



## RIGHT PATIENT, RIGHT CATHETER

Catheter Selection Tool

### VENOUS ACCESS: PICC OR CVC?

No two patients are the same, and selecting a vascular-access catheter should be done with the patient in mind. Selecting the right catheter for the right patient is a critical decision which should be weighed and based on many factors. Teleflex Medical offers one of the most comprehensive ranges of venous access tools, each designed with a specific care application in mind. Selecting a catheter based on routine, convenience, or misinformation could have unintended patient repercussions.

Pairing patient needs and catheter capability is a critical part of providing the best choice in an acute care setting. Weighing these decision points using evidence-based recommendations can help make this vital clinical role a little more manageable. This catheter selection tool is helpful in identifying which catheter is most appropriate for your patients and their acute care needs.

# COMPARING INPATIENT INFECTION RISK WITH PICC AND CVC

## SUMMARY OF DATA AND QUOTES FROM THREE MAJOR PAPERS COMPARING PICC AND CVC COMPLICATIONS IN ACUTE CARE PATIENTS

Results from three major studies comparing the rates of complications associated with PICC and CVC use suggest that the selection of the right catheter for the right patient is based on many different factors. Being aware of the available clinical data and the catheters' advantages for each patient care requirement will aid in the safest and most effective choice for a specific patient.

### RATES OF INFECTION<sup>4</sup>

Outpatient PICCs	1.0 infections per 1000 catheter days
Chlorhexidine-silver-sulfadiazine CVCs*	1.6 infections per 1000 catheter days
Inpatient PICCs	2.1 infections per 1000 catheter days
Nonmedicated CVCs	2.7 infections per 1000 catheter days

\*Teleflex Medical's 1st generation ARROWg<sup>ard</sup>® technology

A 2006 *Mayo Clinic Proceedings* study, "The Risk of Bloodstream Infection in Adults with Different Intravascular Devices: A Systematic Review of 200 Published Prospective Studies," analyses infection rates and, while suggesting some outpatient situations in which a PICC is advantageous, finds that inpatient PICCs do not offer a significantly lower risk alternative to centrally inserted CVCs:

*"Many clinicians believe that PICCs are much safer for intermediate-term access than conventional percutaneously inserted noncuffed CVCs placed in the subclavian or internal jugular vein, probably because most of the earlier studies of PICCs were conducted in outpatients in whom PICCs are used primarily for home IV antimicrobial therapy. The results of the current analysis suggest that PICCs used in inpatients (2.1 per 1000 catheter days) pose a slightly lower risk of catheter-related BSI than standard noncuffed and nonmedicated CVCs placed in the subclavian or internal jugular vein (2.7 BSIs per 1000 catheter days)."*<sup>4</sup>

The 2006 article "Peripherally Inserted Central Venous Catheters Are Not Superior to Central Venous Catheters in the Acute Care of Surgical Patients on the Ward," published in *World Journal of Surgery*, finds that CVCs offer some advantages over PICCs for inpatient use:

*"Data were extracted from 48 papers published between 1979 and 2004. Results: Our results show that infectious complications do not significantly differ between PICC and CVC. Thrombotic complications appear to be more significant with PICC and to occur early after catheterization. Phlebotic complications accounted for premature catheter removal in approximately 6% of PICC. Finally, prospective data suggest that approximately 40% of PICC will have to be removed before completion of therapy, possibly more often and earlier than CVC."*<sup>2</sup>

The 2005 study in *Chest*, "Risk of Catheter-Related Bloodstream Infection with Peripherally Inserted Central Venous Catheters Used in Hospital Patients," emphasises the consideration of CVC usage under some conditions:

*"This prospective study shows that PICCs used in high risk hospitalized patients are associated with a rate of catheter-related BSI similar to conventional CVCs placed in the internal jugular or subclavian vein (2 to 5 per 1000 catheter days), much higher than with PICCs used exclusively in the outpatient setting (approximately 0.4 per 1000 catheter days) and higher than with cuffed and tunneled Hickman-like CVCs (approximately 1 per 1000 catheter days)."*<sup>3</sup>

### REFERENCES:

- 1 Safdar N, Maki DG. The Athogenesis of Catheter-Related Bloodstream Infection with Noncuffed Short-Term Central Venous Catheters. *Intensive Care Medicine*. 2004; 30:62–67.
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- 3 Safdar N, Maki DG. The Risk of Catheter-Related Bloodstream Infection with Peripherally Inserted Central Venous Catheters Used in Hospitalized Patients. *Chest*. Aug 2005; 128 (2): 489-95.
- 4 Maki DG, Kluger D, Crnich C. 2006. The Risk of Bloodstream Infection in Adults with Different Intravascular Devices: A Systematic Review of 200 Published Prospective Studies. *Mayo Clinic Proceedings*. 81(9):1159-71, Sept.
- 5 O'Grady NP, Alexander M, Dellinger EP, Gerberding JL, Heard SO, Maki DG, Masur H, McCormick RD, Mermel LA, Pearson ML, Raad II, Randolph A, Weinstein RA. Guidelines for the Prevention of Intravascular Catheter-Related Infections. *Centers for Disease Control*. 2002; Aug 9, Vol. 51, No. RR10, p. 6.

# CATHETER SELECTION TOOL

## VENOUS ACCESS: PICC OR CVC?

CVC	PICC	PATIENT CARE REQUIREMENT	EXPLANATION
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Pressure injection – Patient may potentially need a CT scan</b>	Many of Teleflex Medical’s ARROW-brand peripherally- and centrally-inserted CVCs are indicated for pressure injection for CT scanning.
<input checked="" type="checkbox"/>		<b>Shorter-term venous access</b>	A centrally-inserted Central Venous Catheter (CVC: non-tunneled acute single and multi-lumen central venous catheters inserted in the internal jugular, subclavian, axillary or femoral veins) is often used in critical care situations for venous access needs.
	<input checked="" type="checkbox"/>	<b>Longer-term venous access</b>	A peripherally-inserted Central Catheter (PICC: non-tunneled single and multi-lumen central venous catheters inserted at or above the antecubital region) is often used in outpatient and inpatient situations for venous access.
<input checked="" type="checkbox"/>		<b>Trauma/Emergent Critical Access</b>	Non-tunneled central venous access provides immediate access for critically ill patients who routinely require multiple infusions of life-sustaining medications or rapid high-volume infusions.
	<input checked="" type="checkbox"/>	<b>Outpatient</b>	PICCs are generally considered more appropriate for outpatient home care, due to their typically smaller diameter, fewer lumens, and peripheral insertion site.
<input checked="" type="checkbox"/>		<b>Patient has a potential for future fistula</b>	K/DOQI guidelines recommend avoiding peripheral access if a patient, specifically a dialysis patient, has a graft or fistula, or is likely to need one in the future.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Ultrasound-guided insertion</b>	Many Teleflex Medical ARROW-brand peripherally and centrally inserted CVC kits include an echogenic needle for enhanced visibility using ultrasound visualisation. Ultrasound is shown to facilitate safer, more efficient insertions for both CVCs and PICCs. Ultrasound is recommended by the CDC and the Agency for Healthcare Research and Quality (AHRQ) for these procedures. <sup>5,6</sup>
<input checked="" type="checkbox"/>		<b>High-gravity flow rates</b>	The larger diameter, larger lumen sizes, and shorter lengths of centrally-placed CVCs are often a first choice for procedures requiring large volumes and fast flows.
	<input checked="" type="checkbox"/>	<b>Reduce risk of thoracic complication</b>	PICC placement eliminates the risk of pneumothorax and reduces the risk of other thoracic complications, such as air embolism.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Reduce risk of co-infusion of incompatible medications</b>	Teleflex Medical ARROW-brand PICC and CVC catheters both have non-communicating lumens with staggered port spacing, to prevent mixing and administering incompatible medications. However, PICC catheters are frequently trimmed, which creates a side-by-side lumen exit that may result in mixing. Trimmed catheters are known to have irregular surfaces which may lead to more traumatic insertions. <sup>7,8</sup>
<input checked="" type="checkbox"/>		<b>Reduce risk of peripheral vein thrombosis</b>	In a <i>World Journal of Surgery</i> meta-analysis of 48 papers published between 1979 and 2004, Turcotte et al. reported that PICC catheters were associated with a higher risk of thrombotic episodes when compared with CVCs. <sup>2</sup>
<input checked="" type="checkbox"/>		<b>Reduce risk of inpatient catheter-related infection</b>	<p>PICCs and CVCs can be accessed many times a day in an acute care setting. Each time this occurs there is a chance that pathogens can gain access to the catheter. A meta-analysis has shown that, on average, many antimicrobial catheters actually have lower infection rates than those of inpatient PICC patients. ARROWg<sup>+</sup>ard Blue PLUS<sup>®</sup> (AGB<sup>+</sup>) antimicrobial catheters have shown infection rates as low as 0.4/1000 catheter days,<sup>9</sup> lower than that of outpatient PICCs, and also have intraluminal protection that includes the extension lines and hubs.</p> <p>This is important because studies have shown that more than 20 percent of CRBSIs are derived from intraluminal contaminants.<sup>1</sup> Hubs are the point of access for health care workers, and PICCs and CVCs are accessed many times a day in an inpatient setting, placing the patient at risk each time.</p> <p>While PICC catheters are often considered a lower risk for CRBSI, results from three major studies found that inpatient peripherally inserted catheters do not offer a clear advantage over centrally inserted catheters.<sup>2,3,4</sup> Antiseptic-impregnated CVCs have been shown to have the lowest infection rates of the acute care options.<sup>4</sup></p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Available in a maximal barrier configuration</b>	Teleflex Medical’s ARROW-brand maximal barrier kits are available in PICC and CVC configurations. These kits are designed to simplify the implementation of maximal barrier procedures and drive compliance.

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#### **YOUR INTERNATIONAL CONTACTS:**

##### **TELEFLEX HEADQUARTER INTERNATIONAL, IRELAND**

Teleflex Medical Europe Ltd., IDA Business and Technology Park,  
Dublin Road, Athlone, Co Westmeath  
Phone +353 (0)9 06 46 08 00 · Fax +353 (0)14 37 07 73  
orders.intl@teleflex.com

**AUSTRALIA/NEW ZEALAND** +61 (0)3 84 12 03 21

**AUSTRIA** +43 (0)1 402 47 72

**BELGIUM** +32 (0)2 333 24 60

**CHINA (SHANGHAI)** +86 (0)21 6381 6399

**CHINA (BEIJING)** +86 (0)10 6418 5699

**CZECH REPUBLIC** +420 (0)495 759 111

**FRANCE** +33 (0)5 62 18 79 40

**GERMANY** +49 (0)7151 406 0

**GREECE** +30 210 67 77 717

**INDIA** +91 (0)44-2836 5040

**ITALY** +39 0362 58 911

**JAPAN** +81 (0)3 3379 1511

**NETHERLANDS** +31 (0)88 00 215 00

**PORTUGAL** +351 22 541 90 85

**SINGAPORE** +65 6447 5022

**SLOVAK REPUBLIC** +421 (0)3377 254 28

**SOUTH AFRICA** +27 (0)11 807 4887

**SPAIN** +34 918 300 451

**SWITZERLAND** +41 (0)31 818 40 90

**UNITED KINGDOM** +44 (0)1494 53 27 61

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