outlook
the official journal of the National Emergency Nurses' Affiliation Inc.

Volume 28, Number 2, Fall 2005

In This Issue:

NENA

outlook
research

You had a say

In early 2005, NENA conducted a poll of its members regarding the potential reporting of gunshot wounds (GSW) to police by emergency department staff. Since several provincial governments were considering possible legislation, NENA sought timely input from NENA members on this important and controversial issue. Twenty-one per cent of NENA members took advantage of the opportunity to participate in this poll (an excellent percentage poll response). Of the NENA members who responded, 96.5% were in support of mandatory GSW reporting, and only 3.5% were opposed. After formulating the member responses, the NENA Board of Directors sent a letter to all provincial and federal health ministers as well as to all health care stakeholders across Canada. An excerpt from that letter follows:

"The majority of NENA poll respondents believe that we are not only responsible for our individual patients, but that, as emergency nurses, we also have a responsibility to all other patients, visitors, colleagues, our communities and society as a whole. It should be recognized that the role of the emergency nurse would be solely to inform law enforcement agencies. The conclusion of the NENA poll indicates that public safety must be the priority in this serious issue."

The NENA board of directors thanks the NENA membership for their participation in this NENA poll. Watch future issues of **Outlook** for other membership polls. With active member participation, NENA can truly be the voice of Canada's emergency nurses.

Janice L. Spivey
NENA President

outlook

the official journal of the National Emergency Nurses' Affiliation Inc.

Volume 28, Number 2, Fall 2005

Outlook is the official publication of the National Emergency Nurses' Affiliation Inc., published twice annually by Pappin Communications, 84 Isabella Street, Pembroke, Ontario.
ISSN 1499-3627

Editorial staff

Editorial board

For information on advertising, contact Heather Coughlin, Advertising Manager, Pappin Communications, The Victoria Centre, 84 Isabella St., Pembroke, Ontario, K8A 5S5, telephone (613) 735-0952, fax (613) 735-7983, e-mail heather@pappin.com. Rate card available at www.pappin.com

Send manuscript inquiries or submissions to: Valerie Eden, RN, ENC(C), Outlook Editor, 34 Bow St., Dartmouth, Nova Scotia, B2Y 4P6 e-mail: valeden@hfx.eastlink.ca

NENA elected executive

President
Janice Spivey, 112 Old River Road, RR#2, Mallorytown, ON, K0E 1R0
(H) 613 923-5539; (W) 613 548-2333; fax: 613 923-5539; e-mail: Spiveyj@ripnet.com

Past President
Carla Policicchio, 4712 Whitemud Road, Edmonton, AB, T6H 5M3
(H) 780 434-5119; (W) 780 472-5116; fax: 780 472-5191; pager 780 445-2083; e-mail: cpolicic@cha.ab.ca

Secretary
Janet Calnan, 1500 Burnside Road West, RR#3, Victoria, BC, V9E 2E2
(H) 250 727-2795; (W) 250 727-4181; fax: 250 744-5939; e-mail: Jan.Calnan@viha.org

Treasurer
Jerry Bell, 10 Laval Drive, Regina, SK, S4V 0H1
(H) 306 522-6295; (W) 306 766-2238; pager: 306 565-5757; fax: 306 766-2770; e-mail: jbell@accesscomm.ca

Communication Officer
Valerie Eden, 34 Bow Street Dartmouth, NS B2Y 4P6
(H) 902 461-1897; (W) 902 465-8340; fax: 902 465-8435; e-mail: valeden@hfx.eastlink.ca

Provincial directors

British Columbia
Clay Gillrie, 160 52A Street, Tsawwassen, BC, V4M 3P6
(H) 604 948-2981; (W) 604 451-7878 e-mail: clay_gillrie@bcit.ca

Alberta
Judy Skanderup, RR#1, Tilley, AB, T0J 3K0
(H) 403 377-2567; (W) 403 501-3220\ fax: 403 377-2849; e-mail: sskander@eidnet.org

Saskatchewan
Bonnie Briere, 22 Hicke Bay Regina, SK, S4R 7G5
(H) 306 543-0242; (W) 306 766-2731 fax: 306 766-2770 e-mail: bonnie.briere@rqhealth.ca

Manitoba
Irene Osinchuk, 495 St. Anthony Ave., Winnipeg, MB, R2V OS4
(H) 204 586-4547; (W) 204 787-3486 e-mail: iosinchuk@hsc.mb.ca

Ontario
Ted Sellers, 396 Ormond Drive Oshawa, ON, L1K 1J4
(H) 905 435-3413; (W) 905 576-8711 ext. 4439; e-mail: t5isellers@rogers.com

New Brunswick
Nicole Raike, 309 Magnolia Avenue Sussex, NB, E4A 2A2
(H) 506 433-6675; (W) 506-432-3231; e-mail: craike@nbsympatico.ca

Nova Scotia
Linda Jackson, PO Box 756, Greenwood, NS, B0P 1N0
(H) 902 765-6659; (W) 902 765-1494 ext. 5422; fax: 902 765-1534; e-mail: l.Jackson@ns.sympatico.ca

Prince Edward Island
Cynthia Bryantor, PO Box 412, Kensington, PEI, C0B 1M0
(H) 902 836-5574; (W) 902 438-4322; e-mail: kevinb@pei.sympatico.ca

Newfoundland & Labrador
Cavell Bolger, PO Box 1621, Stn B., Happy Valley, Goose Bay, NL, A0P 1E0
(H) 709 896-2216; (W) 709 897-2361; fax: 709 896-4130; e-mail: c.b.bolger@superweb.ca

Committee chairs

Awards/Bursaries
Janet Calnan, 1500 Burnside Road West, RR#3, Victoria, BC, V9E 2E2
(H) 250 727-2795; (W) 250 727-4181; fax: 250 744-5939; e-mail: Jan.Calnan@viha.org

Professional Practice and Documents
Ted Sellers, 396 Ormond Drive, Oshawa, ON, L1K 1J4
(H) 905 435-3413; (W) 950 576-8711 ext. 4439; e-mail: t5isellers@rogers.com

Research
Clay Gillrie, 160 52A Street, Tsawwassen, BC, V4M 3P6
(H) 604 948-2981; (W) 604 451-7878 e-mail: clay_gillrie@bcit.ca

Nominations
Linda Jackson, PO Box 756, Greenwood, NS, B0P 1N0
(H) 902 765-6659; (W) 902 765-1494 ext. 5422; fax: 902 765-1534; e-mail: l.Jackson@ns.sympatico.ca

National Course Administration Committee
Karen Latoszek, 115 Healy Road, Edmonton, AB, T6R 1V4
(H) 780 430-6983; (W) 780 407-8616 e-mail: Klatosze@cha.ab.ca

Political Action Committee
Carla Policicchio, 4712 Whitemud Road, Edmonton, AB, T6H 5M3
(H) 780 434-5119; (W) 780 472-5116; fax: 780 472-5191; pager: 780 445-2083; e-mail: cpolicic@cha.ab.ca

Archives
Janet Calnan, 1500 Burnside Road West, Victoria, BC, V9E 2E2
(H) 250 727-2795; (W) 250 727-4400; fax: 250 744-5939; e-mail: Jan.Calnan@viha.org

President's message

As I write my first article as your NENA president, I find myself thinking of how proud I am to be an emergency nurse in Canada. Emergency nursing is my passion, as well as my chosen profession.

Emergency nursing is for those nurses seeking a true personal and professional challenge. Emergency nursing is for nurses who are excited by being a participant in the continuum of emergency patient care and education from wellness to treatment and to prevention of illness and injury.

Emergency nurses are the sentries at the gates to healthcare, thus holding the very keys to patient recovery and survival. We are the eyes to see, the ears to hear, the noses to smell, the voice to inquire, the brains to think, the hands to touch, the nerves to question, the hearts to openly care, the guts to feel, and the legs to run, and oh how we do run!

We provide safe and comprehensive care in a wide variety of Canadian emergency settings, while serving as tireless advocates for the provision of a high standard of emergency nursing care. While many areas of our country experience unique challenges, every Canadian emergency department, though different, is in so many ways the same. As Canada's emergency nurses, we all face huge dilemmas every shift. Province to province, the issues of overcrowding, ambulance diversion, wait times, re-triage and the nursing shortage are shared.

Emergency nurses have fought long and hard to see emergency nursing officially recognized as a specialty. The public trusts us as members of a highly valued and respected profession. Emergency nurses owe the same duties to themselves and others, including the responsibility to maintain competence, to continue personal and professional growth and to work towards the advancement of their profession.

NENA is "your" Canadian national professional organization, offering camaraderie, lifelong friendships, tremendous networking opportunities as well as wonderful educational events. Your entire NENA board of directors is firmly committed to equality and fairness to all members, from every province across Canada. The strength and voice of Canada's emergency nurses comes from their unity under the NENA banner.

NENA has created many wonderful documents. From the Orientation and Triage Education Templates to the Standards of Practice and Core Competencies for Emergency Nurses, to the many assorted and timely position statements, NENA is in touch with the needs of its members. I urge all NENA members to familiarize yourselves with these helpful documents and to let them assist you in your daily practice.

I encourage you each to take advantage of the TNCC, ENPC and CATN courses, made available throughout Canada by the National Course Administration Committee (NCAC). CTAS and PEDS

NENA Inc., 2003-2004 year-end report

INCOME	Actual	Budget	Variance
Fundraising	$2,620.64	$6,500.00	($3,879.36)
Events	$1,554.59	$0.00	$1,554.59
Document Sales	$1,008.00	$6,500.00	($5,492.00)
Book Rebates	$58.05	$0.00	$58.05
Grants	$1,587.00	$3,000.00	($1,413.00)
Indirect Fees: ENPC	$25,020.00	$19,800.00	$5,220.00
Indirect Fees: TNCC	$61,055.00	$42,480.00	$18,575.00
Indirect Fees: CATN	$690.00	$1,800.00	($1,110.00)
Interest Income	$686.20	$750.00	($63.80)
Member Fees	$23,780.00	$26,960.00	($3,180.00)
Advertising	$10,098.06	$2,000.00	$8,098.06
Misc. Income	$7,396.10	$5,500.00	$1,896.10
TOTAL INCOME:	**$132,933.00**	**$108,790.00**	**$24,143.00**

EXPENSES	Actual	Budget	Variance
Awards	$54.25	$0.00	($54.25)
Advertising	$0.00	$1,500.00	$1,500.00
Bank Charges	$384.19	$150.00	($234.19)
Board Meetings	$35,986.74	$22,000.00	($13,986.74)
Bursaries	$2,750.00	$4,750.00	$2,000.00
Professional Fees	$214.00	$250.00	$36.00
Committee Mtgs.	$23,060.95	$29,200.00	$6,139.05
Gifts	$174.24	$200.00	$25.76
Interest Paid	$0.00	$0.00	$0.00
Legal	$0.00	$150.00	$150.00
Office Expense	$16,905.70	$9,050.00	($7,855.70)
Programs	$4,210.20	$4,000.00	($210.20)
Promotions	$1,038.94	$4,330.00	$3,291.06
Public Relations	$10,721.86	$12,650.00	$1,928.14
Reimbursements: ENPC	$7,890.00	$6,600.00	($1,290.00)
Reimbursements: TNCC	$20,220.00	$14,160.00	($6,060.00)
Reimbursements: CATN	$470.00	$600.00	$130.00
Misc.	$2,073.06	$0.00	($2,073.06)
TOTAL EXPENSES:	**$126,154.13**	**$109,590.00**	**($16,564.13)**
INCOME/LOSS POSITION:		**$6,778.87**	

CTAS courses are also increasing in availability, ever raising the bar of emergency nursing preparedness across Canada.

From its redevelopment to its ongoing updates, your NENA website has grown in use, accessibility and acknowledgement. This professional website is truly befitting the National Emergency Nurses Affiliation. This site will become even more interactive for NENA members, since the results of the two recent website polls reflected the membership's desire to truly "have a say".

The 2006 NENA national emergency nursing conference will be held in Ottawa and hosted in turn by Ontario. I encourage all NENA members to seriously consider participating in what promises to be both an educational and fun event. Plan to join your friends and colleagues from across Canada. Show your NENA pride!

Is it not time for every member to get active or to become more active, in NENA? Let your provincial directors and your NENA board of directors hear what you need. Share with them how you want to participate and join them as we accomplish great things together!

As your NENA president, I take my role and responsibilities very seriously. My task is huge as I follow a series of amazing and highly respected past presidents. I am honoured to be able to serve the NENA membership in this manner. My goal is to help to further the wonderful works done thus far by NENA, while promoting exposure and membership across Canada. I promise to work tirelessly for Canada's emergency nurses, shoulder to shoulder with an amazing group of dedicated professionals, your NENA board of directors. Together with your help, NENA can stand tall and speak both loudly and proudly.

Janice L. Spivey RN ENC(C) CEN

NENA Inc., 2004-2005 year-to-date budget report

INCOME	Actual	Budget	Variance
Fundraising	$11,244.20	$4,000.00	$7,244.20
Grants	$0/00	$0.00	$0.00
Indirect Fees: ENPC	$17,890.00	$21,300.00	($3,410.00)
Indirect Fees: TNCC	$47,950.00	$50,700.00	($2,750.00)
Indirect Fees: CATN	$600.00	$1,200.00	($600.00)
Interest Income	$306.78	$300.00	$6.78
Member Fees	$28,100.00	$30,140.00	($2,040.00)
Advertising	$2,840.00	$3,000.00	($160.00)
Misc. Income	$4,105.30	$5,500.00	($1,394.70)
TOTAL INCOME:	**$113,036.28**	**$116,140.00**	**($3,103.72)**

EXPENSES	Actual	Budget	Variance
Awards	$0.00	$0.00	$0.00
Advertising	$0.00	$500.00	$500.00
Bank Charges	$358.66	$200.00	($158.66)
Board Meetings	$11,447.47	$22,000.00	$10,552.53
Bursaries	$0.00	$5,250.00	$5,250.00
Professional Fees	$0.00	$240.00	$240.00
Committee Mtgs.	$31,989.20	$24,500.00	($7,489.20)
Gifts	$100.00	$200.00	$100.00
Interest Paid	$0.00	$0.00	$0.00
Legal	$30.00	$150.00	$120.00
Office Expense	$9,337.97	$12,050.00	$2,712.03
Programs	$75.00	$7,000.00	$6,925.00
Promotions	$0.00	$1,080.00	$1,080.00
Public Relations	$16,637.10	$13,000.00	($3,637.10)
Reimbursements: ENPC	$5,000.00	$6,900.00	$1,900.00
Reimbursements: TNCC	$14,500.00	$16,700.00	$2,200.00
Reimbursements: CATN	$200.00	$400.00	$200.00
Misc.	$750.00	$0.00	($750.00)
TOTAL EXPENSES:	**$90,425.40**	**$110,170.00**	**$19,744.60**
INCOME/LOSS POSITION:		**$22,610.88**	

From the spring board meeting

- Work continues on the action plan developed at the fall board meeting to address some of the issues identified by NENA members.
- The chair of the National Course Administration Committee (NCAC) will sit as an ex-officio member for the three days of the board meeting. With the NCAC chair at the table, issues concerning administering and disseminating the courses will be beneficial.
- The National Working Group (NWG) for CTAS continues to meet yearly and NENA's issues are brought to the table for discussion.
- NENA's views were shared at a meeting with CNA and a response was prepared for the First Minister's Conference on "Timely access to health services".
- A position statement on "The role of the nurse practitioner" was accepted for distribution.
- Revisions were made to the triage position statement with a focus on reassessment.
- Letters were sent to health leaders on "caring for the patient in the waiting room".
- A poll conducted on the website about mandatory reporting of gunshot wounds was positive and a letter was drafted by the Political Action Group for distribution.

From the editor

Emergency nurses – everyday heroes – each and every day.

This is the theme for Emergency Nurses Week and, yet, it seems like an understatement in the aftermath of Hurricane Katrina. The stories that have come out of the Gulf Coast about the insurmountable obstacles that have faced emergency personnel and health care providers, not only during the storm, but also in the hours and days after the storm, are enough to curl your hair (as my mother would say). Even watching the news broadcasts cannot really impart the horror that they must have faced as the power went, the flooding started and people began to die. I can't even imagine what they must have been thinking or feeling. I know that our thoughts and prayers are with them as they continue to struggle to provide necessary and much-needed care while worrying about their own families.

Emergency nurses are everyday heroes. They get up, they get dressed and they go to work in all kinds of weather – good and bad. There is no telling how well or badly the shift may go. It may be busy or it may be quiet. There may be inpatient beds or there may not. There may be intensive care beds or it may be a shift that the intensive care patients either stay in your department or they are transferred out (if you are lucky!). It may be a shift that there is a full complement of staff or you may be short with no hope of getting anyone else to work. However, the unpredictability is part of the charm that attracted many of us to the ED along with the challenge of sick and injured patients. Right?

Each day, though, we care for patients and families who have limited resources, no family physician and who believe that if they come to the emergency department, we will somehow fix their problems. It is tough and challenging work. There is no doubt about that. The rewards may seem to be far and few, but there are lots of rewards, big and small. We do make the difference every day when we save a life, when we help someone to die with dignity, when we help families deal with their pain and loss, when we see a child smile at us even after a painful procedure, when we give the elderly lady a warm blanket, or a popsicle to a small child. There are lots of examples of how we do make a difference each and every day.

And even when we are not at work, we are members of communities. We get called by friends, our families and neighbours who ask our advice, who need our help or a shoulder on which to cry. Nursing is a part of who we are as people. We don't leave it behind when we leave the department at the end of the shift.

Remember that there are things outside of your control, but there are many that are within your influence to change or to make better. So take pride in your work as an emergency nurse. Celebrate your week.

Valerie Eden,
RN, BN, ENC(C), MDE

Outlook

Book review

A nurse's story: Life, death and in between in an intensive care unit

Author: Tilda Shalof
Published by McClelland & Stewart, 2004; 352 pages, ISBN: 0-7710-8086-7

I will say straight up – I loved this book. Here is a book written about nursing by a nurse. The author is Tilda Shalof who is an ICU nurse working in Toronto. She has been a nurse for more than 20 years and most of her career has been spent working in intensive care. It is a collection of stories that chronicles her journey as a nurse during those 20 years: from a brand new nurse who had to learn all the necessary competencies and skills to provide physical care, and who wondered if she would ever be able to give the kind of care that she wanted, to the seasoned veteran who struggled with ethical and moral issues concerning her patients. The stories are authentic, sometimes humorous, sometimes sad and always thought-provoking. The author takes us into the shift-by-shift work of nursing. She shares stories about patients for whom she has cared and about the staff with whom she works – both nursing and medical. The stories may be about patients in the intensive care, but the lessons she learned are easily translated to any area of nursing. I am sure that you will see yourselves as well as your patients in the stories that she relates.

I had the privilege of hearing the writer, Ms. Shalof, speak at a leadership conference in Halifax. She spoke about how she believes that she exposed some of the secrets of nursing. I suppose that she has, too. We talk about our patients, but only with each other. We mostly keep our professional lives separate from our families and friends. They are innocently unaware of much that we see and do. The author is proud to be a nurse. She believes that she still learns valuable life lessons from her patients.

I spent one weekend reading this book. I couldn't put it down. I guarantee – you won't either!

Reviewed by Valerie Eden
RN, BN, ENC(C), MDE

Awards of Excellence

Do you have an idol? Someone who helped you through that long day, evening, or night shift in ER? Well, NENA wants to hear about them! NENA is looking for nominations for Awards of Excellence in emergency nursing. There is no limit to the number of awards that are awarded in four categories: Emergency Nursing Practice, Emergency Nursing Research, Emergency Nursing Administration, and Emergency Nursing Education. See the application form on page 11.

Memories of Partnerships 2005

Partnerships 2005 – Emergency Nursing working with CARE (clinical, administration, research and education), held May 13-15, 2005 in Kelowna, B.C.

Bridging Gaps in Elder Care. Speakers: Brent Hobbs and Gloria Mohr.

Above, Clay Gilrie, president of ENGBC and chair of the conference planning committee speaking to conference participants, and below, Caroline McGarry-Ross and friend – winner of the Outlook contest.

Anne Cessford, past president of NENA and Janice Spivey, president-elect of NENA.

The contingent from Atlantic Health Services Corporation Emergency Department, Saint John, NB.

Cate Knowlton of Nova Scotia shows off her hula hoop skills at the beach party.

NENA's 25th Anniversary

In 1979, ENAO was approached by Nova Scotia, British Columbia, Manitoba and Alberta about forming a national association. In 1980, members attended the first national CAEP conference in Vancouver and the first interest meeting regarding the establishment of a national emergency nursing group was held.

In 1981, a second national meeting was held with representation from British Columbia, Alberta, Saskatchewan, Manitoba, Northwest Territories and Ontario. The group met to further develop the plans for a national emergency nurses group. By September 1981, a philosophy and objectives were developed and the name NENA was chosen. The membership fee was $2.00 or $5.00 depending on provincial needs.

On May 2-3, 1982, a conference was held in Regina, Saskatchewan. It was here that the first executive of NENA was acclaimed into existence. Provincial indirect fees to NENA were $2.00.

There have been significant accomplishments for NENA and for emergency nurses over these past 25 years. Some of these accomplishments include: publication of Standards of Nursing Practice in 1986 that led to acceptance of emergency nursing as a specialty nursing group within CNA. In 1989, the first position statements were developed and published. In 1992, NENA negotiated with ENA to distribute TNCC in Canada. To date, 1,288 courses have been taught with 19,320 nurses trained in TNCC. In 1994, the first certification exam in emergency nursing was held. There were 366 emergency nurses who applied to write that first examination. To date, there are 1,300 nurses certified in emergency nursing. In 2000, NENA collaborated with CAEP on the joint statement on overcrowding. In 2001, core competencies were developed and made available to all members. In 2003, NENA determined that it was time to move to a national conference each year from having a national conference every two years. It has been an eventful first 25 years! NENA continues to evolve and grow and to remain responsive to the needs of Canadian emergency nurses. We have lots of which to be proud!

NENA's 25th Anniversary cake.

Outlook
Guidelines for submission

Editorial Policy

1. **Outlook** welcomes the submission of clinical and research articles, case studies, and book reviews relating to the field of emergency nursing.

2. Statements or opinions expressed in the articles and communications are those of the authors and not necessarily those of the editor, publisher or NENA. The foregoing disclaim any responsibility or liability for such material and do not guarantee, warrant or endorse a product or service advertised in this publication, neither do they guarantee any claim made by the manufacturer of such product or service.

3. Authors are encouraged to have their articles read by others for style and content before submission.

Preparation of Manuscripts

1. The original copy of manuscripts and supporting material should be submitted to the **NENA Outlook** editor. The author should retain one complete copy.

2. Manuscripts must be typed, double-spaced (including references), on 8 1/2" x 11" paper with adequate margins. Manuscripts longer than one page must be submitted in a disk format in Word Perfect or Word. Submissions are accepted via e-mail to the communication officer.

3. Author's name(s) and province of origin must be included.

4. Clinical articles should be limited to six pages.

5. Direct quotations, tables and illustrations that have appeared in copyrighted material must be accompanied by written permission for their use from the copyright owner, and original author and complete source information cited.

6. Photographs of identifiable persons, whether patients or staff, must be accompanied by signed releases, such as the following: "I hereby give (author's name) authorization to use the photograph of (subject's name) in the **NENA Outlook**."

Please submit articles to:
NENA Outlook Editor,
34 Bow Street,
Dartmouth, NS B2Y 4P6
valeden@hfx.eastlink.ca

Deadline dates:
February 20 and August 16

The NENA Bursary

NENA recognizes the need to promote excellence in emergency care, and, to this end, to provide financial aid to its members. NENA will set aside a predetermined amount of monies annually with the mandate of providing a high standard of emergency care throughout Canada. All sections of the emergency nursing team are eligible for consideration including staff nurses, managers and educators.

Applications must be submitted prior to the spring board of directors meeting of NENA for review by the standing committee for bursary disbursements. On April 1 of each year the number of bursaries awarded will be determined by the number of registered members per province for that NENA fiscal year i.e.:

1-99 members - 1 bursary
100-199 members - 2 bursaries
200-299 members - 3 bursaries
300-399 members - 4 bursaries
400-499 members - 5 bursaries
500-599 members - 6 bursaries
600 + members - 7 bursaries

One bursary is to be available to NENA board of directors members and one bursary per year will be available to an independent member.

Successful candidates can only receive a bursary once every three years.

NENA Bursary application process

Each candidate will be reviewed on an individual basis and awarded a number of points as set out below:

1. Number of years as a NENA member in good standing
- 2 years.....1 point
- 3-5 years .....2 points
- 6-9 years .....3 points
- 10 + years .....5 points

2. Involvement in emergency nursing associations/groups/committees:
- Provincial member.....1 point
- Provincial chairperson .....2 points
- Special projects/committee
  - provincial executive .....3 points
- National executive/ chairperson.....5 points

3. Candidates with certification in emergency nursing and/or involved in nursing research will receive an additional five points.

If two candidates receive an equal number of points, the committee will choose the successful candidate. All decisions of the bursary committee are final.

Each application will be reviewed once per spring board meeting.

Preference will be given to actively involved members of NENA and those actively pursuing a career in emergency nursing. Those members requesting assistance for emergency nursing certification, TNCC, ENPC, CATN, as well as undergraduate or post-graduate studies that would enhance emergency care will also receive preference.

Candidates must have completed Forms A, B and C (included with this issue of **Outlook**). The provincial director may forward applications at the spring board meetings.

Any incomplete forms will be returned to the provincial director for correction if possible.

Eligibility
- Current RN status in respective province or territory. (Proof of registration required.)
- Active member in NENA Inc. for at least **two** consecutive years. (Proof of membership required.)
- Working at present in an emergency setting which may include:
  - Emergency department
  - Nursing station
  - Pre-hospital
  - Outpost nursing
  - Flight nursing

Application process

Candidates must complete and submit the following:

a. NENA Bursary application form "A"
b. Bursary reference form "B"
c. 200-word essay
d. Photocopies of provincial registered nurse status and NENA registration

Provincial representative responsibilities:

a. Completes bursary candidate's recommendation form "C"
b. Ensures application forms are complete before submission
c. Brings to board of directors meeting all completed applications

Selection process

The standing committee for bursary disbursements will:

1. Review all applications submitted by provincial representatives and award bursaries based on selection criteria.
2. Forward names of successful candidates to the board of directors for presentation.

NENA Bursary application form "A"

Name: _____ Date of Application: _____

Address: _____

Phone numbers: work (_____) _____ - _____; home (_____) _____ - _____; fax (_____) _____ - _____

E-mail: _____

Place of employment: _____

Name of course/workshop: _____

Date: _____ Time:_____ Length of course: _____

Course sponsor: _____Cost of course: _____

Purpose of course: _____

Credits/CEUs: _____ ENC(C) Certified: ❑ Yes ❑ No

Previous NENA Bursary: ❑ Yes ❑ No Date: _____

Please submit a proposal of approximately 200 words stating how this educational session will assist you and your colleagues to provide an improved outcome for the emergency care user: Attached?: ❑ Yes ❑ No

Ensure photocopies of provincial RN registration and provincial emergency nurses association membership are included with your application: Attached?: ❑ Yes ❑ No

NENA Bursary application form "B"

I acknowledge that _____ (name of applicant) is currently employed in an emergency care setting. This applicant should receive monies for _____ (name of course).

Reason: _____

Other comments: _____

_____

Signed: _____ Position:_____

Address: _____

NENA Bursary application provincial director's recommendation form "C"

Name of bursary applicant: _____ Province: _____

Length of membership with provincial emergency nurses group: _____

Association activities: _____

_____

Do you recommend that this applicant receive a bursary? ❑ Yes ❑ No

Reason: _____

Provincial director signature: _____ Date: _____

NENA Award of Excellence application form

Forward all submissions to the provincial representatives by January 31 of each year. Incomplete or late applications will not be eligible for consideration. Successful candidates will be presented with awards at the annual general meeting. In order to facilitate the process of the applications, the nominator will involve the nominee in the submission and verification of information.

Award of Excellence in: _____

Nominee: _____ Address: _____

_____ Postal Code: _____

Phone: work (_____) _____ - _____; home (_____) _____ - _____; fax (_____) _____ - _____

E-mail: _____

Employer: _____ Current position: _____

Nominator: _____ Address: _____

_____ Postal code: _____

Phone: work (_____) _____ - _____; home (_____) _____ - _____; fax (_____) _____ - _____

Letter of support (1) from: _____

Letter of support (2) from: _____

Signature of nominee: _____

Signature of nominator: _____ Date: _____

An emergency nurse goes to sea

By Shannon Wilson,
RN, BN, Clinical Nurse Educator

Some would call it a sense of adventure, some would say it was insanity and others would say it was a good change. I called it my mid-life crisis. I woke up one day in July 2004 and decided I needed a change. In a matter of five months, I had sold my house, bought a condo, moved, quit my job and ran away to a life at sea. After 24 years of pediatric nursing with the last nine years in emergency, it was a bit of an adjustment to board a cruise ship and start caring for adults.

My adventure started in San Pedro, which is the cruise ship harbour just outside L.A. I boarded the ship with two bags and a lot of questions. From the first week on board, I knew to expect the unexpected. I had a suitcase full of clothes that I would not need and all the wrong colour of socks and shoes for the uniform. My week of orientation included the company standards, firefighting, lifeboat drills, opening and closing the fire doors and the ecologically friendly "save the waves" program. There was very little time to learn the medical stuff until after orientation when I was on my own.

The cruise ships are equipped with a fully functional ICU, resuscitation room and two wardrooms for overnight patients as required. The company I work for has two doctors and three nurses on the ship at any given time. We have x-ray capability (I'm a good photographer, but lousy aim), and a limited lab for blood tests. There are also kits for pregnancy tests, strep tests, flu tests, alcohol levels and cardiac enzymes. Therefore, diagnostics are available, but slightly limited. One passenger who stands out in my memory is a lady who exhibited all the signs of a stroke. She could respond to her name, could not speak, and gradually deteriorated to full resuscitation mode. We stabilized her, then off-loaded her in the middle of the night. The coast guard matches speed with the ship and one of the side doors is opened. We then pass the patients to the coast guard and a doc and nurse accompany them shore side and rejoin the ship the next day. We don't often find out what happened with a patient once they are offloaded but, in this case, she was fine and it turned out to be an overdose of her many medications. Another time, a lady called to say her husband was just sitting there staring at her and totally unresponsive. She couldn't get any response out of him at all. That is until they were informed of the charges to see the doctor, and then he was miraculously cured and started speaking to her again.

We provide medical care for all crew members. With more than 60 nationalities represented among the crew, it can be challenging to communicate and very interesting getting to know people. Some crew members are frequent fliers and learn quickly to manipulate the system. One "princess" would routinely come down with an ailment prior to her shift and recover when in port. Her last episode consisted of being totally unresponsive until given a vitamin B Complex injection at which time she managed a response to the point of bending the needle in her butt.

The resuscitations are really what we are there for. The knowledge to save a life and the equipment to do it is essential on these ships. Much like any city, 9-1-1 calls will activate an emergency response. The bridge officers are the dispatchers for 9-1-1 calls. They take the call then phone or beep the nurse on duty. We then call the room to get more details, if we can, but the call often comes from elsewhere on the ship and we need to make an assessment at the scene. Our mobile unit consists of a wheelchair and an Alpha bag, which is a large backpack filled to capacity with everything required to save a life and stabilize a patient when outside the medical facility. Occasionally, it is a legitimate call, but often it is not. I have handled 9-1-1 calls for requests for Tums, Tylenol and condoms. Even the legitimate-sounding calls often turn out to be false alarms. Unconscious patients on the sports deck up and playing by the time we arrive, heart attack victims discovering relief with a Tums and extremely sick passengers suddenly cured when they find out there are charges for medical care. If the nurse on call requires further assistance, or if it is a code situation, then "Alpha, Alpha, Alpha" is paged overhead and that activates the entire medical team and the stretcher team to the location. When on call, we usually sleep in our scrubs ready for action. When not on call, we may still be asked to help and it is a different story. It is one thing to help

Shannon Wilson

with a resuscitation in your scrubs and shoes with no bra, no underwear and no socks but, when the firemen, paramedics, security and coast guard comes on the scene, you feel a little self-conscious.

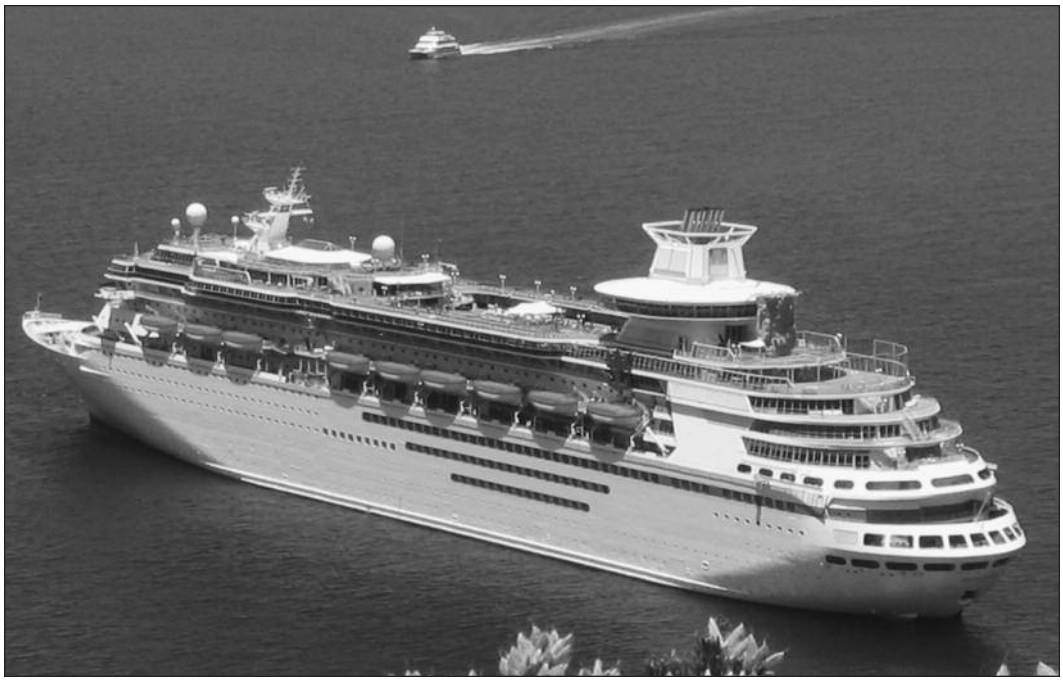
One of the most unusual calls we received was a young lady who took a direct hit to her bosom with a basketball. It must have been a forceful hit as her implant burst. Another time, we had a very drunk but happy young man who put his fist through the slot machine after losing hundreds of dollars. He lost several hundred more by the time we were done stitching and dressing his wounds.

In spite of some limitations and dress restrictions, you can have a very active social life. You can go to the shows, crew parties or bingo. You can go to the lounges and dance or just go shopping or to the gym. There is a library, internet café and video library as well.

When mixing with the passengers, you must be ready for any type of question. Some of the more entertaining questions that I have heard about are listed here.

1. Does the crew sleep on board? (No, we swim ashore each night)
2. Does this elevator go to the front of the ship? (After Ensenada some passengers think so)
3. Do these stairs go up or down? (Yep)
4. What do they do with the ice carvings after they have melted?
5. Does the ship generate its own electricity? (No, we run a long extension cord from L.A.)
6. Do you have to get off the ship to take a shore excursion?
7. If the photos aren't marked, how do we know which ones are ours? (Um, look at the face, buddy)
8. Is the swimming pool salt water or fresh water? When answered that it was salt water, the reply was "Oh that explains the waves".
9. One passenger in the cabin phoned the purser when still in port asking why he paid so much for an ocean view stateroom and all he could see was the parking lot and a bunch of cars. The purser replied, "Because we don't usually take the parking lot with us when we sail".
10. One lady phoned the purser's desk because she couldn't get out of the cabin. One door went into the closet and the other one into the bathroom. When the purser told her to use the door in between those two, the reply was "I can't open that door, it has a 'Please do not disturb' sign on it".

The days off in port are the reason I signed on. This job is a great way to work your way around the world if you plan it right. A lot of the nurses prefer to shop; I preferred to tour the ports of call. Many of my adventures happened shore side. One day, in Catalina, I decided to go for a hike up in the hills. It was a great hike straight up for more than an hour. It was very hot up in the hills and I could feel the heat coming up at me from the ground as well as overhead. I had a litre of water with me and no hat. I was on my own, on an unknown trail, in an uninhabited area and I found out at the top of the mountain that my cell phone was not getting a signal. Then, upon exiting the trail back at the bottom, I spotted a sign warning hikers of rattlesnakes in the area. Normally, I'm a very safety conscious traveller but, in this case, I was lucky to return to the ship without incident. Another day, I rented a crew bike for the sum of $3.00. I was getting a great workout climbing a hill and the pedal started to wobble. I decided it would be advisable to come down before the pedal fell off altogether. It seized up on the next turn of the wheel. I started coasting back to the ship only to find out that the brakes were very worn and not working too well. I had to exert an incredible force on the brakes in order for them to even slow the bike down. Then, as I was coasting the last small hill, the gear casing and pedal fell off completely. I walked the bike back to the ship and spent a glorious afternoon reading my book up on the deck in the sun. It's a much safer pastime for me. Funny thing, when I returned the bike key to the crew office they gave me my money back.



Shannon Wilson's workplace on the water.

Working on a cruise ship can be tedious at times and restrictive. However, the positive aspects of the job far outweigh the few restrictions and problems. I recommend the move for anyone with a sense of adventure and a desire to do something different.

What about those long, "barky" nights?

By Janielee Williamson, RN, Cochrane, Alberta

Section editor Judy Skanderup notes:

This article was submitted by Janielee Williamson, RN, Cochrane, Alberta. Janie is the project coordinator for a multi-centre research project across Alberta looking at the best method for disseminating practice guidelines to physicians. The project personnel are working in collaboration with the Alberta Medical Association CPG Committee to determine which method improves the delivery of best practice for children with croup, while ensuring optimum care for the child and determining which method has the best overall benefit for the health care system and the family.

All emergency department personnel are familiar with this scenario: 18-month-old boy presents to the emergency department at 2 a.m. on December 18. Parents look worried, yet they are baffled. As they tell their story, they are almost apologetic, "Really, he was much worse at home, he seems so much better since we drove to the hospital. He woke up in distress, he couldn't breathe and he was making this awful noise when he took a breath in. And his cough – I've never heard anything like it – he sounded like a dog… or no, more like a seal. Really, it was terrible!"

There, in mom's arms, is a happy, quiet boy looking around. When you try to examine him, his cry is stridorous and you hear the bark… reassuringly you smile back at the mom. "Yes, we know, and no we don't have magic doors. HE HAS CROUP."

Croup is a childhood respiratory illness caused by a virus. It most commonly occurs in children between six months and three years of age, but can occur in children as old as 12 to 15 years, and it has been reported in adults. Croup usually occurs in the fall and winter months, but we have seen cases in July (Denny, 1983). It is characterized by the abrupt onset of a barky cough. Other associated symptoms include inspiratory stridor (noisy breathing on inspiration), hoarseness and respiratory distress (Orenstein, 2000).

Children with croup can be categorized into four levels of severity. Determining severity is key in the management of croup because treatment should be linked to severity.

Mild croup is characterized by an occasional barky cough, no audible stridor at rest and no to mild substernal and/or intercostal indrawing (retractions of the skin of the chest wall). **Moderate**, on the other hand, is characterized by a frequent barky cough, easily audible stridor at rest, heard from a distance away from the child, and chest wall retractions at rest, but no to little distress or agitation. **Severe** is characterized by persistent barky cough, prominent inspiratory stridor and occasional expiratory stridor, marked retractions and significant distress and agitation. These children just will not settle no matter what you do. The fourth category is **impending respiratory failure.** These children may have a barky cough, but it may not be prominent. They often have stridor and retractions, but they may seem less severe. The child, in fact, may appear quieter and less distressed and seem to be improving until, on closer examination, you find that the child is lethargic with a glassy-eyed look and a decreased LOC. They may appear dusky without supplemental oxygen. To the inexperienced eye, these children appear to be improving, however, they are on the verge of respiratory failure.

Having said that, remember two-thirds of all children (in Alberta) presenting to the emergency department with croup have mild symptoms.* Children with severe croup and children with impending respiratory failure are very rare. As a note, children with croup-like symptoms who appear very toxic, have a high fever and who do not respond well to epinephrine, should be considered for bacterial tracheitis, which is believed to be a super-imposed bacterial infection of croup (Orenstein, 2000; Tong, 1996).

Stop…Look and Listen! (And then chart it….)

- Croup symptoms can occur with or without antecedent respiratory symptoms such as a runny nose, fever and cough.
- The symptoms most commonly occur in the late evening or at night, and often have an abrupt onset. On average, symptoms are at their worst when they first occur and they improve over time with episodic fluctuations.
- Croup symptoms frequently improve en route to medical care, and fluctuate significantly depending on whether the child is calm, agitated or active.
- Symptoms include: a seal-like barky cough, inspiratory stridor, hoarseness and no to moderately high fever.

- Croup symptoms usually improve during the day and often will recur on the following night (Johnson, & Williamson, 2001).
- Most children resolve their symptoms in 48 hours, but a small group of children have symptoms that persist up to a week (Johnson, & Williamson, 2001).
- Once the croup symptoms have resolved, many children develop URTI symptoms and, on occasion, a secondary bacterial infection – induced otitis media (Johnson, & Williamson, 2001; Heikkinen, Thint, & Chonmaitree, 1999; Andrade, 1998).

What about investigations?

The diagnosis of croup can reliably be made on clinical presentation in combination with a history and exam. For this reason, radiological and laboratory assessments are not necessary and, in most cases, do not help (Rapkin, 1972). Croup symptoms vary relative to the agitation of the child, therefore unnecessary tests and exams have a tendency to worsen the child's condition.

How can we help?

- Keep the child as calm and as comfortable as possible. This is best achieved by allowing the child to remain in the parent's lap during assessment and treatment.*
- Avoid unnecessary treatments and procedures.*
- Blow-by oxygen is indicated in children who are in distress. Do not force a mask on, and keep in mind that mist therapy has not been shown to have any measurable benefit. Most pediatric centres across Canada no longer use croup tents. Although mist therapy has been in use for a very long time, there is no evidence to support the use of croup tents (Neto, 2002; Lavine, & Scolnik, 2001).
- Epinephrine is indicated in children with severe respiratory distress, keeping in mind that improvement occurs within minutes and begins to wear off in about an hour. Treatment with epinephrine does not affect the disease process or symptoms beyond two hours. Treatment with 1:1000 epinephrine is as effective as racemic, but requires an increased amount to be effective: 0.5 mls of racemic in 3 mls of saline or sterile water is recommended. This is equivalent to 5 mls of epinephrine 1:1000 via nebulizer (Westley, Cotton, & Brooks, 1978; Waisman, 1992).
- Dexamethasone is indicated in the treatment of all children with croup, even those with mild symptoms (Bjornson, in press). Improvement begins within two to three hours after administration and lasts for 24 to 48 hours after administration of a single dose. We recommend giving the parenteral solution orally in all children with the exception being those with severe croup with persistent vomiting. For children with severe disease, nebulized budesonide can be given with the epinephrine dose. Intra-muscular eexamethasone may be considered in a child who has persistent vomiting (Bjornson et al., in press; Luria, 2001; Geelhoed, Turner, & Macdonald, 1996; Johnson, 1996; Patel, Macarthur, & Johnson, 1996; Klassen, 1998; Duggan, 1975).
- The dexamethasone recommended dose is 0.6 mgms/kg given in a single dose (Orenstein, 2000).

So, now what? Discharge – Admit ...that is the question?

Most croup can be managed at home once the dexamethasone has been administered and the child has been observed for a sufficient period of time to determine that their symptoms have returned to mild. If, after four hours, the child continues to have stridor at rest and indrawing, this child should be admitted for observation. Children who receive epinephrine in the emergency department should be observed for two hours before they are discharged home. It is safe to discharge children home who have received epinephrine and dexamethasone in the emergency department once their symptoms return to mild, and assuming the two-hour observation period has passed (Westley, Cotton, & Brooks, 1978; Corneli, & Bolte, 1992; Ledwith, Shea, & Mauro, 1995; Chin, 2002; Sofer, Dagan, & Tal, 1991; Rizos, 1998; Kunkel, 1996; Kelley, & Simon, 1992).

Home with helpful hints

Although present guidelines suggest that most children can be managed at home with the administration of appropriate treatment, we must be cautious in transferring the burden of care back onto the parents. Parents are entitled to adequate information that enables them to safely care for their child at home. A comprehensive teaching sheet has been designed by the clinical practice guideline working group and is available online at www.albertadoctors.org. As is the case for all discharge instructions, croup teaching instructions should include:

- A brief description of the illness, what causes it and what the family can expect
- Tips on how the parent can make their child more comfortable
- What to look and listen for to ensure the child is OK
- Indications on when to call 9-1-1, and when medical attention should be accessed right away
- What medical treatments improve croup
- Reassurance
- Instructions to encourage hand-washing, the only really preventive approach for the spread of viral illnesses.

Although croup is a common childhood illness, it can represent a frightening and stressful experience for families. This may be the "sickest" their child has ever been and its abrupt onset and involvement of the respiratory system tend to validate their concerns. We now have well-documented information that clearly identifies the best management practice for croup. These guidelines, when applied in the emergency department setting with a caring and knowledgeable approach, can safely support families and children through those long 'barky' nights.

* Based on consensus opinion.

General references

Osmond, M. (2003). Croup. **Clin Evid, 7**, 297-306.

Brown, J.C. (2002). The Management of Croup. **British Medical Bulletin, 61**, 189-202.

Klassen, T. (1999). Croup. A current perspective. **Pediatr Clin North Am, 46**, 1167-78.

References

Andrade, M.A. Hoberman, A., Glustein, J., Paradise, J.L. & Wald, E.R. (1998). Acute otitis media in children with bronchiolitis. **Pediatrics, 101**(4), 617-9.

Ausejo, M., Saenz, A., Pham, B., Kellner, J.D., Johnson, D.W., Moher, D., et al. (1999). The effectiveness of glucocorticoids in treating croup: meta-analysis. **BMJ, 319**(7210), 595-600.

Bjornson, C., Klassen, T.P., Williamson, J., Brant, R., Plint, A., Bulloch, B., et al. (in press). The use of dexamethasone in mild croup: A multi-center randomized controlled trial. **Pediatr Research**.

Chin, R., Browne, G.J., Lam, L.T., McCaskill, M.E., Fasher, B., & Hort, J. (2002). Effectiveness of a croup clinical pathway in the management of children with croup presenting to an emergency department**. J Paediatr Child Health, 38**(4), 382-7.

Corneli, H.M., & Bolte, R.G. (1992). Outpatient use of racemic epinephrine in croup. **American Family Physician, 46**(3), 683-4.

Denny, F.W., Murphy, R.F., Clyde, W.A. Jr., Collier, A.M., & Henderson, F.W. (1983). Croup: An 11-year study in a pediatric practice. **J Pediatr, 71**(6), 871-876.

Donnelly, B., McMillan, J., & Weiner, L. (1990). Bacterial tracheitis: Report of eight new cases and review. **Rev Infect Dis, 12**, 729-35.

Duggan, D.E., Yeh, K.C., Matalia, N., Ditzler, C.A., & McMahon, F.G. (1975). Bioavailability of oral dexamethasone. **Clin Pharmacol Ther, 18**(2), 205-9.

Edwards, K.M., Dundon, C., & Altemeier, W.A. (1983). Bacterial tracheitis as a complication of viral croup. **Pediatr Infect Dis J, 2**, 390-1.

Fanconi, S., Burger, R., Maurer, H., Uehlinger, J., Ghelfi, D., & Muhlemann, C. (1990). Transcutaneous carbon dioxide pressure for monitoring patients with severe croup. **J Pediatr, 117**(5), 701-5.

Geelhoed, G., & Macdonald, W.B.G. (1995). Oral and inhaled steroids in croup: A randomized, placebo controlled trial. **Pediatr Pulmonol, 20**, 355-361.

Geelhoed, G.C., Turner, J., & Macdonald, W.B.G. (1996). Efficacy of a small single dose of oral dexamethasone for outpatient croup: A double blind placebo controlled clinical trial. **BMJ, 313**, 140-142.

Heikkinen, T., Thint, M., & Chonmaitree, T. (1999). Prevalence of various respiratory viruses in the middle ear during acute otitis media. **N Eng J Med, 340**(4), 260-4.

Johnson, D.W., & Williamson, J. (2001). Croup: Duration of symptoms and impact on family functioning. **Pediatr Research, 49**, 83A.

Johnson, D., Schuh, S., Koren, G., & Jaffee, D.M. (1996, April). Outpatient treatment of croup with nebulized dexamethasone. **Arch Pediatr Adolesc Med, 150**(4), 349-55.

Johnson, D.W., Jacobson, S., Edney, P.C., Hadfield, P., Mundy, M.E., & Schuh, S. (1998). A comparison of nebulized budesonide, intramuscular dexamethasone, and placebo in moderately severe croup. **N Eng J Med, 339**(8), 498-503.

Kelley, P.B., & Simon, J.E., (1992). Racemic epinephrine use in croup and disposition. **Am J Emerg Med., 10**(3), 181-3.

Klassen, T.P., Craig, W.R., Moher, D., Osmond, M.H., Pasterkamp, H., Sutcliffe, T., et al. (1998). Nebulized budesonide and oral dexamethasone for treatment of croup: A randomized controlled trial. **JAMA, 279**(20), 1629-32.

Kunkel, N.C., & Baker, B.M. (1996). Use of racemic epinephrine, dexamethasone, and mist in the outpatient management of croup. **Pediatr Emerg Care, 12**(3), 156-9.

Lavine, E., & Scolnik, D. (2001). Lack of efficacy of humidification in the treatment of croup: Why do physicians persist in using an unproven modality? **Can J Emerg Med, 1**, 209-12.

Ledwith, C.A., Shea, L.M., & Mauro, R.D. (1995). Safety and efficacy of nebulized racemic epinephrine in conjunction with oral dexamethasone and mist in the outpatient treatment of croup. **Ann Emerg Med, 25**, 331-7.

Luria, J.W., Gonazlez-del-Rey, J.A., DiGiulio, G.A., McAneney, C.M., Olson, J.J., & Ruddy, R.M. (2001). Effectiveness of oral or nebulized dexamethasone for children with mild croup. **Arch Pediatr Adolesc Med, 155**(12), 1340-5.

Margolis, P.A., Ferkol, T.W., Marsocci, S., Super, D.M., Keyes, L.L., McNutt, R., et al. (1994). Accuracy of the clinical examination in detecting hypoxemia in infants with respiratory illness. **J Pediatr, 124**(4), 552-560.

Neto, G., Kentab, O., Klassen, T.P., & Osmond, M.H. (2002). A randomized controlled trial of mist in the acute treatment of moderate croup. **Acad Emerg Med, 9**(9), 873-9.

Newth, C.J., Levison, H., & Bryan, A.C. (1972). The respiratory status of children with croup. **J Pediatr, 81**(6), 1068-73.

Orenstein, D.M. (2000). Acute inflammatory upper airway obstruction. In R.E. Behrman, R.M. Kleigman, & H.B. Jenson (Eds.), **Nelson textbook of Pediatrics** (pp. 1274-9). Philadelphia: W.B. Saunders Company.

Patel, H., Macarthur, C., & Johnson, D. (1996). Recent corticosteroid use and the risk of complicated varicella in otherwise immunocompetent children. **Arch Pediatr Adolesc Med, 150**, 409-14.

Rapkin, R.H. (1972). The diagnosis of epiglottitis: Simplicity and reliability of radiographs of the neck in the differential diagnosis of the croup syndrome. **J Pediatr, 80**(1), 96-8.

Rizos, J.D., DiGravio, B.E., Sehl, M.J., & Tallon, J.M. (1998). The disposition of children with croup treated with racemic epinephrine and dexamethasone in the emergency department. **J Emerg Med, 16**(4), 535-9.

Sofer, S., Dagan, R., & Tal, A. (1991). The need for intubation serious upper respiratory infection in pediatric patients (a retrospective study). **Infection, 19**, 131-4.

Super, D.M., Cartelli, N.A., Brooks, L.J., Lembo, R.M., & Kumar, M.L. (1989). A prospective randomized double-blind study to evaluate the effect of dexamethasone in acute laryngotracheitis. **J Pediatr, 115**(2), 323-9.

Tan, A.K., & Manoukian, J. (1992). Hospitalized croup (bacterial and viral): The role of rigid endoscopy. **J Otolaryngol, 21**(1), 48-53.

Tong, M.C., Chu, M.C., Leighton, S.E., & van Hasselt, C.A. (1996). Adult croup. **Chest, 109**(6), 1659-62.

Wagener, J.S., Landau, L.I., Olinsky, A., & Phelan, P.D. (1986). Management of children hospitalized for laryngotracheobronchitis. **Pediatr Pulmonol, 2**(3), 159-62.

Waisman, Y., Klein, B.L., Boenning, D.A., Young, G.M., Chamberlain, J.M., O'Donnell, R., et al. (1992). Prospective randomized doubleblind study comparing L-epinephrine and racemic epinephrine aerosols in the treatment of laryngotracheitis (croup). **Pediatrics, 89**(2), 302- 6.

Westley, C.R., Cotton, E.K., & Brooks, J.G. (1978). Nebulized racemic epinephrine by IPPB for the treatment of croup. **Am J Dis Child, 132**(5), 484-487.

Pediatric thermometry: "You want me to put it WHERE?"

By Lori Vollmerhaus, RN, BScN, and Shannon Wilson, RN, BN, Clinical Nurse Educators, Alberta Children's Hospital Emergency

Rectal, oral, axillary, tympanic or temporal thermometers: Which one is the most accurate for obtaining a core temperature in children and for which age group? We have researched this subject extensively and repeatedly over the last several years. The reality is that for about 98% of our population IT DOES NOT REALLY MATTER! We teach over and over again the actual height of the temperature is not important, it is how the child looks with the fever, especially after being given an appropriate dose of an antipyretic (Eiland, & Berger, 2003; Payne, 2003; Wong, 2001). In addition, most caregivers are able to tell you that their child has a fever without using a thermometer.

Although the degree of the fever does not necessarily reflect the severity of the illness, there are a few instances where accurate temperature measurement can be the sole determining factor for treatment (immunocompromised, infants less than three months) (Leduc, & Woods, 2005; Bolick et al., 2004). Even in these cases, most clinicians will be looking at the whole clinical picture and not just the temperature (Leduc, & Woods, 2005; Bolick et al., 2004). It is taught that infants can be hypothermic or normothermic when they are fighting infection, and our treatment is based on all the symptoms not just the fact that their temperature is increased or decreased (Leduc, & Woods, 2005; Bolick et al., 2004).

Fever is the body's way of demonstrating outwardly that it is fighting an infection (Wong, 2001). The body heats up to make the environment more inhospitable for the bacteria or virus to flourish (Eiland, & Berger, 2003). Children get fevers more frequently than adults do and that is why it is a major issue in pediatric emergency nursing and medicine (Wong, 2001). The big question seems to be where to take that temperature and how reliable it is. So, let's look at this issue by route and then you can evaluate which method is the most appropriate for your clinical setting.

Rectal

The Canadian Pediatric Society states that a rectal temperature is the gold standard for taking a temperature in the less than two-year age and it should also be used as the definitive diagnostic route in the less than five-year age (Leduc, & Woods, 2005). It is thought to be the most accurate for obtaining a true core temperature (Payne, 2003; Pray, 2002; University of California, 2005; Bernardo, Henker, & O'Connor, 1999). However, it is also identified that it is slow to change in relation to core temperature and may be affected by the depth of measurement or the presence of stool (Leduc, & Woods, 2005; Pray, 2002; Bernardo, Henker, & O'Connor, 1999). Caution is also advised if using a glass thermometer due to environmental concerns. The glass could easily break spilling the mercury (Payne, 2003; Leduc, & Woods, 2005; Pray, 2002). Rectal perforations have also been a consideration with this route (Payne, 2003; Leduc, & Woods, 2005; Pray, 2002). Very little evidence of rectal perforation is provided. In fact, one article states that the actual documented incidence of rectal perforation is less than one in two million (Morley, Hewson, Thorton, & Cole, 1992). Some people, especially caregivers, view taking a rectal temperature as physically and emotionally uncomfortable or even abusive (Bernardo, Henker, & O'Connor, 1999). However, our personal experience in the clinical setting is that infants (less than three months) don't seem to mind having a rectal thermometer inserted. It is argued that, in the infant, this is the only way to truly know if they have a fever and, therefore, require further investigation (e.g., septic work-up) (Leduc, & Woods, 2005).

Infants less than three months and neonates (zero to one month) are the group that most of the controversy surrounds. The literature contradicts itself in the area of rectal versus axilla temperature-taking methods in the neonatal population. While one research article stated that neonates with their decreased brown fat will have core temp in the axilla area, others stated that rectal is still the definitive method, and the environment, as well as neonate position, will affect the outcome of other methods (Leduc, & Woods, 2005; Dollberg, Lahav, & Mimouni, 2001; Haddock, Merrow, & Swanson, 1996; Jirapaet, & Jirapaet, 2002). One product that was approved by the FDA in the USA (Penguin®) in 2001 is an electronic rapid rectal thermometer. Only one study was found in testing this thermometer, but it shows promising results for good reliability in term and near-term infants (Dollberg, Lahav, & Mimouni, 2001).

Axillary

Most hospitals have temperature probes with disposable covers that can be used orally and axillary. The main difficulty in the pediatric population with the axillary method is simply time and proper positioning of the probe. It needs to remain in place

for five to six minutes. Furthermore, it is not reliable and is the least accurate for definitive measurement as the skin temperature is largely influenced by environmental conditions and can vary greatly from the core temperature (Eiland, & Berger, 2003; Leduc, & Woods, 2005; Pray, 2002; University of California, 2005; Bernardo, Henker, & O'Connor, 1999; Cusson, Madonia, & Taekman, 1997). As stated above, the rectal method is generally agreed upon as the definitive measurement of temperature-taking in the neonate and infant populations. However, the axillary method can be used for routine screening in low-risk populations. It is accepted as a less-invasive and reasonably accurate alternate form of temperature measurement (Leduc, & Woods, 2005; Cusson, Madonia, & Taekman, 1997).

Oral

Oral temperature assessment is only an option if the child is old enough to keep the thermometer under the tongue for at least a minute (University of California, 2005). It is easily accessible, but is influenced by ingestion of food and drink and mouth breathing (Leduc, & Woods, 2005; Bernardo, Henker, & O'Connor, 1999). Its accuracy is somewhere between the axillary and rectal methods (Leduc, & Woods, 2005). Also, it is unreliable if the patient is hypothermic. Variable readings will be obtained depending on placement and insertion time (Bernardo, Henker, & O'Connor, 1999). It seems, in the pediatric population, this method is the least used, as quicker easier methods are now available.

Tympanic

The tympanic method of temperature-taking is widely used. There is a strong correlation to a rectal temperature and it is accurate in the presence of hypothermia (Bernardo, Henker, & O'Connor, 1999). It has been adopted largely due to its quick assessment time. Most tympanic thermometers take only a few seconds to get a temperature (Payne, 2003; Bailey, & Rose, 2001). This method is not largely recommended for the less than three-month age group as it is thought that the ear canal is too small to register a proper temperature (McKenzie, 2001; Cusson, Madonia, & Taekman, 1997). Most probe tips are about 8mm and the ear canal of the neonate to two-year-old is only 4mm to 5mm (Leduc, & Woods, 2005). Other factors come into play with the tympanic thermometer. If there is too much earwax in the canal, or if it is not properly positioned, the reading may not be accurate (Eiland, & Berger, 2003; Payne, 2003; Bernardo, Henker, & O'Connor, 1999). Yet, some feel that earwax does not significantly alter the temperature (Leduc, & Woods, 2005). Using the baby's ear that has been against the bed or up to the air may also affect the temperature reading (McKenzie, 2001).

Temporal

This new kid on the block is what sparked us again to look at temperature-taking in our pediatric population. It seems to be a rather slick and fast method where you have a probe that you slide along the child's temporal region. This route poses no risk of injury, eliminates the need for disrobing and is suitable for all ages (Exergen, 2005). One study stated that the temporal artery method correctly reflects a rapid change in core temperature whereas the rectal temperature lags behind (Exergen, 2005). It is more accurate and easy to use than other routes and it works well because the temporal artery is directly connected to the heart through the carotid artery and is close to the skin (Exergen, 2005). It has also been stated that neither temporal nor axillary methods were sufficiently accurate to replace the rectal method (Hebbar, Fortenberry, Rogers, Merritt, & Easley, 2005; Leduc, & Woods, 2005).

Table One

	Pros	Cons
Rectal	- Accurate and definitive core temperature	- Must undress infant - If glass thermometer, then hazardous to the environment. If digital, then hard to keep clean between patients - Slow to change in relation to core temperature - Slow to register (1-3 min)
Axillary	- Non-invasive - Acceptable for all ages - Acceptable for routine screening of low-risk patients	- Difficult to maintain proper positioning for 5-6 minutes - Inaccurate core measurement - Influenced by environmental factors
Oral	- Acceptable correlation to rectal/core temperature - Acceptable for routine screening of low-risk patients	- Only good for the older child - Not accurate for hypothermic patient - Not appropriate for trauma patient
Tympanic	- Acceptable correlation to rectal/core temperature - Accurate with hypothermia - Takes only a few seconds - Acceptable for routine screening of low-risk patients	- Concerns with accuracy in the <2 year age - Proper positioning is needed for accuracy
Temporal	- No risk of injury and non-invasive - No need to disrobe	- Limited research re accuracy

Conclusion

See Table One. We believe that each individual must make a decision based on the cost and acceptability of risks for each method and tool. There simply is no perfect or right answer in this never-ending debate. The staff (nurses and physicians) must look at what works best for their population and take numerous factors into consideration. At the Alberta Children's Hospital, we still perform a rectal temperature on any child less than three months. We use the tympanic route for the rest of our population, and always consider all of the clinical findings and not just the temperature when evaluating our patients. It is only one vital sign and is rarely a stand-alone criterion for treatment of a patient. Until there is research proving that axillary, tympanic, oral or temporal methods can give us a definitive core temperature, we will continue to use rectal measurements in our less than three-month population.

References

Bailey, J, & Rose, P. (2001). Axillary and tympanic membrane temperature recording in the preterm neonate: A comparative study. **Journal of Advanced Nursing, 34**(4), 465-473.

Bernardo, L., Henker, R., & O'Connor, J. (1999, August). Temperature measurement in pediatric trauma patients: A comparison of thermometry & measurement route [Electronic Version]. **Journal of Emergency Nursing, 25**(4), 327-9.

Bolick, N., Denke, N., Garlesky, C., Williams, P., Woloshyn, K., Black, A., et al. (2004). **Emergency Nursing Pediatric Course Provider Manual** (3rd ed.), 189-190.

Cusson, R., Madonia, J., & Taekman, J. (1997). The effect of environment on body site temperatures in full-term neonates. **Nursing Research, 46**(4), 202-207.

Dollberg, S., Lahav, S., & Mimouni, F. (2001). Precision of a new thermometer for rapid rectal temperature measurement in neonates. **The American Journal of Perinatology, 18**(2), 103-105.

Eiland, L., & Berger, B. (2003, December 15). Pediatric OTC Medications Part III Fever. **US Pharmacist, 28:12**. Retrieved August 9, 2005, from http://www.uspharmacist.com/index.asp?show=article&page=8_1178.htm

Exergen. (2005). **Independent Assessment of Temporal Artery Thermometry**. Retrieved June 23, 2005, from http://www.exergen.com/medical/eductr/clinicallyproven.html

Haddock, B., Merrow, D., & Swanson, M. (1996). The falling grace of axillary temperatures. **Pediatric Nursing, 22**(2), 121-125.

Hebbar, K., Fortenberry, J., Rogers, K., Merritt, R., & Easley, K. (2005). Comparison of temporal artery thermometer to standard temperature measurements in pediatric ICU patients [Electronic version]. **Pediatric Critical Care Medicine**, **6**(5), 557.

Jirapaet, V., & Jirapaet, K. (2002). Comparisons of tympanic membrane, abdominal skin, axillary, and rectal temperature measurements in term and preterm neonates. **Nursing and Health Sciences**, 1-8.

Leduc, Dr. D., & Woods, Dr. S. (2005). **Temperature Measurement in Pediatrics.** Canadian Paediatric Society Index to Position Statements, Ref. No CP00-01. Retrieved from http://www.cps.ca/english/statements/CP/cp00-01.htm

McKenzie, N. (2001). Infrared Ear Thermometry in Very Young Children Summary Review of Literature. **The Thermometry Page**. Retrieved June 23, 2005, from www.graduateresearch.com/thermometry/probetip.htm

Morley, C., Hewson, P., Thorton, A., & Cole, T. (1992). Axillary and rectal temperature measurements in infant. **Arch Dis Child, 67**(1), 122-125.

Payne, K. (2003). Body Temperature. **Health Guide A-Z**. Retrieved June 23, 2005, from http://www.mywebmd.com/hw/health_guide_atoz/hw198785.asp

Payne, K. (2003). Ear Thermometer. **Health Guide A-Z**. Retrieved June 23, 2005, from http://mywebmd.com/hw/health_guide_atoz/ux1013.asp

Payne, K. (2003). Liquid Crystal Thermometers. **Health Guide A-Z**. Retrieved June 23, 2005, from http://mywebmd.com/hw/health_guide_atoz/ux1014.asp?number=hw198785

Payne, K. (2003). Glass Thermometer. **Health Guide A-Z**. Retrieved June 23, 2005, from http://mywebmd.com/hw/health_guide_atoz/ux1011.asp?number=198785

Pray, W.S. (2002). Controversies Surrounding Fever. **US Pharmacist**. Retrieved June 23, 2005, from http://www.uspharmacist.com/oldformat.asp?url=newlook/files/Cons/ACF2FC8.cfm&pub_id=8&article_...

University of California. (2005). **The no Fear Guide to Children's Fevers**. Retrieved June 23, 2005, from http://www.ucihealth.com/News/UCI%20Health/peds.htm

Wong, D. (2001). **Wong's Essentials of Pediatric Nursing** (6th ed., pp. 762-764). St. Louis: Mosby Inc.

Cervical spine injuries: What emergency nurses need to know

By R.J. Aceron, RN, BScN, ENC (C), University of Alberta Hospital Emergency Department, Edmonton, Alberta

Frontline emergency personnel are often faced with the difficult task of managing cervical spine injuries. The potential outcomes involved with the improper handling of a patient with a cervical spine injury can be devastating. Canada has no readily available national emergency department statistics regarding cervical spine injuries (Bandiera et al., 2002). However, according to American statistics, it has been estimated that two to three per cent of all trauma patients suffer cervical spine trauma. Of those patients, between three and 25% suffer progression of injuries due to delays in diagnosis and improper manipulation in the emergency department (ED) (Banit, Grau, & Fisher, 2000). It can be surmised that the risks of developing or worsening a spinal cord injury are highly significant if cervical spine injuries (CSI) are not properly immobilized. The purpose of this article is to review what we know about dealing with CSIs and to explore possible solutions to the problem of immobilization of patients with suspected CSIs.

With the advent of improved emergency medical services (EMS), there has been a positive impact in the pre-hospital management of suspected CSIs (Banit et al., 2000). Blunt trauma patients are routinely placed in rigid spinal immobilization based often on mechanism of injury alone. A cervical collar is applied according to the accepted standard of treating a patient as if he or she has sustained a CSI until proven otherwise (Brooks, & Willet, 2001). Spinal immobilizations are performed based on the premise that this procedure will prevent or avoid exacerbation of spinal cord injury during the handling and transportation of field trauma patients. However, not all blunt trauma patients arrive at the ED in full spinal immobilization. It may be because EMS feels that the patient does not require full immobilization, or the patient arrives at the department via private vehicle. It now becomes the clinical judgment of the triage nurse to decide whether the patient warrants full spinal precautions or the application of a rigid cervical collar. Given the consequences of failing to immobilize a patient with a CSI, in most instances, health care professionals tend to err on the side of excess caution (Hoffman, 2001). However, placing all blunt trauma patients, no matter how minor, in spinal immobilization may place them in unnecessary discomfort and at risk for potential complications such as skin damage and respiratory compromise.

Currently, the literature supports the use of specific clinical criteria that allow emergency physicians to clear patients of CSIs without a radiograph (Domeier et al., 2002; Bandiera et al., 2002). Development of specific spinal immobilization protocols would definitely benefit EMS professionals and emergency nurses. These protocols could invariably avoid the time, discomfort, and medical costs associated with unnecessary spinal immobilizations.

Pathophysiology

There are many different types of cervical fractures. These fractures have been given unusual names according to their anatomical location. Upon presentation to the emergency department, patients with these fractures may or may not present with neurological deficits depending upon severity of the fracture and impingement on the spinal cord. Table One provides a brief listing of the fractures and main clinical findings.

Cervical spine injuries located at spine level C1 include the Jefferson fracture and Atlantoaxial subluxation (Blenkinsopp, Carter-Snell, & McLellan, 2002; Graber, & Kathol, 1999). The Jefferson fracture is considered to be a moderately unstable fracture. The C1 ring bursts due to axial load or vertebral compression. Atlantoaxial subluxation is considered highly unstable. This fracture mainly occurs in patients with a history of Down's Syndrome, rheumatoid arthritis and other destructive processes.

Cervical injuries common to spine level C2 are the odontoid fracture and the Hangman's fracture (Graber, & Kathol, 1999; Blenkinsopp, Carter-Snell, & McLellan, 2002). The odontoid fracture is a highly unstable fracture. Its occurrence is poorly understood, as the mechanism of injury remains vague. The Hangman's fracture is also considered a highly unstable fracture. This is a bilateral fracture through the C2 pedicles. It occurs with sudden deceleration (hanging) and hyperextension (motor vehicle collisions).

Flexion teardrop fractures, bilateral facet dislocation and unilateral facet dislocations can occur at any level of the cervical spine (Graber, & Kathol, 1999; Blenkinsopp et al., 2002). Flexion teardrop fractures occur when the large triangular segment is displaced from the anterior vertebral body. This is a highly unstable fracture and is due to sudden forceful flexion. Bilateral facet dislocations are highly unstable fractures due to flexion or combined flexion/rotation. This occurs when one or more cervical vertebrae are anteriorly displaced by 50% or more. Unilateral facet dislocations are unstable fractures that result from flexion or combined flexion and/or rotation of the cervical spine. The cervical vertebral body is anteriorly dislocated 25% to 33% over another.

Another very common fracture is the Clay Shoveler's fracture (Graber, & Kathol, 1999; Blenkinsopp et al., 2002). It is considered to be a very stable fracture and it occurs as result of flexion, such as when picking up and throwing heavy loads. It is an avulsion of the posterior aspect of the spinous process and can occur anywhere in the lower cervical or upper thoracic spine.

There is a special syndrome unique to children known as spinal cord injury without radiographic abnormality (SCIWORA). SCIWORA syndrome occurs when the elastic ligaments of a child's neck stretch during trauma resulting in neuronal injury or, in some cases, leading to complete severing of the cord (Graber, & Kathol, 1999; Blenkinsopp et al., 2002). This syndrome may account for up to 70% of spinal cord injuries in children and is most common in children under eight (Graber, & Kathol), patients may present with paralysis. However, up to 30% of patients have a delayed onset of neurological symptoms, which may or may not occur until up to four or five days after the injury. In most cases, children with SCIWORA have a full and complete recovery, especially if the onset is delayed.

Initial evaluation

The initial basic assumption in evaluating a patient with blunt trauma injury is that they have a cervical spine injury until proven otherwise (Banit et al., 2000; Domeier et al., 2002; Brooks, & Willet, 2001). CSI evaluation criteria include physical examination, mechanism of injury and patient history. However, these criteria apply only to adults without mental status changes, such as drug or alcohol intoxication, and no distracting injuries present.

In the pre-hospital setting, management of a patient with suspected CSI involves placing the patient in a rigid cervical collar and strapping the patient to a hard spinal board (Figure One). In the hospital setting, blunt trauma patients presenting to the triage desk are routinely fitted in a rigid cervical collar and placed on a stretcher lying flat. The primary goal of cervical spine immobilization is to achieve as normal anatomic alignment as possible, thus allowing for natural healing to occur (Webber-Jones, Thomas, & Bordeaux Jr., 2002). The next step is to "clear" the cervical spine through physical examination, radiographs, computed tomography (CT) and magnetic resonance imaging (MRI). The term "cleared cervical spine" means that the patient is clear of any cervical injury (Clancy as cited in Webber-Jones).

Figure One.

Nursing implications

In the United States alone, spine immobilization of trauma patients is one of the most frequently performed pre-hospital procedures with an estimated 1.9 to 2.4 million immobilizations performed yearly (Domeier et al., 2002). Due to the high number of immobilized patients coming through the ED doors, emergency nurses must be aware of the implications related to care of these patients. Improper handling and poor assessment skills can lead to devastating and irreversible injury to these patients.

Even though the majority of blunt trauma patients arrive at the emergency department via EMS in cervical spine immobilization, there is a small number of blunt trauma patients who arrive by private vehicle. Triage nurses must be able to act and use their best clinical judgment to decide whether to place a patient in full cervical spine immobilization. The nurse must weigh the complications of cervical spine immobilization against the consequences of not immobilizing a patient who has a CSI. Immobilizing patients can lead to development of pressure sores, respiratory compromise and pulmonary and deep vein complications (Domeier et al., 2002; Webber-Jones et al., 2002). Other negative aspects of immobilization include patient discomfort and undergoing unnecessary radiological evaluation. Conversely, neglecting to immobilize a patient with a CSI can lead to irreversible injury and possibly death.

The rigid cervical collar has been the mainstay of successful management of CSIs. However, there has been a false sense of security in terms of totally preventing additional and further spinal compromise and damage. Cervical collars restrict between 30% and 83% of neck motion when properly fitted (Askins, as cited in Webber-Jones et al., 2002) and they do not restrict axial loading. Other complications of the cervical collar include: skin damage, respiratory compromise, marginal mandibular nerve palsy with long-term sensory compromise, a potential increase in intra-cranial pressure, possible delayed extubation or difficulty weaning from the ventilator and potential exposure to blood-borne diseases (Webber-Jones et al., 2002).

Cervical spine clearance issues

Clearance of cervical spine injury in a blunt trauma patient should occur in a safe and timely manner. The sooner a patient is removed from cervical spine immobilization, the risk of complications decreases. However, logrolling of the patient can exhaust resources and can be dangerous if trained staff is not utilized. The presence of a hard collar has also been implicated in raising jugular venous pressure and reducing cerebral perfusion pressure and enforces a recumbent or semi-recumbent posture (Brooks, & Willet, 2001). Brooks and Willet concluded that failure to obtain early clearance of the

spine in patients with multiple injuries might be associated with significant morbidity secondary to prolonged immobilization.

Current studies have also supported the potential for clearance of cervical spinal injury by the emergency nurse by using set clinical criteria, such as the Canadian C-Spine Rule and the NEXUS Criteria (Bradshaw, Kelly, & Kerr, 2004; Charters, 2004; Sedlak, 2004). It was found that nurses with additional training in assessment of midline tenderness and range of motion could reliably apply the Canadian C-Spine Rule to effectively rule out cervical spine injury (Bradshaw et al., 2004). This practice would decrease prolonged immobilization of patients and identify those who do not require cervical spine immobilization.

Conclusion

Although the incidence of CSIs in blunt trauma patients is very low, the consequences of improper management of CSIs can have overwhelming consequences. The current trend is to reduce the number of cervical spine immobilizations while not compromising patient safety and care. For the near future, there will be no clear or absolute protocol that will determine which patients do and do not require cervical spine immobilization. Further investigation and research is needed in the area of CSIs but, due to patient safety concerns and ethical limitations, conclusive evidence may not be attainable. Health care professionals who are practising in the hospital or pre-hospital setting must adhere to current institutional and organizational protocols and utilize good clinical judgment when treating blunt trauma patients with suspected CSIs. As a result of the lack of consensus regarding definitive guidelines of suspected CSIs, emergency nurses must remain patient advocates and ensure their patients receive safe, quality and timely care.

Author's note: Website for Canadian C-Spine Rule (and other Canadian "rules" for patient diagnosis and management): http://www.ohri.ca/programs/clinical_epidemiology/OHDEC/clinical.asp

Table One: Cervical fractures

(from ACCN 4453 Emergency Nursing: Care of the Acutely Ill & Injured)

Name	Findings
Jefferson's Fracture	- bursting of the C1 ring with vertical compression - seen with open-mouth odontoid view
Hangman's	- bilateral fracture through C2 pedicles - associated with hyperextension in an MVC
Flexion Teardrop Fracture	- large triangular segment displaced from the anterior vertebral body - extensive anterior and posterior ligament damage and cord injury
Burst Fracture	- vertical compression injury that forces pieces of vertebral body into posterior spinal canal (related to flexion teardrop)
Extension Teardrop Fracture	- as for flexion teardrop but mechanism is extension
Clay (Coal) Shoveler's Fracture	- avulsion of C6, C7 or T1 with flexion or direct blows to spinous process
Bilateral interfacetal dislocation	- unstable flexion injury with an anterior displacement of 50% or more of vertebral body on the one below it
Unilateral facet dislocation	- combined flexion/rotation injury, potentially unstable dependent upon ligamentous disruption - anterior dislocation on lateral x-ray of 25% to 33% of one vertebra over another

Acknowledgement

Thank you to Margaret Dymond for enduring C-spine immobilization for the photo!

For further information, Ray can be reached at e-mail: **raceron@telusplanet.net**

References

Bandiera, G., Brison, R., Clement, C., Cass, D., Eisenhauer, M., Laupacis, A., et al. (2002). Canadian c-spine rule study for alert and stable trauma patients: I. Background and rationale. **Canadian Journal of Emergency Medicine, 4**(2).

Banit, D.M., Grau, G., & Fisher, J.R. (2000). Evaluation of the acute cervical spine: A management algorithm. **The Journal of Trauma, Injury, Infection, and Critical Care, 49**(3), 450-456.

Blenkinsopp, J., Carter-Snell, C., & McLellan, H. (2002). **ACCN 4453 emergency nursing: Care of the acutely ill and injured part a**. Calgary, AB: Mount Royal College.

Bradshaw, L., Kelly, A., & Kerr, D. (2004). Can nurses apply the Canadian c-spine rule? A pilot study. **Canadian Journal of Emergency Medicine, 6**(3), 161-164.

Brooks, A.R., & Willet, K.M. (2001). Evaluation of the Oxford protocol for total spinal clearance in the unconscious trauma patient. **The Journal of Trauma, Injury, Infection, and Critical Care, 50**(5), 862-867.

Charters, A. (2004). Can nurses, working in the emergency department, independently clear cervical spines? A review of the literature. **Accident and Emergency Nursing, 12**(1), 19-23.

Domeier, R.M., Evans, R.W., Fales, W., Frederiksen, S.M., Hancock, B.J., Krohmer, J., et al. (2002). Multicenter prospective validation of pre-hospital clinical spinal clearance criteria. **The Journal of Trauma, Injury, Infection, and Critical Care, 53**(4), 744-750.

Graber, M. A. & Kathol, M. (1999). Cervical spine radiographs in the trauma patient. American Family Physician, 59, (2), 331-342.

Hoffman, J.R., & Mower, W.R. (2001). Out-of-hospital cervical spine immobilization: Making policy in the absence of definitive information. **Annals of Emergency Medicine, 37**(6), 632-634.

Sedlak, K. (2004). Nurses and cervical spine immobilization. **Journal of Emergency Nursing, 30**(2), 165-6.

Webber-Jones, J.E., Thomas, C.A., & Bordeaux Jr., R.E. (2002). The management and prevention of rigid cervical collar complications. **Orthopaedic Nursing, 21**(4), 19-25.

Nurses' guide to ordering x-rays

By Lori Vollmerhaus, RN, BScN, and
Shannon Wilson, RN, BN, Clinical Nurse Educators,
Alberta Children's Hospital Emergency

Emergency departments across Canada have been faced with many challenges including long patient wait times, inefficient patient flow through the department and decreased patient satisfaction. By ordering x-rays prior to the physician assessment, emergency nurses can help streamline the emergency visit of a patient and expedite care. The physician can view the x-ray prior to seeing the patient and start appropriate treatment or discharge on their first interaction with the patient, thus reducing the interactions by at least one episode (Fry, 2001; Seaberg, & MacLeod, 1998; Tambimuttu, Hawley, & Marshall, 2002). In 1990, the Alberta Children's Hospital Emergency Department (ACH ED) developed a "Nurses Guide for Ordering X-rays" to assist triage nurses to address some of these issues. The decision to have only triage nurses order x-rays was supported by the available literature. However, in 2001, the ACH ED made the decision to train all staff nurses to order x-rays to alleviate demands

Table One: Lower leg fractures

	Mechanism of injury	Diagnostic findings	X-ray ordered
Tib/Fib Fractures	Direct blow, indirect stress, twisting or compression to the bone	**Point tenderness**, swelling, and impaired weight bearing	Yes
		Deformity	No

Table Two: Ankle and foot injuries

	Mechanism of injury	Diagnostic findings	RN ordered x-ray
Ankle Sprain	Twisting of foot: Inversion - turn inward by rolling the ankle Eversion - turn outward by rolling the ankle	- Local swelling, discoloration and general tenderness with impaired weight-bearing	No
		- General tenderness anterior and inferior to the lateral malleolus (inversion injury)	No
		- General tenderness anterior and inferior to the lateral malleolus (eversion injury	No
Ankle Fractures	Inversion or eversion injury	- Swelling, ecchymosis, **point tenderness** over medial of lateral malleolus - Pain when foot is directed toward tibial surface (flexion)	Yes
Calcaneal Fracture	Fall from a height on extended legs	- Local swelling, **point tenderness** to heal area, impaired weight-bearing ecchymosis on posterior sole of foot	Yes
		- May have associated #s (i.e., lumbar spine or wrist fractures)	No
Metatarsal Fractures	Base of fifth metatarsal is fractured as a result of inversion Fractures of metatarsal shaft usually result of crush injury Hairline stress fractures at base of metatarsal after jogging, hiking or jumping	- Local swelling and **point tenderness** with impaired weight-bearing	Yes

on triage, increase staff competence, confidence and satisfaction and to further address the issue of streamlining patient flow through the department (Lindley-Jones, 2000, & Finlayson, 2002).

At the ACH ED, the two requirements an RN must fulfil prior to ordering x-rays are to review the "Nurse's Guide for Ordering X-rays" module and to demonstrate comprehension by discussing three actual patient scenarios with an instructor or clinician verifying the accuracy of their assessment. After meeting these criteria, nurses are certified to order an x-ray following completion of their assessment.

According to our guidelines, emergency department staff nurses may order x-rays to conduct a foreign body search, and for a below-elbow, below-knee or clavicular injury (see tables on pages 21-22). The rationale for ordering only these particular x-rays is based on the literature, and because these presentations are typically treated easily in a non-urgent manner (Fry, 2001). The exceptions to this include patients

Table Three: Upper extremities

	Mechanism of injury	Diagnostic findings	RN ordered x-ray
Clavicular fracture	Fall or blow to the shoulder or extended arm	- **Point tenderness** and possible deformity at point of fracture	Yes
		- Pain on movement of affected arm or shoulder	Yes
Radial head dislocation or subluxation (pulled elbow)	Sudden longitudinal pull on forearm while arm is pronated Reported in children less than six months after rolling over	- Arm is in passive pronation, child won't move arm	No
		- Resistance to pain with full supination	No
		- General tenderness over elbow area	No
		- Child complains of pain at wrist	No
Radial head fracture	Fall on outstretched arm (FOOSH)	- **Point tenderness** over radial head	Yes
Distal 1/3 radius and ulna Fracture	Fall on palm of hand or blow to forearm	- Swelling and **point tenderness** over fracture site	Yes

Table Four: Hand and wrist injuries

	Mechanism of injury	Diagnostic findings	RN ordered x-ray
Scaphoid (Navicular)	Fall on outstretched hand (FOOSH)	- **Point tenderness** over the anatomic snuffbox (when the thumb is abducted and extended, a triangular depression is formed on the back of the wrist at the radial border between the three tendons of the thumb. This is the anatomic snuffbox.)	Yes
Metacarpal bone fracture	Due to blow to hand or crush injury	- Decreased grip strength	Yes
		- Swelling and **point tenderness**	Yes
		- Deformity with displacement	No
Phalangeal Fracture	Direct blow to tip of finger	- Swelling and **point tenderness** of phalanx	Yes
		- Deformity with or without displacement	No
Finger Dislocation	Blow to tip of finger	- **Point tenderness** at joint - Swelling and inability to flex finger	Yes
		- Obvious deformity	No

with an obvious deformity, patients requiring IV analgesia, compromised patients who need to see the physician immediately, or if the nurse is uncertain whether the injury requires an x-ray, e.g., soft tissue injury (STI). Also exempt is a foreign body search with any airway compromise or if the object may not be detectable on x-ray (e.g., plastic object).

A foreign body search can be ordered if the patient has a history of ingesting a foreign body. The assessment and documentation should include:

- Airway patency
- Breathing/chest assess
- History
- Drooling and ability to swallow

In the case of an orthopedic injury, the assessment and documentation should include:

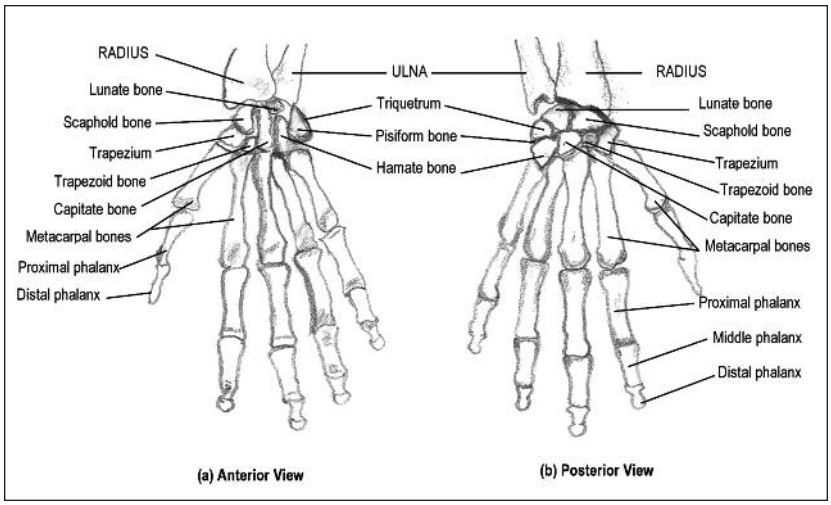
- Location of injury
- Deformity
- Colour of affected limb
- Sensation
- Pulses/circulation
- Movement
- Temperature
- Pain – noting in particular any point tenderness
- Mechanism of injury
- Weight-bearing

(Molczan, 2001).

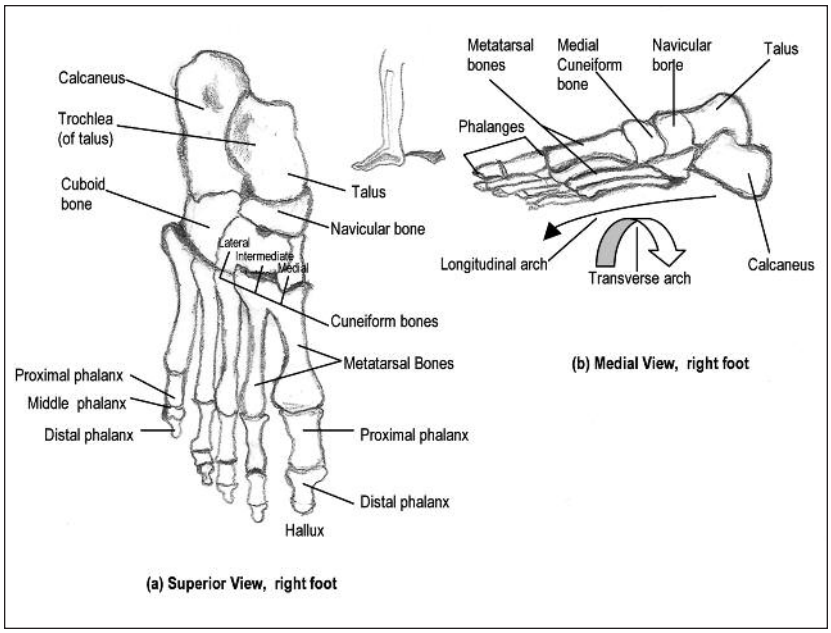
The patient must have point tenderness to confirm the exact location and have no neurovascular deficits for a qualified nurse to order an x-ray.

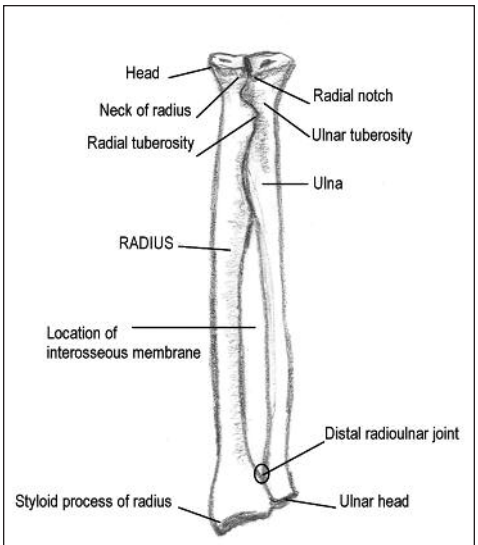
Some of the more common orthopedic injuries that we see and their typical presentations are described in the charts on

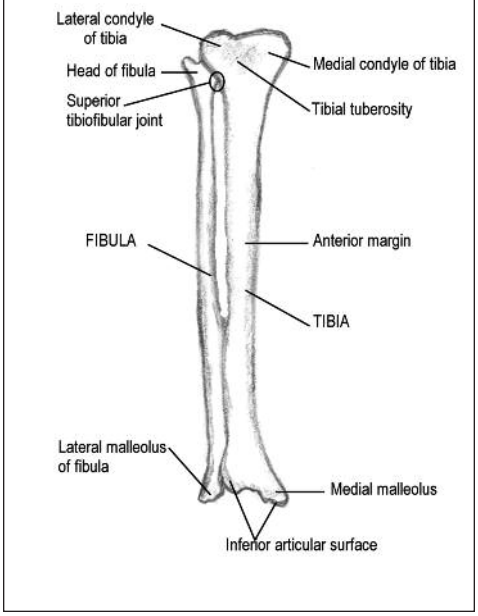
Illustrations



Hand







pages 21 and 22. The history and physical assessment of the patient is necessary for the nurse to make an informed decision about whether or not the patient requires an x-ray (Tham Kwee Ching, Leong Yin Leng, & Ngain Bang, 1999; Lindley-Jones, & Finlayson, 2000; Grossman, & Diekman, 1990).

Ordering x-rays for the more common minor injuries is well within an emergency nurse's scope of practice. If nurses are ordering x-rays, a guide should be developed to educate and guide the practice (Tham Kwee Ching, Leong Yin Leng, & Ngain Bang, 1999). This will avoid unnecessary x-rays and potential harm to a more severely injured child. As reflected in the literature, the Alberta Children's Hospital Emergency Department has had great success with improving patient flow in the department as well as improving the quality of service (Lindley-Jones, & Finlayson, 2000). Furthermore, patients and their parents/caregivers have expressed extreme satisfaction with our practices to streamline care and help to decrease the congestion so common in emergency departments today.

Acknowledgements

(Special thanks to Marguerite Butler who developed the first guide to ordering x-rays at ACH ED.) Illustrations by Dawn Reid, Administrative Assistant to the Nursing Education Team, Alberta Children's Hospital.

References

Fry, M. (2001). Triage nurses order x-rays for patients with isolated distal limb injuries: A 12-month ED study. **Journal of Emergency Nursing, 27**(1), 17-22.

Grossman, M., & Diekman, R. (1990). **Pediatric Emergency Medicine** (pp. 288-299). Philadelphia: J.B. Lippincott.

Lindley-Jones, M., & Finlayson, B.J. (2000). Triage nurse requested x rays – Are they worthwhile? **Journal of Accident and Emergency Medicine, 17**, 103-107.

Lindley-Jones, M., & Finlayson, B.J. (2000). Triage nurse requested x rays – The results of a national survey. **Journal of Accident and Emergency Medicine, 17**, 108-110.

Molczan, K. (2001). Triaging pediatric orthopedic injuries. **Journal of Emergency Nursing, 27**(3), 297-318.

Seaberg, D.C., & MacLeod, B.A. (1998). Correlation between triage nurse and physician ordering of ED tests. **American Journal of Emergency Medicine, 16**(1), 8-11.

Tambimuttu, J., Hawley, R., & Marshall, A. (2002). Nurse-initiated x-ray of isolated limb fractures in the emergency department: Research outcomes and future directions. **Australian Critical Care, 15**(3), 119-122.

Tham Kwee Ching, L., Leong Yin Leng, E., & Ngain Bang, S. (1999). Competency and its effects on patients' total time spent in the accident and emergency department. **Singapore Nursing Journal, 26**(3), 22-26.

Outlook

Conference watch

NENA National Conference – May 4-6, 2006 - Ottawa, Ontario

"Stayin' Alive"

"Stayin'Alive" will be held in Ottawa, Ontario on May 4-6, 2006 at the Westin Hotel.
For further information e-mail:
stayinalive2006@ottawahospital.on.ca

Celebrate Emergency Nurses Week – October 9-15

Emergency Nurses – Everyday Heroes:
each and every day

Flight towards forensics: One nurse's journey

By Christine Cornies, RN, Emergency Nurse,
Burnaby General Hospital, Burnaby, B.C.

From the Section Editor Sheila Early:
This article was written as a discussion paper for the Forensic Nursing course offered at British Columbia Institute of Technology in July 2004.

Introduction

Forensic nursing in Canada is an evolving and exciting realm, with opportunity especially for ER, OR, psychiatric nurses and even paramedics. I was fortunate enough to hear the "pioneer" of forensic nursing from the U.S., Virginia Lynch, speak and I became enthralled with the idea of forensic nursing. It will be interesting to see how the role and scope of practice of the forensic nurse emerges and how nursing schools incorporate this aspect of health care. I hope to be a part of this unfolding in some small way- Christine Cornies

The purpose of this article is to review the evolution of my personal experience and increased awareness of forensic nursing issues, while participating in the Forensic Nursing 8103 course at British Columbia Institute of Technology, in July of 2004. My objective is to express the profound impact this experience has had upon me, personally, and the significant transformation it will have professionally within my practice as an emergency registered nurse. This article will consist of ideas and thoughts previously held and how they underwent a metamorphosis with the application of new concepts learned throughout the various segments of course content and literature research.

I had a very vague sense of what forensic nursing entailed. My belief was that forensics or forensic science was simply the collection of various types of evidence and the processing of that evidence. I was at a loss while discussing my enrolment in the forensic nursing program, when my peers inquired, "What will that get you?" or "How will that help you?" Where do forensic nurses study? How do they expand and enhance their skill set?

The first task was to define forensics. According to **Webster's New World Dictionary** "forensics is characteristic 1. of, or suitable for a law court, public debate, or formal argumentation, 2. specializing in or having to do with the application of scientific, medical knowledge to legal matters, as in the investigation of crime." Therefore, it leads me to understand that forensic nursing applies the principles of nursing to legal matters or issues. The International Association of Forensic Nurses (IAFN, 1997) states, "Forensic nursing is the application of nursing science to public or legal proceedings: the application of the forensic aspects of health care, combined with the bio-psycho-social education of the registered nurse in scientific investigation and treatment of trauma and/or death of victims and perpetrators of abuse, violence, criminal activity and traumatic accidents."

It became clear to me how crucial the role of an emergency nurse is, routinely assessing and caring for victims, perpetrators, families and companions. Who are these "living forensics" patients? They are victims of violent crime. They are victims of sexual assault, domestic violence, the abused, trauma patients, motor vehicle and pedestrian incidents, suicide attempts, workplace injuries, medical misadventure, supervised care and custody, food and drug tampering, environmental hazards, substance abuse and so much more (Lynch, 2001, p. 10). I was completely unaware of the vast group of clientele in this forensic realm for which we, as nurses, advocate.

In the emergency setting, we see a wide variety of these patients. In the Fraser North Health Authority jurisdiction, there were 5,887 offences of violent crime (all ages) in 2002. There were 338 youths charged within this jurisdiction in 2002. These violent crime statistics include homicide, attempted murder, sexual and non-sexual assault, robbery and abduction. Also in this authority, there were 365 sexual crime offences, keeping in mind a large percentage of offences go unreported, and 1,004 total offenders of spousal assault. We, as ER nurses, deal with the physical and emotional aftermath of these incidents.

Societal violence is prevalent. A new awareness can allow us to be proactive in preventing further child, elder and spousal abuse. We can help improve our community while assisting law enforcement to 'catch the bad guys', and lawyers to protect victims and prosecute perpetrators. We do this by applying the age-old nursing process to the newly acquired forensic concepts: highly detailed documentation, modes of evidence collection, photographing wounds, awareness and detection of various drug-induced behaviour and physical symptomology and court testimony skills, among many other ways. We, as ER nurses, can impact care of our patients and their families. I have not been this excited about nursing in years! Without this specialized body of knowledge, there is a potential to destroy evidence and, therefore, inadvertently allow a perpetrator to go free. All emergency nurses can augment their practice by learning to first "be aware" and "recognize" forensic cases, "collect" and "save evidence" and maintain the chain of custody, (i.e., "know what to do with it") (personal communication July 5, 2004). I now know

what this "chain of custody" is, and how to commence and maintain it to the best of my ability so that control and credibility of the evidence is optimal (Evans, Stagner, & Rooms, 2003).

Reflecting on my emergency practice of the last 10 years, I am able to recall instances where, perhaps, knowing more about forensics at the time, I could have done a better job. I have cut off clothes of victims of violent crime. I have thrown clothing in the garbage or on the floor in some instances. Clothes are to be placed separately in paper bags then documented. If they are damp, they must be dried or it should be communicated to the receiving authority that the contents are moist. Clothing can contain trace evidence, gunshot residue, body fluids for potential DNA testing and defects that can be used to compare wounds and weapons (Lynch, 1995).

I have documented the term laceration when the actual wound was an incised wound on a victim of violent crime. Every nurse in our emergency department has done this. We do not all know the difference between lacerations and incised wounds. Lacerations are "tears in the skin, usually ragged and abraded with bridging in the wound base". Incised wounds have "clean-cut straight edges with no abrasions or contusions" (Lynch, 2001, pp. 39-40). I read of an instance in which a nurse testified in a court of law that the patient sustained several lacerations. The defence attorney requested the judge to dismiss the charge, as his client was carrying a knife (not a bat or club) and, therefore, could not have caused a laceration (Pyrek, 2004).

I may have been more "careful" dealing with the walk-in gunshot wound; the removal of his clothing and the handling of the bullet that fell from his clothing. Bullets are to be removed with gloves or rubber-tipped forceps, wrapped in cotton and placed in an evidence envelope (Evans, Stagner, & Rooms, 2003). Ensure that the item has been labelled with name, hospital number, date and time, specimen description and the location of specimen (Carrigan, Collington, & Tyndall, 2000). It may then be placed in a locked drop box available for evidence storage at some facilities, or may be given directly to the law enforcement officer. I understand now why the police officer who responded to the "walk in" gunshot wound was dissatisfied with the sequence of events. My concern was for my patient's safety and the treatment of his non-life threatening injury, which was difficult to determine while he was fully dressed. The police officer did express displeasure, thinking I had removed the bullet from the man's body, although it had fallen onto the stretcher when I removed the man's clothing. I have a better understanding now, and should I be faced with a similar situation, I will know how to collect, store, label and document the item properly, thus working with law enforcement, not unknowingly against them.

It is important to remember the "Locard exchange theory", knowing when two objects contact there will be exchange of material (Wyatt, 2000, p. 9). We can minimize some of the complexity of the investigator's job if we know what to touch and what not to touch. Obviously, as an emergency nurse, our first responsibility is to ensure life-saving measures are taken, with evidence collection being of secondary priority. Taking note of debris or fluids on clothing, not sticking scissors into holes in your trauma patients' clothing that could be caused by a knife or gunshot, swabbing bite marks, and placing clothing on a clean sheet for further inspection are just some simple ways of preserving evidence in the ER.

I am amazed by the types of objects that can be collected for DNA testing. Not only the common biological specimens such as blood, semen, saliva and sweat, but contact lenses, condoms, a fingernail and old bones may be utilized. Trace evidence like glass, paint, assorted fibres and soil may also be collected. All of these can be used to associate or exclude victims to scenes and suspects (Owen, 2000, pp. 174-180).

There are a variety of experts who work together in the processing of forensic details and evidence. During my literature research and during class lectures, I became aware of the highly specialized team required to interlace a forensic science case together. There are toxicologists who test body specimens for drugs (personal communication, July 18, 2004). Microbiologists examine tissue and blood, semen and vaginal fluid (personal communication, July 6, 2004). There are trace analysts, firearms and tool-mark examiners, fingerprint experts and detectives who interview. Chemists analyze vitreous humour for electrolytes and glucose, which can aid in determining time of death (Johnson, 2003). The forensic odontologist compares dental records to skeletal remains or unidentified bodies of victims. Forensic anthropologists study human body anatomy, especially bones, to determine sex, age, stature, ethnicity and general physical condition (Erzinclioglu, 2001, p. 92). They may "note injury to bones which may suggest a violent death" (Johnson, 2003). The forensic pathologist's main role is to determine the cause and manner of death and approximate time of death by applying medical science to knowledge of disease processes (Johnson, 2003).

One expert we cannot forget to include is the ever-evolving "forensic nurse". IAFN past-president Patricia Speck "uses the acronym WHEEL to depict what forensic nursing is: wounding, healing, ethics, evidence, and legal" (Lavoie-Vaughn, & Cantrell, 2003). There is a host of opportunities for operating room, emergency and psychiatric nurses to perform forensic nursing. With specialized training, one can become a sexual assault nurse examiner (SANE) or response team member (SART) to provide victim examination, evidence collection, emotional support and referral and court testimony. There are nurse coroners, nurse investigators, forensic correctional/institutional nurses, legal nurse consultants and clinical nurse specialists (Lavoie-Vaughn, & Cantrell, 2003).

Looking for educational resources for forensic nursing, I determined this is a relatively new frontier. Of course, BCIT (British Columbia Institute of Technology) has the new arrival of Forensic Nursing 8103 course and there is development in situ of an advanced program on the horizon (personal communication, July 8, 2004). There is a variety of online educational opportunities, a few general nursing forensic courses and master graduate/undergraduate levels available in the United States. Kepplestone, Scotland, has an undergraduate forensic nursing program. In Canada, my internet search revealed only an internet nursing course, "Focus on Forensics – An introduction to Health

Care", and classroom-based "Nursing and Healthcare in the Forensic Population" offered at University of Calgary. Forensic studies nonspecific to nursing are offered at Mount Royal College in Calgary. "Forensic nursing in a Secure Environment" via distance education is provided through University of Saskatchewan. The most noted and more readily available programs with actual credentials are the SANE programs. There are approximately 40 programs available throughout Canada.

As an emergency nurse, I deal with violence, abuse, death and dying on a regular basis, and personally as part of society. What I have discovered is while partaking in this course, I now know more and there is more to know! It has revealed much more than I would have expected and changed the way I read the newspaper, watch television, converse with peers and look at my patients. It is clear that all frontline health care providers can benefit from this informative program for best practice and legal issues. As nurses, part of our historical role is teaching and prevention. If we can devise policies and protocols to deal efficiently with victims and perpetrators of violence and abuse, perhaps we can prevent further injuries, exposures or death in the future. We can help stop the cycle of violence. We can help law enforcement provide evidence so victims, suspects or perpetrators receive their justice.

At the end of the day, we must look after ourselves. Under the armour of my uniform is a mother, a wife, a daughter, a sister, an aunty and a member of society. As health care professionals, we are at risk for vicarious trauma, having recurrent exposure to often grim realities of the ER department. "We are expected to handle the emotional and physical demands of traumatic events without developing serious emotional problems" ourselves (Harbert, 2002). The last thing society needs is the loss of caregivers who become too scarred to care anymore.

References

Carrigan, M., Collington, P., & Tyndall, J. (2000). Forensic perioperative nurses – Advocates for justice [Electronic version]. **Canadian Operating Room Nursing Journals, 18**(4), 12-16.

Erzinclioglu, Z. (2001). **Every Contact Leaves A Trace**. London, UK: Carlton Books Ltd.

Evans, M., Stagner, P., & Rooms, R. (2003.). Maintaining the chain of custody: Evidence handling in forensic cases [Electronic version]. **AORN Journal, 79**(3), 563-9.

Harbert, K. (2002, Jan.). **Acute traumatic stress: Helping patients regain control – Board Review**. Retrieved July 13, 2004, from http://findarticles.com/p/articles/mi_m0BUY/is_1_12 8k-17

International Association of Forensic Nurses. (1997).

Johnson, D. (2003, Aug.). Forensic pathology: Separating fact from fiction – Clinical issues. **Medical Laboratory Observer.** Retrieved July 15, 2004, from http://www.findarticles.com/p/articles/mi_m3230/is_8_35/ai_107218216

Lavoie-Vaughn, N., & Cantrell, M. (2003). **Forensic nursing: Defending justice for all nursing spectrum**. Retrieved July 14, 2004, from http://communitynursingspectrum.com/magazinearticles/article.cfm? AID=10368

Lynch, V. (1995). Clinical forensic nursing – A new perspective in the management of crime victims from trauma to trial. **Critical Care Nursing Clinics of North America, 7**(3), 489-507.

Lynch, V. (2001). **Clinical forensic nursing – A new perspective in trauma and medicolegal investigation of death** (5th ed.). Colorado: Collins.

Owen, D. (2000). **Hidden evidence: Forty true crimes and how forensic science helped solve them**. Westport, CT: Firefly Books, Ltd.

Pyrek, K. (2004). Forensic Nursing Pioneers Ponder the Future. **Forensic Nurse Magazine**. Retrieved July 14, 2004, from http://www.forensicnursemag.com/articles/3blcover.html

Wyatt, S., & the Justice Institute of British Columbia. (2000). **Forensic DNA Evidence Investigation Procedures for Law Enforcement.** Victoria, B.C.: The Ministry of Advanced Education, Training, & Technology and the Centre for Curriculum, Transfer and Technology.

All statistics quoted are from the following sources:

- Fraser Health Statistics. Victims Crime-all ages/Youths Prepared by Integrated Analysis & Evaluation, Dec. 2003
- Fraser Health Statistics. Violent (Person) Crime all Ages/Youths Police Services Division, B.C. Ministry of Public Safety and Solicitor General
- Fraser Health Statistics Sexual Crime-all ages/Youths Prepared by Integrated Analysis & Evaluation, Dec. 2003
- Fraser Health Statistics. Crime Statistics-Sexual-all Ages/Youths Police Services Division, B.C. Ministry of Public Safety and Solicitor General
- Fraser Health Statistics. Crime Statistics-Spousal Assault Police Services Division, B.C. Ministry of Public Safety and Solicitor General

Outlook Bouquets

To the national conference planning committee from B.C. What a terrific job! The speakers were great and the topics were relevant. The weather was beautiful as was the scenery. The social events were fabulous. Congratulations on a wonderful conference. You have set the bar high for the rest of us!

Good-bye and thanks to our departing directors, Joanne Collins (Newfoundland and Labrador) and Allison Duncan (New Brunswick). On behalf of the executive and the board of directors, I thank you for your dedication and your energy. I thank you for all of your hard work while members of the board. On behalf of everyone, I wish you well in your future endeavours and all the best!

Welcome to our newest members: Clavell Bolger who is returning as a director from Newfoundland and Labrador, and to Nicole Raike, director from New Brunswick.

"Bouquets" is dedicated to celebrating the achievements of NENA members. If you would like to send a bouquet to a NENA member, contact the communication officer, Valerie Eden, 34 Bow Street, Dartmouth, NS, B2Y 4P6 (H) 902 461-1897; (W) 902 465-8340; fax: 902 465-8435; e-mail: ***valeden@hfx.eastlink.ca****.*

Randomness in nursing research – who needs it?

By Cathy Carter-Snell, RN, MN, ENC(C), SANE-A

This article is one of a series in which we explore aspects of research interpretation that are relevant to emergency nurses. Here, we review the concepts of random selection and random assignment and their importance to nursing research designs. We look at the definitions of both and explore the major types of research designs. Implications for participating in research and interpreting research are suggested.

You are reading a research report about something in your practice and the authors discuss random selection techniques. In another article, they state they randomly assigned patients by entering every fourth patient into a group. Each researcher makes conclusions about how the concepts being studied caused the outcome. Is this reasonable? The next night you see a patient who meets the criteria for the latest stroke study, but you are too busy to call the research assistant. Will this be an issue for the researchers? In order to answer these questions, we need to explore the concepts of random selection and assignment. We then need to look at various types of research designs and their focus to decide if randomness is important to the study or properly conducted.

Random selection and assignment

Random is defined as "without an identifiable pattern, plan, system or connection" (Encarta, n.d.). Random selection is performed when identifying patients to participate in a study. Each patient who meets the research criteria has an equal probability of being selected for the study, but not all patients are chosen. Some researchers mistakenly assume that if they choose every second or every third patient, or only patients on every third day who comes in, that they are randomly selecting. In fact, there is a pattern to this as well and it is possible that events such as time of day, the staff that is on a similar rotation or other cycles could impact on the characteristics of the group. In order to be truly randomly selected, use of random numbers tables is recommended. These tables are found in the back of most statistics textbooks and a sample is shown in Table One.

In looking at the table, consider you wish to study patients who arrive with asthma in the emergency. Suppose you wanted 20 patients in the study and saw 60 patients in a week with asthma. We look at the table and see all numbers in the table are much larger than two digits. Instead, look at the first two digits of the first number, since the number 60 is only two digits. The first number is 46, so the 46th patient who came in with asthma would be part of the study. Then follow the column downward to identify the next number between one and 60 without using duplicates. The next number is 69 so would be ignored. Below that is 14 so we would take the 14th patient as well. This process continues until you have 20 patients. You can see this may cause some problems in emergency. We don't know how many patients will be coming into emergency with a particular condition on a given evening or even during the study period. We then have to gather data about how many patients we would anticipate during the study period and then pre-select and pre-assign the numbers from the random numbers table. Then, we need someone in the department to track what number each asthma patient would be to know when to approach someone about the study. This is labour-intensive and clinically not realistic.

You will know if non-random selection was used when you hear terms such as "convenience sample", "quota sample", "purposive sample" and "stratified sample". Convenience sampling or selection involves using all of the available people in a group until the desired number of participants is obtained. In our asthma example, it would mean the first 20 asthma patients in our emergency. This sample is unlikely to represent all asthma patients and, in fact, may have unusual numbers of some particular characteristic or symptom if from the same geographic area or unit. A convenience sample is the weakest form of selection, yet is the most commonly used method in nursing research and has the greatest potential for the greatest bias, especially if the population has very diverse characteristics (Polit & Hungler, 1995a). Quota sampling is identifying the proportions of a population you wish to have, such as 40% female and 60% male, to represent the population, and then taking all available people until the quota for that segment is met. This technique, while potentially encountering bias, does a somewhat better job than convenience sampling in trying to represent the population. Purposive sampling or selection relies on the researcher's judgment to select specific participants who are thought to be typical of the population. While there is some bias inherent in this method, it is useful for pre-testing instruments for a population. A form of this purposive sampling, known as theoretical sampling, is used in qualitative inquiries. You want to ensure you will encounter the concept of study and be able to explore it.

Like random selection, random assignment relies on ensuring there is no pattern. Random number generation can be used for assignment as well as to choose which patient numbers will go into each group. Other easy methods for random assignment are using a coin toss if there are only two groups or pulling names or patient numbers out of a hat for more than two groups. Although some may criticize this as not scientific, it relies on probabilities

Table One.
Random numbers table sample

468523	346775	749106
692489	453050	613183
140133	597476	765033
563044	165206	116549
813044	686522	928525

and is perfectly acceptable (Polit & Hungler, 1995b). Non-random assignment methods include putting patients in who arrive on certain days or in any pattern such as every third day.

Now that we know what random selection and random assignment are, we need to look at what they do. We also need to understand when they should (and shouldn't) be used.

Why do we do it?

There are a number of different types of research designs. The design chosen is based on what type of knowledge we need to obtain, as well as the constraints of the setting. One categorization of research designs is to describe them in three levels (Brink & Wood, 1998): level 1 – descriptive or exploratory research, intended to determine factors in a concept or disorder and relations between factors; level 2 – survey designs, including correlational and comparative designs, which look at relations between situations or concepts; and level 3 – experimental designs, either "true" experimental or "quasi" experimental, intended to understand how to produce or predict the concept (causation).

Randomness is one of the key characteristics of a true "experimental" design (Campbell & Stanley, 1963b). Randomness is required in order to examine causality or what causes the phenomenon we are exploring. It is therefore necessary to put in techniques that help to reduce the sources of other explanations for the results. We do this in a number of ways such as creating control groups and treatment groups, using larger sample sizes, and other techniques to help recognize and control for other events which may explain the results. Random selection and random assignment are important to this by helping to increase the probabilities that strange events or characteristics are evenly distributed between study groups. This is called controlling for threats to internal validity. A few examples of threats include factors such as history or events which occur during the study to influence results, testing in which results improve only because participants know the test or selection in which we systematically choose participants with a particular characteristic (Campbell & Stanley, 1963a).

Randomization is not foolproof. Most researchers can tell you of the study in which all the patients who had a complication ended up in one study group. One example from my own practice was in looking at the incidence of nosocomial pneumonias with the use of an inline endotracheal suction catheter which remained attached to the ventilator and endotracheal tube for 24 hours compared to standard disposable catheters and techniques. As it turned out, all of the patients who vomited during intubation ended up in the experimental group (the inline catheter group) (Carter-Snell, 1988). Obviously the vomiting was not related to the catheter subsequently used, but it almost certainly affected who got pneumonia. Researchers should be looking for this differential distribution of characteristics by comparing the "biographics" of each group as part of their analysis and interpretation. We see this as tables which compare characteristics such as length of stay, age of patients, number of chronic diseases or other factors which may be alternate explanations for the results. Look for these in the research report. Other factors, such as patients dropping out of the study can affect the distribution of groups. This should also be described in the report.

Now, the key point in the above discussion is that randomness is a crucial aspect if and when you are trying to establish causation. While the "ideal" experiment would have both, random assignment to groups is the minimum requirement of experiments (Buckwalter, Maas, & Wakefield, 1998). Although we would like to claim causation in our studies, without randomness we cannot make these claims. The majority of nursing studies are "quasi-experimental", correlational or interpretive in design, therefore randomness becomes less critical.

You don't always want or need randomness. In fact, randomness may actually create other problems. In some instances, group members will act differently because of their resulting group placement, or there may be ethical concerns with not giving everyone the same treatment if it is thought to be better. Certain situations lend themselves to randomization. These include situations when there are limited resources available for treatment and when it is possible to temporarily isolate study settings. If there are limited resources, randomization actually facilitates ethics by giving everyone an equal chance of receiving the resource (Cook & Campbell, 1979). In a perfect world, non-random or non-probability selection methods would only be used in pilot studies or for exploratory research (qualitative studies). Sometimes there may be limitations preventing this, particularly in clinical research where it is not possible or reasonable to expect random selection. Examples include situations when results are required quickly, when there are limited funds or when an event has already occurred and is not able to be reproduced such as a disaster or a change implemented in treatment in the department. A research design which is randomized is usually larger and, therefore, more time-consuming and costly (Cook & Campbell, 1979). It is also not possible to randomize to groups if this places people at harm or suffering or to characteristics such as those who develop the disease and those who don't. Consider the research on cardiopulmonary resuscitation (CPR). We wonder why techniques keep changing. We cannot randomly select nor randomly assign who gets CPR. This means that we cannot also claim causation or effectiveness of techniques.

An added problem is the depth of knowledge we have in an area. It is unethical to begin experimental or quasi-experimental studies in an area if we don't really know what the concepts include. If we begin to conduct an experiment and exclude what later ends up being key variables or issues in the concept, then the data are useless and the experiment may even be harmful. We would need to do further exploratory or correlational types of research to better understand the concept first and would not need or want randomization.

Correlational and survey research do not rely on manipulating or controlling an intervention and are non-random. For these reasons, they are not capable of determining what causes the correlation, only which factors relate to each other (Rumrill, 2004). The cause of two highly correlated items may be something entirely different that has not been identified or measured. Consider the often-quoted mosquito research. Malaria was strongly correlated with rainfall, therefore it was concluded

by some that the organisms were carried in the raindrops. We realize now that mosquito populations increase with rainfall. It is therefore less important to have randomness. The selection in these situations is sometimes done by quotas to ensure that specific subgroups are represented. It becomes the reader's job to determine if the sample is representative of the group in which you are interested (Wood & Brink, 1998). For instance, if reading a study on substance abuse in inner city children, does the sample adequately represent the subgroups in your city or region?

There are many issues and concepts in nursing which we don't understand enough to study, or for which the purpose of the research is only to understand. For instance, knowing what the experience of being a trauma patient means and what themes they recall or stand out for them (O'Brien & Fothergill-Bourbonnais, 2004) can influence your approach to the next patient you see. Many nursing studies are conducted in order to understand the phenomenon and perhaps understand societal, clinical or social influences on the phenomenon rather than what caused it. These studies use qualitative methods for data collection and randomness is not relevant. It is more important to ensure that the results are meaningful to the participants and reflect what the participants feel or believe. The use of qualitative methods is also scientific. The emphasis is not on what causes the phenomenon or sources of error, however. The focus is on whether the results are consistent across participants, applicable, bias neutral and true (Guba & Lincoln, 1981). This is known as scientific rigour. If the study is one in which qualitative methods are used, the issue of randomness is not relevant. It is more important to purposely select patients who represent the concept being studied and to look for themes and common concepts which emerge. Even sample size is not usually an issue.

Researchers often wish to generalize the results of their study to other populations. This would be considered high external validity. While it seems backwards, as you get better at controlling for internal threats or alternate explanations for your results, such as through random selection and assignment, the level of external validity decreases (Buckwalter, Maas, & Wakefield, 1998). This means you are less likely to be able to generalize the results of the experimental study to other similar populations, even though you may understand what caused it in this population. You need to look at the study population and the distribution once more to determine if this population resembles yours before attempting to generalize the study results to your emergency. Similarly in exploratory research, generalizability is often equated to "applicability" or "fittingness" of the conclusions to other populations (Guba & Lincoln, 1981). You determine if the results "fit" with your population of interest. Randomness is therefore not an issue.

Summary

When reviewing research or participating in data collection, it is important to understand the importance of randomization to the type of research. Experimental studies are conducted when the need to know causation is important. In an experimental study, both random selection and assignment are required. In quasi-experimental studies, at least random assignment to groups is required. When randomness is required, you then have to ask what methods they used for randomness. Then look at the description of the various group characteristics and see if they remained evenly distributed at the end of the study. Attempting randomization and achieving it are not always the same. If you are assisting a researcher in enrolling patients into an experimental or quasi-experimental study, it is hoped that you recognize how important it is to include all relevant patients in the selection or assignment pool, even when busy. Not doing so can affect their interpretation of the data.

We deal with humans in a clinical setting, usually with organizational and financial constraints, especially in our busy emergency departments. It may not be possible, or sometimes even ethical, to conduct randomized experiments in this setting. In addition, there are many unexplored areas of emergency nursing for which we have insufficient data about the concept. We cannot build rigorous studies to look at what causes the disorder or increases its risk if we don't understand what the concept is, the factors involved and its meaning to patients. When reading or participating in research, it is recommended you examine the researchers' use of randomness and whether it is important to the goal and type of research.

References

Brink, P.J., & Wood, M.J. (1998). **Advanced design in nursing research.** Thousand Oaks, CA: Sage.

Buckwalter, K.C., Maas, M.L., & Wakefield, B. (1998). Classic experimental designs. In P.J. Brink, & M.J. Woods (Eds.), **Advanced design in nursing research** (2nd ed., pp. 21-62). Thousand Oaks, CA: Sage.

Campbell, D.T., & Stanley, J.C. (1963a). **Experimental and quasi-experimental designs for research.** Chicago: Rand-McNally.

Campbell, D.T., & Stanley, J.C. (1963b). **Experimental and quasi-experimental designs for research.** Dallas: Houghton Mifflin.

Carter Snell, C.J.1. (1988). **An evaluation of endotracheal suction techniques in relation to ICU nosocomial pneumonias.** Unpublished doctoral dissertation, University of Alberta, Edmonton. Canadian Nurses Association Library.

Cook, T.D., & Campbell, D.T. (1979). Causal inference and the language of experimentation. In T.D. Cook, & D.T. Campbell (Eds.), **Quasi-experimentation: Design & analysis issues for field settings.** Boston: Houghton Mifflin Company.

Encarta. (n.d.). **Dictionary.com.** Retrieved from http://encarta.msn.com/encnet/features/dictionary/dictionaryhome.aspx

Guba, E., & Lincoln, Y.S. (1981). **Effective evaluation.** San Francisco: Jossey-Bass.

O'Brien, J.A., & Fothergill-Bourbonnais, F. (2004). The experience of trauma resuscitation in the emergency department: Themes from seven patients. **Journal of Emergency Nursing, 30**(3), 216-224.

Polit, D.F., & Hungler, B.P. (1995a). **Nursing Research: Principles and Methods** (5th ed., pp. 229-250). Philadelphia: Lippincott.

Polit, D.F., & Hungler, B.P. (1995b). Experimental, quasi-experimental and nonexperimental designs. In D. F. Polit, & B. P. Hungler (Eds.), **Nursing Research: Principles and Methods** (5th ed., pp. 157-186). Philadelphia: Lippincott.

Rumrill, P.D. (2004). Non-manipulation quantitative designs. **Work, 22,** 225-260.

Wood, M.J., & Brink, P.J. (1998). Comparative designs. In P.J. Brink, & M.J. Woods. **Advanced design in nursing research** (2nd ed., pp. 143-159b). Thousand Oaks, CA: Sage.

Understanding the disease of porphyria

By Sherry Obsniuk,
Canadian Porphyria Foundation

The **Canadian Porphyria Foundation** (CPF) had its beginning in the mind of a person who had experienced the lack of knowledge and support when searching for porphyria information in the mid-1970s. In January 1988, a group of six volunteers armed with $350 set out on a mission "to improve the quality of life for people affected by porphyria". The Canadian Porphyria Foundation was formed by September 1988 with the national office located in Neepawa, Manitoba.

The CPF is the only organization of its kind in Canada and is dedicated to providing quality service and support to porphyria sufferers not only in Canada, but globally as well. Since its inception 17 years ago, the CPF has come a long way. It has progressed from being a small rural organization into an international resource of information for porphyric patients. Recently, the CPF had its educational guides printed bilingually and will soon have its "Porphyria Safe and Unsafe Drug Guide" updated and also printed bilingually. This year on June 1, National Porphyria Day was celebrated for the first time in Canadian medical history.

Many people, even those in the medical field, have not heard of porphyria or don't know that it is a disease. Porphyria is not a single disease, but is a group of disorders of at least eight different types. It is the result of an accumulation of porphyrins in the body caused by an enzyme deficiency that occurs due to a genetic defect. Porphyrins are normal body chemicals that can be found in plants and animals. They are produced in the liver and bone marrow and are necessary in the production of heme, which goes on to make hemoglobin. Hemoglobin is the red blood cells that transport oxygen from the lungs to the tissues of the body.

Porphyria is a hereditary disease, but also can be acquired after exposure to certain chemicals. Symptoms of porphyria may include extreme sun sensitivity, abdominal pain, nausea and vomiting, muscle pain and weakness, psychosis, hallucinations, seizures and limb and respiratory paralysis. In rare cases, it can result in death.

Porphyrias are generally divided into two groups: the **acute porphyrias** and **non-acute porphyrias**. Non-acute porphyria is better known as the sun-sensitive or photosensitive kind. However, this does not mean that you can have only one kind of porphyria. Some people suffer from acute porphyria with symptoms of sun sensitivity.

The acute porphyrias are acute intermittent porphyria (AIP), variegate porphyria (VP), hereditary coproporphyria (HCP), and ALAD deficiency porphyria. AIP is perhaps the most severe of all the porphyric syndromes in terms of its symptomatology. It is inherited and is a deficiency in the enzyme porphobilinogen deaminase. There are several triggers that bring about a porphyric attack. Some of these include starvation or unusual diets, street drugs, prescribed medications and environmental stimuli. Endogenous stimuli are also involved, including stress, intercurrent illness and normal menstrual cycles. High concentrations of glucose and other carbohydrates are helpful. The treatment of hematin is used in acute attacks. The prognosis of the acute attacks is good, and most symptoms settle quickly although, at times, severe nerve damage and its associated signs of weakness and sensory disturbance may take several months to improve.

VP is a type of porphyria that may be similar in its acute attacks to AIP, but is also associated with a classic photosensitive skin disorder. It is inherited and is relatively common in the white population of South Africa. The disease rarely appears before puberty, is most common in the young adult, but may suddenly occur at any age including the elderly. It is caused by a deficiency of the enzyme protoporphyrinogen oxidase. These changes include skin fragility, erosions and blisters during the acute attack, and abnormal pigmentation, skin thickening and hirsuitism due to chronic exposure. The precipitating factors and treatment are similar to those of AIP. Patients should be advised to avoid sun exposure and to use sunscreens containing zinc oxide or titanium oxide. If both parents carry the abnormal gene, the disease will be present in early childhood and will be rather severe.

HCP is inherited as an uncommon type of porphyria. It is caused by a deficiency of the enzyme coproporphyrinogen oxidase. The clinical symptoms are similar to those of AIP, but it can be associated with the type of photosensitive dermatitis seen in PCT. Fatigue and muscle weakness are symptoms and sometimes the patient may be jaundiced. The treatment is essentially the same as AIP, with hematin usually being effective.

ALAD is a very rare form of porphyria that is inherited in an autosomal recessive fashion and has been diagnosed in a very small number of patients whose ages range from infancy to adulthood. There is almost a complete lack of enzyme activity.

The non-acute porphyrias are porphyria cutanea tarda (PCT), erythropoietic protoporphyria (EPP), congenital erythropoietic porphyria (CEP), and hepatoerythropoietic porphyria (HEP). PCT is the most common of all the porphyrias. It is caused by the deficiency of the enzyme uroporphyrinogen decarboxylase. Excessive alcohol ingestion has long been recognized as an important cause, possibly related to the development of chronic liver disease. Estrogen therapy may also be a factor in this disease. Infections have been implicated. Iron overload states may cause or magnify the disease.

EPP is due to a deficiency of ferrochelatase. The symptoms are precipitated primarily by sunlight and cause burning, itching, swelling and redness of the skin. Occasionally, liver disease may develop and gall bladder disease is a common problem because the high concentration of protoporphyrin in the bile will lead to gall stone formation. Treatment with beta-carotene improves sunlight tolerance.

CEP is extremely rare. The enzyme that is deficient is uroporphyrin III cosynthase. It occurs at a very young age and has a marked degree of photosensitivity. Total avoidance of sunlight is usually essential to prevent disfiguration. This is the only type of porphyria that can be diagnosed prenatally.

HEP is a very rare type of porphyria due to a deficiency of uroporphyrinogen decarboxylase. Marked phototoxic skin lesions develop early in childhood along with a variety of neurological abnormalities.

If you are interested in learning more about the Canadian Porphyria Foundation, porphyria or about National Porphyria Day, you can contact the Canadian Porphyria Foundation at 1 (866) 476-2801, or visit our website at www.cpf-inc.ca, or e-mail us at porphyria@cpf-inc.ca.

Much of the information in this article is taken from the Canadian Porphyria Foundation's **A Guide to Porphyria booklet by Dr. Barry Tobe.

outlook
in-service corner

Tapeworms

By Ted Sellers, RN, BHScN, ENC(C) - Ontario

Some facts about tapeworms

- They are intestinal parasites of vertebrate animals (including humans)
- They absorb partially digested food through body surfaces as they have no mouths or digestive canals
- Most infections occur in Africa, Yugoslavia, Middle East, Southeast Asia, Mexico, parts of South America and the former U.S.S.R.
- In the U.S., some forms can be contracted from infected dogs or cats when children eat infected fleas
- Some worms have been known to live up to 20 years and exceed 10 metres in length

Tapeworm characteristics

- Flattened worms range from 0.5 inches to 30 feet long
- The head (scolex) has a crown of hooklets for attachment to intestinal lining
- They have a narrow neck and then body segments (proglottids) that are budded off asexually
- They may have as few as three or as many as several thousand proglottids
- The proglottids contain organs of sexual reproduction – both testes and ovaries
- They are ribbon-shaped, segmented worms
- Usually fertilization is between worms, but some species self-fertilize
- Some species shed eggs continuously in the feces, others store the eggs and shed them in the proglottid

Transmission

- The proglottids furthest away from the head mature most rapidly. When they mature, they break off and pass out of the host in the feces
- This newly detached proglottid contains several eggs with embryonic tapeworms
- This living proglottid is ingested by another primary host, regenerates a new scolex that attaches itself to the intestinal wall and resumes growth
- When eggs are ingested, they hatch into larvae, then burrow into the tissue of the host and form cysts. These are known as bladder worms, cycticeri, hydatids and measles
- These larvae attack certain selected tissues (e.g., liver in humans and dogs, brain in sheep)
- When the larvae are ingested, their growth into tapeworms is stimulated by gastric juices

Classes of tapeworms

- Together, they form the class called CESTODA
- Dwarf tapeworm – hymenolepsis nana – is transmitted through fecal contamination
- Fish tapeworm – diphyllobothrium latum – is seen in fish, especially in pike
- Liver tapeworm – taenia coenurus – are also known as hydatid cysts
- Sheep brain tapeworm – taenia coenurus – causes the disease in sheep known as "gid" or "staggers"
- Pork tapeworm – taenia solium
- Beef tapeworm – taenia saginata – can occur often in people who eat raw or lightly cooked beef

Signs and symptoms of tapeworms

- Often patients are asymptomatic with tapeworms
- If symptoms are present, they may include unexplained weight loss, symptoms of pernicious anemia, presence of white eggs or ribbon-like segments of worm in stool, abdominal discomfort, diarrhea, constipation

Treatment

- To eradicate the worm, the scolex must be dislodged from the bowel. If this is not done, the worm will regrow
- Quinacrine hydrochloride (atabrine) medication kills the worm

Resources

http://encarta.msn.com/encnet/refpages/refarticle.aspx?refid=761566007
http://www.1upinfo.com/encyclopedia/T/tapeworm.html
http://www.medhelp.org/glossary/new/gls_4070.htm
http://www.infoplease.com/ce6/sci/A0861444.html
http://www.infoplease.com/ce6/sci/A0861445.html

Blood pressure measurement: A worthy technique for nurses!

By Céline Plante, RN, MSc, Professor of Critical Care (Emergency), Université du Québec à Rimouski - campus de Lévis, Québec

Those unfamiliar with the health field and, unfortunately, many health professionals consider blood pressure (BP) measurement a triviality. It is understandable that those "delegated" health procedures and techniques, which contribute to saving patients' lives, lead to greater professional gratification than the measuring of BP. However, the results obtained trigger a multitude of acts and prescriptions that are not without consequence. Buus-Frank (2003) advises nursing personnel neither to underestimate themselves because they don't believe they perform vital health care functions, nor to limit themselves because they have too few letters after their names. BP monitoring is a complex, everyday technique that shouldn't be "swept under the rug" because it is considered a routine procedure (Costan, 2003).

Imagine a situation in which your electronic sphygmomanometer displays a result of 180/124. Surprised by this result, you retake the BP, this time with a manual device, and obtain a very different result. Which device is the most reliable? The answer to this question involves many scientific, physiological and technical dimensions as described in the following pages. This article reviews the basic principles of an efficient BP measurement – a review that may surprise some readers.

Vital parameter

In an era in which medical technology abounds and research explores myriad pathways, it is ironic that BP monitoring is still the most effective indicator of life expectancy. BP is, in fact, an early indicator for a diversity of pathologies, many of which are fatal or have high death rates. These include diseases of different systems such as cardiovascular (left ventricular dysfunction and hypertrophy, cardiac insufficiency, angina, myocardial infarction), cerebral (stroke, transient ischemic attack), renal (chronic renal insufficiency), ocular (retinopathy) and peripheral vascular (Buss-Frank, 2003). Taking the BP seems a simple task, yet it is one of great medical importance. The consequences are diverse. A rise in BP may be the first sign of an underlying condition or primary hypertension. Without a regular, systematical measurement, no detection is possible before other symptoms or signs appear. Without follow-up or treatment, the problem eventually progresses and becomes more complicated. A man with untreated hypertension loses approximately one year of life expectancy per mmHg increase in his diastolic blood pressure (DPB) (NHLBI and AHA, 2002). "That's why all medical associations tend to tighten up the BP values that are said to be normal or optimal"(Daniels, 2004). BP monitoring is, therefore, the foundation for decisions affecting changes in lifestyle and drug prescriptions for common as well as acute conditions.

Precision is crucial

Since BP is a vital sign, the measurement should not be performed in a nonchalant manner. Nevertheless, many people assume an underestimation of 5 mmHg is insignificant and without important consequence. Yet, one such error at the 90-95 mmHg range would miss over 21 million Americans afflicted with diastolic hypertension. Out of this number, 125,000 will die from coronary artery disease within the following six years, a mistake loaded with consequences since 20% of these deaths and a similar number of fatal strokes could have been prevented with an anti-hypertensive therapy. If we use the previous example again, but this time the error is in an overestimation, 27 million Americans would be incorrectly classified as hypertensive, with all the implications such a diagnosis involves (i.e., monetary expenses and unnecessary medical side effects) (NHLBI and AHA, 2002).

When we take into account all of these potential clinical and monetary consequences, we more easily understand that this fundamental process should be taken seriously and executed with rigour, caution and precision. This is why diverse health organizations, associations and societies regularly issue recommendations for conditions and techniques to measure BP. These recommendations concern all the potential sources of imprecision, whether it is the method used, the professional, the patient or the procedure.

Method used

BP can be measured directly or indirectly, the golden standard being the direct form. Arterial cannulation is the only form of measurement that permits the determining of pressure within the arteries. Since it is an invasive and costly technique with possible complications such as infection and blood clotting, it cannot be carried out on a large scale. The indirect measure is both more common and non-invasive. This form consists of

compressing an artery under the soft tissues with an inflatable cuff. Contrary to the direct form, it is the counter-pressure in the artery that is measured as opposed to the pressure, hence the less reliable result (Mialon, 2003). Indirect monitoring, if done correctly, is usually within 10 mmHg of direct measurement.

BP is most often measured indirectly by one of the three following methods: oscillometric, auscultatory (mercury or aneroid devices) or by palpation. Knowing the limits of the method used is a key to reducing the number of erroneous results. This is why we will briefly examine them.

Palpation

The palpation method relies on the pulse, usually radial, instead of the arterial sounds. The radial pulse reappearance, when the cuff is deflated, coincides with the estimated systolic blood pressure (SBP): a result of limited precision. The clinical usefulness of this method is then very limited, especially because the DBP can't be monitored.

Auscultation

The auscultation method is used most frequently. We find it in certain automatic and manual devices. As the compressed artery is decompressed, the pulsations give off certain characteristic sounds called Korotkoff (named after the person who first described them). These sounds, either heard through a stethoscope or recorded by a microphone built into certain automatic devices, are separated into five phases. According to the clinical context, the DBP can be either the number obtained in phase IV or in phase V. After reading the following section, you will realize that only a human, a professional, can tell the difference.

Phase I begins with the first of two consecutive sounds and the value accorded to this first sound corresponds to the SBP. Phase II comprises softened sounds that acquire a swishing quality. Phase III comes with the disappearance of the swishing quality of the sounds. They become clearer, sharper and their intensity exceeds that of Phase I. The clinical significance, if any, to Phases II and III has not been established. When the intensity of the sounds suddenly diminishes and a distinct abrupt muffling is heard, Phase IV has been reached. Phase V begins immediately after the last sound has been heard (first silence). This most often defines the DBP. In the right conditions, the SBP measured by the auscultation method corresponds perfectly to the results obtained from a direct measurement. The DBP is about 2 mmHg higher than the intra-arterial DBP.

What result would you indicate with the following example? (Answer on page 37)

Phase I – 138 mmHg: 1st sound; 130: 2nd sound; 128: 3rd sound
Phase II – 120 mmHg: 1st swishing sound (i.e. sound followed by a murmur)
Auscultatory gap (not always present but can't be predicted)
116 mmHg: cessation of sound
108 mmHg: return of swishing sounds
Phase III 104 mmHg: 1st clearer sound with higher intensity and no more swishing
Phase IV 94 mmHg: 1st sound muffled
Phase V 82 mmHg: 1st silence

Nevertheless, certain limitations of the auscultatory method need to be made clear. It is possible that the sounds between Phases II and III disappear momentarily due to physiological or other factors. This phenomenon, called "auscultatory gap", can lead to the risk of underestimation of the SBP and/or overestimation of the DBP if the inflation of the cuff is not heeded. Knowledge of this phenomenon helps avoid the problems it causes if the BP is manually monitored. It is an otherwise unavoidable problem by automated devices. In the case of a child under 13 years of age, or of a difference of 10 mmHg and higher between the first muffled sound (Phase IV) and the first silence (Phase V), the diastolic imprecision rises. It is in order to minimize this imprecision that the DBP in such cases would be the first muffled sound of the Phase IV and the result would then need to be recorded in a three-digit number: Phases I / IV – V or I / IV / V. The situation is the same when the arterial sounds continue to 0 mmHg. Again in this situation, only a manual monitoring can avoid this error. Why? Because, to date, no auscultatory device is programmed to consider these "details". The machine only records the first and last sounds heard (Tavarese, 2003; Lebel, 2004).

If you are not familiar with the aforementioned notions, the Korotkoff sounds, then the accuracy of your auscultatory method will be affected. The reading of literature such as **Guide Thérapeutique de la Société québecoise d'HTA8** or Poggi's article (Poggi, Vaïsse, Silhol, & Bouchlaghem, 2000) is recommended in order to further your knowledge on this subject.

Another source which affects the reliability of the auscultatory method is an irregular cardiac rhythm such as atrial fibrillation (AF). The intensity of the sounds in Phase I being diverse in such cases, determination of the SBP becomes less precise (Poggi, Vaïsse, Silhol, & Bouchlaghem, 2000). If the limitations already listed seem impossible to overcome in the context of your work, the use of a method other than the auscultation should be considered.

Oscillometry

The oscillometric method is found in many automatic devices. It is based on the observation of oscillations recorded by the cuff during deflation. These oscillations begin before the real SBP value and continue beyond the real DBP value, but the maximum intensification of the oscillations compares to the mean blood pressure (MBP). The MBP is the geometrical/graphical average of the SBP as well as the DBP and determines the perfusion of an organ. Since the MBP is neither the most used nor the most familiar parameter in medicine, it is necessary for electronic devices to use automatic calculation methods (algorithms) in order to calculate the SBP and DBP. Unfortunately, these algorithms vary between brands and even between devices. It then becomes arduous to judge the

reliability of such results. Since algorithms are subject to manufacturers' secrecy, it is difficult to validate the results attained in comparison with the gold standard (Jones, Appel, Sheps, Rocella, & Lenfant, 2003; Tholl, Forstner, & Anlauf, 2004). To be recommendable, the precision of a sphygmomanometer must be first evaluated by an independent method that follows the protocols of both the British Hypertension Society (BHS) and the Association for the Advancement of Medical Instrumentation (AAMI). Since there is no legal obligation forcing manufacturers to subject their equipment to independent validations, only a fraction of the electronic devises used around the world are evaluated. The majority of these devices have been proven imprecise (Stergiou, Vousa, Achimastos, & Mountokalakis, 1997; O'Brien, Waeber, Parati, Staessen, & Myers, 2001). The list of recommended or non-recommended devices is constantly updated on the two following websites: bmj.com and bhsoc.org. It is disturbing to see the number of invalid sphygmomanometers found in our health establishments. Despite high numbers of reports of imprecision, the Dinamap 8100 (Critikon, Tampa, FL), for example, remains the most used automatic device in health care centres. It would seem that what the manufacturers have to say about the imprecision of their instruments is more important to the buyers than what the BHS and AAMI standards demonstrate (O'Brien, Waeber, Parati, Staessen, & Myers, 2001).

The use of a valid sphygmomanometer (manual or automatic) does not obviate the need for proper maintenance and an annual calibration (Poggi, Vaïsse, Silhol, & Bouchlaghem, 2000; Tholl, Forstner, & Anluaf, 2004; Graves, 1999). The mechanism of a sphygmomanometer is sensitive and is therefore subject to damage by impact or shock. These forces, as well as regular everyday use, can lead to inaccurate results in BP measurements. The development of a new mechanism, called "Gear Free" by the company Welch Allyn (W/A) could reduce the susceptibility to impact. Time will tell if this new line of manual sphygmomanometers called Durashock stands up to its words.

The lack of a maintenance register for the sphygmomanometers, or of a person responsible for the regular verification of the calibration, calls into question the reliability of the results. Marshall and Rouse (2001) state that health professionals using inaccurate sphygmomanometers are not fulfilling their professional duty and are acting in a non-ethical way. These professionals could be sued for negligence by patients who believe that the use of these malfunctioning devices had bad consequences for their health. A maintenance check-up or calibration should be performed at the first sign of malfunction. Would you be able to detect a few? For example, a device incapable of generating a pressure of 30 mmHg higher than the SBP and incapable of doing this in less than five seconds, or a device that has trouble maintaining this pressure for five seconds (Buus-Frank, 2003) after inflation, suggests an air leak (Poggi, Vaïsse, Silhol & Bouchlaghem, 2000; Graves, 1999). The incapability of obtaining a slow and regular decompression of approximately 2 mmHg per second or per heart beat reflects a faulty permeability in the air release (Poggi, Vaïsse, Silhol & Bouchlaghem, 2000). Fissures in the hand pump or in the tubes, a tube minimal length not respected, plush on the Velcro of the cuff, a needle that does not start out pointing at 0 mmHg or wavers when the glass is flicked are other signs that the precision of the final results is questionable (Beevers, Lip & O'Brien, 2001).

Which indirect method should then be used to diagnose hypertension in the health domain? Until recently, the answer would have been the mercury sphygmomanometer, but prohibition in many countries will cause this method to disappear on the short term (Jones, Appel, Sheps, Rocella & Lenfant, 2003; Tholl, Forstner & Anlauf, 2004; Pickering, 2002). The choice device is then a well-calibrated manual aneroid device (Pickering). Automatic devices can therefore be used for follow-up and when the Korotokoff sounds cannot be adequately evaluated, manual monitoring can be used (Pickering). Among the list of automatic devices, it would seem that the ones using the oscillometric method might be slightly more precise (Lehmann, Gelman, Weber & Lafrades, 1998).

Professional/patient

At this point in your reading, you know that an efficient BP measurement requires the professional to be familiar with certain scientific knowledge. The professional also needs to have certain manual skills and good hearing in order to use a stethoscope for the auscultation method.

As far as the patient is concerned, very little is required in an acute or unstable situation. Nevertheless, a few conditions must be respected in a follow-up. The patient should not have eaten or smoked (+6/+5), nor have consumed alcohol (+8/+8), caffeine (+11/+5) or adrenergic substances an hour prior to the test. The patient should not have done any intense physical exercise in the two hours previous to the exam; the patient should not have any vesical or intestinal urge (+15/+10) and should not speak (+7/+8) during the monitoring. Does this seem exaggerated? The numbers in brackets are possible overestimations in the results for the SBP and DBP if the guidelines are not respected. Therefore, a patient who speaks or hums during the monitoring may receive an overestimation in his SBP of 7 mmHg and an overestimation of 8 mmHg in his DBP!

Procedure

Research has repeatedly shown that BP is rarely measured according to the recommendations of the World Health Organization (WHO) and other professional organizations and this, in turn, affects the precision of the results obtained. The following is a list of their recommendations valid for manual or automatic measurement. The numbers in brackets demonstrate the possible margin of error if the recommendation is not followed. Therefore, a patient seated improperly could have a SBP result overestimated by 6 to 10 mmHg while his DBP would not be affected.

If you do not grasp the theoretical concepts behind these recommended techniques and/or you are not comfortable with

the required skills, the precision of your BP results, manual or automatic, will be affected. A deepening of your understanding and knowledge is recommended.

- Patient seated (+6 to +10/)
- Feet supported and uncrossed (+8/ +4)
- Arms free of constrictive clothing, supported (/+10%) with the anticubital fossa at the level of the fourth inter-costal space (each centimetre away from this level represents a mmHg error)
- Using a proper size cuff, firmly adjusted at 2 to 3 cm above the anticubital fossa: the width of the bladder should cover at least 40% of the arm circumference and its length between 60% and 100% (a cuff that is too loose or too small overestimates the BP whereas one that is too large will underestimate the reading)
- Palpation of the pulse on the arm being measured for BP is done to ensure the pulse regularity and to determine the estimated SBP (rapid inflation prevents venous congestion and imprecision)
- Inflate to 30 mmHg above the estimated SBP (to avoid auscultatory gap)* with the bell of the stethoscope placed on an artery below the cuff, at the distal end of the limb (the bell of a quality stethoscope permits better perception of the Korotkoff sounds than the diaphragm)(* Impossible with certain automatic devices)
- Deflate at a rate of 2 mmHg per second or with each heart beat (a more rapid rate will overestimate the DBP or underestimate the SBP)
- Measurement of the BP in both arms is required if being taken for the first time; a difference between readings will require that the BP be taken in the arm with the higher reading (to avoid missing a hypertension)
- A delay of one minute should be respected before retaking a reading on the same arm in order to avoid any imprecision

Conclusion

Far from having covered everything that concerns BP monitoring, this article nonetheless examined two major aspects: BP results have vital implications, and the accuracy of these results requires some scientific knowledge. Nurses performing simple or complicated procedures must maintain their competences. If there is a doubt concerning the best way to approach a patient, a care technique, the use of a device or its reliability, it's extremely important to raise the issue with a supervisor. Ethics, professionalism and the best interests of the patient are at stake.

As Goodwin (1995) puts it, sophisticated investigative methods still require clinical ability from health professionals. They must know how to interpret the results produced by the devices used and be aware of their limitations. Uncritical reliance on values obtained by machines can be dangerous. The problem is urgent because even though the technology develops, the basic abilities and knowledge are still required… and re-appropriating the basic once forgotten, seems difficult.

Answer: 130 / 94 – 82 or 130 / 94 / 82

130: corresponds to the SBP, in other words is the first of two consecutive sounds, i.e. separated by 2 mmHg (138 is an artefact, i.e. an interference sound, secondary to an extra-systole or other).

94: corresponds to the DBP since there is a difference of more than 10 mmHg between the IV and V phases.

82: corresponds to phase V which must be documented by agreement*.

*Note that you would have missed a grade 1 hypertension if you utilized the phase V (82) rather than IV (92) as the result for the DBP.

The result obtained with a valid automatic auscultatory device would have been 138 / 84 since only the first and last sounds would have been registered: imprecision with the systolic and the diastolic BP and a missed grade 1 hypertension.

References

American Society of Hypertension. (1992). Recommendations for routine blood pressure measurement by indirect cuff sphygmomanometry. **Am J Hypertens, 5**(4), 207.

Beevers, G., Lip, G.Y.H. & O'Brien, E. (2001). ABC of hypertension: blood pressure measurement. **BMJ, 322**, 1043-1047.

Buus-Frank, M.E. (2003). Not just a nurse. **Advances in Neonatal Care, 3**(3), 103-104.

Campbell, N.R., Myers, M.G., & McKay, D.W. (1999). Is usual measurement of blood pressure meaningful? **Blood pressure monitoring, 4**(2), 71-76.

Canadian Hypertension Society. (2004). The 2004 Canadian Hypertension Education Program recommendations for the management of hypertension: Part I – blood pressure measurement, diagnosis and assessment of risk. **Can J Cardiology, 20**(1), 31-40.

Carney, S.L., Gillies, A.H.B., Green, S.L., Patterson, O., Taylor, M.S., & Smith, A.J. (1999). Hospital blood pressure measurement: staff and device assessment**. J. Qua. Clin. Practice, 19**, 95-98.

Costan, G. (2003). Les hauts et les bas de la tension artérielle. **L'actualité médicale**, **10**, pp. 22-33

Daniels, J.G. (2004). Énoncé du Chef de médecine générale, Centre de santé de la MRC d'Asbestos.

Goodwin, J. (1995). The importance of clinical skills. **BML, 310**, 1281-1282.

Graves, J.W. (1999). The clinical utility of out-of-office self-measure blood pressure. **Home Health Care Consultant, 6**(11), 26-29.

Grim, C.M., Grim, C.E., & Drew, C.R. (1995). Teaching and assessing blood pressure measurement skills for medical students. **AJH, 8**(4), part 2.

Gury, C. (2003). Mesure de la pression artérielle: recommandations de bonnes pratiques. **Neurologies, 6**, pp. 536-540.

Jones, D.W., Appel, L.J., Sheps, S.G., Rocella, E.J. & Lenfant, C. (2003). Measuring blood pressure accurately: New and persistent challenges. **JAMA, 289**(8), 1027-1030.

Lebel, M. (2004). Énoncé du président de la Société québécoise d'hypertension artérielle (SQHA).

Lehmann, K.G., Gelman, J.A., Weber, M.A., & Lafrades, A. (1998). Comparative accuracy of three automated techniques in the noninvasive estimation of central blood pressure in men. **Am J Cardiol, 81**(8), 1004-1012.

Marshall, T., & Rouse, A. (2001). Letters: Doctors who cannot calibrate sphygmomanometers should stop taking blood pressures. **BMJ, 323**, 805.

Mialon, P. (2003). **Notes du Cours de physiologie cardiovasculaire, DCEM I**. Faculté de médecine de Brest.

National Heart, Lung, and Blood Institute (NHLBI) and American Heart Association (AHA). (2002). **Summary Report: National High blood Pressure Education Program (NHBPEP)/National Heart, Lung, and Blood Institute (NHLBI) and American Heart Association (AHA).** Working meeting on blood pressure measurement. Natcher Conference Center, National Institutes of Health (NIH), Bethesda, Maryland, April 19, 2002, p. 7.

O'Brien, E., Waeber, B., Parati, G., Staessen, J., & Myers, G. (2001). Blood pressure measuring devices: Recommendations of the European Society of Hypertension. **BMJ, 322**, 531-536.

Peters, G.L., Binder, S.K., & Campbell, N.R. (1999). The effect of crossing legs on blood pressure: a randomized single-blind cross-over study. **Blood pressure monitoring, 4**(2), 97-101.

Pickering, T.G. (2002). Principles and techniques of blood pressure measurement. **Cardiology clinics, 20**(2), 207-223.

Poggi, L., Vaïsse, B., Silhol, F. & Bouchlaghem, K. (2000). **Serveur pédagogique : La pression artérielle et sa mesure clinique**. Faculté de Médecine de Marseille – Université de la Méditerranée

http://medidacte.timone.univ-mrs.fr/learnet/webcours/hta/pressionart/intro.htm

Prinea, R.J., & Jacobs, D. (1983). Quality of Korotkofff sounds: Bell versus diaphragm, cubital fossa versus brachial artery. **Preventive medicine, 12**(5), 715-719.

Reeves, R.A. (1995). Does this patient have hypertension? How to measure blood pressure. **JAMA, 273**, 1211-1218.

Société québécoise d'hypertension artérielle (2002) **Guide thérapeutique. Hypertension artérielle 2002** (2e édition).

Stergiou, G., Vousa, A.V., Achimastos, A.D., & Mountokalakis, T.D. (1997). Home self-monitoring of blood pressure: is fully automated oscillometric technique as good as conventional stethoscopic technique? **American Journal of Hypertension, 10**(4), 428-433.

Tavarese, M. (2003). Énoncé de la Représentante Welch Allyn.

Tholl, U., Forstner, K., & Anlauf, M. (2004). Measuring blood pressure: pitfalls and recommendations. **Nephrol Dial Transplant, 19**(4), 766-770.

Vancheri, F., Alletto, M., & Sidoti, P. (2003). Does this patient have hypertension? Different methodologies in the measurement of arterial pressure. **Recenti progreesi in medicina, 94**(3), 106-109.

Woodrow, P. (2004). Assessing blood pressure in older people. **Nurisng Older people, 16**(1), 29-34.

Competing interests

None

Acknowledgement

I thank Adam Wright and Alan Wright for the translation of the French original article and D.r Jean-Guy Daniels for his helpful comments during preparation of the manuscript.

This article has been peer reviewed

Le magazine des infirmières et infirmiers d'urgence du Québec: info urgence 2004; XVIII:3; 12-17.

Correspondence to the author

Céline Plante, UQAR , Département de biologie – chimie – sciences de la santé, Module des sciences infirmières, 55 rue du Mont-Marie, bureau 227, Lévis, Québec, Canada, G6V 8R9 Phone: (418) 833-8800 ext. 265; e-mail: celine_plante@uqar.qc.ca

New Flexi-Seal® FMS

Interested in dramatically advancing the way you manage fecal incontinence?

Find out more,

call 1-800-465-6302
for a free product video or
to arrange a demonstration

Flexi-Seal® FMS is an effective fecal diversion and containment system designed to reduce the risk of skin breakdown and spread of infection due to fecal containment both of which can extend the length of hospital stay.[1]

Created by ConvaTec, a Bristol-Myers Squibb Company with a long history of developing innovative skin, wound, and ostomy products that respond to the needs of the caregiver and patient alike.

Please see package insert for full product information, including instructions for use.

1. Clinical evaluation of a flexible fecal incontinence management system. Phase II clinical results (n=10). July 2004. Data on File, ConvaTec.

ConvaTec
A Bristol-Myers Squibb Company