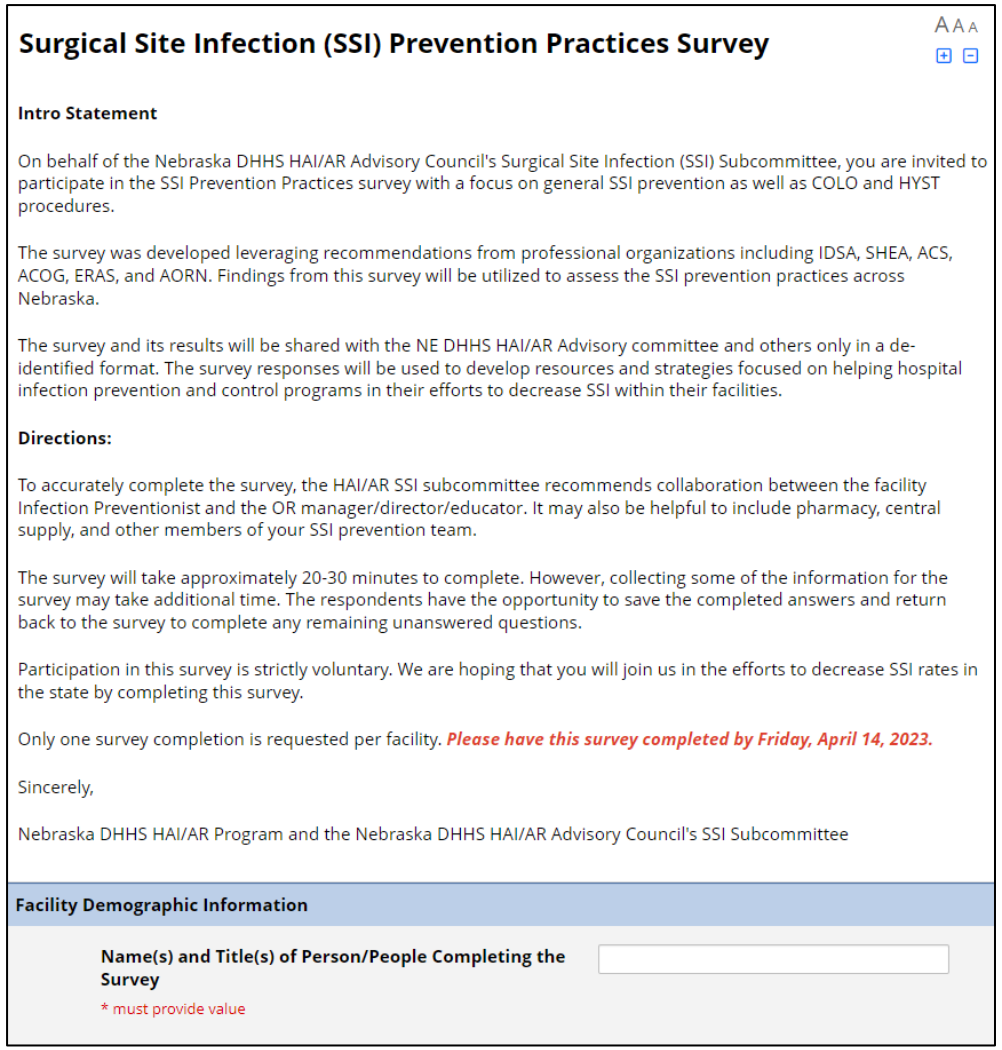
Collaborative Efforts to Decrease SSI

- Development of SSI subcommittee of HAI/AR Advisory Council
  - Representative of 6 hospitals participating in the subcommittee
  - Includes ID physicians, surgeons, IPs and quality program leaders
- Subcommittee developed and conducted statewide survey of hospitals
  - >50% of hospitals responded to survey
  - Completed in April 2023



Surgical Site Infection (SSI) Prevention Practices Survey

AAA

Intro Statement

On behalf of the Nebraska DHHS HAI/AR Advisory Council's Surgical Site Infection (SSI) Subcommittee, you are invited to participate in the SSI Prevention Practices survey with a focus on general SSI prevention as well as COLO and HYST procedures.

The survey was developed leveraging recommendations from professional organizations including IDSA, SHEA, ACS, ACOG, ERAS, and AORN. Findings from this survey will be utilized to assess the SSI prevention practices across Nebraska.

The survey and its results will be shared with the NE DHHS HAI/AR Advisory committee and others only in a de-identified format. The survey responses will be used to develop resources and strategies focused on helping hospital infection prevention and control programs in their efforts to decrease SSI within their facilities.

Directions:

To accurately complete the survey, the HAI/AR SSI subcommittee recommends collaboration between the facility Infection Preventionist and the OR manager/director/educator. It may also be helpful to include pharmacy, central supply, and other members of your SSI prevention team.

The survey will take approximately 20-30 minutes to complete. However, collecting some of the information for the survey may take additional time. The respondents have the opportunity to save the completed answers and return back to the survey to complete any remaining unanswered questions.

Participation in this survey is strictly voluntary. We are hoping that you will join us in the efforts to decrease SSI rates in the state by completing this survey.

Only one survey completion is requested per facility. ***Please have this survey completed by Friday, April 14, 2023.***

Sincerely,

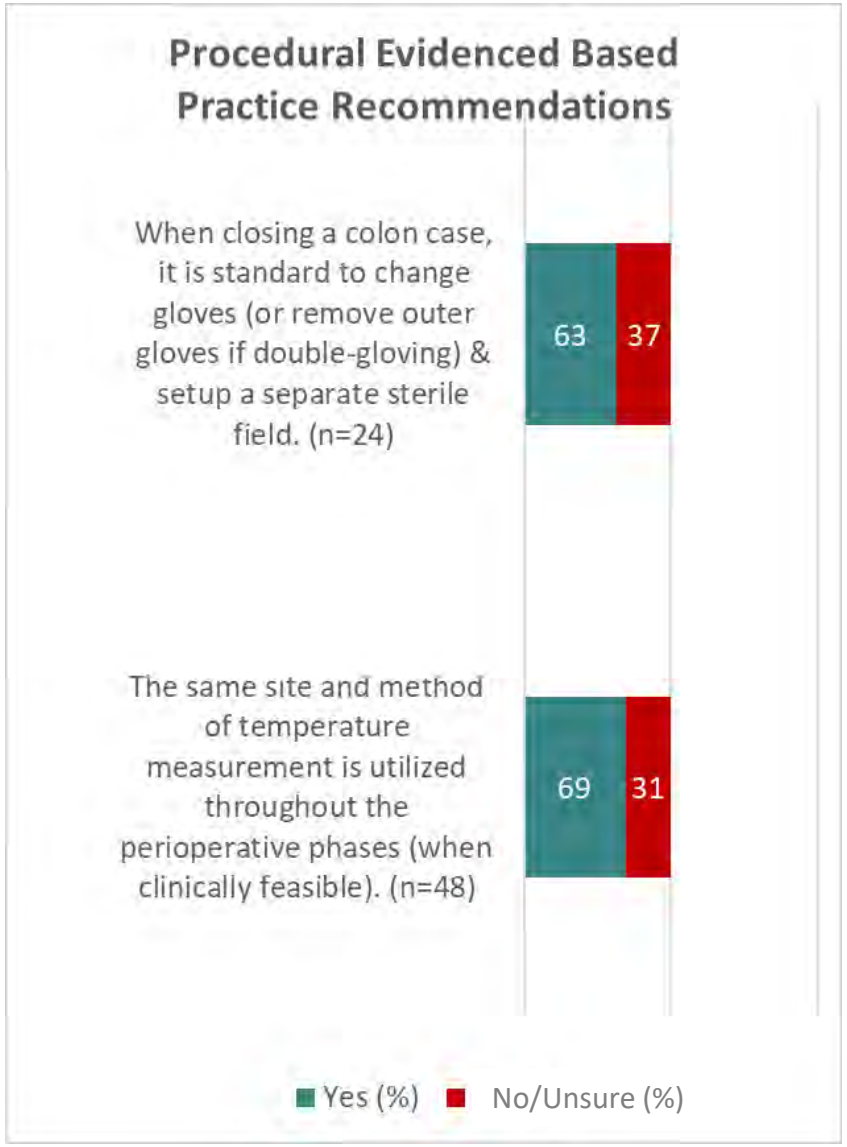
Nebraska DHHS HAI/AR Program and the Nebraska DHHS HAI/AR Advisory Council's SSI Subcommittee

Facility Demographic Information

Name(s) and Title(s) of Person/People Completing the Survey

* must provide value

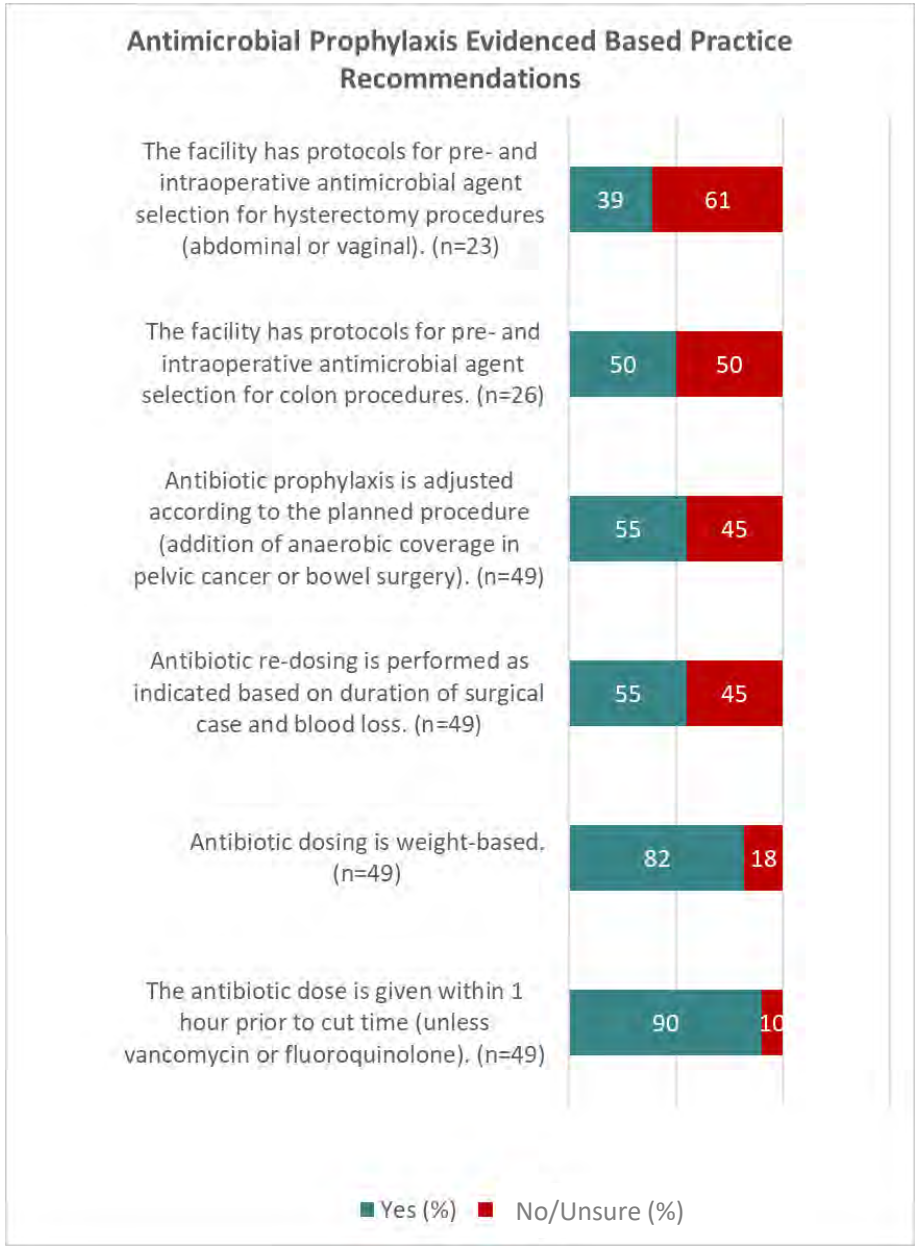
Procedural Evidence-Based Practice Recommendations



Closing a Colon Case	
ACS American College of Surgeons and Surgical Infection Society: Surgical Site Infection Guidelines, 2016 Update	**Gloves/Gown Change** The use of double gloves is recommended. Changing gloves before closure in colorectal cases is recommended, however, rescrubbing before closure in colorectal cases is not recommended. **New Closing Tray/Instrumentation** The use of new instruments for closure in colorectal cases is recommended.
ASCRS Reducing Surgical Site Infection: Where Do I Look?	Perioperative list of elements to consider in developing a comprehensible approach to reducing rates of SSI: • Gown/glove change • New closing trays
JAMA The Preventive Surgical Site Infection Bundle in Colorectal Surgery: An Effective Approach to Surgical Site Infection Reduction and Health Care Cost Savings	Colorectal surgery: At the time of wound closure, surgeons and scrub staff underwent a gown and glove change. (pg. 1047) Colorectal surgery: dedicated wound closure tray used to close the fascia and skin. (pg. 1047)
AORN An Incision Closure Bundle for Colorectal Surgery 2018	Outer surgical glove change before incision closure. Use of a dedicated sterile incision closure instrument tray

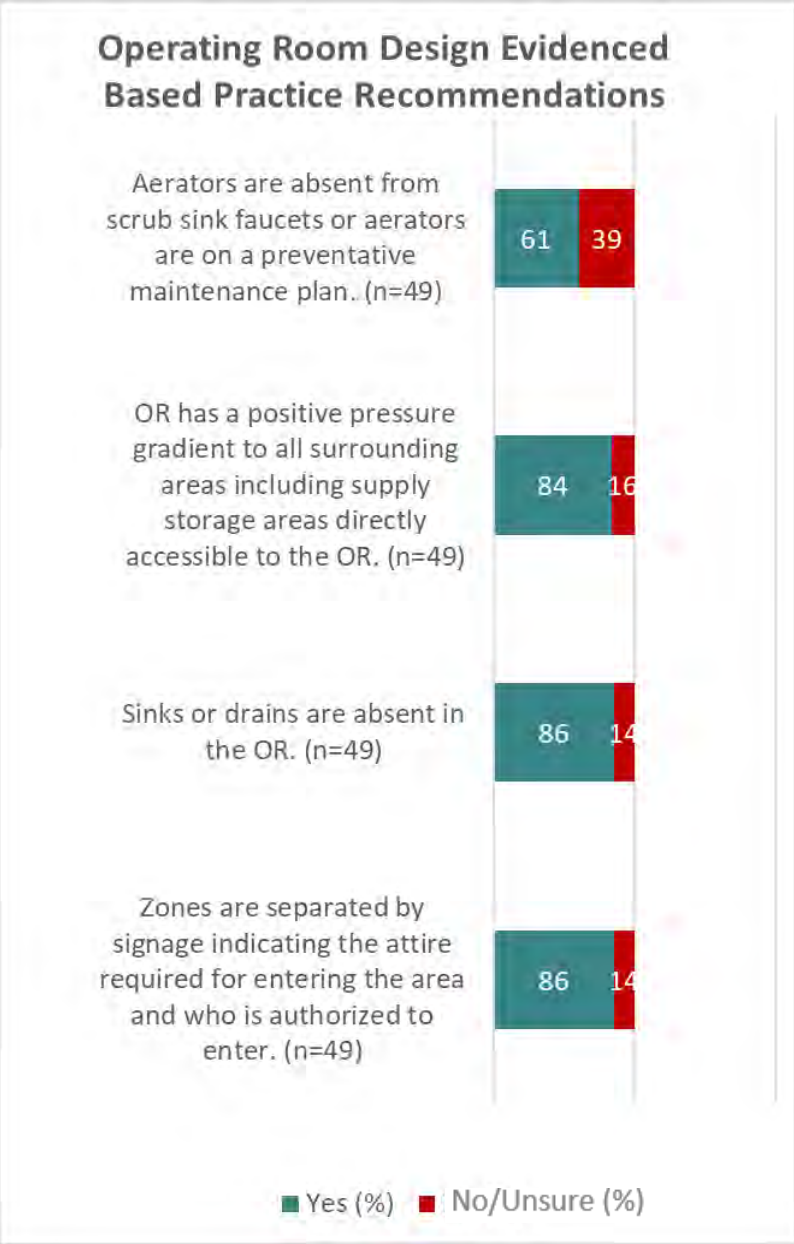
Same Site and Method of Temperature Measurement	
AORN AORN eGuidelines+ Guidelines for Perioperative Practice: Hypothermia 2019	Moderate-quality evidence indicates that temperature measurements can vary significantly when temperatures are measured at different sites or by different methods.

Antimicrobial Prophylaxis Evidence-Based Practice Recommendations



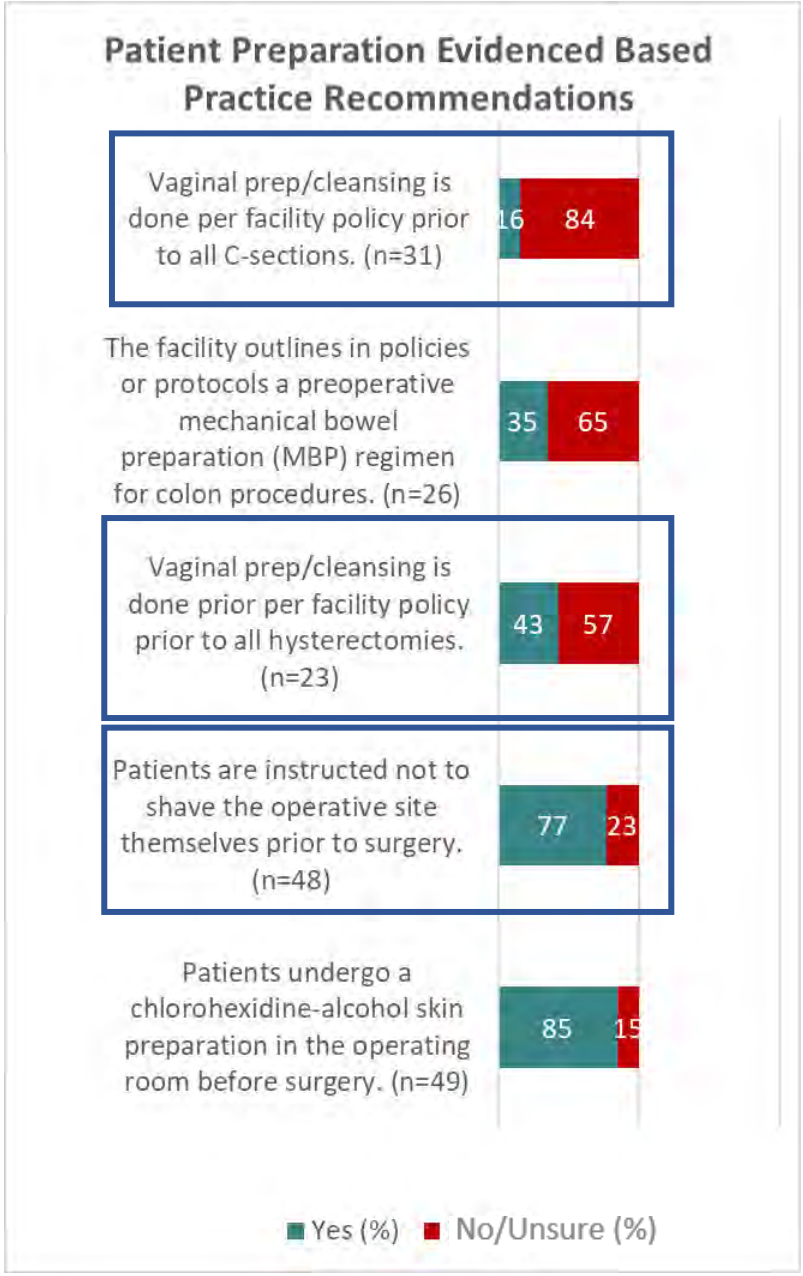
Antibiotic Prophylaxis	
ACOG Prevention of infection after gynecologic procedures. (2018). *The American College of Obstetricians and Gynecologists*, *131*(6).	Antimicrobial prophylaxis generally is defined as a brief course of an antimicrobial agent initiated within 1 hour before a procedure begins. The use of a weight-based dosage is recommended. For lengthy procedures, additional intraoperative doses of an antibiotic, given at intervals of two times the half-life of the drug measured from the initiation of the preoperative dose, not from the onset of surgery, are recommended to maintain adequate levels throughout the operation In surgical cases with excessive blood loss, a second dose of the prophylactic antibiotic may be appropriate.
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Administer antimicrobial prophylaxis according to evidence-based standards and guidelines. (Quality of evidence: HIGH) Increase dosing of prophylactic antimicrobial agent for morbidly obese patients. (Quality of evidence: HIGH) Administer only when indicated. Select appropriate agents based on surgical procedure, most common pathogens causing SSI for a specific procedure, and published recommendations. Administer within 1 hour of incision to maximize tissue concentration. Discontinue antimicrobial agents after incisional closure in the operating room Re-dose prophylactic antimicrobial agents for lengthy procedures and in cases with excessive blood loss during the procedure (i.e., >1,500 mL).
ERAS Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: 2018	Intravenous antibiotic prophylaxis should be given within 60 min before incision as a single-dose administration to all patients undergoing colorectal surgery. In addition, in patients receiving oral mechanical bowel preparation, oral antibiotics should be given. No recommendation for the use of oral antibiotic decontamination can be given for patients having no bowel preparation.
CDC Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017	1A.1. Administer preoperative antimicrobial agents only when indicated based on published clinical practice guidelines and timed such that a bactericidal concentration of the agents is established in the serum and tissues when the incision is made. (Category IB–strong recommendation; accepted practice.) 1A.2. No further refinement of timing can be made for preoperative antimicrobial agents based on clinical outcomes.(No recommendation/ unresolved issue.) 1B. Administer the appropriate parenteral prophylactic antimicrobial agents before skin incision in all cesarean section procedures. (Category IA–strong recommendation; high-quality evidence.) 1E. In clean and clean-contaminated procedures, do not administer additional prophylactic antimicrobial agent doses after the surgical incision is closed in the operating room, even in the presence of a drain. (Category IA–strong recommendation; high-quality evidence.)

Operating Room Design Evidence-Based Practice Recommendation



Operating Room Design	
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Ventilation: Follow American Institute of Architects' recommendations for proper air handling in the operating room
AORN AORN eGuidelines+ Guidelines for Perioperative Practice: Design and Maintenance	Divide the surgical suite into zones (i.e., unrestricted, semi-restricted, restricted) based on the activities performed in each area; the access pathway; and the attire, HVAC, and surface requirements. Design the OR to have a positive pressure gradient to all surrounding areas including supply storage areas (e.g., sterile core, central core) that are directly accessible to the OR. Do not place sinks or drains in the OR.
CDC Controlling *Legionella* in Potable Water Systems 2024	Clean and maintain water system components, such as thermostatic mixing valves, **aerators,** showerheads, hoses, filters, and storage tanks, regularly.

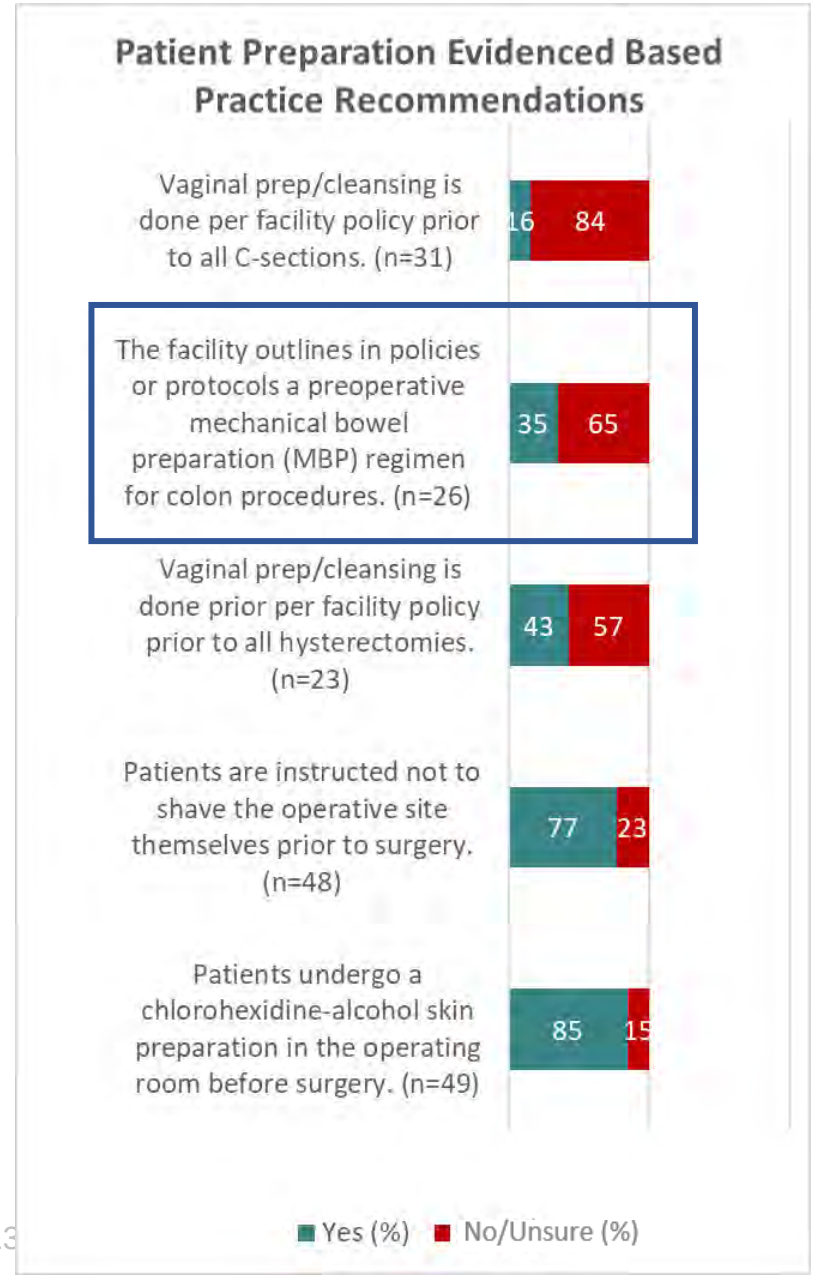
Patient Preparation Evidence-Based Practice Recommendations



Vaginal Preparation	
ACOG Prevention of infection after gynecologic procedures. (2018). *The American College of Obstetricians and Gynecologists*, *131*(6).	Vaginal cleansing with either 4% chlorhexidine gluconate or povidone–iodine should be performed before hysterectomy or vaginal surgery.
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Use antiseptic-containing preoperative vaginal preparation agents for patients undergoing cesarean delivery or hysterectomy. (Quality of evidence: MODERATE) Vaginal preparation with antiseptic solution is also recommended for elective hysterectomy

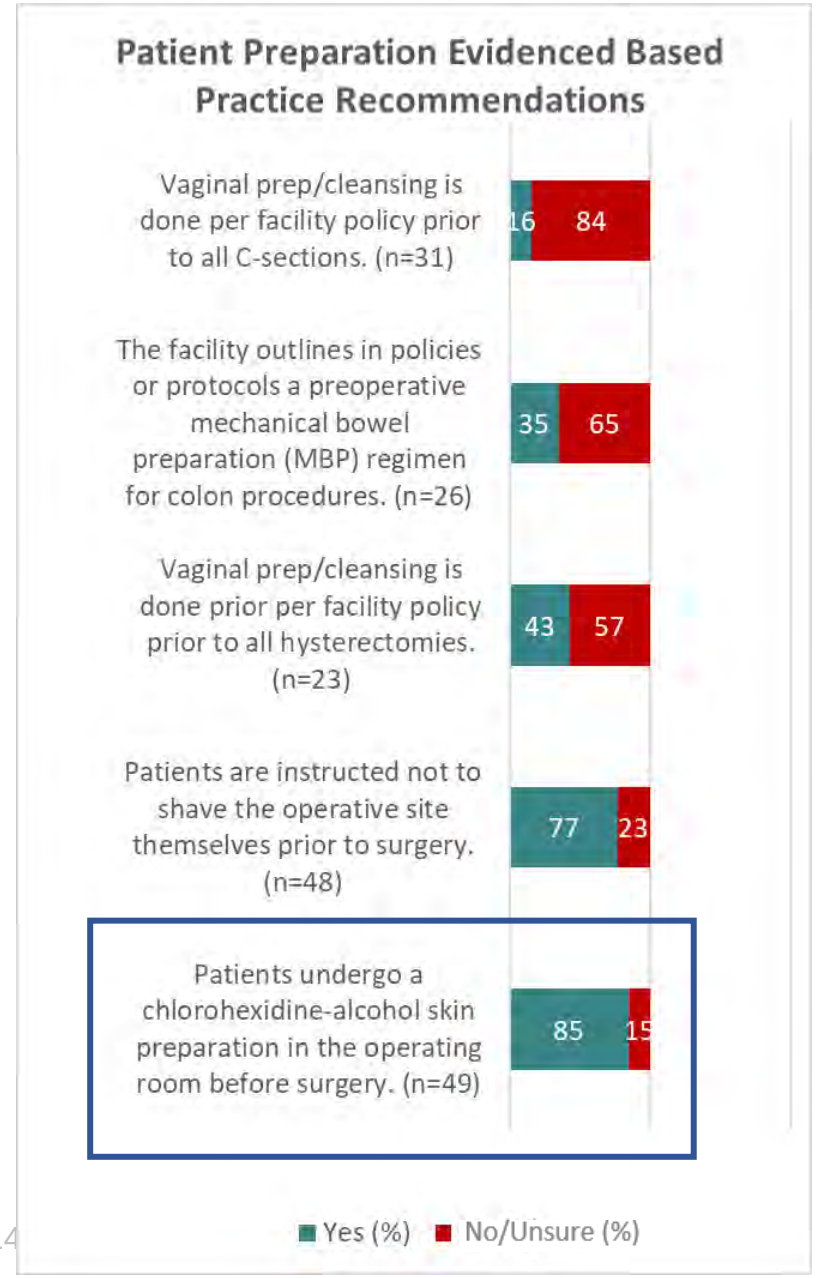
Pre-Operative Hair Removal	
ACOG Prevention of infection after gynecologic procedures. (2018). *The American College of Obstetricians and Gynecologists*, *131*(6).	Do not shave incision site. Hair should not be removed preoperatively unless the hair at or around the incision site will interfere with the operation. Any necessary hair removal should be done immediately before the operation, preferably with electric clippers. Patients should be instructed not to shave the operative site themselves because shaving with a razor increases their risk of infection
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Do not remove hair at the operative site unless the presence of hair will interfere with the surgical procedure. (Quality of evidence: HIGH) If hair removal is necessary, remove outside of the operating room by clipping. Do not use razors. (Quality of evidence: HIGH)
JAMA (Journal of the American Medical Association) Surgical Site Infection Prevention A Review (2023)	Do not remove hair at the surgical site unless the presence of hair will affect the procedure If hair removal is necessary, it should be removed in the preoperative holding area and not in the operating room.
ERAS Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: 2018	Routine hair removal before surgery does not reduce SSI rates, but should be preferably performed—if deemed necessary—by use of clippers rather than razors immediately before surgery

Patient Preparation Evidence-Based Practice Recommendations continued



Preoperative Mechanical Bowel Preparation (MBP) Regimen	
ASCRS and SAGES Clinical Practice Guidelines for Enhanced Recovery After Colon and Rectal Surgery From the American Society of Colon and Rectal Surgeons and the Society of American Gastrointestinal and Endoscopic Surgeons 2023 update	Mechanical bowel preparation combined with preoperative oral antibiotics is typically recommended prior to elective colorectal resection. Grade of recommendation: strong recommendation based on moderate-quality evidence
ASCRS The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Use of Bowel Preparation in Elective Colon and Rectal Surgery Updated 2019	MBP combined with preoperative oral antibiotics is typically recommended for elective colorectal resections. Grade of Recommendation: Strong recommendation based on moderate-quality evidence, 1B.
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Use a combination of parenteral and oral antimicrobial prophylaxis prior to elective colorectal surgery to reduce the risk of SSI. (Quality of evidence: HIGH) Mechanical bowel preparation without use of oral antimicrobial agents does not decrease the risk of SSI
ERAS Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: 2018	Mechanical bowel preparation alone with systemic antibiotic prophylaxis has no clinical advantage and can cause dehydration and discomfort and should not be used routinely in colonic surgery but may be used for rectal surgery. **There is some evidence from randomized controlled trials to support the use of a combination of MBP and oral antibiotics over MBP alone.** In patients receiving oral mechanical bowel preparation, oral antibiotics should be given.

Patient Preparation Evidence-Based Practice Recommendations continued



Intraoperative Skin Preparation	
ACOG Prevention of infection after gynecologic procedures. (2018). *The American College of Obstetricians and Gynecologists*, *131*(6).	Perform preoperative surgical site skin preparation with an alcohol-based agent unless contraindicated. Chlorhexidine–alcohol is an appropriate choice.
SHEA Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update	Use alcohol-containing preoperative skin preparatory agents in combination with an antiseptic. (Quality of evidence: HIGH) Wash and clean skin around incision site. Use a dual agent skin prep containing alcohol unless contraindications exist. (Quality of evidence: HIGH) Alcohol is highly bactericidal and effective for preoperative skin antisepsis, but it does not have persistent activity when used alone. Rapid, persistent, and cumulative antisepsis can be achieved by combining alcohol with CHG or an iodophor.
JAMA (Journal of the American Medical Association) Surgical Site Infection Prevention A Review (2023)	Using chlorhexidine gluconate and alcohol-containing skin preparatory agent in combination Topical alcohol is highly bactericidal but does not have persistent activity when used as monotherapy for skin antisepsis (Table 3). Multiple guidelines recommend that surgical site antisepsis should be performed with a product that contains alcohol and another antiseptic agent (eg, chlorhexidine gluconate or povidone iodine).
ERAS Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations: 2018	Skin disinfection should be performed using chlorhexidine–alcohol-based preparations.
CDC Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017	8B. Perform intraoperative skin preparation with an alcohol-based antiseptic agent unless contraindicated. 8C. Application of a microbial sealant immediately after intraoperative skin preparation is not necessary for the prevention of SSI.

Healthcare-Associated Infections – Nebraska 2015-2024

SSI [Abdominal Hysterectomy]

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	2.03	1.175	1.163	1.001	1.28	1.591	1.585	1.302	0.732	0
Observed Infections	26	15	13	12	18	16	19	15	9	0
Predicted Infections	13	13	11	12	14	10	12	12	12	3
Procedures Performed	1950	2089	2011	1931	2213	1645	1777	1747	1278	438
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	1.354 2.932	0.683 1.895	0.647 1.938	0.542 1.702	0.782 1.983	0.942 2.529	0.983 2.429	0.662 2.995	0.357, 1.343	, 1.066

SSI [Colon]

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	0.956	1.405	1.139	1.101	1.212	0.908	1.286	0.879	1.021	0.33
Observed Infections	42	73	55	58	61	42	71	46	55	4
Predicted Infections	44	52	48	53	50	46	55	52	54	12
Procedures Performed	1770	2050	1907	2063	1956	1773	2027	1992	2006	473
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.698 1.280	1.10, 1.756	0.86, 1.471	0.844, 1.414	0.93, 1.547	0.66, 1.216	1.012 1.613	0.525 1.269	0.766, 1.307	0.132, 1.001

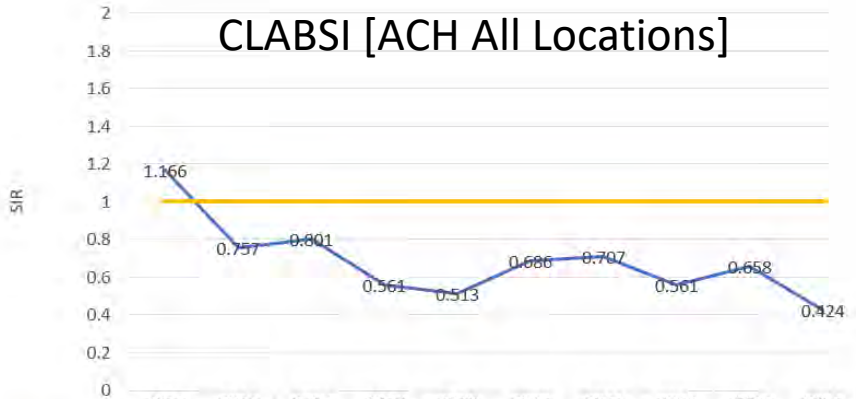
2015-2023 Data Source: NHSN – Include acute care hospitals conferring rights to DHHS

2024 Data Source- NHSN DUA Group

*2024 Data is for January 2024-April 2024

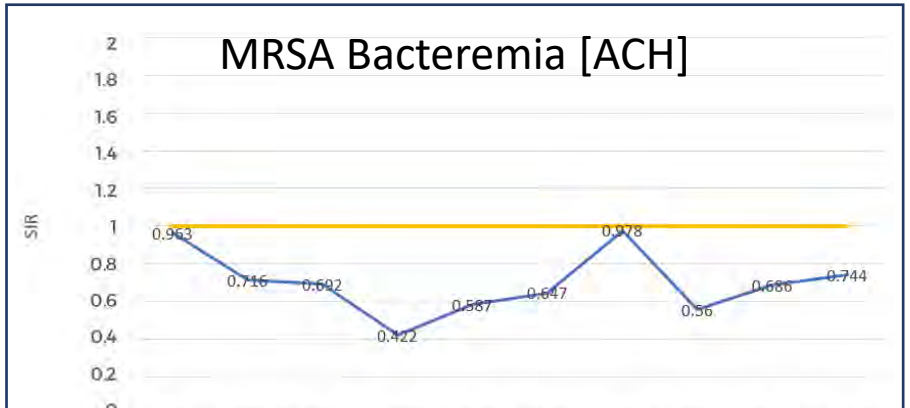
Healthcare-Associated Infections – Nebraska 2015-2024

CLABSI [ACH All Locations]



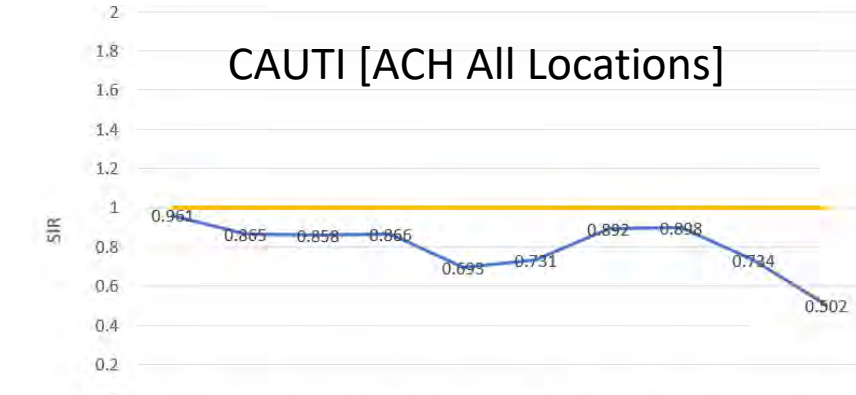
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	1.166	0.757	0.801	0.561	0.513	0.686	0.707	0.561	0.658	0.424
Observed	186	119	124	88	80	103	112	85	99	18
Predicted	159	157	155	157	156	150	158	152	106	42
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	1.008, 1.343	0.630, 0.902	0.669, 0.952	0.453, 0.688	0.410, 0.635	0.563, 0.829	0.586 0.849	0.440, 0.786	0.391 1.227	0.259, 0.657

MRSA Bacteremia [ACH]



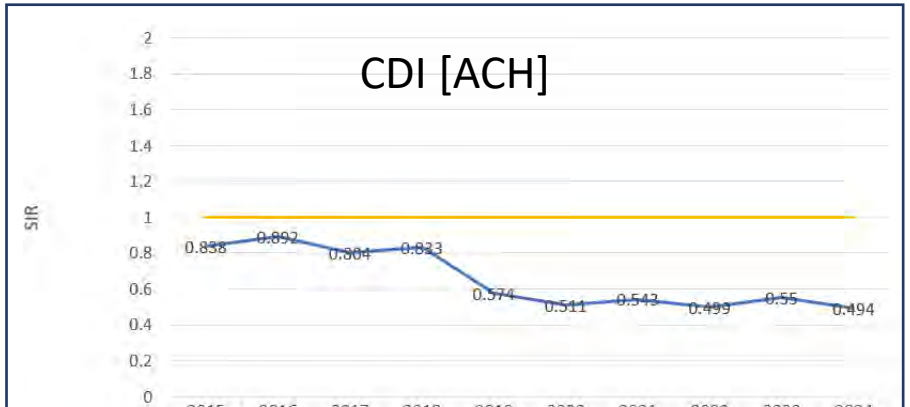
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	0.963	0.716	0.692	0.422	0.587	0.647	0.978	0.56	0.686	0.744
Observed	44	35	36	23	32	34	53	33	38	10
Predicted	46	49	52	55	55	53	54	59	55	13
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.708, 1.281	0.506, 0.985	0.492, 0.948	0.274, 0.623	0.408, 0.818	0.455, 0.894	0.740, 1.270	0.407, 1.032	0.492, 0.932	0.378, 1.327

CAUTI [ACH All Locations]



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	0.961	0.865	0.858	0.866	0.693	0.731	0.892	0.898	0.734	0.502
Observed	135	114	119	114	84	98	129	126	100	17
Predicted	140	132	139	132	121	134	145	140	136	34
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.809, 1.134	0.717, 1.035	0.714, 1.035	0.718, 1.036	0.557, 0.854	0.597, 0.887	0.748, 1.056	0.751, 1.066	0.601, 0.889	0.302, 0.788

CDI [ACH]



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	0.838	0.892	0.804	0.833	0.574	0.511	0.543	0.499	0.55	0.494
Observed	394	477	477	436	273	216	242	224	253	53
Predicted	470	535	593	524	476	423	445	449	460	107
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.758, 0.924	0.814, 0.974	0.734, 0.879	0.757, 0.914	0.509, 0.645	0.446, 0.582	0.478, 0.615	0.437, 0.567	0.486, 0.621	0.374, 0.641

*2024 Data is for January 2024-March 2024

2015-2023 Data Source: NHSN – Include acute care hospitals conferring rights to DHHS

2024 Data Source- NHSN DUA Group

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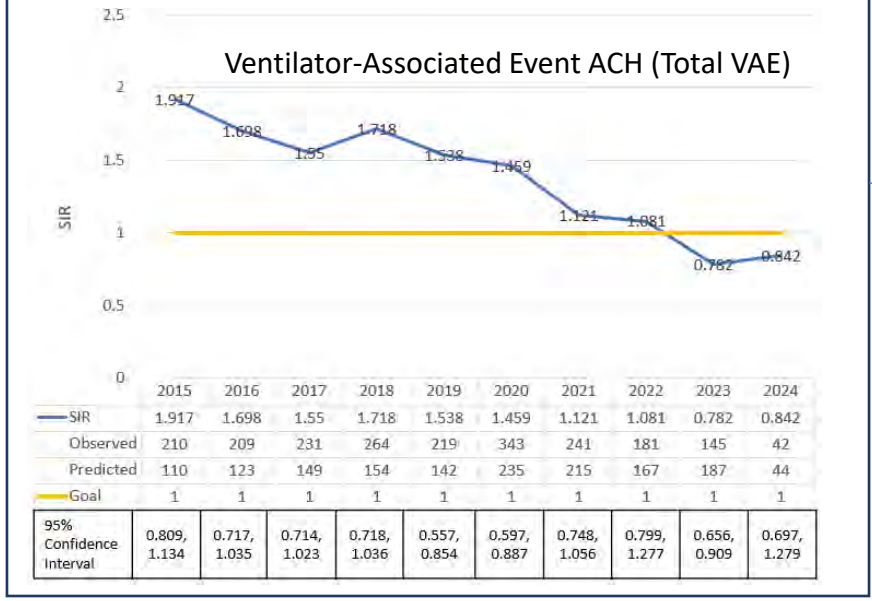
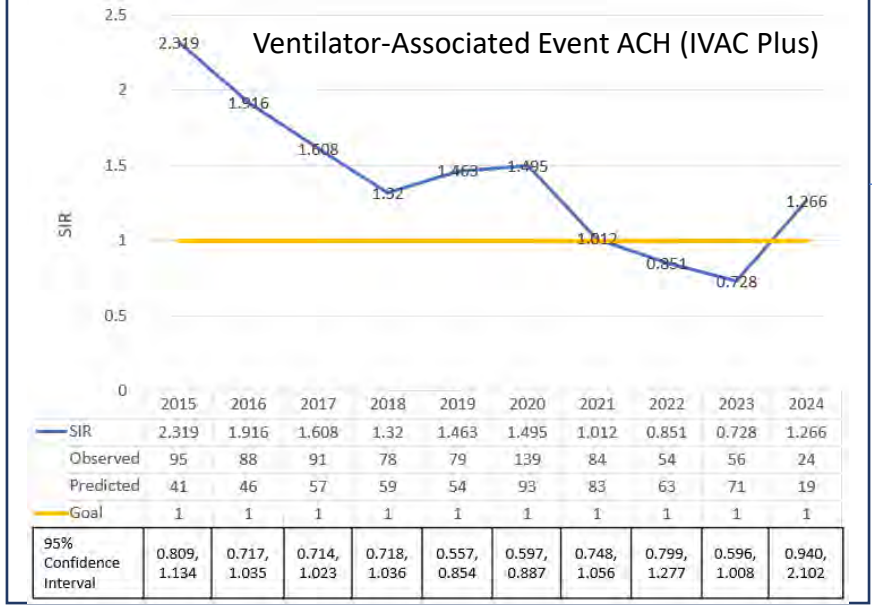
Healthcare-Associated Infections – Nebraska 2015-2024



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	1.917	1.698	1.55	1.718	1.538	1.459	1.121	1.081	0.782	0.842
Observed	210	209	231	264	219	343	241	181	145	42
Predicted	110	123	149	154	142	235	215	167	187	44
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.809, 1.134	0.717, 1.035	0.714, 1.023	0.718, 1.036	0.557, 0.854	0.597, 0.887	0.748, 1.056	0.799, 1.277	0.656, 0.909	0.697, 1.279

Includes Ventilator-Associated Conditions (VAC),Infection Related Ventilator Associated Complications (IVAC) and Possible Ventilator Associated Pneumonia (PVAP)

At least 2 days of stability followed by increased in PEEP or FiO2 will be needed for condition to be considered as VAE



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SIR	2.319	1.916	1.608	1.32	1.463	1.495	1.012	0.851	0.728	1.266
Observed	95	88	91	78	79	139	84	54	56	24
Predicted	41	46	57	59	54	93	83	63	71	19
Goal	1	1	1	1	1	1	1	1	1	1
95% Confidence Interval	0.809, 1.134	0.717, 1.035	0.714, 1.023	0.718, 1.036	0.557, 0.854	0.597, 0.887	0.748, 1.056	0.799, 1.277	0.596, 1.008	0.940, 2.102

Includes Infection Related Ventilator Associated Complications (IVAC) and Possible Ventilator Associated Pneumonia (PVAP)

In addition to minimum criteria mentioned for VAE, there needs to be a new antibiotic started along with change in WBC or Temperature

HAI/AR team plans to start discussion with the HAI/AR Advisory Council on strategies to decrease VAEs in Nebraska

2015-2023 Data Source: NHSN – Include acute care hospitals conferring rights to DHHS.
2024 Data Source- NHSN DUA Group

*2024 Data is for January 2024-April 2024

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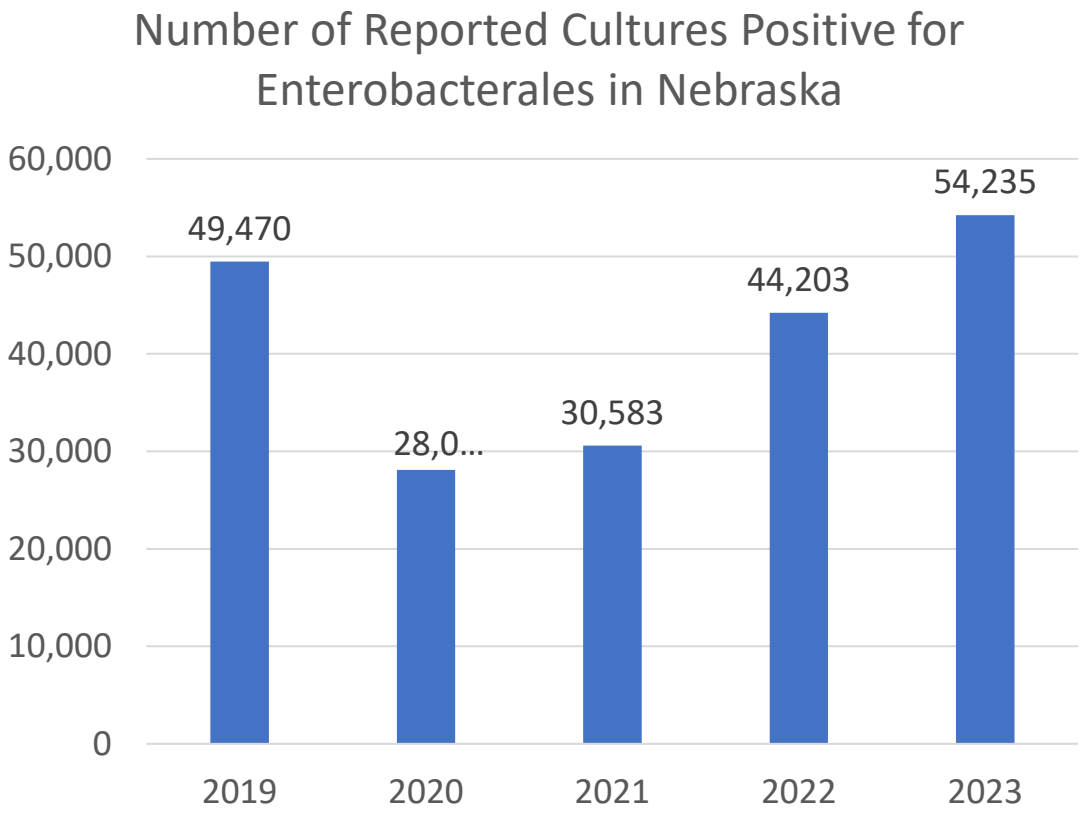
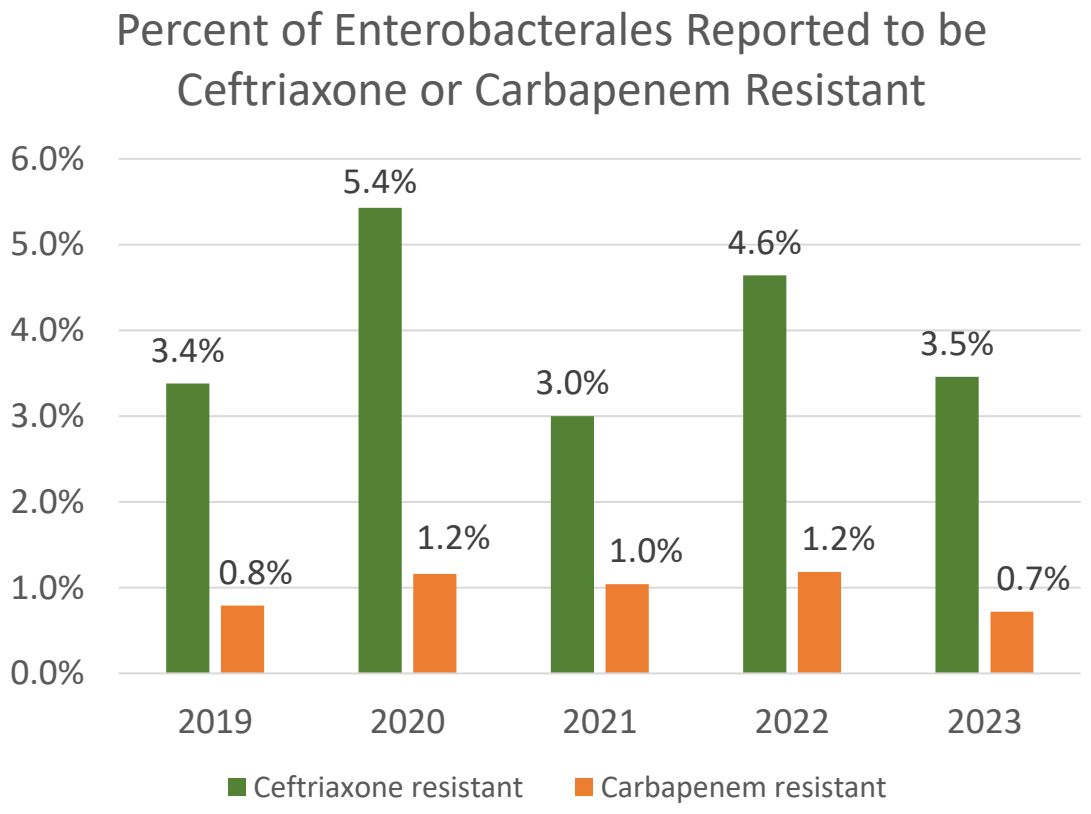
Ceftriaxone and Carbapenem Resistance in Enterobacterales in Nebraska

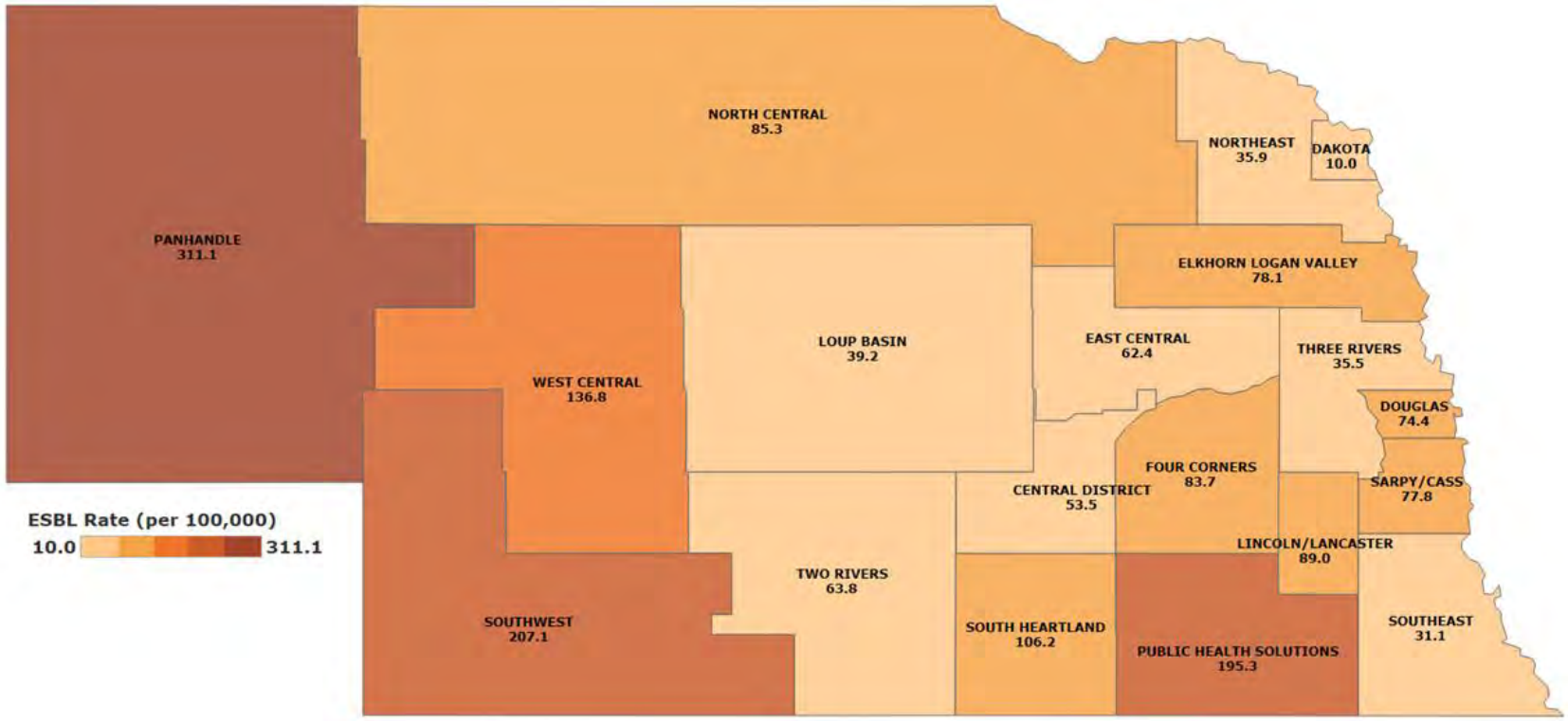




Data Source: Electronic Lab Reports Submitted to NEDSS
Notes: Preliminary data (subject to change after further updates); Currently denominator for ceftriaxone and carbapenem resistant isolates include those isolates with missing susceptibility results

Ceftriaxone-Resistant Enterobacterales Rates by Nebraska LHDs

Ceftriaxone-Resistant Enterobacterales per 100,000 person by LHD



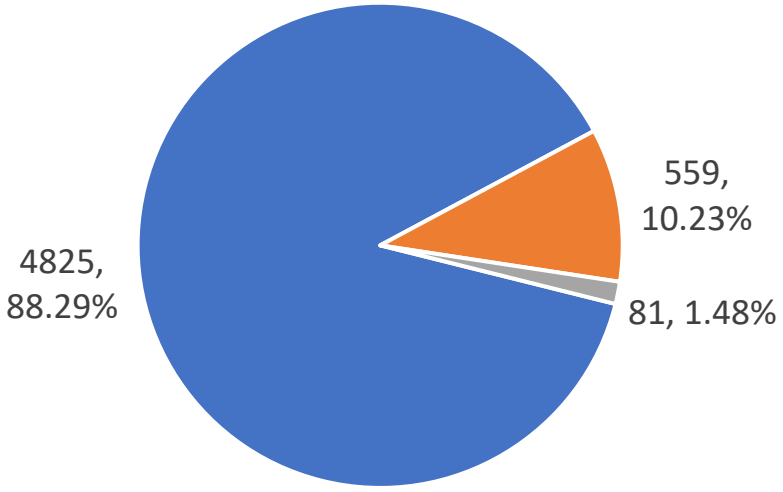
Change in Rate for Ceftriaxone-Resistant Enterobacterales from 2022 to 2023 by LHD

LHD	Rate Change: 2022-2023	% Change: 2022-2023
Panhandle	32.2	11.5%
Public Health Solutions	30	18.1%
Elkhorn Longan Valley	21.3	37.5%
Southeast	18.1	139.2%
Lincoln-Lancaster	7.8	9.6%
Four Corners	6.8	8.8%
Dakota	5	100.0%
North Central	4.5	5.6%
Central	1.2	2.3%
East Central	-5.7	-8.4%
Sarpy/Cass	-8.9	-10.3%
Three Rivers	-11.4	-24.3%
Douglas	-16.1	-17.8%
Northeast	-19.6	-35.3%
South Heartland	-24.3	-18.6%
Southwest	-36.3	-14.9%
West Central	-39.4	-22.4%
Loup Basin	-49	-55.6%
Two Rivers	-72.1	-53.1%

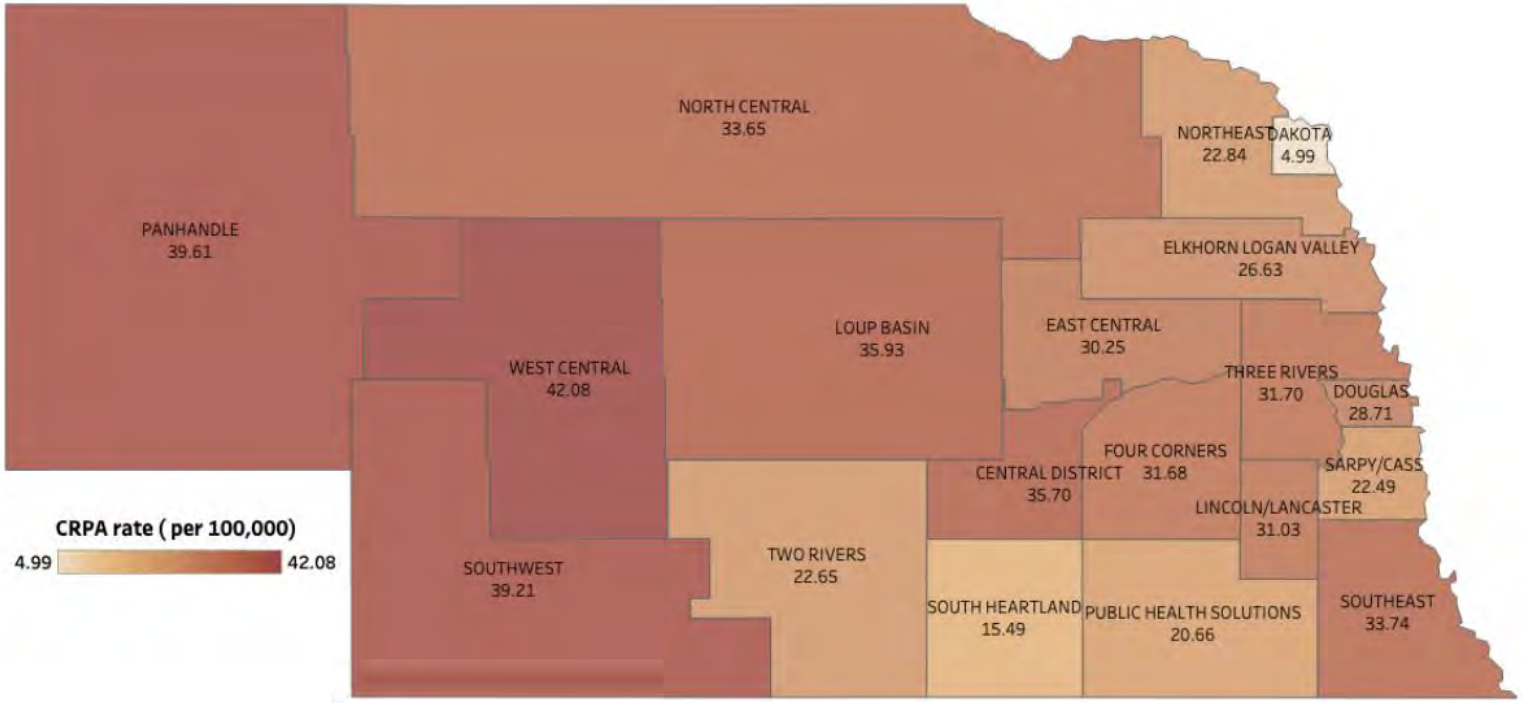
Data Source: Electronic Lab Reports Submitted to NEDSS
Notes: Preliminary data (subject to change after further updates); Currently denominator for ceftriaxone and carbapenem resistant isolates include those isolates with missing susceptibility results

Carbapenem-Resistant Pseudomonas aeruginosa in Nebraska - 2023

Number of *Pseudomonas aeruginosa* isolates reported in Nebraska and their susceptibility pattern in 2023



CRPA isolates per 100,000 person in 2023 by LHD



Data Source: Electronic Lab Reports Submitted to NEDSS

Carbapenemase Genes Identified in Enterobacterales Isolates, Nebraska 2019-2024

Year	KPC	NDM	OXA-48	OXA-181	VIM	IMP	Total
2019	18	9	0	3	0	0	30
2020	8	0	1	0	0	0	9
2021	3	0	1	0	0	0	4
2022	8	3	1	0	1	0	13
2023	7	6	4	2	0	0	19
2024 to date	6	4	3	0	0	1	14

2023- Carbapenemase producing *Pseudomonas aeruginosa* and *Acinetobacter Baumannii* has also been reported

2024- Carbapenemase producing *Pseudomonas aeruginosa* has been reported

Testing for Detection of Carbapenemase Producing Organisms

NPHL SPECIMEN SUBMISSION CRITERIA

Enterobacterales

- Ertapenem MIC ≥ 1 µg/mL, or meropenem MIC ≥ 2 µg/mL, or imipenem MIC ≥ 2 µg/mL, or non-susceptible by disk diffusion method
- Exceptions: *Proteus* species, *Providencia* species, or *Morgenella morganii* non-susceptible only to imipenem but susceptible to meropenem and ertapenem

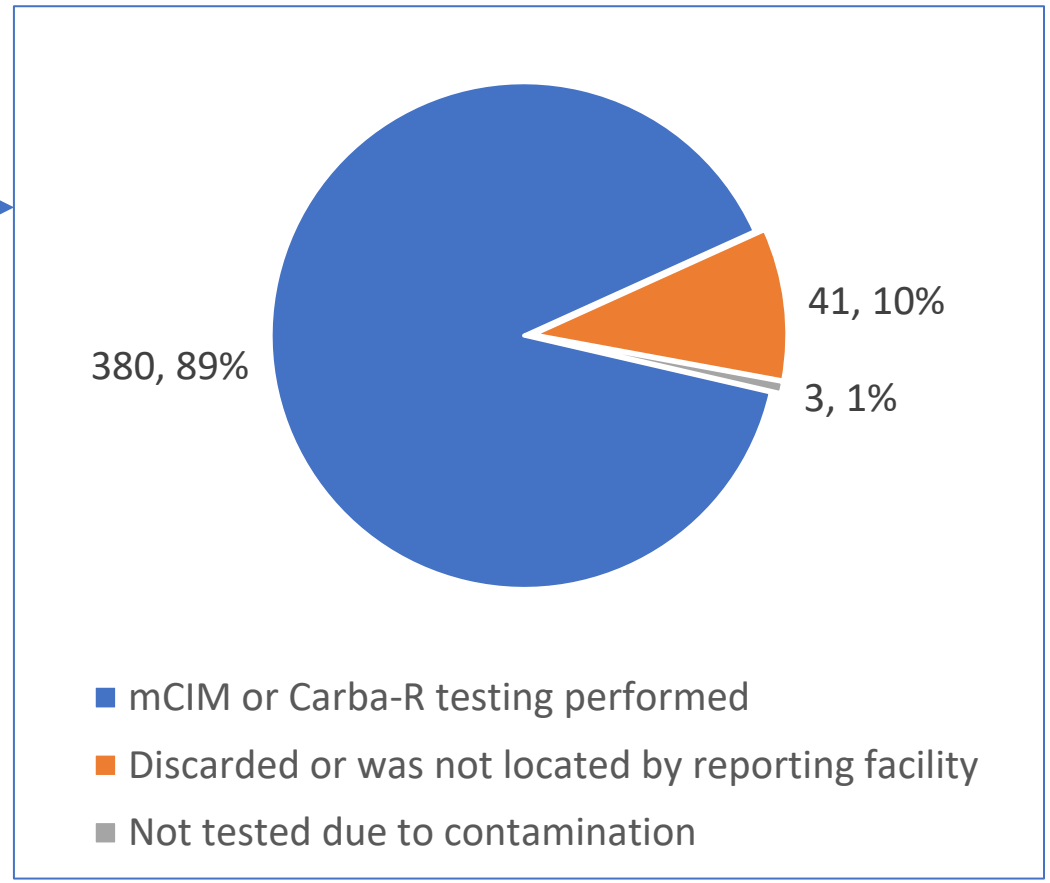
Pseudomonas aeruginosa

- Meropenem or imipeneim MIC ≥ 4 µg/mL or non-susceptible by disc diffusion method PLUS non-susceptible to both cefepime and cefazidime at MIC ≥ 16 µg/mL
- Exceptions: *Pseudomonas aeruginosa* that are mucoid or from cystic fibrosis patients

Acinetobacter baumanii

- Doripenem, Meropenem or imipeneim MIC ≥ 4 µg/mL or non-susceptible by disc diffusion method

2023 Nebraska CRE isolates eligible for Carbapenemase testing



https://www.nphl.org/index.cfm/testing-results/?testlink=78

Multidrug-Resistant Organisms (MDRO) Tiers for Nebraska

Tier	Definition of Included Organisms and Mechanisms	Examples (not all inclusive) of organisms/mechanisms for Nebraska	Transmission-Based Precautions Recommendations
Tier 1	Never (or very rarely) been identified in the United States and for which experience is extremely limited	Novel Carbapenemases	Contact precautions until otherwise recommended by HAI/AR team
Tier 2	Primarily associated with healthcare settings and are not commonly identified in the region (i.e., not been previously identified in the region or have been limited to sporadic cases or small outbreaks), corresponding to "not detected" or "limited to moderate spread" epidemiologic stages. No current treatment options exist (pan not-susceptible) and potential to spread more widely.	Pan-resistant organisms* *Candida auris* Carbapenemase (e.g., KPC, NDM, OXA-48, VIM, IMP) producing organisms (CPO) • Enterobacterales • *Pseudomonas aeruginosa* • *Acinetobacter Baumannii*	Contact Precautions *Long-term Care Facilities (LTCF):* Enhanced barrier precautions (EBP) recommended for colonized resident(s)**
Tier 3	Include MDROs targeted by the facility or region for epidemiologic importance that have been identified frequently across a region, indicating advanced spread, but are not considered endemic	• Extended spectrum beta-lactamase (ESBL) producing organisms • Carbapenem-resistant *Enterobacterales* (CRE) • Carbapenem-Resistant *Pseudomonas aeruginosa* (CRPA)	Contact Precautions *Long-term Care Facilities (LTCF):* Enhanced barrier precautions (EBP) considered for colonized resident(s)**
Tier 4	Endemic in a region and have been targeted by public health for their clinical significance and potential to spread rapidly	• Methicillin-resistant Staphylococcus aureus (MRSA) • Vancomycin-Resistant Enterococci (VRE)	Contact precautions per facility risk assessment *Long-term Care Facilities (LTCF):* Enhanced barrier precautions (EBP) considered for colonized resident(s)**

* Contact tracing and colonization screening may not be indicated for these organisms
**Contact precautions for acute/active infections or uncontained drainage/secretions

Updated 5.26.2024 https://dhhs.ne.gov/HAI%20Documents/Nebraska%20MDRO%20Tiers.pdf

Enhanced Barrier Precautions (EBP)

Infection control intervention designed to reduce transmission of MDROs with targeted gown and glove use during high contact resident care activities in LTCF.

Used in conjunction with standard precautions

Contact precaution will need to be followed in cases of acute diarrhea, draining wounds or other uncontained secretions or excretions

EBP is only intended for MDROs (other than *C. difficile*) and does not replace existing infection control guidance for other pathogens

Indications for Use of Enhanced Barrier Precautions (EBP) in Nursing Homes

Wounds, regardless of known MDRO colonization status

- Generally defined as the care of any skin opening requiring a dressing
- Intent is to focus on residents with a higher risk of acquiring an MDRO over a prolonged period of time.
- Examples: pressure ulcers, diabetic foot ulcers, unhealed surgical wounds, and chronic venous stasis ulcer
- Short-lasting wounds, such as a skin tear, may not apply

Indwelling medical devices, regardless of known MDRO colonization status

- Examples: central line, hemodialysis catheters, indwelling urinary catheter, feeding tube, tracheostomy, ventilator

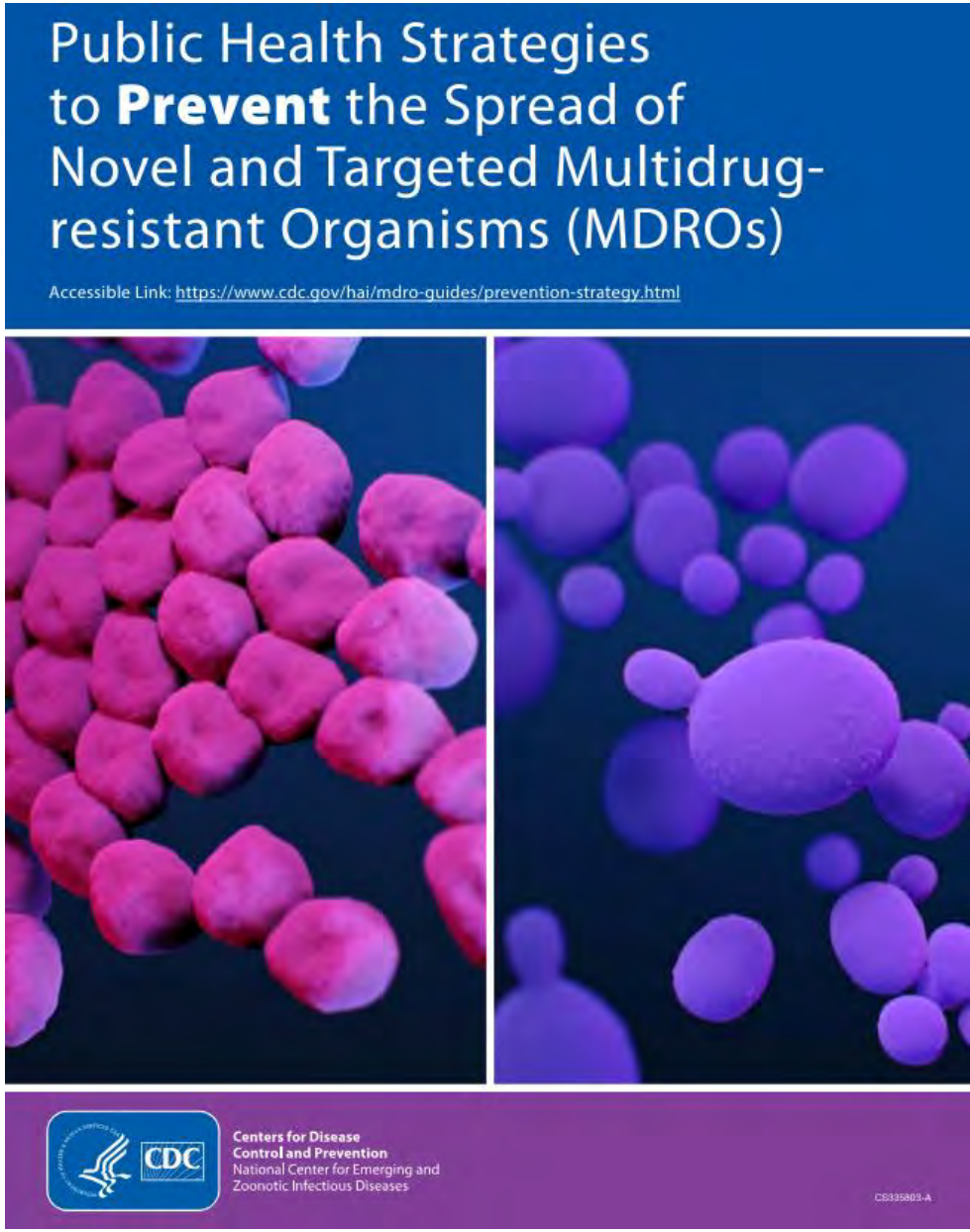
Known infection or colonization with MDRO when contact precaution does not apply

- MDROs for which the use of EBP applies are based on local epidemiology.
- At a minimum, they should include resistant organisms targeted by CDC, but can also include other epidemiologically important MDROs.
- Examples of CDC-targeted MDROs include Pan-resistant organisms, CPR-CRE, CP-CRPA, CP-CRAB, C auris

https://www.cdc.gov/long-term-care-facilities/hcp/prevent-mdro/faqs.html

MDRO Prevention Plan

CDC has published guidance for state, local, territorial, and tribal health departments to support the development, implementation, and coordination of activities focusing on preventing spread of novel and targeted MDROs



https://www.cdc.gov/healthcare-associated-infections/php/preventing-mdros/mdro-prevention-strategies.html

Preparing to Implement MDRO Prevention Plan

Step 1: Determine the focus MDROs

Step 2: Risk stratifying healthcare facilities within the jurisdiction

Step 3: Decide where to begin MDRO Prevention Plan implementation

Step 4: Evaluate jurisdictional clinical laboratory surveillance

Step 5: Define process and outcome measures

CDC- Recommended MDRO Prevention Strategies

Strategy 1	Strategy 2	Strategy 3	Strategy 4:
• Conduct education	• Improve infection prevention and control (IPC) practices	• Detect colonized individuals	• Facilitate communication

HAI/AR Team Planned Outreach to Nebraska Healthcare Facilities

MDRO admission screening for high-risk patients

Point prevalence screening for higher-risk units or facilities

Onsite ICARs for "influential" and "highly connected" facilities

Educational programs focused on MDRO prevention efforts

Outreach to alert facilities on admissions for patients with history of infection or colonization secondary to targeted MDROs

Whole Genome Sequencing for identifying and/or investigating MDRO clusters

Role of Whole Genome Sequencing in HAI/AR Program

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin

ELSEVIER

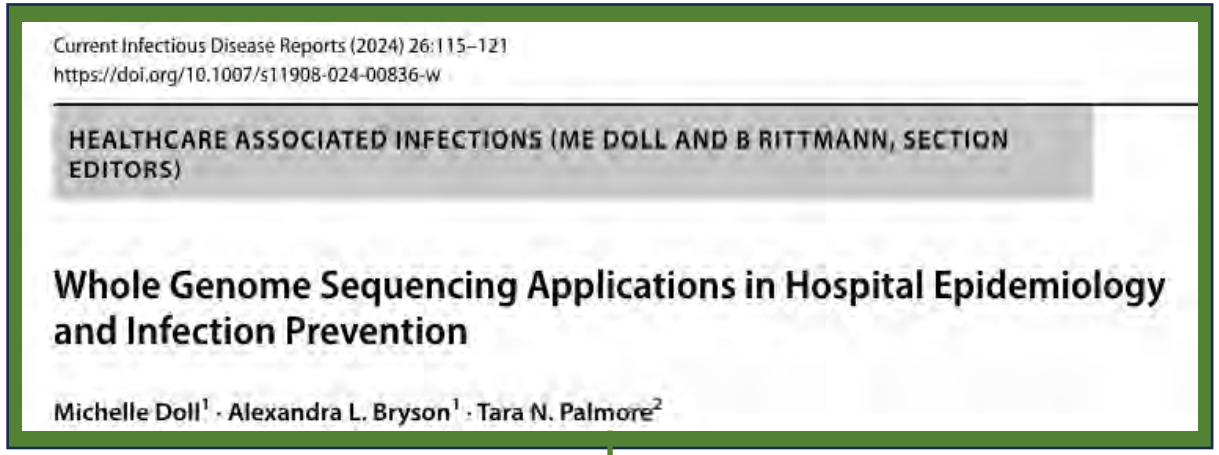
Healthcare Infection Society

Review

Infection prevention and control insights from a decade of pathogen whole-genome sequencing

D.W. Eyre [a,b,c,*]

"Potentially real-time sequencing has advantages: transmission events and pathways supported by sequencing can be targeted for infection prevention and control efforts, and time is saved by not focusing on instances where transmission is excluded based on sequencing."



Current Infectious Disease Reports (2024) 26:115–121
https://doi.org/10.1007/s11908-024-00836-w

HEALTHCARE ASSOCIATED INFECTIONS (ME DOLL AND B RITTMANN, SECTION EDITORS)

Whole Genome Sequencing Applications in Hospital Epidemiology and Infection Prevention

Michelle Doll[1] · Alexandra L. Bryson[1] · Tara N. Palmore[2]

"In the absence of sequencing data, the scientific literature shows that infection preventionists are spending time mitigating outbreaks that do not actually exist, while other transmission events fly under our radar unrecognized."

Nebraska *Candida parapsilosis* Pseudo-outbreak

- Increase in *C. parapsilosis* cases triggered an outbreak investigation.
- WGS confirmed cases were related but no common epidemiological link was identified
- Environmental cultures from lab were performed and grew same organisms with WGS confirming relatedness
- Number of *C. parapsilosis* cases returned to the baseline after mitigation
- WGS helped ruling out ongoing cluster when subsequent occasional cultures resulted positive

	Patient 1	Reference 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10	Env- 1	Env - 2	Env 3	Patient 11	Env-4	Env - 5
Patient 1		1356	0	0	0	0	0	0	0	5	1107	0	0	0	0	0	0
Reference 1	1356		1356	1356	1356	1356	1356	1356	1356	1359	1343	1356	1356	1356	1356	1356	1356
Patient 2	0	1356		0	0	0	0	0	0	5	1107	0	0	0	0	0	0
Patient 3	0	1356	0		0	0	0	0	0	5	1107	0	0	0	0	0	0
Patient 4	0	1356	0	0		0	0	0	0	5	1107	0	0	0	0	0	0
Patient 5	0	1356	0	0	0		0	0	0	5	1107	0	0	0	0	0	0
Patient 6	0	1356	0	0	0	0		0	0	5	1107	0	0	0	0	0	0
Patient 7	0	1356	0	0	0	0	0		0	5	1107	0	0	0	0	0	0
Patient 8	0	1356	0	0	0	0	0	0		5	1107	0	0	0	0	0	0
Patient 9	5	1359	5	5	5	5	5	5	5		1110	5	5	5	5	5	5
Patient 10	1107	1343	1107	1107	1107	1107	1107	1107	1107	1110		1107	1107	1107	1107	1107	1107
Env-1	0	1356	0	0	0	0	0	0	0	5	1107		0	0	0	0	0
Env-2	0	1356	0	0	0	0	0	0	0	5	1107	0		0	0	0	0
Env-3	0	1356	0	0	0	0	0	0	0	5	1107	0	0		0	0	0
Patient 11	0	1356	0	0	0	0	0	0	0	5	1107	0	0	0		0	0
Env-4	0	1356	0	0	0	0	0	0	0	5	1107	0	0	0	0		0
Env-5	0	1356	0	0	0	0	0	0	0	5	1107	0	0	0	0	0	
Patient 12 - a	0	1356	0	0	0	0	0	0	0	5	1107	0	0	0	0	0	0
Patient 12 - b	0	1356	0	0	0	0	0	0	0	5	1107	0	0	0	0	0	0

Whole Genome Sequencing Results for a CPO Cluster

- Carbapenemase producing Gram-negative organisms (same organism and resistance gene) were identified in multiple patients over a period of time
- Possibility of a common environmental source was considered
- However, WGS results suggested that these isolates were not closely related

	Patient 1	Patient 2	Patient 3	Patient 4	Reference 1	Reference 2	Patient 5
Patient 1		27589	109	27652	296825	27045	27808
Patient 2	27589		27674	22726	297102	22060	22832
Patient 3	109	27674		27737	296868	27131	27893
Patient 4	27652	22726	27737		296769	20158	1022
Reference 1	296825	297102	296868	296769		296362	296956
Reference 2	27045	22060	27131	20158	296362		20289
Patient 5	27808	22832	27893	1022	296956	20289	

Transmission of *Candida auris* in Nebraska

Nebraska Department of Health and Human Services

Health Alert Network

ALERT

March 26, 2024

Candida auris in Nebraska

Candida auris is an emerging antimicrobial-resistant yeast that was first identified in 2009 in Asia and began spreading in the United States in 2015. It can cause severe infections and spreads easily between hospitalized patients and nursing home residents. *C. auris* is often multidrug-resistant and some strains are resistant to all three major classes of antifungal medications. In 2019, CDC declared *C. auris* as one of the urgent (highest level) antibiotic resistance threats in the United States. It is still rare in the US, but cases have been increasing nationwide with 8,131 *C. auris* cases (clinical and screening cases) detected in the US in 2022 as compared to 323 in 2018. Nebraska is considered a low incidence state and transmission of *C. auris* was not detected before this year. However, to-date, 5 cases (clinical and screening cases) of *C. auris* have been identified in Nebraska in 2024. Therefore, it is important for all healthcare personnel in Nebraska to be aware of transmission dynamics, risk factors, diagnostic challenges, and treatment recommendations for *C. auris*.

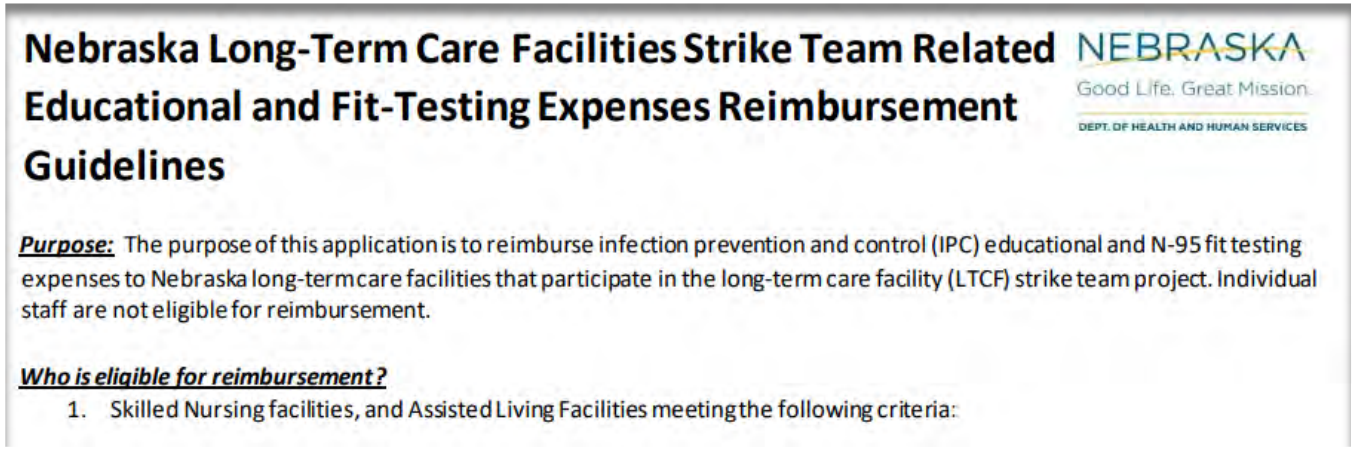
https://dhhs.ne.gov/han%20Documents/ALERT03262024.pdf

2023-2024 Initiative to Support LTCF (LTCF Strike Team Project)

- Assist LTCF with implementing Respiratory Protection Program
- Train additional staff in LTCF who can step in as IP for the facility
- Promote training of frontline staff in LTCF to serve as infection control champions
- Strengthen infrastructure at LHD to coordinate LTCF HAI/AR prevention and containment efforts with Nebraska DHHS HAI/AR Program

Deadline to submit invoices for reimbursement of eligible expenses is **June 14, 2024**

https://dhhs.ne.gov/pages/Healthcare-Associated-Infections.aspx



Nebraska Long-Term Care Facilities Strike Team Related Educational and Fit-Testing Expenses Reimbursement Guidelines

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Purpose: The purpose of this application is to reimburse infection prevention and control (IPC) educational and N-95 fit testing expenses to Nebraska long-termcare facilities that participate in the long-term care facility (LTCF) strike team project. Individual staff are not eligible for reimbursement.

Who is eligible for reimbursement?

1. Skilled Nursing facilities, and Assisted Living Facilities meeting the following criteria:

Examples of Services Offered to LTCF (SNF/ALF)	No. (Benefited/Shared)
Facilities receiving N-95 fit-testing support	183
Staff receiving fit-testing and training on how to perform fit testing	550
Staff receiving fit-testing (without training on how to perform fit-testing) through LHD	1045
Facilities receiving HEPA filter units	227
HEPA filter units distributed to LTCF	1226

In Summary ……

Nebraska hospitals are doing better in preventing most targeted healthcare-associated infections, but opportunities for improvement exist in some areas

Nebraska has low prevalence for the CDC-targeted MDROs but additional collaborative efforts between public health and healthcare facilities will be needed to prevent further spread

WGS services offered by the public health will play an important role to assist healthcare facilities in identifying and limiting MDRO transmission

HAI/AR program will expand collaboration with healthcare facilities, local health departments, professional organizations and other stakeholders to coordinate patient safety initiatives

QUESTIONS?

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THANK YOU

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