



Showcase for Hopkins Inquiry and Nursing Excellence

# SHINE

Conference

## It's All on the Line: Implementation of a High Risk Central Line Tool to Decrease CLABSI in the Surgical ICU

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# Background

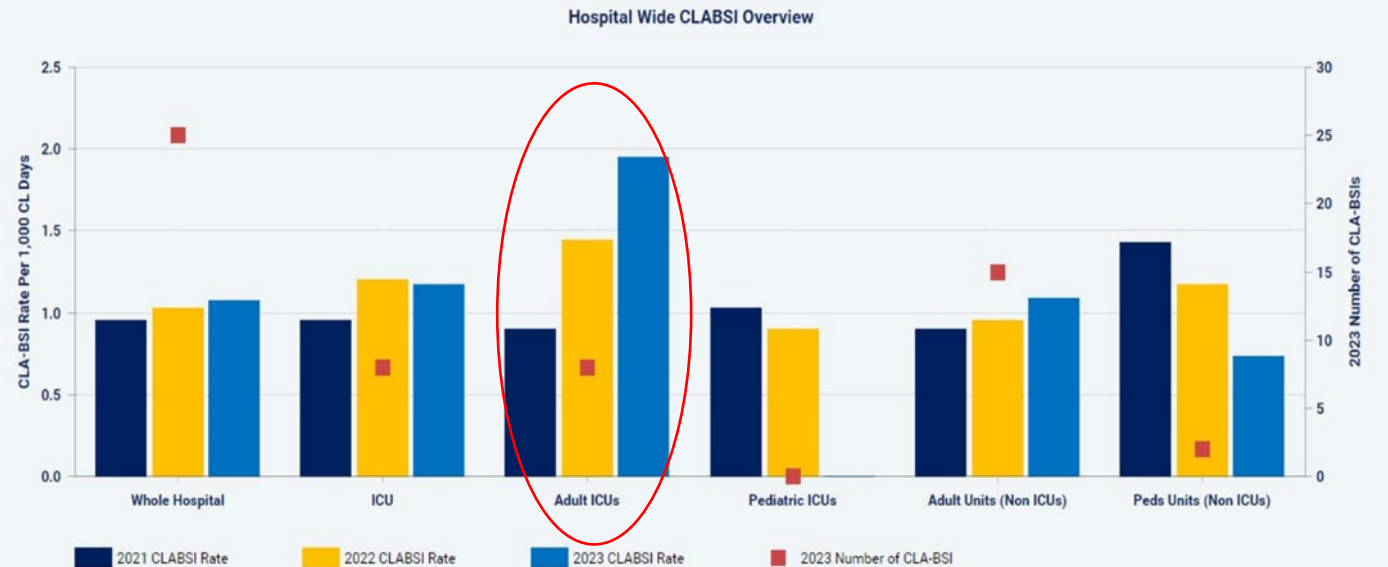
- CLABSIs result in thousands of deaths per year

- Billions of dollars in added costs to U.S. healthcare system

- The attributable mortality of a CLABSI is 12-25%

### Hospital Wide CLABSI Overview

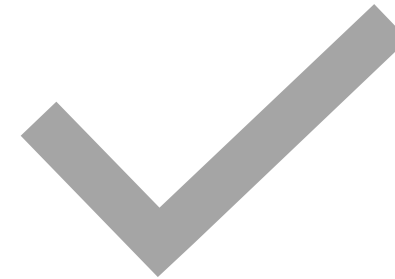
as of March 31, 2023



# Inspiration for Project



WICU multidisciplinary CLABSI rounds and RCA discussions



Success of PICU high risk central line algorithm

# Project Aims

Identify high risk CLABSI patient characteristics present within surgical critical care population

Correlate with mitigation strategies

Guide a focused, evidenced based intervention plan



# Goals

Improve

Improve identification of high risk patients and awareness of evidence based mitigation strategies to decrease incidence of CLABSI

Promote

Promote shared decision making regarding ongoing need for central access in high risk patient populations

Increase

Increase nursing and interdisciplinary provider awareness of high risk CLABSI characteristics in our SICU patients

## High Risk Central Line Tool for Adult ICU Patients

Risk Factor	Qualifier	Intervention/Risk Mitigation
<b>Consistently Observed or At Risk for Compromised Dressing or Securement Integrity</b>	<ul style="list-style-type: none"> <li>Altered skin integrity at CVL site</li> <li>Serous fluid leaks from skin at or near insertion site</li> <li>Diaphoretic patient</li> <li>Insertion location increases the difficulty of achieving occlusive dressing (i.e., deep in skin fold/crease)</li> <li>Frequent stooling or GI drains with femoral line</li> <li>Non-intact sutures +/- CVL moving in/out</li> </ul>	<ul style="list-style-type: none"> <li>Report to primary ICU provider team promptly</li> <li>Frequent dressing site assessments q4 hours</li> <li>Discuss options for line removal or relocation with primary team</li> <li>Report to resource nurse to determine appropriate contact/consult (i.e., is patient appropriate for foam dressing trial, review <i>Challenging Dressing Resource</i> for guidance, consult VAT leadership)</li> <li>Implement difficult dressing strategies such as <i>Mastisol, Aquaguard, StatSeal</i></li> </ul>
<b>Behavioral Concerns</b>	<ul style="list-style-type: none"> <li>Removes/contaminated dressing and/or CVL directly</li> <li>Refuses CHG/line changes or other CLABSI prevention bundle items</li> </ul>	<ul style="list-style-type: none"> <li>Report to ICU provider team promptly</li> <li>Utilize the <i>CHG Nursing Resource</i> for specific interventions and escalation processes</li> <li>Involve and educate patient and family, if able, in preventative care</li> <li>Utilize restraints or Mitts for safety of medical devices, if unable to follow commands</li> <li>Discuss medication options with authorized prescribers</li> </ul>
<b>Inconsistent CLABSI Bundle Adherence in Past 48 Hours</b>	<ul style="list-style-type: none"> <li>Clean/dry/intact dressing, correct tubing/line labeling, CHG skin &amp; linen change, need for line assessed daily</li> <li>Regardless of reason (i.e., patient instability)</li> </ul>	<ul style="list-style-type: none"> <li>Review and identify inconsistent adherence and discuss on rounds daily</li> <li>Discuss with primary RN, ICU team (Attending or Fellow), and resource or charge RN to develop a plan</li> <li>Implement the plan</li> </ul>
<b>Line Location Near Source of Contaminant</b>	<ul style="list-style-type: none"> <li>Line or tubing near tracheostomy</li> <li>Line or tubing near perineal/groin area</li> <li>Prone positioning</li> <li>Line or tubing near Wounds/GI drains/Uro drains/ Ostomies.</li> </ul>	<ul style="list-style-type: none"> <li>Cover line/tubing during suctioning, nebulizer treatments, personal hygiene</li> <li>Utilize <i>Challenging Dressing Resource</i></li> <li>Assess insertion sites, change dressings, secure tubing prior to prone positioning</li> <li>Place a moisture proof barrier (i.e., <i>chux</i>) between tubing/line and source of contaminant. Assure frequent assessment and changing of soiled barrier</li> <li>Discuss line necessity or replacement with ICU team</li> <li>Assess cause of contaminant and brainstorm possible solution/mitigations with team</li> </ul>
<b>Lines Placed non-sterilely During Emergency/Code</b>	<ul style="list-style-type: none"> <li>Femoral</li> <li>IO</li> <li>Any line placed in an emergency</li> </ul>	<ul style="list-style-type: none"> <li>Begin planning for a new line location or removal as soon as possible</li> </ul>
<b>Duration of Line</b>	<ul style="list-style-type: none"> <li>Non-tunneled CVL &gt; 4 days old</li> </ul>	<ul style="list-style-type: none"> <li>Discuss line necessity or possibility for replacement with a lower risk line on day 5 with ICU provider team</li> <li>Reduce other risk factors where possible (i.e., Reduce line entries by converting medications from IV to PO, limit access for lab draws)</li> </ul>
<b>Percutaneous large bore Catheter (&gt; 10 FR)</b>	<ul style="list-style-type: none"> <li>Any large bore CVC, typically a hemodialysis or pheresis catheter</li> </ul>	<ul style="list-style-type: none"> <li>If on hypothermia blanket, change disposable blanket components daily with linen changes (except for Artic Sun blanket)</li> <li>If on warming blanket, change daily with linen change</li> <li>Consider anticoagulation of CRRT circuit if frequent clotting issues are present. Frequent clotting/pump functionality issues = more line access risks.</li> <li>Facilitate ICU team and renal discussion for tunneled line</li> </ul>
<b>Alteplase Event Suspected/Confirmed Clot Burden</b>	<ul style="list-style-type: none"> <li>Repeated patency events &gt;2 in past 4 days <u>  </u> (does not mean one event requiring 2 doses of alteplase to clear)</li> </ul>	<ul style="list-style-type: none"> <li>Replacement/removal of a line with suspected/confirmed clot burden and/or consistent patency concerns should be prioritized.</li> </ul>
<b>Miscellaneous Increased Risk Factors</b>	<ul style="list-style-type: none"> <li>&gt;= 30 Days current hospitalization (ICU or floors)</li> <li>History of CLABSI w/in current admission, last 30 days or in current CVL within prior 30 days</li> <li>Patient is on contact precautions (e.g., VRE, MRSA, MDRO, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Patient requires optimal line maintenance and attention to other risk factors. Address any barriers to CLABSI prevention promptly with primary team.</li> </ul>

1. Comprehensive literature search
2. Tool adaptation
3. Staff knowledge survey and education

# Staff Education

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- Pre and post survey
- Group meetings
- Huddle board
- Week long “Go Live”





# Implementation

Week of:		MRN:								Room:	
Check box for your shift if the patient meets high risk criteria for that category											
	Compromised Dressing integrity	Behavioral concerns	Inconsistent CLABSI bundle adherence	Line near contaminant	Line placed emergently	Duration of line	Large bore catheter	Alteplase event/clot	Miscellaneous	HIGH RISK?	
Sun A											
Sun P											
<i>Interventions:</i>											
Mon A											
Mon P											
<i>Interventions:</i>											
Tues A											
Tues P											
<i>Interventions:</i>											

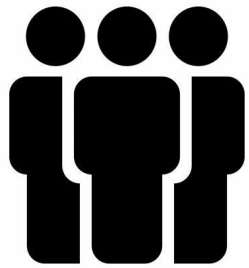
Bedside RN completes tool on each CVC

Charge collects and reviews with bedside RN

Identified with magnet on assignment board

Charge reviews high risk patients with fellow/attendings and resource nurse

# Data



**73 total patients**

**269 completed tools**



**51 days avg LOS**

**56% emergent admissions**



# Data

## Most significant risk factor

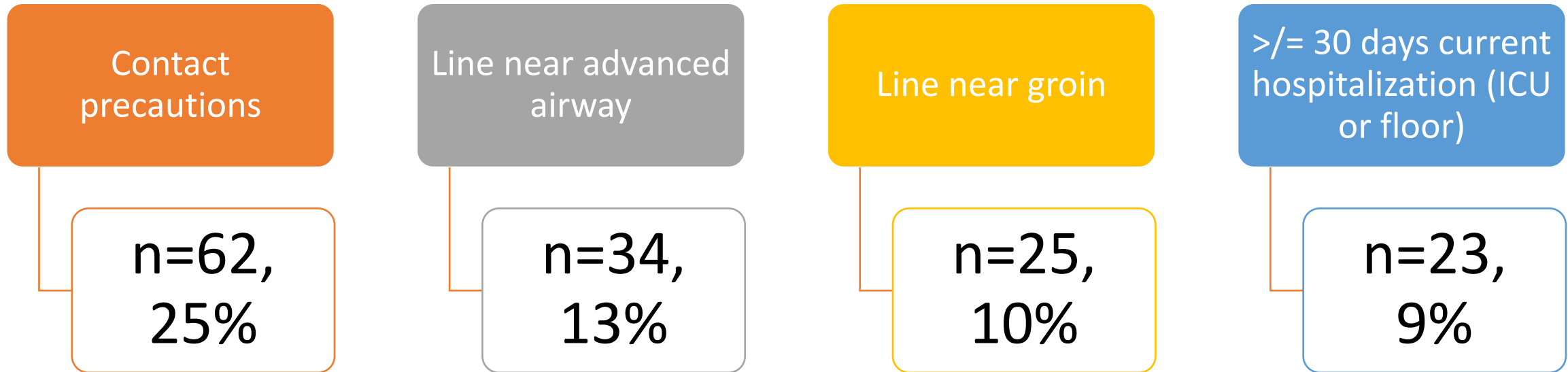
- Non tunneled line >4 days old

## Most Frequent occurring qualifiers with intervention

- Discussing line necessity for line >4 days
  - n=68, 27%
- Utilization of CLABSI bundle
  - n=20, 8%

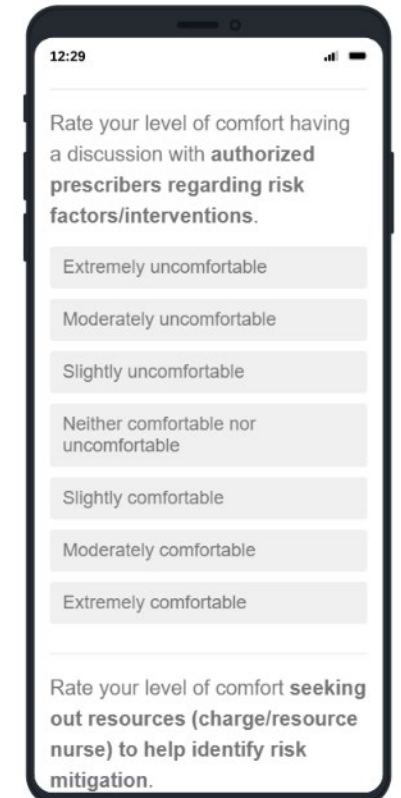
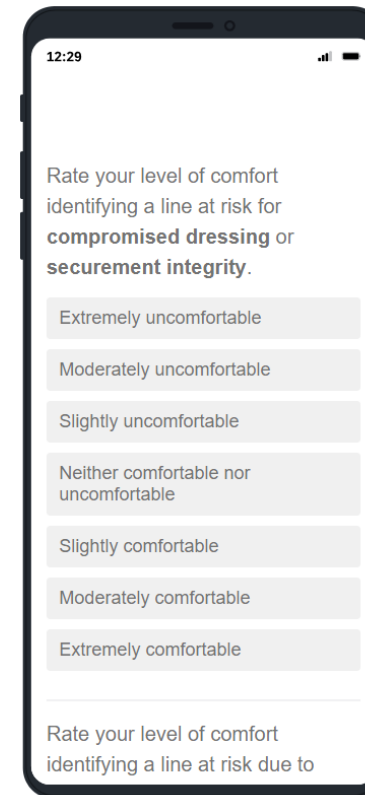
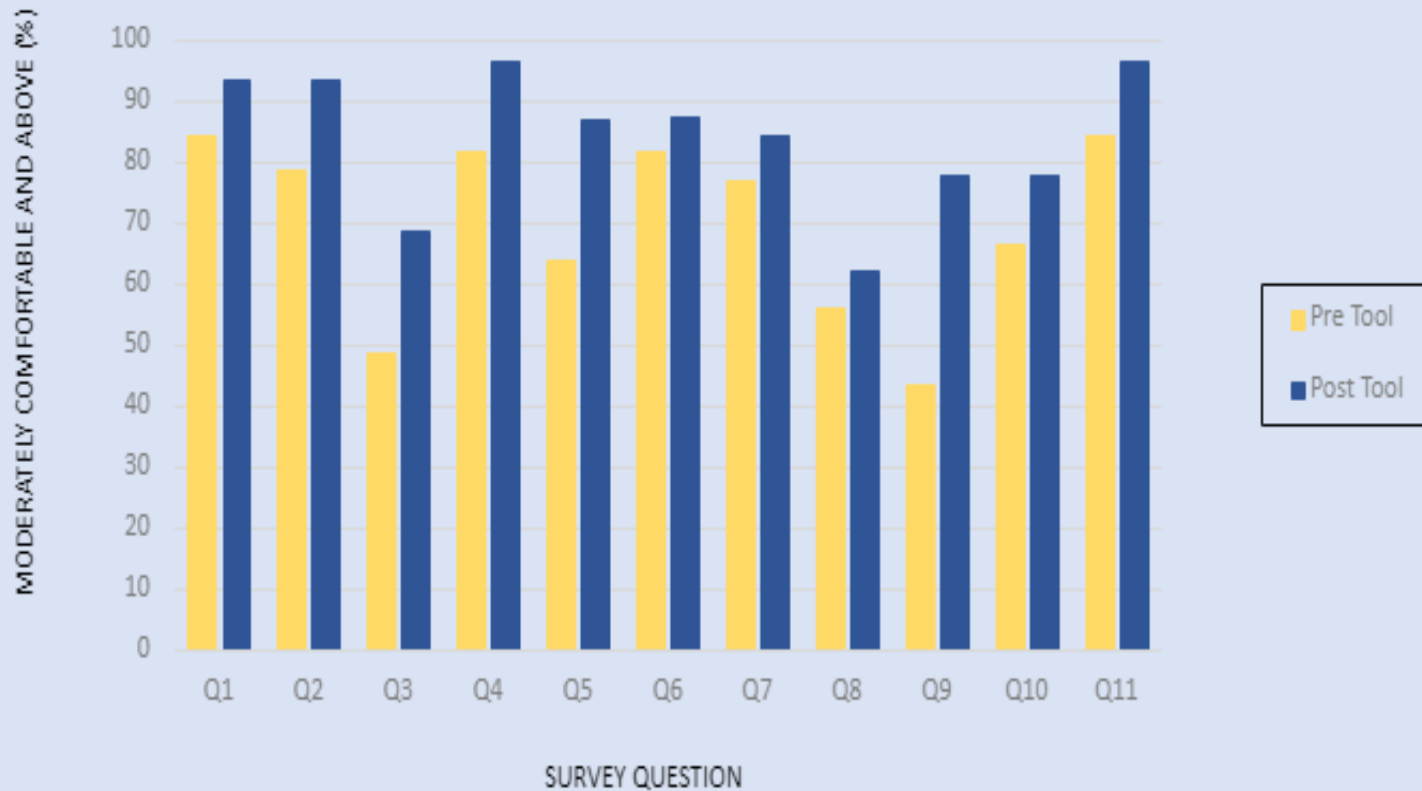


# Data



# Data

## Nurses Comfort Level Identifying and Acting on Risks



# Results

## Weinberg Intensive Care Unit CLABSI Rates



### # of CLABSI

2021:	3
2022:	8
2023:	2

# Discussion

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After implementation of tool, WICU CLABSI rates decreased and have sustained for 4+ quarters

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Overall staff increase in confidence identifying and mitigating risks

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Develop rounds with providers to evaluate line necessity

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Further education on altered skin integrity mitigations

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Mitigate environmental risk for contact precautions

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Kudos to staff for line maintenance

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Tool consistency

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# References

1. Barry JL, Gunderson W, Antwi M, et al. Reducing hospital associated infections in an intensive care unit with a multidisciplinary team led by infection prevention...42nd annual conference abstracts, APIC 2015, nashville, TN june 2015. *Am J Infect Control*. 2015;43:S46-S47. <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=rzh&AN=102785924&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202>.
2. Bearup L, Nannoshi L, Hague S, Beaver C. REAL TIME AUDITS IMPROVE CENTRAL LINE CARE BUNDLE COMPLIANCE FOR CARE OF HOSPITALIZED ONCOLOGY PATIENTS...47th annual congress ONS congress, april 27–May 1, 2022, anaheim, CA. *Oncol Nurs Forum*. 2022;49(2):E100-E101. <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=rzh&AN=155511039&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202>.
3. CDC: [HICPAC Guidelines for the Prevention of Intravascular Catheter-Related Infections \(2011, updates 2017\)](#)
4. Garrett JH. Summary of evidence-based practices for bloodstream infection prevention across the health care continuum of care for vascular access clinicians: Addressing the 3 common sources of health care-associated infection transmission. *J ASSOC VASC ACCESS*. 2016;21(2):72-74. <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=rzh&AN=115594434&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202>.
5. Gorski LA, Hadaway L, Hagle ME, et al. Infusion therapy standards of practice. *J Infus Nurs*. 2021;44(suppl 1):S1-S224.
6. Harlan MDDNP, A.C.N.S.-B.C., Kennell, Jamilyn Sue O. C. N., Lucas WCCCCNS, B.M.T.C.N., Ren D, Tuite, Patricia K. C. C. N. S. A clinical nurse specialist-led quality improvement initiative to identify barriers to adherence to a bundle for central line maintenance. *Clin Nurse Spec*. 2022;36(2):99-108. <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=rzh&AN=155588301&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202>.
7. SHEA Compendium: [Strategies to Prevent CLABSI in Acute Care Hospitals 2022 Update](#)
8. The Johns Hopkins Hospital Interdisciplinary Clinical Practice Manual Infection Control. VAD: Vascular Access Device Policy, Adult. *Policy Number IFCO35*. Effective Date: 02/23/2023





*Questions?*