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DYNAMICS
The Official Journal of the Canadian Association of Critical Care Nurses

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It is hard to believe Dynamics 2007 is OVER! One of the challenges that I face, after attending Dynamics is to sustain the enthusiasm and positive energy that is generated and to carry that forward into my everyday life. This year, Joy Mintenko and her conference committee of Francis Loos, Lori Garchinski, Judy Nixon, Marian Hutchinson, Shirley MacGowan and Gina Mustard brought us a program that helped us explore the “Fields of Change” that are affecting the landscape of critical care today. We were able to honour our colleagues who continue to do remarkable work on behalf of patients, families and nurses. We presented Brenda Morgan with the inaugural “Brenda Morgan Leadership Award” to celebrate her outstanding contribution to critical care nursing and CACCN. Kaaren Neufeld challenged us to “Imagine” the impact of nursing and urged us to become effective leaders. Marlene Smadu encouraged us to continue to advocate and find our voices, Lynne Mitchell Pederson inspired us to find our own personal mountains and to climb them and Darcy Lang reminded us to focus on the positive. Throughout the conference, we heard from ordinary nurses who told us of the extraordinary work they do. We were refreshed, excited, entertained, challenged and exhausted! And then we went home.

In our everyday life, we are faced with people who inspire us and people who can drag us down in seconds. How do we, on a daily basis, remember to focus on the 90% of what is good? I know that personally, within minutes of landing, I was faced with parent-teacher interviews and the issues surrounding that event, school issues, kid issues, house issues and everyday life. It struck me that Dynamics is a fantasy world. Like Disney. BUT, like Disney, I think the magic can be everywhere. I found that I immediately turned my everyday life into blessings. How lucky am I? I have children. They have access to education, their teachers and all the grown-ups around them care about them. I have a house and I have people who love me. So I have a leaky roof? I have a roof! That was easy…but is it sustainable?

I had to go to work the next day. I was immediately hit by the routine of everyday and made the decision to focus on the 90%. Perhaps those around me think I am naïve, or crazy, but I have the choice to be happy, to be positive, and to hope for better. I can dwell on that which frustrates me, or I can choose to advocate changing those things or my response to them. I can climb those mountains and I can imagine a world where nurses make a difference every day. “People say I’m a dreamer, but I’m not the only one” (John Lennon, Imagine, 1971).

As CACCN is entering its 25th anniversary year, I challenge each and every one of you to find the silver lining that surrounds your clouds. Each time you climb your mountain, imagine the (imaginary) reporters asking, “What will you do next?” and your (imaginary) answer: “I’m going to Dynamics ’08”! It is going to be a great silver anniversary year as we celebrate critical care nursing in Canada.

Happy 2008!
Asha Pereira
President

Omission
In the last issue of Dynamics, we recognized all CACCN members that obtained their CNCC(C) or CNCCP(C) designation. One person was mistakenly left off that recognition list:

Helen Pappas, Woodbridge, ON —
Initial Adult Certification CNCC(C)

We apologize for the omission.

In Memoriam of a Colleague

The CACCN board of directors would like to express sympathy to the family and friends of Marg Zanin who passed away recently. Marg was a founding member of the CACCN. She was the president of the National Society of Critical Care Nurses based in Toronto (a chapter of AACN) and was instrumental as one of two presidents who spearheaded the merger of the Toronto Chapter and the Welland Chapter in 1985 to create the new Canadian Association of Critical Care Nurses. At this time, we would like to recognize and acknowledge her vision for a national voice for critical care nurses and the legacy of leadership that she leaves behind today. CACCN will remain as enduring evidence of her vision and passion for critical care nursing.
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www.southlakeregional.org
In this issue of *Dynamics: The Official Journal of the CACCN*, we are pleased to publish three articles. The article by Matheson and Sawatzky addresses an interesting phenomenon we may not always consider: the altered fever response to infection experienced by patients with end stage renal disease. The authors provide an excellent review of the normal fever response and the reasons for patients not presenting with this common sign we look for to indicate infection. This has many implications for our nursing practice.

In the next article, Nickle describes an innovative mentorship model based on the concept of cognitive apprenticeship. Nickle begins by identifying the learning theories that inform this approach to professional development and concludes with select recommendations for implementation of a mentorship program within the ICU.

There has been some debate about whether critical care nurses require ACLS certification. In this article, Hagyard-Wiebe reviews the literature on patient outcomes when nurses are ACLS certified, and the retention of theoretical knowledge and skill competency. Hagyard-Wiebe takes the position and argues that critical care nurses should be certified and institutional authorization or standing orders should be in place to allow certified nurses to practise to their full scope.

Finally, we are pleased to again offer you our regular columns: Research Review, ISMP Canada, and the Canadian ICU Collaborative.

**Paula Price, RN, PhD**
**Clinical Editor**

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**From the clinical editor**

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**Paula Price, RN, PhD**
**Clinical Editor**

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**Question to the Board**

How do I write an abstract for submission for a Dynamics presentation?

**CACCN response:**

Every year there is a call for submission of abstracts for consideration for an oral or poster board presentation at the next Dynamics conference. Over the years there have been many critical care nurses who have had the opportunity to share their experience, expertise and knowledge at Dynamics by having their abstract accepted for oral or poster board presentation. But we also know there are many more nurses who could potentially present, but who may be not confident on what is expected in an abstract submission. The good news is that writing an abstract is a lot less onerous than you would think.

An abstract is intended to be an overview of the content you will cover in a full presentation, but you do not have to have the whole presentation completed in order to write the abstract. In fact, you are limited to only 400 words when submitting the abstract for Dynamics, so you must learn to be succinct while still highlighting the content you will cover well enough so the abstract reviewers get a sense of the purpose of the presentation you wish to make. It is very important that you take note of the “theme” of the conference each year and link your abstract to this theme so the reviewers can appreciate the “fit” with the conference theme. In 2008, the theme for Dynamics is “Celebrating 25 years of Critical Care Advocacy: Past, Present and Future.”

Writing an abstract for consideration for Dynamics presentation is different than writing an abstract of an article. The latter is intended to summarize the contents and findings of an already written article. Writing an abstract for consideration for presentation at the Dynamics conference requires more of a “story” approach. You introduce your topic, provide an overview of the main points you will cover, link it to the conference theme and provide a “hint” of how you will deliver the presentation. For example, you may highlight the manner in which you will engage your audience during the presentation. Coming up with a catchy title weaving in an aspect of the conference theme may assist the reviewers in getting a sense of your creativity in addition to attracting people to your presentation when they review the concurrent sessions they may want to attend.

You also need to consider your ideal preferred format for presentation. Is your material best suited to a poster board format or an oral presentation either in the form of a concurrent session or even a larger, plenary session? Generally, plenary format must be topics suited to a broad interest of the conference participants (Dynamics conferences generally have 400 to 450 attendees) while concurrent sessions attract smaller numbers of people who have a specific interest in the specialty topic on which you are speaking.

The range of topics you could consider presenting at Dynamics is varied. Nurses love to share their stories and, in sharing our stories, we also share our experience and knowledge on a vast range of critical care nursing topics. Some of the most popularly attended sessions are based on an interesting patient case that you cared for in your unit that can form the basis of your presentation. Quality improvement projects, research, or learning events that you may have been involved in are all topics that would be valued at Dynamics.

Your abstract must be submitted by January 31 each year for consideration, and the requirements for format are outlined in the Call for Abstracts. Once submitted, your abstract will be forwarded to a committee that will conduct a blind review, which means they will not know who submitted the abstract until after the selection process is completed. You will be notified by April 1 if your abstract has been accepted, which means that you will then have about seven months to fully develop your poster board or oral presentation, giving you plenty of time to create it and refine it prior to coming to the conference!

Judy Nixon, a member of the Dynamics 2007 conference planning committee has put together an outline of an approach to getting going in the form of “Helpful Hints” which are:
1. Start early.

2. Find a mentor to brainstorm with and direct you along your path. This can be someone who has presented before, an educator or nursing colleague.

3. Choose a topic you are familiar with and are interested in learning more about. This will help to keep you motivated.

4. Do not make the topic too complex. Remember, if you want to learn more on a topic as a critical care nurse, often there are others like you who want to learn.

5. Case studies that relate to patients you have cared for are always well-received, particularly if new or unusual care has been carried out.

6. Talk to colleagues to determine if your topic is an area of interest to others.

7. Make friends with a librarian who can assist with your literature search.

8. Read references and get a feel for the topic to determine if there is adequate information available.

9. Draft an outline of what you hope to accomplish. This will help with the final abstract submission.

10. Think of a catchy title. This is where your coffee break or creative colleagues can help out, e.g. proning could be “Bottoms Up!” Or one on propofol could be “Wake Up Little Snooze.” The title should always relate to the content you will be discussing.

11. The abstract submission should include:
   a) Presentation title
   b) Describe what you hope participants will gain from your presentation and how it will affect their practice
   c) Presentation objectives
   d) Reference list consisting of key articles from the last five years, unless there are older classic hallmark articles.

12. Critique of your abstract submissions should answer the following questions:
   a) Is it easy to understand?
   b) Does the content flow logically?
   c) Is the purpose clearly stated?
   d) Is the content concise?
   e) Is it within the maximum number of allowed words (400)?
   f) Is the grammar and spelling correct?

13. If you have answered yes to all the above questions, ask some colleagues to critique it based on the questions and make any changes.

14. Now you are ready to submit your proposal!

This year, the Dynamics 2008 conference planning committee would welcome you as a first time presenter or a seasoned veteran. All you need to do is put your thoughts to your computer and forward the abstract by the January 31 deadline! C’mon, you can do it!

Kate Mahon, Director, Eastern Region and Judy Nixon, Member, Dynamics 2007 Planning Committee

Reference
Chapters Connections Day, October 20, 2007, brought together the chapter presidents (or their delegate), from across Canada for a pre-conference planning day with the national president, board of directors and the national office administrator. The opportunity each year for the chapters to get together in one room for a day always produces lively discussion, sharing of experiences and ideas, and a renewed commitment to the mission and vision of CACCN. From the opening fun warm-up exercise, requiring each table to envision and demonstrate other uses for everyday objects they selected, the enthusiasm in the room was palpable. Ingenuity and imagination are the hallmarks of critical care nurses in everyday practice, so it was not at all surprising to see some of the “alternate” uses the groups came up with for their items. This exercise filled the room with laughter – an excellent way to start the day.

The business of the day included an update on board activities with the president and each director reporting on the work and accomplishments of the past year within their portfolio. National Office Administrator, Gina Mustard, orientated the group to the support her role can offer to each chapter in facilitating the development of chapter website links on the CACCN website (www.caccn.ca). In addition, Gina walked us through resources available on-line to assist the chapters in managing their activities. Expectations and tools for reporting of chapter financial information and quarterly and annual reports were also reviewed. Then each chapter had a chance to report on: a significant accomplishment, something they were proud of and to articulate if they had a magic wand, what they would hope for in the coming year. This led to some great dialogue between chapters on some of their more successful endeavours. Our newest chapter, New Brunswick, with 12 members, represented by Brenda Gallagher, was able to gain valuable perspectives and support from colleagues across the country sharing ideas to assist in recruiting new members. Everyone was delighted to hear that the national board is allocating $300.00 per chapter, as a grant to support activities over the coming year for the recruitment and retention of members. We look forward to next year hearing how the money assisted the chapters in accomplishing their goals.

After a pleasant lunch where networking and enthusiasm remained high, President Asha Pereira led the chapters and directors through a strategic planning exercise designed to identify priority goals for CACCN over the coming year. The board was delighted when the group identified the same priorities as they had in the spring with recruitment and retention and advocacy strong goals for which to strive. Recognizing that everyone is time-challenged to accomplish the work to achieve identified goals, Asha used a fascinatingly simple set of questions to help the group focus in on how we could achieve major impact with the least amount of effort. She challenged the group with the questions: “How would you explain our issue to an outsider? How would you solve the problem if money were no object? What if you did the opposite? What if you did nothing?” Asha highlighted some of the things that the board is doing to reach these goals: Critical Connections newsletter, enhancing the CACCN website, developing a membership survey, being voting members of the Canadian Patient Safety Institute and Safer Healthcare Now!, regular dialogue with the Canadian Nurses Association, providing $300 to each chapter to use towards their priorities, the Silver Anniversary Challenge to have each chapter increase its membership by 25%. In addition, the theme for Dynamics 2008 is about advocacy.

As the day ended, the feedback from the group indicated that the day is appropriately called “Chapter Connections.” All agreed it was time well spent together and left the room brimming with enthusiasm and ideas to take back to their chapter members.

Kate Mahon, Director, Eastern Region
Elaine Rose, President, Calgary Chapter

Awards Available to CACCN members

Criteria for awards available to members of the Canadian Association of Critical Care Nurses are published on pages 38–42 of this issue of Dynamics.

CACCN calendar of events

DATES TO REMEMBER!

January 15, 2008  Deadline for Spacelabs Innovative Project Award
January 31, 2008  Deadline for abstract submissions for Dynamics 2008 in Montreal
January 31, 2008  Deadline for Smith’s Educational Award
February 15, 2008  Application deadline for CACCN Research Grant
March 1, 2008  Deadline for BBraun Mentorship Award
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Dynamics 2007 Report

Dynamics 2007 was held in Regina, Saskatchewan, October 21–23. The conference theme was Fields of Change in Critical Care. Our brochure depicted a gorgeous autumn prairie scene with all the changing colours of nature. It reminded me that like many of my colleagues across Canada, I am in the autumn of my career. But this is nothing to be sad about. Autumn is my favourite time of year! The weather (or temperament) is more stable, the scenery (or outlook on life) is spectacular and there are a lot fewer bugs. But we must be careful that as we prepare to retire from this career of nursing, we have sown the seeds for the next generation of critical care nurses. Dynamics 2007 had presentations that taught us to “Mentor the Novice on their Journey to Expert Nurse” and to not eat our young with “Horizontal Violence”. We will need these nurses to care for us should we ever have to enter an ICU as a patient in the future.

We have seen fantastic changes in our ICUs over the past years. The plenary and concurrent sessions reflected some of these changes and also some things that never change in a nurse’s life. We got “Back to Basics” to prevent ventilator-acquired pneumonia, looked at controversial issues like non-nurses working in the unit and “Donation after Cardiac Death.” We were fortunate to get a preview of all the new technology and equipment from our exhibitors while asking questions of them about the application in our practice settings.

The Dynamics 2007 keynote speakers were an interesting blend of nursing politics, challenges and inspiration. They brought a prairie influence to the keynote plenary sessions that really reflected on all of Canada’s nurses.

Every province in Canada was represented by the near-400 delegates. Dynamics 2007 brought colleagues together to provide a forum to share ideas and experiences. The networking continued into the evening at the annual dinner where we were entertained by Bobby Bruce, a Neil Diamond tribute singer. It seems that most nurses across Canada know all the words to “Sweet Caroline” and aren’t afraid to sing them!

I would like to thank the members of the Dynamics 2007 conference committee: Lori Garchinski, Marian Hutchinson, Francis Loos, Shirley MacGowan, Judy Nixon and Gina Mustard. Without these dedicated hardworking individuals, Dynamics 2007 could not have achieved the success that it did. There may be Fields of Change in Critical Care, but there will always be critical care nurses that care enough to ensure the succession of our profession.

Joy Mintenko
Chairperson, Dynamics 2007

DYNAMICS 2008 - CALL FOR ABSTRACTS

Abstracts are currently being accepted for oral and poster presentations for Dynamics 2008, to be held in Montreal, Quebec, September 28-30, 2008. Topics of interest include clinical reviews and research, innovative projects and solutions, and ethics. All submissions must be evidence-based and ideally address the conference theme: “Celebrating 25 Years of Critical Care Advocacy. Past, Present and Future”.

Abstract submission guidelines

Submissions for Dynamics 2008 will be accepted as:
- Hard copy and CD ROM (Word) OR e-mail and attached files (Word)

Submissions must include the following:
- **Abstract**: maximum 300 words, include only title and abstract (do not identify author(s) on abstract)
- **Reference List**: reference list in APA format (maximum 2 pages)
- **Presentation Information**: (separated from the abstract and references)
  - identify preferred format of presentation (oral or poster)
  - list names of all authors
  - provide contact information for first author including: name, fax number, mailing address with postal code, home and work telephone numbers, and e-mail address
- **Presentation experience**: (frequency, location of presentation, audience size, evaluation summaries and references)

Important note
- Only completed submissions received by midnight, January 31, 2008, will be considered.
- All correspondence will be with the first author only.
- One presenter for each accepted abstract will be entitled to a discounted tuition.
- All other expenses are the responsibility of the presenter(s).
- Notification regarding selection decisions will be provided by April 1, 2008.
- Abstracts accepted for presentation at Dynamics 2008 must not be presented at a national or provincial level for a period of 12 months prior to, and/or six months after Dynamics 2008. Abstracts are the property of CACCN during this period of time, and may be published in Dynamics, The Official Journal of the Canadian Association of Critical Care Nurses.

Please Send Submissions To:

Dynamics 2008 Abstracts,
CACCN, PO Box 25322,
London, Ontario N6C 6B1
or e-mail: caccn@caccn.ca (with file attached)
Telephone: (519) 649-5284
Fax: (519) 649-1458
Awards presented at Dynamics 2007 — Regina, Saskatchewan

Sorin Group Chapter of the Year Award
Saskatchewan Chapter

Spacelabs Innovative Project Award
Jannell Plouffe, Winnipeg, MB
“The Solar System of Safety”

Edwards Editorial Award
Christina Hurlock-Chorostecki, Cathy Kielb, London, ON

3M Editorial Award
Susan Mertin, Jo-Ann Sawatzky, William Diehl-Jones, Trevor Lee, Winnipeg, MB

Smiths Medical Education Awards
Karen Palmer, London, ON
Bernice Budz, Vancouver, BC

Baxter Guardian Scholarship for Excellence in Patient Safety
Patricia Hynes and co-investigators: Steve Ramganesh, Lisa Burry, Andrew Wylie, Jocelyn Bennett
“Independent double check – A survey of Canadian ICU nurses,” Mount Sinai Hospital, Toronto, Ontario

Gina Souliere
“Enhancing patient safety by reducing antibiotic resistant organisms (ARO) through a collaborative approach,” London Health Sciences Centre, Victoria Hospital, London, Ontario

BBraun Mentorship Award
Jennifer Lewis, IWK Health Centre, Halifax, NS
Nominated by: Susan Roper, Denise MacIntyre, Nicole Lewis

CACCN Research Grant
Jannell Plouffe, Winnipeg, MB
Co-Investigators: Kim Fraser, Helen Cooper, Susan Launder
“The health care providers’ perceptions of family presence in pediatric resuscitation.”

Brenda Morgan Leadership Excellence Award

The inaugural Brenda Morgan Leadership Excellence Award was presented to Brenda Morgan of London, Ontario, right, by CACCN President Asha Pereira.

CNCC(C) and CNCCP(C) Draw Prize Award Winners ($250 each)

Adult Initial Certification
Leah Johnson, Edmonton, AB
Rhonda Matheson, Winnipeg, MB
Nathalie Goulet, Saint Lazare, QC

Adult Re-certification
Angela Ryan, Maxville, ON
Moira McNeill, Toronto, ON

Pediatric Initial Certification
Lindsay Hyslop, Hamilton, ON
Isabelle Hubert, Montreal, QC
Sandy Rolfe, Langley, BC

Pediatric Re-certification
No CACCN member names to draw

Congratulations to all award and draw winners!

The Dynamics 2007 Planning Committee: Judy Nixon, Francis Loos, Gina Mustard, Joy Mintenko, Marian Hutchinson, Shirley MacGowan, Lori Garchinksy
Citation

Research question or purpose
What is the lived experience of making a difference in critical care nursing practice?

Research design
Qualitative study: interpretive inquiry, specifically, hermeneutic phenomenology

Setting
Adult critical units in two tertiary/quaternary-level care hospitals in Alberta, Canada.

Participants
Sixteen (16) critical care staff nurses working in coronary care, cardiovascular, neurosurgical, general systems, or the burn intensive care units volunteered to talk about their experience(s) of making a difference in their work.

Method
Each nurse initially participated in a semi-structured and audiotaped conversation (interview) that primarily focused on gathering the lived experience material in the form of anecdotes or stories in which the nurse recollected moments of having made a difference. Participants were asked to recall and describe the experience(s), including their thoughts, perceptions, feelings, and emotions. The methodological approach outlined by van Manen was used to create meaning from the data. This process included a thematic analysis and reflective process, which involved the examination of words, phrases, sentences, textual excerpts, and each transcript as a whole, and writing/rewriting activities.

Main findings
The world of critical care nursing practice is metaphorically described as a battleground where the sickest are gathered. Contemporary critical care is a space wherein the ultimate war of modern health care is fought; where death is the enemy; the fight against disease or injury is the usual state; nurses, in partnership with other health care professionals and the patients and their families, are warriors committed to the battle; patients struggle with their own internal strife; and battles are both won and lost. Drills and protocols provide some sense of predictability and control in the day-to-day battle on the front lines. Stories from the trenches reveal that critical care nurses act responsively and responsibly in response to the needs of the vulnerable patients and are thereby able to make a difference in their nursing practice. Four themes, each with several sub-themes, emerged from the data. They are: (i) making the inhumane humane by acknowledging human-ness, revealing human-ness, guarding against indignity, and combating the technological imperative; (ii) making the unbearable bearable by tempering fear, conquering bodily discomfort, and assuaging alienation; (iii) making the life-threatening life-sustaining by attending vigilantly, apprehending astutely, and acting skillfully; and (iv) making the unlivable livable by fostering normalcy and engendering hope.

Conclusions
Hawley’s study “showed” how critical care nurses make a difference and what difference they make to patients who experience critical care illness “in a way that more fully captures the reality, complexity, diversity, and subtlety embodied in artful nursing practice as it is enacted in the critical care setting” (Hawley, p. 203). It is the critical care nurse who is “the stabilizing and reassuring force in what can be a very threatening environment” (Washington, 1990, p. 419 as cited by Hawley). The findings from this work open up the possibility that nurses reading and reflecting on them will be empowered personally and professionally and may, as was the intent of her work, celebrate the art of their nursing practice. In addition, these research results have the potential to provoke more “thoughtful action: action full of thought and thought full of action” (van Manen, 2002, p. 88).

Commentary
Nursing master’s theses and doctoral dissertations are evidential resources rarely accessed by nurses working at the bedside. These gold mines of new knowledge are most frequently tapped by graduate students and researchers undertaking a literature review as part of the process of research proposal development. However, as more and more nurses in the practice setting are becoming involved in the development of best practice guidelines, engagement in a comprehensive review of the literature brings this vein of rich research evidence into the awareness of nurses working at the bedside. I chose to present a critique of this published and accessible piece of research for two reasons. First, this doctoral dissertation is an example of exemplary qualitative research, particularly phenomenology. Hawley’s work demonstrates the power of interpretive inquiry to illuminate that which is taken-for-granted and to make visible what is wrongly invisible. Critical care nurses are often described only in terms of being skilled technicians, individuals seduced by technology and, thus, drawn to nursing the equipment rather than the patients and their families. As Tilda Shalof (2004) so poignantly revealed in her book, A Nurse’s Story: Life, Death, and In-Between in an Intensive Care Unit, nurses working in this specialty know that this does not describe who they are and what they do. As Hawley so aptly argued, this type of research has the ability to reveal the mysterious and previously ill-defined art of critical care nursing. Second, the critique provides the opportunity to demonstrate that qualitative research is evaluated with criteria different from those applied to quantitative designs. Furthermore, phenomenological work has some evaluation criteria that are different from other types of qualitative methodologies.

The research design was appropriate to the research question, as were the data collection and analysis processes. A strong orientation to the phenomenon is maintained throughout the entire description and interpretation of the data. The researcher
also remained consistently grounded in the philosophical foundations of phenomenology. The writing of the study demonstrates that a process of hermeneutic phenomenological reflection was used to gain insight into the meaning of the lived experience of making a difference in critical care nursing practice. The researcher’s observations and reflections on the conversations with the participants, as well as various readings, personal experiences, and the evolving interpretive analysis were threaded throughout the text, thus informing the reader as to the questions raised and how interpretive decisions were reached. The researcher’s own stance to the question is revealed.

According to van Manen (1997), an interpretive-descriptive text is considered to be valid when “it is something that others can nod to, recognizing it as an experience that one has had or could have had” (p. 27). I am a nurse who has worked in a variety of critical care settings (neonatal, pediatric, and adult) for more than 20 years. Reading this interpretive description of making a difference in critical care nursing practice evoked a strong recognition of my own experience in this world. I was able to vividly see parts of my own practice in the readings, as well as those of my colleagues. This was accomplished as a result of the researcher’s thoughtful use of concrete descriptions, examples, quotations, anecdotes, and metaphors. As well, other relevant lived experience material, such as that found in literary sources and poetry, was threaded through the text, demonstrating a sense of not only the uniqueness of critical care nursing practice experience, but also some of the universality of the human experience of caring for the vulnerable. Hawley’s writing has the power to lead the readers to reflect on their own lived experiences as critical care nurses, and to consider the experience of the patients and their families, as well as the settings in which they work, from a new yet, paradoxically, already experienced, perspective. There is the potential, then, for some nurses to alter their practice to better meet the needs of the patients for whom they care. In addition, by giving voice to that which has been previously silent in the discourse about what critical care nurses do, critical care nurses, the nursing profession, other health care professionals, administrators, and the public are offered the opportunity to re-experience who critical care nurses are.

In summary, this study is an example of how interpretive inquiry can be used to describe the complex nature of nursing work in a way that quantitative research cannot. Hawley’s study adds a new dimension to our understanding of the art of critical care nursing practice and how it is encountered in the everyday experience of nurses working in this specialty.

**References**


Altered fever response in end stage renal disease: Implications for critical care nurses

By Rhonda Matheson, RN, BN, CNCC(C), and Jo-Ann V. Sawatzky, RN, PhD

Abstract
Patients with compromised renal function are more likely to suffer from infections and fever than the general population. Because these patients often have an altered fever response, the assessment and management of this response to infection can be particularly challenging for critical care nurses. In this article, the authors use a nursing framework to examine the phenomenon of fever in critically ill patients with end stage renal disease. Implications for nursing practice, education, and research are explored.

Caring for patients with end stage renal disease (ESRD) can be complex and challenging, particularly for nurses in the intensive care unit (ICU), where patients are critically ill. Individuals with ESRD are more likely to suffer from infections and fever than the general population (Taylor, Gravel, Johnston, Embil, Holton, & Paton, 2004), and are also more likely to be admitted to an ICU for treatment. A recent study found that 93 out of 476 (20%) patients with ESRD required ICU admission (Dara, Afessa, Bajwa, & Albright, 2004). The fever response in these patients is often altered (Kallenbach, Gutch, Stoner, & Corea, 2005), resulting in difficulty in identifying and treating this response to infection. Using the Human Response to Illness (HRTI) model (Heitkemper & Shaver, 1989) as an organizational framework, the authors will examine the phenomenon of fever in the end stage renal disease population. The discussion related to the prevention and management of fever will focus on the implications for the critical care nurse.

Background
The incidence of renal failure is increasing, creating a large population of patients with chronic renal failure (Baer, 1998). Because of this trend, health care providers, particularly critical care nurses, will be required to intervene more frequently to assist in sustaining life during severe illness (Baer). Renal failure “affects every body system, and results in an overall decreased level of functioning” (Baer, p. 434). The annual mortality rate in ESRD patients is 23%, with infections being the second most common cause, contributing to 15% of deaths (National Institutes of Health, 1999). These statistics demonstrate the need for specialized care aimed at patients with ESRD.

Fever is generically defined as an “abnormally high controlled body temperature that occurs as a host response to pyrogens” (Carrieri-Kohlman, Lindsey, & West, 2003, p. 26). Fever is often a sign of infection, which is why early detection and treatment of fever and infection are important. According to a study by Dara et al. (2004), sepsis developed in 16% of ESRD patients admitted to ICU. Kothari and Karnad (2005) estimate that 50% of fevers in the ICU are due to infectious causes. However, when fever does not present despite the presence of an infection, the prognosis is poor (Henker, 1999) because fever helps to inhibit the growth of pathogens and upgrades immune responses (Kothari & Karnad, 2005). This is concerning for the growing ESRD population, as they often have an abnormal or absent febrile response.

Conceptual framework
Before the mechanisms of fever were known, high temperatures were viewed as the cause rather than the effect of disease. Today, however, fever is generally considered as a response to illness (Carrieri-Kohlman et al., 2003). In this article, the Human Response to Illness framework proposed by Heitkemper and Shaver (1989) is used to examine fever as a human response to an infection in the ESRD patient. This model provides a comprehensive nursing framework that facilitates an interpretation of fever from physiologic, pathophysiologic, experiential, and behavioural perspectives. Environmental and personal factors contribute to the individual variations in adaptation. The relevance of each domain of the model to the renal compromised patient and the consequent implications for critical care nurses are discussed.

Physiological perspective
According to the HRTI model, physiology describes the normal response, which, in the febrile state, is a regulatory process that helps to inhibit the growth of infectious organisms. This involves a combination of behavioural, neurologic, and endocrine responses. Temperature regulation in the body is mediated by the hypothalamus and brainstem, which keep the body at a normal temperature. Fever begins when an exogenous stimulus, such as bacteria, endotoxins, or viruses, is introduced. Phagocytic cells attack exogenous pyrogens and produce endogenous pyrogens, such as interleukin one (IL-1), tumour necrosis factor (TNF),...
interleukin six (IL-6), and interferons. These pyrogens stimulate the preoptic nucleus of the hypothalamus, which releases prostaglandins (PGE2) and other cytokines. The hypothalamus and brain stem send signals to increase body temperature by heat production and heat conservation to maintain a new, higher temperature (McCance & Huether, 2006). Recent scientific evidence suggests the body does this as an adaptive response that enhances host defences (Carrieri-Kohlman et al., 2003).

There are three stages to fever: the chill phase, plateau phase, and defeverescence phase (Carrieri-Kohlman et al., 2003). During the chill phase, peripheral vasconstriction shunts the blood to the body core from the skin and a decrease in vasopressin release causes a reduction in the volume of body fluid to be heated. Epinephrine is released, which increases metabolic rate and muscle tone to produce heat. Shivering occurs, which generates heat, consumes oxygen, and causes muscle aches. These normal physiological changes were observed in a study involving 13 healthy participants who were injected with endotoxins (Henker, 1999). This resulted in an increase in temperature to 38.5 Celsius, oxygen consumption increased from 306 ml/min to 870 ml/min, heart rate increased from 74 beats per minute to 104 beats per minute, and catecholamine levels increased (Henker). During this stage, the patient feels chilled and attempts to warm up with blankets and by curling up (McCance & Huether, 2006). These physiological responses to fever are aimed at increasing body temperature to reach a new set-point.

The plateau phase begins when the body temperature reaches the new set-point. Core temperature and metabolic rate remain high until the fever breaks. When the concentration of pyrogenic substances falls due to natural processes or drug effects, the set-point range falls and the defeverescence phase begins (Carrieri-Kohlman et al., 2003). This results in decreased muscle tone, peripheral vasodilation, sweating, and flushing of the skin. The patient feels warm, removes warm clothes and blankets, and stretches out (McCance & Huether, 2006). The patient’s body temperature will decrease and return to the original set-point.

Pathophysiological perspective
There are three ways patients with ESRD are affected by an altered febrile response. First, these patients are at higher risk of infection and fever, and are often immunocompromised. Second, these patients may not present with any fever signs or symptoms and, third, if these patients do have signs and symptoms of fever, they may be overlooked.

Patients with ESRD are generally exposed to more endotoxins than the normal, healthy population (Rickard, 2001). It follows that infections and fever are more common in renal patients than in the general population, particularly in the ICU, where invasive procedures are common and exposure to various infectious agents is frequent. When serum urea is high and there is an increase in metabolic wastes, ESRD patients have trouble fighting infections, leaving them immunocompromised. The high level of urea and wastes decreases the number of phagocytic cells to fight infections (Rickard). In addition, leukocytes are often reduced in renal patients due to poor nutrition, but are required to fight infections (McCance & Huether, 2006).

Fever is a beneficial response to infection as it stimulates the immune system and has antimicrobial effects that help to fight infection (Carrieri-Kohlman et al., 2003). Urea on its own has an antipyretic effect resulting in subnormal body temperatures in ESRD (Kallenbach et al., 2005). This places afebrile ESRD patients with infections at a disadvantage because they may not experience the beneficial febrile response. Fever has been correlated positively with survival (Henker, 1999) and this may be because the majority of afebrile patients may not receive appropriate antibiotic therapy (Ryan & Levy, 2003).

Pathophysiological responses to fever can be confused with common manifestations of renal disease, such as cardiovascular and respiratory problems. For example, an increase in heart rate related to an increase in catecholamines is common in severe infections (McCance & Huether, 2006), but may be overlooked as a cardiovascular problem in renal patients (Kallenbach et al., 2005). Without treatment, the fever will increase oxygen demand causing an increase in heart rate, respiratory rate, and systolic blood pressure. This expenditure of oxygen is roughly equivalent to vigorous bicycle riding and is poorly tolerated in patients, particularly ESRD patients who are often weak, anemic, and at risk of myocardial ischemia (Holtzclaw, 2004).

Experiential perspective
According to the HRTI model, the experiential perspective refers to subjective indicators given by self-report, such as symptoms, cognitions, and sensations. Many of the symptoms, cognitions and sensations associated with fever are misinterpreted or absent in ESRD patients due to uremia or common manifestations of ESRD. Symptoms that normal individuals may suffer from if fever is left untreated include chills, back pain, myalgia, arthralgia, headache, depression, anorexia, lethargy, insomnia and fatigue (Henker & Shaver, 1994). These symptoms are early manifestations of fever in the “chill phase” (Carrieri-Kohlman et al., 2003).

In ESRD, uremia may cause an absence of feeling cold and shivering, which may mask signs of infection and fever. Uremia may also cause anorexia, insomnia, slow mental processes, muscle cramps, and fatigue (Kallenbach et al., 2005), which may mimic signs of infection and fever. Neurologic changes may affect how individuals interpret their symptoms. Neuropathy has been reported in up to 80% of patients with ESRD (Kallenbach et al.), which may alter the experience of symptoms, such as not being able to feel warm skin or pain. The lack, or misinterpretation of these febrile signs in ESRD patients, may delay diagnosis and treatment of fever and accompanying infection.
**Behavioural responses**

Behavioural responses are objective and observable (Heitkemper & Shaver, 1989). The most obvious and direct measure of fever is body temperature. However, patients with ESRD often do not present with an increase in body temperature since urea acts as an antipyretic (Kallenbach et al., 2005). Indirect indicators of fever may include the body’s normal response to the febrile state such as an increase in heart rate, respiratory rate, blood pressure, cardiac output, and oxygen requirements (Henker, Kramer, & Rogers, 1997).

Other observable responses include warm skin, flushed appearance, and shivering (Carrieri-Kohlman et al., 2003). However, some of these symptoms may be considered normal for a patient with ESRD, even in the absence of infection, as many patients with kidney disease suffer from co-morbidities such as cardiovascular and respiratory abnormalities (Kallenbach et al.). Uremia has antipyretic effects in ESRD patients, which will inhibit temperature changes and shivering responses (Kallenbach et al.). Uremia may also cause skin irritations (Kallenbach et al.), which may be misinterpreted as warm or flushed skin.

Since the presentation of fever and infections in ESRD patients is different from most other patients, tests may be necessary to confirm suspected infections. Computed tomography (CT), or gallium and indium scans may help to identify leukocyte aggregation and, thus, diagnose infections (Henker et al., 1997). Additional indirect, objective measurements that are noted with fever of bacterial origins include positive blood cultures and increased catecholamines in the blood stream (Henker et al.). As well, neutropenia may be present in the infectious state (McCance & Huether, 2006). In the inflammatory process, cytokines decrease blood iron levels (Breiterman-White, 2006) that, in renal failure, may also be attributed to malnourishment (Kallenbach et al., 2005). Hemoglobin levels will drop due to low blood iron levels, and the destruction caused by macrophages in the inflammatory process (Breiterman-White).

**Personal factors**

Vulnerability factors are attributes present in an individual that impact on the human response to illness. They can be categorized as modifiable or nonmodifiable (Heitkemper & Shaver, 1989). ESRD patients often have multiple medical problems aside from kidney failure, which result in a “compromised patient with few adaptive mechanisms” (Baer, 1998, p. 433).

Nonmodifiable risk factors for fever and infections include advanced age, immune deficits (McCance & Huether, 2006), and altered autonomic function (Henker & Shaver, 1994). Many ESRD patients are elderly and will have a blunted febrile response (Carrieri-Kohlman et al., 2003). Also, ESRD patients are unable to fight infections due to uremia. Co-morbidities associated with ESRD, such as diabetic nephropathy and peripheral vascular disease (Kallenbach et al., 2005) may cause altered autonomic function. Modifiable risk factors include knowledge level, dietary practices, coping strategies, medication use, and the control of co-morbidities, such as diabetes, and hydration (Henker & Shaver). In addition, personality, early childhood experiences, and cultural background may also influence how an individual perceives and adapts to fever.

**Environmental factors**

Environmental factors are risks that exist outside the individual (Henker & Shaver, 1994). Patients with ESRD in the ICU are vulnerable because of many environmental interactions. For example, dialysis exposes ESRD patients to the external environment, as vascular access breaches the patient’s skin barrier and connects the blood stream to the outside environment (Rickard, 2001). This patient population is exposed to physicians and surgeons who insert catheters, as well as nurses who access and manipulate them. Invasive monitoring, nasogastric tubes, and endotracheal tubes, all common in the ICU, predispose these patients to infection and, consequently, to fever as well (Henker et al., 1997).

Room temperature, linens, or clothes on the patient can influence body temperature. Room temperature in the ICU may be manipulated to compensate for heat generated by equipment, or for nursing comfort. Some critically ill patients may be wearing little clothing to allow for easy access in case of emergencies and ease of physiological monitoring. Health beliefs and organizational cultures, such as how the health care team perceives and treats fever, influences body temperature. Often, our sense of the need to “do something” encourages us to treat fever (Thompson, 2005). The temperature at which fever is defined, particularly in the ESRD patient, is debatable and influences when fever is treated. Cultural background and practices of families or nurses may influence fever treatment, as some cultures believe in warming patients to treat fever (Ikematsu, 2004). Institutions will determine treatments according to availability of resources (Ryan & Levy, 2003). For example, urea complicates the presentation and detection of fever. Hemodialysis treatments can be given if the resources, such as a dialysis machine and staff are available, thus allowing for the clearance of urea, and allowing a previously masked fever to present.

**Implications**

The knowledge gained from exploring the phenomenon of fever within the context of the HRTI model provides insight for clinical practice, education, and research. The prevention, early detection, and management of fever are important in managing critically ill patients with ESRD. Interventions will be discussed using three considerations: clinical practice, education, and research.

**Clinical practice**

The implications for clinical practice are discussed within the context of prevention of fever and infection, early detection and diagnosis of fever and infection, and management of fever. Much of preventing and managing fever is associated with preventing infection.
Prevention. Therapeutic procedures in the ICU, such as central venous catheterizations, dialysis, and tracheal intubations can result in portals of entry for microorganisms (Kothari & Karnad, 2005). Since the ESRD population is more susceptible to infection, and fever is often precipitated by infectious causes, it is important to prevent infection. Proper hand washing, contact precautions, infection control, and education are important in preventing infections (Kallenbach et al., 2005). Screening patients can help in prevention, since a large portion of the ESRD population are carriers of methicillin resistant *S. aureus* (MRSA), and vancomycin-resistant enterococci (VRE) (Kallenbach et al.). Meticulous vascular access care is crucial.

Early detection and diagnosis. Since signs and symptoms of infection are often altered or misinterpreted in patients with ESRD, “physical examinations are, therefore, crucial to assess common sites of infection or inflammation” (Breiterman-White, 2006, p. 322). Catheter sites should be examined and swab specimens should be sent if inflammation or exudate is noted (Kallenbach et al., 2005). Blood cultures drawn after body temperature exceeds 38.5º Celsius improve the chances of identifying the bacterial cause of a fever (Henker & Carlson, 2007). The diagnosis of fever is variable as to what temperature constitutes a fever, but the general consensus in the literature seems to be temperatures greater than 38.3º to 38.5º Celsius (100.9 - 101.3 Fahrenheit). Trending accurate and regular temperatures is critical in the assessment and management of all critically ill patients. Unfortunately, the existing instruments may produce a wide range of temperatures (Hooper & Andrews, 2006). While the pulmonary artery catheters used in the ICU are the most accurate form of temperature measurement, they are also very invasive. Other forms of temperature measurement include oral, rectal, tympanic, bladder, esophageal, and nasopharyngeal (Henker, 1997). Nurses must be cognizant of the accuracy of these devices when assessing patients. Examining patient trends and knowing a patient’s baseline temperature and hemodynamic parameters are critical to identifying early changes indicating a fever.

Management of fever. Because fever may be beneficial in some patients, the treatment of fever is debatable. However, treatment is generally warranted in patients who are critically ill due to the increased demands fever place on an already compromised individual. This is particularly important in critically ill ESRD patients. Antipyretics will help treat some of the symptoms of fever and increase patient comfort (Thompson, 2005). However, caution must be taken in patients with renal failure as many drugs, such as non-steroidal anti-inflammatories (NSAIDs), are contraindicated due to their nephrotoxic nature (Kallenbach et al., 2005). Other treatments, such as ice packs, fans, cooling blankets, and cold baths may also be used (Henker, 1999), but may increase agitation and oxygen consumption due to discomfort (Henker & Shaver, 1994). Additional comfort interventions include washing patients and changing their clothing after episodes of diaphoresis (Carrieri-Kohlman et al., 2003).

Episodes of diaphoresis during the defervescence phase should be monitored. Replacing fluid loss is important, but should be done cautiously in patients with ESRD, due to potential volume overload issues. Shivering during the chill phase will cause an increase in energy requirements further increasing the demand on cardiac and respiratory function (Holtzclaw, 2004), which may be detrimental in critically ill patients (Henker & Shaver, 1994). To prevent shivering and the accompanying metabolic demands associated with shivering, Holtzclaw (2004) suggests wrapping extremities with insulative wraps. The administration of meperidine or opiates will also help to eliminate shivering. Other drugs that may help to control shivering include clonidine, phystostigmine, ondansetron, and neuromuscular blocking agents such as pancuronium. Managing fever in the critically ill ESRD patient may be challenging, but ICU nurses are skilled at observing alterations in condition and responding with appropriate treatments.

Education Support, counselling, and rehabilitation may help ESRD patients to change behaviours contributing to infections (Kallenbach et al., 2005) and fever. Patients with poor personal hygiene should be taught how to improve and maintain their personal hygiene. Proper nutrition should be taught and encouraged for all ESRD patients to aid in preventing infections. In addition, health care workers, patients and their families should be educated about the signs of fever and infection and what to do if symptoms occur.
It is important for ICU nurses to understand the altered fever response in ESRD patients, in addition to factors that make these patients more susceptible to infection and fever. Nurses must be vigilant in assessing for signs and symptoms of both infection and fever. In managing fever, there is often a perceived need to intervene, and to “do something” when a patient has a fever (Thompson, 2005). Nurses need to assess their patients individually, use critical thinking skills, and not simply respond to thermometer measurements. Thompson (2005) suggests treatment for “...only those who are at secondary risk because of metabolic effects of fever or those in discomfort should receive intervention aimed at lowering it” (p. 490). Thompson also states “...febrile patients not at risk or in discomfort should be monitored and educated about the beneficial effects of fever on the immune system” (p. 490). However, because of the potential detrimental demands of fever on the body, particularly to those with renal failure (Miller, 1993), treatment may be warranted. Since shivering can be detrimental in critically ill ESRD patients, educating staff will heighten awareness of patient vulnerability to shivering and improve care (Holtzclaw, 2004). Critical care nurses need to understand how fever may affect individuals with ESRD and the best practices for prevention, detection, and management.

Research implications

Limited information on fever, specifically in patients with renal disease, is available. Literature that discusses the impact of fever in critically ill patients is available. However, the critically ill ESRD population is unique and, therefore, further research is needed in this population. Because of the growing number of patients with ESRD, health care providers, particularly critical care nurses, will be required to intervene more frequently to assist in sustaining life during severe illness.

Conclusion

Using the Human Response to Illness model from Heitkemper and Shaver (1989), the authors set out to explore how fever is altered in patients with ESRD and can commonly be confused with manifestations of renal disease. Given that the prevalence of ESRD is increasing, and that fever and infections are common in ICU, it is important that critical care nurses understand fever in the ESRD patient to provide high quality care. Critical care nurses can make a difference by detecting and diagnosing fevers early, and appropriately managing febrile episodes, thus improving patient outcomes and providing comfort to patients.

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References


Cognitive apprenticeship: Laying the groundwork for mentoring registered nurses in the intensive care unit

By Penny Nickle, RN, BN, MEd, CNCC(C)

Abstract
Professional nursing practice within the intensive care unit (ICU) requires the registered nurse (RN) to demonstrate evidence of critical thought for the various treatments provided. A sound theoretical knowledge base, coupled with sensitivity to the socio-cultural influences within this often emotionally charged atmosphere is foundational to the provision of excellent patient care. Mentorship is one educational strategy that attempts to integrate skill development with the socialization of a novice ICU RN. However, vagueness surrounding what encompasses the mentor-mentee relationship may prevent employees from entering into these unions. In this article, I present an original mentorship model based on the concept of cognitive apprenticeship, as described by Collins, Brown, and Holum (1991). I identify the learning theories that inform this approach to professional development and conclude with select recommendations for implementation of a mentorship program within the ICU.

The intensive care unit (ICU) registered nurse (RN) plays an integral role in the achievement of satisfactory outcomes for the critically ill patient. The experienced ICU RN’s practice is grounded in the use of explicit and tacit knowledge informed by nursing theory and the socio-cultural influences within the ICU environment. The acquisition of nursing expertise does not occur by chance; the professional development of novice ICU RNs thus warrants considerable attention. In this article, I present an original model for mentoring relationships between expert and novice practitioners in the ICU based on the concept of cognitive apprenticeship, as posited by Collins, Brown, and Holum (1991). This framework is prefaced by a brief review of the learning theories that support its use in adult education. I conclude this article with recommendations for the implementation of a mentorship program within the ICU.

Context
Health care organizations must strive to maximize the potential of all employees in order to adapt to the many external influences exerting pressure on the system including variable government funding and population demographics. Indeed, Garrett (as cited in Hood, 2001) stated, “For an organization to survive, its rate of learning must be equal to or greater than the rate of change in its external environment” (p. 20). Given that change can be assumed to be continuous and the requisite adaptation will be needed throughout the life of an organization, learning cannot be viewed as a finite entity. Leaders in health care organizations must attend to integration of the abilities of employees into their socio-cultural landscape to meet both organizational and individual goals.

RNs will characterize learning by its usefulness for direct application in their practice environment. To date, considerable variation has existed in the practice of facilitating novice ICU RNs’ attempts at bridging theory and practice in the clinical area. Traditionally, a novice practitioner has been matched with a more experienced nurse in an often loosely defined “buddy” pairing that persists for the length of a preset orientation period (Andrews & Wallis, 1999). Dissatisfaction with the orientation process for both participants may follow this brief, unstructured union. Without purpose and direction, participants unfamiliar with their respective roles may be inhibited from learning. I believe mentorship is a professional development strategy that strengthens collegial relationships, facilitates the retention of skilled employees, and enhances overall nursing practice.

Mentoring relationships can be found in a variety of organizational contexts and, as such, the definition of mentorship is subject to shifts in focus and meaning (Andrews & Wallis, 1999). English (2001) noted, “Like tofu, which assumes the taste of whatever it is cooked with, the definition of mentorship also changes with the context” (p. 262). Conventional descriptions of mentorship support the view that an experienced person acts as a role model, coach, and teacher to counsel a more junior person for the purpose of encouraging personal and professional growth (Andrews & Wallis; Cohen, 2003; Daloz, 1990; English, 2001). Galbraith and James (2004) posited, “mentoring is a complex process that supports a mutual enhancement of independent and critically reflective thinking” (p. 690).

Mentorship as an educational strategy capitalizes on the wisdom of experienced colleagues to facilitate the integration of a novice nurse’s knowledge into the ICU context. Some nurses may be wary of engaging in mentoring relationships, however, due to the ambiguity surrounding their definition and purpose. I posit the notion of cognitive apprenticeship, as described by Collins, Brown and Holum (1991), can provide direction and structure to these relationships thereby laying the groundwork for the professional growth of new ICU RNs.
Literature review

The process of designing an educational initiative centred around adult learners often prompts an educator to examine his or her assumptions about how learning is most effectively facilitated within this group. I believe learning, beginning in infancy, is a natural extension of one’s interaction with people within a meaningful context, and this process of knowledge acquisition continues through maturity. Theories that are foundational to cognitive apprenticeship, including constructivism, social constructivism, and situated cognition support my assumption. The following is a review of the salient points of each theory relative to this framework.

Constructivism

The concept of cognitive apprenticeship is grounded in the belief that learning is dependent on environmental influences (Collins et al., 1991). This premise is consistent with the educational philosophy of constructivism. Constructivist views grew out of the search for an alternative explanation for learning outside of the behaviouralist paradigm (Wilson, 1999). Solomon (2000) noted behaviourism and its application are grounded in empiricism whereby observation and experimentation, as in science, dictates what is knowledge. Knowledge, therefore, is externally mediated. Dewey challenged this positivist assumption with his notions of constructivism in education in the early 1900s (Eisner, 1992). Dewey used Darwin’s evolutionary theory to explain how humans interact and adapt to their environment (Eisner). Much as an organism transforms over time to survive in a changing environment, Dewey posited that it is the constant construction of knowledge through problem-solving that provides for one’s intellectual growth (Eisner). Dewey argued that knowledge construction is enhanced in authentic contexts complete with the inherent socio-cultural influences found in the learner’s environment (Eisner; Huang, 2002). Accordingly, an educator’s role is “the shaping of learners’ real experience from the environment, and knowing what surroundings tend to promote experience that leads to growth” (Huang, 2002, p. 29).

Social constructivism

Vygotsky’s theory of social constructivism (as cited in Huang, 2002) emphasized that the social landscape of a learning context, with its inherent interactions among peers, teachers, and others strongly influences cognitive development. Vygotsky posited that knowledge and skills are constructed via a learner’s relationship with contextual extrinsic stimuli in the form of tools and language, and cultural beliefs and values (Hansman, 2001). The social nature of learning can be situated beside the concept of pluralism, from the post-modern view. Solomon (2000), for example, argued that true pluralism, an element of constructivism that honours multiple perspectives, is the appreciation of multiple truths. Collaboration within a learning community allows learners to encounter different points of views when reasoning through problems, and may facilitate what Bostock (1998) described as “synergistic insights” (p. 227). Nursing, like most practice-oriented professions, requires knowledge that cannot be developed solely within the confines of educational institutions. Cope, Cuthbertson and Stoddart (2000) noted a nurse’s knowledge is at risk of remaining “inert” if not coupled with “complex situational understanding” (p. 851).

Situated cognition

The paradigm of social constructivism, that learning is inherently social in nature, provides the basis for the theory of situated cognition (Hansman, 2001). The appreciation of enhanced learning via situational involvement is not new. In the 1920s, Lindemann (as cited in Hansman, 2001) declared “the approach to adult education will be via the route of situations, not subject” (p. 44). The concept of situated cognition recognizes that one’s understanding is dependent on the authenticity of the learning context (Jonassen, 2001; Solomon, 2000). That is, it is through experience in a realistic environment that meaning is constructed (Solomon, 2000). Hansman and Wilson (2002) argued the power of situated cognition can’t be realized by simply placing a learner alone in a congruent context, however, for learning is ultimately shaped by the nature of the relationships learners establish between people and tools within this context. The concept of cognitive apprenticeship is an extension of this notion, as interaction can be considered the common denominator for all learning activities within its framework.

Theoretical framework – Cognitive apprenticeship

Apprenticeships have long been used as a method to teach novice workers the skills of their trade within the socio-cultural context in which they will eventually practise independently (Collins et al., 1991). Cognitive apprenticeship builds on this enculturation of novice professionals with an emphasis on facilitating the process of acquiring knowledge through thinking and reasoning with experienced practitioners (Brown, Collins, & Duguid, 1989). Collins et al. noted one of the key differences between traditional apprenticeship and cognitive apprenticeship is that in the latter, both the expert’s and the novice’s thinking are made visible, therefore illuminating “the cognitive and metacognitive processes that comprise expertise” (p. 3). Metacognition, higher-order thinking, is “the ability to think about thinking, to be consciously aware of oneself as a problem-solver, and to monitor and control one’s mental processing” (Merriam & Caffarella, 1999, p. 206). Dialogue between expert (mentor) and novice (mentee) is central to the development of metacognitive skills and the illumination of not only explicit, but also tacit knowledge – inferred knowledge that further strengthens problem-solving capabilities but, often, remains hidden when only actions are observed (Merriam & Caffarella, 1999).

The transfer of skills and knowledge to diverse situations is another example of the difference between traditional craft and cognitive forms of apprenticeships (Collins et al., 1991).
Unlike craft apprenticeships, where novices learn skills inherent to the particular task, cognitive apprenticeship focuses on the learners’ ability to identify similarities between tasks and then use their knowledge to problem-solve in a variety of contexts (Collins et al.). In critical care nursing, the ability to manage a patient experiencing dyspnea is an essential skill and involves establishing priorities based on patient presentation, and the knowledge of physical assessment, oxygen therapy, and respiratory medications. In accordance with cognitive apprenticeship, the novice nurse would initially practise this skill in one setting, for example with non-ventilated cardiac patients, then seek opportunities to manage more diverse patients that would require an increasingly complex skill-set. The nurse would be encouraged to reflect on the treatment of these patients in order to identify similarities in his or her approach. Collins et al. noted, “The goal is to help students generalize the skill, to learn when the skill is or is not applicable, and to transfer the skill independently when faced with novel situations” (p. 3). Improved transfer of learning, with the requisite learner flexibility and adaptability is, arguably, a major goal of clinical education.

The cognitive apprenticeship framework is built upon four dimensions: content, method, sequencing, and sociology (Collins et al., 1991).

**Dimensions of cognitive apprenticeship**

The four dimensions of content, method, sequencing, and sociology inform the cognitive apprenticeship framework outlined in this article. Each will now be described in detail with examples drawn from critical care nursing practice.

**Content**

Content is the knowledge and skills to be learned in a practice setting and includes domain knowledge, heuristic strategies, control strategies and learning strategies (Collins et al., 1991). Domain knowledge is facts and concepts that are practice-specific (Collins et al.). The pathophysiology of certain diseases specifically attended to in the ICU would be an example of domain knowledge. Heuristic strategies are those “rules of thumb” or “tricks of the trade” that are used in the completion of a task (Collins et al.). This tacit knowledge is most effectively integrated into a learner’s repertoire through practice with a mentor who uses such strategies. Learners then develop control strategies to use the heuristics they have adopted in order to inform their decisions on how to proceed when problem-solving (Collins et al.). Consultation with an experienced peer to select an appropriate intervention for a given problem is an example of a control strategy. Finally, learning strategies are those strategies that demonstrate to the mentee ways he or she can acquire further knowledge and skills related to concepts in the field (Collins et al.). In the ICU, this may include discussions with other members of the multidisciplinary team, peer teaching, or workshops.

**Method**

The dimension of method encompasses collaborative activities engaged in by both mentors and mentees, within context, as a means to facilitate the learner’s acquisition of expert knowledge (Collins et al., 1991). These include modelling, coaching, scaffolding and fading, articulation, reflection, and exploration (Collins et al.).

**Modelling.** Modelling is the demonstration of an element of practice by an expert “so that students can observe and build a conceptual model of the processes that are required to accomplish it” (Collins et al., 1991, p. 13). It is noted that during modelling, mentors must also consciously display their reasoning by verbalizing their thought processes (Hansman, 2001). Their use of heuristic strategies may also be made explicit at this time (Merriam & Caffarella, 1999). An example relevant to critical care nursing would be the demonstration of suctioning an endotracheal tube in a mechanically ventilated patient. While performing the procedure, the mentor would describe the patient considerations involved, such as observing for hypoxia by frequently glancing at the bedside monitor. The mentor could also demonstrate the heuristic strategy of talking to the patient while performing the procedure to lessen the patient’s anxiety and subsequent increased oxygen consumption related to this invasive procedure.

**Coaching.** The method of coaching encompasses mentor guidance of the mentee while he or she is engaged in a situated learning experience, and may involve giving encouragement, suggestions, modelling elements of the behaviour and scaffolding performance (Hansman, 2001). Through coaching, the mentor may direct the mentee’s attention to a previously unnoticed aspect of the task or simply cue the learner to remember an aspect of the task that is known, but has been overlooked (Collins et al., 1991). The provision of feedback on performance is a critical coaching task as a means to enhance learner confidence and motivation (Bohlin & Milheim, 1994). Repeated coaching to facilitate learning is often required in clinical situations due to the stressful and complex nature of many of these nursing responsibilities.

**Scaffolding and fading.** Truscott and Truscott (2004) described scaffolded instruction as “the provision of temporary learning frameworks provided by a ‘more knowledgeable other’ that allows the learner to work beyond his/her acquired knowledge” (p. 54). This support, when afforded to mentees, enables them to engage in more complex thinking through advanced learning activities and can involve the previously mentioned methods of modelling and coaching, as well as physical aids such as checklists (Hansman, 2001). Scaffolded instruction is vital for the novice ICU RN during problem-solving or task completion as the high acuity of patients and intricate treatments leave little room for error. As knowledge and experience are gained, scaffolding may be gradually withdrawn, thereby transferring responsibility of task completion to the now-independent learner (Truscott & Truscott, 2004). Collins et al. (1991) referred to this withdrawal of support as fading.

**Articulation.** Articulation is the process of having learners verbalize their understanding of elements in their practice, including the rationale for decisions they have made, either orally, through writing, or by any other generative learning strategy (Collins et al., 1991). Bostock (1998) described...
generative learning strategies as “active learning… using knowledge and skill to ‘generate’ a product such as text, diagrams, or a physical artifact which embodies knowledge.” (p. 227). Mentees may do this one-on-one with a mentor while in the act of completing a task, or in collaboration with other learners to facilitate an appreciation of multiple perspectives – a true constructivist notion. Critical care nursing “rounds”, where paired learners (or mentor and mentee) present a short case study of a patient, with the associated nursing care to their colleagues, provide excellent opportunities for the articulation of new knowledge.

Reflection. Novices are encouraged to analyze their problem-solving capabilities relative to that of an expert’s through the process of reflection (Collins et al., 1991). Brookfield (1990) noted that the ability to self-evaluate one’s learning is a skill that will be applicable to all aspects of one’s life and, indeed, may supersede the content element. Reflective journaling is a self-assessment technique that is learner-centred, which, when done with a critical eye, can illuminate not just learning outcomes, but also the process of how one learns as well (metacognitive awareness) (Merriam & Caffarella, 1999). Mentees may share their journal entries in confidence with a trusted mentor who can then highlight gaps in logic or pose questions to further deepen the understanding of concepts. Murphy (2004) noted:

Research indicates that reflection enhances learning by reducing error rates, correlates with self-regulation, and positively affects learning. Moreover, students who reflect on their learning are found to be more active in the learning process, more self-aware and self-regulated, and more complex in their thinking (p. 227).

Sequencing

The sequencing of instruction, the third dimension of the cognitive apprenticeship framework, provides mentees with a structured approach to their learning that facilitates the integration of knowledge and enhances transfer of learner skills in diverse situations (Collins et al., 1991).

Global versus local. The first sequencing principle is the attention to global skill before local skills (Collins et al., 1991). “The chief effect of this sequencing principle is to allow students to build a conceptual map, so to speak, before attending to the details of the terrain” (Collins et al., p.15). Reigeluth and Stein (1983) advocated a similar approach to the sequencing of instruction in their Elaboration Theory. The authors argued that the provision of general information can

<table>
<thead>
<tr>
<th>Areas to Focus Learning</th>
<th>Learning Objectives – what you intend to learn</th>
<th>Strategies and Resources – what you intend to do and what will facilitate your learning</th>
<th>What is to be reviewed or assessed – the evidence you will produce to demonstrate that you have met your objective</th>
<th>Criteria for review/assessment - how will you demonstrate that you have been successful (please be specific)</th>
<th>Timetable – when you intend to complete this objective and have learning reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Cardiac Assessment</td>
<td>Basic 12 Lead ECG Analysis</td>
<td>1. Read text: 12 Lead ECGs Made Easy</td>
<td>I will: Accurately diagnosis 10 sample 12 Lead ECGs provided by the unit instructor and ECG technicians</td>
<td>1. Demonstrate a systematic, five-step approach to analysis</td>
<td>June 1</td>
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<td></td>
<td></td>
<td>2. Write up a recipe card with tips: leads = wall of heart</td>
<td>2. Group together leads that look at specific walls of the heart</td>
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<td>3. Print one ECG from a select patient each day to interpret</td>
<td>3. Examine groups for Q Waves; ST segment elevation and depression; T wave changes; reciprocal changes</td>
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<td>4. Identify area of injury or ischemia</td>
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<td>5. Verbalize anticipated signs and symptoms patient may be exhibiting in relation to ECG findings</td>
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<td>6. Extended learning: What nursing or medical treatments do I anticipate for this patient?</td>
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anchor more specific details, thereby setting the stage for new information to be linked with existing knowledge (Reigeluth & Stein, 1983). Accordingly, the exposure of a new ICU RN to a clinical skill, such as central venous pressure (CVP) monitoring, would best be approached from a broad perspective by discussing the general management of fluid imbalance. The complete treatment plan would be shown to include a demonstration of CVP monitoring. This allows for the skill to be seen within the context in which it will be performed and provides the mentee with a goal (stable fluid balance), thus further attaching meaning to the skill (Collins et al.).

Simple to complex. Clark (1986) argued that the processing of information in working and long-term memory is dependent upon logical relations of the content. Collins et al. (1991) concurred and recommended that the sequencing of instruction for learners progress from simple to complex concepts. An example of this second sequencing principle, using the case provided earlier, is illustrated in the equipment set-up and monitoring of a patient’s central venous pressure (CVP). The mentee would learn the theory and technique associated with this skill using a simple single transducer set before progressing to the more complex dual-line monitoring system used with pulmonary artery catheters. Reigeluth and Stein (1983) noted simple to complex sequencing of instruction enables a learner to “(1) more effectively comprehend the structure of that type of content and hence to more effectively form a stable cognitive structure that is isomorphic with it, and (2) form the most useful type of cognitive structure with respect to the goals” (p. 356).

Increasing diversity. Increasing the diversity of tasks in which new knowledge will be used further facilitates contextual links as learners determine which skills fit a given situation (Collins et al., 1991). It is their previous experiences of using specific strategies that encourage learners to make associations between prior knowledge and new knowledge, thereby facilitating the encoding of this new information (Gagne & Medsker, 1996). Continuing with the above example of CVP monitoring, once the mentee is comfortable and competent with treating a stable patient’s fluid imbalance through the use of CVP monitoring, he or she would then be encouraged to practise this skill with a variety of patients demonstrating diverse physical conditions. Mentors can take this opportunity to assist mentees in the transfer of knowledge through scaffolding efforts. They can also offer unique insights into salient features of different experiences thus fostering cognitive flexibility. Spiro, Collins, Thota and Feltovich (2003) noted, “Knowledge that has to be used in many ways has to be represented in many ways. Whenever one sees a complex situation with a different conceptual “lens” or from a different perspective, new and important features of the situation are revealed” (p. 6).

Sociology

This fourth dimension of the cognitive apprenticeship framework is derived from the work of theorists researching learning within the social arena, and comprising situated learning, community of practice, intrinsic motivation and cooperative problem-solving (Collins et al., 1991).

Situated learning. The notion of situated learning draws upon the concepts of constructivism and situated cognition as discussed earlier. Sensitivity to an authentic context in which to construct meaning is central to Knowles’ theory of andragogy and the motivation of adult learners to solve “real-life” problems (Huang, 2002). Collins et al. (1991) noted the power of situated learning is in the active pursuit of relevant knowledge through the achievement of goals within a variety of contexts.

Community of practice. The community of practice, a group of people with a shared interest in a given context, is a valuable resource for advancing the knowledge and skills of respective members (Hansman & Wilson, 2002). Lave and Wegner (as cited in Fenwick, 2000) argued that “the understanding that emerges in and helps a person to participate in a situation are intimately entwined with the particular community, tools, and activity of that situation” (p. 8). The authors extended their theory of legitimate peripheral participation to describe a novice’s development of knowledge and skills within a community of practice (Williams, Matthews, & Baugh, 2004). Lave and Wegner (as cited in Williams et al., 2004) noted that while these new practitioners initially lack the knowledge and skills to practise independently, with expert guidance they may participate from the periphery on authentic tasks.

Intrinsic motivation. Collins et al. (1991) argued that situated learning and a community of practice foster the learner’s intrinsic motivation. Barab and Plucker (2002) supported this notion and stated, “the primary motivation for learning involves participating in authentic activities that move one towards becoming more central to a community of practice” (p. 173). This engagement in the real-life problem-solving process fuels a novice’s desire to continue learning. Framed by a supportive multidisciplinary team, the dynamic ICU environment can afford the mentee with many opportunities to participate in simple to increasingly complex patient care initiatives. It is noted, however, that the high acuity of the ICU patient population does not ensure successful patient outcomes. Space must be created to allow mentors and mentees to debrief potentially stressful situations and then reflect upon opportunities for continued learning.

Exploiting cooperation. The last element of the sociology dimension is exploiting cooperation. This is defined as searching for opportunities for cooperative problem solving (Collins et al., 1991). Merriam and Caffarella (1999) aptly noted, “Adult learning does not occur in a vacuum” (p. 22). Keller (1999) reported that feelings of isolation in a stressful environment negatively affect a learner’s motivation to acquire and integrate knowledge and can lead to his or her withdrawal from the situation altogether. Collaboration within an ICU learning community enhances the development of more than one perspective from which to understand the patient’s condition. This learning strategy also attends to the fact that these nurses are required to engage in cooperative problem solving as a daily function of their work.
Next steps: A mentoring model based on the cognitive apprenticeship framework

As noted earlier, vagueness as to the purpose and methods of mentorship may lead to confusion among employees about how to enter into these relationships. The cognitive apprenticeship framework by Collins et al. (1991) provides an ideal foundation for the construction of an innovative mentorship model that can be used to guide these unions (see Figure One). This progressive model demonstrates that the mentor-mentee relationship is clearly centred on the acquisition of explicit and tacit knowledge. Each dimension of the framework, with its associated methods, guides participants towards the enculturation of the novice ICU RN within the ICU community and onward to the provision of competent and compassionate care for the critically ill patient.

The new ICU RN develops knowledge and skills through observing the mentor, practising the skill, and then articulating and reflecting on his/her own performance in more complex and diverse settings. Knowledge acquisition and transfer of learning within context is facilitated when the mentor begins by modelling expert practice then moves into a supportive role by scaffolding the mentee’s efforts. Eventually, the mentor begins to withdraw this structured support as the mentee develops the abilities to practise independently. It is recognized that independence is a relative term, and the notion of a community of practice implies that ongoing professional development is generally collaborative in nature.

Critical assumptions that inform this model

There are three major assumptions that are critical to the usefulness of this model. If these assumptions are not met, the model will be compromised in its effectiveness.

1) Infrastructure must be in place to support the mentor-mentee relationship and knowledge-sharing process. Individuals involved in this process need to draw from the support of the organization and believe that the investment of time and effort is valued by the organization (and profession). Examples of infrastructure include open lines of communication and clinical education support.

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Figure One. Mentoring model based on the cognitive apprenticeship framework.
2) Both the mentor and mentee are willing and motivated to engage in this learning process and committed to the knowledge-sharing process. I believe such a union cannot be mandated. Therefore, this model should only be used by willing participants.

3) The mentor possesses well-developed clinical knowledge, skills, and mentoring abilities. This third assumption loops back to the first as I view learning as being on a continuum and this includes learning for experienced staff. I, therefore, encourage ongoing mentor support by the ICU Clinical Nurse Educator (CNE) in the form of assessing the mentor’s domain knowledge, providing guidance for enhancing knowledge, and assisting with the development of teaching strategies when needed. This notion is explored further in the following recommendations for mentorship program implementation.

Recommendations – Implementing the mentoring model
Collins et al. (1991) cautioned that cognitive apprenticeship is not a prescription for instruction but, rather, should be used as “an instructional paradigm” (p. 17). Therefore, I present a model for the mentorship of novice ICU nurses based on the cognitive apprenticeship framework. I concur with Shambaugh and Magliaro (1997) who noted, “We better understand what we can represent” (p. 31). Both the mentor’s and the mentee’s philosophical views of teaching and learning will ultimately impact how cognitive apprenticeships may be used to foster learning in the ICU. When these views are coupled with contextual influences such as the value an organization places on the professional development of its employees, adaptations may be required. The following are six suggestions for implementing a mentorship program, framed by cognitive apprenticeship, in the ICU.

Preparation
Clearly, mentoring can be subject to a variety of perceptions. ICU staff must, therefore, be provided with education not only encompassing mentorship as structured within the cognitive apprenticeship framework, but also the personal and organizational benefits and pitfalls inherent with such relationships. The ICU CNE is the ideal person to facilitate these education sessions, as he or she would have an understanding of the unit’s staff and culture. Prefaced by the awareness that learning is viewed as being on a continuum within the model, each element should be discussed with contextual influences such as organizational culture, such as the value an organization places on the professional development of its employees, adaptations may be required. The following are six suggestions for implementing a mentorship program, framed by cognitive apprenticeship, in the ICU.

Management support
As noted in the cognitive apprenticeship framework, dialogue between mentor and mentee is the key to successful learning outcomes. Both proximity and protected time for discussions to occur are required. Management support of a mentorship program is crucial in terms of securing adequate financial and human resources to allow the relationship to grow (Girves et al., 2005). This may involve securing additional staff to decrease the patient load for mentors so they may devote more attention to mentees, especially those who have just joined the team, and rearrangement of patient assignments to allow for close contact between the pair. Management support may also be required in the provision of other sources of communication, such as employee email.

Generational differences
Values, communication styles, learning preferences and motivators for performance vary among generational groups represented in the nursing profession today, and harmonious relationships cannot be guaranteed when generations are blended together for the purpose of learning (Cordeniz, 2002). Unfortunately, there is a frustrating lack of research examining which environments support the education and socialization needs of a diverse, cross-generational workforce. I posit that...
ICU RNs and, indeed, all nurses, would benefit from discussions of generational characteristics – baby-boomers to millennials. This would include challenging the widely held assumptions of those in various groups. Facilitated discussion forums would raise awareness of misconceptions and potentially lead to stronger relationships within the ICU community and more personally relevant learning experiences for both mentors and mentees. Therefore, the design and delivery of such workshops are strongly encouraged.

Recognition
The decision to enter into a mentoring relationship implies a commitment to not only one’s professional growth, but also to the growth of the organization. As such, mentor and mentee contributions towards excellence in patient care deserve to be acknowledged by the organization. Certainly, intrinsic rewards may accompany mentorship involvement, but the motivation to continue to support a learning culture in the ICU would be facilitated by recognition in the form of something meaningful to the participants. This may include financial sponsorship to attend a learning event, or perhaps the funding of professional association membership dues for the Canadian Association of Critical Care Nurses (CACCN) or the provincial licensing associations.

Evaluation
Girves et al. (2005) recommended that formative and summative evaluations of the mentoring process be conducted in order to continually improve the process. Qualitative inquiries, including the triangulation of data collection techniques (surveys, interviews, observations) would best inform participants and organizational leaders. It is important to note that such investigations would be separate from the competency evaluations of new employees according to organizational standards (performance checklists, written exams, return demonstrations of skills). However, the achievement of performance standards is recognized as one desired outcome of the mentoring relationship.

These are only beginning recommendations. Several more strategies for implementing a mentorship program could be determined and a periodic examination of mentoring literature, particularly case-based reviews of mentorship within hospital units, may inform the process. Cohen (2003) designed The Principles of Adult Mentoring Inventory as an instrument that can be used to further explore effective mentoring behaviours. Managers and educators interested in designing a mentoring program may find this guide useful when facilitating mentor and mentee efforts.

Summary
Today’s dynamic health care environment demands knowledgeable employees, but this alone is not sufficient for expertise in patient care (Cope et al., 2000). Nurses must also possess transferable skills and sensitivity to social contexts. Mentorship can cultivate an atmosphere for professional growth through attention not only to skill acquisition, but to integration of the novice nurse into the culture of the unit as well (Andrews & Wallis, 1999). While mentoring relationships may be perceived favourably from the outside, their clear definition for those eager to engage in this collaborative affair has been elusive. Cognitive apprenticeship, with its inherent focus on learning within the social milieu, can be used to structure these interactions. Indeed, many of the cognitive apprenticeship strategies, such as modelling and coaching, are now being used in the ICU environment, but have not been recognized as intrinsically linked to enhanced learning.

Hood (2001) described the relationship between individual professional growth and the goals of an organization as one of interdependency. Success for either warrants continued study to identify those elements in the workplace that foster a heightened curiosity and a quest for knowledge. A structured mentorship program is a progressive move towards realizing personal and organizational potential.

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References


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Should critical care nurses be ACLS-trained?

By Tammy Hagyard-Wiebe, RN, BN, MN

Abstract
The aim of resuscitation is to sustain life with intact neurological functioning and the same quality of life previously experienced by the patient. Advanced cardiac life support (ACLS) was designed to achieve this aim. However, the requirement for ACLS training for critical care nurses working in Canadian critical care units is inconsistent across the country. The purposes of this article are to explore the evidence surrounding ACLS training for critical care nurses and its impact on resuscitation outcomes, and to review the evidence surrounding ACLS knowledge and skill degradation with strategies to support code blue team efficiency for an effective resuscitation. Using the search terms ACLS training, resuscitation, critical care, and nursing, two databases, CINAHL and MEDLINE, were used. The evidence supports the need for ACLS training for critical care nurses. The evidence also supports organized ongoing refresher courses, multidisciplinary mock code blue practice using technologically advanced simulator mannequins, and videotaped reviews to prevent knowledge and skill degradation for effective resuscitation efforts.

More than one-half of all cardiac arrests occur in the intensive care unit (Peberdy, Kaye, Ornato, Larkin, Nadkarni, Mancini, et al., 2003), and research has demonstrated that for patients who experience cardiac arrest, initial survival and survival to discharge improved with regular training of nurses in both cardiopulmonary resuscitation (CPR) and advanced cardiac life support (ACLS) versus those nurses not trained in ACLS (Moretti, Cesar, Nusbacher, Kern, Timerman, & Remires, 2007; Pottle & Brant, 2000).

Given this fact, coupled with increasing public demand for assurances in the competence of their health care providers (Wass, Van der Vleuten, Shatzer, & Jones, 2001), it would seem intuitive that providing advanced resuscitation training such as ACLS for critical care nurses be an expectation of employment. This is not the case in Canada. According to multiple critical care nurse job postings, inconsistencies currently exist across Canada in terms of ACLS requirements for nurses working in critical care units. Potential barriers to universal ACLS training may include funding for initial training and ongoing refresher courses required to prevent ACLS skill degradation.

Do critical care nurses require ACLS training and does this training improve code blue or resuscitation team function and subsequent patient outcomes?

The purposes of this article are to review the literature surrounding critical care nurse ACLS training, summarize the evidence surrounding the decreasing competency of these resuscitation skills over time, and discuss code blue team effectiveness and the professional responsibilities of nurses caring for cardiac arrest patients. CINAHL and MEDLINE databases were used in this literature search. Reference lists from all articles were also valuable resources for further searches. Twenty-eight relevant nursing and medical articles were used. Pediatric articles were excluded.

History of ACLS
Advanced life support has a long and interesting history dating back to 1530 with the use of bellows for artificial ventilation (Chamberlain, 2004). Nurses have been involved in resuscitation efforts for centuries. Chameides (as cited in Whitcomb & Schmied Blackman, 2007) described Hebrew midwives in biblical times applying mouth-to-mouth resuscitation to newborns. ACLS training was initially presented in 1974 by the American Medical Association to advanced emergency medical technicians, experienced critical care nurses, physicians, and physician assistants (Carveth, Burnap, Bechtel, McIntyre, Donegan, Buchman, et al., 1976). Much of the original content is included in today’s ACLS guidelines with the addition of evidence-based revisions.

The 2005 CPR revisions for health care providers consists of a 4.5-hour class of video instruction with hands-on practice integrating theory, such as recognizing life-threatening situations, and psychomotor skills, such as quality compressions and ventilations and the use of automated external defibrillators (American Heart Association, 2007).

Building on competency in CPR, ACLS is a 2.5-day course with detailed protocols for health care providers who either direct or participate in the provision of cardiac resuscitation of a patient in settings ranging from the pre-hospital environment to the hospital setting (American Heart Association, 2007). The course content includes education in the management of a cardiac arrest and team resuscitation concepts with knowledge of advanced airway management, interpretation of electrocardiograms, emergency pharmacology, and management of acute coronary syndromes and acute ischemic stroke (American Heart Association, 2007).

The evidence
It is estimated that ACLS training costs approximately one billion dollars annually (Utstein Style Writing Group, 1997).

To determine the value of such a large expenditure, Dane and colleagues (2000) studied the effect of ACLS-trained nurses on patient outcomes. The study design was a cohort case-comparison and survival to discharge was used as the outcome variable. Of the 120 arrests, the initial rhythm (p<0.005, OR=0.63) and ACLS training (p<0.02, OR=2.3) were the only significant single predictors of survival to discharge. Analysis of the data in this key study indicated that survival was almost...
four times higher for patients when the nurse initiating the resuscitation was ACLS-trained. As a result of this study, the institution participating in the study now requires at least five ACLS-trained personnel on their code blue team.

Marchette, Jone, Bagg, Cohen, Palau & Thaw (1985) used a nonequivalent control group design (n=76) using various health care providers involved in resuscitation efforts to determine the effect of an ACLS course on the ability to perform ACLS skills in a simulated cardiac arrest. Analysis indicated a significant (p<0.05) difference in the post-test results concluding that ACLS training resulted in superior performance in managing a simulated cardiac arrest situation.

Gilligan, Bhatarcharjee, Knight, Smith, Hegarty, Shenton, et al. (2005) went a step further in conducting a prospective comparison study (n=57) in which simulated arrests were led by either an ACLS-trained nurse, an ACLS-trained doctor, or a non-ACLS-trained doctor who had received an in-house resuscitation orientation. Each participant had the opportunity to lead the same resuscitation case scenario. A scoring system included the participants’ pulse, blood pressure, scenario understanding, team orientation to tasks, preparation, rhythm recognition, sequencing of interventions, appropriateness of interventions and performance of defibrillation. The level of performance among the three groups was equal. Each resuscitation leader had the same level of perceived stress (p=0.9) and blood pressure (p=0.95) and there was no clinical or statistical difference in the time to first defibrillation (p=0.95). Interestingly, the nurses’ knowledge of the potentially reversible causes of the simulated arrest was statistically higher (p=0.007) than either the ACLS- or the non-ACLS-trained physicians. This study suggests that ACLS-trained nurses are as effective in managing resuscitations as physicians.

**ACLS skill degradation**

Although the cited evidence supports ACLS training for critical care nurses, retention of the theory and skill degradation have been problematic. Young and King (2000) reviewed the literature over the last 30 years and noted that theoretical knowledge, including cognitive or factual information deteriorated over time. It was also found that psychomotor skills, such as performance of chest compressions deteriorate rapidly over time (Fossel, Kiskaddon, & Sternback, 1983; Moser & Coleman, 1992; Weaver, Ramires, Dorman, & Raizner, 1979). Young and King (2000) conducted their own study in which 10 nurses were provided an in-house ACLS course and, then, subsequently tested in theoretical and practical knowledge at six and 12 weeks. The mean theoretical knowledge scores in both intervals remained the same, but the mean practical scores declined.

Pottle and Brant (2000), spurred by the evidence of ACLS skill degradation, instituted a four-year audit of 367 in-hospital cardiac arrests in a U.K. hospital to determine if frequent CPR and ACLS courses and updates improved skill retention and, thus, improved patient outcomes. Cardiac arrest outcomes were compared between two time periods. Data were collected from 1993-1994 and 1995-1996 with the intervention occurring before the 1995 time period. Return of spontaneous circulation (ROSC) was the primary outcome variable measured. The resuscitation training officer implemented CPR training yearly and ACLS three times per year. It was observed that ROSC improved when the initial rhythm was asystole (pre 26.3% and post 40.1%), but there was no difference with the ventricular fibrillation group. It is noted, however, that defibrillation training had been in place prior to the study thereby affecting these results. This study provides evidence that within the asystolic arrest population, frequent ACLS training and updates improve skill retention and, thus, patient outcomes.

**Innovative solutions for skill degradation**

Although ACLS training improves performance in simulated cardiac arrests for nurses, knowledge and skill degradation are known to occur over time. To combat this issue, many facilities in the U.K. have created resuscitation officer positions to provide frequent CPR and ACLS in-house training. The use of technologically advanced simulator mannequins has provided valuable assessment data in the analysis of performance deficits, thus allowing focused remedial training.

Patient populations served by each institution should also guide the mock scenarios used in practice and testing. A number of authors (Boonmak, Boomak, Srichaipanha, & Poomsawat, 2004; Hamilton, 2005; Hulme, Perkins, Baldock, & MacNamara, 2003) also agree that population-targeted, in-hospital remedial training should be provided as often as required. Identifying performance deficits through mock code blue practice and access to video self-instruction helps prevent skill degradation and develops expertise in specific population cardiac arrests.

**Code blue team effectiveness**

The aim of resuscitation is to improve patient outcomes that include intact neurological functioning and the quality of life previously experienced by the patient. Although the evidence supports improved performance after ACLS training for critical care nurses, they do not work alone during resuscitation efforts. To achieve these objectives and to implement these guidelines, an educated and well-organized team effort must be in place (Cummins, Sanders, Mancini, & Hazinski, 1997). Gilligan et al. (2005) state it “is appropriate that all members of the team know the theory that underlies the practice and are proficient in the skills required” for resuscitation and that “no singleprofession has a monopoly of the knowledge base required to deliver efficient patient care” (p. 630).

According to Marsch, Tschan, Semmer, Spychiger, Breuer, & Hunzikier (2005), resuscitation teams require coordinated team activity, yet post-arrest recall of events may be poor. Overestimating the quality of code blue team performance may occur due to this poor recall. Their study consisted of 20 teams that included three critical care nurses and one resident. All had received an in-house ACLS refresher course within two years and received an extensive orientation to the human patient simulator. The identical case scenarios were videotaped and the patient simulator data of the arrest were analyzed. Time to diagnosis of arrest, defibrillation, CPR, start of
ventilation, and administration of epinephrine were recorded. Significant delays and interruptions in CPR were evident on videotape. However, participants did not recall this delay in post-resuscitation debriefing. Recall of events was not accurate for any of the participants. This study concludes that videotaping mock resuscitation teams provides more objective and accurate data to assess team performance. This may also allow for the identification of deficits and provide a guide to focused remediation.

**Professional responsibility**

Although we have come a long way in multidisciplinary resuscitation education, there remains a gap in the standardization of ACLS training as a requirement for nurses’ employment both nationally and internationally. In examining critical care nursing positions via provincial websites across Canada, job postings are inconsistent. Some require ACLS training as entry to practice, others do not.

Neither the American Association of Critical Care Nurses nor the British Association of Critical Care Nurses has a policy statement regarding ACLS training for critical care nurses. Practice consultants for both associations state that the professional nurse is expected to maintain proficiency in the skills associated with cardiac arrest victims. The critical care nurse would be held accountable to the prevailing standard of care, which is currently ACLS guidelines (M.P. Aust, Critical Care Practice Consultant, personal communication, January 9, 2007; L. Harrison, Critical Care Practice Consultant, personal communication, January 18, 2007).

According to the Canadian critical care (adult) nursing exam list of competencies (Canadian Nurses Association, 2005), the critical care nurse will “select appropriate interventions to correct alterations in cardiac output such as (2.5i) managing cardiac arrest (e.g., ACLS protocols).” Nurses in critical care are specialized and need to be competent in their practice. The Critical Care Nurse Training Standards Task Group’s final report (Critical Care Secretariat Ontario, 2005) also states that the critical care nurse should participate in the management of a cardiac arrest, which may include knowledge of ACLS protocols.

International inconsistencies exist, both with regard to standard ACLS requirements for critical care nurses and with respect to the particular ACLS skills that they are or are not allowed to practice. In the U.K., O’Higgins, Ward and Nolan (2001) questioned not the necessity of ACLS training to practice in critical care, but the lack of authorization of ACLS-trained nurses to use ACLS skills. Their survey revealed inconsistencies between acute care facilities, such as district general and university teaching hospitals. Of the number of nurses surveyed, 11% intubated patients without medical supervision and more than 50% injected ACLS drugs, such as epinephrine, without medical supervision. The authors suggested that nurses trained in ACLS skills should be using these skills at the bedside and that a national standardization should be implemented. In the U.S., critical care nurses typically initiate CPR, defibrillate, and deliver ACLS drugs independently with standing orders (Peberdy et al., 2003).

Clarity is also lacking regarding maintenance of ACLS skills and knowledge. According to the College of Registered Nurses of Manitoba (CRNM, 2002), it is the professional responsibility of the nurse to ensure that they have specific knowledge, skills, and judgment required to competently manage complex care. A cardiac arrest is considered complex care. It is also the responsibility of the employer to provide policies and procedures, orientation and staff development programs based on identified learning and practice needs, and to ensure the provision of the necessary resources for nurses to attain and maintain competency (CRNM, 2002). Ultimately, it is the individual professional responsibility to maintain competence and it is the employer’s responsibility to assist with maintaining this competence.

**Potential barriers**

Funding ACLS training and skill maintenance is the most obvious potential barrier. The initial ACLS course varies across provinces. Paid work time to complete the ACLS training course results in additional costs. For optimal ACLS skill acquisition within a team approach and allowing a safe environment for practice, access to a simulation laboratory is recommended (Devitt, Kurrek, Cohen, & Cleave-Hogg, 2001). However, the cost of establishing a simulation laboratory in the United States is approximately $300,000 with a simulator alone averaging $85,000 (Kidd & Kendall, 2007).

Time constraints allotted for initial training and subsequent refreshers are also barriers. Alloting inappropriate time may have a negative impact on learning, reflection, discussion, and critical thinking and, thus, a deeper learning experience (Kidd & Kendall, 2007).

Availability of highly skilled and educated teachers knowledgeable in ACLS theory and psychomotor skill, as well as knowledge of adult learning principles may be limited and, therefore, a potential barrier.

Lack of buy-in from both nursing leaders and critical care nurses may also be a barrier. Whether the initial cost is incurred by the facility or by the individual nurse is a debate that surrounds resources versus professional responsibility issues.

**Further research**

Nurses are involved in every level of resuscitation from early identification to post-care and rehabilitation and are in a unique position to initiate and participate in research and initiatives that support enhanced patient outcomes. Research involving critical care nurses and ACLS training requires further study with emphasis on patient outcomes and analysis of skill degradation.

Research surrounding improvement of resuscitation team cohesiveness and efficiency requires access to technically advanced simulation mannequins. Code blue teams require team-building, efficient execution of cardiac arrest algorithms supported with education and psychomotor skill practice. Resuscitation is a multidisciplinary team effort and multidisciplinary research is required.
Conclusion
If the ACLS guidelines are the recognized standard of resuscitation management, and the Canadian Nurses Association list of competencies supports knowledge of such protocols, it is clear critical care nurses should have ACLS training to practise in Canadian critical care units. It is then the individual nurse’s professional responsibility to ensure he or she is current with these guidelines. It is also the employer’s responsibility to assist the nurse in maintaining this competence by providing opportunities to practise mock scenarios for maintaining the psychomotor skills and critical thinking abilities required to manage a cardiac arrest effectively.

Code blue team cohesiveness and efficiency should also be maintained with the institution of a resuscitation officer or a code blue committee to develop effective resuscitation teams. Access to simulation mannequins, frequent video-taped mock code blues for analysis and focusing the case scenarios to the patient population the team serves are some strategies critical care units can employ to improve resuscitation outcomes. Funding for such strategies is a debate that should be balanced among professional responsibility, institutional resource management, and evidence of patient outcomes.

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References

The Canadian ICU Collaborative: 
End-of-life care in the ICU: 
Does end-of-life care get enough attention in your ICU?

By Cathy Mawdsley, RN, MScN, CNCC, 
and Tracie Northway, RN, MSN, CNCCP(C)

“How people die remains in the memories of those who live on” (Pitorak, 2003).

As critical care nurses, we take pride in our knowledge and skills of resuscitation and curing illness, often leading to miraculous outcomes and professional satisfaction knowing we have made a difference in the life of a patient and family. Often, critical care nurses seek to care for the “sickest patient”, knowing that their knowledge of physiology and expert assessment and technical skills can impact a life in balance. However, do we seek to care for those patients who are at the opposite end of the spectrum, where cure is no longer the goal, with the same enthusiasm and comfort? For these patients, the goal is one of comfort to transition patients and families toward the dying process.

In these challenging situations, our physiological and technical knowledge take a back seat to our knowledge and skills of communication, the dying process, and our ability to separate our personal “wishes for the patient” and work with the decisions made by the patient and family. The emotional and process skills required by critical care nurses to care for a patient and support the family at this stage in life require tremendous expertise and time. Often, the people we work with and the systems we work within do not appreciate the time and work involved. It is easier to rationalize a high nursing ratio for a bedside full of infusion pumps and specialized technology, than a high nursing ratio for a bedside full of family members and a dying patient.

From the start of our critical care careers, the priorities of nursing orientations and inservices are physiologic disease processes, medications and associated nursing care. These priorities are justified considering the steep learning curve of novice critical care nurses, and the unstable and unpredictable patients who depend on us. However, are the same resources dedicated to end of life (EOL) to ensure all the nursing staff is “competent” and comfortable with EOL care? How do we know the EOL care we deliver is the best it can be, and each staff member is comfortable separating his/her own personal views from the provision of ethical care? When do we teach our novice and experienced nurses the latest evidence, techniques and recommendations to provide the best EOL care? How much educational time have we personally dedicated to learning more about how to deliver bad news, dealing with the grief-stricken family, and learning about the family values from nurses at EOL. This education and ongoing support is crucial to avoid or decrease the critical care team’s discomfort when working with dying patients and their grieving families (Uhlmann & Uhlmann, 2004; Workman, McKeever, Harvey, & Singer, 2003).

In most institutions, the knowledge and skills for expert EOL care are obtained through experience – and expertise is developed by those staff “who have the interest” and have often learned how not to do things by watching others (Cosgrove, Nesbitt. & Bartley, 2006; Puntillo, 2001). Considering the emotions and feelings associated with death and dying, how can we support our frontline critical care nurses to develop these skills and provide the best EOL care possible? Should all nurses be expected to care for these patients, or is this something that requires a specialized team similar to how some ICUs manage sophisticated technologies like renal replacement therapy or intra-aortic balloon pump?

In recent years, several American organizations have taken the initiative to improve EOL care in the ICU through the development of tools and educational programs. One noteworthy partnership is between the Robert Wood Foundation and the American Association of Critical Care Nurses (AACN, 2006). In Canada, the Canadian ICU Collaborative for Patient Safety recently selected improving EOL care in the ICU as a topic for improvement. This ICU Collaborative is using current literature and the experience of others to improve practices and systems (Canadian ICU Collaborative, 2007). There are seven teams from adult ICUs across Canada working on the topic of EOL care.

These teams are working towards one or more of the following goals:
1. To provide excellent communication between the health care team, patients and their families,
2. To focus on shared decision-making for treatment preferences,
3. To administer quality symptom management to dying, and
4. To provide bereavement support to family members.

For each of these goals, the collaborative has developed strategies and tools to change EOL practices, and measures to assist teams with evaluating their work and determining their improvement over time.

The medical surgical ICU (MSICU) at London Health Sciences Centre, initially with the Ontario Ministry of Health Critical Care Secretariat and more recently with the Canadian ICU Collaborative, has been reviewing its EOL practices (e.g., protocols, education, and support systems). Specifically, this team is focusing on two aspects of end-of-life care: 1) team, family and patient communication regarding EOL decision-making, and 2) quality symptom management during EOL care. The average monthly mortality rate in this unit is between 20% and 25%, and this is not unexpected in light of the admission acuity scores and diagnosis, and patient co-morbidities. More than 70% of these deaths occur after withdrawal of life support (WDLS). This MSICU had guidelines for WDLS since the 1990s. However, they just recently developed a standardized approach to every EOL situation in an effort to ensure that the physiological,
psychosocial, and spiritual aspects of EOL care are considered for every patient and family, as well as to ensure that staff is supported in the time required to “debrief” after an EOL situation.

In addition, this team implemented a standardized form to document all family meetings. Included on this form are specific questions to prompt the ICU team review and discuss patient progress and prognosis, goals of care, timing of future meetings, and the families’ understanding of the situation. As well, there are reminders for the team to consider all stakeholders in family meetings. For example, are the respiratory therapists asked to be a part of family meetings about EOL? The respiratory therapist is a key stakeholder in the process of withdrawal of ventilatory support, and an open and clear partnership between the critical care nurse and the respiratory therapist is essential. Feedback so far has indicated that the changes are improving communication within the team, and the staff is more comfortable with symptom management during EOL care.

One key learning for the EOL teams in the Canadian ICU Collaborative teams is that while ICUs are well-prepared to support staff with other disease processes or treatment regimens (e.g., septic shock, cardiac arrest), there are minimal official resources and education dedicated to EOL care. Often, mortality is seen as a bad thing, and rightly so if patients are expected to live. However, for patients with multiple chronic diseases who are near the end of life, mortality should be viewed as a sign of quality care (Holloway & Quill, 2007). Balancing the “cure and save at all costs” mentality of critical care with the reality that 15% to 25% of our patients will die in our ICUs is key to supporting patients and families, because if we are uncomfortable with the dying process, then families will be as well (Levy, 2001; Luce & Prendergast, 2001).

In order to improve EOL care, the critical care team needs to acknowledge the dichotomy of “cure all” and “comfort care”, and recognize when the patient is transitioning from one to the other. Often, the critical care nurse is one of the first to recognize this transition and start these conversations. There need to be supports in place to improve and maintain quality EOL care: a systematic approach to defining and measuring quality EOL care, tools to change practice, a commitment to changing culture and systems to support the delivery of evidence-based EOL care, and expert staff that is comfortable with EOL care and willing to role-model and advocate for best practice. By using the process of rapid change, and sharing ideas and resources nationally among teams, the Canadian ICU Collaborative end-of-life teams are starting to work on these supports, and are advocating that EOL care be openly discussed in each ICU, and resources developed similar to any disease process or clinical situation.

The frequency of death in our ICUs cannot be ignored, especially considering the invariable role the critical care nurse has in supporting both the patient and family during the dying process, and supporting the family as they start their grieving process. For the majority of critical care nurses, we have developed our communication skills and clinical practices around EOL from watching our peers and other members of the team. We have seen fellow critical care nurses cry with patients and families at the time of death, and create an EOL environment that will allow the family to say goodbye with peace and tranquility. Likewise, we have seen situations where communication about the dismal prognosis of a patient has been less than ideal, where families are shocked and paralyzed – and the critical care team is in turmoil.

As critical care nurses, we owe our patients and families the best EOL care possible. As critical care nurses, we are obligated to be the leaders and role models both in the provision of EOL care and our comfort with the dying process. As critical care nurses, we owe each other understanding and support during EOL care, as we learn more about ourselves and develop our expertise during each EOL situation we experience.

“Patients (and families) feel comforted and nurtured by a caregiver who is at ease with the dying process, who does not automatically shrink back from honest expression of grief, loss... who can provide a steadiness in the face of patient (and family) fear and anxiety of dying” (Levy, 2001 p. 36). If you would like more information about how to join the Canadian ICU Collaborative for Patient Safety, please contact Ardis Eliason at aeliasong@telus.net, or go to the website at www.improvementassociates.com, and click on Canadian Collaborative.

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References
Enhancing safety with potassium phosphates injection
By Patti Cornish, RPh, BScPhm, Sylvia Hyland, BScPhm, MHSc (Bioethics), and Christine Koczmara, RN, BSc

Abstract
The inadvertent administration of concentrated potassium chloride resulting in patient death is well-documented in Canada and other countries. Vials of potassium phosphates contain more than twice the concentration of potassium compared to vials of potassium chloride concentrate. If inadequately diluted or administered too rapidly, intravenous potassium phosphate can also lead to serious patient harm. This article contains information reprinted with permission from an ISMP Canada Safety Bulletin (ISMP Canada, 2006, April 25) for the purpose of enhancing safety with potassium phosphates injection.

Background
The dangers associated with inadvertent administration of concentrated potassium solutions are well-known. Adverse events resulting in death from the inadvertent injection of concentrated potassium chloride have been well-publicized (ISMP, 1996; ISMP Canada, 2003; The Joint Commission, 1998; NPSA, 2002; Reeve & Allinson, 2005). ISMP Canada and the Canadian Council on Health Services Accreditation (CCHSA) recommend that concentrated electrolytes be removed from patient care areas. Many Canadian hospitals have succeeded in removing concentrated potassium chloride products from patient care areas (Eli Lilly, 2006; ISMP Canada, 2003). The approach to removal of concentrated potassium phosphates solutions, however, is not as straightforward, largely due to the lack of availability of commercially prepared premixed infusion solutions.

Safety issues with potassium phosphates injection
Potassium phosphates injection is designated as a “high-alert” medication for the following reasons:
• Vials of potassium phosphates contain more than twice the concentration of potassium (4.4 mmol/mL) compared to potassium chloride concentrate (2 mmol/mL). If inadequately diluted or administered too rapidly, intravenous potassium phosphate can cause serious adverse consequences.

Other safety issues include:
• Product labels for commercially available potassium phosphates injection can be confusing because of the nature of the product (see Figure One). A variety of measurement units (mg, mEq, mmol, mOsm, mL) are used on the labels. The variety of information may cause confusion and may lead to calculation errors during preparation of doses for intravenous infusion.
• Variations in the way prescribers express doses of potassium phosphate may lead to error-prone conversions between milligrams (mg), milliequivalents (mEq), and millimoles (mmol) for the phosphorus component, as well as inattention to the amount of potassium delivered with each dose.

Note: The terms phosphate and phosphorus are often used interchangeably and this is acceptable for the purposes of prescribing. Although phosphorus is the elemental form and phosphate exists in various ionic forms, the millimolar content of phosphorous can be considered virtually identical to that of phosphate. Therefore, when prescribing a phosphate product, the recommendation (see below) is to specify the dose in millimoles (mmol).

Background information on the treatment of hypophosphatemia
Hypophosphatemia is a frequently encountered metabolic complication in critically ill hospital inpatients. Moderate hypophosphatemia is usually defined as serum phosphate in the range of 0.4–0.8 mmol/L and severe hypophosphatemia as a level below 0.4 mmol/L (Bugg & Jones, 1998; Dickerson, 2001). Oral phosphate supplementation is preferred for asymptomatic patients with mild to moderate hypophosphatemia when the enteral route is feasible. Intravenous phosphate supplementation is necessary for patients with severe hypophosphatemia, for symptomatic patients with moderate hypophosphatemia, or for patients in whom the enteral route is not feasible. Either potassium phosphates or sodium phosphates may be used for parenteral phosphate replacement. The electrolyte content of each of these products is noted in Figure Two.

Recommendations for preventing adverse events
1. Develop standard protocols for intravenous phosphate supplementation
As an essential first step to improving safety, it is recommended that institutions develop standardized dosing and monitoring protocols for intravenous phosphate replacement therapy. The development of such protocols will encourage the use of standardized doses and solutions. There is confusion about appropriate dosing and administration of phosphate infusions, regardless of whether potassium phosphate or sodium phosphate is used. This confusion may arise because the product monograph lacks clear dosing recommendations, because the labelling on the vials is confusing, and because clinical studies have used a variety of dosing regimens.

Figure One: Photograph of a commercially available potassium phosphates injection label illustrating the potential for confusion because of the nature of the product.
2. Develop “order sets” (pre-printed or electronic) for phosphate infusions

To ensure compliance with standard protocols, the development of order sets (pre-printed or electronic) for phosphate infusions should be considered. These orders should clearly specify the dose in mmol of phosphate, the type and volume of infusion solution, and the recommended rate of administration. As well, the mmol of potassium or sodium provided per dose should be stated on the pre-printed orders. In addition, for potassium phosphate infusions, it may be helpful to include a prompt to ensure that the patient’s serum potassium results are checked to ensure they are below a predetermined level. The text for labels for infusion bags and entries for computer-generated medication administration records (MARs) should also follow a standard format.

3. Remove potassium phosphates injection from patient care areas

The removal of concentrated potassium phosphates injection from patient care areas is an important patient safety initiative. How this is realized will depend on the decisions that are made during the development of standard protocols for phosphate infusion.

- Preferential use of sodium phosphate infusions for parenteral phosphate replacement may be an option for minimizing risk, especially when infusion bags cannot be prepared in the pharmacy. Sodium phosphates injection provides the same phosphate content as potassium phosphates injection, and presents less risk to patients if improperly diluted or rapidly infused. In a publication by Esmail et al. (2005) recommendations include the substitution of sodium phosphate for potassium phosphate for certain patients to facilitate removal of concentrated potassium phosphates from patient care areas. Since the product labels for sodium phosphates injection may be as confusing as those for potassium phosphates injection, it is crucial to establish standard dosing protocols and guidelines for the preparation, labelling and administration of infusion bags.
- If it is decided that potassium phosphate infusion is desirable for some or all patients with hypophosphatemia, the removal of the concentrated product from patient care areas will require a system that includes pharmacy-based preparation of standard infusion bags of potassium phosphate.
Collaboration among prescribers, nurses, and pharmacy personnel will be key to the success in implementing safety strategies for the removal of potassium phosphates injection from critical care and all other patient care areas within your organization. As with the removal of concentrated potassium chloride, sharing your learning related to the implementation of safety strategies beyond your organization is also an integral component towards advancing medication safety nationally with potassium phosphates injection.

ISMP Canada gratefully acknowledges the valuable lessons learned and information reported by professionals in the Canadian health care community that can then be shared to enhance medication system safety. All ISMP Canada Safety Bulletins are available from http://www.ismp-canada.org/ISMPCSafetyBulletins.htm

ISMP Canada is a national voluntary medication incident and ‘near miss’ reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.

Medication Incidents (including near misses) can be reported to ISMP Canada:
(i) through the website
   http://www.ismp-canada.org/err_report.htm or
(ii) by phone: 416-733-3131 or toll free: 1-866-544-7672.

ISMP Canada guarantees confidentiality and security of information received, and respects the wishes of the reporter as to the level of detail to be included in publications.

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References


Call for task force members – Dynamics 2009

Dynamics 2009 will be held in Fredericton, New Brunswick, and will be chaired by Cecilia St. George-Hyslop. Any CACCN member interested in working on this committee should submit a resume and summary of conference planning experience to the CACCN national office by March 1, 2008. Selection of the task force members will take place in March 2008. For further information on this exciting opportunity, please contact the CACCN national office, P.O. Box 25322, London, Ontario N6C 6B1, www.caccn.ca, e-mail: caccn@caccn.ca, phone: (519) 649-5284, fax: (519) 649-1458.

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Dynamics: The Official Journal of the Canadian Association of Critical Care Nurses is looking for members to join the Editorial Review Board

Requirements include:
• Current CACCN member
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CACCN Chapter of the Year Award Program

Award value: $500 plus a plaque.

Deadline: There is no application process, rather the award program will be for the period of April 1–March 31 each year.

Purpose: The Chapter of the Year Award is to recognize the effort, contributions and dedication of a chapter of CACCN in carrying out the purposes and goals of the association.

Criteria for the award program:

1. Chapters may win the award for one year followed by a two-year lapse before entering again.
2. A point system has been developed to evaluate chapter activities during the year. The chapter with the most points will be the winner of the Chapter of the Year Award. CACCN reserves the right to adjust points depending upon supporting materials submitted.
3. The award winner will be announced at Chapter Connections Day and at the annual awards ceremony at Dynamics.

Conditions for the award program:

All chapters of CACCN are eligible to participate provided they have on file at national office all of their financial (quarterly) and activity (annual) reports required for the qualifying period. Chapter website must be current.

If the above conditions are not met, the entry will be disqualified.

Announcement of the winner will be published in CACCN publications.

Categories and their corresponding points that will be used to determine the winning chapter are as follows:

1. Any educational programs that occurred during the fiscal year.
   Programs between:
   1-3 hours........25 points each
   3-8 hours........50 points each
   > 8 hours........100 points each

2. A list of new members recruited during the fiscal year, including national CACCN membership numbers. Calculate your points based on the percentage of new members recruited as compared to the total membership of the previous fiscal year (prior to the qualifying period).
   1-10%..........10 points 51-60%..........60 points
   11-20%..........20 points 61-70%..........70 points
   21-30%..........30 points 71-80%..........80 points
   31-40%..........40 points 81-90%..........90 points
   41-50%..........50 points 91-100%........100 points

3. Evidence of chapter members who have contributed articles to either the chapter newsletter, or had a paper published in Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses.
   25 points for each article/paper

4. Projects that provide public education, community service and/or promote the image of critical care nursing. These projects must be presented under the auspices of the CACCN chapter (i.e., participating in blood pressure clinics, teaching CPR to the public, participating in health fairs). Validation must be provided that the event was a CACCN-sponsored project by, for example, submitting a letter from the receiving group or a picture of the event, etc.
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In the case of a tie, CACCN reserves the right to determine the winner. Good luck in your endeavours!

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Grant available: A CACCN research grant has been established to provide funds to support the research activities of a CACCN member that are relevant to the practice of critical care nursing. A grant will be awarded yearly to the investigator of a research study that directly relates to the practice of critical care nursing.

Eligibility: The principal investigator must:
- Be a member of CACCN in good standing for a minimum of one year.
- Be licensed to practise nursing in Canada.
- Conduct the research in Canada.
- Publish an article related to the findings in Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses.

CACCN members enrolled in graduate nursing programs may also apply. Members of the CACCN board of directors and the awards committee are not eligible.

Application requirements:
- A completed application form.
- A grant proposal not in excess of five pages exclusive of appendices. Appendices should be limited to essential information, e.g., consent form, instruments and budget.
- A letter of support from the sponsoring agency (hospital, clinical program) or thesis chairperson/adviser (university faculty of nursing).
- Evidence of approval from an established institutional ethical review board for research involving human subjects and/or access to confidential records. Refer to the CNA publication Ethical Guidelines for Nursing Research Involving Human Subjects.
- Brief curriculum vitae for the principal investigator and co-investigator(s) describing educational and critical care nursing background, CACCN participation, and research experience. An outline of their specific research responsibilities is to be included.
- Proof of CACCN active membership.
**Budget and financial administration:**
- Funds are to be issued to support research expenses.
- Funds must be utilized within 12 months from the date of award notification.

**Review process:**
- A research review committee will review each proposal. Its recommendations are subject to approval by the board of directors of CACCN.
- Proposals are reviewed for potential contribution to the practice of critical care nursing, feasibility, clarity and relevance.
- Deadline for receipt of application in CACCN national office is February 15. The recipient of the research grant will be notified by mail.

**Terms and conditions of the award:**
- The research award is to be initiated within six months of the receipt of the grant. Any changes to the study timelines require notification in writing to the board of directors of CACCN.
- All publications and presentations arising from the research study must acknowledge CACCN.
- A final report is to be submitted to the board of directors of CACCN within three months of the termination date of the grant.
- An article related to the research study is to be submitted to *Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses*, for publication.

**Editorial Awards**

*Edwards*

**Award value:** $750 Edwards

*3M HealthCare*

**Award value:** $250 3M HealthCare

**Deadline:** None. Awards committee selection process.

The Editorial Awards will be presented to the authors of two written papers in *Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses*, which demonstrate the achievement of excellence in the area of critical care nursing. An award, provided by Edwards Lifesciences, will be given to the author(s) of the best article, and another award, provided by 3M, is given to the author(s) of the runner-up article. It is expected that the money will be used for professional development. More specifically, the recipient must use the funds:

1. Within 12 months following the announcement of the winners, or within a reasonable time;
2. To cover and/or allay costs incurred while attending critical care nursing-related educational courses, seminars, workshops, conferences or special programs or projects approved by the CACCN, and
3. To further one’s career development in the area of critical care nursing.

**Eligibility**
1. The author is an active member of the Canadian Association of Critical Care Nurses (minimum of one year). Should there be more than one author, at least one has to be an active member of the Canadian Association of Critical Care Nurses (minimum of one year).

2. The author(s) is prepared to present the paper at Dynamics of Critical Care (optional).
3. The paper contains original work, not previously published by the author(s).
4. Members of the CACCN board of directors, awards committee or editorial committee of *Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses* are excluded from participation in these awards.

**Criteria for evaluation**
1. The topic is approached from a nursing perspective.
2. The paper demonstrates relevance to critical care nursing.
3. The content is readily applicable to critical care nursing.
4. The topic contains information or ideas that are current, innovative, unique and/or visionary.
5. The author was not the recipient of the award in the previous year.

**Style**
The paper is written according to the established guidelines for writing a manuscript for *Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses*.

**Selection**
1. The papers are selected by the awards committee in conjunction with the CACCN board of directors.
2. The awards committee reserves the right to withhold the awards if no papers meet the criteria.

**Presentation**
Representatives of the sponsoring company or companies will present the awards at the annual awards ceremony during the Dynamics conference. Their names will be published in *Dynamics, the Official Journal of the CACCN*.

**The Spacelabs Innovative Project Award**

*Spacelabs*

**Award value:** $500.00

**Deadline:** January 15, 2008

The Spacelabs Innovative Project Award will be presented to a group of critical care nurses who develop a project that will enhance their professional development. The primary contact person for the project must be an active member of CACCN (for at least one year). If the applicant(s) are previous winners of this award, there must be a one-year lapse before submitting again. Presentation of the award will be made at Dynamics.

Applications will be judged according to the following criteria:

1. The number of nurses who will benefit from the project
2. The uniqueness of the project
3. The relevance to critical care nursing
4. Consistency with current research/evidence
5. Ethics
6. Feasibility
7. Timeliness
8. Impact on quality improvement.
Within one year, the winning group of nurses is expected to publish a report that outlines their project in *Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses*.

Do you have a unique idea?

**SMITHS Educational Awards**

**Award value:** $750.00 each (two awards)

**Deadlines:** January 31 and September 1 of each year.

The CACCN Educational Awards have been established to provide funds ($750.00 each) to assist critical care nurses to attend continuing education programs at the baccalaureate, masters and doctorate of nursing levels. All critical care nurses in Canada are eligible to apply, except members of the CACCN board of directors.

**Criteria for application**

1. Be an active member of CACCN in good standing for a minimum of one (1) year.
2. Demonstrate the equivalent of one (1) full year of recent critical care nursing experience in the year of the application.
3. Be an active member (minimum of one [1] year) of CACCN committee(s) and/or participate in other chapter-related activities. Past participation is acceptable.
4. Submit a letter of reference from his/her current employer.
5. Be accepted to an accredited school of nursing or recognized critical care program of direct relevance to the practice, administration, teaching and research of critical care nursing.
6. Incomplete applications will not be considered; quality of application will be a factor in selecting winners.
7. Was not the recipient of this award in the past two years?

**Application process**

1. Submit completed CACCN educational award application forms to national office (forms package can be requested from national office).
2. Obtain a minimum of 250 merit points (preference will be given to members with the highest number of merit points).
3. Keep a record of his/her own merit points, dating back three (3) years (forms included in package).
4. Submit all required documentation outlined in criteria. Candidate will be disqualified if documentation is not submitted with application.

**Post-application process**

1. All applications will be acknowledged in writing from the awards committee.
2. The awards committee will notify unsuccessful applicants individually.

Winners will be acknowledged at the awards ceremony at the annual Dynamics conference and their names will be published in *Dynamics, the Official Journal of the CACCN*.

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**Chapter Recruitment and Retention Award**

This CACCN initiative was established to recognize the chapters for their outstanding achievements with respect to recruitment and retention.

**Recruitment Initiative**

This initiative will benefit the chapter if the following requirements are met:

- If the chapter recruits 25-49 new members from April 1 to March 31 of the next year, they receive one full tuition to Dynamics of that year.
- If the chapter recruits 50-100 new members from April 1 to March 31 of the next year, they receive one full tuition and one $100.00 coupon to Dynamics of that year.

**Retention Initiative**

This initiative will benefit the chapter if the following requirements are met:

- If the chapter has 100% renewal of its previous year’s members, the chapter will receive three $100.00 coupons to Dynamics of that year.
- If the chapter has greater than 80% renewal of its previous year’s members, the chapter will receive two $100.00 coupons to Dynamics of that year.
- If the chapter has greater than 60% renewal of its previous year’s members, the chapter will receive one $100.00 coupon to Dynamics of that year.

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**Braun Mentorship Award**

**Award value:** $1,000.00

**Deadline for nominations:** March 1, 2008

This award will be presented to an individual who exhibits stellar leadership and mentoring abilities in critical care. The candidate is an individual who supports, encourages, and teaches colleagues. The candidate must demonstrate a strong commitment to the practice of critical care nursing and the nursing profession. These qualities may be demonstrated by continuous learning, professional involvement, and a commitment to guiding novice nurses in critical care. Each nomination must have the support of another colleague and the individual’s manager. It is not necessary for the candidate to be in a formal leadership or education role to qualify for this award.

**Criteria:**

- Nominee must be a CACCN member
- The nominee must have at least three years of critical care nursing experience
- CACCN board of directors are not eligible
- At least one nomination letter must be written by a CACCN member
- Preference is given to a mentor who has CNA certification
• The nominee must demonstrate an awareness of and adherence to the standards of nursing practice as determined by the provincial nursing body, and the Standards of Critical Care Nursing (2004).

Three letters of support are required:
• The nominator must outline the qualities of the candidate, and reasons the candidate should be chosen to receive the award.
• Two additional letters must testify to the eligibility of the candidate as well as outline his/her attributes (one must be written by the nominee’s manager).
• All three letters must be sent by electronic mail by each person on the same day with the subject matter: “BBraun Mentorship Award – Candidate’s Name” to the director responsible for awards at National Office.

Selection Process:
• Each nomination will be reviewed by the awards committee in conjunction with the CACCN director of awards & sponsors.
• The successful candidate will be notified by mail, recognized at the annual awards ceremony at the Dynamics conference and her/his name will be published in Dynamics, the Official Journal of the CACCN.
• The awards committee reserves the right to withhold the award if no candidate meets the criteria.
• The funds may be used to attend educational programs or conferences related to critical care.

The Guardian Scholarship – Baxter Corporation Award for Excellence in Patient Safety

Award value: One award of $5,000.00 or two awards of $2,500.00 each.

Deadline: June 1, 2008.

The Baxter Corporation Guardian Scholarship will be presented to an individual or an interdisciplinary team who propose to make, or who have made, significant contributions toward patient and/or caregiver safety in the critical care environment. Recipients of this award will identify ideas that encompass safety and improve the quality of care in their practice area.

Eligibility
The principal investigator (or applicant) must:
• Be a member of CACCN in good standing for a minimum of one year.
• Be licensed to practise nursing in Canada.
• CNA certification preferred.

Members of the awards committee or the board of directors are not eligible.

Application Requirements:
• The projects will be consistent with the theme of the upcoming Dynamics conference.
• The project will describe an innovative approach, to develop new or revised processes, to encompass patient safety and improve the quality of care at the unit, hospital or health care system level.
• The project/proposal will show evidence of collaboration among team members.

A complete application form that includes:
• A proposal of a project, or a description of a completed project, which makes a significant contribution toward patient and caregiver safety in critical care. The proposal will include the background perspective, statement of the problem, and intended means to change practice. The proposal should include a timeline by which the project will occur.
• Approval from an established institutional ethical review board for projects involving human subjects and/or access to confidential records, if applicable. (Applicant may refer to the CNA publication, Ethical Guidelines for Nursing Research Involving Human Subjects, or the research review process in their institution).
• Brief curriculum vitae for the principal applicant and team members describing educational and critical care nursing background and CACCN participation.
• Proof of active CACCN membership.
• Proof of CNA certification in critical care (if applicable).

Review Process
• A committee made up of a member of the CACCN BOD, a member of the Baxter Corporation and a member of the CACCN Annual Conference Planning Committee (preferably the Chair) will review each proposal.
• Proposals are reviewed for their contribution to patient safety, evidence of transferability of the project, innovation, sustainability, and leadership within critical care practice areas.
• The successful candidate will be notified in writing.

Terms and Conditions of the Award
• A proposed project must be initiated within three months of the receipt of the scholarship.
• Any changes to the timelines require written notification to the board of directors of CACCN.
• All publications and presentations must recognize the Baxter Corporation and CACCN.
• An article related to the project is to be submitted to Dynamics, the Official Journal of CACCN, for publication and the project will be presented at a future Dynamics conference.

Budget and Financial Administration
• One-half of the awarded funds will be available to support the project expenses immediately.
• The remaining funds will be awarded upon the publication of an article describing the project in Dynamics, the Official Journal of CACCN.

NOTE: The CACCN Board of Directors & Baxter Corporation retain the right to amend the award criteria.
Brenda Morgan Leadership Award

Award value: 1,000.00
Deadline: June 1, 2008

The Brenda Morgan Leadership Award was established in June 2007 by the CACCN Board of Directors to recognize and honour Brenda Morgan, who has made a significant contribution to CACCN and critical care nursing over many years. Brenda is the first recipient. Brenda is highly respected for her efforts in developing, maintaining and sustaining CACCN in past years.

This award for excellence in leadership will be presented to a nurse who, on a consistent basis, demonstrates outstanding performance in the area of leadership in critical care. This leadership may have been expressed as efforts toward clinical advances within an organization, or leadership in the profession of nursing in critical care. The results of this individual’s leadership must have empowered people and/or organizations to significantly increase their performance capability in the field of critical care nursing.

This award has been generously sponsored by CACCN in order to recognize and honour a nurse who exemplifies excellence in leadership, in the specialty of critical care.

Eligibility criteria
Persons who are nominated for this award will have consistently demonstrated qualities of leadership and are considered visionaries and innovators in order to advance the goals of critical care nursing.

The nominee must:

a) Have demonstrated a leadership role or have held a key leadership position in an organization related to the specialty of critical care.

b) Demonstrated volunteerism and significant commitment to CACCN, i.e., have participated in CACCN activities at local or national levels (been a member of provincial executive or national board of directors, helped to plan a workshop or a conference), or indirectly provided support of CACCN activities through management activities – supporting staff to participate in CACCN projects or attend conferences.

c) Have been a member of CACCN for a minimum of five years.

d) Have a minimum of five years of critical care nursing experience.

ey) Be registered to practise nursing in Canada.

f) Hold a valid adult or paediatric specialty in critical care certification – Certified Nurse in Critical Care, CNCC(C) or CNCCP(C) from the CNA (preferred).

g) Consistently conducts themselves in a leadership manner.

h) Have effectively engaged others in the specialty of critical care nursing.

i) Have role-modelled commitment to professional self-development and lifelong learning.

j) Have inspired and mentored others to contribute to critical care nursing.

k) On a consistent basis, exemplify the following qualities/values:
   • pro-active/innovator/takes initiative
   • takes responsibility/accountability for actions
   • imagination/visionary
   • positive communication skills
   • interdependence
   • integrity
   • recognition of new opportunities
   • conflict resolution skills/problem-solving skills
   • committed/passionate/dedicated/motivator
   • advocates for patients and families

Application process
The application involves a nomination process. Please submit two letters describing how the nominee has demonstrated the items under the criteria section of this award. Please use as many examples as possible to highlight what this candidate does that makes her/him outstanding. The selection committee depends on the information provided in the nomination letters to select award winners from amongst many deserving candidates.

Winners will be awarded the Brenda Morgan Leadership Award and honoured during the awards ceremony, at the annual Dynamics Conference. Their names will be published in Dynamics, the official Journal of the CACCN.

Terms and conditions of the award
In order to receive the award, the award winner will agree to write a reflective article for the Dynamics, Official Journal of the CACCN sharing their accomplishments and describing their leadership experience. The article will reflect on their passion to move critical care nursing forward, their leadership qualities and how they used these effectively to achieve their outcome.

Selection process
Each nomination will be reviewed by the award committee in conjunction with the CACCN Director of Awards and Sponsorship. The Brenda Morgan Leadership Awards committee will consist of two members of the board of directors and Brenda Morgan (when possible).

The awards committee reserves the right to withhold the award if no candidate meets the criteria outlined.
Spacelabs Healthcare Delivers

Spacelabs connectivity through the UltraviewSL™ patient monitoring line automates processes, reduces task redundancy and improves care efficiencies. It also means connecting you to all of your patients, and bringing you all the information you need - when and where you need it.

Spacelabs compatibility through the use of open systems architecture gives you the ability to interface to existing Clinical Information Systems and 3rd party devices such as ventilators and infusion pumps at the bedside.

Connecting with caregivers and healthcare technology partners throughout the world, Spacelabs is dedicated to providing you with solutions that give you more time to care.

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Connecting Innovation with Care
How can you dramatically
Impact Perinatal Care?

Simplify decision making
by integrating information
from 3 devices onto

1 display

Fragile neonates require constant monitoring. Yet accessing data from warming therapy, ventilation and vital signs monitoring devices can take your attention away from the infant. Dräger Medical’s Neonatal Monitoring Solution brings together information from three devices and displays it on one screen – right at the point of care. As a result, you can recognize the infant’s current situation more quickly and make better informed decisions. This is just one facet of our integrated CareArea™ Solutions for Perinatal Care – and the entire care process. To discover how all our innovative solutions can impact your entire care process hospital-wide, visit www.draeger.com.
Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses (CACCN), is distributed to members of the CACCN, to individuals, and to institutions interested in critical care nursing. The editorial board invites submissions on any of the following: clinical, education, management, research and professional issues in critical care nursing. Critical care encompasses a diverse field of clinical situations which are characterized by the nursing care of patients and their families with complex, acute and life-threatening biopsychosocial risk. While the patient’s problems are primarily physiologic in nature, the psychosocial impact of the health problem on the patient and family is of equal and sometimes lasting intensity. Articles on any aspect of critical care nursing are welcome. The manuscripts are reviewed through a blind peer review process. Manuscripts submitted for publication must follow the following format:

1. **Title page with the following information:**
   - Author(s) name and credentials • Place of employment • If there is more than one author, the names should be listed in the order that they should appear in the published article • Indicate the primary person to contact and address for correspondence.

2. **A brief abstract of the article on a separate page not to exceed 100 words.**

3. **Body of manuscript:**
   - Length: a maximum of 15 pages including tables, figures and illustrations, and references • Format: double spaced, 1 1/2 inch margins on all sides. Pages should be numbered sequentially including tables, figures and illustrations. Prepare the manuscript in the style as outlined in the American Psychological Association’s (APA) Publication Manual 5th Edition. • Tables, figures, illustrations and photographs must be submitted each on a separate page after the references. • References: the author is responsible for ensuring that the work of other individuals is acknowledged accordingly. Direct or indirect quotes must be acknowledged according to APA guidelines • Permission to use copyrighted material must be obtained by the author and included as a letter from the original publisher when used in the manuscript.

4. **Copyright:**
   - Manuscripts submitted and published in Dynamics become the property of the CACCN. Authors submitting to the journal are asked to enclose a letter stating that the article has not been previously published and is not under consideration by another journal.

5. **Submission:**
   - Please submit the manuscript electronically as a Word attachment to the editorial office as printed in the journal. Accepted manuscripts are subject to copy editing.
The voice for Canadian critical care nurses involved in practice, education, research and administration in:

- Medical ICU
- Cardiovascular ICU
- Neonatal and Pediatric ICU
- Burn Units
- Trauma Units
- Surgical ICU
- Neurosurgical ICU
- CCU
- Recovery Room

**Mission Statement**

The Canadian Association of Critical Care Nurses is a non-profit, specialty organization dedicated to maintaining and enhancing the quality of care provided to critically ill patients and their families. We serve the public, our members and the critical care nursing community by meeting the professional and educational needs of critical care nurses.

These needs are met by:
- developing and implementing standards of critical care nursing practice
- providing educational opportunities
- supporting and facilitating critical care nursing research
- providing opportunities for networking
- identifying and addressing political and professional issues
- collaborating with other professional organizations

**Objectives**

i) to provide informed guidance in shaping the delivery system as it relates to the care of the critically ill
ii) to determine standards for critical care nursing
iii) to determine certification standards for national testing for the specialty of critical care nursing
iv) to promote and provide educational opportunities
v) to improve the quality of patient care through the promotion of nursing research in critical care
vi) to promote membership and chapter development.

**Application for membership**

Name: __________________________________________________________

Address: __________________________________________________________

__________________________________________

City) (Province) (Postal Code)

W (__) ____ - ________ H (__) ____ - ________ F (__) ____ - ________

Employing Agency: _________________________________________________

Position: __________________________________________________________

Area of Employment: _______________________________________________

Nursing Registration No.: ______________________ Province: _____________

Chapter Affiliation: _________________________________________________

Sponsor’s Name: ___________________________________________________

Please check one:
- New Member $75.00 (includes 6% GST)
- Renewal $75.00 (includes 6% GST) - Present Number _______________

Are you a CNA member? Yes, No

Signature: ________________________________________________________

Date: __________________________

Please Note: This application is for both national and chapter membership.

Make cheque or money order payable to:
Canadian Association of Critical Care Nurses (CACCN)
Mail to: CACCN, P.O. Box 25322, London, Ontario, N6C 6B1
Telephone: (519) 649-5284, Fax: (519) 649-1458
e-mail: caccn@caccn.ca
www.caccn.ca