



Midline Webinar



JUNE 6, 2018

Welcome & Housekeeping



- **Thank you for attending!**
 - HMS data abstractors
 - Administrators
 - QI staff
 - Vascular access
 - Interventional Radiology
 - Hospitalists
 - Individuals not affiliated with HMS
- **Q & A session following presentation**
 - All phones muted
 - Please raise your hand using the webinar software or type your question

Michigan Hospital Medicine Safety (HMS) Consortium



SCOTT FLANDERS, MD
HMS PROJECT DIRECTOR



HMS: Collaborative Quality Initiative

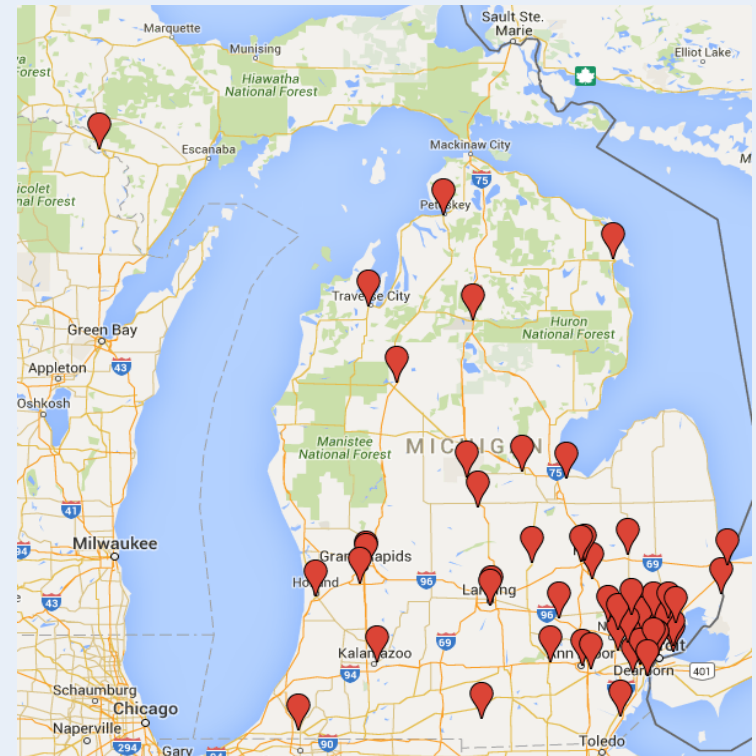


- HMS: 1 of 17 CQIs in Michigan
- Funding: Blue Cross Blue Shield of Michigan
 - Coordinating Center
 - .85 FTE data abstraction per hospital
 - Pay for performance
- Michigan hospitals voluntarily enroll

HMS Hospitals



- 43-50 hospitals
- Diverse types / settings
 - Large AMCs-Small rural hospitals
- Hospital Participants
 - Physician Champion-hospitalist
 - Quality Lead
 - Data Abstractor
- Improving Care
 - Data / best practice sharing / facilitated implementation





HMS Goal

To improve the quality of care for hospitalized medical patients who are at risk for adverse events

○ *Current QI Initiatives:*

- ✦ *Hospital-Associated VTE*
- ✦ *Intravascular Devices (PICC-Midlines)*
- ✦ *Inpatient Antimicrobial Use*



Midlines: Middle Ground vascular access devices



VINEET CHOPRA MD, MSC

Overview



- Introduction and Historical Aspects
- Evidence review – what do we know about midlines?
- HMS midline data review
- Questions and Answers



- **Introduction and Historical Aspects**
- Evidence review – what do we know about midlines?
- HMS midline data review
- Questions and Answers

HMS Midline Initiative



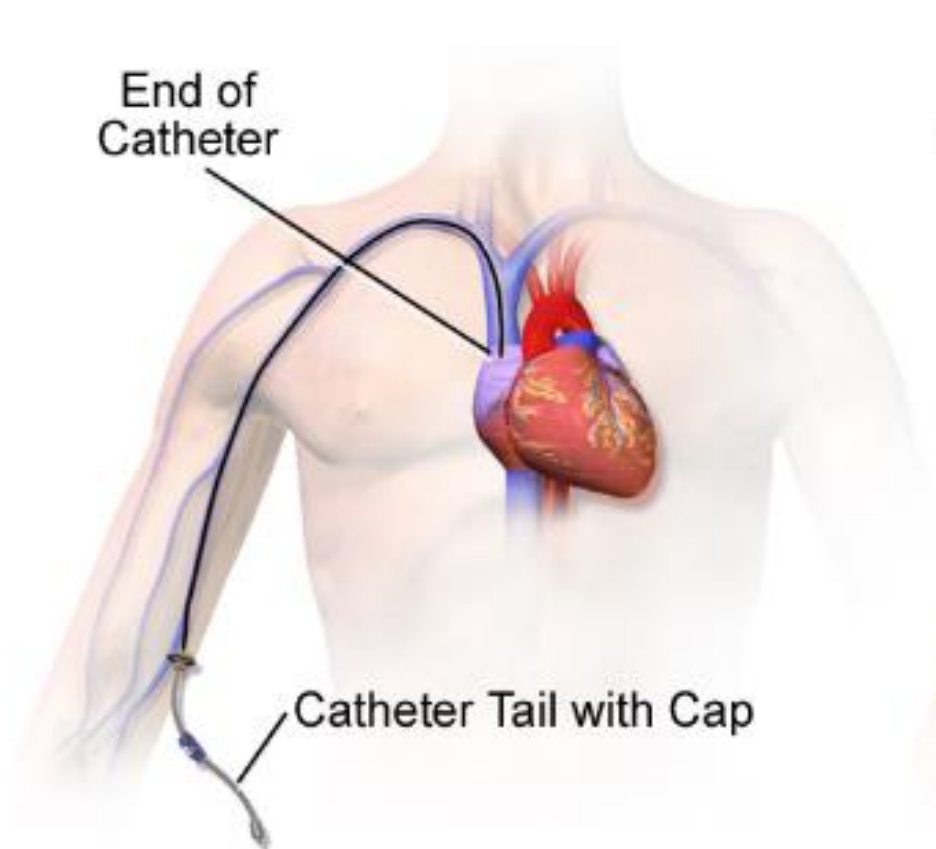
- Growing focus on alternatives to using PICCs
- One such alternative: Midline catheter
- HMS launched midline pilot in summer of 2017; data collection expanded collaborative wide winter 2018
- Midline project was driven by HMS sites
 - More PICCs being replaced with midlines
 - Is midline use associated with potential complications?
 - Are midlines “safer” than PICCs?
- To date~1,500 cases collected

What are Midline Catheters?

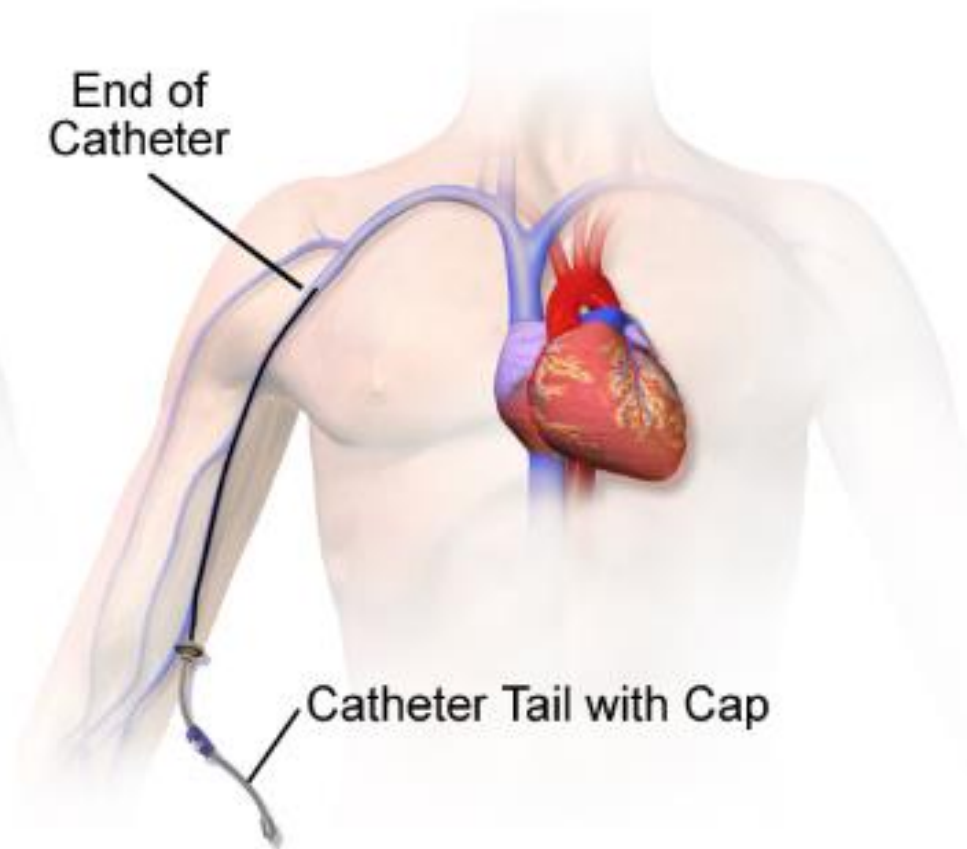


- Midlines – a diverse group of devices that share in common the following characteristics:
 - Inserted in peripheral veins of the arm
 - Do not enter the central circulation
- Consequently – midlines are best thought of as “middle ground” devices
 - Reside in larger, deeper veins of the arm → more blood flow
 - More hemodilution = ability to dwell longer, less phlebitis
 - ✦ PIV - 40 ml/min in peripheral vein
 - ✦ Midline - 120ml/min in the deep upper arm veins

Anatomic localization of Midline Tip



PICC



Midline

Historical Aspects



- Midlines are not new!
 - First devices introduced in the 1950's (before PICCs)
 - ✦ Surgical patients >7 days of treatment
 - Suffered from many problems
 - ✦ Device failure ~ 40%
 - ✦ High rates of contact allergy and phlebitis (materials)
- 1970's: PICCs introduced
 - Attention to midlines dropped as PICC use grew
- Growing concern and reports of inappropriate PICC use/overuse → renewed interest in midlines

Midlines are called many things...



- Extended dwell peripheral IV catheters
- Long peripheral IVs
- US-guided peripheral catheters
- Medial venous catheter
- Peripherally inserted midline device

All meet midline criteria – the difference is catheter length

HMS Definition of a Midline



- To qualify as a midline, a device must:
 - Be inserted into one of the veins of the arm
 - Have a catheter tip that dwells in the basilic, cephalic, or brachial vein
 - Terminate at or below the level of the axilla
- Midlines thus may range from 6-25cm in length.
- For the purposes of the HMS project, extended-dwell peripheral IVs are included in data collection.

Characteristics of Modern Midlines



- 4-5 French in diameter; Single and double lumen
- some trimmed/others pre-cut
- Power compatible for radiographic injections
- Number of materials
- Number of insertion techniques (MST/AST)
- Majority are placed under US guidance
- Majority are placed using maximal sterile barriers
- Common indications: difficult access, antibiotic Rx
- A number of devices and manufacturers

Overview



- *Introduction and Historical Aspects*
- **Evidence review – what do we know about midlines?**
- HMS midline data review
- Questions and Answers

Evidence Review



- **Structured literature search**
 - Contemporary data only (2016 onwards)
 - All study designs
 - Adults Only
- **Focused on studies comparing midline to other vascular access devices:**
 - PICCs, CVCs
 - Peripheral IVs
- **Focused on types and rates of complications**
 - DVT, CLABSI, dislodgement, occlusion, etc.

The Risk of Adverse Events Related to Extended-Dwell Peripheral Intravenous Access

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

CONCISE COMMUNICATION

Sara Campagna, PhD, RN;¹ Silvia Gonella, RN, MSc;²
Pietro Antonio Zerla, RN;³ Gianvito Corona, MD;⁴
Tiziana Correggia, RN, MSc;² Baudolino Mussa, MD;²
Paola Berchialla, PhD;⁵ Valerio Dimonte, RN, MSc^{1,2}

Study Design



- Retrospective database review; 2 hospitals in Italy
- All patients that received a midline between Sept 2007-Dec 2014 were included
- Midlines inserted using maximal sterile barriers and ultrasound guidance by a trained team
- 4-5Fr devices; 20-25 cm in length
- Main outcome:
 - Removal due to an adverse event (occlusion, exit site infection, bloodstream infection, symptomatic DVT)
 - Removal due to other reasons (completion of treatment, accidental dislodgement, patient death or 28d of infusion)

Variables	All Patients (n = 1,538)	MC Removal Due to AEs ^a (n = 154)	MC Removal for Other Reasons (n = 1,384)	P Value
Patient characteristics				
Male gender, no. (%)^b	155 (38.3)	17 (41.5)	138 (37.9)	.784
Age, median y (IQR)	83 (77–88)	83.5 (80–87)	83 (77–89)	.915
MC characteristics				
MC system, n (%)				.074
Open	829 (53.9)	94 (61)	735 (53.1)	
Valved	709 (46.1)	60 (39)	649 (46.9)	
Insertion location, no. (%)				
Left side	413 (27.5)	39 (26)	374 (27.6)	.745
Accessed vein				
Basilic vein	1,281 (83.3)	130 (85)	1,151 (83.2)	.675
Brachial vein	242 (15.7)	21 (13.7)	221 (16)	
Cephalic vein	14 (1.0)	2 (1.3)	12 (0.9)	
Administered therapy, no. (%)				.147
Supportive therapy	1,370 (89.1)	143 (92.9)	1,227 (88.7)	
Chemotherapy	168 (10.9)	11 (7.1)	157 (11.3)	
Dwell time, median d (IQR)				
Chemotherapy	26 (12–37)	14 (6–28)	27 (13–37.25)	<.001
Supportive therapies ^c	25.5 (15–32)	22 (6–30)	26 (16–32)	.318
	26 (11–38)	14 (6–28)	27 (13–40)	<.001

- Ten percent of midlines had adverse events (AEs) that required removal; 90% did not
- Midlines that had AEs were removed earlier than those that did not

TABLE 2. Individual Adverse Events (n = 154)

Adverse Events	No.	No. of Complications per 1,000 MC days	Time Elapsed Between MC Positioning and Onset of AE, median d (IQR; range)
Occlusion ^a	89	1.44	13 (6–28; 1–273)
Symptomatic thrombosis ^b	57	0.92	19 (8–32; 1–307)
Exit-site infection ^c	8	0.13	9 (7.8–39.8; 5–323)
All adverse events ^d	154	2.49	14 (6–28; 1–323)

Low rates of Adverse Events

No bloodstream infections

Occlusion most common complication (6%)

DVT Rates ~ similar to PICCs (4%)



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

American Journal of Infection Control

journal homepage: www.ajicjournal.org



Major Article

Comparison of complications in midlines versus central venous catheters: Are midlines safer than central venous lines?

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Amar Krishna MD ^b, Aleena Saleem MD ^b, Natasha Rana BSc ^c, Sonia Gera BSc ^c,
Suganya Chandramohan MD ^{b,*}, Malini Surapaneni MD ^a, Teena Chopra MD, MPH ^a

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Study Design



- Retrospective cohort study; single center
- March – September 2016
- Midline outcomes compared to CVC/PICC outcomes
- Main outcomes:
 - Catheter-related Blood Stream Infection (CRBSI)
 - Mechanical complications
 - Length of Hospital Stay
 - Readmission
 - Death

Table 1

Baseline characteristics of the 2 cohorts

Variable	Midline (n = 411)	Central line (n = 282)	Odds ratio (95% CI)	P value
Mean age ± SD, y	58.79 ± 17.72	56.62 ± 17.76		.15
Female sex	227 (55.2)	129 (45.7)	0.68 (0.50-0.92)	.01*
Admission source				
Home	325 (79)	210 (74.4)		.0008*
Nursing home or rehabilitation facility	58 (14.1)	64 (22.7)		
Transfer from hospital	28 (6.8)	7 (2.4)		
Unknown	0 (0)	1 (0.3)		
Mean BMI ± SD, kg/m ²	28.8 ± 8.94	28.38 ± 9.22		.30
Median CCI score (IQR)	2 (1-4)	2 (1-4)		.43
Line present at admission	0 (0)	67 (23.7)	257 (15.88-4184)	<.0001*
Indication				
Antibiotic delivery	80 (19.4)	67 (23.7)		<.0001*
TPN	0 (0)	5 (1.7)		
Poor vascular access	315 (76.6)	138 (48.9)		
Other	12 (2.9)	71 (25.1)		
Unknown	4 (0.9)	1 (0.3)		
Line placed by				
IR	7 (1.7)	18 (6.3)		<.0001*
Vascular access team	400 (97.3)	140 (49.6)		
Unknown	4 (0.9)	124 (43.9)		

- Most midlines were placed during hospitalization
- Common indications for midline placement included difficult IV access (76.6%) and antibiotics (19.4%)
- 97.3% midlines placed by vascular access team

Table 3

Univariate analysis of outcomes in patients with midlines versus central lines

Variable	Midline (n = 411)	Central line (n = 282)	Odds ratio (95% CI)	P value
Disposition				
Home	220 (53.5)	139 (49.2)		.0041*
Nursing home or rehabilitation facility	142 (34.5)	80 (28.3)		
Hospice or death	34 (8.2)	50 (17.7)		
Another hospital	14 (3.4)	12 (4.2)		
Unknown	1 (0.2)	1 (0.3)		
Median LOS, d (IQR)	7 (4.61-11.43)	5 (2.69-8.09)		<.0001*
Median LOS after line placed (IQR)	5 (4-9)	4 (2-7)		<.0001*
ICU stay, d	220 (53.5)	111 (39.3)	0.56 (0.41-0.76)	.0002*
ICU transfer after line placement†	19 (4.6)	27 (9.5)	2.18 (1.18-4.01)	.0101*
CRBSI	1 (0.2)	10 (3.5)	15.07 (1.91-118.42)	.0008*
Systemic complication because of CRBSI	0/1 (0)	1/10 (10)	4.38 (0.17-108)	.4069
SSTI	4 (0.9)	0 (0)	0.16 (0.0086-2.98)	.1501
Thrombosis	2 (0.49)	0 (0)	0.28 (0.01-6.06)	.5166
Mechanical issues	11 (2.6)	1 (0.3)	0.12 (0.01-1)	.0333*
Line removed because of a line-related complication	11 (2.68)	11 (3.9)	1.47 (0.63-3.45)	.3665
Readmission within 30 d	89 (21.6)	84 (29.7)	1.53 (1.08-2.17)	.0151*
Readmission within 30 d because of a line-related complication	1 (0.2)	6 (2.1)	8.91 (1.06-74.44)	.0202*
Mortality	22 (5.3)	49 (17.3)	3.71 (2.19-6.30)	<.0001*

- Many midlines were used in patients with an ICU stay
- Midlines were associated with low CRBSI (1 vs 10)
 - Few DVT (2) noted in this study
- Higher number of mechanical complications among those that got midlines vs. CVCs (11 vs 1)
- No differences in removal rates between midlines and CVC

Major Article

Safety and utilization of peripherally inserted central catheters versus midline catheters at a large academic medical center



Tianyuan Xu MPH ^a, Lawrence Kingsley DrPH ^a, Susan DiNucci RN, CIC ^b,
Gwen Messer MT ^b, Jong-Hyeon Jeong PhD ^{c,d}, Brian Morgan RN ^e, Kathleen Shutt MS ^f,
Mohamed H. Yassin MD, PhD, CIC ^{b,f,*}

Study Design



- Retrospective cohort study; single center Pittsburgh
- PICCs and midlines inserted by vascular access team
- Both PICCs and midlines were same manufacturer
- Main outcomes:
 - Severe complications (infection, phlebitis and DVT)
 - Readmission because of line issues
 - Minor complications
 - ✦ Leaking
 - ✦ Edema
 - ✦ Pain
 - ✦ Occlusion

Complications	PICC (n = 206)	Midline catheter (n = 200)	<i>P</i> value*
Severe complications	10 (4.9)	18 (9.0)	.12
Phlebitis-infection	3 (1.5)	5 (2.5)	
DVT	2 (1.0)	2 (1.0)	
Readmission because of line issues	4 (1.9)	0 (0.0)	<.001
Positive culture	5 (2.4)	5 (2.5)	
Infiltration	0 (0.0)	9 (4.5)	
Minor complications	3 (1.5)	23 (11.5)	
Pain	0 (0.0)	3 (1.5)	
Nonpatent	3 (1.5)	17 (8.5)	
Leaking	0 (0.0)	2 (1.0)	
Edema	0 (0.0)	1 (0.5)	
Total complications	12 (5.8)	39 (19.5)	<.0001

- Midlines: more “severe” complications, non-statistical
- Three of the 5 phlebitis cases in the midline group = receiving Vancomycin (controversial)
- More readmissions in patients with PICCs than midlines
- Minor complications more common in midlines than PICCs

What do these three studies tell us?



- Overall, minor complications such as dislodgement, leaking, phlebitis \geq more common in midlines
- Infection is less frequent; DVT is same or better
- Important limitations to these data:
 - All single centers retrospective studies
 - All used different devices, inserters, teams
 - A variety of infusates delivered through midlines
 - Different outcome measurement
- A substantial gap in knowledge about use and safety of midlines; HMS is well poised to fill these gaps

Overview



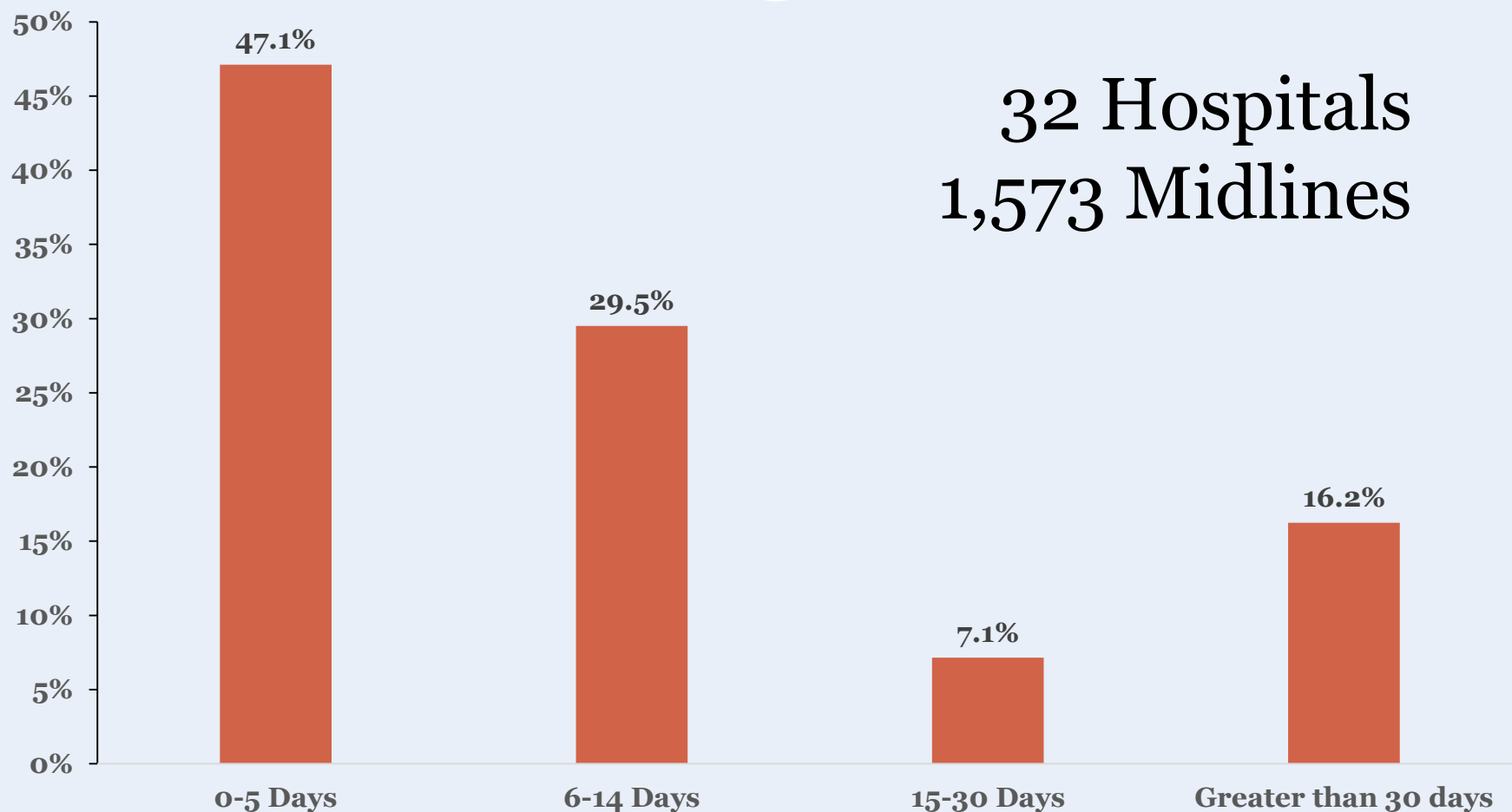
- *Introduction and Historical Aspects*
- *Evidence review – what do we know about midlines?*
- **HMS midline data review**
 - *Current State*
 - *What does pilot data tell us?*
 - *Why are we asking for specific data elements?*
- Questions and Answers

Midline Initiative: Current State

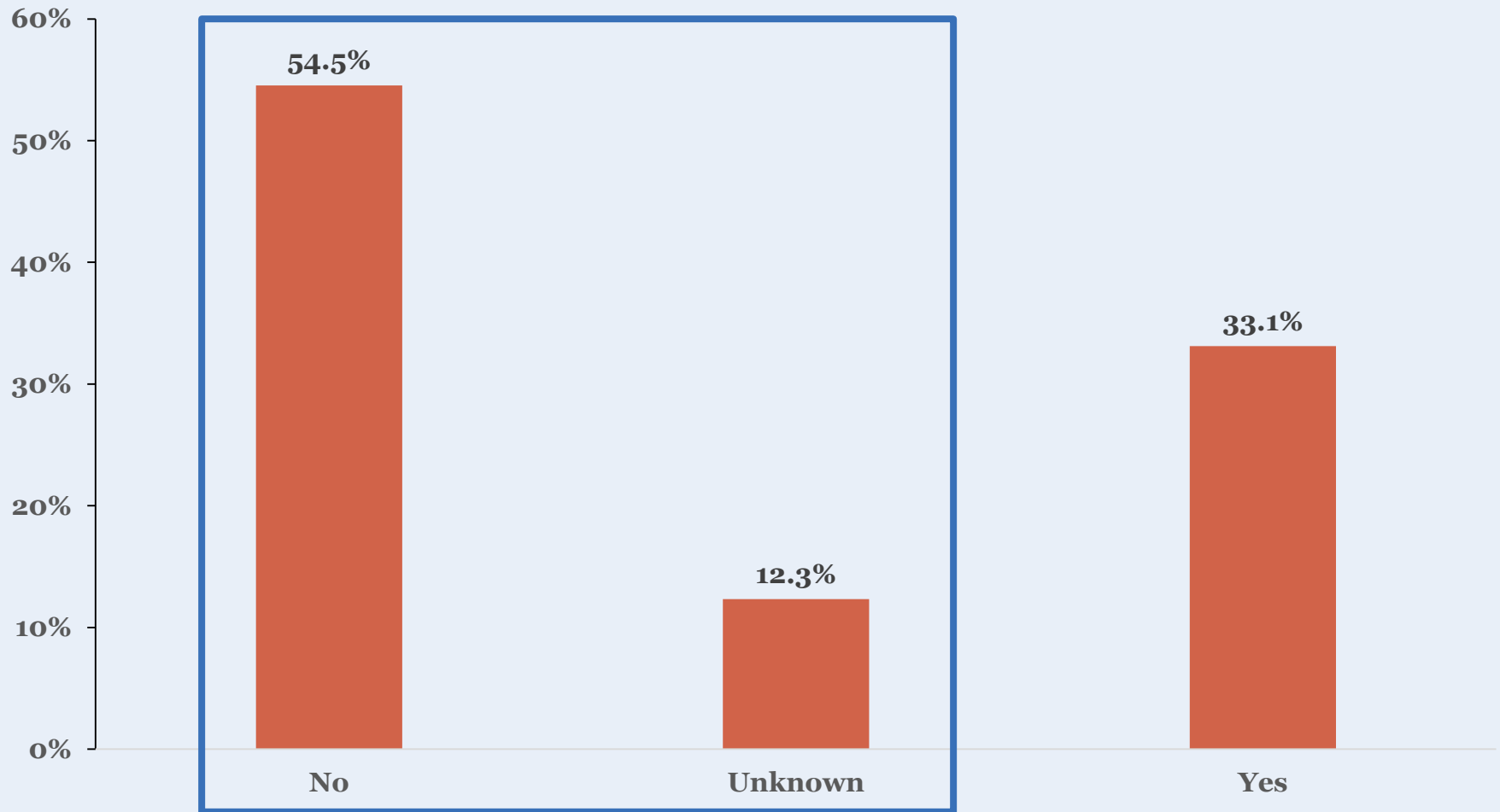


- **Baseline data collection ongoing**
 - Need to understand data before we make improvements
 - Place our findings in context:
 - ✦ What we know about midline use in our hospitals
 - ✦ Differences across device, insertion, infusate and care
 - ✦ Differences in complications across hospitals
- **Current focus**
 - Understand current practice in HMS hospitals
 - Generate new knowledge into best practice
 - Improve documentation related to insertion practices, complications, etc. across HMS hospitals

Midline Dwell Times Across the Collaborative



Written Informed Consent for Midline



Should Midline placement require informed consent?



- Does a general consent cover placement of a Midline?

- Given the risk associated with Midlines, we recommend informed consent

- Sample Midline placement consent*

- Can also be incorporated with existing PICC consents

SAMPLE MIDLINE INSERTION CONSENT FORM

I, _____ hereby give written informed consent to have a midline catheter inserted into my arm.

I understand that my supervising physician, Dr. _____ has given an order for the placement of this midline for the following indication(s) _____.

I understand that the midline catheter has been medically determined to represent the most effective means for receipt of this treatment/indication.

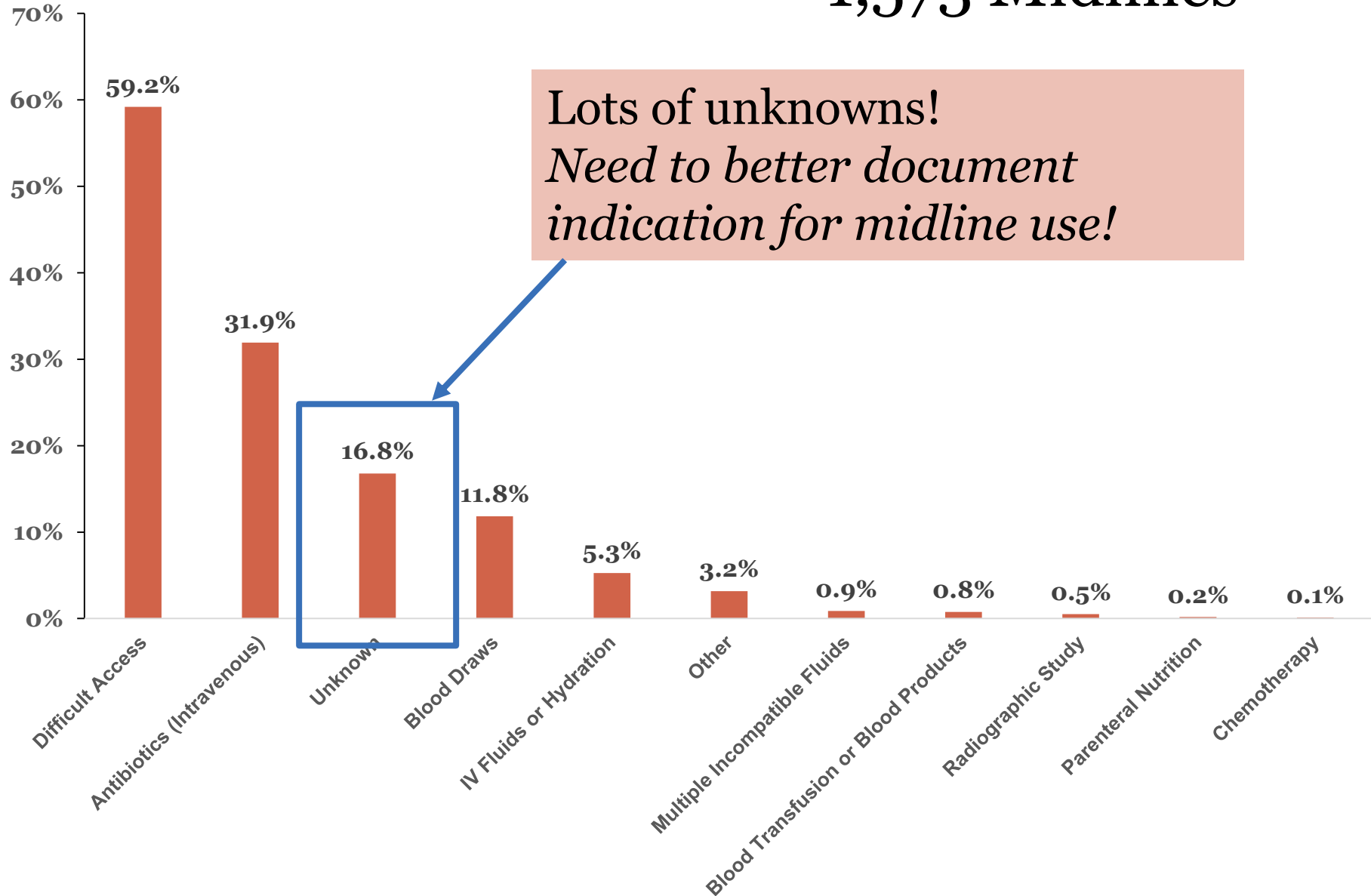
I fully understand that the insertion of a midline catheter is an invasive procedure which is accompanied by certain risks which include, but are not limited to: unsuccessful placement, local and/or systemic infection, cardiac arrhythmias, wire retention, infiltration, catheter embolism, air embolism, hematoma at the insertion site, catheter tip malpositioning, phlebitis and thrombophlebitis. I understand that all appropriate measures will be employed to reduce or eliminate the chance of these risks occurring.

I fully understand that the procedure will only be attempted once evaluation of my upper extremities substantiates that I am an appropriate candidate for midline placement. If I am not a candidate for a midline catheter, other alternative devices will be discussed with me. I fully understand that only an experienced and qualified Registered Nurse or Physician will perform the insertion of the midline catheter.

PATIENT: _____
DATE: _____ TIME: _____
WITNESS: _____
DATE: _____ TIME: _____

Documented Indications for Midline Placement

32 Hospitals
1,573 Midlines



Documentation of Midlines

- Example template for documentation of midline insertion*
- Ensures documentation of key variables that can be tracked to assist with local QI efforts
- Ensures better understanding of drivers of complications or limited dwell time

Midline Insertion Note Template

ORDER DETAILS	
Date:	
Order requested by: (Provider ID)	
Indication for midline placement:	
Antibiotics (Intravenous)	
Blood transfusion or Blood Products	
Chemotherapy	
Blood Draws	
Difficult Access	
IV Fluids or Hydration	
Multiple Incompatible Fluids	
Radiographic Study	
Other	
Written informed consent obtained: Y/N (if no – reason)	
DEVICE TYPE	
Device Type:	
Access Scientific	
Angiodynamics	
BARD/BARD Access	
Cook	
MedComp	
Navilyst	
Teleflex	
Other	
Device length:	
Number of lumens:	
Device gauge:	
INSERTION DETAILS	
Ultrasound guidance used: Y/N	
Depth of vein: (mm)	
Catheter to vein ratio evaluated: Y/N (if no – reason)	
Document Catheter to Vein Ratio: <30%, 33%, 45%, 50%, >50% (include FREE TEXT option)	
Number of insertion attempts: 1, 2, 3+	
Arm of insertion: L/R	
Vein of insertion: Brachial, Basilic, Cephalic, Other	
Midline tip confirmed to be at or below axillary line?	
Method of confirmation:	
Physical exam	
Ultrasound	
Fluoroscopy	
X-ray	
Other	
Was midline trimmed:	
Patient tolerated procedure well? (Y/N)	

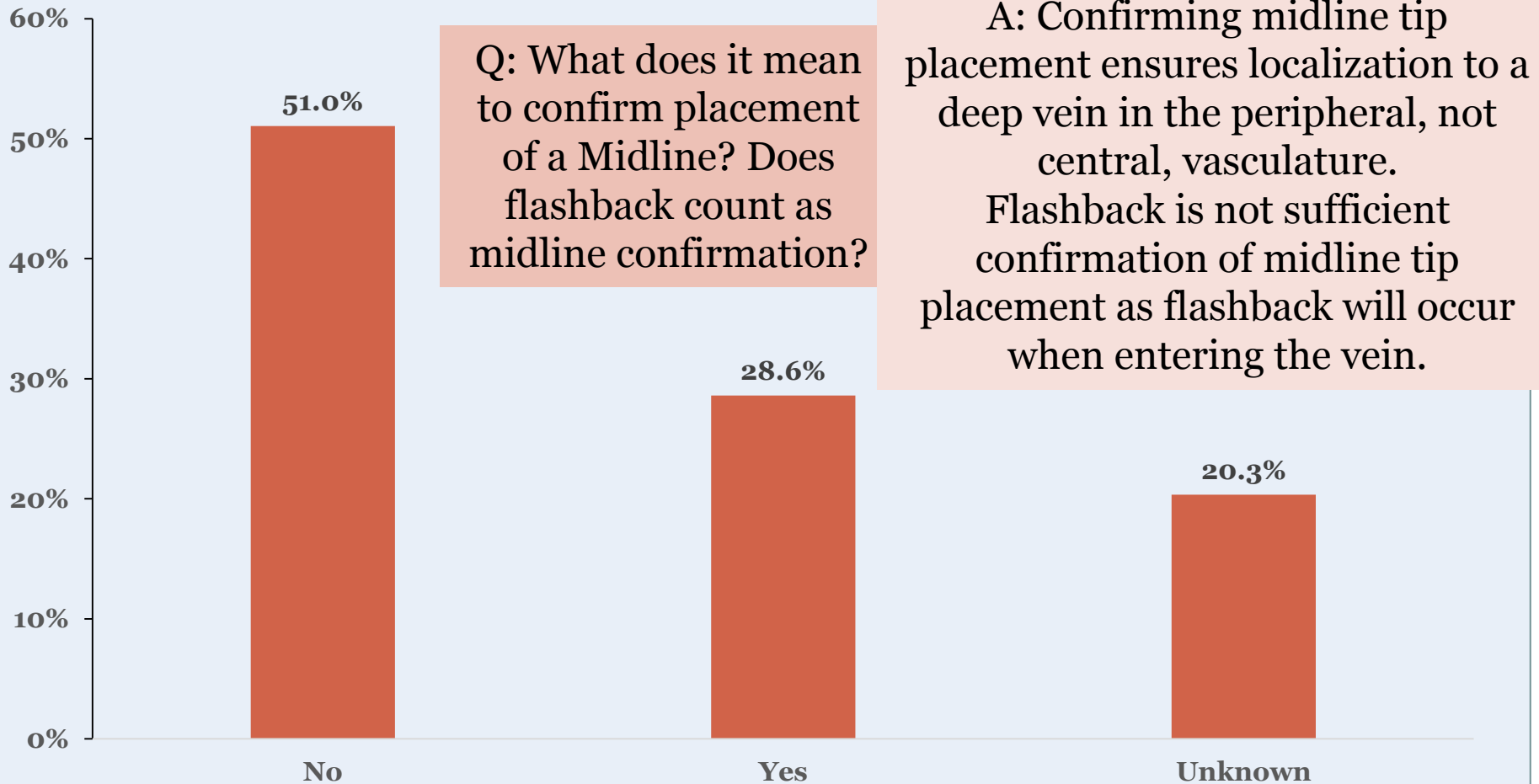
Provide list of **appropriate** reasons for Midline Placement

Incorporate Catheter to Vein Ratios

List methods of tip confirmation used at your hospital

*Resource located on HMS website (<http://mi-hms.org/>)

Midline Tip Confirmation on Initial Placement



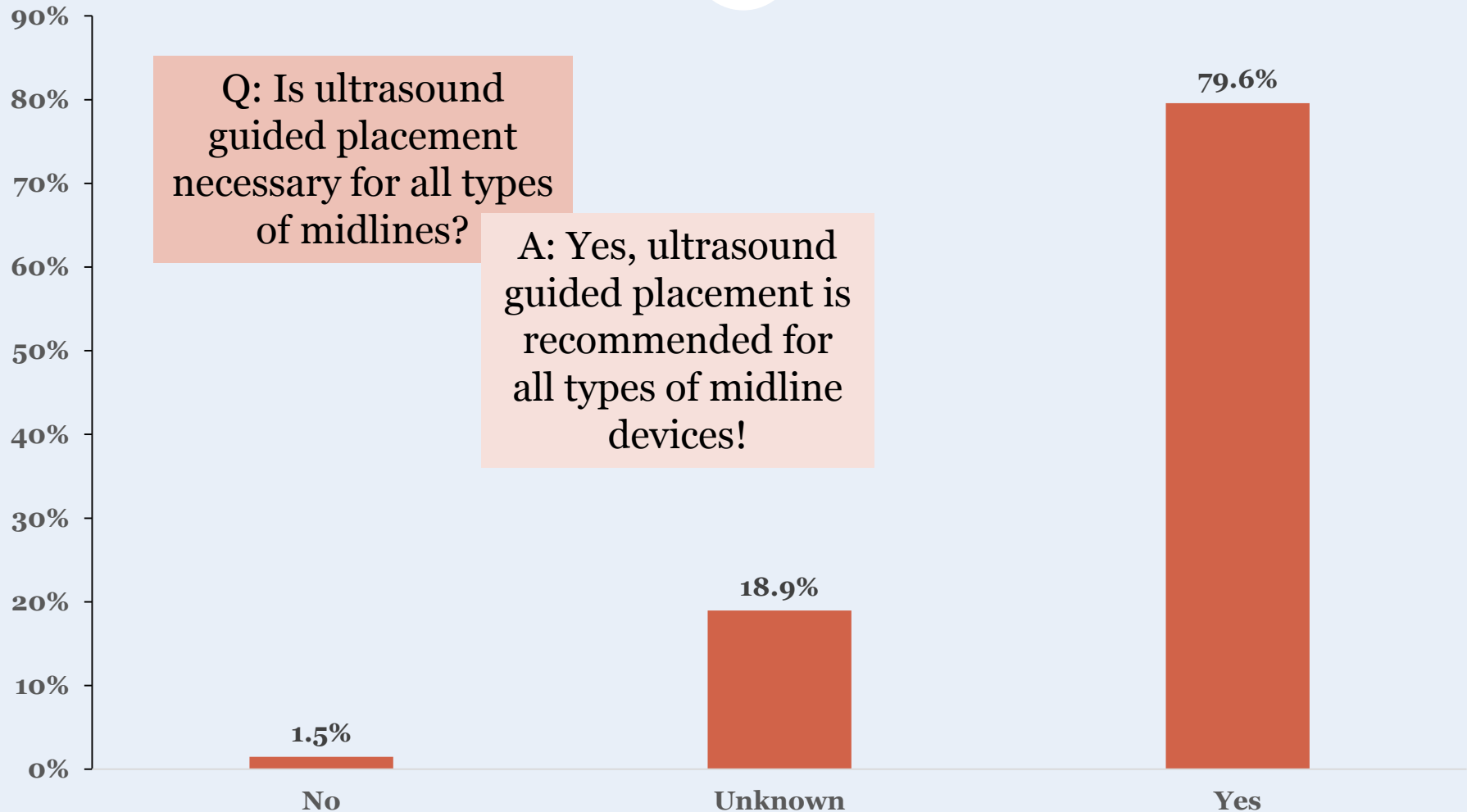
Methods of Midline Tip Confirmation



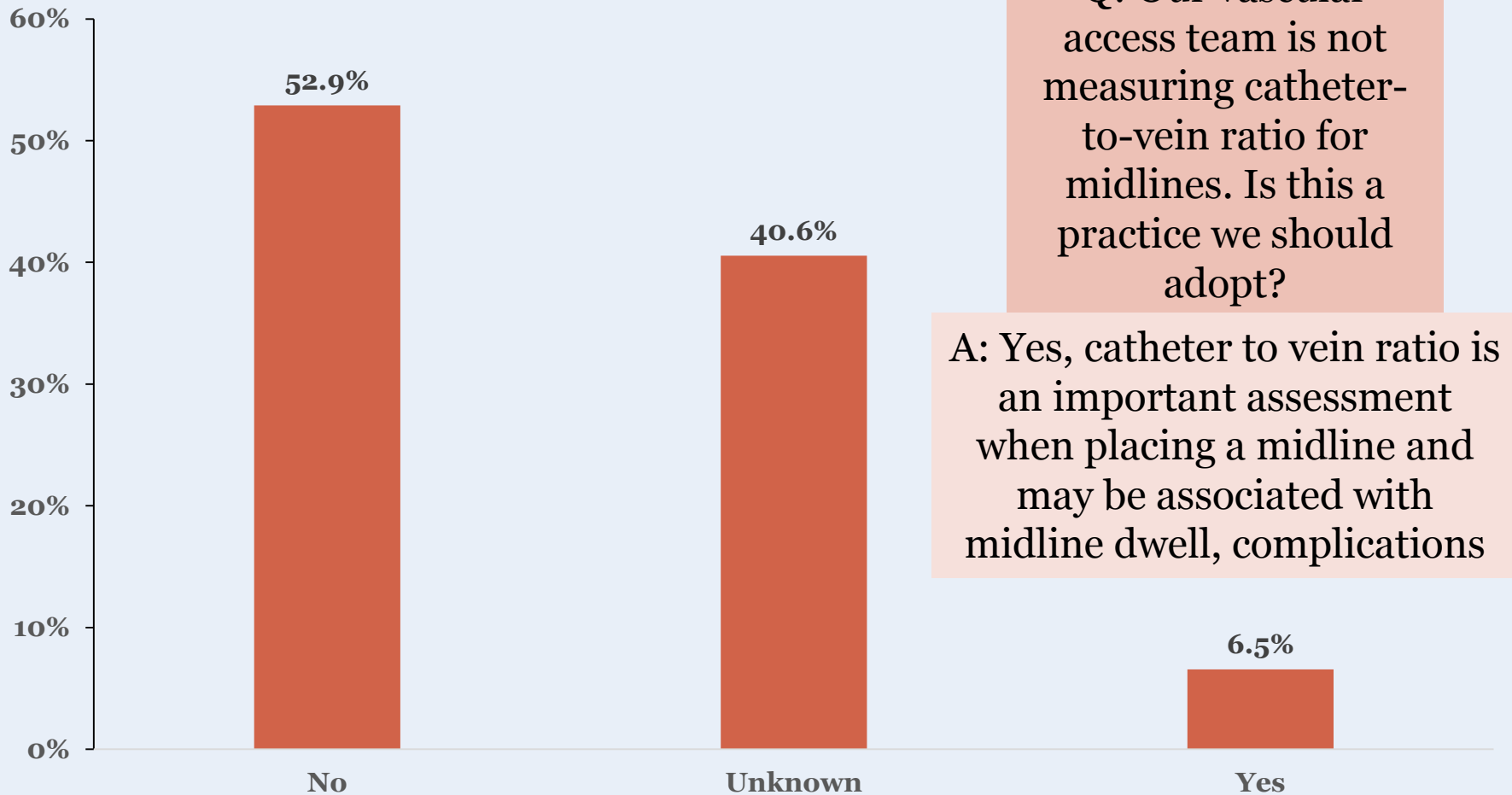
- Physical Assessment (landmark: delto-pectoral groove, anterior axillary line, etc.)
- Ultrasound (during insertion)
- X-Ray
- Fluoroscopy
- Other

Still collecting data on method of tip confirmation
(not enough data to share at this time)

Ultrasound Used for Insertion of Midline



Measurement of Catheter to Vein Ratio



Importance of Catheter to Vein Ratio

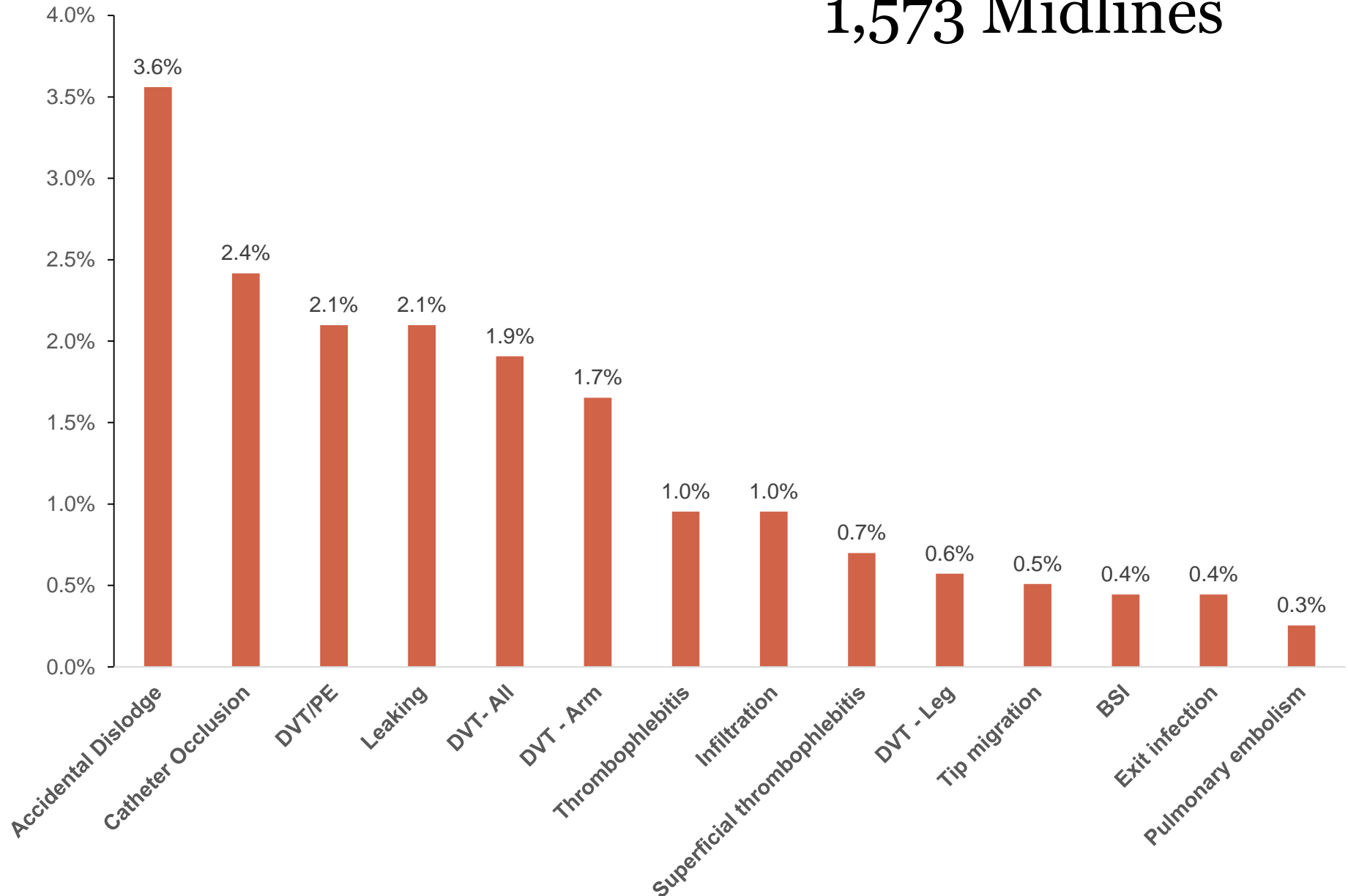


- Why do we care about catheter to vein ratio for midlines?
 - As with PICCs, catheter:vein ratio is important for ensuring blood flow in peripheral veins of insertion
 - Not respecting the C:V ratio is known to be associated with DVT, phlebitis and premature removal in PICCs
 - It is likely that the same holds true for midlines, but this association has not been well studied

HMS has a unique opportunity to shed light on this issue and improve the safety of Midline use in Michigan

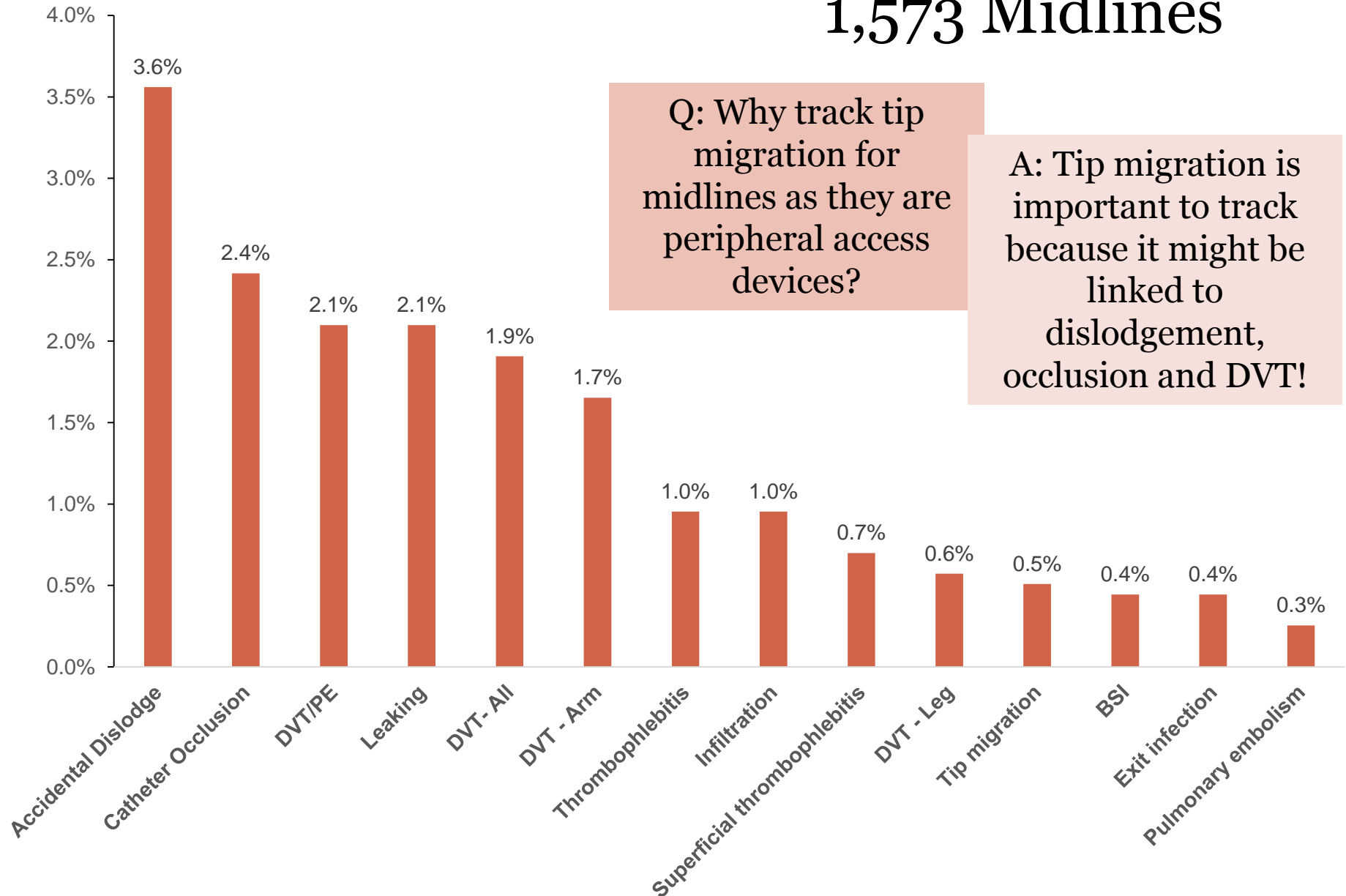
Midline Complications

32 Hospitals
1,573 Midlines



Midline Complications

32 Hospitals
1,573 Midlines



Most Common Midline Challenges Across the HMS Collaborative



- Failure to aspirate labs (21)
- Lack of knowledge regarding appropriate use (16)
- Infiltration or leakage (14)
- Concern about reliability of device (14)
- Documentation (12)
- Concerns related to future vesicant use (12)
- Premature failure resulting in device removal (10)
- ECF's will not accept patients with midlines (9)
- Occlusion (9)
- Dislodgement (7)
- Deep Vein Thrombosis (DVT) (4)
- Other
 - Lack of buy in from IR/Vascular Access, financing the training, PICC preference

To answer these and related questions, we will have to go beyond current studies and look at aspects that have not been considered before!

Overview



- *Introduction and Historical Aspects*
- *Evidence review – what do we know about midlines?*
- *HMS data:*
 - *Current State*
 - *What does pilot data tell us?*
 - *Why are we asking for specific data elements?*
- **Questions and Answers**
 - **Questions from HMS sites**

Q: When is a midline appropriate?

Device Type	Proposed Duration of Infusion			
	≤5 d	6–14 d	15–30 d	≥31 d
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheters for use ≤5 d			
US-guided peripheral IV catheter	US-guided peripheral IV catheter preferred to peripheral IV catheter if proposed duration is 6–14 d			
Nontunneled/acute central venous catheter	Central venous catheter preferred in critically ill patients or if hemodynamic monitoring is needed for 6–14 d			
Midline catheter	Midline catheter preferred to PICC if proposed duration is ≤14 d			
PICC		PICC preferred to midline catheter if proposed duration of infusion is ≥15 d		
Tunneled catheter		<ul style="list-style-type: none"> Preferred over PICCs for use if proposed duration is ≤ 14 days <ul style="list-style-type: none"> Peripherally compatible infusates Difficult venous access Frequent phlebotomy (every 8 hours) Can be used for up to 4 weeks (28 days) Some hospitals are using midlines for longer durations 		
Port				

Appropriate

Neutral

Inappropriate

Disagreement

Q: When is a Midline contraindicated?



- Continuous vesicant therapy
- Total parenteral nutrition (TPN)
 - Solutions greater than 600 mOsm/L
- Infusates requiring central access
- Patients with circulatory impairment, hemiparesis, history of upper extremity DVT
- Patients that may require renal replacement therapy
 - Avoid indwelling catheter in deep veins of the arm
 - ✦ Same logic as PICCs (avoid damaging venous return of the arm)

Midline Q&A: Midline Use



- Is there a list of medications that can/cannot be administered via a midline?
 - Depends on the pH, osmolarity, etc. of the medication
 - ✦ Avoid infusing medications with pH < 5 or > 9, Osmolarity > 600 through a midline (higher rates of phlebitis)
 - There is no official single list!
 - ✦ Hospitals should refer to midline manufacturer guidelines and work in partnership with their pharmacists to identify inappropriate medications on formulary
- Example hospital policy

Example Hospital Policy



POTENTIAL IRRITANT MEDICATIONS *

(Consider administration via central venous catheter – should not administer via Midline)

**An irritant is an agent capable of producing discomfort or pain along the internal lumen of the vein (s 105 INS SOP 2011)*

- aminocaproic acid
- amiodarone
- doxapram
- doxycycline
- nicardipine
- nitrobrusside

POTENTIAL MEDICATIONS WITH VESICANT PROPERTIES †

(Consider administration via central venous catheter – should not administer via Midline)

†Capable of causing blistering, tissue sloughing, or necrosis if it escapes from the vascular pathway into tissues INS SOP S108

- | | | |
|---------------------|--------------------|------------------------------|
| ▪ acyclovir | ▪ epinephrine | ▪ phenergan |
| ▪ calcium chloride | ▪ epirubicin | ▪ pentamidine |
| ▪ calcium gluconate | ▪ esmolol | ▪ pentobarbital |
| ▪ carboplatin | ▪ etoposide | ▪ phenobarbital |
| ▪ carmustine | ▪ idarubicin | ▪ phenylephrine |
| ▪ chlorothiazide | ▪ lorazepam | ▪ phenytoin |
| ▪ cyclophosphamide | ▪ mannitol 10%-20% | ▪ promethazine hydrochloride |
| ▪ dacarbazine | ▪ mechlorethamine | ▪ sodium bicarbonate |
| ▪ dactinomycin | ▪ methocarbamol | ▪ streptozotocin |
| ▪ daunorubicin | ▪ methotrexate | ▪ teniposide |
| ▪ dextrose over 10% | ▪ mitomycin | ▪ tobramycin |
| ▪ dobutamine | ▪ mitoxantrone | ▪ TPN |
| ▪ docetaxel | ▪ nafcillin | ▪ vancomycin |
| ▪ dopamine | ▪ norepinephrine | ▪ vasopressin |
| ▪ doxorubicin | ▪ oxaliplatin | |
| ▪ edetate disodium | ▪ paclitaxel | |

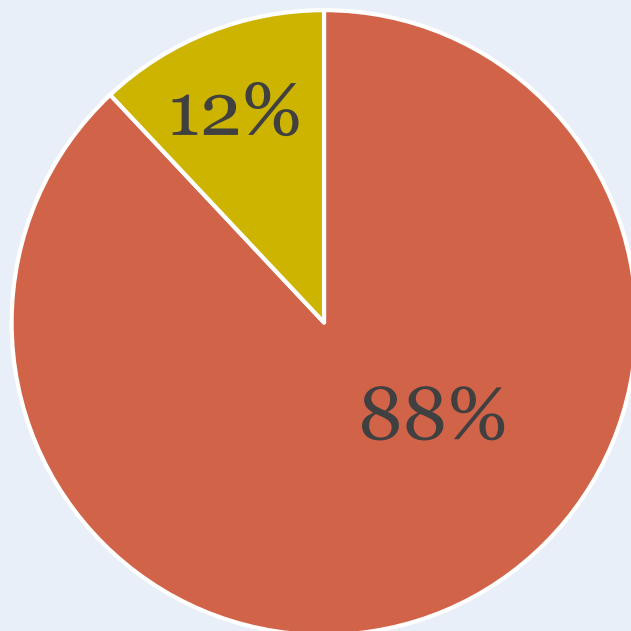
Midline Q&A: Midline Use



- Our facility does not use midlines. Is this something we should look into?
 - Evaluate vascular access needs at your facility
 - ✦ Consider current PICC and CVC use
 - ✦ Evaluate appropriateness of PICC and CVC use
 - Review current CLABSI and other CVAD complication rates – midlines have proven useful to reduce these!
 - Estimate costs and potential savings of a midline program
 - Review and trial the different types of midline products to determine which would best meet your needs

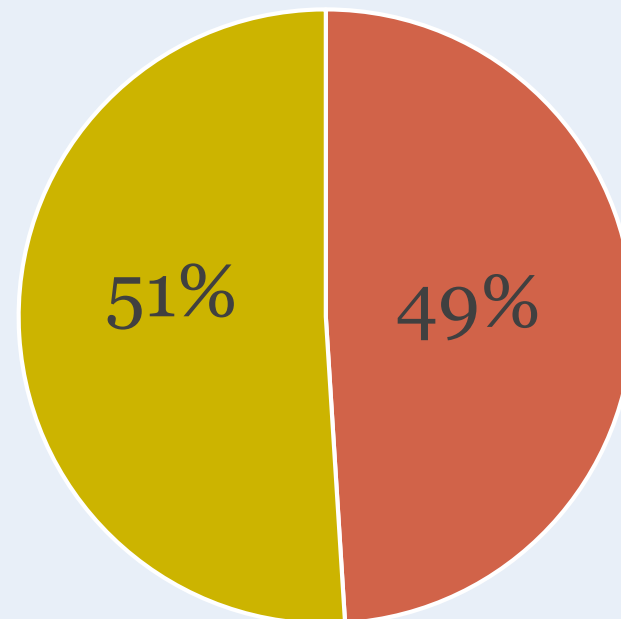
Midline Use Across the HMS Collaborative

Does your hospital insert midlines?



■ Yes
■ No

*Has your hospital begun to place
midlines in adult hospitalized
medical patients in the past
year?*

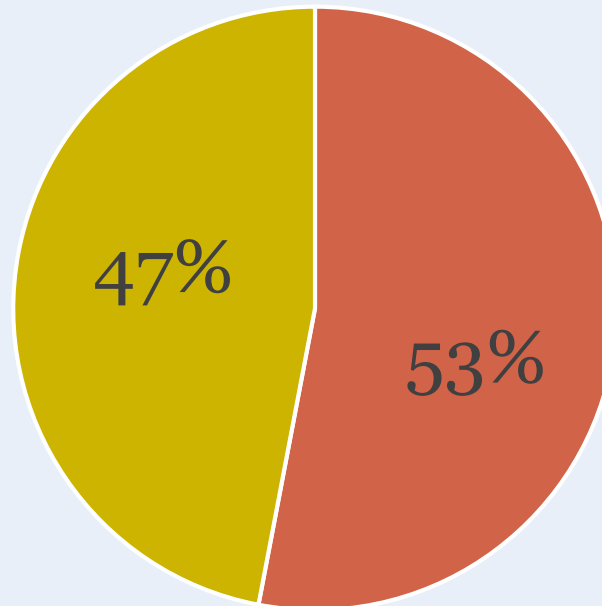


■ Yes
■ No

Midline Use Across the HMS Collaborative



Has the introduction of use of midlines in your hospital led to a decrease in PICC placement?



■ Yes
■ No/Unknown

How to Build a Midline Program

- Moureau, N., Sigl, G., & Hill, M. (2015). How to establish an effective midline program: A case study of 2 hospitals. *Journal of the Association for Vascular Access*, 20(3). <https://doi.org/10.1016/j.java.2015.05.001>



Journal of the Association for Vascular Access

Volume 20, Issue 3, September 2015, Pages 179-188



Case Report

How to Establish an Effective Midline Program: A Case Study of 2 Hospitals

Nancy Moureau BSN, RN, CRNI®, CPUI, VA-BC™  , Gordon Sigl MSN, RN, Margaret Hill RN

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<https://doi.org/10.1016/j.java.2015.05.001>

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Sample Midline Order Set



- HMS created a sample midline order set
- Resource located on HMS website
 - <http://mi-hms.org/>



SAMPLE MIDLINE ORDER SET FORM

SAMPLE MIDLINE ORDER SET FORM				
DIAGNOSIS	MIDLINE PLACEMENT ORDERS			
	MIDLINE PLACEMENT <input type="checkbox"/> P/CC Team <input type="checkbox"/> Interventional Radiology			
	Number of Lumens <input type="checkbox"/> Single Lumen <input type="checkbox"/> Double Lumen <input type="checkbox"/> Other (specify): _____			
ALLERGIES	Indication for Midline: <input type="checkbox"/> Antibiotics (Intravenous) <input type="checkbox"/> Blood Transfusion or Blood Products <input type="checkbox"/> Chemotherapy <input type="checkbox"/> Blood draws <input type="checkbox"/> Difficult Access <input type="checkbox"/> Multiple Incompatible Fluids <input type="checkbox"/> Radiographic Study <input type="checkbox"/> Other (specify): _____			
	NURSING ORDERS FLUSH ROUTINE: Intermittent use – Flush before and after medication with 10cc of NS Not in use – Flush q 8 hours with 10 ml NS Midline – change dressing and end cap q 7 days and prn			
	MEDICATION ORDERS Heparin lock 10 units/ml Routine Indication: Use heparin lock after flushing with NS, at least twice a day. Note: Nurse please flush with 10 ml of NS prior to administering heparin lock			
	RELEVANT RESULTS REVIEWED <input type="checkbox"/> GFR > 45 (needs Nephrology clearance if < 45) <input type="checkbox"/> Creat < 1.5 <input type="checkbox"/> INR < 2 <input type="checkbox"/> Platelets > 50			
Date:	Time AM PM	Prescriber's signature and name	Pager #	Countersign (if required)

Midline Q&A: Insertion

- Is it appropriate practice to trim a PICC to midline length? Are there any risks associated with this?
 - There is little data to guide this practice

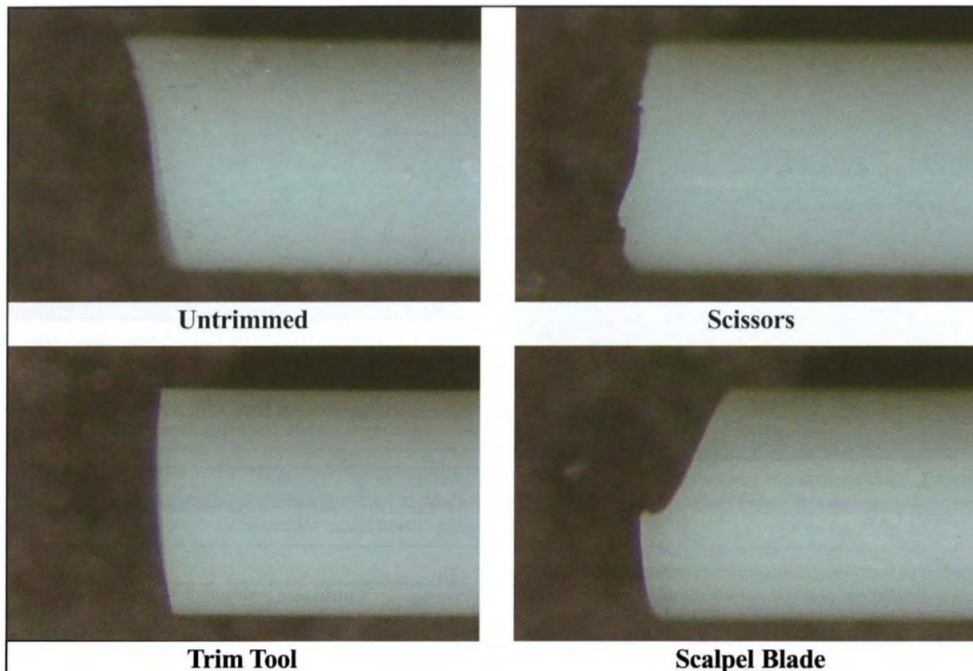


Figure 3. Differences among silicone catheters that were trimmed using three methods, compared with original untrimmed tip.

The Art and Science of Infusion Nursing

Denise Steele, BSN, VA-BC
Colleen M. Norris, PhD

Cutting Peripherally Inserted Central Catheters May Lead to Increased Rates of Catheter-Related Deep Vein Thrombosis

Letter to the Editor

Trimming of peripherally inserted central venous catheters may increase the risk of thrombosis[☆]

Midline Q&A: Insertion



- Is it appropriate practice to trim a PICC to midline length? Are there any risks associated with this?
 - Trimming catheters is thought to increase shear stress, turbulence at the catheter tip
 - Available evidence is limited, but suggests increased risk of DVT when trimming catheters
 - When possible, it is better to use a dedicated midline device than trim a PICC to midline position
 - **More data is needed**

Midline Q&A: Insertion



- Is it necessary to place midlines under sterile conditions (i.e. draping, maximal barrier precautions)? What is the evidence behind this? Is draping necessary for all types of midlines?
 - 2016 INS Standards of Practice and 2012 CDC guidelines both state that midline catheter placement should be done under maximal sterile barriers



Thank you!

Questions?