

**Running Head: VASCULAR ACCESS DEVICES: CURRICULUM
DEVELOPMENT_BODIEK**

Vascular Access Devices: Curriculum development

By

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Abstract

The goal of this project is to provide the information needed for interprofessional collaboration focused on patient-centered care for patients requiring, or who have, a venous access device (VAD). In this project, I outline the process of developing an evidence-based curriculum to support interprofessional education for such patients with long-term venous access. Parse's theory of humanbecoming, constructivist theory, and narrative pedagogy were used as the basis for the curriculum development for a two-day workshop for interprofessional education. A case study was used to highlight how care changes when the focus is on patient/ family-centered care rather than provider centered. A key feature of this curriculum was the use of a case study to guide the participants in the care of those facing a vascular depletion diagnosis, and a VAD intervention.

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November 9 “Judy” lost her battle with cancer and on November 11 my colleague and friend Daryl died suddenly of a massive MI. Kingston General Hospital lost two incredible health care professionals that week. This is for you.

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Vascular Access Devices: Curriculum Development

Vascular access devices (VADs) are an emerging essential health care technology to support patients requiring acute and chronic treatment of many different illnesses of which vascular depletion, or risk for vascular depletion¹, may be a related diagnosis or occur as a result of interventions for the illness (Douglas, Aspin, Jimmeson, & Lawrance, 2009). In this project, I articulate the theoretical underpinnings of a curriculum to guide an interprofessional workshop, and the steps required to implement such a curriculum, in the context of an acute care setting. The goal of the proposed workshop is to disseminate current evidence to health professionals to support their practice when caring for people with vascular access devices (VADs). In this paper, I begin with a review of the literature specific to caring for people with vascular depletion who may require a peripherally inserted central catheter (PICC) nursing care, a type of VAD. I include a review of the literature on nurse-led PICC teams. I used the knowledge gained from this literature review to organize the content of the workshop. The proposed curriculum (development) draws on the knowledge gained during my MN educational journey for curriculum development, in particular, narrative and story-telling pedagogical approaches, and the application of constructivist theory.

Statement of Problem

Currently, I work as a manager in a regional cancer center. This position requires me to support health care professionals to provide quality care to patients

¹ Venous/vascular depletion is defined as irreversible damage to the venous system from repeated venous needle sticks for access (Hawes, 2007).

when a VAD, frequently a PICC², is a required intervention for health and healing. When providing such support in recent months, I noticed that information regarding the insertion and care of VAD's is fragmented, information is located in separate areas within the different units of our institution, and is not shared or current. I noticed also that across the institution, health professional practices focused on assessing for vascular depletion, planning, insertion, and complication prevention was inconsistent. I concluded that the management for PICC devices is not consistent, and policies or written procedures that address the specific care needs of patients with PICCs do not exist, this leading to patients being at risk for complications and frequent invasive procedures. Findings of studies that address health professional educational interventions designed to prepare health professionals to care for VAD's indicate that disseminating knowledge about, and increasing health professionals' self-efficacy with the care of VADs decrease complication rates (Ngo & Murphy, 2005; Tian, Zhu, Qi, Guo, & Xu, 2010; Yap, Karapetis, Leroose, Iyer, & Koczwara, 2006). Since VAD/PICC care is an interprofessional practice in our institution, an interprofessional educational workshop is one way to transfer an evidence- based approach to assessment for vascular depletion, VAD/PICC insertion and care, and prevention and management of problems that can arise from VAD/PICCs. Such an education workshop has the potential to address the quality of care issue that I have identified.

Increasing self-efficacy and knowledge is important for the health care team and also for patients and their families. To foster self-efficacy and the acquisition of

² The term VAD includes many different devices; a PICC is one of these devices.

meaningful knowledge, developing partnerships for learning is achieved by professionals who use a 'patient/family-centered' approach³ (Poochikian-Sarkissian, Sidani, Ferguson-Pare, & Doran, 2010). However, in our institution, using a patient/family-centered approach when caring for patients and their families is not a common practice. In my experience we do not provide patients and their families with the information they need to participate in decision-making regarding their VAD/PICC care. As health professionals working from a patient/family-centered perspective, it is the health professional's responsibility to understand and assist patients and their family members to navigate the health care journey and the decisions that they need to make (Johnson, Abraham, & Shelton, 2009). Each patient and their family members have unique experiences and contexts that underpin their health care needs. Thus, to provide patient/family-centered care, health care professionals must take the time to form relationships with their patients and family through which understanding their unique issues, such as health literacy, and concerns, such as inadequate financial resources, can surface and then be addressed.

In my experience, team members do not always collaborate to ensure optimal care. According to Johnson et al. (2009), when using a patient/family-centered approach, each team member collaborates by practicing within his or her full scope with the shared goal of achieving optimal care. Valuing each member of the team's strengths will ensure that the patient receives the best care and a positive experience in a challenging situation. "Because of its focus on participation and

³ Patient/ family-centered care is an "approach to the planning, delivery and evaluation of health care that is grounded in mutually beneficial partnerships among health care providers, patients and families." (Johnson et al, 2009, p. 125)

collaboration, patient- and family-centered care means working with patients and families rather than doing to and for them” (Johnson et al., 2009, p. 125). Living with a VAD is a very personal experience. The patients’ and their family members’ lifestyles and life circumstances, institutional resources, and medical history will dictate the support each patient and family member will receive. Using a patient- and family-centered approach to care will improve both patient and health care experiences by creating a collaborative environment in which individual circumstances are taken into account.

Background

Many patients in my care suffer from venous depletion⁴, a challenging and discouraging situation that occurs when there is irreversible damage to the venous system from repeated needle sticks. Hawes (2007) cites many causes for this unfortunate situation such as aging, repeated venipuncture, lack of skill and knowledge of the clinician accessing the venous system, and lack of collaboration between members of the health care team. Nurses may attempt to cannulate a patient’s vein numerous times before a successful cannulation is achieved. If information about what worked and what did not work when attempting to insert a line into an individual patient is not shared, then measures cannot be taken to ensure subsequent successful cannulations. With patients requiring long term vascular access, to ensure optimal care, health professionals must collaborate with each other, the patient, and their family members to develop a plan designed to prevent frequent painful attempts for venous access such as a VAD. Such a plan has

the benefit of decreasing interruptions of treatment due to loss of access while preserving the venous system as much as possible.

A peripherally inserted central catheter (PICC) is a commonly used intervention that is performed to prevent venous depletion (Hadaway, 1999; Halderman, 2000; Masoorli & Angeles, 2002; Moureau, 2006; Oakley, Wright, & Ream, 2000; Papke et al., 1996; Robinson, Mogensen, Grudinskas, Kohler, & Jacobs, 2005). Many patients will be advised to have a PICC inserted and will need to be educated on this procedure. Patient and family members benefit from participating in developing a plan of care for long-term vascular access via PICC that includes education about the options for preventing venous depletion (McGowan & Wood, 2008). Patients and their family members will need support in decision-making and the education component. Nurses working with this population need to be competent in educative nursing practice, and they require requisite knowledge, skills, and attitudes to support patients who are at risk for venous depletion, and their families (Chernecky, 2001).

My work in Interventional Radiology raised my awareness of the need for nurses to provide patient and family education regarding the use and care of PICCs. Patients expressed frustration that they were not informed early on in their treatment for cancer that the use of a PICC device was an option that could be used to reduce the frequency of needle sticks. Patients told me that their experiences of intravenous (IV) therapy would have been more positive if they had received a VAD/PICC to avert repeated attempts at venous cannulation. The nurses expressed frustration knowing that these devices were available but were not able to convince

physicians to initiate the insertion of a VAD/PICC process early on in the care trajectory. Why this is so is not clear; however, this may be related to physicians' perceptions that there are limited resources for the insertion of a PICC and/or the belief that PICC insertion is a last resort option. In cases where a patient did have a VAD/PICC in place, nurses found it difficult to access assistance with troubleshooting problems with the PICC such as a line kink or blockage. Several years ago, as a staff nurse I played a role in assisting nurses with PICC problems, I would go to various units on weekends and found myself surrounded by nurses requesting education on PICC care. Then, I would spend an hour in discussion with the nurses about the issues they faced with PICC care, relaying PICC care tips. On these occasions, the nurses expressed gratitude for the information I shared with them. These frequent exchanges point to a significant quality-of-care issue and were a catalyst for my desire to develop a VAD/PICC curriculum for health care professionals that is the focus of this project.

A few years later, when I took my current position at the Regional Cancer Centre, I was surprised that the same learning needs and desire for information regarding PICC lines existed. Health professionals cared for a large number of patients either needing vascular planning or patients that had a device in place. There was no consistent approach to patient education and placement of a device despite recommendations by Cancer Care Ontario (2006) that such guidelines be a standard part of patient care⁵. Because of this knowledge gap, I felt a need to

⁵ Cancer Care Ontario (2006) developed a document outlining practice guidelines for managing vascular access devices as part of their evidence-based series.

perform a literature review for current information and move toward evidence-based practice.

As mentioned previously, given what I understand about quality of care, the move toward evidence-based practice and the development of education based on current information must be grounded in a patient/family-centered care model. Patient/family-centered care must be compassionate, empathetic, and respond to patient needs, values, and preferences (Perocchia et al., 2011; Poochikian-Sarkissian et al., 2010). This care must also encompass communication between patient and health care professionals and encourage patient participation in care (Poochikian-Sarkissian et al., 2010). Parse's theory of humanbecoming is a wonderful lens to view patient-centered care and to build evidence-based interprofessional education (Parse, 1992). Patient-centered care begins with the lived experiences of the patient and family. Guided by this theory, health care professionals can enter into a relationship with "true presence", an approach that makes those in nurses' care feel valued.

Theoretical Lens

The theoretical lens that will be used throughout this project will be Parse's theory of humanbecoming⁶ and the curriculum will be informed by the constructivist theory and narrative pedagogy. Parse's theory of humanbecoming is an appropriate theoretical foundation for patient-centered care and interprofessional education as it helps educators and nurses attend to the diverse experiences and backgrounds of patients and families (Mitchell, Closson, Coulis,

⁶ Parse merged the two words to "make more explicit the idea of indivisible cocreation" (Parse 2007, p. 305).

Flint, & Gray, 2000; Parse, 1992; Parse, 2007). The constructivist theory describes many of the same values that Parse's theory contains. The constructivist theory posits that learning is a "process of meaning making or knowledge building" and will assist me in building a curriculum that attends to the many ways of learning in an interprofessional and intergenerational group (Young & Maxwell, 2007, p. 9).

Narrative pedagogy approach will be used to form a partnership between learners as they share experiences (Brown, Kirkpatrick, Mangum, & Avery, 2008).

Theory of humanbecoming

In the theory of humanbecoming, Parse views people as dynamic beings, always in interaction with their environment (1996). The term becoming is used to show the continuous action, interaction, and change that is life. This theory is very complex and I have reduced and summarized the main concepts and assumptions for this project. These assumptions follow, and are explained, by the two foundations of this theory. The two main points to the foundation of this theory are human subjectivity and intentionality as stated by Pilkington (1999). Parse's concept of human subjectivity includes certain characteristics such as human beings are unique, dynamic, and are greater than the sum of their parts. Humans make conscious decisions based on their current personal values and priorities. Their choices are made because of their past and present experiences. Humans are dynamic in who they are, meaning they are ever changing as they "become." "Become" is a term used for life and "becoming" is living that life. The term "becoming" is also used to show the continuous action, interaction, and change that is life. People interact with their environment and with these interactions change occurs, both in the person and environment. Intentionality deems that humans are purposeful beings. Their

choices are meaningful and have purpose for them. Individuals do not randomly go through life, but they make decisions that guide their path to “becoming.” Parse uses the prefix “co” to explain that humans are interacting with others and their environment. “Cocreating” is used to describe the person and universe together creating a new way to see a situation (Edwards, 2000).

Parse developed nine philosophical assumptions regarding humans and becoming (Parse, 1996). The first four assumptions describe humans as open beings in constant interaction with their environment and developing ways to relate to others. Their hopes and dreams are reflected in the choices they make. The first assumption states that humans exist together and develop a rhythmical pattern to their life. The second, assumption is, humans are open to experiences and freely make decisions in life, and they are responsible for those decisions. The third assumption is, humans are continuously changing and developing new patterns of relating. And the fourth assumption is that humans move through life as multidimensional beings with many possibilities in life as they become (Parse, 1996). The remaining five assumptions discuss health as a process not a goal. Health is therefore defined by the person and does not have quality attached to it such as “poor health” (Edwards, 2000). Parse begins each of these assumptions with the word “becoming”. The fifth assumption is “becoming is unitary human-living-health”, living life is making choices that influence health (Edwards, 2000; Parse, 1996, p. 56). 'Becoming' is rhythmically experiencing life, becoming or living life is shaped by our values and are reflected in the decisions that we make, becoming is a personal process that is filled with many possibilities and finally “becoming is human evolving” (Parse, 1996, p. 56)

Parse (Parse, 1992) identifies three themes in relation to the theory of humanbecoming: meaning, rhythmicity, and cotranscendence. These themes are contained in the three principles and further describe the concepts of Parse's theory. Edwards (2000) discusses and describes the principles that contain these themes and puts them into terms that are easily understood. I have used his interpretations in my explanations of the following principles: first, "Structuring meaning multidimensionality is cocreating reality through the language of valuing and imaging" (Parse, 1992, p. 37). The term meaning is used in Parse's theory when a person interprets his or her situation or gives meaning to his or her life. People interpret their situations through actions like fight or flight, and attitudes such as indifference. Humans express themselves and their reaction to a situation by using verbal skills and body language. A person's reaction to a situation can also reflect their values. Past experience will determine how the person reacts to the situation.

The second principle is "Cocreating rhythmical patterns of relating is living the paradoxical unity of revealing –concealing, enabling-limiting, while connecting-separating" (Parse, 1992, p. 37). Humans interact with the environment and they develop a rhythmical nature to their lives. As a person relates to others, a paradoxical relationship evolves. According to Parse (1992) when humans reveal something of themselves to others, they then conceal other aspects of themselves. When a person selects one option, they enable one situation but limit others. Parse also states that when one person connects with another person, such as in the same physical space, that person may remain separate by not connecting mentally/emotionally (Parse, 1992).

The third principle is "Cotranscending with the possibles is powering unique ways

of originating in the process of transforming” (Parse, 1992, p. 38). Humans are presented with options on the path of life. Making choices gives people power over their lives. Each person is unique; therefore, the process of change will be different for each person because of the choices made. Quality of life is an important concept in the theory of becoming. Individuals define quality of life for themselves.

The principles of humanbecoming theory (1992) are important for this project as it outlines the way I view learners, patients, and their families and guides how I interact with them. I believe that Parse’s theory can also be applied to the way an instructor interacts with a learner. Taking time to enter in to a relationship with a learner or a patient shows I respect them and want to learn about their experiences. It helps me to understand that people react in many ways because of these experiences and that I can assist them in knowledge construction by discussion and interaction with them.

Critics of Parse’s theory feel that her use of complex terms make it more difficult for bedside nurses to understand and apply (Edwards, 2000). In my view, this theory is difficult to understand, as it requires dedication when wading through its many philosophical assumptions. I have used other authors in this next section that explain the assumptions in ways that I was able to understand. The main reason that this theory appeals to me is because I do not feel that I have to have all the answers when caring for patients. I also use this theory as a leader and teacher in what Parse describes as “rhythmicity”(Parse, 2008). Edwards (2000) expressed concerns on Parse’s view of quality of life and her definition of health. Parse views quality of life as defined by the individual, thus if a person is a drug addict but states they are happy with this choice then they have quality of life. Edwards suggests that

this is a subjectivist theory of quality of life. The second concern Edwards expressed is that Parse defines health as living and that health cannot be quantified in terms of good or bad. This is a concern since it raises many questions that could potentially confuse nurses and patients as it applies to health promotion. I do believe that these concerns are valid and quality of life is subjective but when discussing with patients their choices and leading them on this journey of exploration then change can happen. Patients can see other options to their lifestyle that they may have not considered before. Health is also a subjective term. I had a discussion with a patient receiving chemotherapy. She was worried because she was told she was very ill but she felt well. She did not know how to live day-to-day because although she had energy to do all the activities she wanted she felt she should act "sick." I do not use terms such as sick and healthy with my patients so that I do not influence how they live each day. I have explained humanbecoming in the way I understand it and with the assistance of other authors that use less daunting terminology than Parse uses. My hope is that the theory becomes easy to understand and apply in everyday practice.

Constructivist theory

The constructivist theory in some ways resonates with humanbecoming theory. Nursing theory is developed and used to guide nursing whereas education theories guide teaching and learning and assist with knowledge construction in many educational settings. Constructivist theorists assume that knowledge is constructed or built on existing knowledge and that knowledge cannot be transferred (Ali, Hodson-Carlton, & Ryan, 2004). As learners are exposed to new information each will understand and apply this

knowledge in different ways depending on past experiences and knowledge base (Rolloff, 2010). Vygotsky's (Young & Maxwell, 2007) contribution to constructivism was to posit that social interaction plays a central role in how people think through and construct knowledge in his theory of social constructivism. Parse's theory posits that one needs to reflect on experiences, and it is through reflective discussion that personal growth occurs (Melnechenko, 1995). Thus, one can see the resonance between these theoretical positions. Nurse educators can use the constructivist lens for both staff and patient education maintaining the premise that adult learners are active participants in learning (Moss, Grealish, & Lake, 2010).

Moss, Grealish, and Lake (2010) state that the constructivist learner must make sense of their experiences in light of new information. Educators use the image of scaffolding to show how learning and new knowledge is built upon a foundation of experiences and previous knowledge. The learner can move to the next step of knowledge attainment with guidance from a more experienced colleague or educator (Spouse, 2001 as cited in Moss et al., 2010). Young and Maxwell state that learning is more than just presenting new information but rather "placing students in learning situations that raise a challenge to their current understanding" (2007, p. 9). A cognitive constructivism concept of assimilation and accommodation is also important where new knowledge can be assimilated or comprehended based on existing knowledge (Young & Maxwell, 2007). Accommodation requires learners to form new views of what they know. I see accommodation as the imbedding of knowledge in a way that is easily understood and useful in practice. Information often needs to be presented to me using different methods or examples of its use before I am able to accommodate new knowledge into my

knowledge base. It is the way the information is presented to me that makes the difference; these different pedagogies present the information so that it is understandable and the learning is an active process. This learning is known as transformative learning.

Transformative learning reflects how we know, rather than what we know (Matthew-Maich, Ploeg, Jack, & Dobbins, 2010). Mezirow (1991, as cited in Eisen, 2001) differentiates instrumental learning from communicative learning. Instrumental learning is a task-centered leaning focusing on process and can be achieved with didactic teaching methods. Communicative learning focuses on a new way of viewing experiences and information. Learning is achieved by dialogue and reflection of past experiences, values and beliefs. It is through thoughtful discussion that new ways to view experiences transform perceptions and knowledge base of the learner (Matthew-Maich et al., 2010). Innovative pedagogies assist in knowledge transformations that attend to the learning styles of a diverse group.

Narrative pedagogy.

Narrative pedagogy will be used to attend to the diversity of an interprofessional group with the use of shared experiences. Knowledge is derived through reflective dialogue in which members share both personal experiences and their resulting interpretations (Ironside, 2006). In sharing these interpretations, teachers and learners work together to create and modify knowledge (Ironside, 2006). In this way, in the narrative approach it is understood that there are multiple ways of thinking, knowing, and interpreting while fostering transformative learning (Diekelmann, 2001). Narrative pedagogy recognizes the personal and collaborative relationship between the knower and the known. Teachers and learners come together as a group where they collectively interpret and discuss the

individual experiences that have been shared (Ironsides, 2006). As a result, knowledge is gained through the collective interpretation of individual experience (Ironsides, 2006). Moreover, collaboration forms the collective wisdom of the learner group (Ironsides, 2003). This pedagogy integrates the philosophy of Parse's theory of humanbecoming. Parse (1992) describes a process of "illuminating" where a nurse/ teacher uncovers what happened in the past, what is occurring now, and what may be. This is what occurs in the narrative process as the teacher and learner tell their "story."

Story-based learning.

Story-based learning (SBL) based on the tenets of constructivism assists learners to build on existing knowledge (Young, 2010) This pedagogical method assists in providing contextual information that relates to the situation learners may be placed in. Providing information that is easily applicable to practice will encourage active learning, expand on existing knowledge, and makes the learning "relevant and meaningful" (Young, 2010, p. 165)

Story-telling assists the interprofessional group to view experiences from many perspectives and adds to the rich learning experience this wide view will provide. In an interprofessional group of learners using SBL, a social worker may present the story with a view of patient and family struggle with available resources during treatment of cancer, while the dietician will present the story in light of working with the patient to ensure adequate nutrition for healing. The nurse may relate the story from a physical care perspective. In an interprofessional group the story telling will also provide the experienced health care professional an opportunity to reflect back on personal experiences with a new lens. This multi-

disciplinary lens view will also provide the health care team with many perspectives and can be applied when teaching patients.

Theoretical assumptions.

In this section, I will explicate how I plan to apply the assumptions of both humanbecoming theory and constructivist theory and narrative pedagogy to the design of a curriculum for an interprofessional group with varying levels of experiences. These assumptions include the concept that people are free to chose meaning and prioritize situations as they see fit. Humanbecoming deems that as people interact with their environment (universe) they are continually changing and evolving (Parse, 1992). Individuals experience life in unique ways because of past experiences and personal values. Simply stated, as a health care professional, I do not have the right to decide what should take priority in another's life or judge another for his or her way of defining health or quality of life. I can only enter into a relationship with another and by being present and interacting, a process that will change both of our lives. As an educator using this theory as a framework I assume that the learner will make decisions and only through dialogue can different paths be illuminated. Finally I will assume that knowledge is constructed and education must attend to the many experiences and different baseline knowledge of the learners.

The use of Parse's theory and constructivist theory provides guidance to me as I develop and implement the curriculum. This guidance ensures that I provide time for the interprofessional group to discuss their roles and experiences. This will help to foster a teamwork approach when member's strengths are recognized and mobilized. Parse's theory will also be used to understand that each member and

patient have unique experiences and that decisions are based on these experiences. The constructivist theory will also guide me in developing a curriculum that contains pedagogies that facilitate social interaction and sharing of experiences. This will enable the interprofessional group or patients to gain or construct new knowledge in their own way.

Evidence-Based Practice

Constructing new knowledge in a way that fosters transformative learning requires exposure to new information and experiences, and reflection. The nursing profession needs to embrace progressive methods to developing and constructing knowledge (Walker, 2003). There is an increasing pressure on nurses and other health care professionals to deliver care to more patients in less time with fewer resources than ever before. Nurses must be able to give high quality care in this high-pressure environment. Evidence-based practice may be the tool to assist in this. Evidence-based practice leads to better patient care, increased patient safety while providing cost savings to organizations (Cullen, Titler, & Rempel, 2011). While evidence-based practice does take concerted effort to initiate, RNAO and many other nursing organizations are assisting with searching and analyzing of information. Evidence-based-practice (EBP) is “the conscientious and judicious use of current best evidence in conjunction with clinical expertise and patient values to guide health care decisions” (Titler, 2011, p. 291). We have struggled over the years to bring research to the bedside. This subject is now central in most of our decision-making discussions. The Canadian Nurses Association (2002) offers a position statement on evidence-based decision making in which authors state that EBP is

essential to improving patient outcomes and to ensure transparent decision-making and to accountability. The challenge is bridging the research-practice gap by ensuring that key information to support best practice is disseminated and implemented in a way that improves care-related outcomes (Aebersold, 2011).

Much work has been done to encourage nurses to adopt evidence-based practice. The Registered Nurses Association of Ontario (RNAO) has developed workshops to assist organizations, nurse leaders, and bedside nurses in implementing evidence-based guidelines (EBG) and have published many EBG to assist with the dissemination (Registered Nurses Association of Ontario, 2011). There are many models developed to support the uptake of evidence-based practice (EBP). One such model is the Iowa Model of Evidence-Based Practice to Promote Quality of Care. This model views the steps of EBP from the health care professionals perspective (Titler, 2008). Aebersold (2011) states that it is the dissemination phase that can be difficult in the use of EBP. Viewing EBP from the health care professional's perspective, the interprofessional staff can identify an area that they would like to improve care, search for relevant information, critique and synthesize the data. As stated previously, many organizations have started to compile information and publish these guidelines for nurses to apply in their own areas. Unit based councils in our institution provides nurses with time and a venue to review these guidelines to ensure they are appropriate to their practice setting and patient population.

EBP is an important component when developing the curriculum for this workshop as it ensures that the information being presented is based on research

and not just opinion. RNAO has done a great deal of work to synthesize the information available in the area of vascular access devices. RNAO developed a best practice guideline (Registered Nurses Association of Ontario, 2004). I have reviewed the literature as well and will outline the information by themes that were identified in the next section. A literature search is the first step to see what evidence is available to improve practice and identify knowledge gaps.

Knowledge Gaps.

The first notable gap is the lack of Canadian-based studies on vascular access devices. The only article I found on the planning and insertion of a devices was by Gamulka et al. (2005) where the authors studied a nurse-led PICC team for pediatrics. They found that there is a need for Canadian-based information regarding cost savings, team composition, and best location for the insertion (i.e., bedside, imaging services). It is challenging to make a case for a nurse-led PICC team without understanding the financial benefits as part of the argument as I have learned in my challenge to implement this in my practice setting.

Secondly, there is a lack of information regarding the patient perspective on the current process for decision-making in the insertion and care of VADs. The following literature review highlights a gap in the data collected regarding patient experiences with venous access and chemotherapy (Chernecky, 2001; Goossens, Vrebos, Stas, De Wever, & Frederickx, 2005). In terms of qualitative data available on patient experience, the studies done by Chernecky (2001) and Goossens et al.(2005), state that no studies had identified or prioritized the advantages and disadvantages from the patients' perspective. This gap in patient experience shows

the need for further qualitative studies. I believe that with qualitative study patient-centered care gaps can be identified.

Literature Search

A literature review was carried out to compile all relevant and current knowledge regarding best practices for the care of vascular access devices. I searched the literature using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Medical Literature On-Line (MEDLINE). The search words that I used included, vascular access devices, PICC, vascular depletion, insertion, VAD complications, nurse led PICC teams, and patient-centered care. There were no restrictions on years searched as most peer-reviewed articles and practice guidelines were published after the mid-nineties. The literature review revealed different themes related to VADs. I will present the literature review according to key themes. Please see Appendix F for the list of articles and practice guidelines reviewed with themes noted. Overall 39 articles and practice guidelines were reviewed. Key themes arising from the review are: vascular planning, PICC insertion, complications, and complication prevention.

Vascular Planning

In this section I will discuss the literature I have reviewed that is relevant to vascular planning. Literature search using the Cochrane review database revealed one review for vascular access devices but this review showed no relevant studies for this subject. A search using the CINAHL and Medline database revealed 10 articles of which two were research studies and the rest were information articles. One article on continuous quality improvement for vascular access will also be

reviewed as it contained a pilot study with relevant data to this subject. The search limited articles from 1995 to present and from academic journals.

The two studies retrieved studied patient satisfaction with central venous access devices and contributed to the understanding of vascular access planning from the patient's perspective. The study by Chernecky (2001) was a small sample of 24 outpatient oncology patients and used a questionnaire containing five questions using yes or no response and Likert scale for one question. The study by Goossens, Vrebos, Stas, Wever and Fredrickx (2005) was similar to the Chernecky study using the same outpatient oncology population and a questionnaire containing four questions. The results of the studies were similar and reflected the need for early discussions with the patient and family regarding device availability and selection. Patients expressed their satisfaction with having a device over repeated peripheral IVs, and noted the need for nurses to understand the patient point of view with care and maintenance of the VAD. These studies also reflected the need for specialized nursing knowledge when caring for the devices. Both studies highlighted the need for more research in the area of patient experiences with VADs.

The continuous quality improvement paper by Barton, Danek, Johns and Coons (1998) discussed their problem with understanding the nature of vascular access issues. They began with a descriptive pilot study to reflect current state of vascular access for patients and staff. Data was collected from 371 patients from inpatient medical, surgical, and intensive care units, both adult and pediatric, all requiring venous access. The study revealed that twenty-five percent of all IV starts required three to four attempts and resulted in treatment delays. The analysis of the

problem revealed that impacts were financial, therapeutic, and satisfaction. More supplies were used, patient treatments were delayed with the potential for increased complications, and staff and patient satisfaction decreased. The team then implemented a vascular access planning algorithm and educated the staff on its use. Post implementation research was then undertaken using a randomized control study of 297 patients including a control group of 122 patients. The results were that with using the vascular access planning algorithm, patients had a 28% decreased length of stay and had significant less wait time for a VAD insertion, patients that had an IV inserted experienced decreased number of attempts and less stress. This study reflected the need for consistent vascular access planning.

The dearth of rigorous studies in the area of vascular planning reflects the need to review the expert opinion papers available on this subject. The papers are written mainly by nurses and the lack of studies in this subject first highlights that this area is important to nurses, and second shows the need for more nurses to be involved in research. I will review the information from these articles in this section to show the concerns and needs according to the nurse experts in the area of vascular access planning.

Expert opinion papers written by Hadaway (1995, 1999), Halderman (2000), Hamilton (2000), Masoorli and Angeles (2002), McGowan and Wood (2008), Sansivero (2010), Scales (2010), and Wells (2008) discuss vascular access planning, patient assessment, and device selection based on type of treatment, patient needs and preferences, and length of treatment. I will give an overview of the information presented in these papers. I feel that it is important to have a strong knowledge base

on all aspects of vascular planning to ensure excellent patient care. I also believe that if we, as health care professionals, understand why this is needed we are better able to transfer the knowledge to action.

Wells (2008) stated that IV is an “integral part of almost all aspects of modern health care” (p. 35). Treatment success often depends on the choice of the vascular access device by the care team and patient (Scales, 2010). Vascular access planning is an important step because of the many options open to patients and their care team. These options include peripheral short catheters or “angio caths,” midline catheters, and central line catheters (Halderman, 2000; Hamilton, 2006; McGowan & Wood, 2008; Sansivero, 2010; Scales, 2010). Sansivero (2010) states that a partnership between the patient and the care team is critical to ensure “the right device, at the right time, and inserted in the right location”(p. 88) will obtain optimal outcome. The choice depends on patient preferences, history and co-morbidities, infusion needs, environment for administration of treatment, and device choices (Hamilton, 2006; Sansivero, 2010).

The patient and health care team must consider the different devices available to them to ensure the choice is an informed one. Each vascular access option has advantages and disadvantages. The peripheral intravenous cannulae is a short catheter, usually not exceeding 7.5 cm in length, and should not be in place longer than 96 hours (Scales, 2010). This short dwell time limits this device and is not an option for long-term treatments. They are quick to insert and easy to remove.

The midline catheters are usually inserted in the anti-cubital fossa and are 7.5-20 cm in length and the tip usually ends in the subclavian vein. They cannot be

used for vesicants that require large blood flow to prevent vessel erosion (Gorski & Czaplewski, 2005). The site of insertion can also cause mechanical phlebitis as it is inserted in the anti-cubital fossa, a location that has a great deal of movement as the patient performs daily activities. This device is not used frequently as it has a higher occlusion rate than the other devices and patients do not find it comfortable because of the usual insertion site.

The last option is a centrally inserted catheter; this category has many options, ranging from peripherally-inserted central catheter, tunneled catheter, and implantable devices (Sansivero, 2010; Scales, 2010). This category is the best option for long-term access because of the device reliability and the patient does not need to go through multiple, and possibly painful, attempts at cannulation of a vessel (Hamilton, 2000).

The peripherally-inserted central catheter (PICC) is the most common form of vascular access device for long-term IV therapy (Sansivero, 2010). The advantages to this device is that it can be inserted by a nurse, surgeon, or interventional radiologist at the bedside or in a special suite that has x-ray technology (Moureau, 2006). The catheter is usually inserted in the larger vessels in the upper arm and secured in place with sutures or tape. This device can be hidden under short sleeves and easily accessible for infusion initiation. The insertion procedure takes approximately 30 minutes and involves minimal pain (Falkowski, 2006). This device is not without complications and these will be discussed in depth in the next section. This device is used most frequently, and Massorli and Angeles

(2002) quote a 75% rate of all devices inserted; thus the insertion process, nursing care and complications will be covered in the next section.

Tunneled catheters are commonly referred to by the trade name Hickman catheter and can have a cuff that ensures added stability (Sansivero, 2010). The advantages to these devices include arm exit site for these catheters can be moved to ensure patient comfort, low infection rate, ideal for active patients, no dressing needed after cuff has healed and long dwell time (Masoorli & Angeles, 2002). The insertion of these catheters is done in a surgical or interventional radiology setting and requires a skilled practitioner, usually a physician, as they are more invasive due to the tunnel created and venous site accessed (Hamilton, 2000). They also require mild sedation for insertion or anesthesia.

The implantable port or venous port is also used in long-term IV therapy. These devices are completely implanted under the skin and do not require dressings or secure devices once the site has healed (Sansivero, 2010). The advantages to a port are the minimal limits to patient activity, limited care after insertion, and long term durability (Masoorli & Angeles, 2002; Sansivero, 2010). According to Sansivero (2010), the disadvantages of a port are, the invasive insertion and removal, discomfort for patient with device access, and require special training and needles for access.

Once the appropriate devices are selected according to the patient's therapy requirement, discussion with the patient must occur so that their lifestyle and personal preferences can be included in the decision making process. The Registered Nurses Association of Ontario Best Practice guidelines for Assessment

and Device Selection for Vascular Access (2004) have an excellent algorithm to assist health care professionals in selection of the best vascular access method and device in collaboration with their patient (see appendix A).

The Peripherally Inserted Central Catheter (PICC)

PICC Insertion.

This section I will discuss the literature I have reviewed that is relevant to PICC insertion. I chose PICC insertion as the VAD to discuss because it is the most frequent VAD choice for many patient populations (Scales, 2010), and it can be inserted by nurse-led teams (Gamulka et al., 2005; Hornsby, Matter, Beets, Casey, & Kokotis, 2005; Oakley et al., 2000; Robinson et al., 2005). Four studies were retrieved that contribute to an understanding of nurse-led PICC insertion programs. The studies retrieved spanned 10 years and were from two countries, Canada and United States.

Caredella, Cardella, Bacci, Fox, and Post (1996) compared bedside insertion of PICCs by a nurse-led team with PICCs inserted by interventional radiologists (IVR). This quantitative study compared the technical success rate of the nurse-led team to a previously reported success rate of bedside insertions by residents and physicians regardless of training. The access to service between the nurse-led and the IVR team and rates of complications were also compared. The nurse-led team inserted a total of 869 PICCS with the successful insertion rate increasing from 74% from previously reported physician team to 84.6% and access to service decreased from 72.7 days to 28.1 days. Complication rates remained low for both groups. This study reflected the inpatient population and did not reflect any out patient data but

the results can be used to highlight that a nurse-led team is an effective resource to decrease wait times for access to device insertion with no difference in complication rate occurrence.

A prospective quality assurance study by Robinson, Mogensen, Grudinkas, Kohler, and Jacobs (2005) was conducted to determine if a dedicated nurse-led team would improve patient care and reduce costs for PICC placement. A team was initiated to coordinate and insert PICCs. The success rate of PICC placement increased during the study and reflected a decrease of 78% in the use of IVR for placement. IVR spent 88% of their time on PICC placements and at the end of the study spent 6% of their time on this service. The cost dropped 65% with insertion by the team as compared with IVR insertion. The number of PICC requests increased 68% at end of evaluation period. The authors concluded that having a multidisciplinary team to “evaluate patients, approve PICC placement, and insert PICCs when appropriate should become the gold standard of care when using PICCs in high volume” (Robinson et al., 2005, p. 379). This study reflects the challenges in our institution with access to service for PICC insertion by the IVR. With a dedicated nurse-led team we can decrease wait times, free up IVR for critical procedures, and decrease costs per insertion.

Oakley, Wright, and Ream (2000) conducted a qualitative study to examine patient and nurse experiences with a nurse-led PICC team. This small sample study conducted interviews with ten cancer patients, five hospital-based nurses, and five community-based nurses regarding their experience caring for patients with these lines. Patients were invited to participate before their lines were inserted. Two

interviews were conducted, the first within 24 hours of line insertion and the second 2-3 weeks after insertion. The nurses were interviewed once to determine their experiences with PICCs, collaborative practice, and preparation for managing PICC lines. Five themes were discovered in the analysis phase: education, formation of expectations, confidence, adaptation, and sensory experience. The last theme of sensory experience being solely related to patients. I will discuss some of the results.

Patients felt well prepared for their PICC insertion and liked the use of both verbal and written descriptions of the procedure. They felt that their anxiety level was the main roadblock to absorbing the information. Nurses felt comfortable with their education regarding care for patients with PICCs and stated that ongoing education and support from the nurse-led team the most effective training method. Nurses also felt it was important to ensure that patients anxiety was relieved before PICC insertion and educating them on the care of their device. The patients felt their confidence in the nurse inserting the PICC increased with the caring way the nurses interacted with patients. The more positive experiences the patients had also increased their confidence as reflected by questions being answered and access to assistance when needed. Areas noted for improvement were exploring patient preconceived ideas of the insertion process and allaying fears, connecting patients with others who have a PICC in place. This sample size is adequate for a qualitative study. However, I note that the findings of a qualitative study cannot be used to generalize the findings to a larger population. This means that there is a need to do further research in other patient populations and settings using a research method that allows for generalizability.

Gamulka, Mendoza, and Connolly (2005) was the only Canadian-based study that I found. This quantitative study evaluated a nurse-led PICC team in a pediatric setting. Ninety-seven patients aged 3-18 had a nurse-led team PICC placement attempt, with 69 PICCs successfully placed, 15 requiring minor assistance from IVR, and 13 requiring an IVR insertion after a nurse attempt. The authors of this study concluded that a nurse-led team within the diagnostic imaging department was helpful as the interventionalists were close by for consultation and assistance. The nurse-led team had a high safety profile and high success rate. It was felt that the success rate would increase with experience and exclusion criteria for patients would decrease allowing a greater number of patients eligible for the nurse-led insertion.

This study was helpful to me in understanding the support needed in the initiation of a nurse-led team and the need for collaboration and support from IVR in the early stages. This study also discussed the need for the nurse-led team to be a resource for bedside nurses and to assist with troubleshooting and ongoing assessment of PICCs.

In this section I discussed the experiences of a nurse-led PICC insertion program and the need to decrease wait times of this service is an option my institution needs to explore. When we are able to implement the health care professional education and utilize a vascular access planning algorithm the responding increase in demand for PICC placement will increase our already long wait times for insertion. The information in this section is useful in that it demonstrates the need to understand current demand and study the changes with

implementation of this project. I believe as we implement vascular access planning the demand for PICCs will increase.

Prevention of PICC Complications

In this section I will discuss the literature I have reviewed that is related to prevention of complications for PICCs. Four studies were retrieved that contributed to an understanding of complication prevention, specifically addressing increasing nursing knowledge and self-efficacy with PICC insertion.

Funk, Gray, and Plourde (2001) conducted a retrospective and prospective study on the effects of a dedicated nurse-led PICC team and education of bedside nurses in PICC maintenance. The effects studied were complication rates and the resultant cost savings on reinsertion of lines and use of thrombolytic agents for occlusions. A retrospective review of inpatient and outpatient charts was conducted on 202 patients who received PICCs over a two-year period. A prospective survey was then done to monitor PICC insertions, complications, and outcomes over the next two years. Training of bedside nurses was intensified during the prospective survey period. There was a decrease in overall complication rate over the two-year data collection from 20.4 to 13.8 per 1,000 line days. This was attributed to increased proficiency of the team at insertion and the increase in nursing knowledge in care and maintenance. There were no significant differences between the four nurses inserting the PICCS and their complication rates and the authors postulated that bedside nurses were the most effective at reducing overall complication occurrences.

This article did not outline the exact education that the bedside nurses

received nor did they state whether an evaluation of their baseline knowledge was done. It is very difficult to understand the conclusions drawn by the authors with the information provided in the study and thus would need further research to support their conclusions.

Ngo and Murphy (2005) conducted a quantitative study to examine the effects of an intervention to increase nursing knowledge and self-efficacy on the rate of PICC occlusion and infection. The study was broken into five phases: a retrospective study on data six months before intervention as a baseline; the development of educational classes; the implementation of the classes over a year; a six-month collection of data on line occlusion and PICC placement after implementation; and, finally, interpretation of statistical data for the pre- and post-intervention. The researchers hypothesized that the education intervention would increase nursing knowledge and self-efficacy and thereby decrease the rate of infection and line occlusion. A ten-question test was given on central venous catheter (CVC) knowledge as well as a ten-item self-efficacy scale based on Bandura's social learning theory. The test and scale were given to the nurses' pre- and post-intervention. The intervention was the instructional video. The study contained 402 nurses, 91% being hospital nurses, 6% pediatric nurses, and 3% home-care nurses. The authors felt that this was a large enough group to effect patient outcome. The results of the post-test and self-efficacy scale showed an increase in both. There was also a PICC occlusion rate reduction from 29% to 8.5%. The authors felt confident that they had proven their hypothesis and that the

intervention had the further benefit of nurses being able to identify partial occlusion and act accordingly.

The limitations noted for this study was the lack of a control group. The authors had concerns regarding the rights of the participants as well as the inability to keep the groups separate. Another limitation noted was the close timeframe that the post-test was delivered. It would be interesting to see if a test delivered six months later would show knowledge retention.

Roslien and Alcock (2009) conducted a similar study to Ngo and Murphy (2005) with the examination of the effect of staff education on PICC complication rates. A pre-test, a post- test, a Likert scale and skill checklist were used to assess the knowledge and skill acquisition of participants. Eleven nurses participated and were given a test consisting of 22 multiple-choice questions. A confidence assessment with PICC management using a 4 point Likert scale consisting of 10 items that targeted nurses' confidence in PICC care was delivered, and finally the participants demonstrated skills in PICC site care during which they were assessed on 18 criteria. The nurses then participated in an educational intervention that included a lecture and a demonstration of PICC care. Immediately after the education session, the multiple-choice test and confidence scale were readministered. At three months, the test, confidence scale and skills demonstration assessment were repeated. The mean knowledge and confidence scores significantly improved immediately after the education and remained improved three months after. The participants mean psychomotor skills also significantly improved after the education intervention. Patient outcomes were not tracked but the authors identified the need to track this

in the future. The limitation to this study was the small sample size but reconfirmed Ngo and Murphy's results.

A quantitative study was conducted by Tian, Zhu, Qi, Guo, and Xu (2010) to examine the effects of five interventions on PICC complication rates. The interventions included a mandatory nurse reeducation developed by a multidisciplinary team, evaluation of PICC tip before removal of guidewire at insertion, use of specific solution for skin antisepsis, using maximum sterile barrier for insertion and care of PICC, and finally a PICC archive form was developed to ensure there was a PICC archive for each patient. The nursing education consisted of three 60 minute lectures by infection control physicians regarding the need for skin antisepsis and use of maximum sterile barrier to prevent line sepsis, a lecture by a surgeon on PICC anatomy, observation and diagnosis of PICC complications, and a lecture from a radiologist on determining the tip location of the PICC by chest x-ray. Data was gathered pre- and post-intervention with 65 PICC insertion patients pre-intervention and 165 patients with PICCs inserted after the intervention. All patients were from the adult oncology program. The data showed a decrease in complication rate of 62.14 % post-intervention. It is difficult with many interventions applied to understand which one had the greatest impact.

In this section I discussed four research studies that compiled evidence of the effect education can have on PICC complication rates. Each study on its own showed that increasing nursing knowledge and self-efficacy can reduce complication rates significantly and as a whole showed that the results could be generalized to a large

population. This reinforces the need for this project in ensuring we increase the health care teams knowledge regarding the care of PICCs.

Curriculum Development

In the initial sections of this project, I provided an overview of the theoretical lenses that guides my practice, this project, and also influences my teaching vision. I reviewed the literature that is the basis for developing a curriculum to assist the interprofessional team in caring for patients that require long-term venous access and how to care for these patients after a device is inserted. These components will also inform the next step, curriculum development.

Curriculum development is a process that encompasses many steps and includes a large amount of work in the development phase (Iwasiw, Goldenberg, & Andrusyszyn, 2009). The first step in development is to define the purpose or what you want to achieve. The purpose in this project for developing a curriculum is to increase knowledge and self-efficacy for the interprofessional care team caring for patients that require long-term venous access. The curriculum will be a mix of prescriptive and descriptive learning as described by Iwasiw et al.(2009). Prescriptive learning highlights the knowledge transfer of specific content and this would be the information gained from the literature search and communicated by traditional teaching methods such as lecture. The descriptive learning would include “stories to be heard...broad learning goals and ways we engage learners in authentic learning” (Tanner, 2004 as cited in Iwasiw et al., 2009, p. 4). This learning would include narrative, story-telling pedagogies. To bring awareness to the need for

vascular planning and engaging the patient and family in the discussion I have presented a narrative, Judy's story in Appendix D.

The first outline of this curriculum will reflect my personal style and teaching vision. The curriculum will change over time according to the needs of the different practice areas and experiences of the staff, as stated by Iwasiw et al. (2009), and it does not arrive fully developed, thus it will strengthen with each change. To be effective, the curriculum will also have to be context-relevant, responsive to learners, and fit with the current environment of the institution and community(Iwasiw et al., 2009).

Context-relevant curriculum

A context-relevant curriculum will reflect the internal and external factors of the environment. I will discuss these factors according to my institution. The internal factors reflect the mission and vision of the institution and will include the philosophies and goals. Internal factors also include the culture of an institution and are evident in the values, assumptions and behavior that are taught to new staff (Iwasiw et al., 2009). The institution's history and lessons can be learned with past successes and failures. Policy and procedures will have to be examined so that they will support a change in practice. Finally, the human resource factor will also be examined so that curriculum delivery can be supported as well as any practice changes as a result of this learning.

External factors will reflect the patient and staff demographics, experiences of other institutions, and professional practice standards (Iwasiw et al., 2009). The scope of practice of the health care team members will be considered when

discussing roles. Finally, I will examine the socio-political environment and recognition of the need for change.

Internal Factors.

Our institution is going through a massive shift and culture change with our new strategic plan. The mission statement of “outstanding care always” will be attained by changing the patient and family experience with innovative and collaborative approaches to care, knowledge, and leadership (Kingston General Hospital, 2011). This mission statement supports my development of a curriculum based on patient-centered care for interprofessionals to utilize evidence-based practice that improves the patient and family experience.

The philosophy of patient/family-centered care that is part of the strategic statement for our strategic plan is also in line with this project. Many institutions have aspired to be more patient-centered, and our institution has made some great changes to initiate this philosophy. The hospital currently has a patient advisory council and many of the hospital committees have patient advisors as members. This move to patient-centered care starts with a culture change from patient as client to creating partnerships (Frampton & Guastello, 2010). The basis for patient-centered care is to view patients as unique individuals, respecting values and beliefs, and responding to individual needs and preferences of patients (Poochikian-Sarkissian et al., 2010). This curriculum will reflect a patient-centered and learner-centered philosophy.

Along with patient-centered care our institution has also launched a collaborative care practice model in which collaboration with all health disciplines is

stressed (Kingston General Hospital, 2011). The goal of having an interprofessional education curriculum fits well with the institutions' model of care. Interprofessional education will be discussed further in this project.

The philosophical approach of constructivism is also incorporated in this project and is important to note. This approach will highlight the instructor's respect for the learner's base knowledge and experiences and understanding that no one learner will have the same approach to learning. This philosophical approach also encourages group interaction that will enable learners to connect and construct new knowledge (Iwasiw et al., 2009).

Current policies and procedures will have to be reviewed and updated to reflect not only a patient-centered approach but also include evidence-based information. The current policy does not attend to the differences in central venous catheters; it generalizes all care under the central catheter umbrella. In my opinion it misses important information that is relevant to each device.

Finally the human resources factor must be reviewed. Clinical educators are key people involved in this curriculum, as they will need to support ongoing education and policy application in their areas. The curriculum will change as learner feedback is gathered and the educators are in position to advise or initiate those changes. Policy changes will have to reflect scope of practice for the interprofessional team and leads to the external factors.

External Factors.

Patient demographics are an important external factor. The aging population, with many patients requiring long-term access over the age of 70, will require

attention to their specific learning needs (Hawes, 2007; Paterson, 2010). The interprofessional team demographics must also be examined as their learning needs and styles will differ. The method of using multiple pedagogies in the curriculum will address the generational learning difference and respect the experiences of this diverse group (Ironsides, 2003).

The interprofessional aspect of this curriculum must ensure that each group understands and functions with their scope of practice and follows individual professional standards (Iwasiw et al., 2009).

Interprofessional Education

Interprofessional collaboration occurs when two or more health care professionals from different disciplines work together (Lait, Suter, Arthur, & Deutschlander, 2011). Interprofessional education (IPE) involves educators and learners from different disciplines who create a collaborative learning environment (Dacey, Murphy, Anderson, & McCloskey, 2010). The goal of IPE is to develop the knowledge, skills, ability, and attitudes that increase interprofessional team competencies and ultimately improve patient care (Dacey et al., 2010). Frenk et al. (2010) declared the need for core competencies for health care professionals that are adapted to specific context and draw on global knowledge. They further agree that education must be informative, developing knowledge and skills and that it must be transformative, socializing learners around values.

Key to interprofessional education is understanding the roles and exploring the contributions and perspectives of each team member (Karin, 2011). Karin states that although there is a focus on content, how the content is taught is very

important. The team members must be given time to discuss traditional roles and how collaboration would improve patient care. Non-threatening learning environments, small groups, and experiential learning have been components to successful IPE (Curran, Sharpe, Flynn, & Button, 2010; Hollenberg & Bourgeault, 2011). A study by Curran et al. (2010) showed the importance of the social constructivist theory and the way it highlights the culturally shared ways of learning. It is the socialization process that develops roles, attitudes, and beliefs for each discipline. Exposure to interprofessional education opportunities may enhance the learners ability to collaborate effectively in an interprofessional team (Curran, Sharpe, Flynn, & Button, 2010). The benefit of using narrative, story telling pedagogies for IPE assists with understanding the different perspectives and roles of team members.

This curriculum will provide the opportunity for collaboration and discussion amongst an interprofessional team, but it cannot fulfill all the needs of a truly interprofessional curriculum. A two-day curriculum does not allow enough time to ensure effective group dynamics and an equal group mix that is necessary to facilitate IPE (Curran, Sharpe, Flynn, & Button, 2010). To have a successful IPE program you must also have organizational support and be experiential. Our organization is just in the early stages of implementing interprofessional care and thus all professions are not at the same level of acceptance of such a model. The integration of IPE must address pre-existing biases and traditional roles. It must deconstruct a culture of hierarchical perceptions of these roles and a two-day curriculum could only scratch the surface of this work (Karin, 2011). Our

organization has a strong culture of a paternalistic, hierarchical way of practicing. We are working to change this culture, but it will not happen quickly as we have many senior physicians that cling to this way of practicing. I was told recently by a physician that he determines how his clinic is run and how his patients are cared for. Fortunately many of the younger professionals have been exposed to some interprofessional education and appreciate the strength of an interprofessional team.

Course Outcomes

The course outline will include the expected curriculum outcomes. These outcomes can be described in many ways such as ends-in-view, goals, outcomes, or terminal objectives (Iwasiw et al., 2009). For the purposes of this project the term goals will be used. Please see appendix C for course goals and objectives.

Goals are broad statements that describe the expected end point for graduates of the curriculum. These goals reflect the theoretical approaches used in the curriculum. Specifically they will reflect a patient-centered approach and interprofessional collaboration. The health care team will provide an environment that respects the patient's individual needs and preferences. The team will be able to use the strengths of each member to ensure outstanding patient care. The team also understands that patient teaching must be personalized to the learning needs of the patient and their family and that knowledge is built upon existing experiences (Ursel & Aquino-Russell, 2010).

The goals will also reflect the cognitive and psychomotor skills that arise from evidence-based practice. The learners will be able to review the different

vascular access devices available and the recommended devices for each patient's treatment and lifestyle needs. The team will be able to discuss the insertion process to the patient and the care required for each device. The nurse will be able to apply the evidence and best practices while caring for patients and the device. This includes specific flushing practices and dressing requirements.

Future Recommendations

In this project I outline the steps to building a curriculum for evidence-based practice as it relates to vascular access and provide the first draft of a curriculum. This curriculum will need to be refined with the input of the clinical educators from different specialties and professions. The next step would be to do a qualitative research study to understand the patient and staff perspectives on current practice. This will provide a base for change management as we move to evidence-based, patient-centered, and interprofessional collaboration. A quantitative study could then be undertaken in which the researcher would access Imaging Services records to collect the retrospective data. The data would include venous access device requests and date of insertion, number of devices replaced, and the reasons for replacement. This information would reflect the wait time for devices and the complication rate of the devices.

Implementation of the best practice guidelines for vascular access devices (Registered Nurses Association of Ontario, 2004, 2008) would include the development of the curriculum as outlined in this project. The curriculum would be done in collaboration with the clinical nurse educator for oncology, oncologists, and pharmacists and would be given to the teams in the Cancer Center and inpatient

oncology. I decided to start with the team from the cancer center because of their experience as a collaborative interprofessional team, and the oncology patient population usually require long-term venous access for treatment (Wells, 2008).

Once the education has been delivered and the best practice guidelines have been initiated it will be important to study the effects these guidelines have on patient care and complication rates. Complication rates and device reinsertion rates need to be reviewed to see if we are able to reduce these by increasing knowledge and self-efficacy. Research regarding staff and patient satisfaction should be repeated and the wait times for device insertion reviewed. This may be the springboard to initiate a nurse-led PICC team in the institution.

Conclusion

The 2011 strategic plan for both the hospital and the Cancer Center identified the need for a patient-centered approach to care (Cancer Care Ontario, 2011; Kingston General Hospital, 2011). Vascular access planning is an important area to explore this approach and patient satisfaction surveys for Cancer Care Ontario identify the need to have greater patient involvement in treatment decision-making (Cancer Care Ontario, 2010). With evidence-based practice and interprofessional collaboration we can improve patient and family care by initiating vascular planning early in treatment, involving patients and their family members, where relevant, in decisions regarding the device choice. Educating both the team and the patients and their family members will reduce complication rates and interruptions in treatment. This project lays the foundation for the development of an education workshop for the interprofessional team to increase knowledge and self-efficacy and

implementation of the best practice guidelines for vascular access devices (see appendix C). Each team member and patient brings with them experiences, values, beliefs and experiences that must be respected to facilitate knowledge transfer. The most important reason for this project is to ensure that patients like Judy are involved in treatment decisions and have access to all the information they need to make informed decisions. We may not be able to rewrite Judy's story (see appendix D) but Judy has generously allowed us to learn from her.

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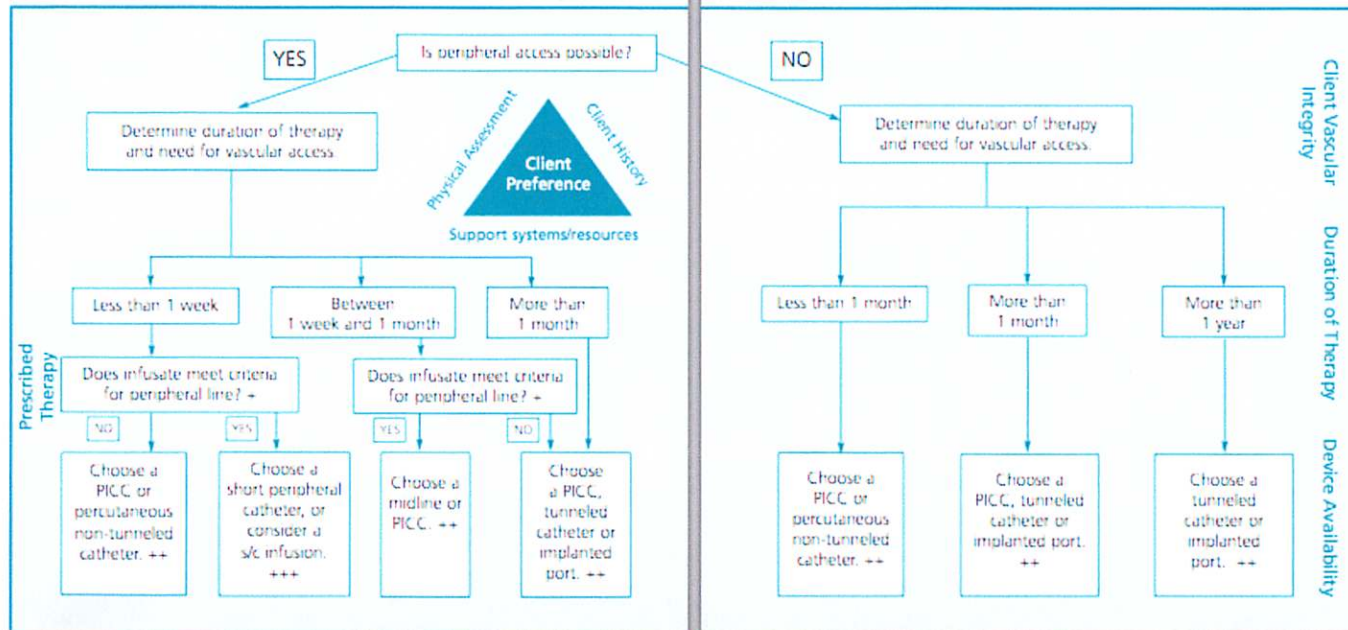
Appendix A

An Assessment and Device Selection Algorithm

(Registered Nurses Association of Ontario, 2004)

Appendix D: Assessment and Device Selection Algorithm

Reprinted with permission. Adapted from: Hademan, J. (2003). Selecting a vascular access device. *Nursing*, 20(1), 59-61.



- **Infusate criteria for use in peripheral infusions:**
- Osmolality must be less than 900 mOsm/L.
 - The pH must be between 5 and 9.
 - The medication must not be a vesicant or irritant.

- **Catheter lumens:**
- Consider the need for single or multilumen catheter to deliver the prescribed therapy.
 - Select the least number of lumens to deliver the required therapy.

- **Considerations for subcutaneous infusions include:**
- Irrigations, intermittent infusions, and continuous infusions of isotonic fluids and a few selected medications.
 - Assessing for this mode of therapy with some client populations.

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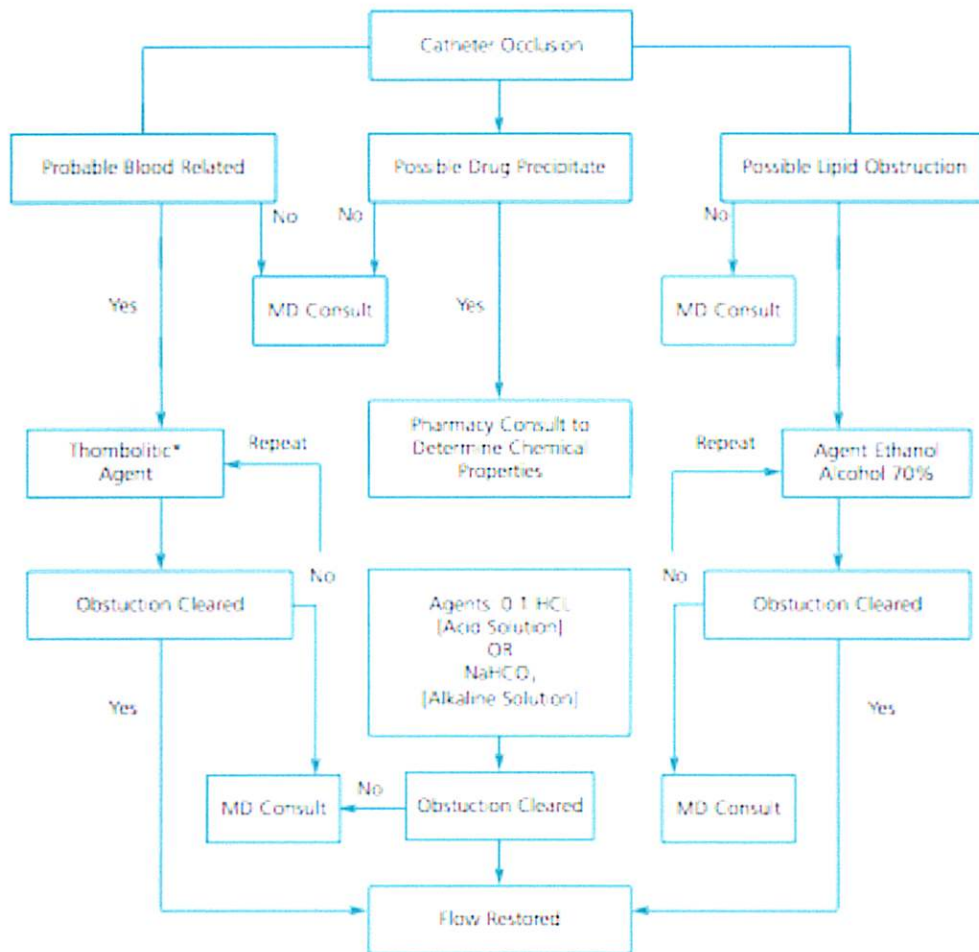
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Appendix B: Algorithm for Troubleshooting Occlusions

(Registered Nurses Association of Ontario, 2008)

Nursing Best Practice Guideline

Algorithm for troubleshooting catheter occlusion



Source: Hamilton Health Sciences Centre IV Team (2002). Algorithm for troubleshooting catheter occlusion (Unpublished document). Hamilton, Author. Adapted with permission.

***Alert: Nurses require a medical directive or direct client order prior to instilling thrombolytic agents, 0.1 HCL [Acid Solution], NaHCO₃ [Alkaline solution] or Ethanol Alcohol 70%. Consult with MD.**

Appendix C

Interprofessional Workshop for Vascular Access Devices

Workshop Syllabus

Prerequisites:

- Care for patients requiring or have a vascular access device
- Interprofessional member of the Oncology Program (pharmacy, social work, nursing, and medicine)

Course Description

This is a two-day course for an interprofessional group to learn evidence-based information to guide in the care of patients, and their families, who have, or require, a vascular access device. The purpose of this course is to familiarize the participants with evidence based, person-centered approach to the care of patients and families regarding vascular access. This course will promote an interprofessional collaboration to provide patient/family-centered care. Teaching and learning in this workshop will utilize Parse's theory of humanbecoming, constructivist theory, and narrative pedagogy to respect the lived experiences of each learner.

Course Goals

The goal of this course is to provide participants with an evidence-based approach to improve person's experiences of vascular access planning and the need for long-term vascular access. The focus of this care will be patient- and family- centered.

Course Objectives

Upon completion of this course, learners will have an understanding of:

- Best practice guidelines for vascular access;
- Interprofessional collaboration and the roles of team members;
- Constructivist teaching and learning to assist with patient education;
- Patient and family-centered care.

Course Process

The delivery of this course will be in two parts. The first part will be theory-based and delivered in a small group setting. To ensure this, the course will be offered at different times. The class will have no more than six students and will have a mix of disciplines. The instructor will respect the fact that most students will have varied experiences to share with different context. Discussion will center on the theory and evidence-based practices and how to apply them in a patient-centered way. Sharing of experiences, so that the less experienced students may learn, is encouraged. The goal will be to understand the changes in practices.

Part two of the course will be hands on simulation of techniques for caring for devices. The experienced health care professionals will be partnered with the novice health care professionals and will serve as a resource for continued practice. Shared experiences are encouraged and will enhance the learning environment.

The evaluation will be in written format using a Likert scale for the evaluation of the learning experience from most effective to least effective and an opportunity for narrative feedback. The evaluation is mandatory for completion of this course. This is the first time this course is delivered, and to ensure the needs of the learners are met and to inform course development I have made evaluation part of the course.

Resources

Registered Nurses Association of Ontario. (2004). Assessment and Device Selection for Vascular Access. *RNAO Nursing Best Practice Guidelines*, from <http://www.rnao.org/Page.asp?PageID=924&ContentID=718>

Registered Nurses Association of Ontario. (2008). Care and Maintenance to Reduce Vascular Access Complications. *RNAO Nursing Best Practice Guidelines*, from http://www.rnao.org/Storage/39/3381_Care_and_Maintenance_to_Reduce_Vascular_Access_Complications_with_2008_Supplement.pdf

Course Schedule

Day 1

| Time | Topic | Facilitator |
|-----------|---|-------------|
| 0800-0850 | Introduction to interprofessional collaboration and education | |
| 0850-0910 | Break | |

| | | |
|-----------|--|--|
| 0910-1100 | Interprofessional role discussion | |
| 1100-1200 | Why Evidence-based practice | |
| 1200-1245 | Lunch | |
| 1245-1400 | Best practice guidelines for vascular access | |
| 1400-1415 | Break | |
| 1415-1600 | Discussion of guidelines and how it fits with current practice | |

Day 2

| Time | Topic | Facilitator |
|-------------|---|--------------------|
| 0800-0915 | Principles and Theory Guiding patient/family-centered care | |
| 0845-0915 | Discussion of current practices | |
| 0915-0930 | Break | |
| 0930-1015 | Patient/family Education | |
| 1015-1200 | Implementation of new practices, discussion and planning | |
| 1200-1245 | Lunch | |
| 1245-1400 | Skills lab for device care | |
| 1400-1415 | Break | |
| 1415-15:30 | Questions and Evaluation | |

Appendix D

Judy's story

Judy⁷ is a married, 42-year-old mother of two children, Katie, 8, and Davy, 5. Judy works in imaging services as a medical radiation technologist with many friends in the medical field. Judy's medical journey began with symptoms of bloating and change in bowel habits. After waiting for many months she finally went to her family physician for assistance. Judy was promptly booked for a colonoscopy that showed extensive colon cancer. I was not only a coworker of Judy's, but also a family friend and thus privy to her story. It is with her permission that I relate her story. This story also includes a composite of many patients that I cared for over the years.

Judy had not required repeat venous access up until this point in her life. Like most women, Judy had blood work done occasionally and had intravenous access only during childbirth. When she arrived for her colonoscopy, Judy required an intravenous. The nurses had a difficult time finding a site. The nurses tried three times to cannulate her vein for this procedure.

Judy was booked quickly for a colon resection in hopes of removing most of the cancerous tumor. She was told that she would be in hospital for at least a week requiring intravenous therapy for most of that time. No venous access planning was discussed with Judy even though Judy expressed some concern over the previous difficulty of accessing her veins for infusion during her colonoscopy. Again, it took three attempts to start Judy's intravenous pre-operatively.

⁷ The names and other identifying information have been changed to protect the identity of the individuals.

In the post anesthetic care unit (PACU) Judy's intravenous became interstitial and was restarted. I happened to be looking after Judy at this time working as a float nurse between interventional radiology, endoscopy, and PACU. Over the last few months I had been concerned with the lack of venous access planning in the hospital. I looked at Judy's arms and noticed many bruises from past experiences of nurse's attempts to cannulate her veins. I asked her physician if an access device was discussed with her. He stated firmly, and to my disappointment, that this would not be discussed until she required chemotherapy. Many misconceptions of vascular access devices were expressed during that conversation with the physician and residents in the room. The physicians felt that there was a limited resource for inserting vascular access devices and that a device should be used as a last resort. There was also a general feeling that the complications for devices far outnumbered the benefits. Judy required four more intravenous restarts during her hospital stay.

Judy required chemotherapy, and I discussed with her the issue of vascular planning and encouraged her to ask her care team for their thoughts. Judy was told that they would arrange for a PICC insertion. She did not have a discussion regarding the best device for her and her lifestyle nor did she feel she had input into the discussion. Knowing that Judy was a busy mother of two and enjoyed swimming I thought that she should have been offered a venous port instead. I did not mention this to Judy until her PICC "fell out" possibly due to the inadequate securing of her dressing. Her dressing was not adhering to her skin well as she was a very active mother. When we discussed the possibility of a venous port she then went back to her care team to ask them about this option.

Judy had a venous port inserted but unfortunately things did not go smoothly with this device either. Her port became infected and she required a repeat insertion. Knowing the literature that indicates that 'line' infections are frequently misdiagnosed, I still wonder if she truly needed to have this removed.

Judy is now a palliative care patient and receiving end of life care. I went to visit her in her room when she was receiving a potassium infusion via a peripheral line. She had a functioning port but it was not accessed. She was in tears because the pain in her abdomen was not well controlled and now her arm was burning due to the potassium infusion. The nurse had not accessed her port because she was not certified for this procedure and was not aware of the resources she could call for this to be done. I accessed Judy's port, we got the palliative care physician in to order medications to improve her pain care , and finally, Judy was able to rest.

Judy has made many repeat visits to the hospital for her venous access issues that has taken time away from her family and decreased her quality of life for that period of time. We could have done a better job at caring for Judy. As I witnessed all that Judy went through I knew that I needed to change the way we care for patients needing long-term venous access.

Appendix E

Judy's Story: A patient-centered version

We will pick up Judy's story at the point where she has had three attempts to start her intravenous for her colonoscopy. Let us assume that the interprofessional team had attended the workshop and were better able to understand how to assist patients with vascular planning and could apply best practice guidelines.

The nurse engages Judy in a conversation regarding her vascular access challenge that day and to see if this has been an issue in the past. The nurse will help Judy to explore possible reasons for her vascular depletion and ways of combating it in the future. The nurse can suggest that if Judy requires an intravenous (IV) in the future that she ensures she is well hydrated in the period before the procedure and her "nothing by mouth" period. She can also suggest that Judy keeps her limbs warm before the IV is started.

Judy then comes in the day of her surgery with a warm sweater on her arms and informs the nurse that IV starts have been a challenge. Using a patient-centered care approach the nurse asks Judy where she had noticed veins in her arms and does she have a preference for placement. The nurse then warms Judy's arm with a warm towel to ensure that the vein is visible for puncture. Judy has an uneventful IV start this time and the care team is aware that Judy does have some vascular access challenges.

Judy and her family are informed of her diagnosis and the need for her to see an oncologist for possible chemotherapy. Judy is then given information regarding venous access devices and starts a discussion with her health care team of her

choices. She is able to look over the information with her family and write down questions she has regarding the choices.

When Judy has her consult appointment in the Cancer Centre the nurse is able to further discuss Judy's lifestyle and vascular access needs with her. Together with her husband they decide that a venous port is the best choice for her and plans are made for the insertion. There is a delay in the insertion of a venous port and Judy decides to have a PICC inserted temporarily as she requires a continuous infusion of chemotherapy. Judy understands the care that this device requires.

Judy arrives with a possible line infection in the emergency department. The staff is aware that she needs to have both catheter and peripheral cultures to decide if it is truly a line infection. Fortunately they were able to prevent a reinsertion, as it was deemed not a line infection. Judy had reduced the number of visits to the hospital, and because of the excellent knowledge base of the staff, many issues were avoided.

Judy then has her port inserted, and she is then able to swim and play with her children without the external reminder of her disease that she felt the PICC signified.

When Judy was admitted for pain control and a potassium infusion the nurse was aware of the resources to call so that Judy's port could be accessed and used. Judy did not have to experience painful venipuncture and she was able to initiate treatment and IV pain medications immediately.

The changes in Judy's care may be small but for a patient experiencing these problems they have great impact. Learning to discuss vascular planning with

patients and understand the decisions patients make need to be supported by their care team. Best practice can be applied to improve patient care and outcomes when interprofessional collaboration occurs.

| Appendix F | | |
|------------------------------|--|--|
| Summary of Literature Review | | |
| Key Themes | Author and Date | Type of article |
| Vascular Planning | Chernecky (2001) | Mixed method study using a convenience sample |
| | Goossens, Vrebos, Wever, & Frederickx (2005) | Prospective subjective study of patients having a vascular access device |
| | Barton, Danek, Johns and Coons (1998) | Randomized control study |
| | Hadaway (1999) | Practice recommendation |
| | Halderman (2000) | Practice recommendation |
| | Hamilton (2000) | Expert opinion paper |
| | Hamilton (2006) | Expert opinion paper |
| | Masoorli & Angeles (2002) | Expert opinion paper |
| | McGowan & Wood (2008) | Expert opinion paper |
| | Sansivero (2010) | Expert opinion paper |
| | Scales (2010) | Expert opinion paper |
| | Wells (2008) | Expert opinion paper |
| PICC Insertion | Cardella, Cardella, Bacci, Fox and Post (1996) | |
| | Gamulka, Mendoza, & Connolly (2005) | Quantitative study |
| | Oakely, Wright, & Ream(2000) | Qualitative study |
| | Robinson, Morgensen, Grudinskas, Kohler, & Jacobs (2005) | Quantitative study |
| PICC complication | Funk, Gray and Plourde (2001) | Quantitative study |
| | Ngo and Murphy (2005) | Quantitative study |
| | Roslien & Alcock (2009) | Mixed method study |
| | Tian, Zhu, Qi, Guo, & Xu (2010) | Quantitative study |

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