

The Space Between Evidence and Reality: The Guidelines Say One Thing and the Street Says Another



Background
Clinical practice guidelines for vascular access are designed to optimize patient outcomes, reduce complications, and standardize care. Yet, the reality at the bedside may diverge from these recommendations. This body of work explores the gap between evidence-based guidelines and real-world practice, examining the factors that drive these discrepancies. Through case examples and current research, we will discuss barriers such as resource limitations, institutional culture, clinician experience, and patient-specific considerations. Readers will gain insight into strategies for bridging this gap, balancing adherence to best practices with pragmatic decision-making in complex clinical environments. Ultimately, the goal is to foster dialogue on how to align evidence with practice without compromising patient safety or clinician autonomy.

Objective

- Identify common barriers preventing full adherence to vascular access guidelines in clinical practice.
- Explore how to balance standardization with flexibility in complex clinical settings.
- Identify why organizations struggle to standardize practice despite the existence of guidelines and recognize gaps in implementation capacity that need to be addressed.

Tactics
Utilize the **Canadian Vascular Access and Infusing Therapy Guidelines (CVAA) Guidelines Implementation Toolkit**, enabling healthcare professionals to customize adaptable online tools to meet individual practice and facility needs.

Despite the availability of evidence based guidelines, organizations often face challenges in standardizing practice due to limitations in organizational readiness, resources, training capacity, and change management processes.

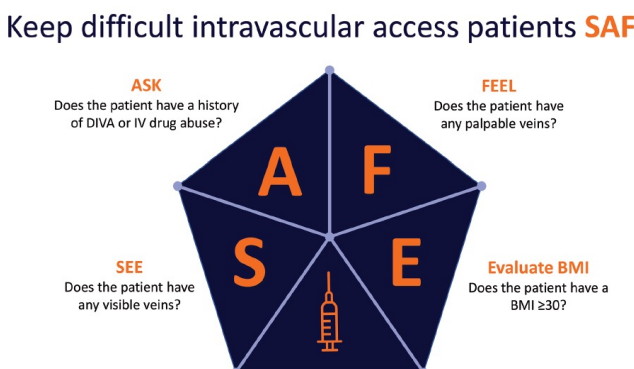
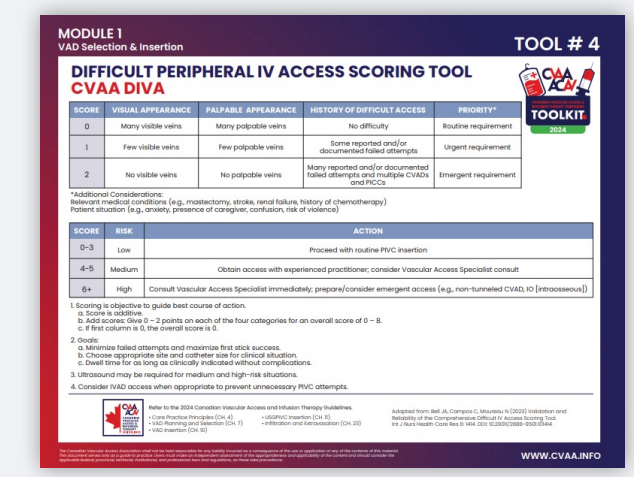
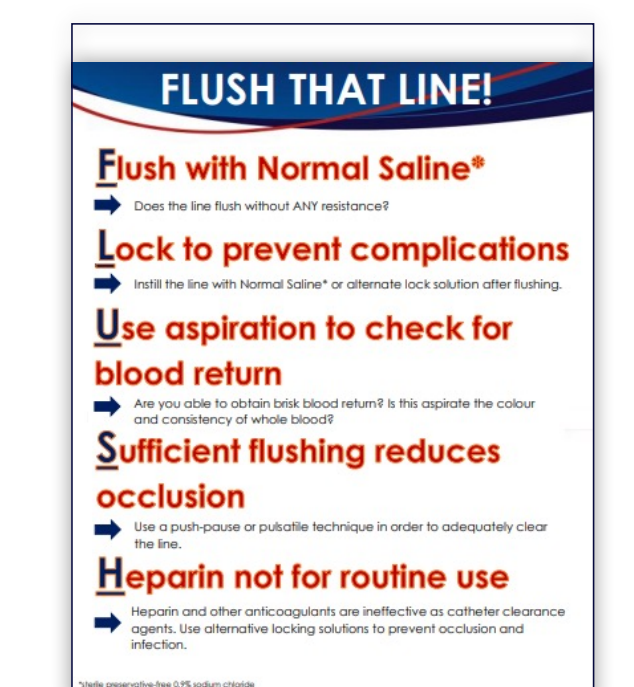
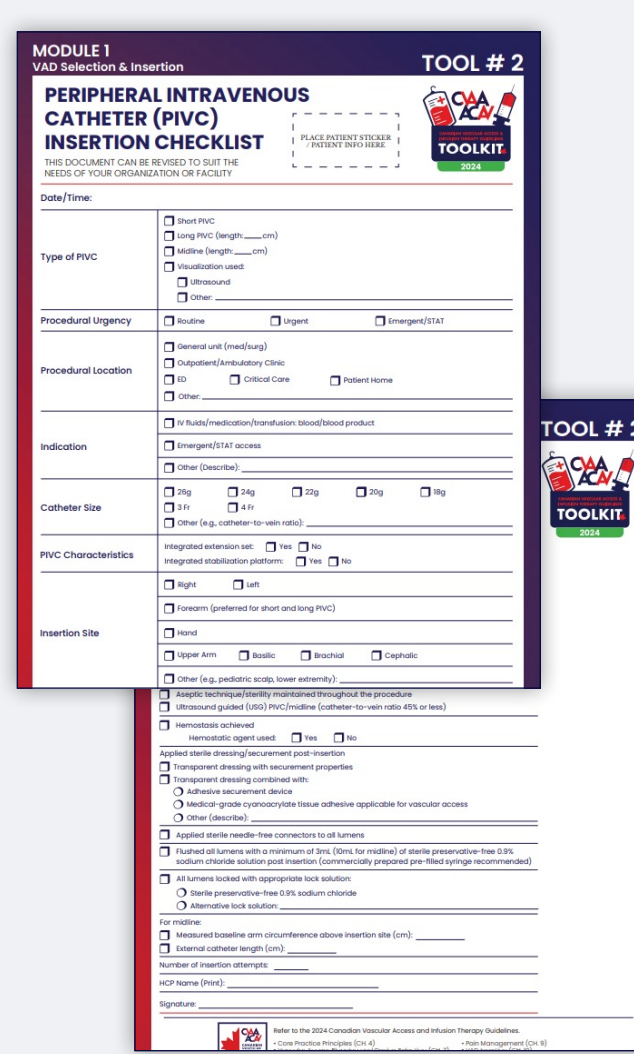
The Canadian Vascular Access and Infusion Therapy (CVAA) Guidelines suggest the following strategies to support successful adoption:

- Assess organizational readiness and capacity for change.
- Identify and secure required financial, human, and operational resources to support implementation.
- Ensure healthcare providers (HCPs) are oriented to relevant technologies and specialty equipment, with ongoing assessment of knowledge and competency to promote consistent and sustainable practice.
- Engage a dedicated vascular access and/or infusion therapy specialist or service to provide clinical expertise, leadership, and implementation support.
- Deliver structured education and ongoing implementation support, including:
 - Direct in-servicing and training sessions (including digital tools such as videos and mobile applications)
 - Case based learning and problem solving discussions
 - Practical reference materials (e.g., cheat sheets, pocket cards)
- Identify, develop, and support vascular access/infusion therapy champions to mentor peers, promote guideline integration, and ensure sustainability.
- Provide standardized tools and resources, including policies, procedures, algorithms, competency assessment checklists, and documentation supports.
- Utilize CVAA clinical practice tools that complement the Guidelines to support procedures, education modules, and access to resources.
- Implement quality improvement initiatives (e.g., audits) to evaluate implementation success and address gaps as they are identified.
- Share and publish experiences, including patient stories, to demonstrate the direct impact of guideline implementation.
- Ensure stakeholder support, including engagement at the C-suite level.¹

Methods
Real-world clinical scenarios where evidence based guidelines conflicted with practice were identified and analyzed. Pragmatic, evidence-informed strategies to bridge gaps between guidelines and bedside practice were synthesized. Approaches to balancing standardization with necessary flexibility across diverse clinical settings were examined to inform practical implementation.

Results
Deviations from guidelines were most commonly driven by systemic barriers (e.g., supply shortages, staffing constraints) and time critical emergencies. Proposed strategies included proactive inventory management, enhanced communication tools and institutional protocols that permit flexibility without compromising safety. Bridging the gap relies on education, advocacy, and pragmatic workflow redesign rather than rigid enforcement.

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Real-World Scenario	Guideline Recommendation from the Canadian Vascular Access Association (CVAA)	Reality in Practice*: • Resource limitations • Experience • Culture • Patient Factors	Recommendations for balancing evidence with a pragmatic approach. • Strategies for teams to support standardization • Balancing standardization with flexibility in practice
Emergency Department (ED) Difficult Peripheral Intravenous Catheter (PIV) Insertion	Use early escalation to ultrasound-guided insertion for difficult access by trained clinicians as a vessel health & preservation strategy. Ultrasound-guided vascular access is considered best practice. The CVAA guidelines emphasize that ultrasound guidance should be used whenever feasible to: - Improve vein selection - Minimize insertion attempts - Reduce vascular trauma and CLABSI risk - Support vessel health and preservation throughout therapy Use ultrasound guidance for DIVA and long PIVC to assess vessel size, depth, pathway, surrounding structures, catheter-to-vein ratio, and patency and to guide insertion.¹	Resources: Limited or no dedicated ED ultrasound access, no escalation pathway, no vascular access team, constrained training. No long length catheters, sterile probe covers or sterile gel. Vascular access practice varies widely between hospitals and resource gaps, including equipment access and training availability, are common barriers to guideline adherence.² Culture: “Just try again” norm, hesitancy to change. “Move fast” mindset, escalation seen as weakness. Reliance on blind insertion technique. Experience: Inconsistent USGPIV training, experience and competencies. Patient Factors: Vessel irritation, rising pain and anxiety, delays worsen condition, risk of compromising future vascular access sites.³	Create an ED Difficult Intravenous Access “DIVA” pathway triggered by a screening tool such as the SAFE Model to predict difficult intravascular access in hospitalized adults and escalation of advanced insertion techniques such as the use of ultrasound.³ Utilize a methodical scoring tool for vessel assessment as ultrasound may be required for medium and high risk situations, according to the CVAA Tool.⁴ Standardized USGPIV Training: Utilize a formal internal or vendor-supported program with a competency checklist and evaluation. Skill Ladder & Coaching: Pair novices with ultrasound proficient clinicians to reinforce guideline aligned practice. Quarterly Skills Labs: Provide phantom based ultrasound simulation and maintain a shift based roster of competency verified clinicians. Analgesia/Vasodilation Bundle: Incorporate warmth, topical anesthetic, and guided breathing to enhance success rates and patient comfort. Transparent Metrics: Post first attempt success and time to access on the huddle board, emphasizing shared learning without blame. Rapid Access Resources: Keep laminated cue cards at the ultrasound machine with SAFE Model³ guidance, cannula length recommendations, catheter to vessel tool and organizational USGPIV procedures and products. Equipment Planning: Ensure availability of a shared portable ED ultrasound and consumables such as longer PIVs, sterile probe covers and sterile gel.  
Catheter Occlusion Related to Inappropriate Flushing Practice	Flush VAD and confirm patency at established intervals. Consider the following factors that may affect flushing and locking: - Type of needle-free connector (positive, neutral, negative displacement, anti-reflux) - Medical conditions that may cause blood reflux (increased intrathoracic pressure) or hypercoagulability (e.g., lifestyle, diabetes, inflammation, cancer) - Type of solution and/or medication – Flush with sterile preservative-free 0.9 % sodium chloride when accessing VAD, between incompatible solutions and/or medications, before and after blood sampling, and after disconnecting an infusion or medication – Use a gentle “push-pause” technique to create a turbulent flow to enhance clearing of fibrin, medication precipitate, and intraluminal bacteria, which may lead to occlusion – Flush at the closest port to patient on the administration set before and after medication delivery during continuous infusion, to clear the VAD and maintain a closed system – Flush the VAD lumen with a sufficient amount of sterile preservative-free 0.9 % sodium chloride following administration of an IV push/direct medication to adequately clear the lumen using the same infusion rate, which was used to administer the medication – Consider flushing every lumen not in use after collecting blood sample from a multi-lumen catheter, to minimize potential of blood reflux into the other lumens – If blood is aspirated into the flush syringe, continue the flush, and use second syringe for locking.¹	Resources: Insufficient staffing and time pressures, limited access to training tools or competency refreshers. Lack of knowledge of the importance of this aspect of catheter care and up-to-date guidelines. Culture: Catheter care is guided by legacy or traditional ways rather than the evidence. This includes outdated flushing volumes, inconsistent techniques or “forceful flushing.” Experience: Wide variation in vascular access practices with inconsistent training and knowledge gaps that affect routine flushing performance.¹ Clinicians may prioritize tasks perceived as higher risk (e.g. medication administration or emergencies) causing proper flushing to be deprioritized. Patient factors: If flushing causes burning, pressure or anxiety, clinicians may shorten or alter the technique. In emergent circumstances, clinicians may flush quickly or incompletely.	Standardize tools and workflows by implementing CVAA’s occlusion-prevention tool (e.g. competency assessments, tracking tools and Flush That Line⁵) to reduce variability and embed best practices into routine care. Utilize auditing criteria to help identify patterns (e.g. certain units or shifts with higher occlusion rates) and target resources accordingly. Allocate protected time for skill upkeep including short, routine, “micro-training blocks” at the point of care to ensure clinicians can maintain skill without workflow disruption. Quick reference tools such as posters, badge cards or digital prompts to reinforce flush volumes and technique. Improve access to education by ensuring clinicians have ready access to the CVAA Guidelines and instructional materials on pocket cards or posters to include the “how-to” for flushing and occlusion prevention. Embed flushing standards into policies and include this education during orientation, routine educational sessions and upskilling. Promote a culture of vascular access competence by encouraging clinicians to learn about CVAA, attend Chapter meetings, achieve nationally recognized vascular access and/or infusion therapy certification (e.g. CVAA(c))¹ and use Toolkit items and ongoing learning opportunities through the organization. Provide targeted education for known gaps related to improper catheter care related to flushing. Routine audits to observe practice and patient device site assessments for blood in the catheter tubing, sluggishness and occlusion will provide a snapshot for existing gaps. Focus on legacy or traditional practices that have changed in the evidence informed guidelines. E.g. replace “forceful flush” with a gentle “push pause” technique. Use comfort and supportive approaches by providing reassurance and explaining the purpose of flushing and using pain-minimizing strategies (topical or needle free local anesthetics, distraction techniques, positioning, psychosocial support, procedural preparation) that reduces improper flushing resistance by clinicians. 
Peripheral Intravenous Insertion NOT Following Aseptic Non-Touch Technique (ANTT®) (Touching key sites and key parts that should not be touched during PIV insertion.)	As infection prevention is a core principle threaded throughout vascular access and infusion therapy, the CVAA Guidelines have incorporated the Aseptic Non Touch Technique (ANTT®) Framework. This framework offers a structured and globally recognized approach and a standardized language for practice. It has been integrated into these CVAA 2024 practice recommendations to ensure the safety of both patients and HCPs. – Vascular Access Device Insertion. Maintain Aseptic Non Touch Technique (ANTT) throughout procedure. – Use type of ANTT (Standard- or Surgical-ANTT) based on procedure complexity and length, number and size of Key-Parts, and HCP skill level. – Use a PIVC insertion bundle to minimize risk of complications and increase adherence to best practice. – Do not touch PIVC insertion site after skin antisepsis has been performed unless using sterile gloves. – Use PIVC with integrated extension set to reduce manipulations and avoid dislodgement, contamination, and blood exposure.¹	Resources: Time pressures and staffing limitations may lead to overburdened clinical environments leading clinicians to take short cuts. When work demands (e.g. emergencies) and patient loads are high, clinicians may skip steps such as setting up a sterile field or maintaining ANTT.⁶ Limited access to updated equipment (such as a PIV with an integrated extension set) or training resources. Culture: “This is how we’ve always done it” mindset may create an environment whereby ANTT® is not followed and improper practices are passed along to new nurses. Variability in products and practices across organizations. Lack of systematic auditing or reinforcement. Experience: Inconsistent training and skill confidence, clinicians may unknowingly omit ANTT® from their practice. Not all organizations have vascular access educators or specialists to understand ANTT® and reinforce correct PIV insertion technique. Cognitive overload and task fatigue may result in clinicians juggling multiple tasks and unintentionally bypassing steps requiring conscious attention. Patient Factors: Challenging anatomy or difficult IV access may make veins difficult to visualize, palpate or access, clinicians may focus on technical success over procedural technique. Emergent scenarios prioritize speed, often resulting in the compromise of ANTT® principles. Patient movement, distress or behavioural factors such as in pediatrics, dementia care or intractable pain may make maintaining a controlled ANTT environment difficult.	Standardize products and set up by providing pre-assembled PIV insertion kits containing: - Appropriate skin antiseptic - Sterile dressing - PIV catheter with an integrated extension set - Pre-filled flush syringe - Gloves (sterile is an option) - Needle free connector cap - Tourniquet Deliver “just-in-time” refresher training during huddles, provide a QR code to quick ANTT® videos, 5-minute refresh sessions on IV insertion and ANTT®. Utilize CVAA Guideline Implementations Toolkit resources: - Peripheral Intravenous Catheter (PIVC) Insertion Checklist. Focus on “Appropriate ANTT® barrier precautions used.” Structured Learning Process: Use Toolkit resources to build a vascular access education pathway with annual skills validation, return demonstration checklists, and mentor supported skill maintenance. Workflow Optimization: Reduce interruptions with protected procedural time and use bedside visual cues such as a “Zone of ANTT®.” Current, Guideline Based Practice: Replace outdated habits by embedding ANTT® into policies, orientation, and competency reviews. Speak Up Culture: Encourage staff to pause and correct ANTT® breaches without judgement. Auditing & Feedback: Perform PIV insertion audits focused on site selection, antiseptic use and dry time, ANTT® and contamination events. Simulation Training: Use high fidelity arms, ultra violet contamination detection and scenario drills for ANTT® skill reinforcement. Champion Program: Develop vascular access champions to provide real time coaching and support during busy shifts. Early DIVA Identification: Flag DIVA patients early to allocate time, skilled inserters, and ultrasound as needed to avoid rushed, non ANTT® procedures. Patient Cooperation Measures: Improve comfort with clear explanations, positioning aids, and child life services to support better adherence to ANTT®. 

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Conclusion
While guidelines represent the gold standard, real world practice requires adaptability. Collaborative dialogue and practical implementation strategies enable clinicians to navigate the space between evidence and reality, ensuring patient safety remains central when ideal conditions cannot be met.