



CANNT JOURNAL JOURNAL ACITN

Volume 25, Issue 4 October–December 2015

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The CANNT Journal is
printed on recycled paper.

The **CANNT Journal** is the official publication of the Canadian Association of Nephrology Nurses and Technologists, P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0, telephone: (519) 652-6767, fax: (519) 652-5015, email: cannt@cannt.ca. Published quarterly, the journal is received by all members of CANNT. Subscriptions are: Canada \$80.00 (plus HST), US. \$90.00, Outside N. America \$115.00. Back issues, when available, are \$7.50 (+HST) per issue and are available from the editors. Opinions expressed by writers in the CANNT Journal are not necessarily those held by the editors or CANNT. Contrasting views by our readership and membership are welcome. All letters, comments and articles are to be sent to the CANNT office, P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0.

1-877-720-2819

Website: www.cannt.ca

The CANNT Journal accepts articles (manuscripts) on an ongoing basis.

The CANNT Journal is indexed in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the International Nursing Index (INI), MEDLINE, EBSCO, ProQuest and Thomson Gale.

ISSN 2291-644X (Online)

ISSN 1498-5136 (Print)

The CANNT Journal is produced by Pappin Communications, The Victoria Centre, 84 Isabella St., Unit 2, Pembroke, Ontario K8A 5S5

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Letter from the Editors

Hello again, and welcome to the fall issue of the CANNT Journal! First, Jovina and I would like to welcome Anita Amos as the 2015/16 CANNT president, and thank Anne Moulton for the support she has provided as CANNT president this year. Her leadership and support have helped to not only advance CANNT, but also the CANNT Journal. As the year winds down, there is much to celebrate. Please join us in congratulating all of the award winners from CANNT 2015 who are showcased in this issue, and imagine yourself as an award winner next year! Find out how to apply on the CANNT website. We are also extremely happy to announce that the 2015 CANNT Vascular Access Guidelines are now available on the website for all members. A huge thank you to all who contributed to the development of these guidelines.

In this issue, we are extremely pleased to provide a practice column to guide the development of ultrasound competency to support vascular cannulation. We are also pleased to share the first article of a three-part series that will describe the use of data from the Canadian Organ Replacement Registry (CORR) to improve care and inform priority-setting. A big thank you to CORR/CIHI board members

Alison Thomas and Dr. Joseph Kim for sharing with CANNT members the value and usefulness of national data. We are also fortunate to revitalize the tech column, and are grateful to José Lloyd for her column describing the role of the dialysis technologist and the expertise they bring to the multi-disciplinary team. We also hope that you will benefit from the Continuing Education article describing chemotherapy agents in relation to nephrotoxicity, and the powerful feature article that illustrates the lived experience of a First Nation author who is a mother, nurse, and organ donor to her son.

Moving forward, we are always welcoming submissions from both seasoned and budding professionals. We have categorized the articles submitted over the past four years, and have identified gaps related to acute kidney injury, pediatric nephrology, peritoneal dialysis, and topics related to First Nations peoples. We solicit articles specifically related to any of these topics, but of course welcome all submissions. We also welcome letters to the editors, and practice questions for which we will do our best to find a nephrology expert who will be able to provide an evidence-based response. Thanks, and enjoy!

Mot des corédacteurs en chef

Rebonjour et bienvenue au numéro d'hiver du journal de l'ACITN! Jovina et moi-même tenons tout d'abord à souhaiter la bienvenue à Anita Amos, présidente 2015-2016 de l'ACITN. Nous remercions également Anne Moulton pour le soutien qu'elle nous a apporté en tant que présidente de l'ACITN durant cette année : son leadership et son soutien ont non seulement contribué à faire progresser l'ACITN, mais également le journal de l'ACITN. Nous avons une foule de choses à célébrer à mesure que l'année avance. Nous vous invitons à vous joindre à nous pour féliciter celles et ceux qui ont reçu un prix cette année et qui sont mis à l'honneur dans ce numéro, et à vous imaginer à leur place l'année prochaine! Découvrez comment déposer votre candidature sur le site Web de l'ACITN. Nous sommes aussi extrêmement heureux d'annoncer que les lignes directrices 2015 de l'ACITN relatives à l'accès vasculaire sont désormais accessibles à tous les membres depuis notre site Web. Un grand merci à celles et ceux qui ont participé à l'élaboration de ces lignes directrices.

Dans ce numéro, nous avons l'immense plaisir de vous proposer un article pratique pour améliorer votre maîtrise des techniques échographiques à l'appui de l'insertion d'une canule vasculaire. Nous avons également le plaisir de vous proposer le premier d'une série de trois articles sur l'utilisation des données du Registre canadien du remplacement d'organes (RCRO) en vue d'améliorer les soins et de mieux établir les priorités. Un grand merci à Alison Thomas et au Dr Joseph Kim, membres du comité RCRO/ICIS, pour

montrer aux membres de l'ACITN l'intérêt et l'utilité des données nationales. Nous avons aussi la chance d'offrir la chronique du technicien dans une toute nouvelle mouture et remercions Josée Lloyd pour son article sur le rôle du technicien et le savoir-faire qu'il apporte à l'équipe interdisciplinaire. Nous espérons également que vous trouverez intéressants l'article de formation continue sur les agents chimiothérapeutiques en ce qui a trait à la néphrotoxicité, ainsi que l'article vedette touchant qui décrit l'expérience vécue par une femme des Premières Nations, en tant que mère, infirmière et donneuse d'organe pour son fils.

C'est toujours avec joie que nous recevons les articles de professionnels chevronnés ou débutants en vue des prochains numéros. Nous avons fait le point sur les articles soumis au cours des quatre dernières années et avons constaté que les sujets suivants n'avaient pas été traités : lésions rénales aiguës, néphrologie pédiatrique et dialyse péritonéale, de même que les sujets se rapportant aux peuples des Premières Nations. Nous aimerions recevoir des articles traitant plus particulièrement de ces sujets, mais nous ne manquerons pas de prendre en considération tous les articles qui nous sont soumis. Les lettres à la rédaction sont également les bienvenues, de même que les questions pratiques, et nous ferons de notre mieux pour trouver un spécialiste de la néphrologie en mesure de fournir une réponse fondée sur des données probantes. Merci à vous, et bonne lecture!

Le Journal ACITN est la publication officielle de l'Association canadienne des infirmiers/infirmières et technologues en néphrologie, a/s P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0, téléphone : (519) 652-6767, télécopieur : (519) 652-5015, Courriel : cannt@cannt.ca. Publié quatre fois par année, ce journal est envoyé à tous les membres de l'Association. L'abonnement annuel est : Canada, 80 \$ (+TVH), E.-U., 90 \$, hors du Canada et E.-U., 115 \$. Les publications antérieures, lorsque disponibles, coûtent 7,50 \$ (+TVH) chacune. Les opinions émises par les auteurs dans ce journal ne sont pas nécessairement partagées par l'Association ni par le corédactrices en chef. Nous invitons les lecteurs à nous faire part de leurs opinions. Toute correspondance devra être envoyée à l'ACITN, P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0.

1-877-720-2819; Site web : www.cannt.ca

Le Journal ACITN accepte des articles (manuscripts) de façon continue.

Le journal ACITN est maintenant répertorié dans le « Cumulative Index to Nursing and Allied Health Literature (CINAHL) », « International Nursing Index » (INI), « MEDLINE », « EBSCO », « ProQuest » et « Thomson Gale ».

ISSN 2291-644X (En ligne)
ISSN 1498-5136 (Dans la presse)

Le journal ACITN est préparé par Pappin Communications
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MESSAGE FROM THE PRESIDENT: ANNE MOULTON

It was a great pleasure to once again experience a successful, educational, and inspiring CANNT conference. This year's conference in picturesque Vancouver, British Columbia, was second to none! The conference theme, "Reaching New Heights", resonated throughout the three-day conference, as delegates had the opportunity to learn how to "catch the energy and release the potential" when our first keynote speaker, Deena Ebbert, focused on some strategies on how to connect with fresh perspective! Valerie Cade, another of the conference's keynote speakers, provided us with an inspirational session to "work through anything with anyone" by narrowing the interpersonal gaps between coworkers in figuring out "why they do what they do" in order to create a respectful workplace for all. Both Deena and Valerie had us thinking, laughing, and learning through their engaging and dynamic presentations!

The O2P (Oh to pee!) dragon boat team members were an inspiration. The stories regaled by Audrey Lo (on hemodialysis since 2001), Croft Bain (kidney transplant recipient 2002), Katrina McAndrew (kidney transplant recipient 2013), and Elizabeth Black (kidney transplant donor) about their respective journey to being fit dragon boaters were a testimonial to their resilient spirit. The stories shared by Dale Calibaba and Shad Ireland about their experiences living with kidney disease and their triumphant victories to achieve their personal goals were both powerful and motivational for any individual living with end stage renal disease and for health care providers in better understanding the challenges faced by our patients on a day-to-day basis. Dale's dream to ride his bicycle across Canada starting from St. John's, Newfoundland, in June ended prematurely due to health issues. Dale is planning to finish

his trek across Canada in the very near future. Shad was the first dialysis patient to complete an Ironman Triathlon and continues to inspire other patients living with kidney disease, including Dale. Shad explains that "to live with chronic illness is not a limitation, but a special invitation to those of us who are willing to accept the challenge." Dale and Shad have taught us that despite the challenges of dialysis, people living in the end stage of renal disease can achieve their personal goals through courage, hope, and perseverance. Undoubtedly, all of the conference delegates were moved and impressed by the achievements of these two extraordinary men!

The CANNT 2015 Planning Committee worked diligently to execute such an exciting program. I would like to extend my sincere appreciation to the planning committee led by co-chairs Rick Luscombe and Stan Marchuk, and to our Conference Planner Heather Reid from Innovative Conferences and Communications and her staff, Sharon LaPointe and Susan Mason. In addition, the CANNT organization would not be able to host such a successful conference were it not for the support of our industry sponsors for whom we are extremely grateful. Their ongoing commitment and financial support to our national organization are commendable.

Last, it is my sincere pleasure to have served as your CANNT President this past year. Having witnessed the dedication of our current and past Board of Directors whom I have had the privilege of working with over the past two years, as a Board member, I feel honoured to have worked with and learned from some of the best! I look forward to the coming year in my role as your past-president and hope to see many of you again in London, Ontario, for CANNT 2016!

Submitted by Anne Moulton

À ma grande satisfaction, la conférence de l'ACITN a été une fois encore une réussite, instructive et inspirante. L'édition de cette année, qui avait pour toile de fond Vancouver, en Colombie-Britannique, n'a eu rien à envier aux éditions précédentes! Le thème de la conférence, « Atteindre de nouveaux sommets », a trouvé écho tout au long des trois jours qu'a duré l'événement, alors que les participants ont eu l'occasion d'apprendre comment « capter l'énergie et libérer le potentiel » lorsque notre première conférencière, Deena Ebbert, s'est penchée sur des stratégies à mettre en œuvre pour créer des liens selon une perspective nouvelle! Valerie Cade, une autre conférencière, nous a proposé un atelier édifiant sur la manière de « trouver un terrain d'entente, peu importe le sujet ou l'interlocuteur », en comblant les écarts interpersonnels entre collègues et en déterminant « pourquoi telle personne agit de telle façon », de manière à créer un cadre de travail respectueux pour tous. Deena et Valerie nous ont toutes deux fait rire et réfléchir, tout en apprenant grâce à leurs exposés dynamiques et stimulants!

Les membres d'équipage du bateau-dragon O2P (« Oh to pee! ») ont été une source d'inspiration. Les anecdotes relatées par Audrey Lo (en hémodialyse depuis 2001), Croft Bain (receveur d'une greffe du rein en 2002), Katrina McAndrew (receveuse d'une greffe du rein en 2013) et Elizabeth Black (donneuse d'un rein) sur leur parcours respectif pour devenir de robustes membres de l'équipage témoignent de leur résilience. Les témoignages de Dale Calibaba et Shad Ireland sur leur expérience avec la néphropathie et leurs victoires qui leur ont permis d'atteindre leurs objectifs personnels sont à la fois percutants et stimulants, tant pour les personnes aux prises avec une maladie rénale au stade terminal que pour les professionnels de la santé désireux de mieux comprendre les défis auxquels sont confrontés nos patients au quotidien. Le rêve de Dale de parcourir le Canada à bicyclette en juin, à partir de St. John's à Terre-Neuve, s'est achevé prématurément à cause de problèmes de santé. Dale prévoit terminer son périple à travers le Canada dans un

avenir très proche. Shad a été le premier patient en dialyse à terminer le triathlon de l'Ironman et continue d'inspirer d'autres patients aux prises avec une maladie rénale, dont Dale. Shad explique que « vivre avec une maladie chronique n'est pas une limite, mais une invitation particulière à celles et ceux d'entre nous qui sont prêts à relever le défi ». Dale et Shad nous ont appris qu'en dépit des difficultés liées à la dialyse, les personnes atteintes d'une maladie rénale au stade terminal peuvent atteindre leurs objectifs personnels à force de courage, d'espoir et de persévérance. Tous les participants à la conférence ont été assurément émus et impressionnés par les exploits de ces deux hommes extraordinaires!

Le comité de planification de 2015 de l'ACITN a travaillé avec diligence pour mettre en œuvre un programme aussi intéressant. Je tiens à exprimer mes sincères remerciements à ses membres et coprésidents, Rick Luscombe et Stan Marchuk, ainsi qu'à la planificatrice de notre conférence, Heather Reid, d'Innovative Conferences and Communications, à son équipe, à Sharon LaPointe et à Susan Mason. L'ACITN n'aurait par ailleurs pas été en mesure d'organiser une conférence aussi enrichissante sans le soutien de nos entreprises commanditaires, à l'égard desquelles nous sommes extrêmement reconnaissants. Nous saluons leur engagement et leur soutien financier à l'égard de notre organisme national.

Enfin, je tiens à dire que ce fut pour moi un véritable plaisir d'œuvrer en tant que présidente de l'ACITN au cours de l'année qui vient de s'achever. Ayant constaté le dévouement de nos comités de direction actuel et passé, avec lesquels j'ai eu l'honneur de travailler au cours des deux dernières années en tant que membre, je me sens honorée d'avoir eu l'occasion de travailler avec quelques-uns des meilleurs collaborateurs et d'avoir pu apprendre à leurs côtés! Je me réjouis de l'année qui s'en vient et du rôle qui sera le mien en tant qu'expresidente, et j'espère vous revoir nombreux à London, en Ontario, où se tiendra la conférence 2016 de l'ACITN!

Article soumis par Anne Moulton

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In Memoriam—Denis Carrier

FOREWORD

On October 25, 2015, Denis Carrier passed away peacefully at his home, surrounded by family and close friends, following a courageous and sustained battle with cancer. He was 58.

Denis leaves behind an impressive professional legacy in dialysis—as technologist, perfusionist, sales professional, and CEO and entrepreneur—who touched the lives of patients and their health care providers for more than 30 years. Denis’s leadership with two international dialysis equipment manufacturers—first, as the Canadian Sales Director with Hospal-Gambro, and subsequently, his stewardship of Bellco’s Canadian business at Genpharm, BHC Medical, and Bellco Canada—spurred the introduction of several pivotal technologies that greatly changed the way dialysis is delivered in this country today.

The following vignettes offer glimpses of a man who will forever be remembered for positively affecting the lives of everyone he met, as a colleague, boss, mentor, and friend.



CATHY FULTON, NURSE MANAGER AT SUSSEX AND SHEPPARD CENTRE SELF-CARE DIALYSIS UNIT

Denis Carrier was a consummate professional who matured into the wonderful man we all knew. His down-to-earth approach and kindness blended so well with his professionalism.

The dialysis community first got to know Denis when he was new to the world of sales. He was a technologist and that gave credibility to his new role. There were growing pains, but Denis listened to us and understood what was important to the caregivers and patients. Denis always supported the caregivers but, ultimately, was emphatic about the care of patients. He was concerned about their safety and their improved health with his equipment, supplies, and personnel. Education of the caregivers was very important to Denis so that we could deliver the best therapies for the patients. Denis surrounded himself with professional nurses who could train, educate, and be resources for all the nurses who used the dialysis equipment.

Denis became a friend, as well as the one who we could turn to in order to solve an issue with equipment or supplies. He responded quickly with an explanation or solution. Denis instilled the same professional respect for the end users into all his staff. We could always feel comfortable talking to anyone in the company. Denis actually stole some very good people from our dialysis units!

There also was the fun side to Denis, which we all enjoyed, especially at conferences. Supporting staff to attend conferences was also important to Denis. Many will remember his generosity, humour, and inclusion of all staff.

CHARLES ESTRIDGE, FORMER TECHNICAL MANAGER, DIALYSIS, TORONTO GENERAL HOSPITAL (NOW RETIRED)

I had the privilege of having known Denis since 1983. In life, a hero is one whom people look up to for courage and inspiration. Denis was a hero to many people in the dialysis community.

He began his career as a dialysis technologist in Sudbury, Ontario, and later transitioned into sales with Gambro Medical. In sales, Denis was a fierce competitor who excelled because of his tenacity, professionalism, and drive to achieve optimal results. He was particularly driven to provide excellent service at all cost and supported his clients with his exceptional knowledge, providing continuous education and/or training. He was someone you could count on to follow through on issues.

Denis moved on to become the director of the Renal Care Division of Genpharm and later the CEO of Bellco Canada and BHC Medical. Despite his growth, Denis remained loyal and in close contact with his clients. If there was an issue to be resolved, he was always willing to listen and provide a meaningful resolution.

It is sad to see the end of such a great person. Denis rose from a humble start in the dialysis sector to become a very significant force. During the transition and later, he never allowed the pressures of the business to get in the way of personal growth and treating his business contacts with the care they desired and deserved. Denis’ kindness and willingness to share his professional advice will remain the hallmark of his interactions with others.

LUKE DESJARDINS, INDUSTRY COLLEAGUE AT HOSPAL-GAMBRO (NOW BAXTER-GAMBRO)

I first met Denis 29 years ago in October 1986 when I joined Hospal, a small private dialysis company. Denis was the first sales rep in Ontario and I was a technician based out of Montreal. Ironically, we had similar backgrounds including post high school education at RCC Institute of Technology and growing up in Sudbury. Denis was instrumental in putting Hospal on the Canadian map. Without his perseverance and business acumen, I don’t think Hospal would have survived the many tribulations caused by product deficiencies, reactions, and machine delays. Denis wrote the book on client relationships; he always protected and defended his clients and we sometimes wondered whom he was working for.

Denis was the key reason I decided to pursue my career in sales. He was persistent that I should join the “dark side” and eventually we ended up working together in Ontario for Hospal-Gambro. Denis became a friend and mentor, and when he moved to Genpharm, he also became a foe and fearless competitor. Through it all, he never lost sight of where he came from and how he got there.

I have thousands of anecdotal stories involving Denis, but one of my favourites was the time Gambro was defending their BiCart patent against Genpharm. Anybody who

has experienced litigation on patent protection will understand that the process is long, arduous, emotional, and sometimes personal. On one side of the room was Denis and lawyers representing Genpharm and on the other side was myself and lawyers representing Gambro. We had numerous heated meetings, and punches were thrown by both sides. However, every time we would take a coffee break, we would talk about our families, friends, and all the good times we had, but once we were back in the meeting room, the fight continued. It felt like a scene from a Bugs Bunny episode of Wile E. Coyote versus Sam Sheepdog. Denis always said not to take things personally—it's only business.

Denis will be missed by all of us at Hospal-Gambro. He played an integral part in our careers and we will certainly miss his energy and joie de vivre.

JED DADSON, INDUSTRY COLLEAGUE AND BUSINESS PARTNER AT BELLCO CANADA

In early 2006, only two years into my career with Denis at Genpharm, he turned to me and asked, "I'm going to take the Renal Care Division out on its own... will you join me?" I had no idea whether Denis could pull this off or whether we could be successful by ourselves. *Not everyone can run a successful business.* Countless lectures, books and magazines, and expensive degree programs are dedicated to divining how to be an entrepreneur—but none of them ever guarantee you'll be good at it. And so, without flinching or further consideration, I said, "Yes". Denis imparted four important lessons by which he lived his life, built his career, imbued on others, and made an indelible impression on me, his disciple and forever friend.

Be persistent. Whether it was the same great "war story" heard over and over, or a follow-up on a delegated task, Denis was single-mindedly persistent, almost to a fault. But it's also what drove him to succeed when others would have quit long before. It brought about real change. His persistence to be better and do better delivered value for all those he served.

Surround yourself with great people. Through Denis, I've been blessed to work alongside some really wonderful people: men and women not simply good at what they do, but truly *good human beings* to their families, friends, and communities. He truly had a knack for attracting these people. What's more, despite all of his career accolades, Denis never lost the humility to seek guidance from others and to wrap himself with their influence. It was never about who knew more; Denis's mission was to listen to what everyone had to say. For him, sometimes the perspective alone was more important than the message itself.

Relationships matter. At Genpharm, our company motto was "People Matter". Denis, in word and in deed, embodied a further truth: *Relationships with people matter.* Denis had the ability to build and nurture personal connections more meaningful than the surface contact most of us find ourselves guilty of. He took an interest. He cared and he remembered.

Inspire loyalty. I was not the only one who said "Yes" when Denis led the drive to transform Genpharm Renal Care first into an independent distributor, BHC Medical, and ultimately into its current form as Bellco Canada. Twenty of us—our entire team—willingly took that plunge. Most of us are still with the company today. Denis *inspired* loyalty in you by first entrusting you with his.

To my mentor: Thank you for the incredible gift of your friendship.

Denis, from all of your friends in our community, you will be greatly missed.

NOTICE BOARD

- February 1, 2016. CANNT 2016 abstract deadline
- February 27–March 1, 2016. Annual Dialysis Conference, Washington State Convention Center, Seattle, Washington. www.annualdialysisconference.org
- February 27–March 1, 2016. 16th Congress of the International Society for Peritoneal Dialysis (ISPD), Melbourne Convention and Exhibition Centre, Melbourne, Australia. www.ispdmelbourne2016.com
- March 10, 2016. World Kidney Day. www.worldkidneyday.org
- April 11 to July 1, 2016. CNA certification exam online application process open
- May 1–4, 2016. American Nephrology Nurses' Association (ANNA) 47th National Symposium, Marriott Louisville, Kentucky International Convention Center, Louisville, Kentucky. www.annanurse.org
- May 21–24, 2016. 53rd European Renal Association–European Dialysis and Transplant Association (ERA-EDTA) Congress, Austria Center Vienna, Vienna, Austria. www.era-edta2016.org
- September 17–20, 2016. 45th Annual European Dialysis and Transplant Nurses Association/ European Renal Care Association (EDTNA/ERCA) International Conference, The Valencia Conference Centre, Valencia, Spain. queries@edtnerca.org
- September 19 to October 7, 2016. CNA certification exams offered
- September 21, 2016. Nephrology Health Care Professionals' Day
- October 27–29, 2016. Canadian Association Nephrology Nurses and Technologists (CANNT) 49th National Symposium 2016—Changing the Face of Tomorrow, London, Ontario. www.cannt.ca
- November 15–20, 2016. American Society of Nephrology (ASN) Kidney Week 2016, McCormick Place, Chicago, Illinois. www.asn-online.org
- CANNT Vascular Access Guidelines: available now in the members only section at cannt.ca!



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Abstracts are currently being accepted for ORAL and POSTER presentations for CANNT 2016 – “CHANGING THE FACE OF TOMORROW”. This annual national meeting of the Canadian Association of Nephrology Nurses and Technologists will be held October 27-29, 2016 in London, Ontario. The conference venue is the London Convention Centre. CANNT 2016 abstract submissions should demonstrate “*Changing the Face of Tomorrow*” – appropriate for the novice through to the advanced practice professional. Topics of interest may include: clinical research, innovative projects and solutions, ethics, case presentations and clinical reviews. All abstract submissions must be evidence-based. Please consult the list of leading edge topics for possible areas of interest.

ABSTRACT SUBMISSION GUIDELINES:

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All abstracts must be submitted via e-mail (susanm@innovcc.ca) as an attachment in Word.

Submissions must include the following:

Abstract Title

- must accurately reflect the content of the presentation

Abstract Text

- should be no longer than 250 words (font: Times New Roman 12 point)
- provide author information on a separate page
- should be as informative as possible
- define **all abbreviations** the first time they appear in the abstract
- use only the **generic** names of drugs
- **do not identify companies and/or products in the body or title of the abstract**

If **research-based**, must include:

- purpose of study
- methods
- results
- conclusions
- implications for nephrology care

If **practice/education-based**, must include:

- purpose of the project
- description
- evaluation/outcomes
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- identify preferred format of presentation (ORAL or POSTER)
- full names and credentials of authors
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IMPORTANT NOTES:

Only **COMPLETE** submissions received by **FEBRUARY 1, 2016** will be considered.

- All correspondence will be with the first author only.
- Acceptance of abstract does not waive attendance fees (registration, transportation, accommodations).
- Notification regarding selection decisions will be provided by April 1, 2016.
- Should the abstract be selected for presentation, the author(s) authorize(s) the publication of the abstract submitted for publication in the CANNT Journal.
- The presentation shall not make comparison to companies or products for any purposes of product marketing, nor will topics or materials used discredit companies or products.
- The abstract, and associated authors, should make full disclosure of corporate employment and/or funding sources.
- Abstracts not in the required format will be returned to the author for revision.
- The language of abstract submission will be the language of presentation, if selected.

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Nagweyaab Geebawug: A retrospective autoethnography of the lived experience of kidney donation

By Mary Smith

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“Get the camera!” I yelled. As my young son came running towards me with the camera, I pointed up to the sky. There they were, four magnificent gleaming rainbows. The clouds surrounding were a moody bluish black and the sun swiftly and gracefully beamed through them. The shimmering and glistening rainbows in that brief moment of sunshine pierced through my own darkness. In the last few months in my First Nations community, we had experienced many deaths. Some of these deaths were relatives and friends. Years later, I would gaze at the picture taken through hot tears, Nagweyaab geebawug or rainbow spirits I thought—these are the ancestors, those who have passed reminding us to never give up. This is a story and in this story an autoethnographical narrative emerges that is rich with contextual cultural interpretations of myself, as a kidney donor to my son. Through this autoethnographical narrative, there is the potential to further illuminate the lived experience of chronic kidney disease (CKD) and kidney transplantation. In this paper, the terms First Nations and Indigenous are utilized interchangeably.

BACKGROUND TO CKD AND FIRST NATIONS

End-stage renal disease (ESRD) represents a health care crisis where the kidneys have failed and, without dialysis or kidney transplantation, survival is not possible. There are fewer kidney transplants and higher rates of ESRD for Indigenous peoples in Canada and throughout the world (Jiang, Osgood, Lim, Strang, & Dyck, 2014; Karpinski & Young, 2011; McDonald, 2014). Moreover, Collier (2013) describes poorer health outcomes for First Nations receiving hemodialysis that must occur numerous times during a week. This is attributable to living distances remote from treatment centres and socioeconomic implications, such as not being able to maintain employment with resulting stresses and pressures on family and relations (Collier, 2013). In light of the lesser kidney transplantation rates occurring in First Nation groups, this autoethnography may be of particular interest in that it offers an account of kidney donation and transplantation within a First Nations context of Canada.

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AUTOETHNOGRAPHY

Methodology

Story telling has long been a tradition in First Nation cultures, offering an enticing way of learning and discovering (Thomas, 2005). Autoethnography offers a way of telling a story that enmeshes one's cultural context and yields an intensely personal experience (McIvor, 2010). Reducing the term into its components, autoethnography means self (auto), culture (ethno), and writing (graphy). Additionally, autoethnography emerges from ethnography and anthropology (Muncey, 2010). Other names for autoethnography include heuristic inquiry, the personal narrative, indigenous ethnography, experiential text, reflexive ethnography and complete-member research (Ellis & Bochner, 2006; Richards, 2008; Wall, 2008). In addition, there are varying types of autoethnography including analytical, evocative, and performative (Ellis & Bochner, 2006). Employing an analytical interpretation, the self-narrative situated within the cultural context is central to the analytical autoethnographic method (Chang, 2008; Ellis & Bochner, 2006). Evocative autoethnography becomes more wild and free and is not restricted by any hard set rules (Ellis, 2004). Performative autoethnography may lean towards a more critical decolonizing approach (Spry, 2011). While somewhat analytic, this paper tends to lean towards both evocative and performative autoethnography, as it fits with the representation of the lived experience that is personalized, heartfelt, and critical. In addition, McIvor (2010) explains autoethnography as a form of narrative that links with the storytelling rituals of First Nations. As well, Kovach (2009) describes interpretative analysis as consistent with storytelling within tribal knowledge and speaks to autoethnography as contextual interpretation. Moreover, storytelling may foster resilience from colonialism and reveal the history not told by the dominant society (Thomas, 2005; Loppie, 2007). As an extension of traditional storytelling, autoethnography may express insights into lived experiences that foster resilience and interpretations that agitate awareness to oppressive forces. Furthermore, autoethnography yields the cultural perspective that intersects with socio-political circumstances resulting in an account revealing societal disproportions that may repel the reader (Ellis, Adams, & Bochner, 2011; Wall, 2008).

The lived experience as an autoethnography may enrich understanding of CKD and ESRD within a First Nations context. The author's personal perspective presented as an autoethnography may offer a perspective of health care

pertaining to CKD and renal transplantation from a particular social and cultural context. Recovering and rewriting one's history and culture becomes an act of social justice that personalizes and may promote healing collectively and through the self (Whitinui, 2013).

Ethical considerations

Smithers Graeme (2013) describes the researcher in autoethnography as both the subject and object without the privileged hierarchy of researcher over the subject and the inherent power differentials. The researcher is the participant in autoethnography and must expose the intricacies of their personal experience. McIvor (2010) compares autoethnography to nudity. Exposure of the author's personal life may provoke scrutiny of both the research method, as well as disapproval of the author (Ellis et al., 2011). In autoethnography, the subjectivity and influence of the researcher is unavoidable (Ellis et al., 2011). Ethnocentrism may be averted through the full explication of the epistemological position of the writer (Aboloso & Willet, 2005). In this, the situatedness of the researcher becomes transparent and contributes to the authenticity of the research (Bull, 2010). Autoethnography may also be rejected where research is fixated on the terms bias and validity, as applicable to quantitative methodologies. Establishing acceptance requires the authenticity and truthfulness or the credibility and verisimilitude, respectively, demonstrated by the accuracy and detail of the personal account (Ellis et al., 2011). The autoethnography needs to penetrate the reader with an open and frank discussion of events. Arising from a postmodern view, autoethnography swells beyond predictable generalizing and reductionism (Anderson, 2006; Denzin & Lincoln, 2011; Wall, 2008). Utilizing this method may enlighten readers of the intersections between health care and the broader dominating and colonizing sociopolitical and power structures.

Smithers Graeme (2013) depicts the diversity between First Nations peoples, but also the commonality of relational ways of being that interconnects the land with the spiritual, emotional, and social. In autoethnography, Smithers Graeme (2013) highlights the importance for autoethnography to adhere to the concepts of relationality, reciprocity, and respect, as depicted by Wilson (2008). This axiology is concerned with relationships that are respectful amid the researcher and participants, and even between the subject matter and the researcher. Furthermore, the researcher is pressed to adhere to the requisite for the development of a strong relationship where there is reciprocal sharing and giving back. There is the necessity to establish responsibility to the participant and all relations, as well as to the focus of the research (Wilson, 2008). Relational ethics links with autoethnography where the researcher must concede the relational aspects of their research and protection for privacy of individuals involved in their personal story (Ellis et al., 2011). Consent is necessary and autoethnographies are required to undergo ethical board reviews. Considerations for how well the consenting person understands the way they may be represented are imperative. Reviewing the accounts involving the person before the research proceeds is required (Ellis,

2007). Publication of the research entails that the researcher must endure in living with the exposure of their personal issues (Ellis et al., 2011).

Data collection

Techniques of data collection include field notes, photos, autobiographies, interviews, memoirs, and even artifacts to assist in the elucidation of the personal experience (Ellis et al., 2011; Chang, 2008). Autoethnographies may use the first, second or third person interchangeably to suit the situation described. The first person may be used to emphasize the very personal or sensitive moments and the second or third person may be employed to reiterate reports and aspects of dialogues (Ellis et al., 2011).

During the entire process, I was able to keep a folder of all medical trips and appointments with specialists. Additionally, I began a journal record of my experiences with the initial idea of sharing with my community to promote kidney health and transplantation that eventually became a presentation for my First Nations community and also the Aboriginal Nurses Association of Canada's annual conference. With this culmination of data pertaining to both of our experiences, I was able to organize the data of this experience for this autoethnographical account.

Research question

The research question that arises is: How does autoethnography of the lived experience of kidney donation contribute to the understanding of issues pertaining to CKD and kidney donation within the First Nations context?

Literature review

A literature review was conducted utilizing the key words *autoethnography* together with *First Nations*, *Aboriginal*, *Indigenous*, *kidney donation*, *kidney transplantation*, *chronic kidney disease*, and *end stage renal disease*, and the databases that included the Cumulative Index to Nursing & Allied Health Literature (CINAHL), Ovid MEDLINE, PsychINFO, Proquest dissertations, Cochrane, and Google Scholar. Although no studies were found that were specific to the autoethnography of the First Nations lived experience of kidney donation, three studies were identified as having relevance to this endeavour.

Richards (2008) provides an autoethnography of her experiences of CKD and kidney transplantation. Autoethnography is explained as having emancipatory and therapeutic potential and is well suited to delineate the lived experience. In addition, this article speaks to the way CKD and transplantation are often written about by others, namely medical professionals rather than the one experiencing it. The author also identifies the lack of documentation concerning the individual experience of ESRD and transplantation. In addition, it is explained how, for those of us who do not have a chronic illness, it may appear that the issues of all chronic illnesses overlap. However, the article emphasizes how each disease has its own unique language and set of issues. Richards (2008) goes further to describe the dehumanizing experience of medicalization, i.e., "...they saw me as a side of beef or an old suitcase, which decreased my

confidence in the experience" (p. 1719). Being the recipient of a kidney transplant improved health, but it also created a new experience of illness with profound unsettling fears emanating from the near-death experiences of the past.

Condiff (2009) completed a dissertation spotlighting the Ojibwe American Indians' experiences of organ donation and transplantation. Through Van Manen's (1990) phenomenological approach, a total of 10 participants received six questions prior to conducting semi-structured interviews. The process entailed coding transcripts and then identifying subthemes. Participants revealed both willingness and interest in encouraging organ donation. Issues for both organ recipients and donors included accessibility and wait times (Condiff, 2009).

A qualitative study conducted by Anderson, Devitt, Cunningham, Preece and Cass (2008) involved interviews to determine Australian Indigenous and non-Indigenous persons' narrative life stories concerning ESRD. Of the total of 241 participants recruited, 146 were Indigenous. The intention was to establish participants' perceptions and factors leading to ESRD. In contrast to the non-Indigenous participants, the Indigenous participants were described as being more perplexed and insufficiently informed with regards to their health. The Indigenous participants also revealed the stigma of alcohol use resulting in kidney disease (Anderson et al., 2008).

AN AUTOETHNOGRAPHY OF THE LIVED EXPERIENCE

In 2010, I was able to donate my kidney to my son. My son was 25 years old and had been experiencing a progressive decline in kidney function, as a result of having immunoglobulin A (IgA) nephropathy that was first diagnosed at the age of 16. Kidney disease was not foreign to us, as we had many First Nation relatives who have also experienced kidney disease. The First Nation community that we belong to and where we had previously lived was unlike most other remote communities in that it was accessible only by ferry. Being an island, accessing specialized nephrology medical services and dialysis entailed a half-hour ferry ride and an even lengthier road trip through hazardous weather conditions. For my son's grandmother or Nokomis (Ojibway for grandmother), travelling three times a week for hemodialysis for several years away from her home community became an arduous grueling lifestyle. In the winters, the water channel sometimes freezes resulting in cold, uncomfortable, and even hazardous experiences when crossing the ice by snowmobile or scooter. For the frail and unwell dependent on hemodialysis, having to make this trip at least three times a week indefinitely can be an overwhelmingly exhausting experience. As a result, many would move from their island homes, away from family and friends, to live in communities distant from their cultural ways to be closer to hemodialysis. Nokomis wanted to be at home and eventually proceeded to decline hemodialysis despite her physician's pleas to continue treatment. Although the word suicide was not spoken, it was creeping around the medical discussions. I myself struggled with the thought of equating refusing to dialyze with suicide. However, unlike

abruptly taking one's life, death happens naturally, as a result of kidney failure when dialysis is discontinued. At the same time, it made perfect sense to want to end this dependence on a machine, as there were no other alternatives. Kidney transplant was not an option at that time given her overall poor health. Freedom from hemodialysis would mean peace, no more tiring journeys, and an end to the pain and suffering. In a family meeting with the physicians and other health professionals of the hospital dialysis team, the decision was made to support the cessation of hemodialysis. This happened a week later in her home on the island, the place where she raised seven children and many more grandchildren. Diabetes led to her kidney failure and all this happened before turning the age of 60. I recall her speaking about her parents who lived until their 90s. Back then, they made their own medicine, grew their own crops, hunted and fished, and spoke only Ojibway. Nokomis went through the residential school system. Her own children were not raised to speak the Ojibway language. Speaking the First Nation languages was punishable in the residential school. Years later, her daughter would also come to require hemodialysis. The daughter had hoped for a kidney transplant but, unfortunately, died two years shy of her 50th birthday from complications related to an infection from the hemodialysis catheter. Nokomis's grandson, my son, would also develop ESRD.

For many First Nation peoples, as within my community, the need for hemodialysis is frequent. Hemodialysis provoked many feelings of fear, anxiety, and depression within our families. There were feelings of dread associated with the sterile, cold hospitals, and piercing steel needles and machines. Unlike the warm friendliness of home amidst beautiful lakes, rocks, and trees, we were often subjected to medicalized environments with people who did not know us or where we were from. There is a profound anguish that comes with ESRD, especially if you have already loved ones lost to kidney disease. With hemodialysis, it may mean a life controlled by a machine, where health and freedom are only a dream. Most of our relatives developed ESRD as a result of having diabetes, but my son did not have diabetes. At the time of diagnosis, the nephrologist had informed me that my son would likely require a transplant by the age of 21. The transplant, however, was not needed until he turned 25. At this point, my son's kidney function had deteriorated to ESRD. We were now facing dialysis, transplantation, death, or all of the above. This was fear at its worst, knowing full well through the horrendous experiences of our community and family relations, I was frenzied for the transplant to happen as soon as possible. Fortunately, I was able to attend the multiple visits with my son to the local regional kidney care centre that was essential in offering emotional support. As a nurse myself, I had an insider awareness of the health care system. I was familiar with the challenges of making appointments, the medical terminology, the objectiveness of medical professionals, hospital environments, and medical routines. During the long drives to the various appointments, I was able to converse with my son to describe the tests and the fears we both had. For my son, his illness came at an age when he was planning his

future career and was interested in forming relationships. My son had seen what had happened to Nokomis and I remember my son saying in a trembling voice, "I don't want hoses in my body, I won't have dialysis, I would rather die!" I shuddered, reminded of the hemodialysis experience of Nokomis—my tall, handsome, and young Anishinabe son, who should be in the prime of his life pursuing his dreams, was in a life-threatening situation! I hoped in vain that maybe the diagnosis could be wrong; maybe he could go on to fulfill his dreams of becoming a police officer, something he always said he wanted to be from a very young age. We sought a second opinion and travelled to the city to see another nephrologist. Unfortunately, we received the same sobering account from the second nephrologist, that my son's future career aspirations were highly unlikely given his physical status. In defiance, my son pushed ahead and successfully completed the police foundations studies, but with his seriously declining kidney function, the transplant was imminent. There were feelings of desperation and depression. Fear and anxiety crept into our lives like the unsympathetic icy cold and penetrating storms off the frozen waters in the winter. Life for us seemed cruel, unfair, chaotic, and confusing.

From the time of first diagnosis, I had volunteered myself as a kidney donor and was very keen about a pre-emptive transplant. Like a mother bear's instinct towards her cub, I had a very strong gut feeling about being able to offer my kidney, knowing it was the right thing to do. I knew I would need to be in the best physical health as possible. I was jogging more and more every day. This exercise was like an outlet for me, a way to escape the stress. I also became very conscious of my dietary intake and I was horrified at the amount of sodium in all the prepackaged foods. Bannock was sometimes served at community events, but I knew it was too salty to eat. I recalled when my son called in panic from his college residence explaining that he had eaten crackers and his blood pressure was way up as a result. He had been put on blood pressure medication, but his blood pressure was often out of control. Frightened for his health, I knew as the potential donor that his life might depend on my own physical health. The donor work-up required travelling long distances to attend the many medical tests at the major city hospitals. One appointment was on Christmas Eve and I was only able to attend because we had moved to the mainland. Living on the mainland allowed us to avoid the complications with arranging ferry schedules to medical appointments and travelling across the water channel during inclement weather and during the winter. Yet, it was away from the cultural heart of the community, away from relatives and the everyday unique experiences of living within a First Nations community. I was still employed on the island, but I had to miss a lot of work. Moreover, the expenses involved in transportation, accommodations, and meals were extremely distressing and an ongoing battle for reimbursement of costs with First Nations Non-insured Health Benefits (NIHB) ensued. Our requests were frequently denied, as we were not always able to obtain letters for the many complex

medical appointments that the NIHB prior approval process demanded. It was very tempting at times to feel desperate as if all odds were against going through the transplant, given the costs and geographical travelling challenges.

With the stress level peaking, I sought more than the physical relief from exercise could offer. During the time before the transplant, we did a lot of smudges and healing circles in my workplace that I felt relieved my mind and prepared me for the transplant. In smudging, I swished the smoke of sage over myself feeling the warmth and the hope for life. Like the sage smoke that billows up, I felt uplifted with a restored clear mind, cleansed from the torments that lingered and engulfed me in paralyzing agony. When we smudged together and in our healing circles, I felt supported and understood by the community.

It was a cold January night in the city and my son had been admitted into the hospital in preparation for the transplant the following day. I was sitting with him and he did not speak much, only to mention that he was wrought with fear and anxiety. He was pale and his expression was sad and fearful. I did my best to convey hope and optimism, but was tense and nervous myself. What if things went wrong, what if one of us dies during the surgery, what if the kidney fails...? My mind was in a spin. I knew that I required admission the following morning at 6:00 a.m. in preparation for the nephrectomy. Walking back to the hotel alone in the cold dark night on the empty city street, I felt so forlorn and troubled, but deep in my heart I felt this was the right thing to do. Before the surgery, my son's girlfriend brought him a tiny pouch of tobacco, one of the four sacred medicines. This, he said, greatly uplifted him and gave him hope and strength to persevere. I remembered the spirit rainbows and knew they were with us.

Soon after the transplant, the surgeon visited my hospital bed to report that my son's blood tests were returning to normal values. Despite my connection to the many intravenous lines, I felt like pouncing on the bed, I was elated—it was like a miracle! The news of his improved laboratory values signified the success of the kidney transplant and my gratitude surged for the entire hospital and medical staff. Four days later, I was discharged and returned home from the hospital. My son, on the other hand, had to remain hospitalized for another two weeks and then for the following month afterwards, he was required to find accommodations by the hospital so that he could be monitored. This entailed frequent blood work and adjustments to his anti-rejection medications crucial for the health of the transplanted kidney. This was an onerous financial burden. The NIHB prior approval process required multiple requests for letters from the hospital specialists and social workers to explain the grave need for regular medical monitoring after organ transplantation. Close proximity to the transplant hospital was essential. The stress of having to deal with the bureaucracy of NIHB was draining, given that we had just gone through the entire kidney transplant experience at a considerable distance from our homes, together with the need for convalescence after the various operations. Furthermore, our other family members who offered

much needed support also had to miss work, travel great distances, and also find accommodations. As status Indians, we were required to seek reimbursement through NIHB and my son's prior approval had been rejected on numerous occasions. At that time, we did not have the mental stamina to appeal or seek other funding sources and, as a result, the burden and financial strain fell upon our families and our community. I returned to work two weeks after being discharged from the hospital, whereas my son was not be able to return to work for several months.

Following the transplant, I provided presentations of my experience of CKD and kidney donation to our First Nations community and the Aboriginal Nurses Association of Canada. In both of these well-attended presentations, there were many stories shared that revealed curiosities and a genuine interest towards more information on CKD and kidney donation.

DISCUSSION

In autoethnography, as Richards (2008) depicts, there is the potential to open the door into the lived experience of CKD, kidney donation, and transplantation. The reflection of the lived experience in this regard may further the voice of the person, thereby empowering and offering a way for people with similar experiences to share and see that they are not alone. Similar to Condiff's (2009) findings, my experience within the unique First Nations context revealed an openness and interest in kidney donation. This is extremely significant given the enhanced quality of life with kidney transplantation versus hemodialysis, the resulting cost savings to the broader health care system and the higher prevalence of ESRD and the lack of kidney transplantation in First Nations (Arora et al., 2013; Canadian Institute for Health Information, 2013; Collier, 2013). Anderson, Devitt, Cunningham, Preece, and Cass (2008) and Condiff (2009) also both reveal the frustrations concerning issues with accessibility to health care. In this account, the difficulties and struggles with obtaining financial assistance with NIHB for accommodations and transportation are demonstrated. It becomes apparent that kidney transplantation is far more cost effective for the Canadian health care system than hemodialysis and, in light

of the disproportionate rate of CKD within First Nations, a supportive system that facilitates transplantation rather than impedes it should be the goal. Furthermore, the elements of the experience reflect on the broader issues including the difficulties involved for persons living in distant isolated communities to undergo life-sustaining treatments such as organ donation and dialysis and the way culture may offer resilience and mental health.

CONCLUSION

Overall, the experience of kidney donation was like an awakening and the writing of this autoethnography felt emancipating. I see things differently and feel particularly aware of the splendour of nature, of Mother Earth, and the Father Sun that emanate hope in living. There are still paralyzing fears, nightmares of losing a loved one, but I am reminded of the rainbows, of being interconnected with everything in the universe and the inspirational magnificence and mystery of life. "Let me walk in beauty, and make my eyes ever behold the red and purple sunsets" (Author Unknown, Anishinaabe Prayer). Gazing into my son's eyes, I see the life force and vitality returned. Like a double-edged sword, there is health now, but also the fear of illness recurring and of transplant failure and rejection. There are daily anti-rejection medications with many serious side effects, ongoing blood work, and medical appointments and tests. For myself, life with one kidney also requires close monitoring and adherence to a healthy lifestyle. There will always be stress, but the beauty and oneness with nature soothes and inspires hope and living. Synergies and reciprocal learning between culture, history, and medicine today are critical in furthering health and wellness (Iwama, Marshall, Marshall, & Bartlett, 2009). From this, it may be realized that an autoethnographic narrative of the lived experience may demonstrate the intersections of culture, history, and context towards enhanced awareness of the elements that may support or impede CKD and ESRD. Translating the lived experience of kidney disease through an autoethnography may further assist in the clarification of the intricacies involved to support kidney donation and transplantation in First Nations.

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An introduction to chemotherapy-associated nephrotoxicity

By Ian Pang, Karen Cameron, and Marisa Battistella

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With advances in therapy, patients with cancer are surviving longer. This aging population includes patients who have or are at risk of developing chronic kidney disease (CKD), either due to their cancer or treatments that have kidney-related complications. Unsurprisingly, there is a growing interest in understanding the relationship between oncology and nephrology, and a new field of onco-nephrology has emerged (Berns & Rosner, 2012; Kintzel, 2001). Thus, there is growing importance to understand how antineoplastic agents can affect the kidneys, and when and how antineoplastic drug doses may need to be reduced or discontinued.

Risk factors that can potentiate or contribute to antineoplastic-related renal dysfunction are related to both drug- and patient-specific factors (Merchan, Drews, & Savarese, 2015; Shirali & Perazella, 2014). Examples of drug-specific factors include their cytotoxic effect on cells, mechanisms of clearance, and concomitant use with other non-chemotherapeutic nephrotoxic agents. Examples of patient-specific factors may include intravascular volume depletion, comorbid conditions (e.g., congestive heart failure), and urinary tract obstruction due to an underlying tumour.

Many antineoplastic drugs used to treat malignant diseases can cause renal disease, which can range from a subtle injury (e.g., electrolyte imbalance) to acute renal failure requiring dialysis. The inherent nephrotoxicity of certain antineoplastic drugs is problematic since renal dysfunction can hinder continued anti-cancer treatment and impede use of supportive medications and measures (Kintzel, 2001). In addition, the kidneys are a major elimination pathway for many antineoplastic agents, and renal dysfunction can

delay excretion resulting in increased systemic toxicity. Therefore, it is important to recognize when dose adjustments are required for antineoplastic medications in order to limit exacerbating renal dysfunction and adverse effects from drug accumulation (Kintzel, 2001).

This article will review our understanding of common nephrotoxic chemotherapeutic agents, and highlight therapies with potential renal implications for a variety of targeted pathways. Table 1 lists the Health Canada approved indications for these agents, whereas Table 2 summarizes their associated nephrotoxicity, the dose adjustments required, and monitoring parameters.

STANDARD CHEMOTHERAPY

Many standard chemotherapy agents inherently cause nephrotoxicity (Table 3). Commonly used standard chemotherapies such as Cisplatin and Methotrexate have been well studied, and will be discussed in detail.

Cisplatin

Cisplatin is a platinum compound that inhibits DNA synthesis through formation of DNA cross-links. It is used to treat a broad spectrum of malignancies (Table 1).

Table 1: Health Canada-approved Oncological Indications

Drug	Health Canada Approved Cancer Indications
Standard Chemotherapy	
Cisplatin	Bladder, ovarian, testicular
Methotrexate	Acute lymphocytic leukemia, breast, bladder, choriocarcinoma, gastric, head and neck, non-Hodgkin's lymphoma, metastasis of unknown primary, osteogenic sarcoma, leptomeningeal spread of malignancies
Targeted Therapy	
Bevacizumab	Colorectal, lung (NSCLC), brain
Cetuximab	Colorectal
Crizotinib	Lung (NSCLC)
Panitumumab	Colorectal
Vemurafenib	Melanoma

Note: Many of the agents above have numerous uses in non-approved indications. This list is not meant to be exhaustive. (Source: Cancer Care Ontario)

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Table 2: Chemotherapeutic Agents Associated with Nephrotoxicity and Management Indications

Drug	Potential Renal Toxicity	Renal Excretion	Dose Adjustment in Renal Impairment			Monitoring
			Mild to Moderate CKD (30-90 ml/min)	Severe CKD (<30 ml/min)	Dialysis	
Standard Chemotherapy						
Cisplatin	Tubular necrosis, tubular abnormalities, hypomagnesemia	>90%	Yes 46–60 ml/min – 75% 30–45 ml/min – 50%	Discontinue	Yes	Creatinine, magnesium
Methotrexate	Acute kidney injury, crystal nephropathy	80–90%	Yes (give high dose only if > 60 ml/min)	Discontinue	Yes	Creatinine, Methotrexate level
Targeted Therapy						
Bevacizumab	Proteinuria, Hypertension, Thrombotic microangiopathy	No	No	No data	No	Creatinine
Cetuximab	Hypomagnesemia	No	No	No data	No	Magnesium
Crizotinib	Decreased eGFR, renal cysts	22%	No (when 30–60 ml/min use with caution)	50% dose	No data	Creatinine
Panitumumab	Hypomagnesemia, other electrolyte disorders	No	No	No data	No data	Magnesium
Vemurafenib	AKI	<1%	No data	No data	Possible (?risk of arrhythmia)	Creatinine

**Details regarding ‘what to do’ in the event of chemotherapy-associated nephrotoxicity are purposefully not included, as the clinicians must weigh the nephrotoxicity against the patient’s goal of therapy (e.g., if the chemotherapy treatment is curative in intent).*

Table 3: Standard Chemotherapies with Known Nephrotoxicity Risk

Carboplatin
Cisplatin
Cyclophosphamide
Gemcitabine
Methotrexate
Mitomycin
Nitrosureas
Pemetrexed
Streptozocin
Vinca alkaloids

Dose-related nephrotoxicity is one of its major adverse effects, occurring in about one-third of patients (Pabla & Dong, 2008). Onset of renal toxicity usually occurs three to 10 days after administration (Lameire, Kruse, & Rottey, 2011; Safirstein, 2007). Cisplatin has several mechanisms of nephrotoxicity such as vascular injury and an inflammatory response. However, the most common mechanism is injury and death of renal tubular cells exposed to the drug (Pabla & Dong, 2008). Uptake of Cisplatin in renal tubular cells is via the basolateral organic cation transporters (OCT) (Pabla & Dong, 2008), more specifically OCT2 (Ciarimboli et al., 2005). Once inside, Cisplatin can cause intracellular injury through a number of pathways, which can ultimately cause an increase in serum creatinine and lead to acute kidney injury (AKI) (Perazella, 2012). Saline hydration is usually given to prevent nephrotoxicity; however, the mechanism of protection is not known (Safirstein, 2007). Cisplatin can also cause a number of electrolyte disorders

including hypomagnesemia, which has been reported to affect as many as 90% of patients (Lajer & Daugaard, 1999). Hypomagnesemia can also increase in severity with subsequent treatment courses (Cancer Care Ontario, 2015). Intravenous magnesium can be co-administered to prevent complications of hypomagnesemia. Patients receiving Cisplatin should have their serum creatinine and magnesium monitored.

Methotrexate

Methotrexate is a folate antagonist that inhibits dihydrofolate reductase, ultimately inhibiting DNA synthesis, repair, and cellular replication. Although infrequent and often reversible, Methotrexate-induced nephrotoxicity can occur with high-dose Methotrexate therapy (1 to 15 g/m²) (Merchan et al., 2015; Schmiegelow, 2009; Widemann & Adamson, 2006). Nephrotoxicity is usually due to a phenomenon called crystal nephropathy, which occurs when Methotrexate precipitates in the renal tubules (Bleyer, 1978; Schmiegelow, 2009) causing tubular obstruction (Lameire et al., 2011). Precipitation occurs when urine pH is acidic. An increase of urine pH from 6 to 7 results in a 5-8 fold increase in Methotrexate solubility (Widemann & Adamson, 2006).

Risk factors for nephrotoxicity include intravascular volume depletion, acid urine pH, and underlying kidney disease (Perazella, 2012). Thus, prevention is geared towards maintaining adequate urinary output and urinary alkalisation (pH greater than 7.1) (Perazella, 2012) in order to reduce the risk of Methotrexate precipitation. This can often be achieved by giving intravenous (IV) hydration along with sodium bicarbonate before Methotrexate (Lameire et al., 2011; Widemann & Adamson, 2006). As well, Leucovorin (a Methotrexate rescue agent) is routinely given with high dose Methotrexate to replenish folic acid and reduce Methotrexate-associated toxicities, including nephrotoxicity. Monitoring of patients receiving high dose Methotrexate should include serum creatinine and Methotrexate levels.

TARGETED CHEMOTHERAPY

The next evolution of antineoplastic agents has been targeted therapies, which exert their anticancer effect by interfering with molecules involved in tumour growth and progression. It is important that clinicians understand the potential nephrotoxicity of these newer agents, and recognize that our knowledge of these agents is continually evolving.

Bevacizumab

Tumour growth is highly dependent on angiogenesis, which is the process of creating new vasculature. Vascular endothelial growth factors (VEGF) are a key regulator of this pathway, and many agents target VEGF, as their anti-tumour mechanism of action. In the kidney, VEGF is produced by glomerular podocytes and tubular epithelial cells, and bind to VEGF receptors found on mesangium, glomerular, and peritubular capillaries (Gurevich & Perazella, 2009). Bevacizumab is a humanized monoclonal

antibody that prevents VEGF from binding to its receptor. Unsurprisingly, it has kidney-related adverse effects (Eremina et al., 2008). The most common renal effects are proteinuria and hypertension, at 38% and 35%, respectively (Cancer Care Ontario, 2014a).

Eremina and colleagues (2008) reported six cases where patients on Bevacizumab developed proteinuria and thrombotic microangiopathy localized in the kidney. In their study, the authors postulated that the loss of VEGF inside the glomerulus leads to a loss of healthy fenestrated phenotypes and promotes the development of microvascular injury and thrombotic microangiopathy. This conclusion was supported by their animal experiments, where they removed the VEGF-producing podocytes in adult mice, which resulted in profound thrombotic glomerular injury. In most of the patient cases, renal function either stabilized or returned to normal, and proteinuria resolved after discontinuation of the agent (Gurevich & Perazella, 2009).

No guidelines currently are available on the treatment of proteinuria secondary to toxic effects from targeted therapies. The product monograph recommends holding Bevacizumab if proteinuria is equal to or greater than two grams in 24 hours, and to stop if nephrotic syndrome develops or the proteinuria of equal to or greater than two grams in 24 hours does not completely resolve (Cancer Care Ontario, 2014a). Antihypertensives should be used to control any pre-existing hypertension before therapy is initiated (Porta, Cosmai, Gallieni, Pedrazzoli, & Malberti, 2015), and Bevacizumab should be held if uncontrolled hypertension develops (Cancer Care Ontario, 2014a).

Cetuximab and Panitumumab

Cetuximab and Panitumumab are both monoclonal antibodies that are used in the treatment of colorectal cancer and competitively inhibit epidermal growth factor receptor (EGFR). Hypomagnesemia is a relatively common side effect for both Cetuximab and Panitumumab (Saif, 2008); their product monographs cite incidences of 43% and 39%, respectively (Cancer Care Ontario, 2014b, 2014c). It is thought that reabsorption of magnesium in the distal convoluted tube is, in part, dependent on EGFR activation, and that blocking EGFR likely impairs the active transport of magnesium from the urinary space back into the cells (Perazella, 2012; Saif, 2008). Magnesium should always be monitored, and management of hypomagnesemia depends on the severity but usually involves IV replacement (Perazella, 2012; Saif, 2008).

Crizotinib

Crizotinib is an oral small molecule inhibitor of the anaplastic lymphoma kinase (ALK) receptor tyrosine kinase. ALK gene rearrangements are found in non-small cell lung cancers (NSCLC). No renal side effects were reported in the initial phase one clinical trial, although adverse events in at least 10% of the safety population were reported (Camidge et al., 2012). Among the two largest clinical trials, 2% of patients had treatment-related renal cysts (Schnell et al., 2015). The mechanism of cyst development is unknown. Some cases have shown cysts regressing after the

discontinuation of Crizotinib (Lin et al., 2014). In another case, a patient who was asymptomatic to the cysts eventually spontaneously regressed with no Crizotinib cessation required (Klempner & Aubin, 2014).

A number of case reports have emerged regarding Crizotinib and increased serum creatinine (Gastaud et al., 2013; Martorell, Alvaro, Salguero, & Molla, 2014). In both cases, serum creatinine improved with Crizotinib cessation, though not always returning to baseline. Brosnan and colleagues (2014) retrospectively assessed a cohort of patients and calculated their estimated glomerular filtration rate (eGFR) for the first 12 weeks of Crizotinib therapy and after Crizotinib but before the introduction of any further systemic therapy (Brosnan et al., 2014). Using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation, they found an average decrease of 23.9% in eGFR during the first 12 weeks of treatment (N=38), and where data were available (N=16), a recovery by all participants to at least 84% of the baseline eGFR after Crizotinib cessation.

Vemurafenib

Vemurafenib is an oral small molecule inhibitor of the BRAF kinase, and is used to treat cancers such as melanoma caused by the BRAF (V600E) mutation. Launay-Vacher et al. (2014) reported a case series of eight patients who experienced severe renal impairment with Vemurafenib treatment. All patients experienced some degree of decreased eGFR, with five of eight improving or recovering with

Vemurafenib discontinuation. In one patient, acute tubular necrosis was seen on renal biopsy.

There is one published case report of a patient undergoing dialysis who initially developed a prolonged QTc, which persisted despite a subsequent dose reduction (Iddawela et al., 2013).

As QTc prolongation is a common side effect of Vemurafenib, this case report shows one instance of safe use of Vemurafenib in chronic renal failure, but demonstrates the importance of careful ECG monitoring required in this patient population.

CONCLUSIONS

Chemotherapy has improved survival for patients with cancer, and the field of oncology is continuing to advance with newer agents and treatment pathways. Most kidney effects are recognized after these agents are introduced into clinical practice and are described in case reports and series, therefore, all health care providers should have increased awareness and vigilance on how these agents can impact the kidneys (Perazella & Izzedine, 2015).

As well, clinicians should be able to provide preventative measures, when possible, and know how to monitor for signs and symptoms of nephrotoxicity. As the field of onco-nephrology continues to grow, patient care providers must work together to ensure proper management of patients with cancer and kidney concerns.

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- Which of the following drug-specific factors can contribute to renal dysfunction?
 - cytotoxic effect on cells
 - mechanisms of clearance
 - concomitant use with other nephrotoxic drugs
 - all of the above
- Which of the following is a reason why kidney dysfunction during anticancer treatment is problematic?
 - hinders giving treatment
 - impedes giving supportive medications
 - delays excretion of treatment resulting in potentially increased toxicity
 - all of the above
- What is the incidence of Cisplatin dose-related nephrotoxicity?
 - 20%
 - 30%
 - 40%
 - 50%
- What is Cisplatin's main mechanism of nephrotoxicity?
 - crystal nephropathy
 - injury and death of renal tubular cells
 - renal vascular damage
 - inflammation
- Which of the following is not part of reducing the risk of Methotrexate-induced nephrotoxicity?
 - IV hydration
 - sodium bicarbonate
 - ensuring urine pH > 7
 - magnesium replacement
- High dose Methotrexate is often given with what agent to reduce Methotrexate-associated toxicities?
 - Lansoprazole
 - Leucovorin
 - Levemir
 - Levothyroxine
- Which of the following are the two most common renal effects of Bevacizumab?
 - proteinuria and hypertension
 - UTI and hypertension
 - proteinuria and hyperkalemia
 - hyperkalemia and UTI
- What is the main monitoring parameter for Cetuximab and Panitumumab?
 - hypermagnesia
 - hypomagnesia
 - hyperkalemia
 - dypokalemia
- Which of the following targeted therapies does not have a Health Canada approved indication for treatment of colorectal cancer?
 - Bevacizumab
 - Cetuximab
 - Crizotinib
 - Panitumumab
- Which of the following chemotherapy agents does not have a known nephrotoxicity risk?
 - Cyclophosphamide
 - Pemetrexed
 - Streptozocin
 - Temozolomide

CONTINUING EDUCATION STUDY
ANSWER FORMCE: 2.0 HRS CONTINUING
EDUCATION

An introduction to chemotherapy-associated nephrotoxicity

Volume 25, Number 4

By Ian Pang, Karen Cameron, and Marisa Battistella

Post-test instructions:

- Select the best answer and circle the appropriate letter on the answer grid below.
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- a b c d

EVALUATION

	Strongly disagree		Strongly agree		
1. The offering met the stated objectives.	1	2	3	4	5
2. The content was related to the objectives.	1	2	3	4	5
3. This study format was effective for the content.	1	2	3	4	5
4. Minutes required to read and complete:	50	75	100	125	150

Comments: _____

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The Canadian Organ Replacement Register: Nursing's important contribution

By S. Joseph Kim and Alison Thomas

You are a charge nurse in a large hemodialysis unit in Ontario. One of the clerical staff has approached you today to assist with an update to her statistics on new and existing patients in your unit. You are asked to clarify the cause of death for one patient and to clarify the date of transfer to the home dialysis program for peritoneal dialysis on another patient. Finally, you are asked to remind the nurse practitioner (NP) to complete a registration form for another patient who has just started chronic hemodialysis in your unit. While you know the collection of data is important, there are lots of patients to look after and you feel frustrated by having to take time away from planning urgent hemodialysis requests—which are your priority—to source out information to complete a form. You reflect on this need for statistical data and wonder where the information on this form ends up and how it helps your patients who are living with end stage kidney disease (ESKD).

If you have ever been in charge in a hemodialysis unit in Canada, chances are the above scenario resonates with you. In all likelihood, the need to collect data for statistical reporting is not new or unique to your program and is incorporated into the day-to-day operations in your unit.

WHAT IS THE CANADIAN ORGAN REPLACEMENT REGISTER?

The Canadian Organ Replacement Register (CORR) is a national database that collects information on dialysis activities, organ transplants (both kidney and non-kidney), organ donation, and wait lists. If you reside in one of the provinces with a provincial renal agency such as British Columbia or Ontario, the statistics that you collect for your provincial agency will also populate CORR.

CORR has been in operation since the late 1960s and originally served as a renal failure registry for the province of Ontario. It was expanded in 1972 to serve as a national register with data submitted from all provinces. After a hiatus due to budgetary constraints from 1978 to 1981, the register was re-initiated and expanded in 1987 to include transplantation

of kidney and non-kidney organs and replacement therapies, and was renamed to the current “Canadian Organ Replacement Register”. Since 1995, CORR has been managed under the Canadian Institute for Health Information (CIHI), and produces an Annual Data Report that provides statistics on dialysis, organ transplants, waiting lists, and donors. The 2015 report can be viewed or downloaded on CIHI's website at <http://www.cihi.ca> (Moist et al., 2014).

What type of data is collected?

CORR data are collected from provincial programs such as the Ontario Renal Network (ORN) and the BC Renal Agency (BCRA), as well as participating dialysis and transplant centres and organ procurement organizations in Canada. Patients are registered from their first treatment type (dialysis or transplantation) until death. The only exception to this is if the patient is lost to follow-up. Patient demographics, risk factors, annual clinical monitoring, and follow-up are collected on all patients receiving dialysis or a transplant in Canada (CORR Metadata, n.d.).

How are the data used?

The data that are entered into the forms are analyzed and included in the annual CORR data report (<https://secure.cihi.ca/estore/>), which, in turn, is used in varied ways. For example, when the media prepare news stories about related topics, CORR data may be reported as part of the information provided on kidney disease in Canada. Health care organizations might also refer to CORR data when submitting proposals for expansion of services for patients with end stage kidney disease (ESKD), and researchers will often reference data from CORR in scholarly publications.

WHAT ARE THE IMPLICATIONS FOR NEPHROLOGY NURSES?

While data collection and form completion may seem like a “make work” project, the value of the data cannot be underestimated. As providers of information to the database, nephrology nurses are contributing to public education about kidney disease and organ transplant, research publications, and news reports, to name a few. Your role in supporting these initiatives through thoughtful completion of CORR data forms and annual updates is valued by those who rely on the data for these purposes. Your commitment to quality information through verification of items such as cause of ESKD and cause of death when completing forms is critical to maintaining a database that accurately reflects the landscape of ESRD and treatment in Canada.

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The dialysis technologist: What is our role?

By José Lloyd

“Can someone get one of the techs? This machine isn’t working right...”

Most of the staff members in the hemodialysis know that the dialysis technologists (techs) fix the hemodialysis (HD) machines but, of course, the role of the tech is much more than that. The technologist is the “translator” between what the machine is trying to “say” when an alarm occurs or when the treatment is not taking place as anticipated. The clinical staff are patient-focused, whereas the technical staff are equipment-focused. Both work together to ensure a safe and effective treatment. A technical staff member must have a good clinical knowledge base in order to resolve issues that may arise and be able to communicate well with the clinical staff. The technologist provides support to credentialed staff, as well as to patients in home hemodialysis (HHD). This often means having to maintain knowledge of several different types of HD machines. There can be many types of dialysis equipment within one program. Fortunately, there are service manuals and extensive training courses provided for each piece of equipment.

Technologists have many more responsibilities than assisting staff and patients during the dialysis treatments. They are responsible for verifying and maintaining all the water treatment equipment, as well as adhering to the quality assurance standards of those systems. Purified water systems provide water to the traditional dialysis unit. Portable water systems provide water in acute settings, as well as the water required in the ever-growing home programs. Both provide the first ingredient in the dialysis prescription.

Like the HD machines, there are several different types of water treatment systems that require maintenance, with each one having specific needs and maintenance schedules to follow. Along with the Reverse Osmosis Units, pre-treatment equipment is required. Pre-treatment equipment can include the following; (1) blend valves for tempering, (2) booster pumps to stabilize system pressure, (3) water softeners and scavengers to remove hardness and organic

carbons and their brine tanks, (4) carbon tanks for chlorine and organic matter removal, and (5) various size sediment and ultra filters, all of which require service.

This proves most challenging in the HHD program where each home can have differing qualities of potable water. There are also back-up water systems that require maintenance so that they are ready in case they are needed. Water treatment quality assurance and maintenance is the single most important item in the technical repertoire and is always the first priority. If the water is not acceptable, it increases the potential for harm and decreases the adequacy of the dialysis treatment.

Quality assurance is a big part of the technical routine. Testing must be done and standards maintained, otherwise patient safety and quality of treatment are compromised. Technologists ensure the performance of the HD/HHD equipment through scheduled maintenance, which can be likened to tune-ups on vehicles. Once the components are replaced, calibrations and verifications are performed. A simulation of the dialysis treatment is executed along with validating instruments, such as electrical safety analyzers and dialysate meters in order to confirm that the equipment is ready for use. Technologists also validate the performance of the water treatment systems through sophisticated water testing for endotoxins and bacteria levels. In addition, third party validation occurs on a regular basis, including analysis of chemical, endotoxin, and bacteria levels. A great resource quality assurance is the Technical Best Practices document, which can be viewed on the CANNT website or downloaded and printed from the Members Only section at www.CANNT.ca.

The dialysis technologist assists in the training of staff and patients on home hemodialysis, mainly in the area of water treatment. They are called upon during the selection of new dialysis equipment. There are additional areas that the technical staff are tasked to maintain, which include but are not limited to the following: (1) water treatment systems in other areas in the hospital setting such as endoscopy, medical device reprocessing and sterilization; (2) dialysis chairs, televisions, and scales; and (3) minor troubleshooting of ultrasound equipment used in body access in the dialysis setting, and electrical safety testing of peritoneal dialysis (PD) equipment. The list seems to continue to grow, proving that the technical staff are important members of the dialysis multidisciplinary team.

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Development of competencies for the use of bedside ultrasound for assessment and cannulation of hemodialysis vascular access

By Rosa M. Marticorena, Linda Mills, Kelly Sutherland, Norma McBride, Latha Kumar, Jovina Concepcion Bachynski, Carol Rivers, Elizabeth J. Petershofer, Joyce Hunter, Rick Luscombe, and Sandra Donnelly

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BACKGROUND

Bedside ultrasound technology for assessment and real-time cannulation of hemodialysis (HD) vascular access (VA) has become standard of practice in several HD units in Canada and worldwide (Schoch, Du Toit, Marticorena, & Sinclair, 2015). The main goal for embracing this technology is to provide the highest quality vascular access care for patients with end stage renal disease (ESRD) at any stage in the maturation process and with any degree of complexity of the vascular access (Donnelly & Marticorena, 2012).

As with most clinical procedures, the use of bedside ultrasound (US) requires specialized training. In many units, this is currently obtained with a series of didactic sessions and hands-on practice in simulation settings with phantom models prior to its use in the clinical setting with patients. In a collaborative approach, HD vascular access nurses throughout the country performing expanded roles in the use of bedside ultrasound technology identified levels of competency that can assist new users of this technology to practise safely and effectively, taking into consideration the degree of complexity of the vascular access under evaluation.

Basic ultrasound competencies can be achieved by most with daily practice and, as with any other hands-on procedure, “practice makes perfect”. It takes approximately 500 cannulations of combined new and complex accesses to achieve the highest level of competencies described in this document (Marticorena et al., 2014).

POSITION STATEMENT

Nurses who have attained advanced competency in the use of bedside ultrasound can function independently and can assess and cannulate accesses of varied complexity to allow for initiation of hemodialysis therapy safely and in a timely fashion. They can troubleshoot cannulation complications and function as mentors for nurses from the basic to the advanced level. The nurses will provide written documentation of their assessment and intervention in the patient's medical record. HD nurses who have attained the highest level of competency, as defined in this document, can be designated as Hemodialysis Vascular Access Advanced Users of Bedside Ultrasound.

TRAINING PROGRAMS

Policies, procedures, and educational programs incorporating ultrasound technology have been developed to assist HD nurses to attain competencies at both local institutional, regional, and provincial levels (i.e., St. Michael's Hospital's Access to Science in Hemodialysis symposia in Toronto since 2004; St. Paul's Hospital's Quarterly Vascular Access Mentorship Course events in Vancouver since 2011; and the University of Ottawa's Vascular Access Update courses since 2013). These educational programs are based on national recommendations (CANNT, 2015) and international guidelines (National Kidney Foundation Kidney Disease Outcomes Quality Initiative, 2006), and include didactic teaching, as well as hands-on sessions with phantom models and in the clinical setting with patients. Validation of the level of competency is done at the local level and under the supervision of an expert user. The trainees receive specialized education and training by local educational modules, by website educational resources, or a combination of both that include: (1) vascular anatomy and physiology (AnatomyZone, 2015), (2) web-based HD vascular access educational modules endorsed by the Ontario Renal Network and available via secure websites at the institutional level, (3) basic ultrasound physics (Hoffman, Rumsey, & Nixon, 2008), (4) operation of the ultrasound equipment, and (5) hands-on clinical assessment and real-time cannulation in accesses of varied complexities. All performance criteria are tested at each level of competency following completion of the training program. Advanced level of competency is achieved when all performance criteria are met at each level of competency described below.

PERFORMANCE CRITERIA AND COMPETENCY LEVELS

To promote and encourage safe use of ultrasound technology in HD, performance criteria and competency levels with their corresponding key skills are presented in this document. HD nurses who have reached an advanced level of competency have the ability to perform vascular access assessment using advanced knowledge and judgment to determine the level of access complexity, as well as to determine whether a cannulation procedure can be performed safely. HD nurses with advanced competency are knowledgeable regarding vascular anatomy and physiology, and surgical and diagnostic imaging procedures. They communicate effectively with all stakeholders (i.e., multidisciplinary team) and are able to mentor other nurses to obtain competencies from the basic to advanced levels.

Basic Competency Level

1. The HD nurse performs complete physical assessment of the access prior to utilizing the portable ultrasound:
 - Explains procedure to the patient or to the instructor during practice.
 - Demonstrates all three components (i.e., look, listen, and feel) as outlined in the self-learning package:
 - *Look:* Rolls up the sleeve; assesses the entire arm; looks for collateral vessels on forearm, upper arm, and chest wall; looks for redness, swelling, warmth, coolness compared to other arm, bruising, aneurysmal formations, or oozing

- *Listen:* Uses a stethoscope; starts at the anastomosis and listens to the entire length of the access paying attention to changes in the pitch of the bruit
 - *Feel:* Starts at the anastomosis and uses fingertips to palpate the entire vessel, noting areas that are deep, bulging, narrow, or hard; palpates for the thrill, which should be present at the anastomosis and diminish as the vessel is palpated upstream
 - Plans cannulation sites for both arterial and venous needles
2. The HD nurse demonstrates theoretical knowledge of the appropriate use of the portable ultrasound device in the following situations:
 - New access assessment: Identifies and correctly describes anastomosis, access depth, diameter, and length of cannulation segment
 - Small access diameter on clinical evaluation—diameter should be at least 0.6 cm for optimal cannulation (National Kidney Foundation Kidney Disease Outcomes Quality Initiative, 2006)
 - Deep access on clinical evaluation—depth of access should be less than 0.6 cm from skin surface for optimal cannulation (National Kidney Foundation Kidney Disease Outcomes Quality Initiative, 2006) and guide use of the appropriate needle length, i.e., standard 1 in., $\frac{3}{4}$ in. for shallow depth, and 1 $\frac{1}{4}$ in. for deeper access (Marticorena & Donnelly, 2012)
 - Cannulation of a new access until successfully needled with standard 15-gauge needles
 - Assessment for the presence of vein valves, collateral veins or vein branches, or veins that run adjacent to the fistula or graft, which may compromise optimal cannulation
 - Tortuous cannulation segments that are challenging to cannulate—the access should have areas of adequate length to accommodate a one-inch needle
 - Post-radiological or surgical intervention access assessment, i.e., selection of adequate cannulation area
 - Determination of degree of access thrombosis (i.e., absent bruit or thrill, firm to touch, pain) with or without visible erythema
 - Suspected access stenosis based on clinical evaluation by palpation and auscultation and on clinical indicators (e.g., change in the trend of dynamic pressures, inability to achieve prescribed blood flow, or decrease in access flow of 25% or greater)
 - History of difficult cannulation: multiple infiltrations, multiple needle insertions, or clot aspiration during cannulation
 - Location of peripheral venous access for venipuncture for blood draw or intravenous (IV) infusion in patients followed in the chronic kidney disease (CKD) clinic or in peritoneal dialysis with a history of difficult venous access as per hospital policy

3. The HD nurse demonstrates theoretical knowledge of the basic principles of ultrasound and can explain:
 - Basic physics in ultrasound use: the transducer as the source of energy and how sound waves are transmitted
 - Transducer parts: face, footprint, size, shape
 - Images in the screen: B-Mode (“brightness mode”, two-dimensional black, white and grey scale images), and Color Doppler Mode (two-dimensional colour image of blood flow)
4. The HD nurse demonstrates theoretical and practical knowledge of the operation of the ultrasound device:
 - Positions the ultrasound unit for direct visualization of the screen and maintains a comfortable position for scanning when possible
 - Positions the patient in comfortable position when possible
 - Turns on ultrasound unit and adjusts depth and gain
 - Locates the notch (marker) and tests the position of the probe with respect to the image on the screen
 - Understands importance of stabilizing probe on the skin surface: Holds the probe with hand stability and applies adequate pressure to scanning area (maintaining circular shape of vessel in short axis)
 - When finished, adequately disinfects and turns off the ultrasound unit and stores the ultrasound following manufacturer’s advice
5. The HD nurse demonstrates appropriate knowledge and actions when troubleshooting the ultrasound machine:
 - Portable ultrasound will not turn on: Checks that the power cord is plugged into the back of the device; plugs the other end of the power cord into an outlet to charge the device
 - Portable ultrasound image is too dark or too light for proper visualization: Adjusts gain or uses “Auto Gain” button if available; uses the quick user guide; reports appropriately to the technical department
 - Adjusts the depth for optimal visualization
6. The HD nurse demonstrates theoretical knowledge of three basic probe manipulations and their respective application:
 - *Sliding*: To assess the entire length of the access and locate any structure surrounding the vessel
 - *Rotation*: To change view from short axis to long axis and vice versa
 - *Compression*: To differentiate veins from arteries or determine thrombosis
7. The HD nurse utilizes the portable ultrasound to cannulate a phantom model in real-time in the presence of the instructor (at least 10 times or until all are demonstrated):
 - Locates phantom access in short and long axis
 - Demonstrates sliding probe manipulation when performing a longitudinal assessment along the cannulation segments of a phantom access
 - Demonstrates compression probe manipulation
 - Targets vessel in short axis
 - Introduces needle in short axis in the centre of the anterior phantom vessel wall
 - Locates needle tip in short and long axis
 - Demonstrates the rotation probe manipulation from short axis to long axis for needle advancement
 - Introduces needle in long axis and advances needle in long axis
 - Introduces needle in short axis and advances needle in short axis
8. The HD nurse utilizes the portable ultrasound to cannulate good functioning VA in real time in patients (at least three times in a fistula and three times in a graft):
 - Demonstrates sliding probe manipulation for assessment of the cannulation sites
 - Demonstrates compression probe manipulation to locate arteries surrounding cannulation sites
 - Demonstrates adequate probe positioning to target the vessel and determines vessel direction
 - Cannulates access in short axis and advances needle in long axis
 - Locates the tip of the needle in short and long axis
9. The HD nurse demonstrates knowledge of infection control practices and disinfection of the portable ultrasound device using disinfectant agents approved by the institutional Infection Control department following the manufacturer’s advice and as per institutional policy:
 - Examines the portable ultrasound device and probe prior to use for visible signs of blood; if present, thoroughly cleans with approved disinfectant for the ultrasound machine
 - Protects ultrasound probe with adequate cover in presence of open wounds, body fluid substance, or potentially infectious skin surface
 - When the examination is complete, thoroughly cleans the ultrasound probe and portable ultrasound device
10. The HD nurse demonstrates proper verbal and written communication of the following findings to the corresponding authorities (vascular access coordinator, physician, nurse practitioner, charge nurse, etc.) and documents in the appropriate section of the medical chart:
 - Diameter of 0.6 cm or less
 - Depth greater than 0.6 cm
 - Cannulation segment length less than 6 cm which does not accommodate hemodialysis needles available (needles are ¾ in., 1 in., or 1¼ in. length)
 - Hematoma that may compromise successful cannulation
 - Stenosis (50% decrease in diameter compared to baseline)
 - Thrombosis (indicated by partial or total occlusion of the access with flow verification by colour Doppler)
 - Any findings that the nurse feels may compromise successful cannulation

Intermediate Competency Level

1. The HD nurse demonstrates practical knowledge of the operation of the ultrasound for taking measurements, pictures, video clips, and the use of colour Doppler:
 - Uses calipers to measure depth, diameter, and length of the cannulation segment
 - Determines direction of the vessel
 - Identifies areas of uneven depth
 - Uses colour Doppler for patency assessment
 - Identifies collaterals and/or accessory vessels
2. The HD nurse demonstrates theoretical and practical knowledge of the five basic probe manipulations:
 - *Sliding*: To assess the entire length of the access
 - *Rotation*: To change view from short axis to long axis and vice versa
 - *Compression*: To differentiate veins from arteries or determine thrombosis
 - *Tilting*: To extend the plane of imaging front and back (locates the needle tip in a narrow acoustic window)
 - *Angling*: To extend the plane of imaging side to side (in irregular surface areas such as an aneurysmal formation)
3. The HD nurse utilizes the portable ultrasound to guide cannulation of vessels of irregular depth, diameter, and direction in phantom models in the presence of instructor:
 - Targets vessel in short and long axis
 - Introduces needle in short axis and advances needle in long axis
 - Introduces needle in long axis and advances needle in long axis
 - Introduces needle in short axis and advances needle in short axis
4. The HD nurse utilizes the portable ultrasound to cannulate VA in real-time selecting adequate needle size and appropriate angle of insertion in the presence of instructor:
 - New fistula: at least ten successful cannulations
 - New graft: at least ten successful cannulations
 - Tortuous fistula with long cannulation segments (greater than 6 cm)
5. The HD nurse demonstrates accurate understanding of ultrasound images and identifies the following:
 - Native vessel wall versus prosthetic graft wall
 - Presence of valves
 - Collateral vessels or vein branches (indicated by a vessel joining the fistula or branching out of the fistula and that may run underneath, beside or on top of the access)
 - Areas of vessel wall calcification or calcified valves
 - Presence of implants: coils, stents, surgical staples, metal cannulation guides (VWING)
 - Presence of aneurysms or pseudoaneurysms
 - Presence of stenosis indicated by a narrowing of the access greater than 50% of the baseline diameter: Uses ultrasound visualization to measure degree of narrowing

- Presence of partial or total thrombosis (unable to feel a thrill or hear a bruit, access very firm to the touch and painful without signs of inflammation or infection)
- Deep access unable to be palpated due to swelling, prior infiltration, or presence of hematoma
- Tortuous access challenging to cannulate (the access should have areas of adequate length to accommodate a one-inch needle, which maximizes the distance between the arterial and venous needles)

Advanced Competency Level

1. The HD nurse utilizes the portable ultrasound to cannulate VA in real time selecting adequate needle size and appropriate angle of insertion for the following in the presence of instructor:
 - Small fistula: less than 0.6 cm
 - Deep fistula: greater than 0.6 cm
 - Tortuous fistula: greater than 6 cm of straight cannulation segments
2. The HD nurse demonstrates advanced theoretical and practical knowledge of the portable ultrasound and identifies different types of artifact:
 - *Reverberation artifact*: repeated image of the same structure multiple times (with dialysis needles in short or long axis)
 - *Enhancement artifact*: visualization of structures that do not exist (a mirage of the same image underneath or beside the scanning area)
 - *Acoustic shadowing*: highly attenuating structures (bone, newly inserted graft, surgical implants)
3. The HD nurse utilizes the portable ultrasound to make measurements (in short axis and long axis) using calipers:
 - Edema, seroma, or any fluid collection
 - Perivascular hematoma or intramural blood collection
 - Thrombus within aneurysms or pseudoaneurysms
 - Aneurysmal and pseudoaneurysmal areas
4. The HD nurse utilizes the portable ultrasound to cannulate successfully (in short axis and long axis) in the presence of the following:
 - Stenotic areas (50% decrease in diameter or less) compared to baseline
 - Thrombosis (indicated by partial or total occlusion of the access) with flow verification by colour Doppler
 - Deep access: depth greater than 1 cm
 - Marginal access: less than 0.6 cm diameter
 - Tortuous access: cannulation segments of greater than 6 cm
 - Surgical staples and or other implants (stents, VWING, coils, etc.)
 - Hematoma: well defined or diffuse
 - Blood extravasation, back wall infiltration, intramural blood leak
 - Blood leak during first cannulation (successful cannulation and resolution of blood leak)
 - Partial thrombus or fibrin tail
 - Areas of gross edema, seroma, or other fluid collection
 - New graft: ePTFE, rapid use, Polyurethane
 - New HeRO graft

- Avoidance of stented areas
 - Identification of arterial and venous imaging sheaths post diagnostic imaging intervention
 - Post diagnostic imaging intervention in the presence of a single sheath for hemodialysis (when single needle HD is not available)
 - Buttonhole tunnel track location and indication of depth and direction for BH needle insertion
 - Cannulation infiltrations and incorrect needle placement requiring needle repositioning to reach target and obtain adequate pump speed during hemodialysis, respectively
 - Venipuncture or IV cannula insertion for blood collection or medication infusion in renal patients with very small peripheral vessels
5. The HD nurse has the ability to mentor a novice user of ultrasound and demonstrates the following:
- Holds probe to assist cannulation
 - Guides trainee in needle insertion in short and long axis
 - Corrects trainee's needle insertion to ensure cannulation is achieved without complications
 - Rescues unsuccessful needle placement
6. The HD nurse demonstrates theoretical and practical knowledge in the following measurements with bedside ultrasound:
- Locates tunnel tracks for BH
 - Measures VA velocity and volume flow with colour Doppler
 - Measures pulse wave velocities
 - Measures intimal-media wall thickness

SUMMARY AND CONCLUSIONS

Use of ultrasound for hemodialysis vascular access assessment and real-time cannulation requires specialized training. In order to obtain basic hand-eye coordination, theoretical sessions on ultrasound use, as well as practical sessions using phantom models are recommended prior to its use in the clinical setting with patients. New users of this technology need to consider that all competencies can be achieved with daily use of ultrasound at the bedside. It takes approximately 500 guided cannulations to achieve the highest level of competency described above.

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PROFILING...

2015 Award Winners

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ALLIED HEALTH PROFESSIONALS GRANT: NICHOLAS PHAN, BSc, TORONTO, ON



No bio available

RESEARCH GRANT NOVICE: LEE-ANNE HYER, RN, BScN, CNEPH(C), TORONTO, ON



Lee-Anne Hyer is a kidney transplant assessment co-ordinator at Toronto General Hospital. Lee-Anne has been working in nephrology since 1983. As a staff nurse, she worked in the in-centre hemodialysis setting and in a self-care satellite. She has worked as a clinical coordinator in self-care hemodialysis and, most recently, as a kidney transplant assessment co-ordinator.

Lee-Anne received her nursing diploma from George Brown College in 1978. She has maintained her Nephrology Nursing Certification since 1997. Lee-Anne received her Bachelor of Science in Nursing from York University in 2005.

Lee-Anne has presented several verbal and poster presentations at CANNT conferences and has participated in CANNT as a unit liaison.

RESEARCH GRANT EXPERIENCED RESEARCHER: ALISON THOMAS, RN(EC), MN, CNEPH(C), TORONTO, ON



Alison Thomas is a nurse practitioner in the hemodialysis unit at St. Michael's Hospital in Toronto. A nephrology nurse with more than 30 years' experience, her interests are in clinical hemodialysis care and quality, and patient safety. Alison has served on the CANNT Board of Directors, and was co-editor of the CANNT Journal until 2014. She was one of the recipients of a CNF Nursing Care Partnership research grant to study the impact of decision support interventions on hemodialysis patients with central venous catheters as vascular access in 2010. Her current research is looking at the use of a safety checklist to improve outcomes in the outpatient hemodialysis unit.

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TECHNOLOGICAL PRACTICE: RICKY LIN, VANCOUVER, BC



Ricky graduated from Simon Fraser University in 2001 with a Computer Science Degree. He graduated from British Columbia Institute of Technology in 2004 with a Financial Management Diploma.

He worked as a personal financial advisor from 2005 to 2008. Ricky has been working as a renal technician since receiving the Renal Dialysis Technician Certificate in 2008.

CLINICAL PRACTICE: HEATHER DEAN, RN, CNEPH(C), CALGARY, AB



Please refer to profile on page 36.

MENTORSHIP: JOHN MEANEY, RN, VANCOUVER, BC



John Meaney has been a hemodialysis nurse at St. Paul's Hospital since 2013. He graduated from the Winnipeg Health Science Centre School of Nursing and the Manitoba Nephrology Nursing Course (MNNC).

His previous dialysis experience includes peritoneal dialysis at Vancouver General Hospital and hemodialysis at Seven Oaks Hospital in Winnipeg, Manitoba.

John participated in the Vascular Access Mentorship Course at St. Paul's Hospital and currently orientates new staff in vascular access assessment and provides leadership for the nocturnal dialysis program. John is currently participating on a committee using the 5S tool to improve supplies management and efficiencies for staff on the hemodialysis unit. He is currently living in Vancouver, British Columbia.

EDUCATION: CRISA CARDENTE, RN, VANCOUVER, BC *No bio or photo available*

**CERTIFICATION OR RECERTIFICATION BURSARY
HEATHER DEAN, RN, CNEPH(C) – CALGARY, AB**

Please refer to profile on page 36.

**HAO PING SUNNY CHOU, RN, BSCN, CNEPH(C) –
BURNABY, BC**



Hao Ping Sunny Chou has been working as a registered nurse in St. Paul's Hospital hemodialysis unit since 2011. She has had a passion for nephrology nursing since the beginning of her nursing career. She graduated in 2007 and worked in a surgical and high acuity units for four years. She received her nephrology nursing specialty with distinction from BCIT in 2014. Sunny received her CNA nephrology certification in 2015; this has broadened and deepened her knowledge of nephrology. She was honoured to have this opportunity to receive a nephrology certification award. Sunny will continue to pursue her career in nephrology, commit herself to lifelong learning, and become a great advocate for patients.

Bursary and Grants

**FRANCA TANTALO: SHARON CALVERLEY, RN,
CNEPH(C) – OTTAWA, ON**



I have been in nephrology nursing at the Ottawa Hospital for 23 years, including general nephrology, hemodialysis, transplant and home dialysis as a staff nurse and, more recently, in a progressive leadership role as the Care Facilitator in the home dialysis unit, which specializes in peritoneal and home hemodialysis therapies. I initially obtained my certification in nephrology in 2003.

In CANNT 2012 in Ottawa, I had two oral presentations: *The Trials and Tribulations of Switching to Single Needle for Safety* and *PARADISE Almost Found: Realizing Peritonitis Analysis of Rates Advancing Dialysis Information and Staff Education*. I thoroughly enjoyed sharing my knowledge at CANNT with others. I also co-authored *Whose Choice Is It? Shared Decision Making in Nephrology Care*.

Last year, I decided to complete my Master of Nursing degree with a specialization in education through the Charles Sturt University in Australia, which has a distance education program. I hope to complete my Master's degree in October 2018.

**CANNT JOURNAL AWARD – LORI HARWOOD,
RN(EC), PhD(C), LORI WAZNY, PharmD, JO-ANNE
WILSON, BScPhM, ACPR, PharmD, LONDON, ON**

Recent changes in anemia management: The Kidney Disease Improving Global Outcomes (KDIGO) anemia guideline versus the Canadian Society of Nephrology (CSN)



Lori Wazny completed her Bachelor of Science in Pharmacy from the University of Manitoba, Doctorate of Pharmacy from the University of Minnesota, and Fellowship in Internal Medicine (Nephrology) from Virginia Commonwealth University. She is currently an Extended Practice Pharmacist with the Manitoba Renal Program in Winnipeg and a Clinical Assistant Professor with the University of Manitoba and University of Florida Schools of Pharmacy. Lori has published 46 research and review articles and book chapters in the field of nephrology.



Lori Harwood is a nurse practitioner in the Adam Linton Hemodialysis Unit, Victoria Hospital at London Health Sciences Centre. She is also an adjunct associate professor at the Arthur Labatt Family School of Nursing and School of Graduate and Post-doctorate Studies at Western University. She received her BScN from Ryerson University, her MSc from the University of Toronto and her PhD in Nursing from the University of Alberta.



Jo-Anne Wilson graduated from Dalhousie University, College of Pharmacy, in 1994 with her Bachelor of Science in Pharmacy. In 1995, she completed a hospital pharmacy residency at the Victoria General Hospital, Halifax, Nova Scotia. She then earned her Doctor of Pharmacy degree from the University of South Carolina in 1997. In 1998, Jo-Anne accepted a joint position with Dalhousie University, College of Pharmacy, and the QEII Health Sciences Centre where she was the Clinical Pharmacy Coordinator of the Thrombosis Anticoagulation program and assistant professor of pharmacy. She has also practised in cardiovascular medicine focusing on the management of diabetes, dyslipidemia, and hypertension.

Jo-Anne is currently the Clinical Pharmacy Coordinator with the Nova Scotia Health Authority Renal Program where she serves as a resource for medication-related issues, leads drug-related research initiatives, provides education to other health care professionals, and develops medication management protocols related to chronic kidney disease. She is also an associate professor with the College of Pharmacy, Dalhousie University, where she chairs the admissions program and teaches undergraduate students.

Jo-Anne's research focus includes thrombosis and anticoagulation, management of central venous catheter dysfunction, anemia management, drug pharmacokinetics and pharmacodynamics in hemodialysis, medication management, and immunization.

Jo-Anne has received several awards including an Accreditation Canada Leading Practice Award and a CSHP National Innovative Practitioner Award.

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CANNT MANUSCRIPT AWARD: MICHELE IVANOUSKI, RN, CNEPH(C) – LONDON, ON

Reaching New Heights: PD Training Goes To The Hometowns of Visiting Nurses

CANNT POSTER AWARDS:

First Place: Nikki Saran, BSN, RN and Amy Robin, BSN, RN – Vancouver, BC

Living Kidney Donor Process

Second Place: Krista Morgan, RN, BScN, CNeph(C), and Tammy McComb, RN, CNeph(C) – Peterborough, ON

Increasing Vascular Access, Home Modalities and Patient Satisfaction through the Implementation of a Dialysis Transition Unit

Third Place: Sudarshan Meenakshi Sundharam, CDT, and Vijiananthan Sivanandan, Toronto, ON

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SHARON LAPOINTE

Membership Coordinator

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SUSAN MASON

Website and Social Media

susan@cannt.ca



HEATHER REID

National Administrator

heather@cannt.ca

New CANNT Board Members

HEATHER DEAN, PRESIDENT ELECT



I graduated from the Misericordia School of Nursing in Edmonton in 1984, with an Award in Psychiatric Nursing. I worked as a staff nurse on medical/surgical units for the first 10 years of my nursing career. In 1996, I moved to Calgary and took a position with the Southern Alberta Renal Program on an inpatient renal unit. I have worked in the renal program ever since. My nephrology nursing experience has included working as a staff nurse in the in-patient renal unit, transplant, peritoneal dialysis, clinical nurse educator in hemodialysis, and my present position as nurse clinician at the South Calgary Dialysis Centre. I have a special interest in conservative care and end of life. I have had the privilege of working with a team of health care professionals who developed an end-of-life workshop to assist renal health care professionals to engage in difficult conversations. I have attended many workshops/conferences in regards to end-of-life issues and continue to advocate for the right to die with dignity. I am a member of the policy and procedure committee for the Southern Alberta Renal Program. I am the advanced care and vascular access resource nurse on my unit. My role of nurse clinician provides me the opportunity to advocate for our patients, my staff, and be a part of an excellent group of renal health care professionals who advocate for excellence in renal care.

I have attended several CANNT symposia including 1999, and 2010 to 2014. I was co-chair of the planning committee for CANNT 2011, Blazing New Trails in Calgary, and served two consecutive terms, completed in October 2014, as CANNT Western Vice-President.

I co-facilitate a one-day end-of-life workshop for renal health care professionals. The goal to improve the quality of interaction between end stage renal patients and their care providers, especially at the end of life. The program has been presented to more than 300 participants.

I am also a United Nurses of Alberta Ward Representative, board member of the Silverado Community Association and a CNA member.

I have participated in the Kidney March—a three-day 100 km walk—six times, and I am signed up to walk my seventh in 2016.

CATHY CAKE, VP ATLANTIC



I have been in nursing for 30 years since graduating from the General Hospital School of Nursing in 1985. After graduation, I worked in geriatrics while completing a Bachelor of Nursing degree. I then moved to oncology for the next five years. In 1992, I accepted a position in hemodialysis and have been involved with the nephrology program ever since. For the past 11 years, I have been in the position of clinical educator for Eastern Health in Newfoundland. Being the first in this position challenged me to develop the associated roles. It was during this time that I completed a Master's of Education degree in post-secondary studies in 2010.

I have been involved with many and varied committees and projects within nephrology, medicine and nursing including Nephrology Nursing Council, Regional Medication Safety, Professional Practice, and Association of Registered Nurses of Newfoundland and Labrador. I have also served on the CNA Examination Committee for the Nephrology Nursing Certification Program for the past two consecutive terms.

I have a passion for hemodialysis nursing and constantly strive to promote excellence through education, knowledge and evidence-based practice. I have been involved with CNA and CANNT and have attended CANNT conferences over the years, as well as other nephrology conferences and educational opportunities. I share my expertise by presenting at many local, provincial and national conferences including the National Vascular Surgeons Conference.

I am very excited to accept the VP Atlantic position and look forward to serving you!

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