Medication Knowledge and VAD Decisions: *A Canadian Perspective*

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Background

Vascular access device selection is a crucial element in patient care. Choosing the appropriate vascular access device is determined by a myriad of information, including information about the patient, the medication/infusate, the treatment duration, etc… The characteristic of the medication/infusate that is infused is extremely valuable information for choosing the right VAD, a key factor often misunderstood and underestimated. Canadian clinical practice emphasizes evidence-based, patient-centred care that encourages insight into medication/infusate properties when making vascular access device decisions.

Objective

The objectives of this work were to examine how medication and infusate characteristics influence vascular access device (VAD) selection in Canada, to outline the ways in which national guidelines support clinical decision making, and to identify existing gaps and opportunities to improve practice and strengthen knowledge translation.

Methods

Vascular access decisions and knowledge are strongly guided by the Canadian Vascular Access and Infusion Therapy Guidelines (CVAA Guidelines) from the Canadian Vascular Access Association (CVAA), along with other Canadian resources, international standards, and published literature. Referring to established guidelines and standards enables us to make well informed vascular access decisions. As healthcare challenges increase and patient comorbidities become more complex, these decisions can be difficult. Evaluating how innovations in tools and resources can enhance our decision making is essential to sustaining high quality care.

Results

Best practice for vascular access device (VAD) planning is consistently emphasized across Canadian and international guidelines. The CVAA Guidelines, 2024, provide clinicians with clear, evidence based direction for selecting the most appropriate device, guided by key therapy characteristics such as: osmolarity, pH, and vesicant and irritant properties[1]. These guidelines recognize the potential tissue injury associated with various infusates and provide clearly organized, accessible information to support clinical decision making. This includes a practical, evidence based table—derived from the robust research of Gorski et al. (2024)[2]—that categorizes non-antineoplastic vesicant medications and infusates into high , moderate , and cautionary risk groups. This table provides a straightforward, clinically useful resource for clinicians *(see Figure 1)*[1].

Additional national recommendations reinforce this approach. Choosing Wisely Canada™ advises selecting *"an access device that is the least invasive with the greatest likelihood of reaching the end of the planned therapy with the lowest rate of replacements and complications."*[3] This guidance highlights the importance of balancing invasiveness with therapy demands and complication risk. Another well-respected Canadian organization is the Registered Nurses' Association of Ontario (RNAO), which has published evidence based Best Practice Guidelines (2021) that emphasize therapy-driven decision-making, recommending clinicians, *"Determine the clinical indication for the device. Vascular assessment, including determination of clinical indication, is to include prescribed therapy (e.g., osmolarity, pH, and vesicant and irritant properties)."*[4]

International standards align with this perspective. The Infusion Therapy Standards of Practice (INS, 2024) caution that pH and osmolarity values alone do not reliably predict safety.[5] European recommendations on the proper indication and use of peripheral venous access devices (the ERPIUP consensus): A WoCoVA project, further support medication specific VAD planning. They state *"It is highly recommended that any clinical unit should have a list of peripherally incompatible drugs … and should use it as a guide when choosing between a CVAD and a PVAD."*[6]

Emerging perspectives also highlight broader questions in clinical education and practice:

- **Are these guidelines and standards widely known and understood within the culture of Canadian clinicians?** The influence of national guidelines varies considerably across healthcare systems, and their impact often depends on the presence of local champions who promote evidence based vascular access practice.

- **What does 'peripherally compatible' actually mean?** Recent evidence has increasingly concentrated on the notion of peripheral medication compatibility, but the term itself warrants clarification. What qualifies a medication as peripherally compatible? As described by an AI based definition (Google AI, Aug. 11, 2025): "A medication or solution that can be safely administered through a peripheral intravenous (IV) catheter without causing significant irritation or damage to the vein or surrounding tissue."

  This reflects a general understanding, yet underscores the need for consistent, evidence based definitions in clinical practice. For clinicians to make these decisions appropriately, they require access to relevant resources, such as Figure 1, and the necessary education to apply evidence based information in their critical decision-making.

- **Are we giving clinicians the tools they need—or unintentionally removing critical thinking?** As guidelines, algorithms, and decision-support tools grow increasingly detailed, it remains essential that clinicians retain a strong foundational understanding of therapy characteristics and infusion related risks. The evidence consistently demonstrates that safe vascular access decision-making is rooted in clinical knowledge and critical reasoning rather than reliance on checklists alone.

Interprofessional collaboration among physicians, nurse practitioners, pharmacists, and vascular access teams is essential for optimizing device selection, improving patient outcomes, and enhancing patient satisfaction. However, clinicians often make these decisions in isolation or with a limited understanding of the full range of vascular access device options, which can hinder optimal decision making. Within the Canadian healthcare landscape, the degree of interprofessional involvement in vascular access decision making varies considerably across institutions. Some sites demonstrate strong collaborative practices, whereas others face significant limitations due to resource constraints. Rural centres, in particular, may lack access to specialized vascular access teams and may have limited capacity or institutional support to expand these services despite clinical need. Persistent disparities between rural and urban settings—such as the absence of vascular access teams, reduced expertise, and delayed referrals for advanced devices—contribute to increased catheter related complications. To address these challenges, innovations such as, enhanced access to medication knowledge and understanding and strengthened advocacy for vascular access team development are emerging as important strategies to support equitable, high quality vascular access care across Canada.

Despite regional variation across the country, Canadian national guidelines consistently support the standardization of vascular access device planning and emphasize the importance of understanding medication and infusate characteristics to inform these decisions. The CVAA Guidelines further highlight the importance of patient centred care and vessel health and preservation, stating: *"Use a systematic process to develop a patient centred vascular access plan of care prior to, or at onset of, therapy that promotes vessel preservation and guides device selection. Use a device selection decision making tool."*[1]

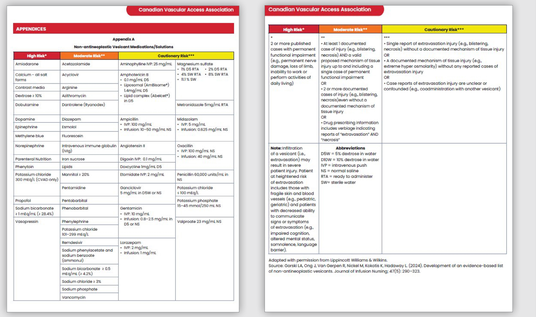

Figure 1

Conclusion

Medication/infusate characteristics play a central role in appropriate VAD selection. Canadian guidelines offer robust, user friendly tools that help clinicians integrate therapy-specific risks into their vascular access decisions. These guidelines also support a patient-centred, evidence-based approach. Multidisciplinary collaboration is essential to optimize outcomes and reduce complications. Continued emphasis on guideline use, education, interdisciplinary collaboration and adoption of innovative clinical resources will further support high quality, patient centred vascular access care across Canada and can be useful globally.

References

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