with and gathering feedback from nursing staff, nurse educators, and supply chain, we developed a blood culture collection kit that included all items necessary for blood culture collection thus eliminating the need for nurses to gather these items individually prior to collection. Additionally, simple step-by-step educational materials (Fig. 1) detailing the collection technique were provided. Education was presented at nursing huddles and skills fairs prior to kit roll-out. Blood culture kits were then stocked in place of individual blood culture collection bottles in all ED stock rooms in August 2022. **Result:** The 12-week pre-intervention period found 249 contamination events from 4265 total collections deriving a contamination rate of 5.8% across our health system's four ED locations. During a 12-week post-intervention period following kit roll-out, 116 contamination events occurred from 3629 total collections deriving a contamination rate of 3.2% across our four ED locations. Given our results, we ultimately rolled this out to all units in all locations of our health system. When including all time from kit rollout to present (August 2022 to November 2023, 16 months), there were 1077 contamination events from 43379 total collections deriving an overall contamination rate of 2.5%. When compared to the 16 months prior to the kit rollout (April 2021 to July 2022) there were 1803 contamination events in 49335 total collections (3.7% contamination rate) deriving an overall percent reduction of 32.1%. **Conclusion:** We were able to decrease our health system's blood culture contamination rate through simple interventions aimed at reducing the mental burden on nursing staff by developing a blood culture collection kit and educational materials. Since implementation of the kits, we have continued to maintain lower contamination rates as evident by our 16 month follow up period.

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Contributing Factors to Central Line-associated Bloodstream Infections and Catheter-associated Urinary Tract Infections

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Background: Central line-associated bloodstream infections (CLABSI) and catheter-associated urinary tract infections (CAUTI) are key healthcare-associated infection (HAI) quality metrics. In this qualitative analysis, we aimed to identify common issues contributing to CLABSIs and CAUTIs occurring during the COVID-19 pandemic. **Methods:** In an academic healthcare network in Atlanta, GA, four hospitals perform real-time, apparent cause analyses (ACAs) for all CLABSIs and CAUTIs. Contributing factors are entered as free text into an electronic database. We analyzed data from 8/2020–8/2022. We first performed a qualitative open card sort of all reported contributing factors to CLABSI and created a novel framework based on mutually defined critical tasks (e.g., line insertion) and cross-cutting issues (e.g., communication breakdown). Contributing factors could describe ≥1 critical task and/or ≥1 cross-cutting issue. After establishing interrater reliability, a multidisciplinary group applied this framework to classify each contributing factor. For CAUTI, we used the same set of cross-cutting issues but identified new critical tasks via open card sorting. We then used the framework to classify each CAUTI contributing factor. We used descriptive statistics to identify frequent critical tasks and cross-cutting issues. **Results:** We reviewed 350 CLABSI ACAs with 602 contributing factors and 240 CAUTI ACAs with 405 contributing factors (Figure 1). Our classification framework comprised 11 cross-cutting issues and 9 critical tasks for CLABSI and 7 critical tasks for CAUTI (Figure 2). CLABSI: The critical tasks most often reported were bathing (19%), central line dressing maintenance (15%), and assessing central line indication (8%; Figure 3). Within these tasks, the most frequent issues described for bathing were the task not being performed (20%) and unclear documentation (18%); for dressing maintenance, the task was not performed (15%), not documented (15%), or poorly performed due to lack of competency (15%); and for assessing line indication, there was frequent communication breakdown (33%). CAUTI: The critical tasks most often reported were urinary catheter care (26%) and assessing the indication for urinary catheter (22%; Figure 4). Within these tasks, urinary catheter care was frequently not documented (38%) or not performed (16%); assessing urinary catheter necessity was often not documented (29%) or involved breakdown of communication (19%). **Conclusion:** We created a novel framework to evaluate common causes of HAIs in an academic healthcare network. This framework can be used to identify and track gaps over time and to develop quality improvement initiatives targeting key tasks and

Characteristics of CLABSIs and CAUTIs

CLABSI	**N = 350**
Days CVC in place prior to CLABSI,[1] median (IQR)	10 (6, 17)
Type of CVC[2]	
Multi-lumen CVC (excluding dialysis CVC and PICC)	148 (42)
PICC	94 (27)
Dialysis/apheresis CVC	80 (23)
Port	28 (8)
CVC insertion location[2]	
Internal jugular	195 (56)
Arm	71 (20)
Subclavian	52 (15)
Femoral	28 (8)
Unknown	4 (1)
Role of person inserting CVC[2]	
Advanced practice provider	85 (24)
Trainee (resident or fellow)	85 (24)
Vascular access team member	57 (16)
Attending physician	48 (14)
Unknown	75 (21)
Central line indication[2]	
Medication requiring central venous access	194 (55)
Clinical instability	95 (27)
Dialysis/CRRT/apheresis	78 (22)
Other	73 (21)
Hemodynamic monitoring	57 (16)
Difficult venous access	48 (14)
CAUTI	**N = 240**
Days catheter in place prior to CAUTI, median (IQR)	15 (4, 17)
Role of person inserting urinary catheter	
Nurse	172 (72)
Resident	4 (2)
Attending physician	2 (1)
Student (medical or nursing)	2 (1)
Other	60 (25)
Urine culture order indication	
Fever	187 (78)
Suprapubic pain or dysuria	18 (8)
Other	50 (21)

Values are reported as N (%) unless otherwise stated.
1. Defined as number of days between CVC insertion and first positive qualifying blood culture
2. The analysis was performed for the first line inserted that was in place at the time the CLABSI occurred. 84 patients had an additional CVC in place at the time of the CLABSI

Abbreviations: CAUTI, catheter-associated urinary tract infection; CLABSI, central line-associated bloodstream infection; CRRT, continuous renal replacement therapy; CVC, central venous catheter; IQR, interquartile range; PICC, peripherally inserted central catheter

Cross-cutting Issues:	Definition:
Documentation Missing or Unclear	Documentation, written or electronic, is either missing or unclear (e.g., inadequate or performed improperly).
Staffing Shortages	Staffing level, of any type of healthcare worker, is insufficient for adequate patient care or routine IPC tasks.
Competency Concerns	Concern that healthcare worker lacks adequate training, knowledge, or skills for routine IPC tasks (e.g., concerns about new staff and/or protocols specific to Emory Healthcare).
Care Refusal	A task either did not occur or did not occur properly because the patient or their family was unengaged or refused care.
Task Not Performed	Task was not performed (e.g., missed) or done incorrectly for reasons not otherwise specified.
Communication Breakdown during Care Transitions or Between Teams	During care transitions (e.g., handoff, bedside shift report, or transfer in patient location) or between teams, communication about IPC tasks was absent, incomplete, inconsistent, or unclear.
Inadequate Supplies	Supplies for IPC tasks were not adequate (e.g., supplies not functioning appropriately or being incompatible with a patient's anatomy/condition).
Supplies Unavailable	Supplies for IPC tasks were not available.
Patient's Medical Condition(s) Compromises Care	Patient's medical condition (e.g., high acuity, emergency situation, COVID-19) or characteristic (e.g., anatomy/facial features) contributed to tasks being missed or performed improperly, or made them more susceptible to adverse outcomes
Limited Patient Care Space	Patient care areas impede workflow because they are small, cramped, or crowded.
Policies Missing or Unclear	Work policies and procedures are missing, unknown, or ambiguous.
CLABSI Critical Tasks:	Definition:
Line Blood Draw Technique	Any process that involves drawing blood from a central line (e.g., blood cultures, routine labs).
Call to Order	Refers to the standard process of pausing before central line insertion.
Bathing	Any reference to bathing patients (e.g., includes CHG bathing).
Line Caps	Missing or inconsistent use of line caps.
Dressing Maintenance	Includes integrity of dressing, missing dressing changes, dating of dressings, Biopatch placement, or other tasks related to the central line dressing.
Line Insertion	Process of inserting a central line (after Call to Order), which includes adherence to the Central Line Insertion Practices (CLIP) bundle.
Assessing Line Indication/Necessity	Refers to the reason(s) for why central line was placed or the ongoing necessity for the central line.
Maintaining Line Patency	Refers to any process that keeps line free of obstruction, including the use of declotting medications (e.g., tPA/alteplase) or flushing.
Environmental Cleaning	Refers to concerns about the cleanliness of surfaces in the healthcare environment around the patient (e.g., high touch surfaces not being wiped down, general cleanliness of room, terminal cleaning, and other concerns for contamination of the healthcare environment).
CAUTI Critical Tasks:	Definition:
Assessing indication and necessity of an indwelling urinary catheter	Routinely performing the process of determining, documenting, or communicating the ongoing need for an indwelling urinary catheter. This includes, but is not limited to, assessing urinary retention as well as determining whether an external urinary catheter could be used.
Inserting or exchanging an indwelling urinary catheter	All processes involved in inserting or exchanging an indwelling urinary catheter (including specialty catheters). This includes the provider placing the order, the procedural steps, and documenting the process.
Catheter care	All processes involved in either catheter or perineal care.
Use of bowel management system	Understanding the indications for or appropriately using any type of bowel management system.
Assessing the need for a urine culture	Understanding when a urine culture is needed to assess for infection.
Obtaining a urine culture	All processes involved in obtaining a urine culture, including having an order or following recommended techniques for obtaining urine culture (e.g., including exchanging the catheter prior to culturing, if needed).
Environmental cleaning	All processes involved in cleaning all patient care areas.

Figure 2: Novel Analysis Framework. Mutually identified cross-cutting issues and CLABSI/CAUTI critical tasks with definition. Abbreviations: CHG, chlorhexidine gluconate; tPA, tissue plasminogen activator

Figure 3: Classification of all identified CLABSI contributing factors using a novel framework assessing critical tasks and cross-cutting issues

		Critical Tasks (n, column %)										
		Bathing	Dressing Maintenance	Assessing Line Indication	Maintaining Line Patency	Line Insertion	Call to Order	Line Blood Draw Technique	Line Caps	Environ Cleaning	Other	Total (%)
Cross-cutting Issues	Staffing Shortages	16 (12%)	14 (13%)	8 (15%)	2 (4%)	0 (0%)	2 (5%)	0 (0%)	0 (0%)	2 (22%)	68 (27%)	112 (15%)
	Task Not Performed	28 (20%)	17 (15%)	6 (11%)	11 (23%)	6 (14%)	25 (60%)	0 (0%)	3 (33%)	3 (33%)	6 (2%)	105 (14%)
	Documentation Missing or Unclear	25 (18%)	17 (15%)	13 (24%)	4 (8%)	6 (14%)	5 (12%)	0 (0%)	3 (33%)	0 (0%)	22 (9%)	95 (13%)
	Communication Breakdown during Transitions or between Teams	20 (14%)	11 (10%)	18 (33%)	10 (21%)	4 (9%)	2 (5%)	3 (14%)	1 (11%)	2 (22%)	19 (7%)	90 (12%)
	Competency Concerns	10 (7%)	17 (15%)	0 (0%)	9 (19%)	8 (19%)	4 (10%)	9 (43%)	0 (0%)	0 (0%)	27 (11%)	84 (11%)
	Patient's Medical Condition(s) Compromises Care	9 (7%)	14 (13%)	3 (5%)	0 (0%)	6 (14%)	1 (2%)	1 (5%)	0 (0%)	1 (11%)	40 (16%)	75 (10%)
	Care Refusal	20 (14%)	2 (2%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	9 (4%)	32 (4%)
	Policies Missing or Unclear	3 (2%)	3 (3%)	1 (2%)	2 (4%)	0 (0%)	1 (2%)	4 (19%)	0 (0%)	0 (0%)	6 (2%)	20 (3%)
	Inadequate Supplies	0 (0%)	7 (6%)	1 (2%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (1%)	12 (2%)
	Supplies Unavailable	1 (1%)	1 (1%)	0 (0%)	1 (2%)	2 (5%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	5 (2%)	11 (2%)
	Limited Patient Care Space	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (3%)	10 (1%)
	Other	6 (4%)	8 (7%)	4 (7%)	9 (19%)	8 (19%)	2 (5%)	4 (19%)	1 (11%)	1 (11%)	42 (16%)	85 (12%)
	Total (n, row %)	**138 (19%)**	**111 (15%)**	**55 (8%)**	**48 (7%)**	**43 (6%)**	**42 (6%)**	**21 (3%)**	**9 (1%)**	**9 (1%)**	**255 (35%)**	**731 (100%)[1]**

1. Each contributing factor (or "card") could be classified as referring to more than one critical task or cross-cutting issue so this adds up to more than the total number of reported 602 contributing factors

Abbreviations: Enivron, environmental

associated factors, such as communication difficulties when assessing device indications.

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Figure 4: Classification of all identified CAUTI contributing factors using a novel framework assessing critical tasks and cross-cutting issues

		Critical Tasks (n, column %)[1]							
		Catheter care	Assessing indication/necessity of an indwelling urinary catheter	Inserting or exchanging an indwelling urinary catheter	Use of bowel management system	Assessing need for a urine culture	Obtaining a urine culture	Other	Total (%)
Cross-cutting Issues	Documentation Missing or Unclear	52 (38%)	34 (29%)	13 (27%)	1 (4%)	1 (6%)	0 (0%)	7 (4%)	108 (20%)
	Staffing Shortages	13 (10%)	8 (7%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	58 (35%)	80 (15%)
	Competency Concerns	17 (13%)	19 (16%)	12 (25%)	13 (50%)	7 (39%)	6 (33%)	8 (5%)	82 (15%)
	Care Refusal	1 (1%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1%)	4 (1%)
	Task Not Performed	22 (16%)	15 (13%)	5 (10%)	4 (15%)	4 (22%)	4 (22%)	7 (4%)	61 (12%)
	Communication Breakdown during Care Transitions or Between Teams	10 (7%)	23 (19%)	4 (8%)	2 (8%)	2 (11%)	0 (0%)	15 (9%)	56 (11%)
	Inadequate Supplies	0 (0%)	0 (0%)	2 (4%)	0 (0%)	0 (0%)	0 (0%)	7 (4%)	9 (2%)
	Supplies Unavailable	0 (0%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	2 (0.4%)
	Patient's Medical Condition(s) Compromises Care	10 (7%)	3 (3%)	4 (8%)	0 (0%)	0 (0%)	0 (0%)	8 (5%)	25 (5%)
	Limited Patient Care Space	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	3 (2%)	4 (1%)
	Policies Missing or Unclear	2 (1%)	1 (1%)	2 (4%)	0 (0%)	3 (17%)	1 (6%)	2 (1%)	11 (2%)
	Other	9 (7%)	14 (12%)	4 (8%)	6 (23%)	1 (6%)	7 (39%)	48 (29%)	89 (17%)
	Total (n, row %)	**136 (26%)**	**119 (22%)**	**48 (9%)**	**26 (5%)**	**18 (3%)**	**18 (3%)**	**166 (31%)**	**530 (100%)[2]**

1. Environmental cleaning was dropped as a critical task as it was only identified in one CAUTI contributing factor and this was reclassified as other
2. Each contributing factor (or "card") could be classified as referring to more than one critical task or cross-cutting issue so this adds up to more than the total number of reported contributing factors

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Impact of Discontinuing Contact Precautions for Multidrug-resistant Gram-negative Enterobacteriaceae in a Large Health System

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Background: Contact precautions (CP) to prevent transmission of multi-drug-resistant gram-negative (MDRGN) Enterobacteriaceae are recommended, although studies of discontinuation of CP (DcCP) have found no change in healthcare associated infections (HAI) due to extended-spectrum beta-lactamase (ESBL) producing Enterobacteriaceae. Limited data exists on DcCP for MDRGN in a large health system. **Methods:** We performed a retrospective observational study analyzing the relationship between use of CP and HAI due to two definitions of MDRGN Enterobacteriaceae: ESBL, and non-susceptibility to ≥3 drug classes (3DC-GNR), with carbapenem resistant Enterobacteriaceae (CRE) serving as control. The study included all inpatient admissions from 2/2017 through 9/2022 at 21 acute care hospitals. Hospitals had latitude to determine CP practices based on local risk assessment, but in 2/2018, system-wide transmission-based precautions guidance was updated to recommend DcCP for MDRGN Enterobacteriaceae and in 12/2019 was updated to clarify DcCP specifically for ESBL and 3DC-GNR while continuing CP