



MIND THE LINE

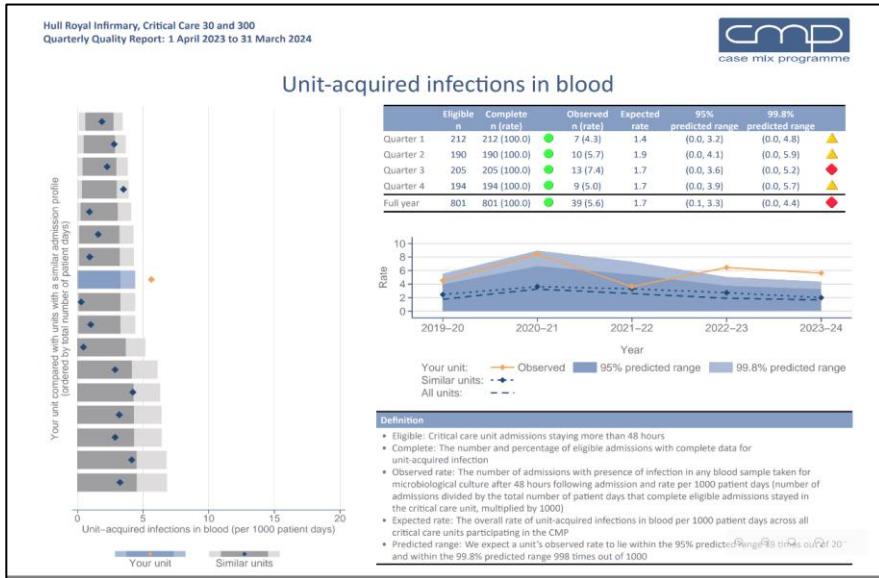
Care of invasive lines in ICU

**A QI Project: Hull Royal Infirmary, Hull University Teaching
Hospitals**

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Background:

Our infection rates from CVADs much higher than similar units (CQC)
 Increased risk of negative impact on patient outcomes
 Significant rise seen since post COVID
 = TIME FOR CHANGE



Infection (ii)

	Your unit	Similar units	All units
Number of admissions staying more than 48 hours, with infection data recorded	801		
Admissions with any unit-acquired infections, in those staying more than 48 hours, n (%)			
Bloodstream infection	39 (4.9)	(2.4)	(1.5)
Non-bloodstream infection	173 (21.6)	(11.1)	(6.7)
Origin of first unit-acquired bloodstream infection, n (%)			
Central venous catheter	9 (23.1)	(13.7)	(28.9)
Peripheral venous catheter	15 (38.5)	(17.7)	(19.0)
Pulmonary	4 (10.3)	(12.9)	(14.3)
Digestive tract	2 (5.1)	(2.0)	(4.9)
Surgical site	2 (5.1)	(2.4)	(1.8)
Skin and soft tissue (not surgical site)	1 (2.6)	(3.2)	(3.1)
Unknown	6 (15.4)	(41.9)	(20.0)
Origin of first unit-acquired non-bloodstream infection, n (%)			
Central venous insertion site	4 (2.3)	(2.0)	(1.3)
Pulmonary	147 (85.0)	(65.4)	(66.0)
Urinary catheter	6 (3.5)	(11.1)	(8.5)
Surgical site	5 (2.9)	(4.7)	(5.2)
Skin and soft tissue (not surgical site)	10 (5.8)	(6.7)	(6.2)
Other	1 (0.6)	(0.9)	(1.6)
Admissions with unit-acquired infections, n (rate per 1,000 patient days)			
Unit-acquired MRSA	1 (0.1)	(0.3)	(0.2)
Unit-acquired VRE	4 (0.6)	(0.4)	(0.7)
Unit-acquired CRE	0 (0.0)	(0.2)	(0.2)
Unit-acquired C. Difficile	1 (0.1)	(0.5)	(0.5)

Date of report: 04/09/2024 31 ©ICNARC 2024

What did we do about it?

The QI project:

- ▶ A drive to educate and empower nurses and medical staff on ICU- to implement better standards of caring for invasive lines
- ▶ Multi-layered, multi-disciplinary involvement
- ▶ Develop an educational program highlighting gold-standard practices
- ▶ Focus on infection control and patient safety
- ▶ Combined with the introduction of new ways of working
- ▶ Aim to foster a positive learning environment

M

- **Monitoring**

I

- **Insertion**

N

- **Necessary?**

D


- **Documentation**

MONITORING:

- Incorporate an education package detailing CVAD gold standards of care and highlighting trust policies.
- Focus included aseptic technique, and infection control measures
- Introduction of the CUROS lumen caps with the aim to reduce cross infection at the point of CVAD use, and impregnated CVAD dressing

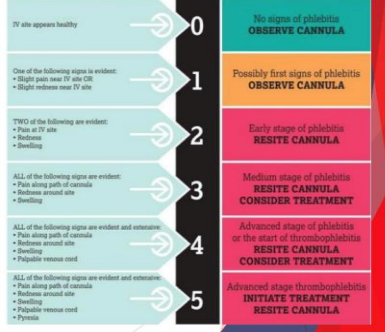
MONITORING

- ▶ VIP scores - ensure confident to assess and done every shift
- ▶ Effective dressing changes aseptically to minimise infection
- ▶ Are lines patent and flushed daily
- ▶ Appropriate daily care of lines – 'scrub the hub', 5 moments of hand hygiene, appropriate PPE when using lines
- ▶ Lines, transducers, bungs and 3 way taps changed according to policy
- ▶ Ensure infusion lines are changed and labelled appropriately



Patients may arrive from theatre without 3M dressing, this is not vital to be changed immediately unless soiled/not intact. When changed to be swapped to 3M dressing.

Staff must acknowledge when dressings require changing and address as soon as possible, using aseptic technique to redress. We know IJ and femoral lines are prone to infection due to where they are, we can reduce that risk by ensuring they are dressed effectively.



Signs	Scale	Action
IV site appears healthy	0	No signs of phlebitis OBSERVE CANNULA
One of the following signs is evident: • Slight pain near IV site OR • Slight redness near IV site	1	Possibly first signs of phlebitis OBSERVE CANNULA
TWO of the following are evident: • Pain at IV site • Redness • Swelling	2	Early stage of phlebitis RESITE CANNULA
ALL of the following signs are evident: • Pain along path of catheter • Redness around site • Swelling	3	Medium stage of phlebitis RESITE CANNULA CONSIDER TREATMENT
ALL of the following signs are evident and extensive: • Pain along path of catheter • Redness around site • Swelling • Palpable venous cord	4	Advanced stage of phlebitis or the start of thrombophlebitis RESITE CANNULA CONSIDER TREATMENT
ALL of the following signs are evident and extensive: • Pain along path of catheter • Redness around site • Swelling • Palpable venous cord • Pyrexia	5	Advanced stage thrombophlebitis INITIATE TREATMENT RESITE CANNULA

INSERTION:

Education program - procedural policy during CVAD insertion

- Introduction of 'Grab Boxes' for line insertions
- Protection of environment during insertion- introduction of 'LINE IN PROGRESS' signs and curtain clipping
- Clearer role/responsibility definition for those involved in CVAD insertion
- Increase awareness around acceptable and unacceptable practices during CVAD insertion
- Challenge and escalate where required

Posters will be available in the 'grab boxes' alongside clips. If in a cubicle the doors MUST be shut and if on the unit curtains must be closed and clipped with the signs clearly placed to discourage staff to come in and out of the clinical area.

It is important for the nurse in charge of the patient to be **present for the full insertion** of the line. You are vital for situational awareness and keeping the patient safe.

Title	Duties
Operator (doctor or ACCP)	Check equipment, ensure infection control precautions, ensure sterile technique, insertion of line, confirmation of line placement and rule out of complications
Assistant (nurse, ODP, doctor, ACCP, AA)	Facilitate patient comfort, assist with patient positioning, pass additional equipment e.g. ultrasound probe, observe patient monitor, call for help if needed
Supervisor (Consultant, senior trainee, senior ACCP)	Ensure appropriate operator competence and level of supervision required, assist if difficulty encountered, second check position / rule out complications if needed

INSERTION:

In addition to the usual ICS insertion checklist....

....a dedicated nurse checklist focusing on infection control and safety measures.

Aim to empower all staff involved in CVAD insertion to be gatekeepers of good practice and feel confident in challenging substandard practice.

This checklist was released with the roll out of 'Mind the Line' purely for nursing staff

MIND THE LINE CVC Insertion Nurse Checklist

ROOM PREPARATION	TICK WHEN COMPLETE
All fans off in the room prior to start of procedure	
Cubicle doors shut/curtains closed and clipped shut	
Is adequate PPE available? MASK, CLOVES, APRON AND HAIRNET FOR ANYONE PRESENT AT INSERTION Ultrasound available and clean?	
Has the patient consented if able?	
Transducer prepared	
Do you have CVC insertion checklist and CVAD Bundle available	
Has the trolley been cleaned?	
DO YOU FEEL CONFIDENT TO ASSIST? If not escalate to band 6 or senior nurse for support.	
During the Procedure	
Nurse assistant to REMAIN PRESENT THROUGHOUT PROCEDURE AT ALL TIMES	
Has the correct PPE been worn by operator and assistant	
Is the minimum amount of people kept in the room while insertion is occurring? - DO NOT LET PEOPLE IN AND OUT ALL THE TIME	
Post Procedure	
Has the doctor/ACCP disposed of sharps appropriately and cleaned their trolley - This is THEIR RESPONSIBILITY Ultrasound cleaned	
Has chest X-ray been ordered if required	
Has VBC been taken if required	
Has CVAD bundle been completed prior to ACCP/Doctor leaving patient	
Are you Happy for the Doctor/ACCP to leave? Is the patient stable?	

INVASIVE PROCEDURE SAFETY CHECKLIST: CVC Insertion

The Royal College of Intensive Care Medicine

BEFORE THE PROCEDURE	TIME OUT	SIGN OUT
<p>Patient identity checked? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Appropriate consent completed? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>All equipment available? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Correct type/size of line available? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Is there a coagulopathy (drugs and lab tests)? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Known drug allergies? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Are infection control precautions in place? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Is help required? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Verbal confirmation between team members before start of procedure</p> <p>Team members identified and roles allocated? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Is patient position optimal? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Operator to confirm, during procedure, that guidewire is removed? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Ultrasound available and set up? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Able to aspirate blood from all lumens and flush all lumens? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Correct injection site caps / connectors used? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Correct dressing applied? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Guidewire confirmed as removed? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Chest X-ray required? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If Chest X-ray required, is line position satisfactory? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Pneumothorax excluded? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Placement confirmation - use two methods</p> <p>CVP waveform present? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Venous pressuremmHg Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Ultrasound confirms CVC placement? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Paired venous and arterial blood gases? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Arterial pO2kPa</p> <p>CVC pO2kPa</p>

Procedure Date: _____ Time: _____

Operator: _____ Assistant: _____ Supervisor: _____

Patient Identity Sticker: _____

Signature of responsible clinician: _____

And finally....

We asked teams to consider daily whether CVAD was still **N**ecessary, and incorporate this into ward round discussion.

Documentation was highlighted as crucial to preventing infection

NECESSARY?

Is the device necessary?

- ▶ Encourage the question to be asked EVERY SHIFT
- ▶ Why does the patient have an invasive line?
- ▶ How much access does patient have – can any be removed? Unnecessary lines are an infection risk and cause of pain/discomfort
- ▶ Any infection concerns, does the line need to be removed, replaced and tip sent

If removal is deemed appropriate – are you confident to aseptically remove? Escalate if you need support.

DOCUMENTATION

Paper Documentation

- ▶ **CVAD/Arterial Line Bundle** to be completed x1 per shift
- ▶ **Green chart infection control** – number of days insitu, dressing and site

Nerve Centre Documentation

- ▶ Catheter Bundle
- ▶ Infection control – Assessment and Evaluation

Practitioners and trained physician associates must ensure that the CVAD and its duration of occupancy, as well as its patency, condition and actions taken (e.g. escalation) are handed over to each subsequent staff member looking after that patient.

Continued use of the CVAD must be discussed and documented by medical staff daily in the medical notes, and evidenced by the Nursing Staff in the CVAD Bundle. If prolonged use is required, replacement of CVAD may be necessary, or alternative access should be considered such as a skin tunnelled CVAD, PICC or cannula. Any signs of infection should trigger urgent medical review and likely removal/replacement of line. Escalation is essential if resolution is not immediate to prevent systemic sepsis.

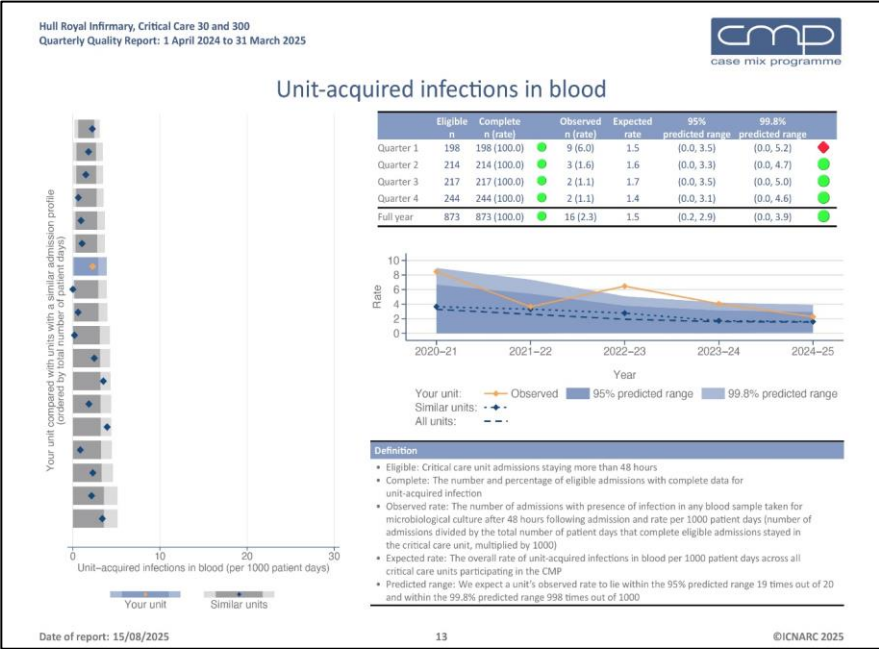
Successes and challenges:

- ▶ Education delivered successfully to all nursing staff
- ▶ Medical inclusion- agreement to be included in Dr induction
- ▶ Face-to-face allowed for better management of staff concerns/push back
- ▶ Staff engagement
- ▶ Time consuming
- ▶ Busy workload could be a barrier
- ▶ Some staff pushback was encountered
- ▶ Staff turnaround

What happened next?

Outcomes:

Data from 1 April 2024- 31 March 2025: Overall improvement seen in blood stream infection associated with CVAD seen from second quarter onwards.



Hull Royal Infirmary, Critical Care 30 and 300
Quarterly Quality Report: 1 April 2024 to 31 March 2025

Infection (ii)

	Your unit	Similar units	All units
Number of admissions staying more than 48 hours, with infection data recorded	873		
Admissions with any unit-acquired infections, in those staying more than 48 hours, n (%)			
Bloodstream infection	16 (1.8)	(1.7)	(1.3)
Non-bloodstream infection	151 (17.3)	(10.2)	(6.2)
Origin of first unit-acquired bloodstream infection, n (%)			
Central venous catheter	6 (37.5)	(19.1)	(29.6)
Peripheral venous catheter	4 (25.0)	(12.7)	(18.2)
Pulmonary	1 (6.2)	(21.6)	(13.0)
Urinary tract	1 (6.2)	(2.5)	(2.1)
Surgical site	2 (12.5)	(3.9)	(2.0)
Skin and soft tissue (not surgical site)	1 (6.2)	(3.9)	(2.2)
Unknown	1 (6.2)	(25.0)	(19.5)
Origin of first unit-acquired non-bloodstream infection, n (%)			
Central venous insertion site	2 (1.3)	(1.2)	(1.3)
Peripheral venous insertion site	1 (0.7)	(0.2)	(0.2)
Pulmonary	129 (85.4)	(75.6)	(69.5)
Urinary catheter	10 (6.6)	(9.2)	(7.9)
Digestive tract	1 (0.7)	(2.0)	(5.2)
Surgical site	3 (2.0)	(3.3)	(4.4)
Skin and soft tissue (not surgical site)	4 (2.6)	(3.7)	(4.3)
Other	1 (0.7)	(1.6)	(1.7)
Admissions with unit-acquired infections, n (rate per 1,000 patient days)			
Unit-acquired MRSA	1 (0.1)	(0.2)	(0.2)
Unit-acquired VRE	0 (0.0)	(0.5)	(0.6)
Unit-acquired CRE	0 (0.0)	(0.1)	(0.2)
Unit-acquired C. Difficile	0 (0.0)	(0.5)	(0.4)

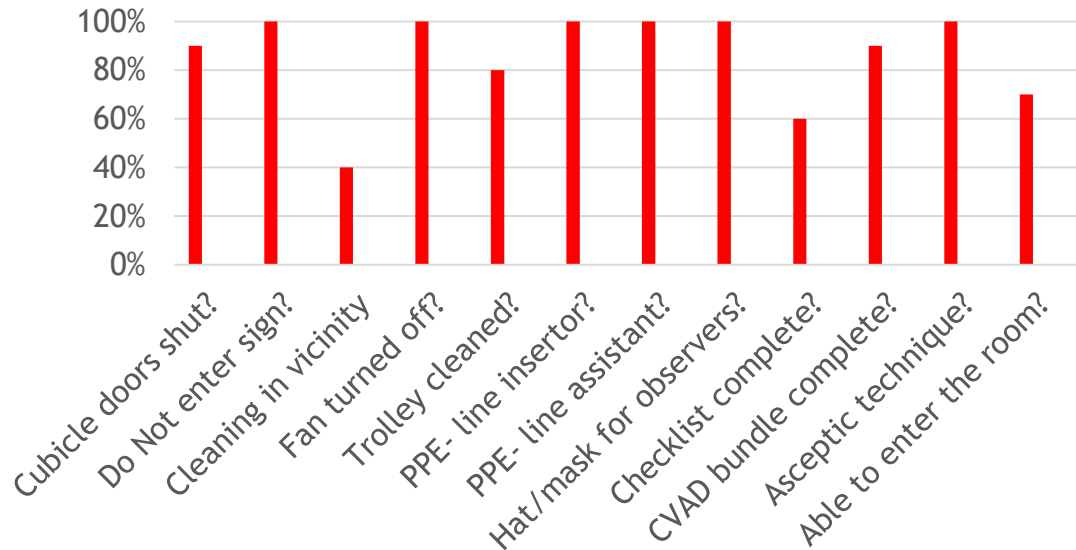
Date of report: 15/08/2025

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What happened next?

The Audit:

- Data collected over 12 weeks
- Auditing practice against Mind the line criteria and best practice
- Results- May 2025



- ▶ Overall insertion practices improved
- ▶ Still room for improvements;
- ▶ Particularly with, cleaning in the environments close by, entering the bed-space during procedures and safety checklist completion.

What happened next?

Benchmarking (Feb 2026):

- ▶ CVAD site care was being done well
- ▶ Care bundles completed
- ▶ Good practice observed when accessing CVAD at the bedside
- ▶ Improvements still required for documented evidence of daily line reviews
- ▶ Use of insertion checklist not always being done

Where did we go from there/where are we now?

Our goal is to improve infection rates and see positive patient outcomes

- ▶ Audit learning fed back into governance meetings
- ▶ Actioned through sharing information through teams
- ▶ A new combined CVAD document introduced
- ▶ However, 2015-2016 infection rates are beginning to rise again (first 3Q)
- ▶ Further work in progress to address issues
- ▶ Coming up to next audit cycle.
- ▶ Medical team involvement in audit
- ▶ Engagement with theatre teams- point of insertion documentation
- ▶ Continuation of education
- ▶ Working on systems to ensure earliest line removals
- ▶ Data being assessed looking at trends in patient factors

Thank you for listening

MIND THE LINE

Any Questions?