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DYNAMICS

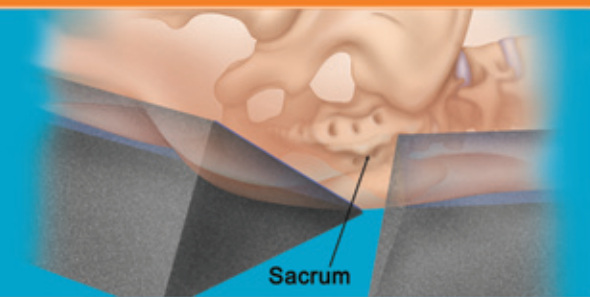
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Journal of the Canadian Association of Critical Care Nurses

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DYNAMICS

Journal of the Canadian Association of Critical Care Nurses

Volume 22, Number 3, Fall 2011

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is printed on recycled paper.



**Canadian
Association of
Critical Care Nurses**



Canadian Association of Critical Care Nurses

Vision statement

The voice for excellence in Canadian Critical Care Nursing

Mission statement

The CACCN is a non-profit, specialty organization dedicated to maintaining and enhancing the quality of patient- and family-centred care by meeting educational needs of critical care nurses.

Engages and empowers nurses through education and networking to advocate for the critical care nurse.

Develops current and evidence-informed standards of critical care nursing practice.

Identifies professional and political issues and provides a strong unified national voice through our partnerships.

Facilitates learning opportunities to achieve Canadian Nurses Association's certification in critical care.

Values and beliefs statement

Our core values and beliefs are:

- Excellence and Leadership
 - Collaboration and partnership
 - Pursuing excellence in education, research, and practice
- Dignity & Humanity
 - Respectful, healing and humane critical care environments
 - Combining compassion and technology to advocate and promote excellence
- Integrity & Honesty
 - Accountability and the courage to speak for our beliefs
 - Promoting open and honest relationships

Philosophy statement

Critical care nursing is a specialty that exists to care for patients who are experiencing life-threatening health crises within a patient/family-centred model of care. Nursing the critically ill patient is continuous and intensive, aided by technology. Critical care nurses require advanced problem solving abilities using specialized knowledge regarding the human response to critical illness.

The critical care nurse works collaboratively within the inter-professional team, and is responsible for coordinating patient care using each member's unique talents and scope of practice to meet patient and family needs. Each patient has the right to receive care based on his/her personal preferences. The critically ill patient must be cared for with an appreciation of his or her wholeness, integrity, and relation to family and environment.

Critical care nurses plan, coordinate and implement care with the health care team to meet the physical, psychosocial, cultural and spiritual needs of the patient and family. The critical care nurse must balance the need for the highly technological environment with the need for safety, privacy, dignity and comfort.

Critical care nurses are at the forefront of critical care science and technology. Lifelong learning and the spirit of enquiry are essential for the critical care nurse to enhance professional competencies and to advance nursing practice. The critical care nurse's ability to make sound clinical nursing judgments is based on a solid foundation of knowledge and experience.

Strategic plan: Five pillars



1. Leadership:

- Lead collaborative teams in critical care interprofessional initiatives
- Develop, revise and evaluate CACCN Standards of Care and Position Statements
- Develop a political advocacy plan

2. Education:

- Provision of excellence in education
- Advocate for critical care certification

3. Communication & Partnership:

- Networking with our critical care colleagues
- Enhancement and expansion of communication with our members

4. Research:

- Encouraging, supporting, facilitating to advance the field of critical care

5. Membership:

- Strive for a steady and continued increase in CACCN membership

The impressions we leave...

IN RECENT MONTHS I have spent a lot of time in hospitals with my two elderly parents, both with health issues. Sadly, my dad passed away recently at the age of 85 in a Veteran's long-term care dementia unit. He had been cared for lovingly at home by my mother, 83, until March of this year. As I write this article in mid July, my mother is recovering in a geriatric "restorative care" unit after having her artificial, but septic knee joint removed in emergency surgery in June, on the very day and hour that my father died. She will face further surgery to replace the joint in the fall when she is infection-free, so I know that I will be spending more time in hospitals in the months ahead, as I assist her. I have met many health care professionals and providers in this time, and I have been left with a lot of impressions that I think are important to appreciate about how the family "sees" us, as nurses, when we work with them. What we say and do are noticed and can make a positive difference for our patients and their families in ways that we may not realize and may never know.

During the many hours my family has been navigating the health care system for both of our parents, we have come across some outstanding examples of nurses who have been exemplary in their care coordination of the needs of my parents and their family. And at other times (thankfully not many), I have been disappointed when some of the most basic information about my family was not known by a nurse caring for my mother. My dad was already palliative and had a DNR order in place when my mom was taken by ambulance to hospital unable to walk and in great pain and distress. When she was admitted from the emergency department at 2 a.m., five days before her surgery, she was initially placed in a four-bed room. I had a quick chat the next morning with the charge nurse explaining that we were dealing with my dad's last days (he was in the same facility) and would appreciate being moved to a private room. It took only 10 minutes to organize and this request was accommodated. Great impression. The nurses that shift immediately saw more than the lady with the septic knee. Three days later, the same nurses worked with my family to ensure that my mom had the opportunity to be brought to my dad's room for one last time together to hold hands and say good-bye to her husband of 62 years. The nurses on two nursing units (one acute care and one long-term care) made that happen, and we will forever treasure and remember how important that was for both of them to be able to reach out and hold hands one last time. Dad died two days later, while mom was on the operating table. In her immediate post operative period, the physical care provided to my mother was attentive, expert, vigilant and constant on the orthopedic unit. For the most part, everyone knew "her story" and was sensitive to the additional emotional burden she carried while she struggled to recover from her sur-

gery. Photos of our family and my dad's obituary were posted on her bulletin board, so I was surprised when it was apparent that several very skilled and knowledgeable nurses caring for my mother were unaware that my dad had died when they inquired about how he was doing or where he was several days after he had died. The continuity of information was not carried through shift after shift. Not a great impression. It left me thinking... what else is not being passed along?

As mom began to recover and become more aware of her surroundings, she took notice of what was being said by nurses and I took notice of the impact this was having on her confidence that she would get the attention and care she needed. She felt vulnerable when she was told "We are short staffed today" or "We are very busy, as we had two sick calls." She worried that she would not get the care she needed, and she tried to be the "good" patient not making too many demands on the already overburdened nursing team. This strategy would mean that requesting a pain medication was delayed until she felt it would not be an imposition to the nurse, or waiting too long to ambulate. Of course, the nurses did not see it as an imposition, but that is the impression my mother had when she knew they were short-staffed.

Patients and their families need to be able to maintain confidence in their nurses and do not need to be burdened with the daily staffing challenges. That leaves the impression that their care could be less than optimal. We hold a sacred trust with our patients and we cannot undermine that trust by sharing our staffing issues.

Our patients' world is very small, they are very limited in their view while in hospital and all their impressions are formed as they see and watch and listen to what is happening around them. As nurses, they watch us closely and trust us explicitly—so, when we worry, they worry. When we are confident, they are confident.

Many years ago, I had to "counsel" a critical care nurse who was in-charge on a busy shift, because of the impression she left when she had been assigned the care of a family whose child had died on the previous shift, but who continued to want to stay and hold and rock the child several hours later. It was a busy night shift and the nurse initially checked in on the family, but then had to help out elsewhere, as more admissions arrived. She was finding it increasingly hard to continue to have the deceased child assigned to her and, in her efforts to assess how the family was doing, she poked her head through the curtain and inquired to the mother very matter-of-factly, "How much longer are you going to be?" The mother was horrified being asked that question, and was very distressed in my

follow-up with her that she had been approached in this manner. Her impression was that the nurse was cold, uncaring and insensitive. The nurse was equally horrified that she had caused this distress to the mother when I made her aware of what the mother had told me. I am sure, to this day, the mother remembers those words spoken to her, and I hope the nurse has never repeated a similar comment.

Patients and families notice what we say, what we do and even what we are wearing some days. Conversations around patients between staff about social events attended or how late you have been out do not belong near the patient. Burdening the patient with conversations about staffing shortages does not belong near the patient. Sitting at the bedside using a cell phone to have text conversations with others is time taken away from learning something about your patient and their family when you are not busy performing technical tasks. Personal cell phones do not belong at the bedside when you are on duty. How you dress for work, how you introduce yourself as the RN, and how you speak to families all form impressions that speak volumes about who you are, as a professional RN. Casual dress days at work that allow you to wear jeans do nothing to create a positive impression of an RN and it is something we need to think about.


It is a challenging environment in the ICU to provide the kind of holistic care we wish to on some shifts when our patients are very unstable and the technology that has advanced the care also competes for our attention in monitoring, recording and documenting information. There are many tasks to be done for the critically ill patient that keep us busy. Yet, as the bedside critical care nurse, you are responsible to coordinate everything that possibly goes on in the universe of your patient and that is a role that belongs solely to the RN in the ICU. It is one of our most important responsibilities to do well. Although it is necessary to master the myriad of technical skills and to acquire the education and knowledge one needs to be competent to work in critical care, it is equally important to be the coordinator of care for the patient and family. If we define ourselves by the tasks we perform, then many of these tasks can be delegated to other professionals or health care providers. When the “busy work” is done by others, it is what the RN does with the time she/he now has to provide the kind of holistic care that critically ill patients and their families need. If we can’t describe this role as one of our most important duties, then why are we surprised when others may think that we are “replaceable” with other health care professionals (i.e., LPNs) or assistive personnel (Patient Support Workers) who can perform the tasks? When we have time to have text conversations, yet say we have no time to talk to our patients, who are we really fooling?

I have had the privilege in my career to watch so many critical care nurses who embrace a holistic model of care for critically ill patients and their families, performing their jobs with the technical expertise and knowledge one would expect, but able to combine this with an amazing ability to “be there” for their patients in the quieter moments. One on one. They have used their time to find out the needs of the patients they serve. These are the nurses who develop the programs and the holistic mod-

els of care in many of our ICUs that are innovative and improve the lives of patients. They are the nurses that patients and families remember positively.

We often do not know what impression we have left with a patient or family, but it is there. This reality was demonstrated to me last fall when I was travelling. I was passing through security at the airport in Halifax and the woman who was screening me asked, “Are you a nurse at the IWK in PICU?” I told her I was. She then told me that she remembered me from the time her daughter had open heart surgery there in 1992. She said that one day she was having a very low day and felt she could not cope anymore and that I had sat with her and told her how strong she was, as a mother, how resilient she was, and how that was helping her daughter to recover. She said I gave her the strength to carry on that day. She said she never forgot it and when she has had low days since, she remembers that conversation. She went on to tell me that her daughter (now 21) was moving away to Alberta and she was having to be strong again... but she knew she could be. We reconnected. I did not remember that conversation... but the mother did.

In the critical care unit, our patients and their families often are sitting in the middle of all the activity and conversations going on around them. They become very attuned to the daily rhythm of the unit and acutely aware when there are issues among the staff. Each conversation they overhear forms an impression. They notice many things. Each observation they make forms an impression of the nurse who provides care to them.

What impression do you want to leave? 

Take care of yourself and each other.
Kate Mahon, RN, BN, MHS
CACCN President

Dynamics 2013 conference planning committee Call for participation

Dynamics 2013 will be held September 22–24, 2013, at the World Trade and Convention Centre in Halifax, Nova Scotia. Dynamics 2013 will be chaired by Kate Mahon. CACCN members interest in working on the conference planning committee should submit a resume/CV and summary of conference planning experience (*planning experience is appreciated, but not a requirement for submission*) to the CACCN National Office by March 1, 2012. Planning Committee selection will take place in March 2012. *Consideration will be given to planning committee applicants who are local to the conference venue or are from chapters/provinces/adjacent to the conference venue.* For further information on this exciting opportunity, please contact the CACCN National Office, P.O. Box 25322, London, ON N6C 6B1, www.caccn.ca, email: caccn@caccn.ca, phone: (519) 649-5284, fax: (519) 649-1458. *For frequently-asked questions regarding Dynamics conference planning, please visit www.caccn.ca.*

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FROM THE EDITOR

IN THIS ISSUE we have two articles where nurses have found their voices. Natalie Degenhardt writes about an interesting phenomenon of increased mortality for patients admitted to an ICU on the weekend. I couldn't help but reflect with these summer months, and individuals and families travelling and participating in vacation activities, how often we see critically ill and injured patients admitted on weekends. Degenhardt has provided us with an extensive review of the literature on this subject.

Our second article is the dissemination of results from Frankie Wong's study regarding which port is better to collect CSF samples for a patient with an external ventricular drainage system in situ. Wong shares the results of his study so nurses caring for critically ill and injured neurological patients will have some evidence on which to base their practice. We also include our regular ISMP Canada.

Watch for our next issue of *Dynamics*. It will be our special issue on end-of-life care in the ICU. If you have ideas for other special issues, please contact me. We would be delighted to publish additional special issues. 

P. Price, RN, PhD
Editor

Notice of ANNUAL GENERAL MEETING

The National Board of Directors of the Canadian Association of Critical Care Nurses extends an invitation to the membership to attend the 27th Annual General Meeting. The meeting will be held:

Sunday, October 16, 2011, approx. 1630 hours
London Convention Centre, London, Ontario,
in conjunction with Dynamics 2011.

All CACCN Members and interested parties are invited to attend. **Please note:** Associate and Student Members do not hold voting rights and are ineligible to vote. If you are unable to attend the meeting, you may participate by completing the CACCN Proxy form, found on page 10 of this issue of *Dynamics*.

CACCN Board of Directors Nominee

Western Region

Lissa Currie, RN, BN, CNCC(C), Île-des-Chênes, MB, Coordinator, Critical Care Education, Winnipeg Regional Health Authority

Nominated by: J. Mintenko, T. Sidloski, and B. Kline




I BEGAN MY CAREER in critical care in 1990 after completing the collaborative Adult Intensive Care Nursing Program at St. Boniface Hospital (SBH). My expertise and passion for critical care flourished over the following 11 years while working in the surgical intensive care unit at SBH. I then had the opportunity to combine my critical care expertise with my passion for teaching, as I took on an educator role for ICU and the post-anesthesia care unit and then became an educator for the adult intensive care nursing

program. I feel very blessed in my nursing career and, recently, have taken on a new challenge in the role of Coordinator, Critical Care Education with the Winnipeg Regional Health Authority. I obtained my certification in critical care and I am currently pursuing my master's degree.

I have been involved with CACCN Manitoba Chapter at the local level since in 1996, as a conference planning committee member and previous conference planning chair for our local conference and recently served as president for three years. I have frequently attended Dynamics and Chapter Connections over the years.

I have a strong belief in forming a strong, unified voice for critical care nursing, patients and their families. I feel very passionate about critical care nursing and have worked hard at increasing our visibility, promoting CACCN membership and advocating on behalf of patients and families.

I would find it a privilege to work with such a dedicated group of individuals on the National Board. 



FIND YOUR VOICE!

Design the new CACCN logo

CACCN is looking for a fresh, new logo!

Submit your logo design ideas to CACCN National Office at caccn@caccn.ca by no later than **September 23, 2011** (midnight EST)

Logos will be displayed at Dynamics 2011 and on the CACCN website. Members will be provided with the opportunity to vote on the logo design via the polling feature in the Members Only area November 1 to December 31, 2011.

Only original ideas/artwork submitted electronically will be accepted for consideration.

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Precedex™ (dexmedetomidine hydrochloride for injection) is indicated for sedation of initially intubated and mechanically ventilated postsurgical patients during treatment in an intensive care setting by continuous intravenous infusion. The Precedex™ infusion must not exceed 24 hours.

Precedex™ has been continuously infused in mechanically ventilated patients prior to extubation, during extubation, and post-extubation. It is not necessary to discontinue Precedex™ prior to extubation. After extubation, the dose of Precedex™ should be reduced by half. The mean time of continued infusion is approximately 6.6 hours.

Precedex™ is indicated for sedation of non-intubated patients prior to and/or during surgical and other procedures by continuous intravenous infusion for the following procedures:

- Monitored Anesthesia Care (MAC) with an adequate nerve block and/or local infiltration and
- Awake Fiberoptic Intubation (AFI) with adequate topical preparation of the upper airway with local lidocaine formulations.

Due to insufficient safety and efficacy data, Precedex™ is not recommended for use in procedures other than the two listed above.


Patients should be continuously monitored while receiving Precedex™. Caution should be exercised when administering Precedex™ to patients with advanced heart block and/or severe ventricular dysfunction. Because Precedex™ decreases sympathetic nervous system activity, hypotension and/or bradycardia may be

expected to be more pronounced in patients with hypovolemia, diabetes mellitus, or chronic hypertension and in elderly patients. In situations where other vasodilators or negative chronotropic agents are administered, coadministration of Precedex™ could have an additive pharmacodynamic effect and should be administered with caution. Because Precedex™ has the potential to augment bradycardia induced by vagal stimuli; clinicians should be prepared to intervene. Precedex™ is known to be substantially excreted by the kidney, and the risk of adverse reactions to this drug may be greater in patients with impaired renal function. Precedex™ is indicated only for sedation of initially intubated and mechanically ventilated postoperative patients recovering in a post-operative care unit or an intensive care unit. During the use of Precedex™ in an intensive care setting, the patients must be monitored continuously, particularly for their cardiovascular safety indicators. If Precedex™ were to be administered for more than 24 hours and stopped abruptly, withdrawal symptoms similar to those reported for other alpha-2-adrenergic agents may result. These symptoms include nervousness, agitation, and headaches, accompanied or followed by a rapid rise in blood pressure and elevated catecholamine concentrations in the plasma. Precedex™ infusion must not exceed 24 hours.



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 See prescribing summary on page 34

Annual General Meeting Proxy Vote 2011

Every active member may, by means of proxy, appoint a person (not necessarily a member of the association), as his/her nominee to attend and act at the annual general meeting in the manner and to the extent and with the power conferred by the proxy. The proxy shall be in writing in the hand of the member or his/her attorney, authorized in writing, and shall cease to be valid after the expiration of one (1) year from the date thereof.

Proxy votes must be received in the national office no later than 2359 hours, October 10, 2011. Proxies received after the deadline will be ineligible for voting at the AGM.

The following shall be a sufficient form of proxy:

I, _____, of _____,

an active member of the Canadian Association of Critical Care Nurses, hereby appoint

_____ of _____,

or failing her/him,

_____ of _____,

as my proxy to vote for me and on my behalf at the meeting of members of the association to be held on the 16th day of October, 2011, and at any adjournment thereof.

Dated at _____, this ____ day

of _____, 2011.

Signature of Member: _____

CACCN Membership Number: _____

Chapter: _____

Return completed proxy forms to:

Canadian Association of Critical Care Nurses

P.O. Box 25322, London, ON N6C6B1

Fax: 519-649-1458

Scanned/mailed to: caccn@caccn.ca

CACCN calendar of events

DATES TO REMEMBER!

September 1: Smiths Educational Award Application deadline

September 2: Dynamics 2011 Early Bird Conference Registration deadline

October 3: Dynamics 2011 Conference Registration deadline

October 10: CACCN Annual General Meeting Proxy Vote deadline

October 13–14: Board of Directors F2F Meeting, London, ON

October 15: Chapter Connections Day, London, ON

October 16–18: Dynamics of Critical Care 2011, London, ON

October 16: CACCN Annual General Meeting, London, ON

October 31: Chapter Quarterly Reports (July–Sept. 2011) due in National Office

November 13–16: Critical Care Canada Forum

December 31: Chapter Quarterly Reports (Oct.–Dec. 2011) due in National Office

January 31: Smiths Medical Canada Ltd. Education Award

January 31: Call for abstracts, Dynamics 2012 deadline

February 15: CACCN Research Grant deadline

March 1: Dynamics 2013 Planning Committee Application deadline

March 27, 28, 29: BOD F2F Meeting, London, ON

April 12: CNA Certification Examination

Awards available to CACCN members

Criteria for awards available to members of the Canadian Association of Critical Care Nurses are published on pages 28–33 of this issue of *Dynamics*.



**Critical Care: Our Kaleidoscope
Dynamics of Critical Care**
London, Ontario
October 16–18, 2011

Future sites of Dynamics conferences

Dynamics 2012
September 23–25, Vancouver, BC

Dynamics 2013
September 22–24, Halifax, NS

Dynamics 2014
September 20–23, Quebec City, QC

Dynamics 2015
TBD, Winnipeg, MB



Find a member!



CACCN Membership Recruitment Program

Current CACCN members are eligible to receive a \$10 coupon toward your next CACCN renewal, for each new member you refer to CACCN.

Let's work together and continue to grow!

Criteria:

1. Current / Active CACCN Members may participate.
2. Applicable on NEW member applications only. A new member is one who has not been a CACCN member previously/ has not been a CACCN member for a minimum of 12 months.
3. To qualify, your name must be included on the new member's application form or included in the online application submission, as the "sponsor" or "person who recommended joining CACCN". Coupons cannot be awarded if the sponsor / recommending information is not included when the member application is processed.
4. Members may receive a maximum of seven (7) coupons towards their next renewal. Coupons expire on the member's renewal date.

Confessions of a Critical Care Nurse

I talk to myself



Part of getting ready for work each day
Means a little self-talk on my drive to the unit
I wait for the almost traffic-less stretch where I can think, and I mumble out loud
I'm going to Work, I tell my simple self
And Work ... is important
It's important for all sorts of reasons—the rest of the team, society
I know what I will do that day reflects our nation's values
And oh, yeah, it's important to me
The rest of the non-poetic chant goes like this:
Mental alert! Think. Pay attention. Be careful. Be vigilant and meticulous.
Be positive and efficient. Stand up straight ... and go like Hell

I have trouble discerning left from right

And remembering if norepinephrine is compatible with morphine
And if it's infusing through the medial or the proximal lumen
And by which among that crowd of IV pumps it is being delivered
And ... well, it goes on
I go through contortions
I trace lines and stopcocks, cables, drains, and waveforms
Until the connections are meaningful
Each member of my patient's Team is also there to contribute
Until we know exactly where we are,
And all is well
Like an "X" on a map, we are here
Our map has an "X" for each who has chosen to care for the critically ill
And although we are sea to sea to sea
We are travelling together
And are exactly here in the middle
Our destination is here, where we started
Close to the hearts of those we serve



I receive (take and keep!) so much more than I give

Precious things
Like Trust
Like the privilege of accompanying individuals
On some of the most important stretches of their unique journeys
I am given tools and knowledge and support
To allow me to help turn fear to calm,
Pain to comfort, and despair to hope
I share in the success of goals reached
I am given smiles, generous words, stories, and memories
I see things that fill me with quiet joy:
The young man who beat dire odds going home to his children,
An elderly person who "made the bounce",
Someone who suffered complication after complication now back to visit,
A picture of health
I recognize crises prevented, protection in place
I enjoy personal and professional
Satisfaction, growth, and companionship
When I drive home after a particularly difficult shift,
I might reflect on its challenges and opportunities and countless tasks
By then I'm too tired to mumble
But I might suddenly smile—



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Kathleen Herzig, London Regional Chapter, May 2011

Winner—CACCN 2011 Nursing Week Contest promoting "Nursing: the Health of Our Nation" and Critical Care Nursing. Kathleen receives Early Bird Tuition to Dynamics of Critical Care 2011, London, ON October 16–18, 2011

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Increased mortality among the critically ill patients admitted on weekends: A global trend

BY NATALIE DEGENHARDT, BScN(STUDENT)

Abstract

Critical illness and injury have no concept of time and do not always occur within regular business hours or at times conducive to optimal hospital function. In fact, it is a global trend that critically ill patients admitted to hospitals on weekends suffer higher mortality rates than those admitted during the week. Using a Canadian nursing lens, it is clear that there are some obvious differences in hospital function on weekends that include decreased hospital staffing, access to diagnostic services, intensivist coverage and the reluctance of patients to seek care on weekends. However, the exact differences contributing to the increased mortality in this patient population on weekends and the solutions remain

unclear in the literature, and further research is needed. Possible solutions include moving to a “closed” ICU system, increasing nurse staffing, intensivist coverage and diagnostic accessibility, and creating a true seven-day hospital system. Finally, it is unclear exactly how to solve the nurse staffing portion of this problem, as it appears internally linked to the nursing profession and externally to hospital management, recruiting difficulties and financial restraints, and a problem that will take more than change in nursing management strategy to resolve.

Key words: critically ill, nursing implications, nurse staffing, patient mortality, weekend

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CRITICAL ILLNESS AND INJURY have no concept of time and often strike unpredictably. Initially, Alspach's (2010) editorial prompted a literature analysis, as the thought of poorer quality weekend care left the writer feeling uneasy about the health care system. The purpose of this article is to look at the global trend of increased mortality among critically ill patients admitted on weekends. The author uses a Canadian nursing lens to discuss barriers to adequate weekend care, possible solutions to these barriers, and the implications for nursing practice, as discovered through a literature analysis.

Background and description of the trend

In the last 10 years, there has been an abundance of research published about increased morbidity and mortality among critically ill patients admitted to hospitals in the developed world on weekends. Depending on hospital practice and function, patient outcomes may be significantly worse on the weekends. A landmark Canadian study by Bell and Redelmeier (2001) was the first where the researchers examined this phenomenon in depth and has been the basis for most of the studies that have followed. Bell and Redelmeier (2001) knew that hospitals functioned on a decreased model of service on weekends and discovered that while patients with less-serious conditions were usually unaffected by weekend care, those with more critical conditions were more likely to die in hospital if admitted on a weekend.

Others followed Bell and Redelmeier's (2001) general research study by seeking to answer more in-depth questions regarding this phenomenon. A literature review revealed that general hospital mortality on weekends is minimal (Barba et al., 2006; Ensminger et al., 2004; Laupland, Ball, & Kirkpatrick, 2009; Sheu et al., 2007). However, weekend mortality among the critically ill population is significantly higher than on weekdays.

Barnett, Kaboli, Sirio, and Rosenthal (2002) cite weekend mortality rates as being “moderately” higher than weekday mortality

rates. Analysis of several research studies revealed that weekend mortality from ICU admissions ranges from 1.09 to 1.62 times higher than weekday ICU admissions (Aujesky et al., 2009; Barba et al., 2006; Barnett et al., 2002; Cavallazzi et al., 2010; Clark & Normile, 2007; Laupland, Shahpori, Kirkpatrick, & Stelfox, 2008; Maggs & Mallet, 2010; Uusaro, Kari, & Ruokonen, 2003). To further demonstrate the difference between weekend and weekday mortality, Bell and Redelmeier (2001) cite the chance of death if admitted with a ruptured abdominal aortic aneurysm as being 1.28 times higher on weekends and of acute epiglottitis as being 5.28 times higher on weekends.

Researchers have investigated why ICU patients are so much more susceptible to changes in hospital function on weekends when compared with general hospital admissions. The consensus has been that due to the severity of illness, outcomes of critically ill patients are susceptible to even small changes in health care delivery in a way that less-critical illnesses are not (Barnett et al., 2002; Ensminger et al., 2004). Sheu et al. (2007) describe the crucial nature of immediate diagnostics and early, evidence-based treatment in ensuring positive outcomes for critically ill patients. Bell and Redelmeier (2004) demonstrated that the longer patients admitted on weekends have to wait for critical procedures, such as ventilation-perfusion imaging, the greater the likelihood of mortality. Thus, on weekends, when timely access to diagnostics and treatment is not always available due to greater patient demand of resources coupled with insufficient staff ratios, unit familiarity and experience, patient outcomes are negatively affected by the greatest amount in the sickest patients: our ICU population (Barnett et al., 2002; Bell & Redelmeier, 2001; Laupland et al., 2008).

This is a trend that we must reverse. Increased weekend mortality for those admitted to ICU appears to be a trend that spans Canada, the United States and Europe and, as such, does not seem directly tied to the method of health care delivery, its

policies or procedures (Barba et al., 2006; Bell & Redelmeier, 2001; Ensminger et al., 2004; Maggs & Mallet, 2010; Uusaro et al., 2003). It appears to be a problem with difficult solutions, because we can't pinpoint the exact reason(s) for its existence. Further, it is a problem that requires an immediate and lasting solution, as it compromises patient safety and quality of care (Laupland et al., 2008).

Barriers to excellent weekend care

Hospital staffing and diagnostic accessibility. Quantitative evidence in hand, researchers sought to discover differences between hospital function on weekends and weekdays that could be detected by the ICU population and account for less favourable outcomes.

In addition to decreased nursing staff overall that is guided by patient numbers instead of acuity, Hamilton, Eschiti, Hernandez and Neill (2007) noted that on weekends nurses have limited access to support services, decreased support from management and nursing supervisors, and strained relations with on-call physicians. Bell and Redelmeier (2001) also noted that weekend staff are often less experienced and less familiar with their patients, as often they work only casually or part-time. These were noted to be factors in increasing ICU mortality on weekends in other studies, as well (Barba et al., 2006; Barnett et al., 2002; Cavallazzi, 2010; Clark & Normile, 2007; Ensminger et al., 2004; Laupland et al., 2008; Sheu et al., 2007; Uusaro et al., 2003).

Intensivist coverage. During the week, intensivists are almost always available for nurses to consult with regarding patient status. The approach to intensivists varies greatly among countries and within Canada, as well. While the Society of Critical Care Medicine and the American College of Critical Care Medicine published critical care guidelines in 2003 that outlined 24-hour in-house staffing by ICU intensivists as ideal in achieving positive patient outcomes, many ICUs in Canada still fail to meet these guidelines (Parshuram, Kirpalani, Mehta, Granton, & Cook, 2006). Hill et al. (2009) studied ICUs in Ontario and discovered that only 63% of level 3 (highest level of ICU service) ICUs had intensivists available for all admissions, with level 2 ICUs using them to an even lesser degree. Parshuram et al. (2006) did not look directly at intensivist coverage on weekends but, instead, at day-to-night coverage differences and revealed that 85% of the Canadian ICUs studied did not have continuous staffing by an ICU physician and that only 60% had overnight ICU physician coverage.

Although neither of these studies relate directly to the availability of intensivists in Canadian ICUs on weekends, one can hypothesize that if we are not meeting the standards overall, there would be even less coverage than average on weekends, assuming that the best coverage is provided during regular business hours.

Patient reluctance to seek weekend care. Several researchers noted possible differences in patient populations during the week and the weekend (Barnett et al., 2002; Bell & Redelmeier, 2001; Maggs & Mallet, 2010). Although no researchers set out with it as their research

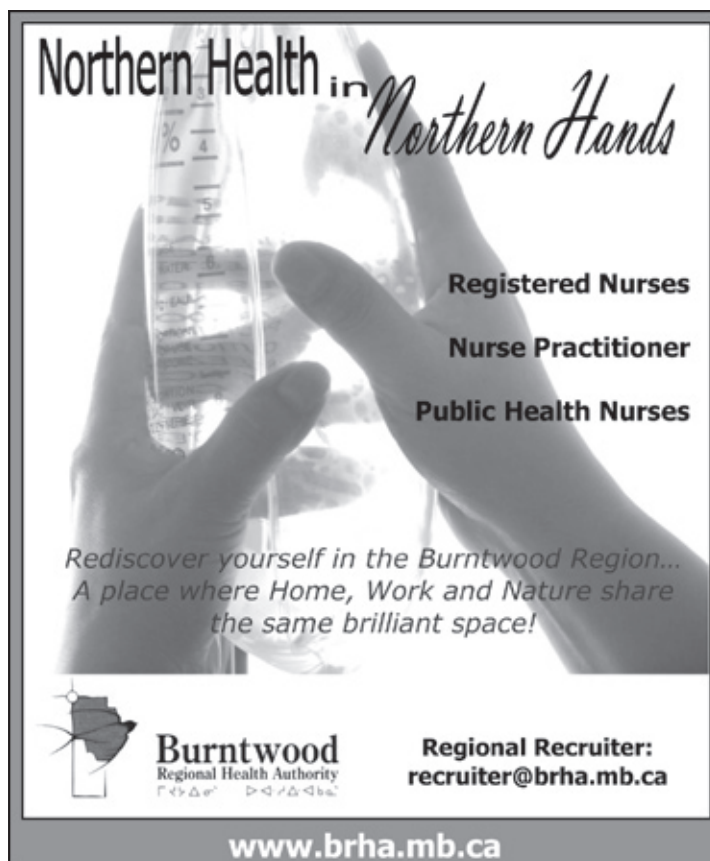
question, each suggested that there may be inherent differences in ICU patients admitted during normal weekday hours as compared to those admitted on weekends.

Bell and Redelmeier (2001) noted that many major accidents requiring critical care interventions, such as motor vehicle crashes, injuries from handguns and recreational activities occur more frequently on weekends than during weekdays. Maggs and Mallet (2010) suggested that patients who present to hospitals and are admitted to ICU out of normal business hours may be in a more acute state of emergency than those who arrive during business hours. Further, the researchers noted an increase in mortality not only on the weekend, but also on Mondays owing to this "waiting it out" technique of patients to see if issues resolve themselves (Maggs & Mallet). If it is the case that hospitals may, in fact, be busier or admit more severely ill and injured patients on weekends, it builds perhaps an even stronger case for resolving the issue.

Possible solutions

Analysis of the literature could not reveal the exact formula of factors contributing to increased mortality among weekend critical care admissions, but through analyzing many different hospitals that function in many different ways, several suggestions were offered to optimize patient outcomes, with the hope that once implemented, future research could deny or confirm their role in this global trend.


Moving to "closed" ICU systems. The issue of "closed" versus "open" ICUs is discussed at length in American literature and appears to be an issue of contention in that country where



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some ICUs operate according to each structure. Using the “open” model, patients are cared for by their primary care physician, who may or may not be an expert in critical care, whereas the “closed” model allows intensivists to manage patient care while in the ICU (Multz et al., 1998). In the study conducted by Multz et al. comparing “open” and “closed” ICUs, a narrow decrease in patient mortality was found in units that operated according to a “closed” method.

Due to limited research findings, it is difficult to determine whether this is an issue in Canada. As hospitals are funded and operated provincially, there is no nation-wide standard for ICU operating practices. In Alberta, however, it appears that closed ICUs comprise the majority of ICUs, as various studies of ICUs in the major cities included only “closed” ICUs (Billington, Zygun, Stelfox, & Peets, 2009; Rockwood et al., 1993). However, a broad-based Ontario study indicated that only 44% of the ICUs sampled functioned using a “closed” system (Hill et al., 2009). Further evidence was unavailable for Canada, but a Canadian commentary revealed that many Canadian ICUs do continue to function as part of an “open” system, thereby possibly making the American literature generalizable to at least some Canadian ICUs (Piquette, Fowler, & Slutsky, 2010).

Increasing intensivist coverage. Some studies have demonstrated better patient outcomes when intensivists are available in the ICU 24 hours a day, seven days a week (Blunt & Burchett, 2000; Provonost et al., 2002; Young & Birkmeyer, 2000). In one American analysis, estimated mortality rates in ICUs were reduced by an estimated 15% to 60% just by implementing full-time intensivist coverage (Young & Birkmeyer, 2000). Arabi, Alshimemeri and Taher (2006) studied weekend and weekday outcomes for critically ill patients and found no difference between the two when qualified intensivist coverage was provided continuously. Although academic consensus has not been reached, there is an indication that weekend intensivist coverage is an important factor in patient outcomes.

Hill et al. (2009) recognized that the largest probable factor for decreased intensivist coverage is associated with cost, but noted that the cost of the intensivists could likely be off-set by potential health care savings due to better patient outcomes and better utilization of critical care resources, although further research is needed to substantiate this hypothesis.

Increased nursing staff. Increasing nursing staff and, therefore, decreasing workload is a strategy that almost every researcher identified as being a likely solution to this trend. Provonost et al. (2001) found that decreasing nurse-to-patient ratio decreases all medical complications, including pulmonary insufficiency and re-intubation. However, Provonost et al. recognize that nurse-to-patient ratios are a crude measure of workload and suggest that it may be greatly affected also by staff mix, experience, certification and fatigue.

Hill et al. (2009) suggested that “enhanced” nurse staffing be available to improve patient outcomes in the ICU. It is unclear exactly what Hill et al. meant by the term “enhanced”, but one could hypothesize that it means staffing ICUs with nurses who have taken extra training in the form of CNA certification or

other advanced studies in critical care nursing. Hill et al. suggests that hiring more intensively trained nurses and improving technology may be both more efficient and cost-effective than hiring more intensivists in reducing mortality among critically ill patients.

Another possible solution, suggested by Barba et al. (2006) is to implement higher standards for nurse staffing on weekends and to motivate greater numbers of staff and those with more experience to work on the weekends by providing a greater economic benefit. In addition, Barba et al. suggests management put more resources and energy into the development of protocols and guidelines to help staff act in accordance with current evidence-based practice during all shifts, but especially on weekends when staff may have less experience to draw on with regard to decision making.

Increased accessibility to diagnostic services. Nichols et al. (2007) discussed the need for rapid diagnostic therapeutic turnaround time to improve patient outcomes in critical care. However, a review of Canadian literature suggests that deferring testing to weekdays is not an uncommon practice (Bell & Redelmeier, 2004; Laupland et al., 2008). Neither of these Canadian studies suggested possible ways to decrease this problem, as it is probably more of a financial issue than one that can readily be solved within the hospital system (Bell & Redelmeier, 2004; Laupland et al., 2008). However, Bell and Redelmeier (2004) did recognize that interventions addressing this issue could have important effects on patient outcomes within the hospital.

Building the seven-day hospital. As this is a current trend, there is a little research proving the benefit of moving to a seven-day hospital service whereby hospital function remains standard on any given day of the week. However, research does show that many hospitals are attempting to introduce seven-day hospital service in order to improve patient care, productivity and outcomes (Aylin, as cited in Healthcare Events, 2011). Further, although the research advocating for seven-day hospital service has not been completed, scholarly conferences are often the precursor to changing hospital standards and functioning. On March 24, 2011, London, England, hosted a conference showing hospital administrators how to introduce and deliver true seven-day hospital service in their facilities (Healthcare Events, 2011). Perhaps following this and other worldwide conferences, hospital administrators will begin to implement the strategy, and in doing so, research will be conducted comparing true seven-day service to our current model of health care delivery.

Implications for nursing

It has been identified that while the solutions to preventing increased mortality on weekends among the critically ill are not certain, nursing plays an important role. Research clearly suggests that by increasing unit nursing staff in both number and experience, patient outcomes can be improved (Berkow, Jaggi, Fogelson, Katz, & Hirschhoff, 2007; Eschiti & Hamilton, 2011; Hamilton, Mathur, Gemeinhardt, Eschiti, & Campbell, 2010; Hill et al., 2009; Provonost, et al., 2001). What has not been

extensively studied is the ability of nursing to adapt to these changes and the impact these changes may have on the profession, as a whole.

In one qualitative article, Eschiti and Hamilton (2011) spoke with nurses across the United States about what they believe are the biggest factors contributing to inadequate staffing during non-peak times and how, or if these factors can be alleviated. Several themes emerged relating to financial constraints, the unpredictability of critically ill patients, and levels of nursing competency.

Financial constraints. Financial constraint is a topic that seems never to tire in health care. First, staffing intensive care areas adequately is difficult from a budget perspective because novice nurses are paid significantly less than more senior nurses. Thus, it requires managers to weigh the risks and benefits of having greater numbers of nurses or greater levels of experience (Eschiti & Hamilton, 2011). Despite this inherent difficulty, it is reassuring to note that according to Berkow et al. (2007), experience and education levels are the primary driving force taken into consideration when addressing nursing needs in the critical care area, with actual staffing numbers coming next. With this information in mind, one could suggest that for staffing to become less problematic, change must occur at the fundamental level in which health care funding occurs. This is to say that it may become easier to balance nursing skill mix if funding was based less on concrete dollar amounts and moved to an actual skill-based funding model to reflect actual costs per full-time equivalent including experience levels and staff numbers required to safely run an ICU.


Unpredictability of critically ill patients. The unpredictability with critically ill patients is another factor affecting the ability of nurse managers to effectively staff ICUs. One issue brought to light is that even if at 1500 hr there appears to be sufficient staffing, a patient can take a dramatic turn for the worse, there can be unexpected admissions, or planned discharges may not occur due to unplanned changes in acuity, which can wreak havoc on staffing needs and nurse workloads (Eschiti & Hamilton, 2011).

One strategy that has not been further researched, but appears admirable in reducing negative patient outcomes, was described by nurses in Eschiti and Hamilton's (2011) study. They described how charge nurses on their units attempted to make rounds early in the shift so that they could gauge patient status and adjust assignments, if staffing allowed, in an attempt to improve patient care and outcomes (Eschiti & Hamilton).

There is limited research in the area of managing this nursing challenge, but one can only hypothesize that if staffing were able to be more flexible, perhaps by 'overstaffing' in an attempt to be prepared for the instability of critical illness, that outcomes during typically understaffed times, such as weekends, could be improved.

Various levels of nursing competency. Finally, nurses studied by Eschiti and Hamilton (2011) discussed the difficulties in staffing that arise due to various levels of competency among staff. They discussed the management challenges of ascertaining which patients were appropriate for each nurse according to their competency, comfort level and experience (Eschiti & Hamilton). This final theme solidifies the fact that basing adequate nursing staff merely on the numbers oversimplifies the issue, and that while a novice nurse may be competent to care for a septic patient, he/she may not be competent to care for a patient with acute respiratory distress syndrome. The broad and varied skill sets of registered nurses only act to solidify the need for further education and strong nurse mentorship (Clauson, Wejr, Frost, McRae, & Straight, 2011).

Conclusion

The global trend of increased patient mortality among critically ill patients admitted on weekends appears to be one that researchers have not yet been able to fully understand. Although various studies exist throughout the world, researchers have not yet been able to identify a single, or combination of factors that can be shown to cause the discrepancy in patient outcomes. Decreased hospital staffing, access to diagnostic services, intensivist coverage, and the reluctance of patients to seek care on weekends have been described in this article as possible causal factors. The author of this article has also investigated possible solutions that have been presented in the literature, such as moving to a "closed" ICU system, increasing nurse staffing, intensivist coverage, diagnostic accessibility, and creating a true seven-day hospital system. However, much of the research to identify and measure the causes, as well as to identify and substantiate these interventions, has yet to be completed. Finally, the author discussed the nursing implications of alleviating the staffing issue on weekends and pointed to the problem being both internally and externally linked and, in being so, one that will take more than change in nursing management strategy to resolve. Individually, nurses must begin by advocating for patient safety through adaptation of inadequate staff mixes, recognizing mentorship needs and by enhancing critical thinking based on current, evidence-based practice so that timely intervention and care can be provided to critically ill patients. 

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Cerebrospinal fluid collection: A comparison of different collection sites on the external ventricular drain

BY FRANKIE W.H. WONG, RN, BN, MHS, CNN(C)

Abstract

Background: Intracranial pressure monitoring using an external ventricular drainage (EVD) system is the most commonly used technology to monitor intracranial pressure or drain cerebrospinal fluid (CSF) in neurological and neurosurgical patients. CSF samples are collected routinely from the EVD system for laboratory tests. No study has been conducted to identify where the most appropriate site for CSF collection is in order to reduce the disruption of the closed EVD system and reduce the risk of infection.

Purpose: The purpose of this study was to identify a CSF sampling port in the EVD system that is easily accessible, provides accurate results, and minimizes disruption to the closed EVD system.

Sample: Fifty patients admitted to the neurological and neurosurgical intensive care step-down unit with the EVD system between July 2007 and September 2009 agreed to participate in the study. There were 21 women and 29 men. Forty-seven patients' data were analyzed.

Method: The design was quasi-experimental using a convenience sample. Two samples of CSF were collected daily. One sample

was collected from the proximal port and another sample was collected from the distal port. The second sample was collected immediately after the first. Each set of samples (proximal and distal) was tested and compared for any differences in appearance, culture results, and concentrations of protein, glucose, and white cell count.

Results: Using a two-tailed paired *t* test with 95% confidence interval, there was no statistically significant difference between the samples obtained from the two collection sites for protein, glucose, white cell count, appearance, and culture. Pearson's correlation coefficient was also used to analyze the correlation for the continuous measures. Both protein and glucose had very high correlations. However, the white cell count, and white cell counts and culture had very low correlations.

Conclusion: The distal port of the EVD system is safe and easy for CSF collection. It also provides accurate results for CSF samples. When the CSF sample is collected from the distal port, the entire volume of CSF in the drip chamber should be collected and tested to obtain an accurate WBC count per unit of volume.

Wong, F.W.H. (2011). Cerebrospinal fluid collection: A comparison of different collection sites on the external ventricular drain. *Dynamics*, 22(3), 19–24.

AN EXTERNAL VENTRICULAR DRAINAGE (EVD) SYSTEM is the most commonly used technology to monitor intracranial pressure (ICP) and drain cerebrospinal fluid (CSF) to control rising intracranial pressure in patients with traumatic brain injury, subarachnoid hemorrhage, hydrocephalus, brain tumour, or neurological disease (Dasic, Hanna, Bojanic, & Kerr, 2006; Korinek et al., 2005; Pfissherer, Mühlbauer, Czech, & Reinprecht, 2003; Sloffer, Augspurger, Wagenbach, & Lanzino, 2005; Zabramski et al., 2003). The external ventricular drainage system can detect changes in ICP and nurse practitioners can implement appropriate interventions promptly to prevent complications resulting from intracranial hypertension.

Background

Cerebrospinal fluid samples are frequently collected from the EVD system and sent for laboratory studies such as white cell count, red blood cell count, protein, glucose concentration, and cultures. Depending on policy and practice, frequency of CSF sampling varies among institutions (Arabi

et al., 2005; Hader, & Steinbok, 2000; Holloway et al., 1996; Pfissherer et al., 2003; Wong, Poon, Wai, Yu, & Lam, 2002). Also, methods for CSF sampling vary among institutions. In some institutions, CSF samples are collected through the access port closest to the patient, some are collected from the port below the CSF collection chamber, and some policies require the entire CSF collection bag be sent to the laboratory for testing (Bader, Littlejohns, & Palmer, 1995; Franges, & Beideman, 1988; Winfried, Rosenthal, Kanther, & Casella, 1993). There is no consistency in practice for CSF collection among institutions.

Purpose

This study was conducted to evaluate the differences of CSF samples (protein, glucose, white cell count, appearance, and culture) obtained from two commonly used CSF collection ports on the EVD system. They were the patient line stopcock (proximal port) and stopcock below the drip chamber (distal port) (see Figure 1).

Method

This study was a quasi-experimental design. A convenience sample (non-randomized) was selected from the neurological/neurosurgical intensive care step-down unit at the Foothills Medical Centre. The study protocol was approved by the Calgary Health Region Conjoint Health Research Ethics Board and University of Calgary Bioethics Committee (Ethic ID: E-20687).

Sample

With 50 pairs of samples at any given time, the lower tails of the 95% confidence intervals (CIs) for these correlations will be 0.67 or greater (Price, 2000). The continuous measures taken from the two sites will show a high level of similarity if Pearson correlation coefficients are > 0.8 .

Patients who were 18 years or older, who had an EVD inserted and were admitted into the neurological/neurosurgical intensive care (ICU) step-down unit at the Foothills Medical Centre were invited to participate in the study. Patients who had been diagnosed with meningitis, ventriculitis, or any systemic infection before data collection were excluded from the study.

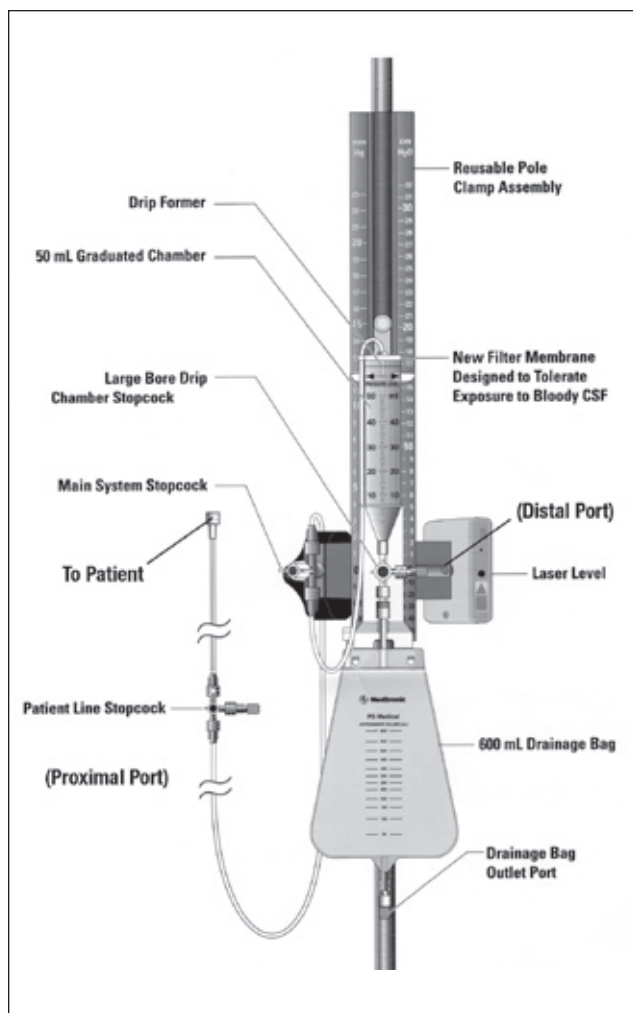


Figure 1: The external ventricular drainage system
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Informed consents were obtained from the potential subjects or their surrogates by the principle investigator or delegate (nurses who were assigned by the principle investigator and had received detailed instructions about the study) once the patients were admitted to the neurological/neurosurgical intensive care step-down unit after the EVD system was inserted.

Data collection

Two samples of CSF were collected at midnight daily. One sample was collected from the proximal port and another sample was collected from the distal port immediately after.

One hundred and ninety-six samples were collected from 47 patients. Each set of samples (proximal and distal) was tested and compared for differences in protein, glucose, white cell count, appearance, and culture. Blood in the CSF made analysis of protein and glucose concentrations unreliable (Pfisher et al., 2003). Therefore, samples with blood were excluded from data analysis. Also, only samples with laboratory results available from both sites were used for analysis. Therefore, the sample size varies for the laboratory tests (see Table 1).

Data analysis

Pearson's correlation coefficients were calculated to determine the correlation of the continuous variables, which included white cell count, protein, and glucose between the two samples of data. A high level of correlation was demonstrated if Pearson's correlation coefficients were ≥ 0.8 (Price, 2000). The two-tailed paired t test with 95% CIs was used to calculate the significance of all laboratory results.

Results

Fifty patients admitted to the neurological and neurosurgical intensive care step-down unit with the EVD system between July 2007 and September 2009 agreed to participate in the study. In this group, there were 21 women and 29 men. Three patients were excluded from the study. Patient number 25 developed respiratory distress and was transferred to the intensive care unit after his wife signed the research consent form.

Table 1: Two-tailed paired t test results with 95% Confidence Interval (CI)

Items	No. of samples	$t =$	$p =$	Standard error
Protein	91	0.3051	0.7610	0.018
Glucose	92	1.0782	0.2838	0.095
White cell count	192	0.3399	0.7343	95665589.262
Red cell count	189	0.9992	0.3190	17857006948415.168
Appearance	192	1.6079	0.1095	0.065
Culture	194	1.4179	0.1578	0.007

Patient number 38 had a blocked catheter and it was removed before the sample was collected. Patient number 39 pulled out her EVD catheter and the physician decided not to insert another catheter. Data from 47 patients were analyzed. The patients' ages ranged from 18 to 81 years with a mean of 48.98 years. The admitting diagnoses of these patients were subarachnoid hemorrhage (n = 15, 30%), brain tumour (n = 13, 26%), hydrocephalus (n = 9, 18%), stroke (n = 8, 16%), intra-cerebral hemorrhage (n = 2, 4%), colloid cyst (n = 2, 4%), and arteriovenous malformation (n = 1, 2%).

The EVDs were inserted in the operating room, intensive care unit, or the procedure room on a neurological/neurosurgical ICU step-down unit under sterile procedures. The length of time the catheter was in place ranged from one to 23 days (mean 3.88 days).

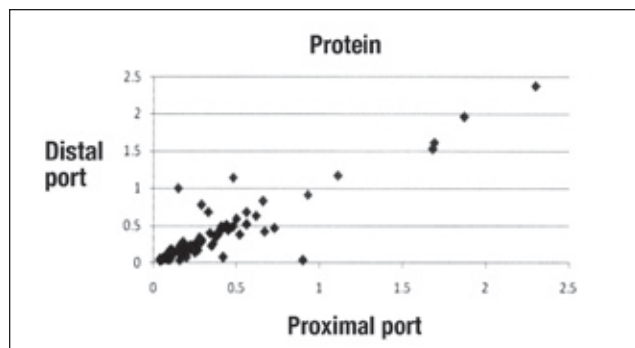


Figure 2: Correlation of protein (g/L) obtained from the proximal and distal port

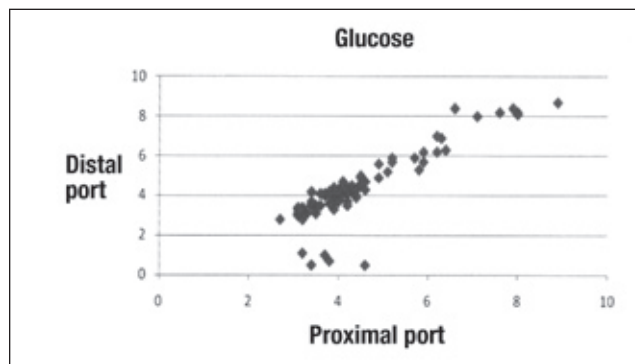


Figure 3: Correlation of glucose (mmol/L) obtained from the proximal and distal port

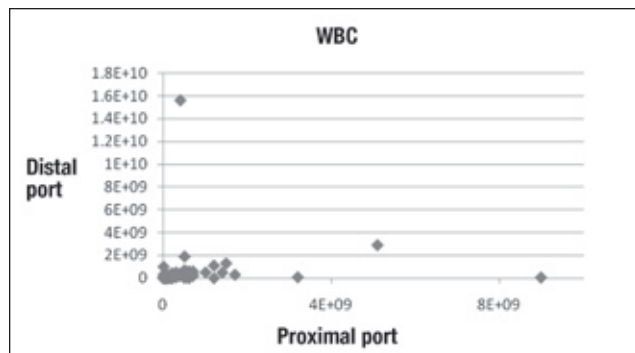


Figure 4: Correlation of white cell count (per litre) obtained from the proximal and distal port

The two-tailed paired *t* test analysis on all laboratory tests showed no statistically significant differences between the samples obtained from the two collection sites for protein, glucose, white cell count, appearance (clear, bloody, yellowish), and culture (see Table 1).

Pearson's correlation coefficient was used to analyze the agreement for the continuous measures between the two collection sites (Bland & Altman, 1986). Both protein ($r = 0.908$) (see Figure 2) and glucose ($r = 0.874$) (see Figure 3) had high correlations. However, the white cell count between the proximal port and distal port ($r = 0.1222$) (see Figure 4) and white cell counts and culture ($r = -0.0195$) (see Figure 5) had low correlations.

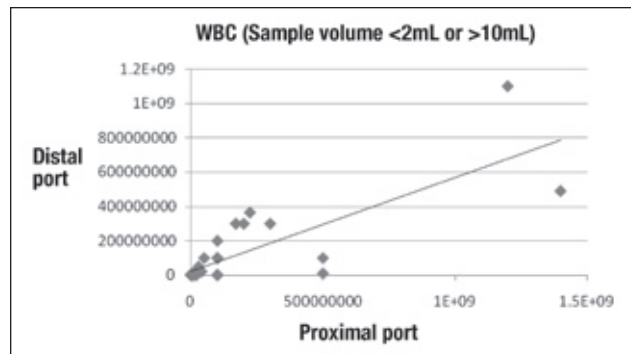


Figure 5: Correlation of white cell count (per litre) between the proximal and distal port with the CSF sample volume < 2mL or ≥ 10mL

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Discussion

Cerebrospinal fluid culture is the most commonly used method to identify CSF infection (Muttaiyah, Ritchie, Upton, & Roberts, 2008). However, it may take several days to have the CSF culture results. In our hospital, gram stain results are reported on the same day of specimen collection and culture and sensitivity results are reported on day four after the specimen collection. Some researchers have suggested that changes in CSF glucose and protein concentration and WBC count may indicate EVD system-related infection (Leverstein-Van Hall et al., 2010). In this study, both glucose and protein concentrations from the proximal and distal ports were highly correlated. That means the glucose and protein concentrations were unaffected by the collection site.

The white blood cell (WBC) count had a very low correlation between the proximal and distal ports (see Figure 4). After a detailed review of the results, it is clear that the WBC count from the distal port was higher than the proximal port. The possible reason for this variation might be that the CSF samples collected from the distal port were usually sitting in the drip chamber for a period of time, perhaps up to an hour. The extra time that CSF sits in the drip chamber might lead to WBCs settling on the bottom of the drip chamber. If nurses only collected a portion of CSF from the drip chamber instead of the full amount, a falsely high WBC count could result.

In order to find out the cause that contributed to the differences in the WBC counts between the proximal and distal ports, all WBC count results were recalculated according to the sample volume (see Table 2). The results demonstrated that when the CSF sample volumes were $< 2\text{mL}$ or $\geq 10\text{mL}$, Pearson's correlation coefficients of the WBC count from the proximal port and distal port had higher correlations. The reasons may be that if the volume of samples collected were $< 2\text{mL}$, it indicated the entire amount of CSF from the drip chamber was collected (unit policy recommends a minimum of 2mL of CSF should be obtained for testing). If the sample volumes were $\geq 10\text{mL}$, the larger volume

compensated for the WBC settlement effect and gave a more accurate result on WBC count per unit of volume. When Pearson's correlation coefficient was calculated on samples with volumes $< 2\text{mL}$ and $\geq 10\text{mL}$ combined, the result showed a higher correlation ($r = 0.81$) (see Figure 5). This result indicates that when the CSF sample is collected from the distal port, the entire volume of CSF in the drip chamber should be collected and tested to obtain an accurate WBC count per unit of volume.

An increased WBC count in the CSF or CSF pleocytosis is believed to be an indicator of infection (Pfisherer et al., 2003; Sloffer et al., 2005). Some physicians and nurse clinicians use the trends of CSF WBC count to detect possible infections. However, some authors have argued that CSF pleocytosis might be related to the body responding to the

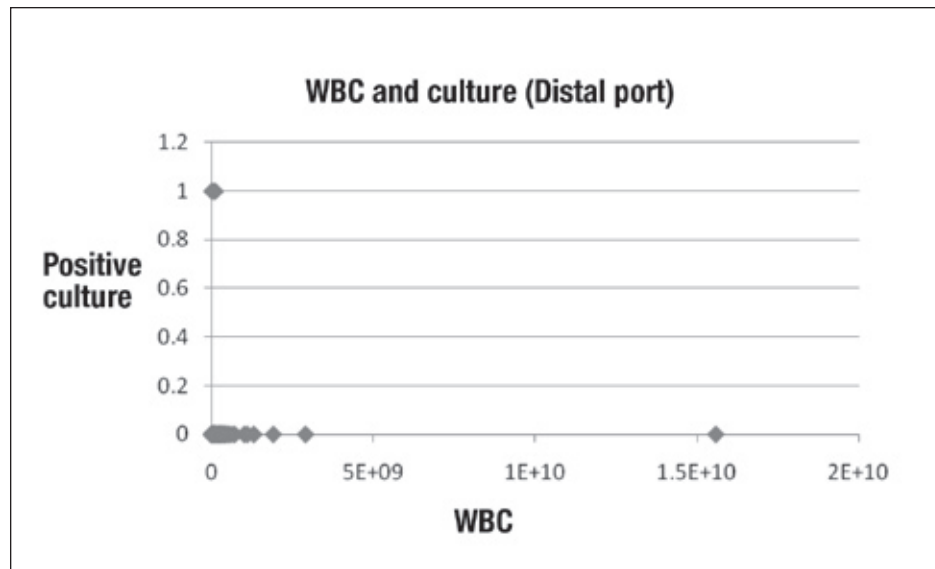


Figure 6: Correlation of white cell count (per litre) and culture obtained from the distal port

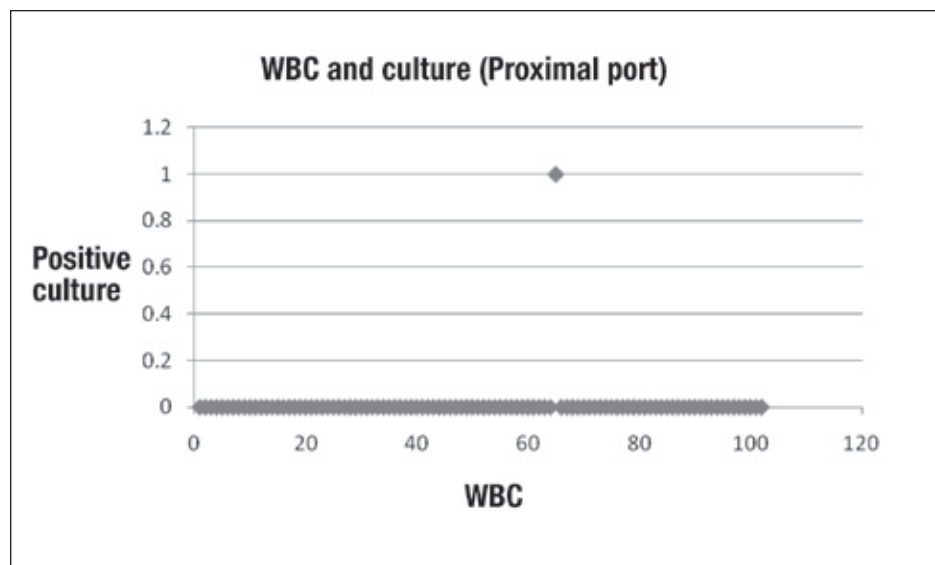


Figure 7: Correlation of white cell count (per litre) and culture obtained from the proximal port

foreign-body such as the ventricular catheter, or responding to some CNS insult from the ventriculostomy other than infection (Pfausler et al., 2004). In the Mayhall et al. (1984) study, 23% of patients developed pleocytosis and were without infection. In addition, blood contamination of CSF in patients with traumatic injury or subarachnoid hemorrhage may have influenced the accuracy of the CSF WBC counts (Boer, Siegmund, Pfister, Isenmann, & Deufel, 2008). In this study, with the smaller number of positive culture results, it was difficult to identify the relationship between the WBC count and cultures (see Figures 6 & 7). Pearson's correlation coefficient of the WBC count and culture from the distal port had a low correlation.

Pearson's correlation coefficient of culture between the proximal and distal port had a high correlation. Two CSF samples from the distal port had positive culture results. In one patient, staphylococcus aureus was identified in both the proximal and distal port samples. Patient number 18 had a positive culture of gram negative bacilli from the distal port sample, but not from the proximal port. Interestingly, this patient had a positive culture of coagulase-negative staphylococcus (contamination) on the proximal port four days before the distal port had the positive culture result. To ensure the accurate culture result, the entire EVD system was changed (without changing the EVD catheter) and CSF samples from the proximal and distal port were recollected 12 hours after the system was changed. These samples obtained from both the proximal and distal ports showed a negative result for bacterial culture. This indicates that the positive culture from the distal port of patient number 18 was a false positive result.

With two positive culture results from the distal port, which included one false positive related to upper stream con-

tamination, Pearson's correlation coefficient was $r=0.7053$. When the positive result related to the upper stream contamination was excluded, Pearson's correlation coefficient was $r=1$. However, this study has a very small number of positive culture results, further research to verify the relationship between CSF WBC count and positive culture may be required.

In the Hader and Steinbok (2000) study, CSF samples were collected from the proximal port of the system. Their results indicated that 30.6% patients had positive culture results. However, 41 (85%) of these cultures resulted from contamination (coagulase-negative staphylococcus and propionibacterium). Our results identified the same issue: eight patients had positive culture results from samples collected from the proximal port and seven positive culture results (87.5%) are related to contamination (coagulase-negative staphylococcus in six patients, micrococcus in one patient). This indicates that CSF samples collected from the proximal port were at high risk of contamination and may have the chance of introducing infection into the system.

The reason the proximal port had a higher incidence of contamination during CSF collection may be related to its close proximity to the patient's hair, clothing, and bed linen. Most EVD system-related infections are related to skin organisms (Coplin, Avellino, Ki, Winn, & Grady, 1999; Sandalcioglu & Stolke, 2003; Wong et al., 2002).

Limitations

Due to the low infection rate in this study, it is difficult to establish the relationship between infection and different CSF sample collection sites. Also, this study had a small sample size and was conducted on only one unit. A study with a larger sample size and involving several centres may be required to establish a more generalizable result especially with the relationship between the WBC count and culture results.

Conclusion

The external ventricular drainage system is one of the most commonly used tools in clinical practice to monitor ICP or for drainage of CSF to control ICP. CSF is collected routinely from the EVD system to monitor for CSF infection. CSF samples have been collected from different ports from the EVD among institutions. Improper handling of the EVD system during CSF sampling may increase the risk of infection. External ventricular drainage system-related infection prolongs patients' length of hospital stay, mortality and morbidity rates, and increases the health care cost (Sloffer et al., 2005). CSF sampling is one of the procedures performed by nurses. Prevention of CSF infection should be the priority of critical care and neurosciences nurses. Identifying a site that is safe, easily accessible, and able to provide accurate results for CSF collection is essential (Pfisher et al., 2003). Collection of CSF from the proximal port of the EVD may increase the risk of CSF infection. The distal port is the preferred spot for CSF sampling because it is more secured

Volume of CSF Specimens	Pearson's Correlation Coefficient
< 2 mL	0.8017
≤ 2 mL	0.7876
≥ 3 mL	0.037
≥ 4 mL	0.1163
≥ 5 mL	0.0939
≥ 6 mL	0.0813
≥ 7 mL	0.655
≥ 8 mL	0.2183
≥ 9 mL	0.2206
≥ 10 mL	0.907

(clamped on the IV pole) and further away from the patient. The results of this study indicated that the distal port of the EVD system is a safe and easily accessible site for CSF sample collection. In addition, when a CSF sample is collected from the distal port, the entire volume of CSF in the drip chamber should be sent for testing to obtain an accurate WBC count per unit of volume. ❁

About the author

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Drug name alert: Potential for confusion between Pradox and Plavix

BY CHRISTINE KOCZMARA, RN, BSC, AND SYLVIA HYLAND, BSCPHM, MHSC (BIOETHICS)

Abstract

In this article, the authors highlight an incident that involved a mix-up between the oral anticoagulant medication Pradox (dabigatran etexilate) and the antiplatelet medication Plavix (clopidogrel). Because critical care nurses may admit or care

for patients who are receiving (or have received) one of these medications, it is important that they be aware of the potential for confusion between these two drug names throughout the medication-use process.

Koczmar, C., & Hyland, S. (2011). Drug name alert: Potential for confusion between Pradox and Plavix. *Dynamics*, 22(3), 25–26.

THE INSTITUTE FOR SAFE MEDICATION PRACTICES CANADA (ISMP Canada) has received four reports from health care practitioners and one report from a consumer related to the brand names Plavix (clopidogrel) and Pradox (dabigatran etexilate). Two of these reports identified concerns about the potential for confusion between the brand names. Two other reports involved mix-ups that occurred during verbal communication. The fifth report involved a medication incident that occurred during preparation for a procedure to treat a brain aneurysm. In this article the authors focus on the factors leading to this medication incident and the lessons that can be learned from it.

Medication incident

An otherwise healthy patient was scheduled for an endovascular coiling procedure to treat a brain aneurysm. Several days before the procedure, the neurosurgeon wrote a prescription for Plavix 150 mg daily with acetylsalicylic acid (ASA) 325 mg daily. The patient was to take these medications to prevent platelet aggregation and clot formation during, and as a result of, insertion of a foreign substance (the coils) into the vascular system.

The day before the scheduled procedure, the patient was admitted to the hospital as planned. Fortunately, the patient had remembered to bring all current medications to the hospital. During medication reconciliation, the pharmacist noticed that the patient was taking Pradox 150 mg daily instead of the intended Plavix 150 mg daily. The hospital pharmacist called the community pharmacy to discuss the situation. It was determined that the order for Plavix had been misinterpreted and that Pradox had been dispensed in error. The neurosurgeon was notified of the error, and the procedure was postponed.

Discussion

Plavix (clopidogrel) is a platelet aggregation inhibitor that was initially approved in Canada in 1998 for the secondary prevention of vascular ischemic events (myocardial infarction, stroke, vascular death) in patients with a history of symptomatic atherosclerotic disease. The indications for Plavix were expanded to include acute coronary syndrome (ACS), unstable angina, non-Q-wave myocardial infarction, and ST-segment elevation acute myocardial infarction. For the ACS indication, Plavix is to be administered in combination with acetylsalicylic acid (ASA). Most recently, on February 16, 2011, Plavix in combination with acetylsalicylic acid (ASA), was approved for the prevention of atherothrombotic and thromboembolic events, including stroke in patients with atrial fibrillation who have at least one risk factor for vascular events and for whom treatment with an anticoagulant is unsuitable (sanofi-aventis Canada Inc., 2011).

Pradox (dabigatran etexilate) is an oral anticoagulant (direct thrombin inhibitor) that was initially approved in Canada in 2008 for the prevention of venous thromboembolic events in patients who have undergone elective total hip or knee replacement. An additional indication for the use of Pradox, the prevention of stroke and systemic embolism in patients with atrial fibrillation, was approved on October 26, 2010 (Boehringer Ingelheim [Canada] Ltd., 2011).

Plavix is indicated for patients for whom treatment with an anticoagulant is unsuitable. Because Pradox is an anticoagulant, it should not be given to such patients. A mix-up between Plavix and Pradox could have serious consequences. If a patient is supposed to receive Plavix, but Pradox is supplied (e.g., the prescription is written incorrectly or the wrong drug is dispensed) the patient will not experience the desired antiplatelet effect and could be at increased risk of bleeding. Similarly, if a patient is supposed to receive Pradox, but Plavix

is supplied, the patient will not experience the desired anticoagulant effect.


The incident highlighted also demonstrates the importance of practitioners correctly identifying and verifying the medication that a patient has been taking as this can impact the treatment plan.

Both Plavix and Pradax begin with the letter “P” so the two drugs may be stored in close proximity in medication storage areas. In addition, the typical dosage strength for Pradax may overlap with the dosage strength for Plavix, which increases the potential for mix-ups.

Plavix is available in 75 mg and 300 mg tablets. Pradax is available in 75 mg, 110 mg, and 150 mg capsules.

Suggested strategies

- Include the generic name (clopidogrel for Plavix, dabigatran etexilate for Pradax) throughout the medication-use process (e.g., prescribing, transcribing, dispensing).
- If the brand name is being communicated verbally, include its spelling. Consider using a phonetic alphabet (e.g., “R as in Roger”) to verify the brand name whenever it is verbally communicated.
- If these two drugs must be stored in a care area, consider opportunities to differentiate the products, such as ensuring that they are not stored in close proximity and/or using a warning label.
- Consider an automated alert (e.g., for computerized prescriber and pharmacy order entry systems).
- Involve patients (and their family members) in the medication-use process. Informed patients and family members can prevent mix-ups. A consumer alert about this issue is also available at <http://www.safemedicationuse.ca/alerts/index.html> and may be shared.
- Support initiatives that foster the use of medication reconciliation. Medication reconciliation is an important safety initiative, and the incident described above highlights its value.
- Share this information to alert other practitioners and to raise awareness of this issue.

ISMP Canada has notified the manufacturers of Pradax and Plavix, as well as other stakeholders about the potential confusion between these drug names. 

REFERENCES

Boehringer Ingelheim (Canada) Ltd.(2011, June 13). *Pradax* [product monograph]. Retrieved from <http://webprod.hc-sc.gc.ca/dpd-bdpp/item-iteme.do?pm-mp=00013431>

sanofi-aventis Canada Inc. (2011, May 12). *Plavix* [product monograph]. Retrieved from <http://webprod.hc-sc.gc.ca/dpd-bdpp/item-iteme.do?pm-mp=00013221>

About the authors

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Acknowledgement

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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 an independent national not-for-profit organization committed to the advancement of medication safety in all health care settings. ISMP Canada maintains a national voluntary medication incident and ‘near miss’ reporting program founded for the purpose of sharing the learning experiences from medication errors. Our collaborative goal is implementation of preventive strategies and system safeguards to decrease the risk for error-induced injury.

ISMP Canada is a key partner in the Canadian Medication Incident Reporting and Prevention System (CMIRPS).

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.

What inspired our game-changing IntelliVue MX800 monitor? The need to make better decisions at the point of care.

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AWARD INFORMATION

The Sorin Group “Chapter of the Year”



Award

The Sorin Group “Chapter of the Year” Award is presented to recognize the effort, contributions and dedication of a CACCN Chapter in carrying out the purposes and goals of the association.

Award funds available: \$500.00 plus a plaque

Criteria for the award program:

- All chapters of CACCN are eligible for consideration of the Chapter of the Year Award, provided all quarterly and annual financial/activity reports are on file with CACCN National Office for the qualifying period. If the above conditions are not met, the chapter will not be eligible for consideration
- The award program will be for the period of April 1 to March 31 of each year
- Chapters may win the award for one year followed by a two-year lapse before winning again.

Conditions for the award program:

- A point system has been developed to evaluate chapter activities during the year
- Chapters will be responsible for ensuring National Office receives all required documentation to validate accumulated points
- The chapter with the most points will be the successful recipient of the Chapter of the Year Award
- CACCN reserves the right to adjust points depending upon supporting materials submitted
- In the case of a tie, CACCN reserves the right to determine the recipient of the award
- The award winner will be announced at Chapter Connections Day and at the annual awards ceremony at Dynamics
- Announcement of the successful chapter will be published in CACCN publications
- The successful chapter will be profiled at Chapter Connections Day and Dynamics.

Categories and their corresponding points:

- Educational programming—please provide an accompanying brochure/advertisement of events that occurred in the award year:

Programs between:

1–3 hours:	25 points each
3–8 hours:	50 points each
> 8 hours:	100 points each

- Recruitment: points are calculated based on the percentage of new members recruited, as compared to the total membership of the previous year:

01–10%:	10 points
11–20%:	20 points
21–30%:	30 points
31–40%:	40 points
41–50%:	50 points

51–60%:	60 points
61–70%:	70 points
71–80%:	80 points
81–90%:	90 points
91–100%:	100 points

Points will be calculated for chapter members who have contributed presentations at local, provincial and national CACCN activities. Points will only be awarded once for a presentation, regardless of the number of times or venues at which it is presented.

Each Presentation: 25 points

Points will be calculated for chapter members who have contributed articles to either the chapter newsletter, or who have had a paper published in *Dynamics*, *Journal of the Canadian Association of Critical Care Nurses*. Please provide a copy of the associated chapter newsletter.

Each article or paper: 25 points

Projects that provide public education, community service and/or promote the image of critical care nursing or CACCN. 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, recruitment booths, etc.).

Each project: 50 points

Good luck in your endeavours!

The CACCN Board of Directors retains the right to amend the award criteria as required.

CACCN Research Grant

The CACCN research grant has been established to provide funds to support the research activities of a CACCN member that is 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.

Award funds available: \$2,500.00

Deadline for submission: February 15

Send applications to CACCN National Office at caccn@caccn.ca or fax to 519-649-1458 or mail to: CACCN, PO Box 25322, London, ON N6C 6B1. Mailed applications must be postmarked on or before February 15.

Eligibility:

The principal investigator must:

- Be a member of CACCN in good standing for a minimum of one year
- Note: where a student is submitting the research grant application and is ineligible to act as the principal investigator, the student 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 research study in *Dynamics*, *Journal of the Canadian Association of Critical Care Nurses*

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

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:

- Each proposal will be reviewed by a research review committee
- 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
- The recipient of the research grant will be notified in writing.

Terms and conditions of the award:

- The research 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
- The research study is to be submitted to the *Dynamics, Journal of the Canadian Association of Critical Care Nurses* for review and possible publication.

Application requirements:

- A completed application form
- A grant proposal not in excess of five single-spaced pages exclusive of appendices and application form
- Appendices should be limited to essential information, e.g., consent form, instruments, budget
- A letter of support from the sponsoring agency (hospital, clinical program) or thesis chairperson/advisor (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 CNA publication *Ethical Guidelines for Nursing Research Involving Human Subjects*
- A 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
- Proof of CACCN active membership and Canadian citizenship
- Facility approval for commencement of study

CACCN Research Grant Application located at <http://www.caccn.ca/en/awards/index.html> or via CACCN National Office at caccn@caccn.ca.

The CACCN Board of Directors retains the right to amend the award criteria.

Editorial Awards

1st place award value: \$750.00 Edwards

Runner-up award value: \$500.00 CACCN

Deadline: None. Awards committee selection process.

The Editorial Awards will be presented to the authors of two written papers in **Dynamics**, 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 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** 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**.

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 Spacelabs Innovative Project Award



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.

Award funds available: \$1,500.00 total

- \$1,000.00 will be granted to the Award winner
- \$500.00 will be granted for the runner up
- A discretionary decision by the review committee may be made, for the award to be divided between two equally deserving submissions for the sum of \$750.00 each.

Deadline for submission: June 1 each year

Send applications to CACCN National Office at caccn@caccn.ca or fax to 519-649-1458 or

Mail to: CACCN, PO Box 25322, London, ON N6C 6B1

Mailed applications must be postmarked on or before June 1

Do you have a unique idea?

Award criteria:

- The primary contact person for the project must be a CACCN member in good standing for a minimum of one year
- Applications will be judged according to the following criteria:
 - the number of nurses who will benefit from the project
 - the uniqueness of the project
 - the relevance to critical care nursing
 - consistency with current research/evidence
 - ethics
 - feasibility
 - timeliness
 - impact on quality improvement.
- If the applicant(s) are previous recipients of this award, there must be a one-year lapse before submitting an application.
- Members of the CACCN board of directors and the awards committee are not eligible.

Award requirements:

- Within one year, the winning group of nurses is expected to publish a report that outlines their project in Dynamics, Journal of the Canadian Association of Critical Care Nurses.

The CACCN Board of Directors and Spacelabs Healthcare retains the right to amend the award criteria.

Smiths Medical Canada Ltd.



Educational Award

Award value: \$1,000.00 each (two awards)

Deadlines: January 31 and September 1 of each year

The CACCN Educational Awards have been established to provide funds (\$1000.00 each) to assist critical care nurses to attend continuing education programs at the baccalaureate, master's 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. Submit a letter of reference from his/her current employer
4. 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
5. Has not been the recipient of this award in the past two years
6. Incomplete applications will not be considered; quality of application will be a factor in selecting recipient.

Application process:

1. Submit a completed CACCN educational award application package to National Office (forms package online at www.caccn.ca)
2. Preference will be given to applicants with the highest number of merit points
3. Keep a record of merit points, dating back three (3) years
4. Submit all required documentation outlined in criteria— candidate will be disqualified if documentation is not submitted with application
5. Presentations considered for merit points are those that are not prepared as part of your regular role responsibilities
6. Oral and poster presentations will be considered.

Post-application process:

1. All applications will be acknowledged in writing from the awards committee
2. Unsuccessful applicants will be notified individually by the awards committee
3. Recipients will be acknowledged at the Dynamics of Critical Care Conference and be published in the journal.

Chapter Recruitment and Retention Awards

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:

- Minimum of 25% of membership is **new** between April 1 to March 31, the chapter will receive one (1) full Dynamics tuition
- Minimum of 33% of membership is **new** between April 1 to March 31, the chapter will receive one (1) full Dynamics tuition and one (1) \$100.00 Dynamics tuition coupon.

Retention Initiative:

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

- If the chapter has greater than 80% 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 70% 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.

BBraun Sharing Expertise Award

Award funds available: \$ 1,000.00

Deadline for submission: June 1 each year

The BBraun Sharing Expertise 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.

Send applications to CACCN National Office at caccn@caccn.ca or fax to 519-649-1458 or

Mail to: CACCN, PO Box 25322, London, ON N6C 6B1

Mailed applications must be postmarked on or before June 1

Eligibility criteria:

- Nominee must be a CACCN member for a minimum of one (1) year
- The nominee must have at least three (3) years of critical care nursing experience
- 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 (2009)
- CACCN board of directors are not eligible to apply for the award.

Three (3) 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 Sharing Expertise Award—Candidate's Name" to the Director responsible for awards at National Office (caccn@caccn.ca).



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 email and regular mail
- The successful candidate will be 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 Awards Committee reserves the right to withhold the award if no candidate meets the criteria outlined

The CACCN Board of Directors & BBraun Medical retain the right to amend the award criteria.

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 of each year.

The Baxter Corporation Guardian Scholarship will be presented to an individual or an interdisciplinary team who proposes to make, or who has 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 applicant must:

- Be an active member of CACCN in good standing for a minimum of one year
- Be licensed to practise nursing in Canada
- Members of the award review committee and/or the board of directors are not eligible.

Application Requirements:

- 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

- 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
- If this project requires ethics approval, please submit evidence of approval with your application.

Review process:

- Each proposal will be reviewed by the awards review committee and a representative of the Baxter Corporation
- Proposals are reviewed for their contribution to patient safety, evidence of transferability of the project, innovation, sustainability, and leadership within critical care practice areas
- Deadline for receipt of applications is **June 1** of each year
- The successful candidate will be chosen and notified in writing by **July 1**.

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** for publication.

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 total funds available are \$5,000.00.

The award funds may be granted to a maximum of two applicants (\$2,500.00 each).

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

The Brenda Morgan Leadership Excellence Award

Award funds available: \$1,000.00 plus award trophy

Deadline for submission: June 1

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 was the first recipient of the award. 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 profes-

sion 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.

The Brenda Morgan Leadership Excellence 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.

Send applications to CACCN National Office at caccn@caccn.ca or fax to 519-649-1458 or
Mail to: CACCN, PO Box 25322, London, ON N6C 6B1
Mailed applications must be postmarked on or before June 1

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:

- Have been a member of CACCN for a minimum of five (5) years
- Have a minimum of five (5) years of critical care nursing experience
- Be registered to practice nursing in Canada
- Have demonstrated volunteerism and significant commitment to CACCN
- Have participated in CACCN activities at local or national levels
- Been a member of the CACCN Chapter executive or National Board of Directors
- Have 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
- Hold a valid adult or pediatric specialty in critical care certification—Certified Nurse in Critical Care—CNCC(C) or CNCCP(C) from the CNA (preferred)
- Have demonstrated a leadership role or have held a key leadership position in an organization related to the specialty of critical care
- Consistently conducts themselves in a leadership manner
- Have effectively engaged others in the specialty of critical care nursing
- Have role modelled commitment to professional self development and lifelong learning
- On a consistent basis, exemplifies 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.

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
- Members of the CACCN board of directors and the awards committee are not eligible
- Award recipients will be notified in writing of their selection for the award
- Recipients will be honoured during the awards ceremony, at the annual Dynamics Conference
- Recipient names and possibly a photo will be published in Dynamics, the official Journal of the CACCN

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

Terms and conditions of the award:

- The award recipient will be encouraged to write a reflective article for Dynamics: the Journal of the CACCN, sharing their accomplishments and describing their leadership experience. The article should reflect on the recipient's passion to move critical care nursing forward, their leadership qualities and how they used these effectively to achieve their outcome.

The CACCN Board of Directors retains the right to amend the award criteria.

Chasing Excellence Award

Award value: \$1,000.00

Deadline: June 1 annually

This award is presented annually to a CACCN member who consistently demonstrates excellence in critical care nursing practice. *The Cardinal Health Chasing Excellence Award* is \$1,000.00 to be used by the recipient for continued professional or leadership development in critical care nursing.

The *Cardinal Health Chasing Excellence Award* is given to a critical care nurse who:

- In critical care, has a primary role in direct patient care
- Has been a CACCN member in good standing for three or more years
- Holds a certificate from CNA in critical care CNCC(C) or CNCCP(C) (preferred)
- Note: Current members of the national board of directors are not eligible

The *Cardinal Health Chasing Excellence Award* recipient consistently practises at an expert level as described by Benner (1984). Expert practice is exemplified by most or all of the following criteria:

- Participates in quality improvement and risk management to ensure a safe patient care environment
- Acts as a change agent to improve the quality of patient care when required
- Provides high-quality patient care based on experience and evidence
- Effective clinical decision-making supported by thorough assessments
- Has developed a clinical knowledge base and readily integrates change and new learning to practice
- Is able to anticipate risks and changes in patient condition and intervene in a timely manner
- Sequences and manages rapid multiple therapies in response to a crisis (Benner, Hooper-Kyriakidis & Stannard, 1999)
- Integrates and coordinates daily patient care with other team members
- Advocates and develops a plan of care that consistently considers the patient and family and ensures they receive the best care possible
- Provides education, support and comfort to patients and their families to help them cope with the trajectory of illness and injury, to recovery, palliation or death
- Role models collaborative team skills within the inter-professional health care team
- Assumes a leadership role as dictated by the dynamically changing needs of the unit
- Is a role model to new staff and students
- Shares clinical wisdom as a preceptor to new staff and students
- Regularly participates in continuing education and professional development.

Nominations:

Two letters describing the nominee's clinical excellence and expertise are required, one of which must be from a CACCN member. The nomination letters need to include three concrete clinical examples outlining how the nominee meets the above criteria and demonstrates clinical excellence in practice. In addition, a supporting letter from a supervisor, such as a unit manager or team leader, is required.

Selection:

Each nomination will be reviewed by the awards committee in conjunction with the CACCN director of awards and sponsors. The successful recipient 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 awards committee reserves the right to withhold the award if no candidate meets the criteria. 🌸

References:

- Benner, P. (1984). *From novice to expert. Excellence and power in clinical nursing practice*. Menlo Park: Addison-Wesley.
- Benner, P., Hooper-Kyriakidis, P., & Stannard, D. (1999). *Clinical Wisdom and Interventions in Critical Care: A Thinking-in-action Approach*. Philadelphia: Saunders.





Prescribing Summary



Patient Selection Criteria

THERAPEUTIC CLASSIFICATION: Alpha₂-adrenergic agonist
INDICATIONS AND CLINICAL USE:

Intensive Care Unit Sedation

Precedex™ is indicated for sedation of initially intubated and mechanically ventilated postsurgical patients during treatment in an intensive care setting by continuous intravenous infusion. The Precedex™ infusion must not exceed 24 hours.

Precedex™ has been continuously infused in mechanically ventilated patients prior to extubation, during extubation, and post-extubation. It is not necessary to discontinue Precedex™ prior to extubation. After extubation, the dose of Precedex™ should be reduced by half. The mean time of continued infusion is approximately 6.6 hours.

Conscious Sedation

Precedex™ is indicated for sedation of non-intubated patients prior to and/or during surgical and other procedures by continuous intravenous infusion for the following procedures:

- Monitored Anesthesia Care (MAC) with an adequate nerve block and/or local infiltration; and
- Awake Fiberoptic Intubation (AFI) with adequate topical preparation of the upper airway with local lidocaine formulations.

Due to insufficient safety and efficacy data, Precedex™ is not recommended for use in procedures other than the two listed above.

CONTRAINDICATIONS

Patients who are hypersensitive to this drug or to any ingredient in the formulation or component of the container. For a complete listing, see the Dosage Forms, Composition and Packaging section of the product monograph.

SPECIAL POPULATIONS

Pregnant Women: There are no adequate and well-controlled studies in pregnant women. Precedex™ should be used during pregnancy only if the potential benefits justify the potential risk to the fetus.

Labor and Delivery: The safety of Precedex™ during labor and delivery has not been studied. Therefore, Precedex™ is not recommended during labor and delivery including cesarean section deliveries.

Nursing Women: It is not known whether Precedex™ is excreted in human milk. Radio-labeled Precedex™ administered subcutaneously to lactating female rats was excreted in milk. Because many drugs are excreted in human milk, caution should be exercised when Precedex™ is administered to a nursing woman.

Pediatrics: There have been no clinical studies to establish the safety and efficacy of Precedex™ in pediatric patients below 18 years of age. Therefore, Precedex™ should not be used in this population.

Geriatrics: Precedex™ is known to be substantially excreted by the kidney, and the risk of adverse reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection in elderly patients, and it may be useful to monitor renal function (see **Dosage and Administration**).



Safety Information

WARNINGS AND PRECAUTIONS

General

Precedex™ should be administered only by persons skilled in the management of patients in the intensive care or operating room setting. Due to the known pharmacological effects of Precedex™, patients should be continuously monitored while receiving Precedex™.

Cardiovascular

Hypotension, Bradycardia and Sinus arrest: Clinically significant episodes of bradycardia and sinus arrest have been reported with Precedex™ administration in young, healthy volunteers with high vagal tone or with different routes of administration including rapid intravenous or bolus administration.

Reports of hypotension and bradycardia have been associated with Precedex™ infusion. If medical intervention is required, treatment may include decreasing or stopping the infusion of Precedex™, increasing the rate of intravenous fluid administration, elevation of the lower extremities, and use of pressor agents. Because Precedex™ has the potential to augment bradycardia induced by vagal stimuli; clinicians should be prepared to intervene. The intravenous administration of anticholinergic agents (e.g., glycopyrrolate, atropine) should be considered to modify vagal tone. In clinical trials, glycopyrrolate or atropine were effective in the treatment of most episodes of Precedex™-induced bradycardia. However, in some patients with significant cardiovascular dysfunction, more advanced resuscitative measures were required.

Caution should be exercised when administering Precedex™ to patients with advanced heart block and/or severe ventricular dysfunction. Because Precedex™ decreases sympathetic nervous system activity, hypotension and/or bradycardia may be expected to be more pronounced in patients with hypovolemia, diabetes mellitus, or chronic hypotension and in elderly patients. In situations where other vasodilators or negative chronotropic agents are administered, coadministration of Precedex™ could have an additive pharmacodynamic effect and should be administered with caution.

Transient Hypertension: Transient hypertension has been observed primarily during the loading dose in association with the initial peripheral vasoconstrictive effects of Precedex™.

Treatment of the transient hypertension has generally not been necessary, although reduction of the loading dose infusion rate may be desirable.

Dependence/Tolerance

Precedex™ is not a controlled substance. The dependence potential of Precedex™ has not been studied in humans.

Endocrine and Metabolism

The available evidence is inadequate to confirm if dexmedetomidine is associated with significant adrenocortical suppression. The adequacy of the adrenocortical function should be individually assessed and managed.

Hepatic/Biliary/Pancreatic

Since Precedex™ clearance decreases with severity of hepatic impairment, dose reduction should be considered in patients with impaired hepatic function.

Renal

Precedex™ is known to be substantially excreted by the kidney, and the risk of adverse reactions to this drug may be greater in patients with impaired renal function. (see **Dosage and Administration**)

Peri-Operative Considerations

Arousability: Some patients receiving Precedex™ have been observed to be arousable and alert when stimulated. This alone should not be considered as evidence of lack of efficacy in the absence of other clinical signs and symptoms.

Withdrawal

Intensive Care Unit

Precedex™ is indicated only for sedation of initially intubated and mechanically ventilated postoperative patients recovering in a post-operative care unit or an intensive care unit. During the use of Precedex™ in an intensive care setting, the patients must be monitored continuously, particularly for their cardiovascular safety indicators.

If Precedex™ were to be administered for more than 24 hours and stopped abruptly, withdrawal symptoms similar to those reported for other alpha-2-adrenergic agents may result. These symptoms include nervousness, agitation, and headaches, accompanied or followed by a rapid rise in blood pressure and elevated catecholamine concentrations in the plasma. Precedex™ infusion must not exceed 24 hours.

Conscious Sedation

Withdrawal symptoms were not seen after discontinuation of short term infusion of Precedex™.

Patient Counselling Information

Precedex™ is indicated for short-term intravenous sedation. Dosage must be individualized and titrated to the desired clinical effect. Blood pressure, heart rate and oxygen levels will be monitored both continuously during the infusion of Precedex™ and as clinically appropriate after discontinuation.

- When Precedex™ is infused for more than 6 hours, patients should be informed to report nervousness, agitation, and headaches that may occur for up to 48 hours.
- Additionally, patients should be informed to report symptoms that may occur within 48 hours after the administration of Precedex™ such as: weakness, confusion, excessive sweating, weight loss, abdominal pain, salt cravings, diarrhea, constipation, dizziness or lightheadedness.

Intensive Care Unit Sedation

A total of 849 patients in the clinical studies were 65 years of age and over. A total of 242 patients were 75 years of age and over. In patients greater than 65 years of age, a higher incidence of bradycardia and hypotension was observed following administration of Precedex™. Therefore a dose reduction should be considered in patients over 65 years of age (see **Dosage and Administration**).

Conscious Sedation

A total of 131 patients in the clinical studies were 65 years of age and over. A total of 47 patients were 75 years of age and over. Hypotension occurred in a higher incidence in Precedex™-treated patients 65 years or older (72%) and 75 years or older (74%) as compared to patients <65 years (47%). Pre-specified criteria for the vital signs to be reported as adverse reactions are footnoted below Table 2 (see **Adverse Reactions**). A reduced loading dose of 0.5 mcg/kg given over 10 minutes is recommended and a reduction in the maintenance infusion should be considered for patients greater than 65 years of age (see **Dosage and Administration**).

ADVERSE REACTIONS

Adverse Drug Reaction Overview

Use of Precedex™ has been associated with the following serious adverse reactions:

- Hypotension, bradycardia and sinus arrest (see **Warnings and Precautions**),
- Transient hypertension (see **Warnings and Precautions**).

Most common treatment-emergent adverse reactions, occurring in greater than 2% of patients in both Intensive Care Unit and conscious sedation studies include hypotension, bradycardia and dry mouth.

Intensive Care Unit Sedation

Adverse event information derived from the placebo-controlled, continuous infusion trials of Precedex™ for sedation in the surgical intensive care unit setting in which 387 patients received Precedex™. Overall, the most frequently observed treatment-emergent adverse events included hypotension, hypertension, nausea, bradycardia, fever, vomiting, hypoxia, tachycardia and anemia (see **Table 1**).

Conscious Sedation

Adverse event information is derived from the two trials for conscious sedation in which 318 patients received Precedex™. Treatment-emergent adverse events occurring at an incidence of >2% are provided in **Table 2**. The most frequent adverse events were hypotension, bradycardia, and dry mouth.

Post-Market Adverse Drug Reactions

Hypotension and bradycardia were the most common adverse reactions associated with the use of Precedex™ during post approval use of the drug.

DRUG INTERACTIONS

Drug-Drug Interactions

Anesthetics, sedatives, hypnotics, opioids

Co-administration of Precedex™ with anesthetics, sedatives, hypnotics, and opioids is likely to lead to an enhancement of effects. Specific studies have confirmed these effects with sevoflurane, isoflurane, propofol, alfentanil, and midazolam. No pharmacokinetic interactions between Precedex™ and isoflurane, propofol, alfentanil and midazolam have been demonstrated. However, due to possible pharmacodynamic interactions, when co-administered with Precedex™, a reduction in dosage of Precedex™ or the concomitant anesthetic, sedative, hypnotic or opioid may be required.

Neuromuscular Blockers

In one study of 10 healthy volunteers, administration of Precedex™ for 45 minutes at a plasma concentration of 1 (one) ng/mL resulted in no clinically meaningful increases in the magnitude of neuromuscular blockade associated with rocuronium administration.

Cytochrome P450

In vitro studies in human liver microsomes demonstrated no evidence of cytochrome P450 mediated drug interactions that are likely to be of clinical relevance.

REPORTING SUSPECTED SIDE EFFECTS

Toll-free telephone: 1-866-234-2345 • Toll-free fax: 1-866-678-6789

Online at: www.healthcanada.gc.ca/mec/effect

Regular Mail: Canada Vigilance Program, Health Canada

Postal Locator 0701C, Ottawa, ON K1A 0K9



Administration

Dosing Considerations

- Precedex™ should be used in only facilities adequately staffed and equipped for anesthesia, resuscitation, and cardiovascular monitoring.
- Precedex™ dosing should be individualized and titrated to the desired clinical response.
- Precedex™ is not indicated for infusions lasting longer than 24 hours.
- Precedex™ should be administered using a controlled infusion device with adequate precision.

Recommended Dose and Dosage Adjustment

Intensive Care Unit Sedation

- Precedex™ is indicated for post-surgical patients in an intensive care setting, e.g. in Post Anesthesia Care Unit or Intensive Care Unit.
- An assessment of the level of sedation and the need for Precedex™ should precede the initiation of Precedex™.
- Another intravenous sedative (e.g. midazolam or propofol) may be added if Precedex™ provides inadequate sedation at the highest recommended dose level.
- The need for Precedex™ continuous infusion post-extubation must be assessed individually.

If the continuous infusion is needed post-extubation, the infusion speed should be reduced by half. The mean time of continued infusion is approximately 6.6 hours.

- Precedex™ use should not exceed 24 hours in an ICU setting.

A dose reduction for both the loading and maintenance infusions should be considered in patients with impaired hepatic or renal function and in patients over 65 years of age.

Initiation: For adult patients, Precedex™ is generally initiated with a loading infusion of up to one mcg/kg over 10 to 20 minutes, if needed. For patients being converted from alternate sedative therapy a loading dose may not be required.

Maintenance: Adult patients will generally require a maintenance infusion of 0.2 to 0.7 mcg/kg/hr. The rate of the maintenance infusion should be adjusted to achieve the desired level of sedation.

Conscious Sedation

- Based on the Ramsay and Observer's Assessment of Alertness/Sedation Scales, the loading infusion provides clinically effective onset of sedation 10 to 15 minutes after start of infusion.
- For use in Monitored Anesthesia Care, an adequate nerve block and/or local infiltration should be used.
- For Awake Fiberoptic Intubation, the upper airway should be topicalized with proper lidocaine formulations.

Initiation: For adult patients, Precedex™ is generally initiated with a loading infusion of one mcg/kg over 10 minutes. For patients over 65 years of age or those undergoing less invasive procedures such as ophthalmic surgery, a loading infusion of 0.5 mcg/kg over 10 minutes may be suitable.

Maintenance: The maintenance infusion of Precedex™ is generally initiated at 0.6 mcg/kg/hr and titrated to achieve desired clinical effect with doses ranging from 0.2 to 1 mcg/kg/hr. The rate of the maintenance infusion should be adjusted to achieve the targeted level of sedation. Following the load in awake fiberoptic intubation, a fixed maintenance dose of 0.7 mcg/kg/hr is recommended until the endotracheal tube is secured.

Dosage Adjustment: Due to possible pharmacodynamic interactions, a reduction in dosage of Precedex™ or other concomitant anesthetics, sedatives, hypnotics or opioids may be required when coadministered. A dose reduction for both the loading and maintenance infusions should be considered in patients with impaired hepatic or renal function and in patients over 65 years of age.

Administration

Precedex™ must be diluted in 0.9% sodium chloride solution to achieve required concentration (4 mcg/mL) prior to administration. Preparation of solutions is the same, whether for the loading dose or maintenance infusion.

Strict aseptic technique must always be maintained during handling of Precedex™.

To prepare the infusion, withdraw 2 mL of Precedex™ and add to 48 mL of 0.9% sodium chloride injection to a total of 50 mL. Shake gently to mix well. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.



Study References

1. PRECEDEX™ (Dexmedetomidine Hydrochloride for Injection) Product Monograph, December 8, 2009, Hospira Healthcare Corporation.

Supplemental Product Information

Clinical Trial Adverse Drug Reactions: Because clinical trials are conducted under very specific conditions, the adverse reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates. **Intensive Care Unit Sedation:** Adverse event information derived from the placebo-controlled, continuous infusion trials of Precedex™ for sedation in the surgical intensive care unit setting in which 387 patients received Precedex™. In these studies, the mean total dose was 7.36 mcg/kg (SD = 2.86), mean dose per hour was 0.51 mcg/kg/hr (SD = 0.29) and the mean duration of infusion of 15.6 hours (range: 0.17 to 29.08). Midazolam or propofol was used as the rescue medication for patients on Precedex™ or placebo. The population was between 19 to 83 years of age, 43% > 65 years of age, 73% male and 97% Caucasian. Treatment-emergent adverse events occurring at an incidence of >1% are provided in Table 1.

Table 1: Treatment-Emergent Adverse Events Occurring in >1% Of All Dexmedetomidine-Treated Patients in the Randomized Placebo-Controlled Continuous Infusion Short-Term Intensive Care Unit Sedation Studies

Adverse Event	Randomized Dexmedetomidine* (N=387)	Placebo with Midazolam Rescue (N=181)	Placebo with Propofol Rescue (N=198)
Hypotension	28%	15%	10%
Hypertension	16%	13%	23%
Nausea	11%	9%	10%
Bradycardia	7%	3%	2%
Fever	5%	6%	4%

Adverse Event	Randomized Dexmedetomidine* (N=387)	Placebo with Midazolam Rescue (N=181)	Placebo with Propofol Rescue (N=198)
Vomiting	4%	6%	6%
Atrial Fibrillation	4%	4%	3%
Hypoxia	4%	5%	3%
Tachycardia	3%	7%	3%
Hemorrhage	3%	6%	4%
Anemia	3%	4%	1%
Dry Mouth	3%	2%	<1%
Rigors	2%	3%	4%
Agitation	2%	3%	3%
Hyperpyrexia	2%	3%	2%
Pain	2%	3%	1%
Hypoglycemia	2%	3%	1%
Acidosis	2%	<1%	3%
Fluorid Effusion	2%	<1%	2%
Clinical	2%	1%	<1%
Thirst	2%	<1%	<1%

*Data combined from studies conducted in post-surgical patients receiving in an ICU setting.

Conscious Sedation: Event information is derived from the two trials for conscious sedation in which 318 patients received Precedex™. Midazolam was used as the rescue medication for patients on Precedex™ or placebo. The mean total dose was 1.6 mcg/kg (range: 0.5 to 6.7), mean dose per hour was 1.3 mcg/kg/hr (range: 0.3 to 6.1) and the mean duration of infusion of 1.5 hours (range: 0.1 to 6.2). The population was between 18 to 93 years of age, 30% > 65 years of age, 52% male and 51% Caucasian. Treatment-emergent adverse events occurring at an incidence of >2% are provided in Table 2. Pre-specified criteria for the vital signs to be reported as adverse reactions are footnoted below the table. The decrease in respiratory rate and hypoxia was similar between Precedex™ and comparator groups in both studies.

Table 2: Adverse Events with an Incidence >2% – Conscious Sedation Population

Body System/Adverse Event	Precedex™ N = 318 n (%)	Placebo N = 113 n (%)
Vascular disorders		
Hypotension ¹	173 (54%)	34 (30%)
Hypertension ²	41 (13%)	27 (24%)
Respiratory, thoracic and mediastinal disorders		
Respiratory depression ³	117 (37%)	36 (32%)
Hypoxia ⁴	7 (2%)	3 (3%)
Bradypnea	5 (2%)	5 (4%)
Cardiac disorders		
Bradycardia ⁵	45 (14%)	4 (4%)
Tachycardia ⁶	17 (5%)	19 (17%)
Gastrointestinal disorders		
Nausea	10 (3%)	2 (2%)
Dry mouth	8 (3%)	1 (1%)

¹ Hypotension was defined in absolute and relative terms as Systolic blood pressure of <80 mmHg or <30% lower than pre-study drug infusion value, or Diastolic blood pressure of <50 mmHg. ² Hypertension was defined in absolute and relative terms as Systolic blood pressure >180 mmHg or >20% higher than pre-study drug infusion value or Diastolic blood pressure of >100 mmHg. ³ Bradypnea was defined in absolute and relative terms as <40 bpm or <20% lower than pre-study drug infusion value. ⁴ Hypoxia was defined in absolute and relative terms as <100 bpm or >30% greater than pre-study drug infusion value. ⁵ Respiratory Depression was defined in absolute and relative terms as respiratory rate <8 bpm or <25% decrease from baseline. ⁶ Hypoxia was defined in absolute and relative terms as SpO₂ < 90% or 10% decrease from baseline.

Post-Market Adverse Drug Reactions: The following adverse reactions have been identified during post approval use of Precedex™. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Table 3: Adverse Events Experienced During Post approval Use of Precedex™

Body System	Preferred Term
Body as a Whole	Fever, hyperpyrexia, hypokalemia, light anesthesia, pain, rigors
Cardiovascular Disorders, General	Blood pressure fluctuation, heart disorder, hypertension, hypotension, myocardial infarction
Central and Peripheral Nervous System Disorders	Dizziness, headache, neuralgia, neuritis, speech disorder, convulsion
Gastrointestinal System Disorders	Abdominal pain, diarrhea, vomiting, nausea
Heart Rate and Rhythm Disorders	Arrhythmic, ventricular arrhythmia, bradycardia, hypoxia, atrioventricular block, cardiac arrest, extrasystoles, atrial fibrillation, heart block, 1 wave inversion, tachycardia, supraventricular tachycardia, ventricular tachycardia
Metabolic and Nutritional Disorders	Acidosis, respiratory acidosis, hyperkalemia, increased alkaline phosphatase, thirst, hyperglycemia
Psychiatric Disorders	Agitation, confusion, delirium, hallucination, illusion
Red Blood Cell Disorders	Anemia
Renal disorders	Blood urea nitrogen increased, oliguria
Respiratory System Disorders	Apnea, bronchospasm, dyspnea, hypercapnia, hypoventilation, hypoxia, pulmonary congestion
Skin and Appendages Disorders	Increased sweating
Vascular disorders	Hemorrhage
Vision Disorders	Photopsia, abnormal vision

Compatibility with Other Fluids: Precedex™ has been shown to be compatible when administered with the following intravenous fluids: Lactated Ringers, 5% Glucose in Water, 0.9% Sodium Chloride in Water, 20% Mannitol in Water. Dexmedetomidine has been found to be compatible with water solutions of the following drugs when administered via Y-site injections: thiopental sodium, vecuronium bromide, pancuronium bromide, glycopyrronium bromide, phenylephrine hydrochloride. **Compatibility with Natural Rubber:** Compatibility studies have demonstrated the potential for absorption of Precedex™ to some types of natural rubber. Although Precedex™ is used to affect, it is advisable to use administration components made with synthetic or carboxylated natural rubber products. **Incompatibilities:** Precedex™ infusion should not be co-administered through the same IV catheter with blood, serum, or plasma because physical compatibility has not been established. Precedex™ has been shown to be incompatible when administered with the following drugs: amphotericin B, diazepam. **OVERDOSAGE:** The tolerability of Precedex™ was studied in one study in which healthy subjects were administered doses at and above the recommended dose of 0.2 to 0.7 mcg/kg/hr. The maximum blood concentration achieved in this study was approximately 13 times the upper boundary of the therapeutic range. The most notable effects observed in two subjects who received the highest doses were first degree atrioventricular block and second degree heart block. No hemodynamic compromise was noted with the atrioventricular block and the heart block resolved spontaneously within one minute. Five patients received an overdose of Precedex™ in the intensive care unit sedation studies. Two of these patients had no symptoms reported; one patient received a 2 mcg/kg loading dose over 10 minutes (twice the recommended loading dose) and one patient received a maintenance infusion of 0.8 mcg/kg/hr. Two other patients who received a 2 mcg/kg loading dose over 10 minutes, experienced bradycardia and/or hypotension. One patient who received a loading bolus dose of undiluted Precedex™ (19.4 mcg/kg), had cardiac arrest from which he was successfully resuscitated. **STORAGE AND STABILITY:** Store at controlled room temperature, 25°C (77°F) with excursions allowed from 15 to 30°C (59 to 86°F). (See USP **CONTROLLED ROOM TEMPERATURE** storage conditions). **STORAGE AND STABILITY:** Store at controlled room temperature, 25°C (77°F) with excursions allowed from 15 to 30°C (59 to 86°F). (See USP **CONTROLLED ROOM TEMPERATURE** storage conditions). **COMPOSITION AND PACKAGING:** Precedex™ (dexmedetomidine hydrochloride for injection) is a sterile, nonpyrogenic solution suitable for intravenous infusion following dilution. Each 1 mL of Precedex™ contains 118 mcg of dexmedetomidine hydrochloride equivalent to 100 mcg dexmedetomidine and 5 mg of sodium chloride in water. The solution is preservative-free and contains no additives or chemical stabilizers. Precedex™ (Dexmedetomidine Hydrochloride for Injection), 100 mcg/mL as the base is available in 2 mL clear glass vials (200 mcg/2 mL). Vials are intended for single use only.

Product Monograph available upon request at 1-866-488-0888 or at www.hospira.ca

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Hospira Healthcare Corporation

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DYNAMICS

Information for Authors

Dynamics 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 physiological 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, position
- 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.

3. Body of manuscript:

- Length: a maximum of 15 pages including tables, figures, and references
- Format: double spaced, one-inch margins on all sides. Pages should be numbered sequentially including tables, and figures. Prepare the manuscript in the style as outlined in the American Psychological Association's (APA) Publication Manual 6th 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 CACCN. Authors submitting to Dynamics 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. Hard copy manuscripts may also be submitted through the national office. Accepted manuscripts are subject to copy editing.

October 2009



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Our recruitment continues in order to meet needs for our capacity-building initiatives. The **Critical Care Tower** will increase **Surrey Memorial Hospital** to 650 beds by 2014, providing a dedicated regional Perinatal Centre, helipad, expanded ICU, as well as a new Emergency Department opening in 2013. Fraser Health has current needs in various locations for experienced Critical Care, ICU, Emergency Room, Operating Room, PACU and Neonatal Intensive Care Unit Registered Nurses.

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WHY CACCN?

Vision: The voice for excellence in Canadian Critical Care Nursing

CACCN Mission Statement

The CACCN is a non-profit, specialty organization dedicated to maintaining and enhancing the quality of patient- and family-centred care by meeting educational needs of critical care nurses.

Engages and empowers nurses through education and networking to advocate for the critical care nurse.

Develops current and evidence informed standards of critical care nursing practice.

Identifies professional and political issues and provides a strong unified national voice through our partnerships.

Facilitates learning opportunities to achieve Canadian Nurses Association's certification in critical care.

CACCN Values Statement

Our core values are:

Excellence and Leadership

- Collaboration and partnership
- Pursuing excellence in education, research, and practice

Dignity & Humanity

- Respectful, healing and humane critical care environments
- Combining of compassion and technology to advocate and promote excellence

Integrity & Honesty

- Accountability and the courage to speak for our beliefs
- Promoting open and honest relationships

Revised November 2010

Application for membership

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Signature: _____

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Or fax with Visa/MasterCard number, expiry date to: 519-649-1458

Telephone: 519-649-5284; Fax: 519-649-1458; Toll-free: 1-866-477-9077

e-mail: caccn@caccn.ca; website: www.caccn.ca

Types of Membership

Active Member: Any registered nurse who possesses a current and valid licence or certificate in the province, territory or country in which the registered nurse practises.

Student Member: Any student in an accredited professional nursing program, who is currently not licensed as a registered/graduate nurse.

Associate Member: Any person with an interest in critical care, but who does not meet the requirements for an Active Member.

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SIGNAL™
FMS

A LEADING-EDGE SOLUTION FROM THE FLEXI-SEAL® FMS FAMILY OF FECAL MANAGEMENT SYSTEMS

It can hit any hospital.



Contain *C. difficile* before it strikes.

C. difficile is a nosocomial infection that can cause diarrhea and life-threatening intestinal conditions such as pseudomembranous colitis, toxic megacolon, sepsis and death.¹ Flexi-Seal® is scientifically proven to contain *C. difficile*.²

Flexi-Seal® SIGNAL™ FMS is a closed system that minimizes exposure to potentially infectious waste.



For more information, please call our Customer Relations Center (Registered Nurses on staff) at **1-800-465-6302**, Monday through Friday, 8:00 AM to 6:00 PM (EST), or visit our Web Site at www.convatec.ca



Reference: 1. Jarvis WR, Schlosser JA, Jarvis AA, Chinn RY. National point prevalence study of *Clostridium difficile* in US health care facility inpatients, 2008. The Association for Professionals in Infection Control and Epidemiology, Inc. (APIC). Am J Infect Control 2009;37:263-70 2. Containment of *Clostridium difficile* by the Flexi-Seal® Faecal Management System: an In Vitro Study. WHRI3107 MA106. May 8 2008. Data on file, ConvaTec.

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