

DYNAMICS

The Official Journal
of the Canadian
Association of
Critical Care
Nurses

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The Official Journal of the Canadian Association of Critical Care Nurses

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DYNAMICS

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Critical Thinking

After having served four years on the national board of directors of the Canadian Association of Critical Care Nurses (CACCN), my term as president has now come to an end. Prior to this, another five years were enjoyed serving the Toronto Chapter members on the executive. I have Patricia Hynes to thank for these nine years, as it is in her footsteps I have followed—she nudged me on many occasions in the early days. Over time, I have often told her it is because of her that I have been so fortunate to have had so many opportunities. Over the years, I have met many wonderful people, with incredible knowledge, skill and expertise. A number of people have served as excellent role models and mentored me along this path. I hope in return I have and will continue to *“pay this forward”*, mentoring others in a similar manner. To mentor another is a gift, as is having the opportunity to be mentored.

The years simply seem to have flown by and now I will turn the responsibilities of CACCN over to our new President, Kate Mahon, to share with the board of directors, chapter executives and our members. I liken this transition to watching our proud Canadian Olympic torchbearers pass the torch off to other athletes on their way to the winter games in British Columbia. Similarly, as I pass the torch to Kate, I feel very proud to have been given this opportunity to hold the position of president of the Canadian Association of Critical Care Nurses. I will consider this to be one of the highlights of my career.

The CACCN continues to grow and flourish, even in this time of uncertainty where Canadians have been facing financial, political, national and international challenges. This can only mean the efforts of previous executive boards, at the chapter and national levels, have done a terrific job in building a cushion and involving the members at large to provide the organization with a solid foundation for its current stability. Even though our nurses have their own personal commitments and pressures, they still have made time to attend to and be involved in the affairs of CACCN. Their strong commitment makes this association run smoothly and effectively and I wish to thank everyone involved in contributing to CACCN's continued success.

I make the analogy of the passing of the torch to the athletes, to that of handing the responsibilities of this office over to the next president and executive board members. I feel I have left the national executive in the solid hands of a strong team. Kate Mahon, Teddie Tanguay, Pam Cybulski, Joanne Baird, Tricia Bray, Ruth Trinier (our newest member) and our ever-so-

reliable National Administrator Christine Halfkenny-Zellas. I can honestly say I am leaving the board in a good position as past presidents have, and in a time where CACCN continues to realize a number of successes. These successes are a **direct result of a lot of extremely hard work** by our CACCN members and national board of directors across Canada. The successes over the last two years include:

- Revised Mission/Vision/Philosophy Statements.
- A new Core Values and Belief Statement.
- A new Five-Pillar Strategic Direction under the headings of Leadership, Education, Communication and Partnership, Research, and Membership.
- Revised 2009 National “Constitution and Bylaws” with approval at the annual general meeting in September 2009, in Fredericton, N.B.
- Smart financial investment planning from past boards and the maintenance of stability and growth under the careful guidance of our fiscally responsible Treasurer Joanne Baird. Joanne has been careful to ensure every penny is accounted for, as did her predecessor Glenda Roy.
- A revised fourth edition of the CACCN Standards for Critical Care Nursing Practice, the product of a national effort, headed by Tricia Bray with a team from across Canada, including: Valerie Banfield, Jennifer Giesbrecht, Sandra Goldsworthy, Pamela Hughes, Dale Kastanis, Grace MacConnell, Charlotte Pooler, Michelle Sobrepena, and Ruth Trinier. The document has undergone a major revision. The translation of the fourth edition of the CACCN Standards for Critical Care Nursing Practice into the French language by Steve Gagne has been an additional accomplishment.
- A *Dynamic* new website in partnership with Bizzone. This website is ever-expanding and changing, under the leadership and creativity of Teddie Tanguay and Christine Halfkenny-Zellas. A beautiful new design, with fresh pictures is very becoming. The development of a “Members Only” section, polling, On-line Continuing Education Credits (CEUs) for articles included in the official journal, the addition of scrolling banner ads as an enhanced source of funding, as well as a way to heighten the profile of our sponsors and partners that we are grateful for, placement electronically on the web of current and past editions of our official journal, and Critical Connections bulletins and, finally, the addition of a Web Discussion Board, where nurses across Canada can communicate with one another on

critical care issues. Plans are to continue to develop the educational component of the website to house resources for critical care nurses that are easily accessible.

- Slight increases in membership through successes in the Silver Anniversary Chapter Challenge of 2008 and the Olympic Anniversary Chapter Challenge of 2009. Pam Cybulski, our Membership Chair responsible for recruitment and retention, has done a stellar job. She consistently comes up with fresh ideas, responds to CNA surveys and partners with CNA regarding a collaborative effort towards membership and CNA certification and recertification efforts. Her response, as secretary, to questions from our members and the general public is timely, polite and thoughtful. I will never forget the first day I shared a room with Pam at a board meeting, a complete stranger, she secretly ironed my shirt while I was taking a shower... that is just the kind of person she is, warm, caring and compassionate!
- Two successful Dynamics Conferences 2008 and 2009, each bringing in more than \$110,000 to support the work of CACCN, providing a firm foundation for operations, creating opportunities to build and give back to the members. This is in addition to successes of Dynamics conferences over several years:
 - a) Dynamics 2008—we celebrated a very splashy silver anniversary in Montreal, with conference Chair Asha Pereira and her team leading this spectacular event and a memorable one it was!
 - b) Dynamics 2009—we celebrated in pretty Fredericton and a successful conference it was. I happily chaired a wonderful team of nurses from across Canada who worked closely together to produce an excellent conference, with endless choices for learning. A revised format for the Dynamics brochure and syllabus was produced.
- Approval at the AGM 2009 in Fredericton to elect an additional director to the national board of directors to support annual conference planning activities.
- Improved chapter reporting to the national executive with enhanced accountability attached. Although chapter executives, at times, may struggle with challenges of increasing membership, they always put their best foot forward to be creative and innovative in seeking new membership and retaining existing members. We have always remembered and are grateful for their efforts. They are the pillars that hold CACCN strong. Thank you to the chapter executive teams.
- A partnership with an excellent Parliamentarian Riek van den Berg from Ottawa, who has become an integral part of our team. Riek consistently provides us with solid guidance on process issues, use of Bourinot's Rules of Order, and has been a rock at our annual general meetings to ensure we do not falter from due process. Riek also provides us with guidance throughout the year, as needed. We truly appreciate her and value her role and advice on our team.
- A solid transitional plan was created by the national board of directors to prevent an exodus, as the realization that a number of board members' terms were due to expire at the same time. The transitional plan created allows for directors

to remain on the board for an extra year to allow for a smooth transition in leadership and still maintain experience on the board.

- Increased monetary value of CACCN awards, in collaboration with our sponsors and partners. Revision of award criteria for some of the awards. Continued strong partnerships with sponsors.
- In progress: the revision of five previously developed position statements led by board members in collaboration with CACCN nursing leaders across Canada.
- In progress: the development of six new position statements led by board members with CACCN nursing leaders across Canada.
- CACCN national board members Kate Mahon and Teddie Tanguay expressing a national nursing voice in the media, on H1N1 in the fall of 2009.
- Leadership development opportunities for chapter and national board members at Chapter Connections Days (2008, 2009), led by Riek van den Berg, on holding annual general meetings and "Managing the Media".
- A new look for the CACCN communication boards, increasing distribution of the boards and information throughout hospitals across Canada. The design of the new board was initiated by past board member Joy Mintenko and approved by the current board based on the design and compact look. Pam Cybulski was instrumental in the development of the CACCN decals for the boards. Pam and Christine ensured the boards were adopted and maintained.
- The continued production of a professional peer reviewed journal: The Official Journal of the Canadian Association of Critical Care Nurses. A special thanks to Kate Mahon, Paula Price and Bruce Pappin for their endless dedication to this journal, which can now also be accessed on our website. This could not be done without the work of the editorial review board: Janice Beitel, Franco Carnevale, Marie Edwards, Debbie Fraser Askin, Sandra Goldsworthy, Kathleen Graham, Martha Mackay, Mae Squires, and Judy Rashotte.
- Continued revision and development of CACCN manuals by Christine Halfkenny-Zellas. These were originally started by Tracy Porchak and further enhanced by Gina Mustard. Christine has since seriously laboured over these manuals and has produced some really first-class informational and educational tools. The manuals are in the final stages with approval scheduled for March 2010. These guides will serve as a good foundation for CACCN directors in the future. This truly has been a labour of love!
 - a) National Board of Director Manual/Chapter Manual
 - b) National Administrator Manual.

It is through TEAM WORK and COLLABORATION and DEDICATION that all of the above have been made possible. **Together** we make a difference. Whether it be to CACCN, to critically ill patients and families, to our own families, or to the efforts of making this world a better place. Of being good, caring, compassionate, hard working, and making the time we can to make a difference. I cannot forget the accomplishments above have largely been completed on a voluntary basis and that, in itself, is incredible. The organization runs on our perpetual voluntary steam, and it is because of our motivation, our energy and for our intense desire to make things better for everyone.

We have so much to be thankful for in this part of the world. Our nurses work hard to reach their goals, vision and values of giving the best in patient care and improving human outcomes. It is quite a different story for the nurses in Haiti, for example. The task must feel so insurmountable for these nurses who share exactly these same goals of giving the best in patient care. The catastrophic earthquake in Haiti has required extraordinary efforts, on behalf of all people, in order to survive in unimaginable circumstances, where their world has literally crumbled around them. This has opened the eyes of the world yet another time, and gives us an opportunity to pull together once again, as a team, undivided to help the sick, the hurt and the devastated. The fact that we can collectively make a difference in the lives of others, even when they are so far away, cannot be underestimated. Even a little help from everyone, goes a long way. A special thank you to all of our colleagues, who are directly or indirectly involved in helping out in this horrific situation. It is leaders like you who make our world a better place to live in. The long-term task of rebuilding Haiti is daunting. The importance of a coordinated plan, and collaborative efforts towards emergency relief, and meeting every day needs (i.e., provision of food and clean water) is critical. The sustained global efforts of support for rebuilding their nation, under their guidance, cannot be underestimated.

Before I conclude, my hope is that nurses continue to step forward for whatever the cause, to continue to identify additional new and exciting initiatives and pull together. On behalf of the board of directors, we appreciate everyone's efforts, in continuing to move this organization and nursing practice in general in the field of critical care (adult and pediatric) in a forward direction.

In summary, I would like to thank the nurses who have walked **beside** me and have made my path easy over the last nine years on the various boards of the CACCN of which I have been fortunate to have been a part.


From the clinical editor

As you read through this issue of **Dynamics: The Official Journal of the Canadian Association of Critical Care Nurses**, you will see there is only one article included. The submission of manuscripts to us for consideration for publishing has dwindled to extremely low levels. We would encourage you to consider writing for publication, and encouraging your colleagues who are working with interesting patients or on projects to please consider submitting a manuscript to CACCN. The journal is one of the most frequently cited benefits of being a member of CACCN, but we cannot produce a high-quality journal with content of interest to you without your participation. All members of the Editorial Review Board and I are more than happy to help you if you are having difficulty or have questions.

The article in this issue is a report of a study Wong did to determine where critical care nurses should be measuring


1. **National Board of Directors:** Joanne Baird, Tricia Bray, Pam Cybulski, Kate Mahon, Grace MacConnell, Joy Mintenko, Asha Pereira, Glenda Roy, Teddie Tanguay, Sue Williams
2. **National Administrators:** Tracy Porchak, Gina Mustard and Christine Halfkenny-Zellas
3. **Toronto Chapter Executive:** Marie Aue, Fred Canute, Janice Beitel, Winnie Chu, Michelle Cleland, Karen Dryden-Palmer, Darcy Farrell, Rob Fuerte, Sandra Goldsworthy, Nicky Holmes, Patricia Hynes, Christine Koczmarek, Margaret Kvorcka, Marsha Lipsius, Mary Ann Nelson, Linda Nusdorfer, Dilshad Pirani, Jenny Poon, Lisa Preddy, Joyce Rankin, Alistone Skepple, Wendy So, Connie Supnet
4. **Dynamics 2009 Conference Committee:** Sean De Jardine, Habiba Desai, Karen Dryden-Palmer, Rob Fuerte, Brenda Gallagher, Marg Kvorcka, Linda Nusdorfer, Mae Squires and Christine Halfkenny-Zellas
5. **Others who have consistently offered me guidance:** Patricia Hynes, Brenda Morgan, Riek van den Berg.

I would also like to introduce and acknowledge Ruth Trinier, our newest member to the national board of directors. Ruth will assume the responsibility of the awards and sponsorship portfolio. Ruth is a critical care nurse and research nurse in the Critical Care Unit at the Hospital for Sick Children in Toronto. Ruth participated in the development of the national initiative of revising the Standards of Critical Care. I know Ruth will do well in her new role and I wish her much success. She will be an asset to this board.

On a final note, even though my role as president is finished, I do not feel like my work with CACCN is complete. I, like you, will continue to be a part of CACCN and look forward to contributing to the many opportunities towards achieving its mission, vision and strategic directions. I will continue to nurture those longstanding relationships through networking and collaboration. I look forward to continuing to be a part of this team as a member at large. 

Best wishes!
Cecilia Hyslop

pulmonary artery wedge pressures when a patient is on pressure support ventilation. His descriptive pilot study holds some interesting implications for critical care nurses.

In this issue we also are pleased to include our regular research review and ISMP Canada columns. 

Paula Price, RN, PhD
Clinical Editor

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Research Review

Poncet, M.C., Toullic, P., Papazian, L., Kentish-Barnes, N., Timsit, J.-F., Pochard, F., & Azoulay, E. (2007). Burnout syndrome in critical care nursing staff. *American Journal of Respiratory and Critical Care Medicine*, *175*, 698–704.

Research question or purpose

To identify the determinants of burnout syndrome in critical care nurses. Burnout syndrome is defined as “an inability to cope with emotional stress at work or excessive use of energy and resources leading to feelings of failure and exhaustion” (p. 698).

Design

Questionnaire survey design.

Setting

Out of 286 intensive care units (ICUs) in France affiliated with the French Society for Critical Care invited to participate, 165 ICUs took part in the study (giving a response rate of 57.7%). To be eligible to participate, the ICUs had to be in a not-for-profit hospital, have more than six beds and two attending physicians, and have at least one onsite physician 24 hours a day.

Participants

In total, 2,497 people in the 165 study units responded to the questionnaire, with 237 staff members not returning a questionnaire. From the 2,497 completed questionnaires, 2,392 had complete Maslach Burnout Inventory data. Of these 2,392 respondents, 81% (1,937) were nurses, 4% (96) were head nurses, and 15% (359) were nursing assistants. Eighty-two (82) per cent of respondents were female, and the median age was 31 years.

Method

A three-page questionnaire was distributed by head nurses to every nurse and nursing assistant in the participating ICUs. These were completed and returned in a sealed envelope to preserve anonymity. The questionnaire contained the following: questions about the characteristics of respondents (e.g., age, months in the ICU) and the work environment (e.g., work schedule, relationships with other team members, conflict situations); 22 items of the Maslach Burnout Inventory (MBI), measuring emotional exhaustion, depersonalization, and one’s sense of personal accomplishment at work; eight items to measure the impact of burnout syndrome on daily life; and 22 items of the Center for Epidemiological Studies Scale for Depression (CES-D). The head nurses filled out an additional questionnaire regarding the characteristics of their units. Data analysis involved the use of the chi-square test or Fisher exact test for categorical variables, and the nonparametric Wilcoxon test or Kruskal-Wallis test for continuous variables. Univariate logistical regression analyses were used to identify variables that significantly influenced the occurrence of severe burnout syndrome (BOS).

Main findings

Approximately 33% (785) of respondents were found to have severe BOS (as defined by a score on the MBI of < -9), with no significant differences found between groups (i.e., nurses, head nurses, and nursing assistants). Characteristics associated with severe BOS included working in a teaching hospital, age (odds ratio, 0.97/additional year), organizational factors, including the ability to schedule days off as desired, quality of working relationships, including relationships with co-workers and conflict with patients or other health care providers, and end-of-life-related factors, including caring for a patient where a decision had been made to forego life-sustaining treatments or a dying patient within the week prior to completing the survey. Greater than 60% of respondents with severe BOS experienced issues with sleep disruption, insomnia, and irritability, and 60% (458) of these same respondents indicated they were thinking about changing professions. Symptoms of depression were evident in 12% (287) of respondents and in 223 of those 287 respondents found to have severe BOS.

Conclusions

This cross-sectional survey demonstrated that severe BOS is an issue for a large number of nurses, head nurses, and nursing assistants working in ICUs in France. The researchers identify that strategies to improve work relationships, prevent conflict, and enhance communication, particularly in relation to end-of-life decision-making, may help prevent burnout syndrome in health care providers.

Commentary

This is a well-designed, multicentre study examining burnout syndrome and its precursors in nursing staff in ICUs in France. The cross-sectional survey design used is appropriate for the stated research objective, and the response rates, in terms of both units and nursing staff, are impressive. The reliability and validity of the Maslach Burnout Inventory are discussed by the researchers, but limited information is provided regarding the reliability and validity of the Center for Epidemiological Studies Scale for Depression. The focus of the results section of the report is on the group found to have severe BOS, but it would also be helpful to know the percentages of respondents with moderate or low levels of BOS. A strength of the report is the thorough discussion of the limitations of the study, including the possibility that countries other than France may differ with regard to the factors associated with BOS (e.g., physician-nurse relationships). In addition, the characteristics of ICUs in Canada and the people working in them may be different from the characteristics of the study units, but detailed tables of unit and respondent characteristics are provided in the article to enable comparisons to be made.

Given that it is well documented that working in critical care settings is challenging and stressful, the results of this study are not entirely unexpected. But the results are cause for concern. Equally worrying is the fact that nurses are not alone in this problem. In a similar study involving 978 intensivists in France carried out by Embriaco and some of the researchers from this study, 46.5% of respondents experienced a high level

“There are all kinds of professional development opportunities. I have taken a number of courses supported by the hospital, and was also a preceptor to new grads and new hires.”

Cathy, RN, Oakville

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of burnout (Embriaco, Azoulay, et al., 2007). If, as Embriaco, Papazian, Kentish-Barnes, Pochard, and Azoulay (2007) have suggested, “burnout syndrome may be considered a marker of the health of the caregiver team” (p. 487), we have reason to be worried. As with the findings of studies examining moral distress and conflict in ICUs, the results of this study illustrate the need for strategies to improve the relationships between health care providers working in ICUs and the communication that occurs between physicians and nurses, and between the health care team and patients and families, particularly in the context of end-of-life care. These are certainly strategies worthy of the attention of health care providers, researchers, and educators alike. The Canadian Association of Critical Care Nurses is considering the creation of a position statement on “healthy work environments”, and studies like this one illustrate the importance of such a document. ☘

Marie Edwards, RN, PhD, Assistant Professor,
Faculty of Nursing, University of Manitoba

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- Embriaco, N., Papazian, L., Kentish-Barnes, N., Pochard, F., & Azoulay, E. (2007). Burnout syndrome among critical care healthcare workers. *Current Opinion in Critical Care*, 13, 484–488.

Future sites of Dynamics conferences

Dynamics 2010	September 19–21 Edmonton, Alberta
Dynamics 2011	October 16–18 London, Ontario
Dynamics 2012	Vancouver, British Columbia (dates to be determined)
Dynamics 2013	Halifax, Nova Scotia (dates to be determined)

Call for task force members: Dynamics 2011

Dynamics 2011 will be held October 16–18, 2011, in London, Ontario, and will be chaired by Pamela Cybulski. Any CACCN member interested in working on this committee should submit a resume and summary of conference planning experience to the CACCN national office by March 1, 2010. Selection of the task force members will take place in March 2010. For further information on this exciting opportunity, please contact the CACCN national office, P.O. Box 25322, London, ON N6C 6B1, www.caccn.ca, e-mail: caccn@caccn.ca, phone: (519) 649-5284, fax: (519) 649-1458.


Standards for Critical Care Nursing Practice 2009

On behalf of the CACCN National Board of Directors, I am pleased to present the fourth edition of the Standards for Critical Care Nursing Practice 2009. The first edition of the standards was produced in 1992, with revisions completed in 1997 and 2004. The 2009 Standards Revision Committee would like to thank the contributors to the previous three editions of the Standards for Critical Care Nursing Practice. Their work and dedication to critical care nursing in Canada have provided the foundation on which this edition is built. The committee would also like to recognize the invaluable support of the CACCN board of directors, chapter presidents and members throughout the completion of this document. Special thank you to Steve B. Gagné, BSN, CNCC(C), for providing French translation of the standards. And further thanks to those who provided expert review:

Patricia Benner, RN, PhD, FAAN, FRCN
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 Donalda Dyjur, RN, BScN
 Mary Lou King, RN, PhD
 Gail Liggett, RN, MN, CNCC(C)
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 and Paula Price, RN, PhD for her editorial skills.

Without the hard work, dedication and contribution of the following CACCN members, the current standards revision would not have been completed. Many thanks to:

Tricia Bray, RN, MN, Calgary, AB
 Valerie Banfield, BScN, RN, MN, CNCC(C), Halifax, NS
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CACCN calendar of events

DATES TO REMEMBER!

March 1, 2010	Spacelabs Innovative Project Award application deadline	September 13, 2010	Deadline for submitting AGM Proxy Vote forms to National Office
March 1, 2010	Dynamics 2011 Planning Committee application deadline	September 16–17, 2010	Board of Directors' F2F meeting, Edmonton, AB
March 2010	Board of Directors' F2F meeting, London, ON	September 18, 2010	Chapter Connections Day, Edmonton, AB
June 1, 2010	BBraun Sharing Expertise Award application deadline	September 2010	CACCN Annual General Meeting, Edmonton, AB
June 1, 2010	Baxter Corporation Award for Excellence, The Guardian Scholarship application deadline	September 19–21, 2010	Dynamics of Critical Care 2010 Conference, Edmonton, AB
June 1, 2010	Brenda Morgan Leadership Excellence Award application deadline	September 30, 2010	Chapter Quarterly Reports due in National Office (July–Sept)
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June 30, 2010	Chapter Quarterly Reports (April–June)	January 31, 2011	Smiths Educational Award application deadline
September 1, 2010	Smiths Educational Award application deadline	January 31, 2011	Abstract submissions deadline for Dynamics 2011, London, ON
		February 15, 2011	CACCN Research Grant application deadline

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Changing Lives, Pushing Boundaries, Striving for Excellence: *The Power of Critical Care* Dynamics 2010, September 19–21, Edmonton, AB



Where is end expiration? Measuring PAWP when the patient is on pressure support ventilation

By Frankie W.H. Wong, RN, BN, MHS, CNN(C)

Abstract

Background: The hemodynamic information obtained from the pulmonary artery catheter provides physiologic rationale for a selected therapy and allows rapid determination of patients' response to the therapy. A wide range of pressure support levels have been used in pressure support ventilation (PSV), and patients' breathing patterns change from a spontaneous breathing pattern with low levels of PSV to a pressure control pattern with high levels of PSV. Different levels of pressure support have different effects on intrathoracic pressure. Changes in intrathoracic pressure may change the respiratory pattern and affect the timing for measuring the pulmonary artery wedge pressure.

Purpose: The purpose of this study was to identify the pressure support level at which a patient's breathing pattern switches from a pressure control pattern to a spontaneous breathing pattern.

Sample: Fourteen patients admitted to the cardiovascular surgery ICU between January 2001 and December 2001 agreed to participate in the study. Four patients' data were not useable. Ten patients' data were analyzed. In this group, nine patients were male and one female. Patients' ages ranged from 45 to 87 years old with a mean age of 66.7 years. One patient had a left ventricular aneurysm repair, four patients had aortic valve repair and five patients had aortic coronary bypass performed.

Method: This study was an exploratory descriptive study. Simultaneous pressure tracings of the pulmonary artery wedge pressure (PAWP) and proximal airway pressure were recorded during the weaning of pressure support at 2 cm H₂O intervals from 18 cm H₂O to below 10 cm H₂O. End expiration was identified by using the proximal airway pressure when measuring the PAWP. Simultaneous pressure tracings of the PAWP and proximal airway pressure were used to analyze changes in respiratory patterns at different pressure levels during weaning of PSV.

Findings: One patient's breathing pattern switched into the spontaneous pattern at PSV 16 cm H₂O, one at 14 cm H₂O, and the rest of the patients at 12 cm H₂O.

Conclusion: Different levels of pressure support have various impacts on the intrathoracic pressure and alter the respiratory pattern. Using the proximal airway pressure, nurses can identify the location of end-expiration and measure the PAWP accurately.

Background

Since the introduction of the pulmonary artery catheter (PAC) by Dr. Swan and Dr. Ganz in 1970, the PAC has become one of the most commonly used diagnostic devices for hemodynamic monitoring in critical care (Oropello et al., 1999; Shah & Miller, 2007). Using a PAC to guide the management of critically ill patients has been shown to improve survival rates in some studies (Friese, Shafi, & Gentilello, 2006; Shah, & Miller; Vincent et al., 2008). This tool is effective for monitoring patients' hemodynamic status. Many factors may affect the accurate interpretation of these measurements, such as when patients are mechanically ventilated.

Pressure support ventilation (PSV) is a ventilation mode that is designed to support patients' inspiratory effort according to the strength of their respiratory muscles. At higher pressure support levels it provides maximum inspiration support and at the lower pressure support levels it allows patients to breathe spontaneously with minimal airway resistance during inspiration. PSV has gained increasing popularity and is widely used in intensive care units (Aliverti et al., 2006; Amato et al., 1992). Different levels of pressure support have different effects on intrathoracic pressure and change the pulmonary artery wedge pressure (PAWP) measuring methods. Nurses in the critical care unit should be aware of these changes to provide accurate measurements of the PAWP.

Pressure changes during different mechanical ventilation modes

The heart is a pressure chamber essentially within another pressure chamber (the lungs). Intrathoracic pressure can be transmitted from the lungs to the pulmonary vessels and change the intraluminal pressure (Marino, 2007). Changes in intrathoracic pressure during the respiratory cycle cause

changes in pulmonary vascular pressure and affect hemodynamic measurements (Bellamy & Mercurio, 1986) such as the PAWP. To minimize the effects of changes in intrathoracic pressure during the respiratory cycle on hemodynamic measurements, it is recommended to measure the PAWP at the end of expiration (Cengiz, Crapo, & Gardner, 1983; Marino, 2007; Swan, 1991). Normally, the elastic recoil forces of the pulmonary parenchyma tend to retract the lung tissue inward and toward residual volume. At the same time, the muscle tone and the normal recoil of the chest wall and diaphragm muscles tend to expand outward. These opposing forces reach equilibrium at the end of the expiration phase (Dantzker, 1998). At this point, the opposite intrathoracic pressures are equal and balanced (Berryhill, Benumof, & Rauscher, 1978; Riedinger, Shellock, & Swan, 1981), and no movement occurs. At end expiration, the intrathoracic pressure is equal to atmospheric pressure (Brandstetter et al., 1998; Dantzker; Marino; Wiedemann, Matthey, & Matthey, 1984). As a result, there is no movement of the lung parenchymal tissue, the chest wall, or the airflow in or out of the lungs.

In the intensive care unit, the two most commonly used ventilation modes are spontaneous ventilation and mandatory ventilation. Due to different mechanisms of ventilation, changes in the intrathoracic pressures during the respiratory cycle are totally opposite in these two ventilation modes (Bellamy & Mercurio, 1986). These pressure changes create different waveform patterns on the PAWP tracings (Bridges, 2006).

With spontaneous ventilation, there is a reduction in intrathoracic pressure during inspiration and a subsequent decrease in pulmonary vascular pressure (Swan, 1991). This lower or negative pressure creates a negative deflection in the PAWP tracing (Booker & Arnold, 1993). During expiration, the increased or higher intrathoracic pressure creates a positive deflection in the PAWP tracing. End expiration is the point on the PAWP tracing that is immediately before the negative pressure deflection that occurs with inspiration (Booker & Arnold) (see Figure One).

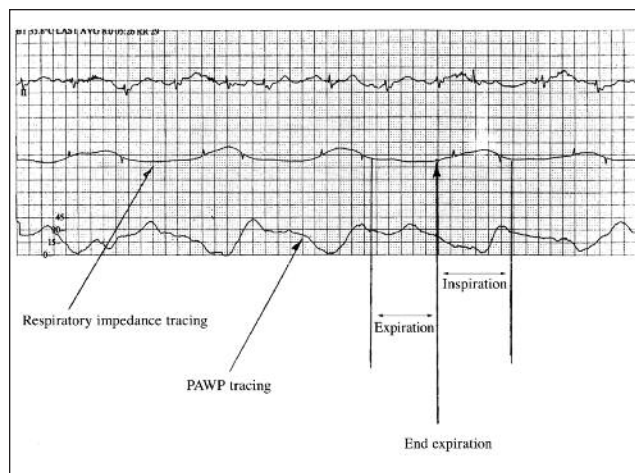


Figure One. PAWP Tracings of a Patient Breathing Spontaneously

In positive pressure ventilation such as assist control or pressure control ventilation, the ventilator forces the mixture of gas into the lungs during inspiration and creates a higher intrathoracic pressure, thereby creating a higher pressure waveform in the PAWP tracing during inspiration. While in expiration, the natural recoil of the lung parenchyma, the chest wall, and the diaphragm expel the air out of the lungs passively and create a lower pressure waveform in the PAWP tracing. End expiration can be identified in these tracings as the lower point before the ascent of the waveform (Booker & Arnold, 1993) (see Figure Two).

Depending on the amount of pressure support, pressure support ventilation (PSV) is a partial ventilator support mode (Tobin, 2006). PSV combines the features of spontaneous breathing and mandatory ventilation. At lower levels (5 cm H₂O to 8 cm H₂O), the pressure support compensates for the additional respiratory load imposed by the resistance of the endotracheal tube, the ventilator tubing, and the demand valve of the ventilator (Jounieaux, Dura, & Levi-Valemsi, 1994; Lessard & Brochard, 1996; Tobin, 2006). In moderate levels (8 cm H₂O to 15 cm H₂O) of pressure support, the total work of breathing is shared between the patient and the ventilator. This level of pressure support can avoid a load that exceeds the

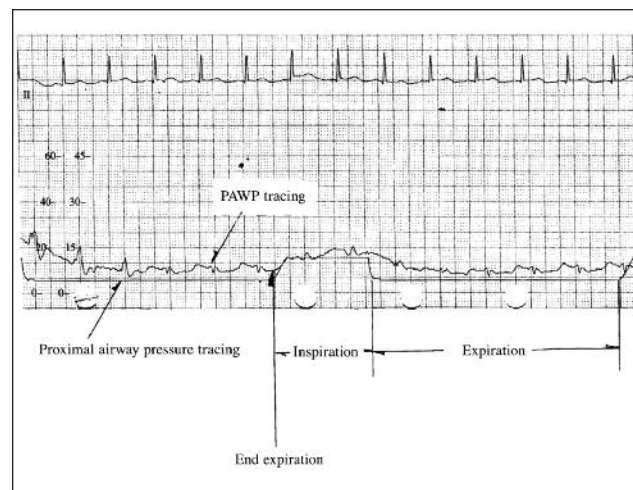


Figure Two. PAWP Tracings of a Patient on Assist/Control Mechanical Ventilation

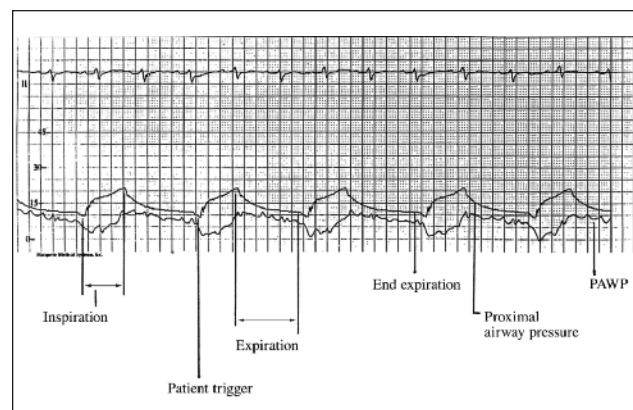


Figure Three. PAWP Tracings of a Patient on PSV of 8 cm H₂O

patient's respiratory capacity while improving the patient's respiratory system compliance and resistant (Lessard & Brochard) by reconditioning the patient's respiratory muscles (Jounieaux et al., 1994). At high levels (above 15 cm H₂O) of pressure support, which is called PSV max (Jounieaux et al.), a tidal volume of 10 ml/kg to 12 ml/kg can be provided (MacIntyre, 1988).

Due to the wide range of pressure support levels used, patients' breathing patterns change from a spontaneous breathing pattern in low to moderate levels of pressure support (see Figure Three) to a pressure control pattern in high levels of pressure support (see Figure Four). The PAWP is a difficult parameter to interpret during pressure support ventilation (Ahrens, 1999). The point where the PAWP is measured varies and depends on the patient's breathing pattern (spontaneous breathing versus pressure control ventilation). No research study had been done to identify at which level of pressure support the patient's breathing pattern changes from a ventilator control pattern to spontaneous breathing. If pulmonary artery pressure and PAWP are used for clinical treatment decisions, the measurements need to be as accurate as possible (Cengiz et al., 1983). Inappropriate therapies such as fluid management or use of vasoactive drugs can occur due to misinterpretation of pressure and waveform tracings and may be harmful to the patient (Bellamy & Mercurio, 1986; Cengiz et al.;

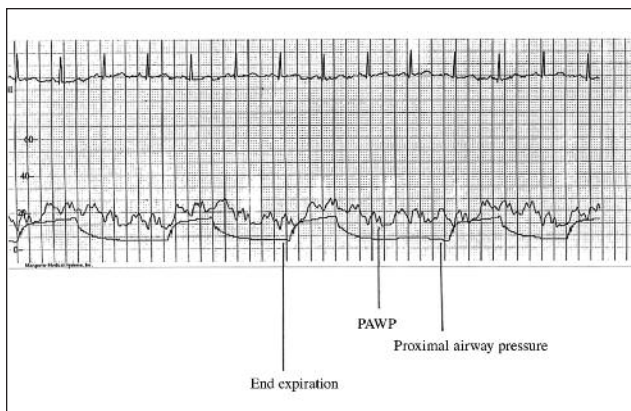


Figure Four. PAWP Tracings of a Patient on PSV of 20 cm H₂O

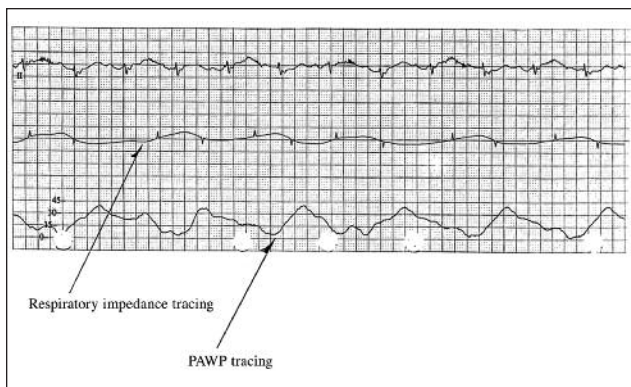


Figure Five. The Respiratory Impedance Waveform from the ECG Leads is not always correlated to the PAWP Tracing

Wiedemann et al., 1984). A consistent method of reading pressure waveform tracings is important to ensure meaningful measurements and subsequent appropriate treatment (Riedinger et al., 1981).

Purpose

The purpose of this study was to identify the pressure support level at which the patient's breathing pattern switches from a pressure control pattern to spontaneous breathing pattern. The results of this study may be able to develop a more accurate method for interpreting the PAWP tracing when the patient is receiving PSV.

Method

This study was an exploratory descriptive study. A convenience sample was selected from the cardiovascular surgery intensive care unit. The study protocol was approved by the Conjoint Health Research Ethics Board of the University of Calgary and Calgary Health Region.

Sample

Patients who were 18 years or older, who were intubated and ventilated with PSV, had a pulmonary artery catheter inserted, and were admitted into the cardiovascular surgery ICU at the Foothills Medical Centre were invited to participate in the study.

The principal investigator met all potential candidates on the cardiac unit on the day of surgery if they were outpatients and the day before surgery if they were inpatients. The purpose of the study, the benefits and possible complications were explained to patients.

Measurement

Visual and physical assessment of the patient's chest wall movement has been used to determine end expiration. Tobin, Perez, Guenther, Lodato and Dantzker (1987) argued that visual and physical assessment of the rib cage and abdominal movement are insufficient to determine flow during inspiration and expiration, especially in tachypnic patients. Also, rib cage and abdominal wall asynchrony is common in critically ill patients with high workloads on the respiratory system (Tobin et al., 1987). Inspection of respiratory impedance from electrocardiogram leads that detect the patient's chest wall movement has also been found to be ineffective because some tracings are poor quality and some tracings are not correlated with the respiratory cycle (Bellamy & Mercurio, 1986) (see Figure Five). Most researchers suggest monitoring proximal airway pressure with simultaneous display of the PAWP tracing as a more accurate way to determine the end-expiration point (Bellamy & Mercurio; Berryhill et al., 1978; Booker & Arnold, 1993).

A device was developed (see Figure Six) for this study to monitor proximal airway pressure changes during the respiratory cycle to identify end expiration. This device uses the disposable pressure transducer (TruWave Disposable

Pressure Transducer, Model PX260, Baxter Healthcare Corporation, USA) primed with sterile saline and zeroed at the level of the external end of the endotracheal tube to measure the proximal airway pressure. The transducer is connected to the side port of an antimicrobial air filter (DAR, Mallinckrodt, Italy) between the flex tube and the Y connector of the inspiration and expiration tubing of the ventilator (Drager, Evita 4, German, or Puritan Bennett 7200, USA).

The proximal airway pressure tracing, the PAWP tracing, and the ECG rhythm strip are displayed simultaneously on the bedside monitor (Marquette, General Electric Co., USA). All tracings are printed out on a laser printer (Laserjet 4, Hewlett Packard, USA).

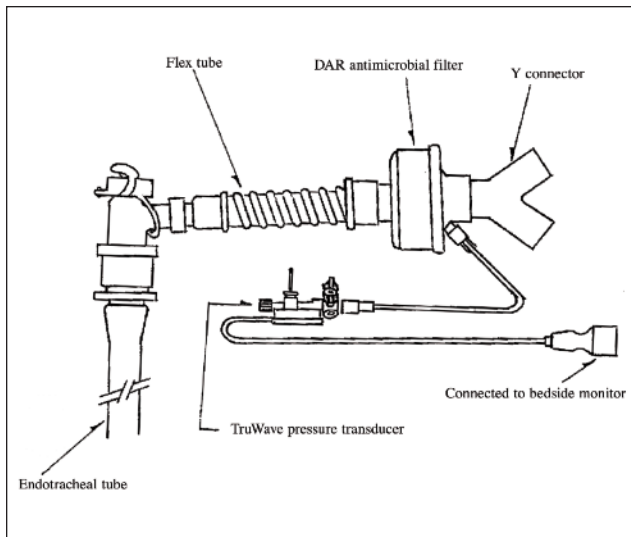


Figure Six. Diagram Illustrating the Device for Monitoring the Proximal Airway Pressure

Data collection

Simultaneous pressure tracings of the PAWP and proximal airway pressure were recorded during the weaning of pressure support at 2 cm H₂O intervals from 18 cm H₂O to below 10 cm H₂O. The location of end expiration for measuring the PAWP could be identified accurately by using the simultaneous proximal airway pressure tracing.

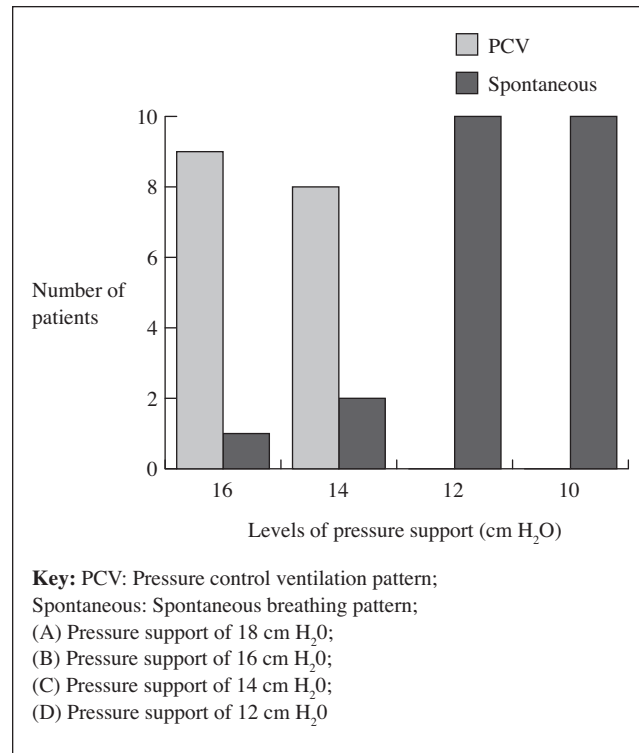


Figure Seven. Breathing Pattern of Patients During Pressure Support Ventilation

Table One. Results							
Patient No.	Mode of Ventilation on Admission	Pressure Support Level Used (cm H ₂ O)	Breathing pattern changed at (cm H ₂ O)	Peep	Age (yr)	Sex	Diagnosis
1	SIMV	16, 14, 12	12	10	71	F	Repair LV aneurysm
2	A/C	16, 14, 12	12	5	77	M	ACB
3	A/C	15, 12, 10	12	5	45	M	AVR
4	A/C	16, 14, 12	12	5	62	M	AVR
5	A/C	16, 14, 12	12	5	66	M	ACB
6	A/C	16, 14, 12	12	5	87	M	AVR
7	A/C	15, 13, 12	12	5	61	M	AVR
8	A/C	16, 14, 12	12	5	59	M	ACB
10	A/C	16, 14, 12	14	5	67	M	ACB
11	A/C	16, 14, 12	16	5	72	M	ACB

Key: A/C = Assist/Control ventilation; SIMV = Synchronized Intermittent Mandatory Ventilation; AVR = Aortic valve repair; ACB = Aortic coronary bypass; LV = Left ventricle

Data analysis

Simultaneous pressure tracings of the PAWP and proximal airway pressure were used to analyze changes in respiratory patterns in different pressure levels during weaning of PSV. A frequency distribution was used to determine at which level of pressure support in cm H₂O, the measuring point (end expiration) of the PAWP changed from a control breathing pattern to a spontaneous breathing pattern.

Findings

In order to meet the target of 10 samples, 14 patients were recruited because data from four patients were not useable. These patients were admitted to the cardiovascular surgery ICU between January 2001 and December 2001. Reasons for the unuseable data were one patient had a large V wave, one patient was very agitated while measuring his pulmonary wedge pressure and his respiratory rate was up to 30 breaths

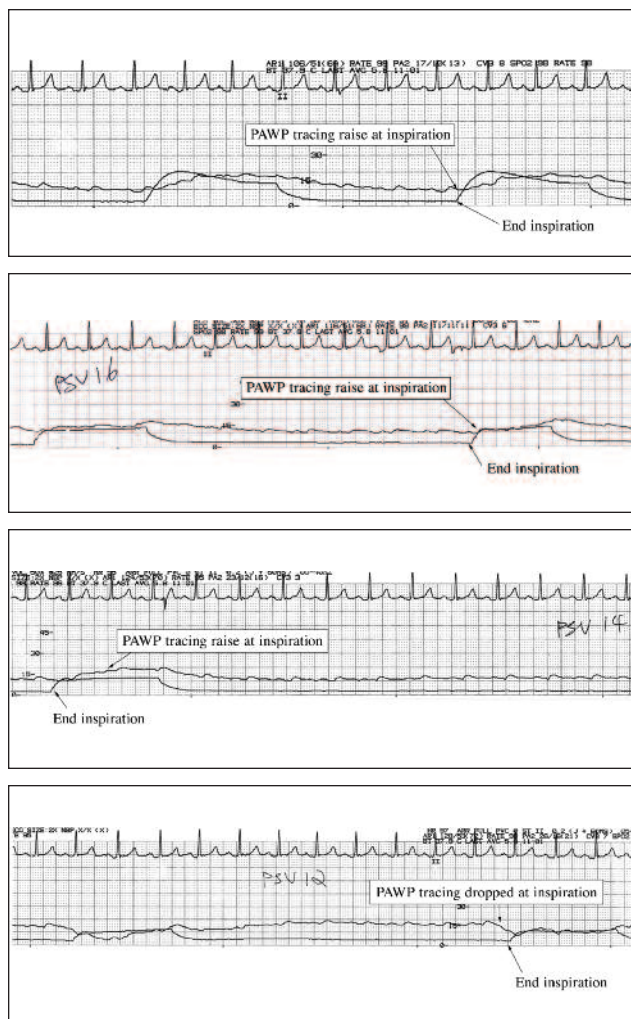


Figure Eight. Pressure tracing showing changes in the respiratory pattern when level of pressure support was weaning down: (A, B, C) patient was on pressure support of 18 cm H₂O, 16 cm H₂O, and 14 cm H₂O. The respiratory patterns were in pressure control pattern. Once the pressure support was down to 12 cm H₂O, patient's breathing changed into spontaneous pattern (D).

per minute and he required sedation, one patient's PA catheter was not able to wedge and, one patient was resting on his left lateral position while the data were collected. Ten patients' data were analyzed. In this group, nine patients were male and one female. Patients' ages ranged from 45 to 87 years old with a mean age of 66.7 years. One patient had a left ventricular aneurysm repair (Dor procedure), four patients had aortic valve repair and five patients had aortic coronary bypass performed.

When admitted into the cardiovascular surgery intensive care unit postoperatively, all patients were sedated with Diprivan (Propofol) and on assist controlled (A/C) ventilation (n=9) except one patient (n=1) who was on synchronized intermittent mandatory ventilation (SIMV). When they started to wake up, the ventilation mode was switched to pressure support ventilation with a higher pressure support (16 cm H₂O to 18 cm H₂O depending on the patient's lung compliance). The level of pressure support was gradually weaned down by 2 cm H₂O increments by the registered respiratory therapist according to the patient's tolerance and condition. Simultaneous proximal airway pressure tracings were recorded when taking the PAWP during the weaning of the pressure support. One patient's breathing pattern switched into the spontaneous pattern at PSV 16 cm H₂O, one at 14 cm H₂O, and the rest of the patients' respiratory pattern switched to the spontaneous pattern at a pressure support level of 12 cm H₂O (see Table One and Figure Seven).

Discussion


Monitoring the proximal airway pressure is an accurate and easy method to assess the respiratory pattern during the inspiratory and expiratory phase when a patient is on pressure support ventilation. Proximal airway pressure measurement accurately identifies the location where nurses should be measuring (higher/upper pressure waveform or lower pressure waveform) on the PAWP waveform to evaluate the patient's hemodynamic status. Previous researchers found that a pressure support of 5 cm H₂O to 8 cm H₂O is used to compensate for resistance created by the ventilator tubing and reservoir (Jounieaux et al., 1994; Lessard & Brochard, 1996; Tobin, 2006). Aliverti et al. (2006) indicated that when PSV is lower or equal to 10 cm H₂O, patients are actively involved in the whole respiratory cycle (trigger, inspiration, and expiration). In this study, eight out of 10 patients converted from the pressure control mode of breathing pattern into spontaneous breathing pattern at the pressure support of 12 cm H₂O (see Table One).

A PAC is a valuable tool to monitor hemodynamic status. However, due to the complex relationship between the intrathoracic pressure and mechanical ventilation, special training and knowledge on interpretation of the pulmonary catheter readings are essential to provide appropriate care to patients at the appropriate time (Greenberg, Murphy, & Vender, 2009; Vincent et al., 2008).

Limitations

This study had a very small sample size and was conducted on one unit. All patients had cardiovascular disease and received open heart surgery. A study with a larger sample size and patients with different diagnoses is recommended to provide a more generalized application of the results.

Conclusion

Critical care nurses use different tools to assess their patient's condition, progress, and responses to interventions. Pulmonary arterial wedge pressure provides information on the patient's cardiovascular status. An accurate measurement of the PAWP is able to guide appropriate and prompt interventions. However, different levels of pressure support have various impacts on the intrathoracic pressure and alter the respiratory pattern. Accurate measurements of PAWP rely on identifying the precise timing of end expiration. If nurses have difficulty in identifying the timing of end expiration, using other measurements such as proximal airway pressure are effective and accurate to locate the timing of end expiration. 

Acknowledgement

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What are the characteristics of a leader?

**By Brenda Morgan, RN,CNCC(C), BScN
Recipient of the Brenda Morgan Leadership
Excellence Award 2007**

In September 2007, I received a tremendous honour when CACCN created the Brenda Morgan Leadership Excellence Award in my name.

As the inaugural recipient of the Leadership Excellence Award, the national board of directors has asked me to share my thoughts about leadership. The greatest reward any nurse can ever receive is the thanks of an appreciative patient or family, or the recognition of their peers. I have been blessed in



Brenda Morgan received the inaugural Brenda Morgan Leadership Excellence Award from then-President Asha Pereira in 2007.

my career to have enjoyed both. Receipt of this award was, indeed, a high point in my nursing career, but I am humbled by the knowledge that there are many other deserving critical care nursing leaders in Canada. I would like you to consider who they might be.

What makes an individual a critical care nursing leader? Is it a title? Is it academic qualifications? Or, is it a list of accomplishments? Think about your own nursing experience, and make a list of all the individuals who you would identify as being nursing leaders. Chances are you have identified individuals who don't meet any of these criteria, while you have probably excluded some who do. So what is it that makes a leader?

Leadership takes many forms. While we all have the potential to be leaders, we may lead in different ways and at different times. Some nurses take on leadership roles by developing specific areas of expertise, such as wound care, while others have leadership behaviours embedded in their daily practice. For some nurses, their full leadership potential remains untapped.

A team of nurses brings an assortment of leadership strengths. The sum of the leadership characteristics among the nurses in a given team strengthens the unit as a whole. And while we all have the ability to be leaders, all leaders have days when they demonstrate stronger attributes than other days.

So what do these leaders on your list look like? Chances are they are the nurses that you would choose to be your caregiver, or the caregiver for your family members. They likely demonstrate all or several of the characteristics below, and are considered important role models in their workplace. Leadership characteristics include:

Commitment to excellence

Leaders are committed to providing optimal patient care, and make best practice a part of their everyday lives. They do this whether they are planning and providing care for individual patients, or setting standards for an entire population. They are goal oriented, and remain focused on strategies that promote positive patient outcomes. While a leader may be an individual who demonstrates commitment to excellence by ensuring the appropriate allocation of resources and holding staff accountable for their practice in a formal leadership capacity, some of our most important leaders are providing

direct patient care in a clinical role. Leadership is not a quality that is limited to those who develop protocols and practice guidelines. Clinical leadership is demonstrated by nurses who keep apprised of changing policies and practice recommendations, and incorporate these changes into their practice.

There are many clinical leaders providing high-quality patient care in critical care units across Canada. Clinical leadership is taken “up a notch” when we also hold others accountable to maintain practice standards. For example, what do we do when we see another team member violate aseptic technique? A simple pause to wait for the team member to collect the right equipment may be all that is required to demonstrate expectations. But what do we do when we see prolonged or serious standard violations? Addressing a coworker who routinely takes short cuts or has serious practice gaps can be one of the most difficult leadership challenges. Few of us can honestly say that we have never failed to act on an occasion when we wish that we had acted. Being able to provide feedback in a constructive manner and accepting feedback when given is a hard thing to do. Most of us struggle with this important aspect of leadership. However, it is one of the essential requirements for safe and healthy workplaces.

Effective communicator

The development of effective communication skills is a fundamental requirement for all nurses, and an essential attribute of leaders. There are many dimensions to communication, and nurses may be stronger in some areas than in others. Skill development begins when a nurse first learns to formulate and communicate a concise and comprehensive assessment and report. Clinical leaders demonstrate mastery in the way they organize information, allowing them to advocate to meet their patients’ needs or communicate important information to the team.

Teaching, precepting, coaching and mentoring require a variety of effective communication skills and their development is another aspect of leadership. In addition to the skills required to present information (formally or informally), clinical leaders who demonstrate mentoring skills are able to tease out facts and guide new learners through decision-making. The ability to listen, observe and evaluate are also paramount. Other leadership characteristics include the ability to give and receive feedback, resolve conflict and facilitate group consensus. And the ability to put pen to paper expands the opportunity to share information and provide broader leadership. Clinical leaders use a variety of communication skills, as required to ensure patient and staff safety and health.

Fosters a spirit of inquiry

An environment that fosters a spirit of inquiry is one where it is safe to take risks and team members feel free to ask any question without criticism. Critical care nurses must be life-long learners, and clinical leaders embrace and promote this belief. Leaders do not have all the answers, but they know how to access resources. Leaders engage in exploratory discussion, invite input from experts and encourage others to investigate

their clinical questions. Leaders make the learner feel safe, whether in a classroom setting or at the bedside. When they witness behaviour that threatens the safety of learning, they speak up.

Solution orientated

Leaders are solution oriented. They bring issues of patient or staff risk forward for discussion, listening with an open mind to all points of view. They participate in the development and/or support strategies aimed at improving patient and staff safety and quality, contributing constructive feedback to help create optimal outcomes. Not every nurse has the ability to commit to the demands of committee or extracurricular activities, and our ability to commit often changes over time. Nurses can be clinical leaders by remaining informed and supporting the work of those who are developing guidelines.

Demonstrates commitment

Leaders are often identified as individuals who “go the extra mile”, and nurses do this every day. A few years ago, we received a letter from a bereaved mother who lost her daughter to a traumatic brain injury. She was deeply touched when, after commenting that her daughter’s favourite colour was mint green, her daughter’s nurse had hunted down a mint green top. Something her nurse probably considered to be “no big deal” turned out to be huge for the family. During a recent visit to a hospital in Ontario, tears of professional pride came to my eyes when I read a recognition plaque in the lobby, acknowledging a nurse who had planned a wedding to fulfill a young patient’s dying wish. These two examples demonstrate very different levels of “going the extra mile”, and not everyone would be able to take on something as big as a wedding. But nurses go the extra mile in a number of ways, every single day. Unfortunately, we often fail to take the time to celebrate and feel good about our positive contributions.

Continuity of care

Clinical leaders are individuals who ensure patient care planning is carried out and communicated effectively. They participate actively in patient care rounds, and make sure their issues are discussed. Team plans are incorporated into the nurse’s documentation, and communication tools such as the nursing kardex are kept up-to-date. While clinical leaders assume responsibility for ensuring relevant information is communicated to other staff, they also listen attentively to colleagues during report and take responsibility for ensuring they have the information they need to optimize the patient’s care.

Primary nursing can be an effective model for promoting continuity of care. This can be particularly true when a nurse takes on the challenge of a patient or family that other nurses avoid. Watching a patient that others had “given up on” go on to a good quality recovery can provide immense personal satisfaction. Have you given it a whirl lately?

Commitment to team

A team is described as a group of people who are committed to a common purpose. Most individuals who pursue careers in

health care share a vision of quality patient care; this should make the work easy. But, like marriage, creating healthy teams requires ongoing effort. The easy part is working together with our core group of friends and coworkers to achieve patient-care goals. The tough part is dealing with people who threaten team cohesiveness or seem to have a different agenda.

We have all gone to break and listened to a coworker complain about the manager, a peer or a member of another discipline. We may have listened sheepishly to comments out of fear of becoming a target. Being imperfect, many have even expressed opinions that we know we probably should not have expressed. Imagine what you would think if you were a new nurse listening while a coworker criticizes an absent colleague in front of others. Then, consider what it would mean to a new nurse to hear someone say, “This is a conversation that should be held between you and Mary”. Clinical leaders support their team members and give them the benefit of the doubt. And if we slip up ourselves and a coworker reminds us, we take responsibility for our actions.

“Management” is often identified as a mysterious group of faceless individuals who are the root cause of all that ails our teams. While managers do play a role in facilitating team health, the real power rests within the team. Every time we allow a colleague to rant and rave, we are giving them permission for the next time, and allowing negativity to prevail. Unaddressed behaviour is condoned and will flourish. Is it easy to speak up? Of course not, but when it becomes the standard to halt negative behaviour, team culture will change.

Every nurse has the ability to lead his or her team to a healthy team.

Part of a commitment to a team is to ensure the success of our most vulnerable members. New staff members, new graduates, new residents, or those struggling with their practice or to just “fit in” need the leadership of a mentor. Being a mentor is one of the most important ways to ensure the team’s future success and shine as a clinical leader.

Compassion

While knowledge and skill are essential parts of clinical leadership, clinical expertise without compassion is hollow. We can never fully understand the needs of our patients and families without trying to understand their world. Being able to humanize our high-tech environment and modelling respectful, dignified and compassionate care are important attributes of clinical leaders.

Passion

Nursing leaders have passion for their work, and their passion is contagious. They can excite others with their enthusiasm. Think of a time when you attended a conference, listened to a speaker, and came away filled with ideas of how you might incorporate changes into your own practice. This ability to influence others is an example of leadership.

Professional pride

Leaders are role models who walk the talk. They maintain confidentiality and demonstrate ethical decision-making.


They are proud to be nurses, and are able to clearly articulate the unique contributions that nurses make. “Just a nurse” never enters their vocabulary. Leaders look like and behave like professionals and expect similar conduct by their peers. They monitor discussions at the bedside, speak up when conversations become loud or inappropriate, and they thank others for reminding them when they slip up themselves.

I am an old nurse who graduated with a cap in the era where hair had to be up, jewelry off, nails clipped and uniforms ironed. The evolution of a more relaxed approach to professional appearance has led many institutions to revisit the concept of a dress code, and this has not been without controversy. I have heard many nurses say that you shouldn’t be judged by how you look. I would agree that you shouldn’t, but do you really want to have to work twice as hard to gain people’s trust? A few years ago, a young couple shared their experience of the birth of their first child with me. This is a couple young enough to not bat an eye at body piercings and tattoos. They commented that the doctor and nurse were both very nice, but they were really young, goofing around a lot, and the nurse had multiple piercings. They said it really made them question whether they knew what they were doing. So what do you think? Does professional behaviour matter?

Visionary

Finally, nursing leaders are able to imagine a better tomorrow. They can “think outside the box” and look for new ways to tackle emerging challenges. They are never static, always looking to bring better practices into their work. They are open-minded and willing to consider options that others might quickly reject. These characteristics may be evident in nurses in formal leadership roles, or among our clinical leaders.

So, look back at your list of leaders again. Are the characteristics I have suggested qualities of those individuals on your list? Are you a leader? Consider this question, and reflect upon your own areas of leadership strength. Identify your own leadership competencies and the areas where you would like to grow, and think of ways that you could enhance your own leadership skills. Clinical leaders have the greatest potential to improve patient outcomes, enhance a family’s experience and develop a healthy team. Positive role models who expect high standards dictate the future standards of care and develop our leaders of the future. So, is it important to develop your leadership potential? Absolutely. Think of the legacy you will leave.

What led me down this critical care career path? I was fortunate enough to have worked with strong clinical leaders in my formative years, and to work in an environment where I could influence practice. Along the way, I became involved in CACCN, opening many doors and learning opportunities. Am I a leader? I think so. Am I a perfect leader? Of course not. Until I retire, I plan to continue to learn, grow and improve my skills, including my leadership competencies. I just happen to be a very lucky person—I found a hobby I could earn a living at! 

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Hospital-acquired acute hyponatremia and reports of pediatric deaths

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Abstract

Information from four voluntary reports of hospital-acquired acute hyponatremia leading to the death of otherwise healthy children is highlighted. In this column, we present two cases and information from a recent ISMP Canada Safety Bulletin, as well as two cases reported to ISMP United States. Information is shared to enhance health care practitioners' awareness of the potential for acute hyponatremia and to provide an overview of some of the potential underlying factors.

Hospital-acquired acute hyponatremia and reports of pediatric deaths

Four pediatric deaths due to acute hyponatremia associated with intravenous (IV) administration of hypotonic solutions, three in a postsurgical setting and the other in a medical setting were voluntarily reported (two to the Institute for Safe Medication Practices Canada [ISMP Canada] and two to the Institute for Safe Medication Practices [ISMP] in the United States). Acute hyponatremia is defined as a decline in serum sodium to less than 130 mmol/L within a 48-hour period. This abrupt change can lead to cerebral edema as a result of electrolyte-free water moving into the brain cells. Acute hyponatremia can be fatal for both children and adults. However, children are more vulnerable to the effects of fluid and electrolyte imbalance. The early signs of acute hyponatremia and rising intracranial pressure are often nonspecific and include nausea, vomiting, headache, and decreasing level of consciousness. Information from the voluntary incident reports is shared here to enhance health care practitioners' awareness of the potential for acute hyponatremia and to provide an overview of some of the potential underlying factors.

Incident reports received by ISMP Canada

Case 1

A four-year-old child who weighed about 15 kg underwent a tonsillectomy as day surgery. No abnormalities were noted during a pre-admission assessment the day before the surgery. The tonsillectomy was performed under general anesthesia; the child was intubated and mechanically ventilated during the procedure. According to the records from the operating room, the child received a total of 250 mL of IV fluid (0.9% sodium chloride). After the procedure, an infusion of 3.3% dextrose and 0.3% sodium chloride solution (referred to herein as "2/3 and 1/3") was ordered for IV administration at 55 mL per hour. Oral intake of fluids was also encouraged. The child was transferred to a patient care area with orders to be discharged home when drinking well.

Shortly after arriving in the patient care area, the child experienced several episodes of vomiting. Oral intake of clear fluids over the next several hours was about 200 mL. The child was kept in hospital, and the IV administration of "2/3 and 1/3" was continued, as originally ordered, over the rest of the day and night. The child voided several times, but the amount was unknown. Overnight, the child became incontinent and was noted to be drowsy. Toward the morning, the child had several seizures, which were treated initially with lorazepam and later with phenobarbital. Blood testing indicated a sodium level below 120 mmol/L. The IV solution was changed to sodium chloride 3%, and the child was transferred to a regional pediatric centre. The child died shortly thereafter. The cause of death was severe cerebral edema with brain herniation due to acute hyponatremia (Institute for Safe Medication Practices Canada, 2009).

Case 2

A previously healthy three-year-old child was brought to an emergency department with a one-day history of vomiting and diarrhea. The child's pulse was more than 125 beats per minute, and the blood pressure was 85/60 mm Hg. The child's mucosal membranes were dry and the eyes sunken. Laboratory testing indicated normal serum electrolytes, elevated blood urea nitrogen (BUN), and normal creatinine; a urine test was positive for ketones. In the emergency department, the child received two boluses of (0.9% sodium chloride) by IV administration, totalling about 450 mL. Follow-up blood work revealed that the sodium level was 138 mmol/L and BUN had decreased to within normal limits. The child was admitted, and "2/3 and 1/3" was administered at 130 mL per hour IV. Over the course of the next 12 hours (through the evening and overnight), the child voided about 110 mL urine in total and received more than 1.5 litres of "2/3 and 1/3". The child's nausea continued.

The next day, the child voided once, but the amount was not determined or recorded. Shortly thereafter, the child experienced incontinence of urine and seemed to be sleepy. A few hours later, the child appeared lethargic and rigid. The infusion was stopped and blood tests revealed a sodium level below 120 mmol/L and lower-than-normal levels of potassium, BUN, and creatinine. The child experienced a seizure and was treated with lorazepam. Hypertonic saline (3% or 5% sodium chloride) was ordered, but none was available, so mannitol was administered IV, followed by a bolus of 0.9% sodium chloride. Because of continued seizure activity and oxygen desaturation, the child was intubated and ventilated. Shortly thereafter, the child experienced cardiac arrest and could not be resuscitated. The cause of death was cerebral edema with brain herniation due to acute hyponatremia (ISMP Canada, 2009).

Incident reports highlighted by ISMP (U.S.)

Case 1

A six-year-old child "underwent an outpatient tonsillectomy and adenoidectomy. Postoperative orders included IV fluids of '1000 cc D5W [dextrose 5% in water]—600 cc q8h.' An experienced pharmacist accidentally calculated the infusion rate incorrectly and entered 200 mL/hour instead of 75 mL/hour on the child's electronic medication administration record (eMAR)... Thinking in terms of how many 600 mL

'doses' would be needed, he set up the calculation as follows: 600 mL (the volume to infuse over eight hours) divided by three (the number of 600 mL 'doses' he thought would be needed for 24 hours) and arrived at 200 mL/hour infusion rate.

The nurse who started the infusion did not detect the pharmacist's error... she felt rushed by the hectic pace of the unit and was distracted during the verification process... like other nurses on the unit, she had come to rely on the accuracy of their pharmacists who 'never made mistakes.' When the first 1,000 mL bag of D5W was empty, the nurse hung a second bag to infuse at 200 mL/hour.

Several times throughout the day, the child vomited small amounts of dark, bloody secretions, as expected from the surgery. Near the anticipated time of discharge that afternoon, the child's mother asked a nurse to administer an antiemetic before she took her daughter home. About 40 minutes after receiving promethazine 12.5 mg IV, the child became lethargic and began experiencing jerking movements, rigid extremities, and rolled-back eyes. The surgeon attributed this to a dystonic reaction from promethazine, administered a dose of IV diphenhydramine, and admitted the child to a medical-surgical unit.

During the next few hours, the child's vomiting worsened, she became more unresponsive, and the seizure-like activity became much more pronounced and frequent. The nurses called the child's surgeon multiple times to report the seizure-like activity, during which additional doses of IV diphenhydramine were prescribed and, subsequently, administered. Several nurses also told the surgeon that the seizure-like activity appeared to be more than dystonic reaction to promethazine, although none of the nurses had ever witnessed such a reaction. Unfortunately, during this time, the nurses failed to notice the infusion rate error or recognize that an infusion of plain D5W alone or an infusion rate of 200 mL/hour was unsafe for a six-year-old child. Subsequently, a third 1,000 mL bag of D5W was hung after the second bag had infused.

After the child developed significant bradycardia that necessitated calling a code, the surgeon came into the hospital, observed the child having a grand mal seizure, and consulted a pediatrician to help manage the seizures. The consulting pediatrician finally recognized that the child was experiencing hyponatremia and water intoxication due to the erroneous infusion rate of 200 mL/hour during the previous 12 hours... The child had nonreactive pupils and exhibited decerebrate posturing. Stat lab studies showed a critically low concentration of sodium of 107 mEq/L. A CT scan of the brain revealed cerebral edema and, despite treatment, the child subsequently died (Institute for Safe Medication Practices [ISMP U.S.], 2009).

Case 2

A child underwent surgery for coarctation of the aorta, a condition that had been identified in this otherwise asymptomatic, healthy child during a school physical. The child's postoperative course seemed to be progressing well, but later on the post-op day one, his physician prescribed a furosemide infusion (1 mg/hour) because the child's urinary output was less than expected despite several doses of EDECRINE (ethacrynic acid). By post-op day two, the child's serum sodium level had dropped, so his physician prescribed

an infusion of sodium chloride. It is uncertain whether the sodium chloride was ever administered, as the child's sodium level continued to drop and administration of the prescribed infusion was never documented on the MAR.

The child became less responsive throughout the morning of post-op day two, and his parents expressed concern to several nurses when they could not awaken their son. The nurses assured the parents that deep sleep was expected due to the pain medication—HYDROMORPHONE—that the child was receiving. Despite ongoing, repeated concerns expressed by the parents, the nurses failed to recognize that the child was exhibiting signs of severe, life-threatening hyponatremia... When the child began experiencing seizure-like activity in the early afternoon, nurses attributed the movements to the child being 'fidgety' from pain. The child also began vomiting... the physician was not kept informed regarding the child's change in cognition, continued oliguria, vomiting, and seizure-like activity. When the intensivist visited the child in the early evening for a routine assessment, he quickly recognized the problem. By then, the child exhibited no reflexes or response to painful stimuli. Despite intubation and ventilation support, and aggressive treatment of the hyponatremia and cerebral edema, the child died the following day (ISMP U.S., 2009).

Acute hyponatremia

Hyponatremia can occur if there is a disproportionate loss of sodium such as occurs with primary kidney disease or conditions that affect the ability of the kidneys to conserve sodium. It can also occur because of a disproportionate gain of electrolyte-free water in the vascular compartment, also known as dilutional hyponatremia or water intoxication. The increased ratio of free water to sodium in the vascular space will cause the water to move from this extracellular compartment into the intracellular compartment until osmolality is equalized—free water will enter body cells (i.e., brain cells) and cellular edema will result.

In acute hyponatremia, the brain cells are unable to compensate for the rapid decrease in serum osmolality. As such, minor increases in electrolyte-free water can lead to disproportionately large increases in intracranial pressure due to swelling of the brain cells (Arieff, Ayus, & Fraser, 1992; Hoorn, Geary, Robb, Halperin, & Bohn, 2004; Moritz & Ayus, 2003). Children exhibit symptoms more quickly than adults in response to abnormal sodium levels because there is less room for the brain cells to swell (the brain reaches its adult size by the time the child is six years old, but the skull does not reach adult size until a person is 16 years of age) (Arieff et al., 1992).

Since the early signs and symptoms of acute hyponatremia are often nonspecific, health care professionals may attribute them to other causes, such as the postoperative effects of anesthetics, medications administered such as opioids for pain, or the presenting illness. A rapid decline in serum levels of sodium leading to symptoms of increased intracranial pressure is a medical emergency, as further increases in brain-cell swelling can cause seizures, respiratory depression, coma, irreversible brain damage, or brain herniation and death.

The kidney is the main regulator of water through the activity of antidiuretic hormone (ADH), also known as vasopressin. ADH acts directly on the kidneys, causing them to reabsorb

water, which helps to maintain the serum sodium concentration and, thus, the osmolality of the blood, within normal limits. A reduction in serum osmolality (as occurs with a reduction in serum sodium concentration) typically inhibits the release of ADH, whereas an increase in serum osmolality causes the release of ADH. This “osmotic” feedback system in the body allows for variability in electrolyte-free water intake and excretion so that serum osmolality and serum sodium remain within normal range. (One need only consider how much free water can be lost through the extreme volumes of dilute urine output that are produced in patients who have diabetes insipidus and the absence of ADH.) The normal adult kidney can excrete up to 10 L of water per day provided there is a normal solute intake. As such, an extraordinary amount of free water would have to be provided to cause hyponatremia in an individual with a *normal* ADH response.

ADH is also released in response to numerous “nonosmotic” stimuli, even when serum sodium falls to below-normal values. Two of the most potent stimuli for ADH release are nausea and vomiting. Other nonosmotic stimuli for the release of ADH include pain, stress, gastroenteritis, hypoxia, positive pressure ventilation, trauma, and commonly used medications such as opioids (Hoorn et al., 2004; Moritz et al., 2003; Neville, Verge, O’Meara, & Walker, 2005). Numerous disease states such as pneumonia are also known to cause the release of ADH. The release of ADH after surgery in response to nonosmotic stimuli typically resolves by the third postoperative day, but can last up to the fifth postoperative day (Moritz et al., 2003). Children appear to be at particular risk after surgical procedures, and deaths have been reported after even minor surgery (Arieff et al., 2003; Auroy, Benhamou, Péquignot, Jouglu, & Lienhart, 2008; McRae, Weissburg, & Chang, 1994).

Importantly, *in the presence of ADH, the kidneys cannot eliminate excess electrolyte-free water* (Hoorn et al., 2004; Moritz & Ayus, 2003). In addition to the administration of hypotonic parenteral solutions, such as D5W or 2/3 and 1/3, oral and enteral intake may be a source of electrolyte-free

water that contributes to the development of acute hyponatremia (e.g., hypotonic feeds, water, ice chips) (Shafiee et al., 2005). Experts have noted that hyponatremia is the most common electrolyte disturbance among children being treated in hospital because such patients are commonly exposed to nonosmotic stimuli for ADH, and also because the administration of hypotonic solutions is routine practice in many hospitals (Hoorn et al., 2004; Moritz & Ayus, 2003).

Parenteral solutions

IV solutions are often required in hospitalized children to rehydrate or maintain hydration, to treat electrolyte abnormalities and for acid-base balance. It is important to understand how fluids can act within the body in order to monitor and assess ongoing response to fluids, particularly when the control of the fluid intake is no longer dependent on an individual’s normal thirst mechanism, but rather in the control of the practitioner.

The IV solution 2/3 and 1/3 contains only 51 mmol/L of sodium. Outside of the body, the osmolality of the solution is 269 mOsmol/L (sodium and dextrose combined), which is similar to blood. However, once the solution is infused, it is extremely hypotonic, as the dextrose is rapidly metabolized resulting in two-thirds of the solution (e.g., two-thirds of 1 litre, 667 mL) being electrolyte-free water. In the case of D5W, it contains no electrolytes. Although outside of the body the osmolality of D5W is 250 mOsmol/L and similar to blood, once a litre of D5W solution is infused and the dextrose is metabolized, the entire litre (1,000 mL) of solution is free water.

The intracellular compartment comprises approximately two-thirds of the total body water and the extracellular compartment approximately one-third. Therefore, two-thirds of infused free water will move into cells and only one-third will remain in the extracellular compartment. Thus, for every 1 litre of 2/3 and 1/3 infused, 444 mL (two thirds of the 667 mL of electrolyte-free water) will move into cells; for every 1 litre of D5W infused, 667 mL (two-thirds of the entire litre) will move into the body cells—including brain cells. (Refer to

Table One: Select IV solutions, their osmolality, sodium content, total electrolyte-free water content and its disposition in the bodyⁱ

IV Fluid	Osmolality (mOsmol/L)	Sodium (mmol/L)	Electrolyte-Free Water			
			Total Volume** (mL)	Extracellular		Intracellular
				Intravascular	Interstitial	
1 L of D5W ⁱⁱ	252	0	1000 mL	83 mL	250 mL	667 mL
1 L of D5W and 0.2% NaCl ⁱⁱⁱ	321	34	778 mL	65 mL	194 mL	519 mL
1 L of 2/3 and 1/3 ^{iv}	269	51	667 mL	56 mL	167 mL	444 mL
1 L of D5W and 0.45% NaCl	406	77	500 mL	42 mL	125 mL	333 mL
1 L of 0.9% NaCl	308	154	0 mL	0 mL	0 mL	0 mL
1 L of D5W and 0.9% NaCl	560	154	0 mL	0 mL	0 mL	0 mL

ⁱ Thirty-three per cent of the electrolyte-free water disperses into the extracellular compartment and 67% disperses into the intracellular compartment. Within the extracellular compartment, ¼ remains intravascular and ¾ moves into the interstitial space. (Information adapted from Cook, 2003; Baxter Canada, Inc., 2009.); ⁱⁱ D5W refers to dextrose 5% in water; ⁱⁱⁱ NaCl refers to sodium chloride; ^{iv} 2/3 and 1/3 refers to 3.3% dextrose and 0.3% sodium chloride.

Table One for these and other examples of fluid distribution.) Free water combined with nonosmotic secretion of ADH will reduce the ability of the kidneys to excrete the excess water and dilutional hyponatremia can ensue. This can also occur or be compounded further with enteral feeds because they are hypotonic, and when oral fluids are given in the form of ice chips and water, which are also very hypotonic.

Electrolyte solutions, such as 0.9% sodium chloride and lactated ringer's, once infused, do not lead to changes in tonicity among the fluid compartments. Approximately 25% of the solution will remain in the intravascular compartment and 75% in the interstitial space. Another example is D5W combined with 0.9% sodium chloride. Although outside of the body, it has an osmolarity greater than blood (osmolarity is about 560 mOsm/L), once infused, however, the dextrose is rapidly metabolized and what remains is an isotonic fluid. In the absence of cellular dehydration, the fluid will remain in the extracellular compartment and there will be no movement of the fluid into body cells.

Although hypotonic fluids have been identified to be most frequently associated with hospital-acquired hyponatremia, the infusion of 0.9% sodium chloride has also been reported to be associated with hyponatremia—a process called desalination. This has been reported, for example, in patients postoperatively. Patients can experience a reduced vascular tone from anesthetics and other medications administered intraoperatively, which results in decreased blood pressure. Infusing 0.9% sodium chloride intraoperatively can compensate to maintain a normal blood pressure. Postoperatively, once the vascular tone returns to normal, receptors in vasculature are activated, natriuretic peptides are released, and the kidney responds by excreting a disproportionate amount of sodium to free water to rid itself of excess fluid.

Discussion

Incidents of hospital-acquired acute hyponatremia in children leading to severe harm and death have been reported internationally associated with hypotonic solutions. Various literature reports (Arieff et al., 1992; Auroy, Benhamou, Péquignot, Jouglu, & Lienhart, 2008; Duke, Kinney, & Waters, 2005; Hoorn, et al., 2004; McRae, Weissburg, & Chang, 1994; Moritz & Ayus, 2003), and pediatric inquests (Hyponatremia Progress Hearing, 2008) have highlighted cases of acute hyponatremia leading to the in-hospital deaths of children who were otherwise healthy. The National Patient Safety Agency in the United Kingdom has identified hospital-acquired hyponatremia in children as a major patient safety issue. Safety alerts and guidelines for the administration of fluids to children have been published as a result, including the requirement for sodium chloride 0.18% with glucose 4% intravenous solution to be removed from wards and general stock (Ellis, 2008; Government of Northern Ireland, Department of Health, Social Services and Public Safety, 2007; National Patient Safety Agency, 2007; National Patient Safety Agency, 2008). In Canada, the Canadian Medical Protective Association recently highlighted a case of hospital-acquired hyponatremia in a child (The Canadian Medical Protective Association, 2008). A provincial coroner identified six pediatric deaths related to acute hyponatremia in hospital

settings over a 10-year period and provided a guideline for practitioners administering parenteral fluids to children (Office of the Chief Coroner Province of Ontario, 2007).

There appears to be general consensus that isotonic IV fluids such as 0.9% sodium chloride should be used for children during surgery and in the treatment of moderate to severe hypovolemia. However, there has been a debate as to which solution is the best choice for maintenance of hydration (Arieff et al., 1992; Auroy et al., 2008; Beck, 2007; Choong, Kho, Menon, & Bohn, 2006; Coulthard, 2008; Duke et al., 2005; Hatherill, 2004; Holliday, Friedman, Segar, Chesney, & Finberg, 2004; Holliday, Ray, & Friedman, 2007; Holliday & Segar, 2003; Hoorn et al., 2004; McRae et al., 1994; Moritz & Ayus, 2003; Moritz, & Ayus, 2006; Neville, Verge, O'Meara, & Walker, 2005; Neville, Verge, Rosenberg, O'Meara, & Walker, 2006; Shafiee, Bohn, Hoorn, & Halperin, 2003; Skippen et al., 2008; Taylor & Durward, 2004).

Pediatric experts are questioning the widespread use of hypotonic solutions for parenteral maintenance, a practice based on a formula that was developed more than 50 years ago (Holliday & Segar, 1957). The formula is derived from minimum free water requirements based on caloric expenditure per kilogram of body weight. Experts argue that this formula overestimates maintenance requirements for a variety of reasons. Most importantly, the formula presumes normal excretion of free water by the kidneys and, thus, does not take into account ADH released in response to nonosmotic stimuli, a process that was identified since the original development of the formula and that is commonly seen in hospitalized children. Although there is no single IV solution that is ideal for all children, a variety of studies, including randomized trials from pediatric ICUs, are answering questions regarding the use of maintenance fluids for children (Au et al., 2008; Montañana et al., 2008; Yung & Keeley, 2009). In one recent study, a key factor in the development of hospital-acquired hyponatremia was the use of hypotonic maintenance solutions (Montañana et al., 2008). Yung and Keeley identified that postoperative and very ill children were at risk for hyponatremia when given dextrose with hypotonic saline solutions at traditional rates.

Parenteral fluids administered for the purpose of hydration have not, traditionally, been viewed with the same rigour as medications. These fluids are usually distributed through a central supply and redistribution service or through hospital stores, as part of the materials management division of hospital operations.


Many Canadian pediatric centres have recognized hospital-acquired hyponatremia as an important issue that merits attention and have revised, or are in the process of revising their practice guidelines and management of fluids and electrolytes accordingly (BC Children's Hospital, 2008a; BC Children's Hospital, 2008b; Hospital for Sick Children, 2007; Hurdowar et al., 2009).

Conclusion

Hospitalized children have multiple risk factors that predispose them to nonosmotic release of ADH that can lead to the retention of free water, particularly in the critical care setting. Monitoring of serum electrolyte values, including trends in serum sodium levels, assessing fluid status through physical assessments, keeping accurate records of intake and output and cumulative balances, daily weights, review and consideration of

the type of solutions infused (IV, enteral) and those taken orally, and informing the intensivist when fluid intake greatly exceeds output balance can facilitate recognition of fluid imbalance that requires further assessment and a change in the plan of care.

As critical care practitioners often respond to calls in other areas of a hospital, as part of rapid response teams, it is also important to be on the alert for, and consider the possibility of acute hyponatremia, and to take the opportunity to educate peers. Critical care practitioners can advocate for enhancements to how these fluids are stored and labelled within critical care areas, so that there is not only adequate access to the various solutions that may be needed, but also clarity for practitioners as to the type of fluid being selected (e.g., indication of tonicity upon infusion). Practitioners can provide valuable input regarding which types of fluids should be made readily accessible outside of critical care, and which may require additional safeguards. Practitioners who work in pediatric centres can take a lead role to ensure that guidelines within their own centre include use of optimal IV solutions and rates, as well as the application of minimum monitoring and assessment practices to prevent incidents similar to those described in this article. Furthermore, such guidelines can be shared with peripheral hospitals caring for children to inform them of changes in practice.

It is also important that all practitioners engage family members whenever they express concerns about their child's behaviour—subtle changes may be more readily identified as abnormal by family members than by health care providers and, thus, can provide an invaluable source of assessment information. Prompt recognition and treatment of acute hyponatremia is vital to prevent brain herniation and death. 

This article was written using materials from ISMP Canada, with permission (ISMP Canada Safety Bulletin. October 27, 2009, 9(7), 1–2. Available from: <http://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2009-7-HospitalAcquiredAcuteHyponatremia.pdf>).

ISMP Canada gratefully acknowledges the valuable lessons learned and information reported by professionals in the Canadian healthcare 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 healthcare 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.

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.

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Award information

CACCN Chapter of the Year Award Program

Award value: \$500.00 plus a plaque.

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

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

Criteria for the award program:

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

Conditions for the award program:

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

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

Announcement of the winner will be published in CACCN publications.

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

1. Any educational programs that occurred during the fiscal year.

Programs between:

1–3 hours25 points each

3–8 hours50 points each

> 8 hours100 points each

2. A list of new members recruited during the fiscal year, including national CACCN membership numbers. Calculate your points based on the percentage of new members recruited as compared to the total membership of the previous fiscal year (prior to the qualifying period).

1–10%10 points

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

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

25 points for each article/paper

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

50 points for each project

In the case of a tie, CACCN reserves the right to determine the winner. Good luck in your endeavours!

Sorin Group sponsors this award

CACCN Research Grant

Award value: \$2,500.00

Deadline for submission: February 15 of each year.

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

Eligibility: The principal investigator must:

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

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

Application requirements:

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

Budget and financial administration:

- Funds are to be issued to support research expenses.
- Funds must be utilized within 12 months from the date of award notification.

Review process:

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

Terms and conditions of the award:

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

Editorial Awards

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

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

Eligibility:

1. The author is an active member of the Canadian Association of Critical Care Nurses (minimum of one year). Should there be more than one author, at least one has to be an active member of the Canadian Association of Critical Care Nurses (minimum of one year).
2. The author(s) is prepared to present the paper at Dynamics of Critical Care (optional).
3. The paper contains original work, not previously published by the author(s).
4. Members of the CACCN board of directors, awards committee or editorial committee of **Dynamics, the Official Journal of the Canadian Association of Critical Care Nurses** are excluded from participation in these awards.

Criteria for evaluation:

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

Style:

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

Selection:

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

Presentation:

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

The Spacelabs Innovative Project Award



Award Value: \$ 1,500.00 (Total)

Deadline: March 1.

The award funds of \$1,500.00 will be granted annually:

- \$1,000.00 will be granted to the Award winner and \$500.00 for the runner up.

Do you have a unique idea?

The Spacelabs Innovative Project Award will be presented to a group of critical care nurses who develop a project that will enhance their professional development.

The primary contact person for the project must be an active member of CACCN (for at least one year).

If the applicant(s) are previous winners of this award, there must be a one-year lapse before submitting again.

Applications will be judged according to the following criteria:

1. the number of nurses who will benefit from the project
2. the uniqueness of the project
3. the relevance to critical care nursing
4. consistency with current research/evidence
5. ethics
6. feasibility
7. timeliness
8. impact on quality improvement.

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

SMITHS Educational Awards

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:

Be an active member of CACCN in good standing for a minimum of one (1) year.

Demonstrate the equivalent of one (1) full year of recent critical care nursing experience in the year of the application.

Be an active member (minimum of one [1] year) of CACCN committee(s) and/or participate in other chapter-related activities. Past participation is acceptable.

Submit a letter of reference from his/her current employer.

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.

Incomplete applications will not be considered; quality of application will be a factor in selecting recipient.

Has not been the recipient of this award in the past two years.

Application process:

Submit completed CACCN educational award application forms to National Office (forms package can be requested from national office).

Obtain a minimum of 250 merit points over three years (preference will be given to members with the highest number of merit points).

Keep a record of merit points, dating back three (3) years.

Submit all required documentation outlined in criteria—candidate will be disqualified if documentation is not submitted with application.

Presentations considered for merit points are those that are not prepared as part of your regular role responsibilities.

Oral and poster presentations will be considered.

Post-application process:

All applications will be acknowledged in writing from the awards committee.

Unsuccessful applicants will be notified individually by the awards committee.

Recipients will be acknowledged at Dynamics of Critical Care and be published in the official journal.

Chapter Recruitment and Retention Award

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

Recruitment Initiative:

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

- 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.

These criteria were updated at the Board of Directors face-to-face meeting in April 2008.

BBraun Sharing Expertise Award

Award value: \$1,000.00

B | BRAUN

Deadline for nominations: 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.

Criteria:

- Nominee must be a CACCN member.
- 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).
- Members of the CACCN board of directors are not eligible.

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 and 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 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 principal investigator (or applicant) must:

- Be a member of CACCN in good standing for a minimum of one year.
- Be licensed to practise nursing in Canada.
- CNA certification preferred.

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

Application Requirements:

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

A complete application form that includes:

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

Review Process:

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

Terms and Conditions of the Award:

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

Budget and Financial Administration

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

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

The Brenda Morgan Leadership Excellence Award

Award value: \$1,000.00

Deadline: June 1 of each year

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

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

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

Eligibility criteria:

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

The nominee must:

- a) Have demonstrated a leadership role or have held a key leadership position in an organization related to the specialty of critical care.
- b) Demonstrated volunteerism and significant commitment to CACCN, i.e., have participated in CACCN activities at local or national levels (been a member of provincial executive or national board of directors, helped to plan a workshop or a conference), or indirectly provided support of CACCN activities through management activities—supporting staff to participate in CACCN projects or attend conferences.
- c) Have been a member of CACCN for a minimum of five years.
- d) Have a minimum of five years of critical care nursing experience.
- e) Be registered to practise nursing in Canada.
- f) Hold a valid adult or paediatric specialty in critical care certification—Certified Nurse in Critical Care, CNCC(C) or CNCCP(C) from the CNA (preferred).
- g) Consistently conducts themselves in a leadership manner.
- h) Have effectively engaged others in the specialty of critical care nursing.
- i) Have role-modelled commitment to professional self-development and lifelong learning.
- j) Have inspired and mentored others to contribute to critical care nursing.
- k) On a consistent basis, exemplify the following qualities/values:
 - pro-active/innovator/takes initiative
 - takes responsibility/accountability for actions
 - imagination/visionary
 - positive communication skills
 - interdependence
 - integrity
 - recognition of new opportunities
 - conflict resolution skills/problem-solving skills
 - committed/passionate/dedicated/motivator
 - advocates for patients and families.

Application process:

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

The winner will be awarded The Brenda Morgan Leadership Excellence Award and honoured during the awards ceremony at the annual Dynamics Conference. The winner's name will be published in **Dynamics, the Official Journal of the CACCN**.

Terms and conditions of the award:

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

Selection process:

Each nomination will be reviewed by the award committee in conjunction with the CACCN Director of Awards and Sponsorship. The Brenda Morgan Leadership Excellence 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.

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 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 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 also 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 Official Journal of the CACCN**. 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.

The voice for Canadian critical care nurses involved in practice, education, research and administration in:

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

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 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

Comm. Brd Rev. Oct 2009

Application for membership

Name: _____

Address: _____
(Street)

(City) (Province) (Postal Code)

W (____) ____ - ____ H (____) ____ - ____ F (____) ____ - ____

E-mail: _____

Employer: _____

Position: _____

Area of Employment: _____

Nursing Registration No.: _____ Province: _____

Chapter Affiliation (if known): _____

Sponsor's Name: _____
(If applicable)

Type of Membership (Please see types of membership noted below and check one.

All include GST):

New Member—one year \$75.00 New Member—two years \$140.00

Renewal—one year \$75.00 Renewal—two years \$140.00

CACCN Number _____

Student Member—one year \$50.00

Are you a CNA member? Yes No

Signature: _____

Date: _____

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

Make cheque or money order payable to:

Canadian Association of Critical Care Nurses (CACCN)

Mail to: CACCN, P.O. Box 25322, London, ON N6C 6B1

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 nurse/graduate nurse.

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

D Y N A M I C S

The Official Journal of the Canadian Association of Critical Care Nurses

Information for Authors

Dynamics: The Official Journal of the Canadian Association of Critical Care Nurses (CACCN) is distributed to members of the CACCN, to individuals, and to institutions interested in critical care nursing. The editorial board invites submissions on any of the following: clinical, education, management, research and professional issues in critical care nursing. Critical care encompasses a diverse field of clinical situations, which are characterized by the nursing care of patients and their families with complex, acute and life-threatening biopsychosocial risk. While the patient's problems are primarily 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



Canadian Association of Critical Care Nurses

DYNAMIC CAREER CONNECTIONS on www.caccn.ca

CACCN Dynamic Career Connections is the official job site for the Canadian Association of Critical Care Nurses. Our mission is to connect employers with hard-to-fill positions with the brightest, most-qualified critical care nurses in Canada.

Job Seekers: this new job site provides you with the opportunity to post your resume confidentially, view and apply for positions from some of the best employers in Canada, set up job alerts to search and notify you when a job matches your criteria and best of all registration for job seekers is always **FREE**. **Register** your resume today!

Employers: CACCN knows how important it is for you to find new ways to directly reach critical care nurses. **CACCN Dynamic Career Connections** provides you with the opportunity to extend your reach to a targeted candidate pool, post your jobs confidentially. Use the advanced pre-screening tools to automatically filter applicants for easy resume management. **Register** to post your jobs!

If you are interested in taking advantage of this new service, please visit www.caccn.ca, click on **CACCN Dynamic Career Connections**—register to start searching for your new career or team member.



