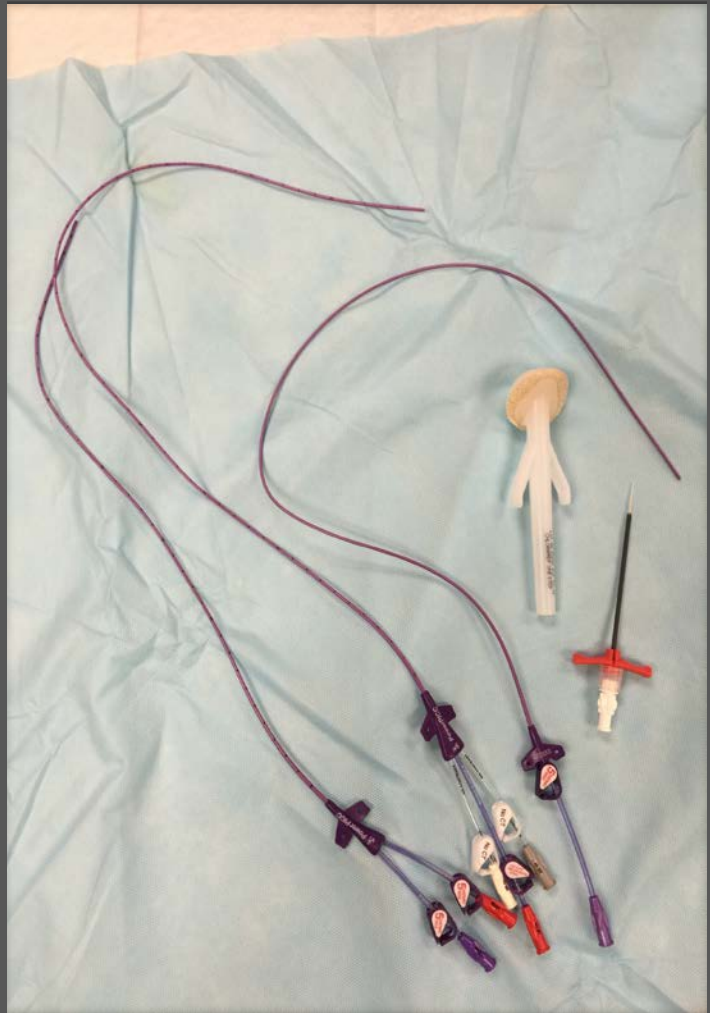


# The W.I.S.E Tool for Assessment of Short Term PICC Use



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### How to use this Change Package

This change package is intended for hospitals that are participating in the Michigan Hospital Medicine Safety Consortium (HMS) Peripherally Inserted Central Catheter (PICC) Improvement Project. It is meant to be a tool to help make patient care safer by improving the use of PICCs in hospitals. This package offers a summary of insights from work performed in HMS aimed at understanding the drivers of short-term PICC use, defined as PICC dwell for 5 or fewer days. It was developed utilizing collaborative feedback from participants across HMS hospitals and subject matter expert contributions. The change package introduces the W.I.S.E. tool, an acronym for Where the PICC was placed, Indication for insertion, Specialty ordering the PICC and Events associated with insertion or removal of the device. The WISE tool can be used to assess why PICCs are being placed in your hospital and what factors may be targeted to reduce avoidable insertions. The package is intended to be complimentary to literature reviews and other evidence-based tools and resources.

## PART 1: DEFINITION AND SCOPE OF SHORT-TERM PERIPHERALLY INSERTED CENTRAL CATHETER USE

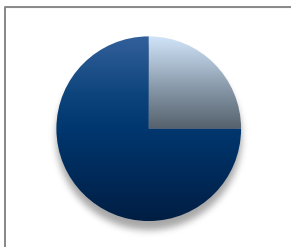
Short-term PICC use is defined as the placement and removal of a peripherally inserted central catheter (PICC) within 5 or fewer days. Short-term PICCs are therefore those that have a catheter dwell time of  $\leq 5$  days.

### Magnitude of the Problem

Like traditional central venous catheters, PICCs are vascular access devices that terminate in the great vessels of the chest adjacent to the heart. However, unlike traditional central venous catheters, PICCs can be placed in veins of the upper extremity and are increasingly inserted by trained vascular access nurses. These properties allow for PICCs to be safely and conveniently inserted at the patient's bedside. As a result, use of PICCs has grown dramatically in hospitalized patients across the world.<sup>1, 2</sup>

With growing use of PICCs has come the realization that some might not be placed for appropriate reasons.<sup>3</sup> For example, several studies have reported that PICCs placed in hospitalized patients are often idle (i.e., unused), forgotten about or placed for inappropriate reasons.<sup>4-6</sup> Recent data from HMS shows that approximately 25% of the 10,000 PICCs placed in the consortium dwell for 5 days or less.<sup>7</sup> These findings of short-term use suggest that some PICCs might be unnecessary and potentially avoidable. Avoiding short-term PICCs may improve patient safety as a substantial proportion have been linked to complications.<sup>8</sup>

### "Real-World" Data from 51 Michigan Hospitals



1 in 4 PICCs are removed within 5 days of insertion

33%

Are placed in patients with Difficult Intravenous Access

1/10

Will develop either a major or minor complication

### What does this mean?

Some short-term PICC use may be avoidable and might help reduce costs and complications

## PART 2: MEASUREMENT OF SHORT TERM PICC-USE

A key component to making patient care safer in your hospital is to track the utilization and dwell time of PICCs. This section outlines process and outcome measures that you should consider collecting to examine use of PICCs in your hospital. These data should be collected monthly to guide quality improvement efforts as part of a Plan-Do-Study-Act (PDSA) process.<sup>9</sup>

Tracking PICC dwell data in this manner will provide invaluable information that will allow you to study the effect of your improvement strategies on PICC use in your hospital. Furthermore, collecting these metrics will allow the HMS coordinating center to aggregate, analyze and benchmark your progress in relation to other hospitals towards reducing short-term PICC use. These data will also shed light on how you may improve PICC care and appropriateness in your hospital.

### Recommended Process and Measures

- Measure the volume of PICCs placed in adult hospitalized patients.
  - This measure should include PICCs placed by all operators, including but not limited to vascular access nurses, interventional radiologists, physicians or other advanced practitioners.
  
- Measure the dwell time of each PICC placed in the hospital setting.
  - PICC dwell time begins with day of PICC insertion, which is day zero.
  - For patients discharged with PICCs, track total dwell time (in hospital + out of hospital use). If this is not possible, track in-hospital use as an abbreviated measure of dwell time.
  - PICC removal should be defined only when the device is completely removed (i.e., not exchanged). PICC exchanges should not be counted as they reflect continued use of the device.
  
- Compile a list of hospitalized patients who have PICC dwell times of  $\leq 5$  days.
  - This includes patients whose PICC was placed and removed within 5 days, with day of insertion being time zero.
  - This list represents the cases for which you will begin to evaluate short-term PICC use.

## PART 3: APPROACHING SHORT TERM PICC USE

### THE WISE TOOL

Once a list of patients that have received short-term PICCs is available, the WISE tool may be applied to understand drivers behind such use. The WISE tool was developed following an in-depth review of almost 200 cases of PICCs that were placed for  $\leq 5$  days in HMS hospitals. A systematic review process including medical record review and abstraction of data on a templated form were used by each hospital to understand why the PICC was placed and removed within a short-time frame. Key themes and findings from this review were ascertained, summarized and then compiled to create this tool. The resulting high specificity of this tool and your subsequent data collection will help inform evaluation and improvement strategies.

The WISE tool consists of four questions:

- W:** **Where -- where was the PICC inserted?**  
(options may include general medical or surgical wards, emergency department, intensive care unit)  
*\*\*the more specific the location (e.g., 6N, 7A, Trauma-Burn Intensive Care, the better)*
- I:** **Indication -- what was the documented indication for the placement of the PICC?**  
(options include intravenous antibiotic administration, chemotherapy, difficult venous access)  
*\*\*we recommend collecting these data from the vascular nurse insertion note, interventional radiology note or the physician order for PICC placement*
- S:** **Specialty -- which specialty was responsible for ordering/requesting the PICC?**  
(options may include general medicine, hospital medicine, critical care, infectious disease, etc.)  
*\*\*we recommend collecting specialty data directly from the order for PICC insertion, if available*
- E:** **Events -- what events, if any, led to insertion and removal of the PICC within 5-days?**  
(e.g., patient discharged and PICC no longer necessary, PICC was not deemed necessary by specialist, the patient expired, PICC was placed for a contrast-study or blood product)

#### Applying the WISE Tool

We suggest applying each element of the WISE tool to your list of patients with PICCs  $\leq 5$  days. A tabular layout may be helpful as shown in the diagram below.

Patient Name/ID	W	I	S	E
Test Patient 1	ICU	Critical Illness	Critical Care	Patient Expired
Test Patient 2	7N, General Ward	Difficult IV access	Hospital Medicine	Discharged
Test Patient 3	1A (OBS Unit)	Difficult IV Access	Emergency Medicine	Blood transfusion

## PART 4: STRATEGIES TO IMPROVE SHORT-TERM PICC USE

With the application of the WISE tool to your list of patients that have received PICCs, you now have a modular display of which patients received PICCs for  $\leq 5$  days and which locations, specialists, indications and factors were associated with placement or premature removal of the device. These factors can help inform improvement efforts. To structure and inform interventions around short-term PICC use, we suggest the creation of a **driver diagram**.

A driver diagram visually demonstrates the causal relationship between change ideas, primary and secondary drivers as they relate to the plan to reduce short-term PICC use. A description of each of these components is outlined below. This change package is organized by reviewing the components of the driver diagram to (1) help you and your care team identify change ideas to implement at your facility and (2) to show how the WISE tool can be used to inform the development of new processes.

### Driver Diagram

Overall Aim	Primary Driver	Secondary Driver	Change Plan 1
		Secondary Driver	Change Plan 2
		Primary Driver	Change Plan 2
		Secondary Driver	Change Plan 3

**Overall Aim:** A clearly articulated goal or objective describing the desired outcome. In this case, the goal may be to decrease the proportion of patients that receive PICCs  $\leq 5$  days. For maximal impact, we recommend that your aim is specific measurable and time-bound.

*Example: We will decrease short-term PICC use from the current rate of 25% to 15% over the next 6 months.*

**Primary Driver:** System components or factors that contribute directly to achieving the aim.

*Example: Develop criteria to guide physicians when PICC use is appropriate*

**Secondary Driver:** Actions, interventions or lower-level components necessary to achieve the primary driver.

*Example: Meet with Physician leadership to develop an EMR-based PICC appropriateness tool*

**Change Idea:** Specific change ideas which will support/achieve the secondary driver.

*Example: Implement a PICC-appropriateness EMR tool and determine impact on short-term PICC use*

***More Examples of how you may apply the information from the WISE Tool to inform a Driver Diagram are available in the Appendix***

## PART 5: CONCLUSIONS AND ACTION PLANNING

Improving the use of PICCs in hospitalized patients is complex and challenging. However, several approaches may be used to help improve your planning and chances of success. WISE is an example of an innovative tool that can help identify, isolate and subsequently target factors that are associated with short-term PICC use. Ongoing monitoring of rates of short-term use and application of WISE will help create an environment of data-driven decision making -- using data to drive practice and process changes. Information obtained from WISE can be used to inform action plans using a driver-diagram that can be shared with others.

### ACTION PLANNING RECOMMENDATIONS

In addition to measuring use of short term PICCs, applying WISE and developing improvement strategies, we suggest considering the following elements when planning actions and interventions.

- **Multidisciplinary approach:** Vascular access is inherently a multi-disciplinary science that has numerous stakeholders including physicians, patients and nurses. Assembling a team that is representative of this diversity including physician and nursing champions, front-line staff and key leadership is recommended to enable change. Determine and define roles for each individual and ensure that the leader of the team has the energy and will to lead a dynamic process improvement project. Assess the composition of the team and the support from key strategic partners such as the chief quality officer, chief medical officer, nursing director, information technology staff, infection prevention, etc. Create strategies and/or allocate resources to engage front-line staff in designing and supporting new processes of care.
- **Ongoing monitoring:** use the data obtained from WISE to drive decision-making and inform practice and process change. Enlist physician and nursing champions on the team to assist with data analysis and interpretation, determine potential interventions and conduct small tests of change. When deviations from expected rates occur (e.g., rates of short-term use increase), share these data with front-line staff to understand why this may be occurring and how it may best be addressed.
- **Communication:** establish clear lines of communication with physicians, staff, nurses, other stakeholders and supporting leadership. Communication should include reports of short-term use rates, updates on process designs and interventions and barriers and facilitators associated with improvement efforts. Effective communication is bi-directional and should allow for both top-down and bottom-up sharing of information.

## PART 6: REFERENCES

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## PART 7: EXAMPLES OF WISE TOOL AND DRIVER DIAGRAMS

### (A) Example of how to pair information from the WISE Tool with Driver Diagrams

Where: *The majority of short-term PICCs in our hospital are placed in the intensive care unit.*

- This observation suggests that efforts to improve short-term PICC use in the ICU may be relevant. Engaging in discussions with ICU leadership critical care committees regarding drivers for PICC use is necessary. Such conversations should focus on risks and benefits of PICCs compared to other devices and identification of workflow, alternative strategies and devices that may be more appropriate.

#### Driver Diagram

Decrease Short Term PICC Use in ICU Settings	Engage ICU physicians and leadership to develop PICC criteria	Develop PICC Screening Tool	Change Idea 1
	Understand ICU needs for venous access	Identify alternative venous access choices	Change Idea 2
			Change Idea 3
Change Idea 4			

Indication: *The most common indication for short-term PICC use was difficult IV access.*

- Difficult IV access is known to be a driver of short-term, PICC use. In patients with difficult IV access, a number of alternative devices may help meet needs before a PICC becomes necessary. Discussions with your IV access team may thus focus on making alternative devices available. Consideration of alternatives including a vein finder to place a short term peripheral IV, or ultrasound guided IV placement may prove valuable in bridging this gap.

#### Driver Diagram

Decrease Short Term PICC Use	Standardize approach to patients with difficult venous access	Understand vascular nursing workflow	Develop an "IV-PRO" access team that will receive specialized training in venous access
	Review appropriateness of IV access choices	Identify technologies and protocols to improve success	Introduce ultrasound for IV placement
			Introduce a pager to route all difficult IV access calls
Implement Vein-Finder technology			

Specialty: *Most short-term PICCs are ordered by hospitalists or residents in medicine.*

- This finding suggests that interventions targeted to a particular provider group may be valuable in reducing short-term PICCs. Available evidence suggests residents and hospitalists often have important knowledge gaps when it comes to PICC placement. Educational sessions led by physician champions that focus on risks and benefits of PICCs as well as appropriate indications may prove helpful.

Driver Diagram

Decrease Short Term PICC Use	Create educational content regarding indications and types of venous access	Work with vascular nurses and IR to define and create content	Structure lecture series in morning reports, intern reports, grand rounds with residency program
		Use infection prevention mandatories to introduce use of IV devices	Create 1-page "Did You Know" info-graphs for hospitalists
	Implement a training module for trainees		Identify and assign physician-champion for learning activities
			Implement electronic mandatory modules for learning

Events:

Some of our PICCs were placed only for a test (e.g., IV contrast) and removed. Others were removed for unanticipated reasons (the patient expired, the PICC was pulled out accidentally). Building a database of such events can help shed light on whether use of the PICC was appropriate, inappropriate or could have been prevented through better communication.

Driver Diagram

Decrease Short Term PICC Use	Develop a database for unanticipated PICC removal	Create online tool for nurses or providers to report unanticipated removal	Share data with staff regarding unanticipated removal during nursing huddles or in communication briefs
		Assemble multi-disciplinary team to create "stepped protocol" for IV needs prior to tests	Implement stepped protocol
	Develop a standardized approach for IV use for certain procedures		Create bulletins to announce protocol

(B) Example of how to use a WISE Table to evaluate Hospital Use of PICCs

The W.I.S.E. tool can be used to evaluate PICC use across your entire hospital. Simply using a table such as the one below may help create an audit and feedback tool to provide a quick snapshot of short-term PICC use. This type of table can be used to evaluate all PICC use in all parts of your facility, or simply PICC use in a specific department. Additionally, a column for "Notes" can allow evaluators of each case to comment on whether the decision to place the device may have been appropriate or avoidable, based on their review of the chart and application of standard criteria, such as the MAGIC Appropriateness Tool.

Patient Name/ID	W	I	S	E	NOTES
A	ICU	Vasopressors, Central Access,	Critical Care	Patient Expired	Needed central access, multiple IV infusions and antibiotics, blood draws three times a day
B	Medical Floor	Difficult IV access	Hospital Medicine	Discharged	Unclear if pt. needed PICC. Blood draws needed for 1d and then patient discharged.
C	1A (OBS Unit)	Difficult IV Access	Emergency Medicine	Blood transfusion	Pt. had 22G IV only. Required blood and blood bank required min 20G IV. Multiple nurses tried to place IV.

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