CANNT|ACITN
Canadian Association of Nephrology Nurses and Technologists
l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie

CANNT JOURNAL
JOURNAL ACITN

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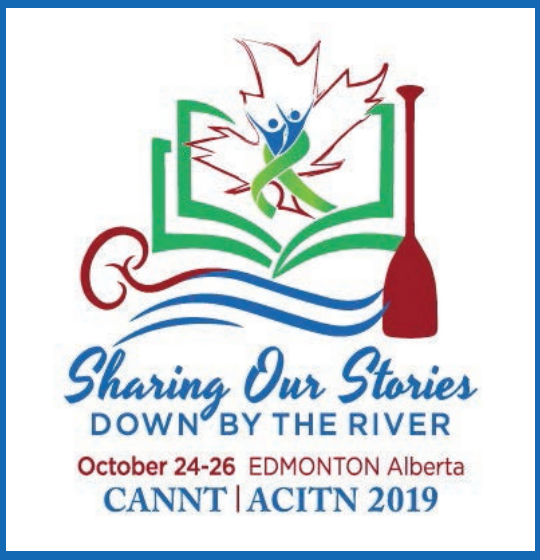

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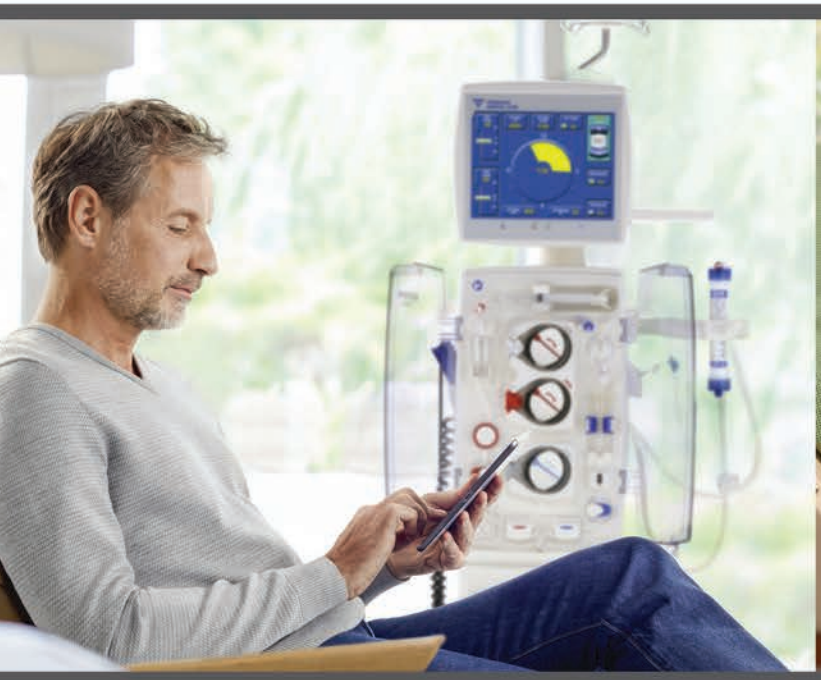

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JOVINA BACHYNSKI

Letter from the Editor

Changes are abounding in CANNT and the *CANNT Journal*. I wish to acknowledge our outgoing regional vice-presidents from technology (José Lloyd), Quebec (Nancy Filteau), Ontario (Rosa M. Marticorena) and Western (Rick Luscombe). I have worked alongside José, Nancy, and Rick for almost the entire time of their tenure at CANNT, and it has been a wonderful experience. We welcome Marc Heroux (VP Technologists), Patty Quinan (VP Ontario), Jerrica McKinnon (VP Quebec), and Deidra Goodacre (VP Western). In addition, Rosa has come on board as a co-editor at the *CANNT Journal*. Rosa brings her immense wealth of knowledge in nephrology clinical research and practice to the co-editor role – she will be an immense asset to the editorial team. CANNT is very fortunate to have such committed individuals such as the aforementioned working to advance the agenda of the organization and its members. The editorial team at the *CANNT Journal* wish the outgoing VPs well – not goodbye, mind you, because one never says goodbye at CANNT. Once we form a connection, we remain connected through time and distance. We shall see you around, José, Nancy, and Rick, and welcome aboard, Rosa.

In this issue, in our lead article, *The shortage of expert nephrology nurses and patient quality care indicators: A quantitative cross-sectional study*, Gaietto and Brooks investigate the impact of expert nephrology nurses on patient quality indicators. Interestingly, anemia and dialysis adequacy were associated with greater nephrology nursing experience, whereas the lower mortality rate was associated with higher level of nursing education. This article is a nod to the overall medical complexity of the individuals we care for. In our CE article, Lau and Battistella discuss the role of *potassium* binding agents (patiromer and sodium zirconium cycloscilicate) for the treatment of hyperkalemia. Although these agents are approved by Health Canada, they remain novel in practice.

We are preparing once again for the upcoming CANNT symposium in Edmonton (*Sharing our stories down by the river*) this October. In this year's line-up of plenary and concurrent sessions, as well as poster presentations, the speakers and authors once again showcase the diverse issues that are front and centre in our nephrology practice. Over the years, the program committee for the annual symposium has striven to be inclusive of members' affiliated interests, and this year is no different – there is something for everyone. We tip our hats to this year's program committee for keeping up with this tradition.

See you in Edmonton!

Sincerely,
Jovina Bachynski, MN, RN(EC), CNeph(C)
Editor-in-Chief,
CANNT Journal

Erratum: Oral abstract presentation

CALCIPHYLAXIS (CALCIFIC UREMIC ARTERIOLOPATHY): A CASE OF A MULTI-INTERVENTION APPROACH

Paulina Bleah, MN, NP-PHC – Department of Nephrology, University Health Network, Toronto, ON

The author would like to note that sevelamer hydrochloride (Renagel®) was administered instead of sevelamer carbonate (Renvela®), as reported in the abstract published in the CANNT Journal, 29(2), 22, and in concurrent session abstract 5B.

JOVINA BACHYNSKI

Lettre de la rédactrice en chef

Les choses bougent beaucoup à l'ACITN et au *Journal ACITN*. J'aimerais remercier nos vice-présidents régionaux sortants, José Lloyd (technologie), Nancy Filteau (Québec), Rosa M. Marticorena (Ontario) et Rick Luscombe (Ouest). J'ai travaillé avec José, Nancy et Rick pendant presque toute la durée de leur mandat à l'ACITN et ce fut une merveilleuse expérience. Bienvenue à Marc Heroux (vice-président, technologie), à Patty Quinan (vice-présidente, Ontario), à Jerrica McKinnon (vice-présidente, Québec) et à Deidra Goodacre (vice-présidente, Ouest). Par ailleurs, Rosa est maintenant corédactrice en chef du *Journal l'ACITN*. Ses vastes connaissances dans la pratique de la néphrologie et en recherche clinique dans ce domaine seront d'une grande utilité pour le poste de corédactrice en chef; elle représente un atout considérable pour l'équipe de rédaction. Nous nous estimons privilégiés de pouvoir compter sur des gens aussi dévoués que les personnes susmentionnées pour mettre en œuvre le programme de l'organisation et de ses membres. L'équipe de rédaction du *Journal l'ACITN* souhaite bonne chance aux vice-présidents sortants; notez bien que nous ne leur disons pas au revoir, puisqu'ils feront toujours partie de l'ACITN. Une fois que les liens sont créés, nous demeurons liés les uns aux autres malgré le temps et la distance. À un de ces jours, José, Nancy et Rick, et bienvenue parmi nous, Rosa!

Dans notre article principal de ce numéro, « The shortage of expert nephrology nurses and patient quality care indicators: A quantitative cross-sectional study, » Gaietto et Brooks étudient l'incidence du personnel infirmier spécialisé en néphrologie sur les indicateurs de qualité des patients. Fait intéressant, le niveau de satisfaction des patients pour ce qui est du traitement de l'anémie et de la dialyse était associé à une plus grande expérience en soins infirmiers en néphrologie, tandis que le plus faible taux de mortalité était associé à un niveau d'éducation supérieur en soins infirmiers. Cet article se veut un rappel de la complexité médicale générale des personnes que nous soignons. Dans notre article de formation continue, Lau et Battistella abordent le rôle des agents liants du potassium (le patiromer et le cyclosilicate de zirconium sodique) dans le traitement de l'hyperkaliémie. Bien que ces agents aient été approuvés par Santé Canada, ils demeurent nouveaux dans la pratique.

Nous nous préparons une fois de plus pour le congrès annuel de l'ACITN, qui se déroulera à Edmonton en octobre prochain. Le thème de cette année, « Sharing our stories down by the river, » met l'accent sur le partage d'expériences. Dans la série de séances plénières, de séances simultanées et de présentations par affiches, les conférenciers et les auteurs mettront une fois de plus en lumière les divers enjeux qui sont au cœur de l'exercice de la néphrologie. Au fil des ans, le comité responsable du programme du congrès annuel s'est efforcé de tenir compte des intérêts des groupes affiliés, et cette année ne fait pas exception; tout le monde y trouvera son compte! Nous levons notre chapeau au comité responsable du programme de cette année pour avoir perpétué la tradition.

Au plaisir de vous voir à Edmonton!

Cordialement,
Jovina Bachynski, M. Nurs., Inf. aut. (FC), CNéph(C)
Rédactrice en chef,
Journal l'ACITN

Le *Journal ACITN* est la publication officielle de l'Association canadienne des infirmiers/infirmières et technologues en néphrologie, a/s 4, rue Cataraqui, bureau 310, Kingston (Ontario) K7K 1Z7.

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JANICE MACKAY

Message from the President

Dear CANNT members, colleagues, partners, sponsors and friends,

As I prepare to write this message, I reflect upon the events in my personal life that have influenced the theme of my message in this issue. In order to provide context to these recent events that my family has experienced, I must first provide you with a brief description of my family.

I have been happily married for 33 years to my high school sweetheart whom I began dating at the age of 15. We have two beautiful children. Our daughter is 26 and lives with her boyfriend whom we consider our son now. My husband and I are fortunate that their condominium is very close to our home. She has a Bachelor of Nursing and practises in a teaching hospital. My son is 28, and married an amazing young woman (who also has a Bachelor of Nursing) three years ago. They bought a beautiful home close to us and decided to start a family of their own. This was the happiest news for our family and her family. We all live close to one another, and communicate, celebrate, and holiday together often, and we are blessed to have each other. Although this may sound like a storybook, believe me we have our difficulties in life as well. We looked forward to our weekly updates on how our expectant "Mom" and "Babymac" (as he was affectionately named) were doing. As the due date grew closer, I am sure we became pests asking for updates on how she was feeling and then providing those words of encouragement—"hang in there", "any day now", "he can't stay in there forever", "enjoy this time with having him all to yourself". As her due date came and went, we received an update on the date that "Babymac" was getting his "eviction notice" by virtue of induction.

I am not going to describe at length the events that surrounded her admission, induction, and long hours of labour, eventual C-section, fleeting moment of parental bliss and tender moments with their newborn son, followed by a return to the OR, post-op stay in ICU, and now a long recovery with a healthy baby boy. When I was comfortable that everything was going to be okay, I sat back and thought to myself, "How could anyone without loved ones around have managed through this? Who would be their help, their voice, and their support?" Our family rallied to support our children and grouped together to ensure that they were supported. We all observed, assessed, sought information, arranged, and acted in caring for our family.

Merriam-Webster defines an advocate as a person who pleads another's cause, or who speaks or writes in support of something. We, as renal healthcare professionals, have a paramount role in being advocates for our patients. This is a momentous responsibility. Advocacy matters—and how you convey this to your patient is so important to their well-being, their sense of trust, and their health outcomes. Thank you for advocating for the best renal care for those living with kidney disease.

The Canadian Nurses Association's (CNA's) annual meeting was held on Saturday, June 1, 2019 at the Simon Fraser University in Vancouver, BC. Members of the Board of Directors were elected at this meeting. President Claire Betker and CEO Mike Villeneuve provided an overview of the accomplishments of the CNA over this past year. Of important note, the marketing firm Venture Communications shared the work it is doing on CNA's brand strategy. There were six resolutions approved by the CNA executive. These resolutions will focus on policy and programs. You can find more information on this meeting here: **https://www.cna-aiic.ca/en/about-us/meeting-of-members**

The Canadian Association of Nephrology Nurses and Technologists is a conduit that can bring us together—whether it is at our annual CANNT conference, through social media, through our website, or our newsletter. I encourage your involvement, engagement, and participation

in CANNT. Together we can strengthen our association and continue to advance our profession, advocate for the interests of our membership, and provide value to our community of renal professionals.

I hope to see you at CANNT/ACITN 2019 in my home province of Alberta! Here are a few of the benefits to your attendance. Our conference will provide you with the following:

- Information and ideas that will help demonstrate to our patients our commitment to staying informed and being knowledgeable of important issues and procedures
- Three days for networking opportunities with nephrology professionals, including: registered nurses, technologists, doctors, pharmacists, dietitians, and industry representatives
- Fifty in-depth sessions on various topics including clinical outcomes of home hemodialysis, dying with dignity, the role of the biomedical engineer in dialysis, transplantation, and much more
- Fifteen posters with their authors available to answer professional practice questions
- Six hours of plenary sessions

I sincerely look forward to "Sharing our Stories Down by the River" with you at CANNT 2019. **https://www.canntconference.com/2019/program/**

With warm support to all,
Janice MacKay
CANNT President 2018–2020

ADDENDUM: ORAL ABSTRACT PRESENTATION

The JUNO goes to living kidney donation—Starring Kidney Paired Donation

Clay Gillrie, MSN, BScN, RN – Senior Program Manager, Living Donation and Transplantation, Canadian Blood Services

Living kidney donation and the Kidney Paired Donation (KPD) program continue to evolve in Canada. Despite the benefits of living donation, and the enormous potential to impact transplant waitlists, there are still significant barriers to overcome in educating healthcare professionals and the public, and increasing living kidney donation rates.

This presentation will briefly outline the evolution of living kidney donation in the Canadian context including the past, present, and future. Common myths and misconceptions about living donation will be explored, current challenges and issues will be described, and current national initiatives to advance living kidney donation will be outlined. The narrative will include the evidence and support that makes living kidney donation the JUNO winner for best transplant option and best graft outcomes, and will describe how one national registry program has become the starring character in the living kidney donation story in Canada—The Kidney Paired Donation program, which, to date, has facilitated 691 transplants across the country.

All the instagrammable facts about the Kidney Paired Donation program will be described! You will hear the red-carpet highlights such as who should consider KPD, why KPD deserves a star on Canada's Walk of Fame as an option for some patients, and all the potential benefits to patients participating in the program. Come learn how KPD works and how thoroughly living donors are assessed using the Canadian KPD eligibility protocol to ensure the risk of donation is as low as possible. The session will finish up with some interesting post-JUNO party favourites—statistics you will want to share with colleagues and patients, case examples of how living donation has helped some very hard-to-match transplant candidates find a donor and receive a transplant, and how living donation can improve the quality of life for the real JUNO winners—individuals needing a kidney transplant!

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JANICE MACKAY

Le mot de la présidente

Chers membres de l'ACITN, collègues, partenaires, commanditaires et amis,

Tandis que je me prépare à écrire ces mots, je repense aux événements qui se sont déroulés dans ma vie personnelle et qui m'ont inspiré le thème du message qui vous est adressé dans ce numéro. Afin de mettre en contexte ces événements que nous avons vécus récemment, je dois d'abord vous décrire brièvement ma famille.

Je suis mariée depuis trente-trois ans à mon amour de jeunesse, avec qui je forme un couple heureux depuis l'âge de 15 ans. Nous avons deux magnifiques enfants. Notre fille de 26 ans habite avec son amoureux, que nous considérons désormais comme notre propre fils. À notre grand bonheur, leur immeuble en copropriété est situé très près de chez nous. Notre fille est titulaire d'un baccalauréat en sciences infirmières et travaille dans un hôpital universitaire. Mon fils de 28 ans a épousé, il y a trois ans, une jeune femme extraordinaire, elle aussi titulaire d'un baccalauréat en sciences infirmières. Ils ont acheté une belle maison près de chez nous et ont décidé de fonder leur propre famille. C'était la plus heureuse des nouvelles pour notre famille et la sienne. Nous vivons tous près les uns des autres, avons une belle communication, célébrons et passons souvent nos vacances ensemble; bref, nous avons la chance de pouvoir compter les uns sur les autres. Bien que mon histoire puisse sembler tout droit sortie d'un livre de contes, croyez-moi, nous avons aussi nos moments difficiles! Chaque semaine, nous étions impatients d'avoir notre compte rendu chaque semaine de l'état de santé de la future maman et de « bébé Mac », comme nous l'avions affectueusement surnommé. À l'approche de la date d'accouchement, nous sommes très probablement devenus assez casse-pieds, lui demandant sans cesse comme elle se sentait, avant de lui ressortir les fameuses phrases d'encouragement du type « tiens bon », « ce n'est plus qu'une question de jours », « il ne pourra pas rester là-dedans pour toujours », « profites-en pendant que tu l'as pour toi toute seule »... La date d'accouchement est arrivée, puis elle a été dépassée, et nous avons finalement été informés de la date où « bébé MAC » recevrait son « avis d'expulsion » par déclenchement artificiel du travail.

Je ne raconterai pas en long et en large tout ce qui s'est passé lors de son admission, du déclenchement du travail et des longues heures de travail, mais je peux vous dire que ça s'est terminé par une césarienne. Après un instant fugace de bonheur parental et de tendres moments passés avec son fils nouveau-né, ma belle-fille a dû retourner sur la table d'opération. Après un séjour postopératoire au service de soins intensifs, elle est maintenant en processus de rétablissement, avec un beau garçon en pleine santé. Une fois que j'ai été certaine que tout irait bien, je me suis détendue et me suis posé la question suivante : « Comment une personne seule, sans êtres aimés, aurait-elle pu passer à travers cette épreuve? Qui aurait été là pour l'aider, parler en son nom et la soutenir? » Notre famille s'est mobilisée pour soutenir nos enfants et pour veiller à ce qu'ils reçoivent tout le soutien nécessaire. Nous avons tous observé et évalué la situation, puis cherché de l'information. Nous nous sommes organisés et avons agi pour le bien de notre famille.

Selon le dictionnaire, le terme « défenseur » se définit comme quelqu'un qui plaide la cause d'une autre personne, qui parle d'une cause ou qui écrit pour appuyer une cause. En tant que professionnels des soins de santé en néphrologie, nous avons un rôle primordial à jouer comme défenseurs des droits de nos patients. Il s'agit d'une responsabilité colossale, et la façon dont cette responsabilité se traduit auprès de vos patients a énormément d'importance pour leur bien-être, leur sentiment de confiance et les résultats sur leur santé. Merci de plaider en faveur des meilleurs soins néphrologiques possible pour les personnes atteintes d'une maladie rénale.

L'assemblée annuelle de l'Association des infirmières et infirmiers du Canada (AIIC) a eu lieu le samedi 1er juin 2019 à l'Université Simon-Fraser, à Vancouver, en Colombie-Britannique. Les membres du conseil d'administration ont été élus à cette occasion. La présidente, Claire Betker, et le chef de la direction, Mike Villeneuve, ont donné un aperçu des réalisations de l'AIIC au cours de la dernière année. Il importe de souligner que l'entreprise de marketing Venture Communications a partagé le travail qu'elle effectue sur la stratégie de marque de l'AIIC. Six résolutions ont été approuvées par le conseil d'administration de l'AIIC. Ces résolutions seront axées sur les politiques et les programmes. Pour en savoir plus sur cette réunion, cliquez ici : **https://www.cna-aiic.ca/fr/a-propos-de-nous/assemblee-des-membres**.

L'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) est un intermédiaire qui a pour but de rassembler tous les membres de la communauté, que ce soit lors du congrès annuel, sur les médias sociaux, par notre site Web ou par notre bulletin d'information. Je vous encourage à participer aux activités de l'ACITN. Ensemble, nous pouvons renforcer notre association et continuer de faire progresser notre profession, de défendre les intérêts de nos membres et d'ajouter de la valeur à notre communauté de professionnels de la santé en néphrologie.

J'espère vous voir au Congrès annuel 2019 de l'ACITN, qui se tiendra dans ma province natale, l'Alberta! Voici quelques avantages que vous tirerez de votre participation à notre congrès :

- Renseignements et idées qui contribueront à démontrer à nos patients notre détermination à rester informés des questions et des procédures d'importance;
- Trois jours de réseautage avec des professionnels de la néphrologie, notamment des infirmières autorisées et infirmiers autorisés, des techniciens et techniciennes, des médecins, des pharmaciens et pharmaciennes, des diététistes ainsi que des représentants et représentantes de l'industrie;
- Cinquante séances exhaustives sur divers sujets, notamment les résultats cliniques de l'hémodialyse à domicile, le concept « mourir dans la dignité », le rôle de l'ingénieur biomédical en dialyse, les greffes et plus encore;
- Quinze affiches seront présentées et leurs auteurs pourront répondre à des questions liées à la pratique professionnelle;
- Six heures de séances plénières

Je suis impatiente d'entendre les expériences que vous aurez à partager lors du congrès annuel 2019 de l'ACITN : **https://www.canntconference.com/2019/program/**.

Salutations cordiales,
Janice MacKay
Présidente de l'ACITN (2018-2020)

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Your Board in Action

Hello, CANNT members! I hope everyone had a wonderful summer. Your Board of Directors has been working on a number of initiatives that I would like to share with you.

Members of the Board are currently reviewing the vascular access guidelines and the nephrology nursing and technical standards with much support from our nephrology colleagues with expertise in these areas across Canada. These reviews are a major task and their volunteer work is greatly appreciated!

The Board has also been working on more partnerships with other organizations. We are still in the early stages of these partnerships, and will provide updates as we move forward. The CANNT Atlantic Conference held in May 2019 was extremely successful—kudos to Cathy Cake, VP Atlantic. We are continuing to upgrade our website to provide current and relevant information to our membership. The quizzes for the Continuing Education Series are now available.

MEMBERSHIP

We currently have a membership of 421 renal professionals as of August 2019. The Board of Directors continuously evolves to provide enduring benefits to all our members. I am seeking input from our valued membership, and I want to hear from you on ways to increase our association membership. Please share your thoughts with us by contacting the CANNT National Office team at **cannt@cannt.ca** or at 613-507-6053.

Membership is vital to CANNT, as it is an association run by membership. There are many advantages to becoming a member of CANNT:

- Member access to the online *CANNT Journal*
- Access to **www.cannt.ca** "Members Only" section
- Reduced rates at the annual nephrology symposium
- Access to *CANNT Nephrology Nursing Standards and Practice Recommendations* and the *CANNT Standards of Nephrology Technical Practice*
- Promotion of and support for the specialty certification in nephrology (CNeph [C])
- Continuing education opportunities—through the journal, online webinars, and continuing education units (CEU)
- Opportunities to recognize excellence in practice with yearly awards
- Access to educational bursaries and research grants
- Promotion of evidence-based practice
- Collaboration within the nephrology community.

Maintaining your yearly membership in CANNT assists with the long-term viability of our association.

JOURNAL

Guidelines for journal article submission can be found under the "CANNT Journal" section of the CANNT website. E-mail your manuscript to Rosa Marticorena and Jovina Bachynski at: **cannt.journal1@gmail.com**. Details of the submission guidelines for authors can be found at: **https://cannt-acitn.ca/cannt-journal/**

The CANNT Journal is published four times per year in electronic version. Scientific articles are peer-reviewed. Manuscripts that present new clinical information or address clinical practice issues of special interest to nephrology nurses and technologists are accepted. Corporate sponsored education and advertising opportunities are also available.

COMMUNICATIONS

We continue to develop new strategies for engaging our members, and communicating timely and relevant information to our membership. Your *CANNT Connection* is our bi-monthly email that provides strategic, targeted, personalized, and properly segmented information to our members. Additionally, we try to keep the content simple, direct, to the point, and useful with a goal to engage members on continuous basis. If you have a question, idea or event to promote please speak to our Director of Communications, Ethan Holtzer.

CANNT website (www.CANNT.ca)

Twitter: CANNT (@CANNT1)

ANNUAL CONFERENCE

CANNT 2019 is themed "Sharing Stories Down by the River," and your conference committee is working hard to create an innovative and exciting program to meet the needs of nephrology professionals from novice to advanced practice. We hope to see you in Edmonton on October 24–26, 2019.

FINANCES

As a "Not for Profit" professional association, our objective is to provide value to our members that aligns with our mission and vision. We continue to explore development, collaborative, and lucrative opportunities to assist in maintaining the viability of the association.

Krista Smith
CANNT President-Elect/Treasurer (2018-2020)

Votre conseil en action

Bonjour à tous les membres de l'ACITN! J'espère que vous avez tous passé un très bel été. Votre conseil d'administration travaille sur un certain nombre d'initiatives dont j'aimerais vous faire part.

Les membres du conseil d'administration passent actuellement en revue les lignes directrices relatives à l'accès vasculaire, de même que les normes de pratique technique et de soins infirmiers en néphrologie, avec beaucoup d'aide de nos collègues en néphrologie se spécialisant dans ces domaines partout au Canada. Il s'agit d'une tâche considérable et nous sommes très reconnaissants de leur contribution bénévole!

Le conseil d'administration s'affaire également à l'établissement de nouveaux partenariats avec d'autres organisations. Nous en sommes toujours aux premières étapes du processus et vous tiendrons au courant des développements. Le Congrès de l'ACITN pour les provinces de l'Atlantique qui s'est tenu en mai 2019 a connu un énorme succès – bravo à Cathy Cake, vice-présidente pour l'Atlantique. Nous continuons d'améliorer notre site Web afin de fournir à nos membres des renseignements actuels et pertinents. Les questionnaires liés à la formation continue sont maintenant disponibles.

ADHÉSION

Nous comptons actuellement 421 professionnels de la néphrologie parmi nos membres (août 2019). Le conseil d'administration évolue continuellement pour offrir des avantages durables à tous nos membres. Je sollicite les commentaires de nos précieux membres sur les façons d'accroître le nombre d'adhésions à notre association. Veuillez nous faire part de vos idées en communiquant avec l'équipe administrative nationale de l'ACITN, par courriel au **cannt@cannt.ca** ou par téléphone, au 613-507-6053.

Les membres sont la force vive de l'ACITN, puisque ce sont eux qui administrent l'Association. Il y a une foule d'avantages à devenir membre de l'ACITN :

- Accès au journal électronique de l'ACITN;
- Accès à la section réservée aux membres du site www.cannt.ca;
- Tarifs réduits au symposium annuel de néphrologie;
- Accès aux publications *Nephrology Nursing Standards and Practice Recommendations* et *Standards of Nephrology Technical Practice de l'ACITN*;
- Promotion et soutien en vue de l'obtention du certificat de spécialisation en néphrologie (CNéph [C]);
- Possibilités de formation continue (par l'intermédiaire du *Journal ACITN*, de webinaires en ligne et d'unités de formation continue);
- Occasions de saluer l'excellence professionnelle par la remise de prix annuels;
- Accès à des bourses d'études et à des subventions de recherche;
- Promotion de la pratique fondée sur des données probantes;
- Collaboration au sein de la communauté de la néphrologie;

Le renouvellement de votre adhésion annuelle à l'ACITN contribue à la viabilité de notre association à long terme.

JOURNAL

Vous trouverez la marche à suivre pour soumettre un article pour publication dans notre revue sous la section réservée au *Journal ACITN* du site Web de l'ACITN. Envoyez votre article par courriel à Rosa Marticorena et à Jovina Bachynski à l'adresse **cannt.journal1@gmail.com**. Vous trouverez la marche à suivre pour soumettre un article pour publication dans notre revue sous la section réservée au *Journal ACITN* du site Web de l'ACITN : **https://cannt-acitn.ca/cannt-journal/**

Le *Journal ACITN* est publié quatre fois par année sous forme électronique. Les articles scientifiques sont évalués par les pairs. Les articles qui portent sur de nouvelles données cliniques ou qui traitent de sujets présentant un intérêt particulier pour les infirmières et infirmiers et les technologues en néphrologie sont acceptés. Des possibilités de formation, parrainées par des entreprises et des occasions de publicités sont également offertes.

COMMUNICATIONS

Nous continuons d'élaborer de nouvelles stratégies pour mobiliser nos membres et leur transmettre des renseignements pertinents en temps opportun. *Your CANNT Connection* est un bulletin d'information bimensuel transmis par courrier électronique (en anglais) qui fournit à nos membres des renseignements ciblés, personnalisés et correctement segmentés. Nous tâchons en outre de faire en sorte que le contenu soit simple, direct, concis et utile, de façon à fidéliser les lecteurs. Si vous avez une question, une idée ou un événement à promouvoir, veuillez écrire à Ethan Holtzer, notre directeur des communications.

Site Web de l'ACITN : www.CANNT.ca

Twitter : CANNT (@CANNT1)

CONGRÈS ANNUEL

Le congrès annuel 2019 de l'ACITN a pour thème « Sharing Stories Down by the River » (Partageons nos histoires au bord de la rivière). Le comité du congrès travaille très fort pour élaborer un programme novateur et captivant qui répond aux besoins des professionnels en néphrologie, débutants comme chevronnés. Nous espérons vous voir à Edmonton du 24 au 26 octobre 2019.

FINANCES

En tant qu'association professionnelle sans but lucratif, notre objectif est d'offrir à nos membres une valeur ajoutée qui s'harmonise à notre mission et à notre vision. Nous continuons d'explorer des occasions de développement, de collaboration et de financement pour maintenir la viabilité de notre association.

Krista Smith
CANNT President-Elect/Treasurer (2018-2020)

NOTICE BOARD

- Canadian Nurses Association (CNA) Exam Timeline.
  https://www.nurseone.ca/certification/renewing-your-certification#sthash.IDBqg5i7.dpuf

	Spring 2019	Fall 2019
Initial exam or renewal by exam application window	**Jan. 10–March 31, 2019**	**June 3–Sept. 12, 2019**
Certification exam window	**May 1–15, 2019**	**Nov. 1–15, 2019**
Renewal by continuous learning application window	**Jan. 10–Nov. 1, 2019**	

N.B. CNA will provide 20% discount for initial certification, re-certification, and re-write examination fees in 2019 to active members of CANNT. For more information, contact the CANNT National Office at cannt@cannt.ca

- **October 24–26, 2019.** Canadian Association Nephrology Nurses and Technologists (CANNT) 51st National Symposium 2019: *Sharing our Stories Down by the River*, River Cree Resort and Casino, Edmonton, AB. **www.cannt.ca**
- **November 5–10, 2019.** The American Society of Nephrology (ASN) 2019 Kidney Week, Walter E. Washington Convention Center, Washington, DC. **www.asn-online.org**
- **May 2–5, 2020.** ISPD-EuroPD Joint Congress, Scottish Event Campus (SEC), Glasgow, Scotland. **www.ispd-europd2020.com**

CANADIAN NURSES ASSOCIATION

Nephrology Certification Registration Status Report 2019

Initial and Renewal by Exam to Renew in 2019	Renewal by Continuous Learning (CL) Hours	Total of Initials and Renewals	Due
66	73	139	272

The shortage of expert nephrology nurses and patient quality care indicators: A quantitative cross-sectional study

By Karen J. Gaietto and Mirella V. Brooks

ABSTRACT

Nurses in the nephrology setting need time, experience, and education to manage the complexities of the renal patient and the associated patient quality care outcomes. Dialysis providers are challenged to hire and retain experienced nephrology nurses. This quantitative cross-sectional study examined the shortage of expert nephrology nurses and patient quality care indicators in the dialysis setting, and sought to determine if there was a statistically significant relationship related to the shortage of expert nephrology nurses. The study collected data by survey method from 34 Ohio chronic dialysis units on nursing tenure, nephrology experience, education level, certification status, and age. The Centers for Medicare and Medicaid Quality Incentive Program patient data for each unit were compared to the level of nursing experience and the level of education of the nursing staff. Dialysis units with higher level of nursing experience and education were compared to dialysis units with less-experienced and less-educated registered nursing staff to determine if a relationship existed. The analyzed data have three areas of statistical significance: hemoglobin level less than 10.2 g/dl, Kt/V of 1.2 or greater, and facility mortality rate. Units with higher levels of experience had a lower percentage of anemia and a higher percentage of dialysis adequacy levels. Units with higher level of education had lower facility mortality rates. This study noted the need to measure the level of experience and education of the expert nephrology nurse, and how these aspects affect patient quality care indicators for current and future renal patients.

INTRODUCTION

Healthcare is experiencing a shortage of registered nurses, as a natural consequence of aging and attrition by retirement. It is estimated that an additional 1.05 million nurses will be required by 2020 in the United States alone to keep up with the demand caused by this gap and replace the nursing workforce (Rosseter, 2014). The overall shortage in nursing leads into a shortage of expert nephrology nurses. In Benner's novice to expert model, the nurse expert is described as one possessing the ability to competently and reliably provide the highest level of quality patient care (Benner, 1984, 2015). Developing nephrology nurse specialists requires extensive time, budgetary investment, and commitment (Ulrich & Kear, 2015). Indeed, nurses spend many years developing expertise in specialty practice (Watson, 1996). Watson's caring science theory looks to the expert nurse using both intrinsic and extrinsic factors to provide holistic patient care (Sitzman & Watson, 2013). In this vein, the expert nephrology nurse provides the caring aspect of nursing in addition to the theoretical and practical knowledge obtained in nursing school and entry into practice (Watson, 1996). The increased complexity of the patients with chronic kidney disease (CKD) amplified by multiple comorbidities requires the expert nephrology nurses' ability to manage multiple tasks and initiatives meant to improve patient outcomes, and promote patient safety (Bednar & Latham, 2014). Specifically, expert nephrology nurses at the bedside place the knowledge where it is needed in managing crucial laboratory values, providing early identification of complications, and reducing adverse occurrences for the patients (Ulrich & Kear, 2015). The shortage of these leaders and experts in renal care significantly impacts quality outcomes for patients with CKD (Hayes, Douglas, & Bonner, 2015), presenting an immense challenge to adequately meet patient needs and provide quality care within the dialysis unit. The present research study on the shortage of expert nephrology nurses, as informed by both Benner's and Watson's respective conceptual framework of what constitutes the expert nurse, investigated the role expert nurses play in relation to patient quality care indicators such as anemia and dialysis adequacy parameters, and mortality rate. This could, in turn, change the approach toward clinical outcomes and support the need to retain expert nephrology nurses.

AUTHOR NOTE

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THEORETICAL FRAMEWORK

Benner and Watson's nursing theories help support the study of expert nurses shortages. The theoretical frameworks from Patricia Benner and Jean Watson were applied to the phenomena of interest, and these were used as the central frameworks for this research. This approach identifies the definition of an expert nurse as skilled and competent both in the art and science of nursing (Benner, 1984; Watson, 1996). The expert is also able to move past foundational knowledge, seeks additional education, and applies those pieces to abstract concepts within the nursing discipline. Watson's and Benner's theories blend to create the ideal nephrology nursing expert to provide patient-centred care.

Clinical Expertise

The nursing theorist, Patricia Benner (2015), described the nursing expert as one with the ability to competently and reliably provide the highest level of quality patient care. Benner's definition of the expert nurse guides this study to identify nurses working in specialty practice a minimum of 10 years, exhibit advanced skill and understanding of patient conditions, and manage the complexity of nursing care with little or no difficulty (Benner, 1984). Jean Watson's caring science theory looks to the expert nurse using both intrinsic and extrinsic factors to provide holistic care to the patient (Sitzman & Watson, 2013). Watson (1996) identifies that the nurse spends many years developing expertise in specialty practice. The expert nephrology nurse provides the caring aspect of nursing in addition to the theoretical and practical knowledge obtained in nursing school and entry into practice.

Clinical expertise is continuously being examined and redefined as the nursing profession grows. Lyneham, Parkinson, and Denholm's (2008) study placed Benner's expert stage into three distinct phases: cognitive intuition, transitional intuition, and embodied intuition. Mannix, Wilkes, and Jackson's (2013) study identified the ideal expert nurse as a combination of clinical expert, clinical leader, and clinical scholar. Expert nurses are often viewed as using insights or intuition as the basis for decision making in the care of patients (Lyneham et al., 2008). Lyneham, Parkinson, and Denholm (2009) explained the need to expose new nurses and students to a multitude of environments, thus promoting growth toward the intuitive practice of clinical experts.

Expert nephrology nurses are more important than ever given the diversity of skill mix and non-nursing personnel that have been introduced over the years. Nursing units often staff with varying levels of nursing tenure and abilities. Esparza (2010) explored nurse staffing and skill mix patterns, and found positive effects on patient outcomes with teams with greater experience. A cross-sectional study by Staggs and Dunton (2012) further reviewed the impact of skill mix at the hospital and unit levels, and noted that units with higher skill levels experienced less turnover and greater stability. The positive impact of the expert clinician within the skill mix of the nursing units in both studies noted the importance of having these expert nurses available to improve patient and staff experiences.

A supportive environment was identified by McHugh and Lake (2010), and Benner (1984) as the most frequently cited reason for nursing success in the acquisition of expertise. Carmel and Baker-McClearn (2011) recognize the need for a community and collaboration bolstering the use of expert nurses. In Onishi, Sasaki, Nagata, and Kanda's (2008) study, the administrators acknowledged their role in providing clarification, direction, and support for nurses of expert status level. The nurse expert does not merely emerge one day as the clinical expert, but grows everyday through interactions and human experiences.

The nephrology nursing expert provides significant contributions to the nursing quality, nursing care, and patient quality outcomes by providing clinical supervision and direction (Ulrich & Kear, 2015). Expertise in this discipline takes years of learning, advancing education, and clinical practice in the field of nephrology care. The Quality and Safety Education for Nurses Project was developed by a national expert panel based on the Institute of Medicine's (IOM) recommendations for establishment of core competencies. The group identified essential core competencies: patient-centred care, teamwork and collaboration, evidenced-based practice, quality improvement, safety, and informatics (Sherwood & Zomorodi, 2014). This relates back to frequently measured data and practice within the nephrology specialty environment.

EXPERT NEPHROLOGY NURSES

Nephrology nurses practise care within their scope and standard of practice from the level of novice through the level of expert. In the United States, these standards are established by the American Nephrology Nursing Association (ANNA) in conjunction with subject matter experts (Gomez, Castner, & Dennison, 2011). The standards are put into place through distribution and integration within policy, procedures, and best demonstrated practices at the unit level.

Expert nephrology nurses readily translate situations and patient conditions based on their vast background of formal and informal education. Bonner (2007) examined nephrology nurses' expertise and noted that recognition of expert status by others was an essential piece. It is a role of growth and development, and is continuously redefined by the nurse expert's thoughts and ideas. Bonner (2007) recognized that nurse experts maintained current nephrology care practices and chose to use evidence-based or best-demonstrated practices.

Specialty certification is considered an outward sign of increased experience and education. Wiseman (2013) discussed the certification in nephrology nursing as the formal recognition of experience, but identified the need for research to recognize any relationship between certification and outcomes. However, at this time, certification is still not pursued by many within the nephrology specialty (ANNA, 2016). Wiseman (2013) theorized that the employer's lack of recognition of certification and its importance within institutions may be a deterrent to pursue specialty certification.

The plan to obtain expert nephrology nurse status is not consistent or clear. There is agreement on the strong need to develop the next generation of renal nurses, provide structure for success, and expand the appreciation for the nursing specialty (Harwood, Downing, & Ridley, 2013). These researchers proposed use of the Renal Nursing Professional Practice Model previously developed and instituted at their dialysis units in Canada (Harwood et al., 2013). The practice model was found to be useful in consistent training, education, and advancement of skill in the units. Having a consistent approach has the potential to bolster the transition of a novice nurse towards the expert nurse status in the nephrology setting. This consistency allows the novice to take previous knowledge and apply it to new situations in the nephrology setting, and improves self-confidence in the nurse.

METHOD

This quantitative cross-sectional study focused on the shortage (lack of qualified nurses) of the expert nephrology nurse. The quantitative cross-sectional design was chosen because it is a descriptive approach that is useful to review past or current data and allowed for the collection of measurable data from the surveyed units. The purpose of this research study was to identify a relationship between the shortage of the expert nurse and patient quality indicators. Prior to conducting the study, approval from the institutional review board (IRB) was obtained. Research ethics board (REB) approval was not required due to the use of aggregate data. Publicly reported data available through the Centers for Medicaid and Medicare Quality Incentive Program were used as the measurement for patient quality indicators.

The literature review search and focus began with the expert nephrology nurse with a total of 65 articles meeting researcher's criteria. The following key terms were used in the Boolean search: (a) *expert nurse*, (b) *nephrology expert*, (c) *nursing shortage*, (d) *nursing retention*, (e) *older nurses*, (f) *experience in nursing*, (g) *education*, (h) *patient quality indicators/measurements*, (i) *patient outcomes*, (j) *older workers and safety,* and (k) *skill acquisition*. The four computerized databases used included EBSCOhost, ProQuest, CINAHLComplete, and Nursing@Ovid.

Information regarding expert nephrology nursing was obtained through a direct survey of chronic dialysis administrators in the state of Ohio. The nurse demographic survey sent to the dialysis unit administrator requested identification of the dialysis unit for comparison purposes. The target population of chronic dialysis units was chosen to maintain consistent patient quality measurements. The survey was voluntary with participant identification and confidentiality maintained throughout the survey set up and process. These units were selected to provide similar educational standards, same scope and standard of practice, and same regulatory laws as required by the state.

The units were assessed for nurses' skill mix by identifying: (a) differing experience levels as a registered nurse, (b) experience as a nephrology nurse, (c) education, (d) certification status, and (e) age (50 years or older). These five measurable items were chosen after the literature review was completed and for ability to be quantified. The survey questions were adapted from the United States Demographics Survey, the Department Performance Survey, and Team Performance Survey templates located on Survey Monkey's website within the tools section. The publicly reported data on patient outcomes were retrieved on the ESRD Quality Incentive Program (QIP) Centers for Medicare and Medicaid Services website (Centers for Medicare and Medicaid Services [CMS], 2016). During the analysis phase, unit names were removed to maintain anonymity of the participating facilities and administrators. The data were used to conduct a regression analysis and placed in table form to provide visualization of relationships between data.

Data Collection

The use of a Nursing Demographic Survey was the first instrument used to collect data on the nurses employed within the chronic dialysis units. The experience and expertise of the nephrology nurse within the chronic dialysis units in the state of Ohio was the focus. The independent variables measured included: (a) years of nursing experience, (b) years in nephrology nursing, (c) educational level, (d) certification in nephrology nursing, and (e) age of 50 years or older. The administrators at chronic dialysis unit were notified via email through a nursing specialty organization.

The second instrument was the Centers for Medicare and Medicaid Quality Incentive Program (2015) used to report patient quality indicators. The dependent variables measured included areas of: (a) anemia, (b) dialysis adequacy, (c) vascular access type, (d) calcium, (e) phosphorus, (f) mortality, and (f) readmission rate listed through the publicly reported data. CMS uses these measurements due to their relevance in morbidity and mortality reports. Anemia causes shortness of breath, fatigue, and impacts patients overall health (CMS, 2015). Patients not receiving adequate dialysis experience high levels of uremia, phosphorus, calcium and potassium and may cause cardiac events (CMS, 2015). Patients with a central venous catheter (CVC) have a higher rate of infections and higher rate of hospitalization; thus, the goal is to have a permanent vascular access (arteriovenous fistula [AVF] or graft [AVG]) in place (CMS, 2015). A comparison of units with a higher percentage of nephrology nursing experts versus those with a lower percentage ensued. Key survey items, such as years in nursing, years in nephrology, and level of education, were paired with reported patient quality indicators with some statistically significant relationships noted.

Data Analysis

Data analysis consisted of using reported level of experience and education levels of the chronic dialysis units and identified key areas (i.e., anemia, dialysis adequacy, vascular access type, calcium, phosphorus, mortality, and readmission rate) from the Centers for Medicare and Medicaid Quality Incentive Program data. Statistical Package for the Social Sciences (SPSS) version 24 and Microsoft Excel were used for data synthesis. Reliabilities were calculated using Cronbach's alpha resulting in a positive (or direct) reliability coefficient of .012. A simple linear regression analysis was conducted on the patient quality indicators and was used to predict outcomes on the shortage of nursing experts on the collected convenience sample. The chronic dialysis units were split into two categories by using the mean nephrology nursing experience of 9.968 years. Units with average years in nephrology nursing less than 9.9, were compared to those with 9.9 or more. The 12 identified patient quality care indicators were run for comparison.

RESULTS

The Nursing Demographic Survey was sent to 121 Ohio chronic dialysis unit administrators (participants) through the nursing specialty organization email distribution list. A total of 34 administrators from the chronic dialysis units completed the survey. Information regarding a total of 128

registered nurses currently working at the 34 Ohio chronic dialysis units was collected. The Centers for Medicare and Medicaid patient quality care indicators from these units were obtained for review. The June 2017 data were used for the purpose of comparison.

Experience Level

Experience level within the dialysis units was noted to have a vast difference in years as a registered nurse (Table 1) and years in the nephrology specialty (Table 2). The years of nursing experience ranged from one year up to 43 years in nursing. The mean was 14.945 with a standard deviation (SD) of .67. The reported experience level in nephrology nursing range was 0 to 30 years of experience. The mean was 9.968 with a standard deviation (SD) of 0.15.

Table 1. Years of Registered Nurses' Experience Within Participating Chronic Units

n	Mean	Median	Mode	SD	Range (years)
128	14.94	13.00	7.0	.67	1–43

Table 2. Years of Nephrology Experience of Nurses within Participating Chronic Dialysis Units

n	Mean	Median	Mode	SD	Range (years)
128	9.96	7.00	5.00	.15	0–30

Education Level

Educational level within the chronic dialysis units was varied (Table 3). The registered nurses possessing an associate degree (AD) in nursing constituted the largest group at 57% (*n*=73). Those registered nurses with a bachelor's degree comprised 32% (*n*=41). This grouping included Bachelor of Science, Bachelor of Science in Nursing, and Bachelor of Arts in the Nursing Demographic Survey. Registered nurses with a diploma in nursing comprised 7% (*n*=9). The remaining 3.9%, or a mere five nurses, held a master's degree. These five nurses listed Master of Nursing Science, Master of Hospital Administration, and Master in Business, as their degree foci. The noted lack of master-level degree within the sample units was an unexpected finding and a potential source of concern due to the importance of advancing education within the nursing discipline.

Table 3. Highest Educational Degree of Nurses within Participating Chronic Dialysis Units

Educational degree	*n*	Percent
Associate	73	57
Bachelor	41	32
Master	5	3.9
Diploma	9	7.0

Age

The next question on the survey was to identify those aged 50 years or older based on the average age of registered nurses at 50 years or older (Rosseter, 2014). Nurses in this age category are closer to retirement and are often considered experts in their respective nursing specialty practice. This information had the ability to identify units at risk (i.e., if a high number of the nurses were over age 50) to experiencing a shortage of expert nephrology nurses within 10 to 15 years. The reported number of nurses at 50 years or older within these surveys was 36 (28.1%), which was lower than expected based on the average age of the registered nurses being 50 years or older (Table 4).

Table 4. Nurses' Age Groups Within Participating Chronic Dialysis Units

Age	*n*	Percent
50 years or older	36	28.1
Under 50 years	92	71.9

Certification

The certification status for registered nurses within the participating chronic dialysis units was noted to be low (Table 5). Out of 128 registered nurses within the 34 chronic dialysis units, only 14 possessed certification in nephrology. This translates into 10.9% of the nurses who pursued and passed the certification test. This was considered lower than expected with current nursing standards moving toward advancing degrees, certification, and clinical ladder promotion within the nursing specialty practice.

Table 5. Certification Status of Nurses within Participating Chronic Dialysis Units

Certification	*n*	Percent
Certified	14	10.9
Not Certified	114	89.1

Comparison of Data

Linear regression analysis was used to predict the potential relationship between the shortage of nephrology nursing experts at the chronic dialysis units and the patient quality care indicators. The chronic dialysis units were divided into two groups based on nursing experience. The more experienced chronic dialysis unit group was composed of nurses who had equal to or more than 14.945 years of nursing experience, and equal to or more than 9.968 years of nephrology nursing experience. The less-experienced chronic dialysis units had nurses with less than 14.945 years of nursing experience and less than 9.968 years of nephrology nursing experience. This distinction was based on Benner's definition of expert nurses and guided the study to determine whether most nurses would reach expert nephrology nursing status in 10 years.

The chronic dialysis units were also divided into two groups based on educational level of the registered nurses. Units identified as having a higher level of education comprised at least one registered nurse with a bachelor or master degree. Units identified as having a lower level of education employed nurses with either an associate degree or diploma degree. This was based on the collected Demographic Nursing Survey data.

The dependent variables (i.e., patient quality indicator targets), were systematically compared with the years of nursing experience and years in nephrology nursing. These variables included: (a) hemoglobin less than 10.2 g/dl (102 g/L); (b) Kt/V greater than 1.2; (c) AVF in use; (d) central venous catheter (CVC) longer than 90 days; (e) calcium over 10.2 mg/dl (2.54 mmol/L); (f) phosphorus less than 3.5mg/dl (1.13 mmol/L); (g) phosphorus 3.5–4.5 mg/dl (1.13–1.45 mmol/L); (h) phosphorus 4.6–5.5 mg/dl (1.48–1.77 mmol/L); (i) phosphorus 5.6–7.0 mg/dl (1.8–2.26 mmol/L); (j) phosphorus over 7.0 mg/dl (2.26 mmol/L); (k) mortality rate; and (l) readmission rate, which is defined as unplanned readmission to the hospital setting within 30 days (Table 6).

There were three areas of patient quality indicators that were statistically significant. The first two indicators, the hemoglobin level of 10.2 g/dl (102 g/L) or less, and adequacy (Kt/V) of 1.2 or greater, were statistically significant with the experience level of the nurses. The third area, mortality rate for the facility, was statistically significant for the education level of the nurses. Hemoglobin less than 10.2 g/dl (102 g/L) was used as the dependent variable with nursing experience (years of nursing and years of nephrology nursing), and educational level served as the independent variables. Table 7 presents the results of this analysis. Nursing experience *(beta = .659; t = 4.466; 95% C. I. = -8.634–9.157; p = .00)* was significant, indicating that nursing experience was associated with low percentage of patients with hemoglobin levels less than 10.2 g/dl (102 g/L). Education level *(beta = .081; t = .416; 95% C. I. = -5.946–8.962; p = .681)* was found not significant as an independent variable when looking at the hemoglobin 10.2 or greater in the sample group.

The management of adequacy (Kt/V greater than 1.2) was used as the dependent variable with nursing experience (years of nursing and years of nephrology nursing),

Table 6. Patient Quality Care Indicators for Participating Chronic Dialysis Units

Quality Indicator	*n*	Mean	Median	Mode	SD
Hgb less than 10.2 g/dl (102 g/L)	28	18.64	17.00	23.00	9.22
Kt/V greater than 1.2	32	95.50	96.00	96.00	2.78
AVF in use	32	67.93	71.50	45.00	12.32
CVC longer than 90 days	32	8.81	7.00	7.00	5.20
Hypercalcemia over 10.2 mg/dl (2.54 mmol/L)	32	.75	1.00	0.0	.84
Phosphorus less than 3.5mg/dl (1.13 mmol/L)	32	7.50	7.50	5.00	3.03
Phosphorus 3.5–4.5 mg/dl (1.13–1.45 mmol/L)	32	25.53	24.50	22.00	4.45
Phosphorus 4.6–5.5 mg/dl (1.48–1.77 mmol/L)	32	32.75	30.00	30.00	5.47
Phosphorus 5.6–7.0 mg/dl (1.8–2.26 mmol/L)	32	12.71	12.50	11.00	5.49
Phosphorus over 7.0 mg/dl (2.26 mmol/L)	32	12.71	12.50	11.00	4.66
Mortality rate	29	17.48	17.70	11.90	4.58
Readmission rate	30	21.60	23.55	14.60	6.77

Table 7. Management of Patient Quality Care Indicator Hemoglobin less than 10.2 g/dl

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing experience	11.969	2.680	.659	4.466	.00	-8.634	9.157
Education level	1.508	3.626	.081	.416	.681	-5.946	8.962

and educational level served as the independent variables. Table 8 presents the results of this analysis. Nursing experience *(beta = -.337; t = -1.960; 95% C. I. = -3.836–.079; p = .050)* was borderline significant indicating that nursing experience was mildly associated with a higher adequacy (Kt/V) for the hemodialysis treatment in the sample group. Educational level *(beta = .267; t = .258; 95% C. I. = -1.840–2.374; p = .798)* was not a predictor for adequacy of Kt/V of 1.2 or greater.

The mortality rate indicator was used as a dependent variable with nursing experience (years of nursing and years of nephrology nursing), and educational level served as independent variables. Table 9 presents the results of this analysis. The nursing experience level *(beta = -249; t = -1.451; 95% C. I. = -5.464–.942; p = .159)* statistically showed no significance between the experience level of the nursing staff and the mortality rate of the patients within the chronic dialysis unit. The education level *(beta = -.410; t = -2.384; C.I. = -7.090–.525; p = .025)* was found to be a significant predictor of mortality rate within the sample population.

DISCUSSION

The study found three areas where the experience or education level of the registered nurse correlated with the improved patient outcomes in the Ohio chronic dialysis unit setting. The hemoglobin of 10.2 g/dl (102 g/L) or less was the first patient quality indicator with statistical relevance. The renal patient is often anemic and is managed through the physician's orders and protocols managed by the registered nursing team. There is a strong need to manage care to keep patients' anemia levels above 10.2 g/dl (102 g/L), thus maintaining a low percentage of chronic unit dialysis patients with low hemoglobin levels. The advantage to having adequate hemoglobin is improvement in patients' ability to carry out activities of daily living, potential for improved quality of life, and decreased mortality. The surveillance and monitoring of the anemia level requires nephrology nurses to develop expertise through education, training, and understanding of the complexities of patients with CKD.

The second patient quality indicator with noted statistical relevance was adequacy (Kt/V of 1.2 or greater). The skilled nursing team works with patients to enable meeting this essential patient quality indicator. The adequacy measurement is an objective way to ensure that the dialysis treatment is removing enough of the toxins within the patient's blood. The patient's dialysis needs can change over time, requiring vigilance for laboratory values, patient condition, and patient assessment. Experience aids the registered nurse to identify trends and conditions sooner, thus reducing the risk to the patient of poor adequacy lab results. An effective treatment translates into decreased mortality and improved quality of life for the patient on dialysis.

The third patient quality indicator with statistical significance was the mortality rate in the chronic dialysis unit. An increased level of education among the registered nurses was associated with a lower rate of mortality in the unit. This could be due to the increased level of understanding regarding patient conditions, disease process, or improved ability to manage the multiple aspects of complex patient care. Those choosing to start dialysis desire quality and quantity for their lives. The nephrology professionals work toward assisting these individuals to reach these goals (Bonner, 2006).

The promotion and encouragement of advanced education requires understanding and focus. In this research study, only five nurses held a master's level degree. This was only 3.9% of the nurses caring for patients in the 34 Ohio chronic dialysis units. This is an alarmingly low percentage of registered nurses within the nephrology nursing specialty. The complexities of renal failure, the management of multiple comorbidities, and advanced understanding of care and management requires advanced education and skills.

Table 8. Management of Patient Quality Care Indicator Kt/V greater than 1.2

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing experience	-1.879	.959	-.337	-1.960	.050	-3.836	.079
Education level	.267	1.032	.047	.258	.798	-1.840	2.374

Table 9. Management of Patient Quality Care Indicator Mortality Rate

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing Experience	-2.261	1.558	-.249	-1.451	.159	-5.464	.942
Education level	-3.807	1.597	-.410	-2.384	.025	-7.090	-.525

An investigation into the reasons why these chronic dialysis units had such a low number of master's-prepared nurses could provide insight into the problem.

Nephrology nursing certification is another aspect of promotion and support for advancing practice within this nursing specialty. The registered nurses working within the surveyed units reported 10.9% or a mere 14 individuals certified in the nephrology specialty. Pursuit of certification is an outward sign of the nurse's knowledge in the nephrology nursing practice. Understanding what moves a nurse to pursue certification, knowing the barriers, and promotion of certification by employers may improve the percentage of certified nephrology nurses.

LIMITATIONS OF FINDINGS

Program patient quality data were limited in measurement for all aspects of patient care. The 34 participating chronic dialysis units were reporting the required metrics. However, there were data missing for some units. The overall missing data occurred in only two units, yet this did limit knowing exactly the consequences or outcomes for those two specific units on every aspect of patient quality care indicators. The use of one month's reported data limited any potential for chronic dialysis unit trending.

The use of only Ohio chronic dialysis units limits applicability of findings to other states or types of dialysis units. Also, chronic dialysis units were not asked for information regarding retention, turnover, or years of employment at the facility. Units with higher retention would potentially be viewed as more stable and provide improved consistency in patient care (Carmel & Baker-McClearn, 2011). Retaining experienced nurses, maintaining a stable work environment, and improving satisfaction may be associated with leadership style, physician interaction, and team dynamics. The unit that is stable may influence patients who view the chronic dialysis unit staff as an extension of their lives. For better or worse, the dialysis staff see patients more often than patients' families and often build a lasting connection.

The composition and skill mix of the interdisciplinary team for the chronic dialysis units was also not provided. The chronic dialysis unit has multiple disciplines working to provide optimum care to the renal patient. The social worker provides support and direction to the team and patient through counselling and resources. The dietitian provides guidance and essential information on the renal dietary needs for each patient. The nephrologists and nurse practitioners responsible to provide orders and direct medical care must be active participants in the renal care team. Their presence, support, and temperament drive the best practices and essential care of the medically complex individual. Together an effective team manages patient care; the ineffective team struggles to complete the simplest of tasks.

The chronic dialysis units were divided into two convenience groups for comparison with one group consisting of higher level of experience and the other group with a lower level of experience. If the units were divided into multiple levels for units, based on years of experience, a different statistical analysis may have occurred. Dividing units by educational level (i.e., diploma; associate, bachelor, and master degrees) may have yielded altered statistical information. Although this particular sample was small, there was a high percentage of registered nurses with associate's and bachelor's degrees noted. Understanding the low percentage of registered nurses with master's degrees and certification could be investigated in future research. Data were not collected on the reason for a specified level of education or the choice to pursue certification.

STRENGTHS OF THE STUDY

The study did identify a statistically significant relationship between the expert nephrology nurse and patient quality indicators in three key areas. This could promote further studies of nephrology nurses' education, experience, and certification in conjunction with the dialysis units' patient quality care indicators. This research study has additional transferability for other specialty practice areas within nursing. Institutions collect and maintain patient care metrics in nearly every setting. The potential to take this information and compare it to the current staff model within each unit could identify properly the mix of expert nurses for optimal patient outcomes. It may also identify the relevance or support for current hiring practices within the units. Managers may exhibit preferences for certain educational or experience levels, or promotion of certification within the units. The opportunity to understand how current staffing skill mix, hiring, and retention practices affect the relationship between expert nurses and patient quality care indicators, may be beneficial in addressing future healthcare needs.

IMPLICATIONS

For Nurses

The nephrology nursing specialty practice needs to look to promotion of further education and certification among its nursing population. The consistent use of a clinical ladder within nephrology nursing would be a valuable step toward uniformity within the specialty. Ideas may intertwine the nurse's individual aspirations with the specialty's need to advance skill and understanding of the complexities of renal patient care. This objective will require extensive collaboration across nephrology nursing, employers, and the healthcare community.

Recruitment of new nurses into the nephrology nursing specialty needs to be a priority. Engaging in current school of nursing activities, training, and clinical experiences should be looked to as opportunities to interact with student nurses. Taking time to speak with fellow nurses, family, and friends, and dispelling any myths are important. Explaining the role of a nephrology nurse and the value of their role is essential to maintain the specialty.

Nephrology nursing specialty is time intensive, requires months of additional training, and involves multiple demands placed on the registered nurses. A review into each unit's current training, education, and retention of nephrology nurses must be completed. Identification of chronic dialysis units struggling to meet patient quality

indicator metrics versus those that are successful need to be viewed from all aspects. The current team skill mix, the level of education, certification status, age (those planning for retirement), and anticipating future demand, play a part of the unit's viability.

Nephrology leaders will also need to assess for competitiveness to recruit the new nurses, experienced nurses, and advanced degree holders into the nephrology nursing specialty. Salary, wage, and compensation packages need to attract these nurses. Employers also need to know how to keep current nephrology nurses in the specialty by offering flexibility in scheduling (where needed), options for cross-training, and for promotion. Opportunity for advancing education, ability to conduct research, and working on special projects may be additional ways to attract and keep nephrology nurses within the specialty practice (Bonner, 2007).

For Future Research

Improved relevance of the study could be accomplished through additional information on not just years of nursing experience and years of nephrology experience, but also inclusion on the number of hours worked by each nurse. Other factors to study include the chronic dialysis unit's size, location (rural, suburban, urban), and patient census. Information about the acuity level of patients in the unit would also benefit overall understanding of patient population needs within the unit's location.

The team mix, including number of dialysis technicians and the ratio of nurses and technicians related to patient census may impact patient outcomes. The number of patients per shift, number of shifts, and overall unit hours of operation provide greater information on the demand on nursing teams. The larger units appear to work more like factories than clinics. These units may see a disconnect between patients and staff. Nurses working in large units may have less time to complete assessments, provide medications, and carry out learning opportunities. The smaller units may struggle to keep staff, lack the ability to manage needed time off, or be able to accommodate specific patient treatment needs or schedules. All of these aspects could negatively influence reported patient quality care indicators and quality of life for the renal patient. Having one or more expert nurse may make the difference in stabilizing various unit types.

Further study is warranted to comprehend the overall need for expert nephrology nurses in all aspects of care for the renal patient. Additional studies should focus on expert nurses, defining what quality care involves, understanding how to retain experienced nurses, and the promotion of cooperation within disciplines. The use of quantitative and qualitative means would continue to add to the overall understanding of Benner's novice to expert and Watson's caring theories as they apply to the expert nephrology nurses.

CONCLUSION

This study demonstrated that there was a statistically significant relationship between the expert nephrology nurse and three patient quality care indicators. Anemia (hemoglobin less than 10.2 g/dl [102 g/L]) and adequacy (Kt/V 1.2 or greater) were associated with the more experienced registered nurses, whereas the lower mortality rate was related to a higher level of nursing education. This study is only the beginning of understanding the relationship between the expert nephrology nurse and patient quality indicators. Additional research is needed to provide understanding on the intricacies of the nephrology nursing specialty. It is a specialty that requires commitment, perseverance, and patience. There is a need for a high level of skill, to work as a team, to communicate to all people, and remember that the patient has a life beyond the dialysis chair. The treatment provides life and the ability for patients to continue with enjoyed activities with family and friends. Those working within nephrology realize and embrace their role as caregiver, friend, and professional for these complex medical patients. Understanding the expert nephrology nurse's impact will improve the experience for the nurse, patient, and the healthcare community.

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CONTACT HOUR: 2.0 HRS

The role of potassium binding agents: Patiromer and sodium zirconium cycloscilicate

By Laurence Lau and Marisa Battistella

LEARNING OBJECTIVES

1. Describe the role of the new potassium-binding agents, patiromer and sodium zirconium cyclosilicate, in patients with hyperkalemia.
2. Discuss the risks and benefits of potassium-binding agents in patients with hyperkalemia.

BACKGROUND

The kidneys play a vital role in potassium homeostasis. Patients with chronic kidney disease (CKD) and end-stage kidney disease (ESKD) are more susceptible to hyperkalemia. Hyperkalemia is a serious medical condition that is associated with an increase in mortality rates (Parham, Mehdirad, Biermann, & Fredman, 2006). In addition, it can cause paralysis, muscle weakness, and cardiac arrhythmias (Beccari & Meaney, 2017). Hyperkalemia is defined as potassium levels above 5.5 mEq/L, and can occur as a result of increased potassium intake, decreased renal excretion, or imbalanced distribution of potassium between intracellular and extracellular space (Tamargo, Caballero, & Delpón, 2018). The prevalence of hyperkalemia is approximately 2-3% of the general population; however, it can be up to 50% in patients with CKD (Palmer & Clegg, 2015).

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Risk factors associated with hyperkalemia include diabetes mellitus, decompensated congestive heart failure (CHF), and the use of renin-angiotensin-aldosterone system inhibitors (RAASi) such as angiotensin-converting-enzyme inhibitors (ACE inhibitors) and angiotensin II receptor blockers (ARBs). Although RAASi have been known to improve outcomes of patients with CKD, this drug class can cause drug-induced hyperkalemia. Other medications that can cause drug-induced hyperkalemia include direct renin inhibitors, nonsteroidal anti-inflammatory drugs (NSAIDs), calcineurin inhibitors, heparin and derivatives, aldosterone antagonists, potassium-sparing diuretics, trimethoprim, and pentamidine (Ben Salem, Badreddine, Fathallah, Slim, & Hmouda, 2014). The current treatment regimen for chronic hyperkalemia is focused on eliminating predisposing factors such as high potassium intake from diets and the use of medications that can raise potassium levels such as RAASi. As such, clinicians often discontinue the medications as a first step; in turn, this can deprive patients from the reno- and cardio-protective effects.

Currently, the most common treatment options for hyperkalemia include albuterol, insulin, sodium bicarbonate, loop diuretic, and dialysis. Sodium polystyrene sulfonate (KAYEXALATE®), a potassium binder agent, has also been used to treat hyperkalemia (Varallo, Trombotto, Lucchetta, & Mastroianni, 2019). However, long-term use of this agent is associated with rare serious adverse effects such as fecal impaction, gastrointestinal hemorrhage, necrosis, obstruction, perforation, and ischemic colitis (Akagun, Yazici, Gulluoglu, Yegen, & Turkmen, 2011). A recent systematic review aimed to compare and contrast the efficacy and safety of the new potassium binder agents, patiromer and sodium zirconium cyclosilicate (SZC), in patients with CKD in the treatment of hyperkalemia (Meaney, Beccari, Yang, & Zhao, 2017). Health Canada had approved the addition of patiromer (VELTASSA®) and SZC (LOKELMA®) to its Prescription Drug List on November 1, 2018, and July 25, 2019, respectively, for the treatment of hyperkalemia in adult patients.

PHARMACOLOGIC PROPERTIES AND MECHANISM OF ACTION

Overall, potassium-binding agents work by excreting potassium via the feces. Patiromer is a non-absorbed, organic, potassium-binding polymer that contains a calcium-sorbitol complex to improve stability (Beccari & Meaney, 2017). It is a cation exchange polymer that increases fecal potassium excretion through the binding of potassium in the lumen of the gastrointestinal (GI) tract, and is not systemically absorbed. The binding of potassium reduces the concentration of free potassium in the GI lumen, which results in a reduction of serum potassium levels (Chaitman, Dixit, & Bridgeman, 2016). Patiromer was developed with improved physical properties with minimal water absorption by using calcium as the exchange cation instead of sodium (Li et al., 2016). It also provides a higher potassium-binding capacity in comparison to sodium polystyrene sulfonate.

On the other hand, SZC is a non-absorbed zirconium silicate that binds potassium in exchange for hydrogen and sodium. The cation-binding pores of SZC have a high affinity for potassium ions, which bind and remove potassium from the GI tract, particularly the colon. In turn, the vast majority of SZC is excreted in feces and not systemically absorbed (Linder, Krawczynski, & Laskey, 2016). Additionally, SZC was found to be remarkably specific for potassium *in vitro*, binding 9.3 times more potassium compared to sodium polystyrene sulfonate (Linder et al., 2016). See Table 1 for a comparison of the pharmacokinetic parameters of the different agents.

PATIROMER (VELTASSA®)

In the AMETHYST-DN randomized control trial study, among patients with hyperkalemia and diabetic kidney disease, patiromer starting doses of 4.2 to 16.8 grams twice daily resulted in statistically significant decreases in serum potassium level after four weeks of treatment. The decrease in potassium level lasted through 52 weeks (Weir et al., 2015). The recommended initial dosing is 8.4 grams once daily, which can be titrated to 25.2 grams per day based on response (Beccari & Meaney, 2017).

In a multi-centre prospective trial, more patients in the patiromer group were able to continue taking RAASi (56% versus 6% discontinuation rates), as compared to placebo (Weir et al., 2015). Proteinuria is often presented in patients with CKD, and many clinical trials have demonstrated that the use of ACE inhibitors or ARBs can delay or prevent the progression of CKD (Steuber, Lee, Holloway, & Andrus, 2019). Renoprotective effects of ACE inhibitors and ARBs can lower glomerular capillary bed pressure and protein filtration; thus, these agents should be continued. In addition, this study showed benefits of reducing the risk of recurrence of hyperkalemia in patients with a history of hyperkalemia (Weir et al., 2015).

In a multi-national study, patiromer showed a mean decrease in serum potassium concentration of 1.01 mEq/L. In addition, 76% of the patients with CKD were within the normal serum potassium range (3.8–5.1 mEq/L) at the end of four weeks of treatment (Weir et al., 2015). Given its onset of 7–48 hours as shown in Table 1, patiromer is effective for chronic management of hyperkalemia and, thus, should not be administered for emergency management (Meaney et al., 2017).

SODIUM ZIRCONIUM CYCLOSILICATE (LOKELMA®)

Sodium zirconium cyclosilicate exhibits a quick and reliable reduction in potassium. The recommended initial dosing is 10 grams orally three times per day, with a maintenance dose of 10 grams orally once daily. Given its onset of one hour, it plays a more significant role in the treatment of acute hyperkalemia as compared to patiromer (Meaney et al., 2017). Based on a meta-analysis by Meaney et al. (2017), it estimated that SZC can lower potassium by 0.17 mEq/L at one hour; in addition, there were no cases of hypomagnesemia reported in this study. The HARMONIZE trial found that 84% of the patients achieved dose-dependent potassium reduction within 24 hours compared to placebo (Kosiborod et al., 2014).

ADVERSE EVENTS

Currently, there are no head-to-head trials between patiromer and SZC. However, these agents have been compared

Table 1. Comparison of Potassium Binders

	Sodium polystyrene sulfonate (Kayexalate®)	Patiromer (VELTASSA®)	Sodium zirconium cyclosilicate (LOKELMA®)
Dosing	15–60 g/day PO (1–4 times daily); 30–50 g/day PR (up to 4 times daily)	8.4–25.2 g PO once daily	5–10 g PO once daily
Onset Mechanism of action	1 to 2 hours Resin exchanges sodium for potassium in intestine, excreted via feces	7 to 48 hours Cation ion exchange polymer, potassium binder, increase fecal potassium excretion	1 hour Potassium binder, exchanges potassium for hydrogen and sodium, excreted via feces

PR = per rectum

to placebo in the systematic review by Meaney et al. (2017). Generally, both have been well tolerated. The most common adverse effects reported for both agents were GI disturbances (e.g., constipation, diarrhea, nausea, vomiting) (Beccari & Meaney, 2017). In the systematic review by Meaney et al. (2017), it was reported that 8% (43/538) of patients on patiromer and 1% (5/479) of patients on SZC discontinued the therapy due to an adverse event during the maintenance phases of the trials.

Three main clinical trials (PEARL-HF, AMETHYST-DN, and OPAL-HK) examined the safety and efficacy of patiromer in patients with hyperkalemia. In the PEARL-HF trial, hypomagnesemia occurred in 23.2% (13/56) of patients receiving patiromer compared to 2% (1/49) on placebo, and vomiting occurred in 3.6% (2/56) of patients (Bushinsky et al., 2015). In the AMETHYST-DN study, 6.3% (19/304) of the patients on patiromer experienced constipation, 5.6% (17/304) experienced diarrhea, 5.6% (17/304) experienced hypokalemia, and 8.6% (26/304) experienced hypomagnesemia (Pitt et al., 2011). In the OPAL-HK trial, 11% (26/243) of the patients on patiromer experienced constipation, 3% (8/243) experienced diarrhea, 3% (8/243) experienced nausea, and 3% (8/243) experienced hypomagnesemia (Weir et al., 2015). Overall, adverse events of patiromer are known and seem minimal primarily including GI disturbances and hypomagnesemia.

In a phase 2 clinical trial (Anker et al., 2015), nausea, vomiting, and urinary tract infections (UTI) were reported in 5% (3/60) of the patients receiving SZC. In the HARMONIZE phase 3 trial, hypokalemia occurred in 7.2% (11/152) of the patients receiving SZC. However, hypomagnesemia was not observed (Kosiborod et al., 2014). Edema was reported in 13.1% (8/61) patients with heart failure receiving SZC compared to 3.8% (1/26) on placebo (Kosiborod et al., 2014). Overall, patiromer and SZC have a minimal adverse event profile except for an increase in GI disturbances. However, patiromer may cause hypomagnesemia whereas SZC likely does not.

STORAGE AND ADMINISTRATION

Patiromer must be stored and transported refrigerated. After dispensing, it may be stored at room temperature for up to six months. It should not be used after the expiry date printed on the sachet. The reconstituted mixture should be taken within one hour of initial suspension, and it is recommended to be administered at least three hours before or after other oral medications (Relypsa, Inc., 2016). On the other hand, SZC can be stored at room temperature. The entire packet contents should be mixed with approximately three tablespoons of water or more, and drunk immediately. It is recommended to be administered at least two hours before or after other oral medications (AstraZeneca, 2018). Due to the pharmacology of these medications, it has the potential of binding with other medications in the GI tract by reducing its absorption.

CONCLUSION

Potassium-binding agents are a relatively new class of agents in treating hyperkalemia. In the past, sodium polystyrene sulfonate has been used, but, given its rare serious side effects, it is less commonly used. At the present, the Ontario Drug Benefit (ODB) program only covers sodium polystyrene sulfonate. Patiromer and SZC are new advancements in this class. These agents are better options, as they can lower potassium with improved adverse events profile. Patiromer seems more effective for chronic hyperkalemia, whereas SZC is better for acute hyperkalemia due to their onset of action. These agents are more selective for the potassium ion, have less adverse events and have a more consistent potassium-lowering effect (Meaney et al., 2017).

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CONTINUING EDUCATION STUDY QUESTIONS **CONTACT HOUR: 2.0 HRS**

Potassium binding agents: Patiromer and sodium zirconium cycloscilicate

By Laurence Lau and Marisa Battistella

1. Which of the following electrolyte imbalance is associated with the induction of cardiac arrhythmias, and an increase in mortality rates?
   a) Sodium
   b) Potassium
   c) Chloride
   d) Calcium
2. Which of the following potassium binding agents can cause a rare but serious adverse effect?
   a) Insulin
   b) Sodium polystyrene sulfonate
   c) Patiromer
   d) Sodium zirconium cyclosilicate
3. What is the normal serum potassium level?
   a) 1–2.2 mEq/L
   b) 2.3–3.7 mEq/L
   c) 3.8–5.1 mEq/L
   d) 5.1–6 mEq/L
4. Which of the following are not associated side effects of Patiromer?
   a) Constipation
   b) Hypermagnesemia
   c) Diarrhea
   d) Hypokalemia
5. What dosage forms do Patiromer and sodium zirconium cyclosilicate come in?
   a) Oral powder
   b) Oral tablets
   c) Oral capsules
   d) Lozenges
6. Which of the following potassium binding agents is covered by the Ontario Drug Benefit (ODB)?
   a) Sodium polystyrene sulfonate
   b) Patiromer
   c) Sodium zirconium cyclosilicate
   d) All of the above
7. Which patient population has the highest risk of hyperkalemia?
   a) CKD
   b) ESKD
   c) Hypothyroidism
   d) A and B
8. Which of the following are not treatment options for hyperkalemia?
   a) Insulin
   b) Hemodialysis
   c) Calcium gluconate
   d) ACE Inhibitors
9. Which of the following does not cause drug-induced hyperkalemia?
   a) Bisphosphonates
   b) NSAIDs
   c) Calcineurin Inhibitors
   d) Trimethoprim
10. How should patiromer and SZC be stored safely?
    a) Patiromer must be stored refrigerated, and SZC can be stored at room temperature.
    b) Patiromer can be stored at room temperature, and SZC must be stored refrigerated.
    c) Both Patiromer and SZC can be stored at room temperature.
    d) Both Patiromer and SZC must be stored refrigerated.

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

Potassium binding agents: Patiromer and sodium zirconium cycloscilicate

Volume 29, Number 3

By Laurence Lau and Marisa Battistella

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6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
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10.	a	b	c	d

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❑ Yes ❑ No

Professional Status
❑ Registered Nurse
❑ Registered Practical Nurse/Registered Nursing Assistant/ Licensed Practical Nurse
❑ Technician
❑ Technologist
❑ Other (Specify) _____

Number of years in nephrology _____

Area of responsibility
❑ Direct Patient Care
❑ Administration
❑ Technical
❑ Teaching
❑ Research
❑ Other (Specify)

_____

Work environment
❑ Acute Care
❑ Self-Care Unit
❑ Independent Health Care
❑ Private Sector

Highest level of education

Nursing	*Non-Nursing*
❑ Diploma	❑ Diploma
❑ Baccalaureate	❑ Baccalaureate
❑ Master's	❑ Master's
❑ Doctorate	❑ Doctorate

I am at present studying toward

Nursing	*Non-Nursing*
❑ Specialty Certificate	❑ Specialty Certificate
❑ Baccalaureate	❑ Baccalaureate
❑ Master's	❑ Master's
❑ Doctorate	❑ Doctorate

Primary area of practice
Choose one
❑ Adults
❑ Combined Adult/Pediatrics
❑ Pediatrics
❑ Other

Select all that apply
❑ Full-Care Hemo
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The Canadian Association of Nephrology Nurses and Technologists (CANNT) Journal invites letters to the editor and original manuscripts for publication in its quarterly journal. We are pleased to accept submissions in either official language—English or French.

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We welcome letters to the editor concerning recently published manuscripts, association activities, or other matters you think may be of interest to the CANNT membership.

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We prefer manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists. In particular, we are looking for:

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- Reviews of current articles, books and videotapes
- Continuing education articles

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Revised March 2018

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Nous acceptons les articles portant sur des manuscrits récemment publiés, des activités de l'Association ou tout sujet d'intérêt pour les membres de l'ACITN.

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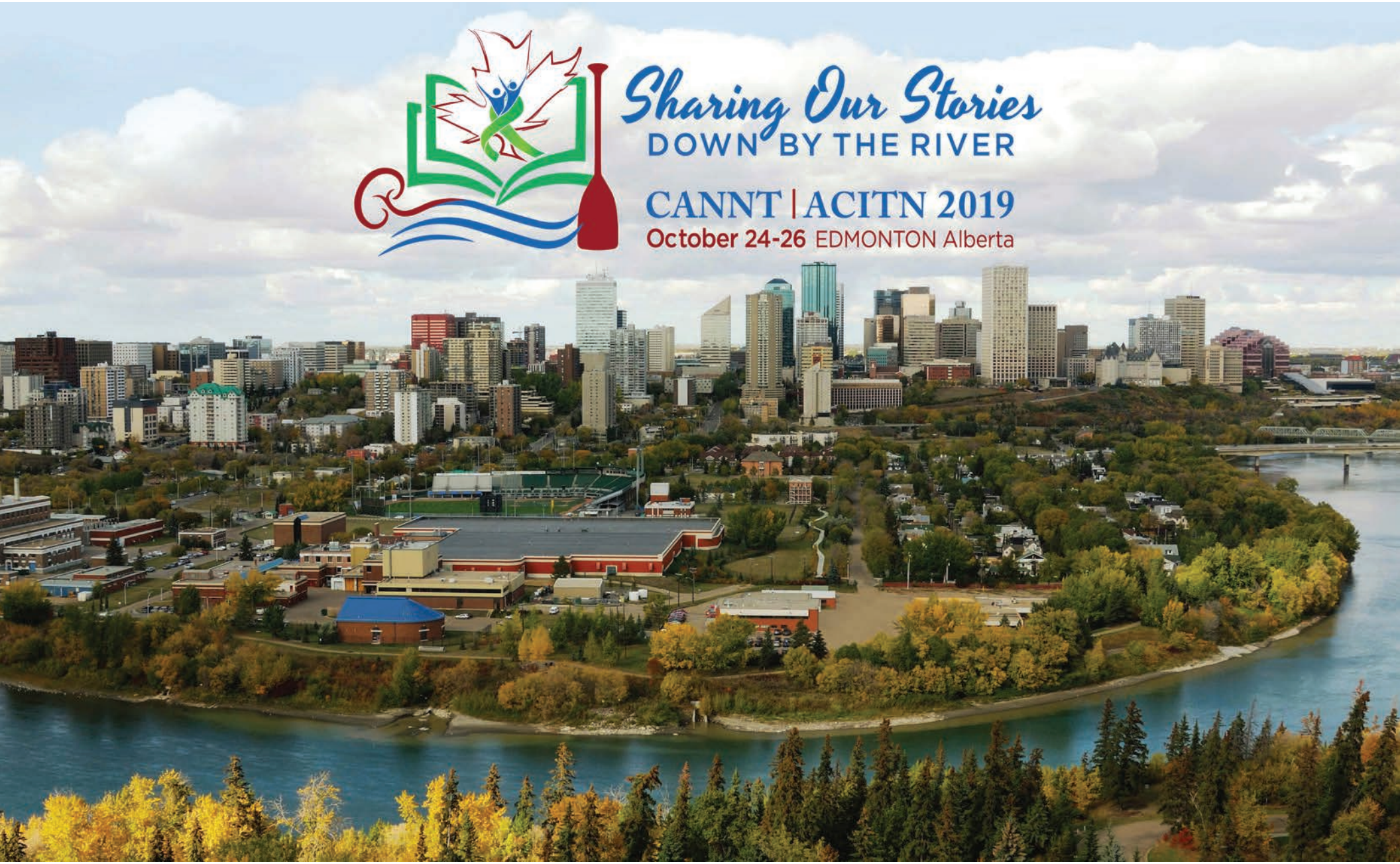
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