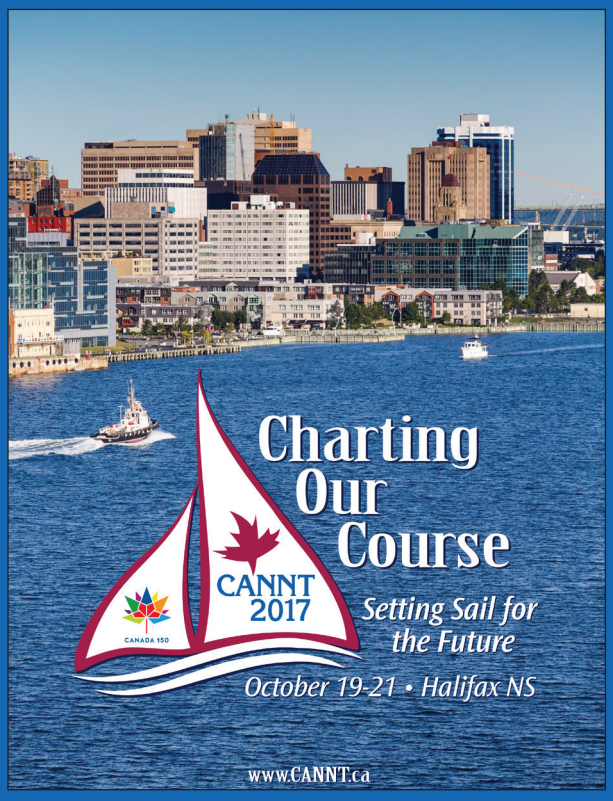
CANNT ACITN
CANADIAN ASSOCIATION OF NEPHROLOGY NURSES AND TECHNOLOGISTS
L'ASSOCIATION CANADIENNE DES INFIRMIÈRES ET TECHNICIENS DE NÉPHROLOGIE

CANNT JOURNAL
JOURNAL ACITN

Volume 27, Issue 2 April–June 2017



IN THIS ISSUE:

APRIL–JUNE 2017 • VOLUME TWENTY-SEVEN • ISSUE TWO

CANNT JOURNAL
JOURNAL ACITN

CANNT ACITN
CANADIAN ASSOCIATION OF NEPHROLOGY NURSES AND TECHNOLOGISTS
L'ASSOCIATION CANADIENNE DES INFIRMIÈRES ET TECHNICIENS DE NÉPHROLOGIE

CONTENTS

IN EACH ISSUE:

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

Editor-In-Chief
Jovina Bachynski, MN, RN(EC), CNeph(C)
T: (905) 845-2571 ext 6307
Email: cannt.journal1@gmail.com

Managing Editor
Heather Coughlin, Pembroke, Ontario

Layout and Design
Sherri Keller, Pembroke, Ontario

Advertising Sales
Heather Coughlin, Pappin Communications
84 Isabella St., Unit 2, Pembroke, ON K8A 5S5
T: (613) 735-0952; F: (613) 735-7983
Email: heather@pappin.com
Rate card: www.pappin.com

Letter from the Editor

CANNT Journal is privileged to present three distinct contributions in this edition that are somehow fortuitously interconnected. In our lead article, *"Chaos through the continuum of kidney dysfunction: A conceptual framework"*, Boudreau and Dubé describe how the patient, as a complex dynamic system, is intricately tied to the surrounding physical, social, and political environment that directly influences his or her health-related behaviour. Implicit in this is the unpredictability of living with chronic kidney disease (CKD). As the authors note, initiating renal replacement therapy (RRT) can precipitate chaos, but a modicum of balance can be achieved by the patient by making small changes in habits or behaviour that can enhance long-term health-related behaviours and outcomes (butterfly effect). However, for some, RRT (or, for that matter, renal transplant) is not a viable option. In *"Conservative kidney management: An alternative care pathway for patients unlikely to benefit from dialysis"*, Wasylynuk and Davison present a body of work that serves as a bookend to the series that started with *"Palliative care in patients with advanced chronic kidney disease"* in *CANNT Journal* in 2015. Conservative kidney management (CKM) is a holistic and patient-centred approach to care that enhances quality of life. Finally, in a nod to the butterfly effect from a system level, I posit that Sivarajahkumar, So, and Battistella's article, *"Antimicrobial stewardship: Is there a role in hemodialysis?"*, offers a way of ensuring some semblance of order through optimal and appropriate prescribing of antimicrobials in this day and age of multi-drug resistance, particularly among patients on hemodialysis, by coordinated means, e.g., education, guidelines/clinical pathways, antimicrobial order sets.

In this edition, we have also included the abstracts that will be showcased at the CANNT annual national meeting this October in Halifax. I invite you to read these abstracts, which appeal to a wide variety of audience interests. Halifax promises to be yet another banner conference and we are privileged to showcase diverse topics in nephrology that have the potential to further enrich our patients' lived experiences as they navigate through the uncertain continuum of CKD, and concurrently elevate our collective professional practice.

Jovina Bachynski
CANNT Journal
Editor-In-Chief

Mot de rédactrice en chef

Le *Journal de l'ACITN* a le privilège de présenter dans ce numéro trois contributions distinctes qui ont en quelque sorte des liens fortuits entre elles. Dans notre article principal, *Chaos through the continuum of kidney dysfunction: A conceptual framework* (Chaos à travers le continuum du dysfonctionnement rénal : un cadre conceptuel), Boudreau et Dubé décrivent comment le patient, en tant que système dynamique complexe, est étroitement lié au milieu physique, social et politique environnant, lequel influe directement sur son comportement au chapitre de la santé. L'article touche de manière implicite le caractère imprévisible de la vie des personnes aux prises avec la néphropathie chronique. Comme l'indiquent les auteurs, l'instauration du traitement de suppléance rénale (TSR) peut précipiter le chaos, mais le patient peut atteindre un certain équilibre en apportant de petits changements à ses habitudes ou à son comportement, ce qui peut améliorer les comportements et les résultats à long terme liés à la santé *(effet papillon)*. Cependant, pour certains, le TSR (ou, en l'occurrence, la transplantation rénale) n'est pas une option viable. Dans *Conservative kidney management: An alternative care pathway for patients unlikely to benefit from dialysis* (Soins conservateurs des reins : une trajectoire de soins alternatifs pour les patients peu susceptibles de bénéficier d'une dialyse), Wasylynuk et Davison présentent une série de travaux qui constituent le dernier chapitre de la série amorcée dans le *Journal de l'ACITN* en 2015 avec *Palliative care in patients with advanced chronic kidney disease* (Soins palliatifs prodigués aux patients atteints d'une néphropathie chronique avancée). Les soins conservateurs des reins constituent une approche holistique axée sur le patient, qui améliorent la qualité de vie. Enfin, clin d'œil à l'effet papillon au niveau du système, je vous soumets que l'article de Sivarajahkumar, So et Battistella, *Antimicrobial stewardship: Is there a role in hemodialysis?* (Gérance antimicrobienne : Y a-t-il un rôle pour l'hémodialyse?) offre un moyen d'assurer un semblant d'ordre grâce à la prescription optimale et adéquate d'antimicrobiens en cette époque de multirésistance aux médicaments, en particulier chez les patients en hémodialyse, par des moyens coordonnés, notamment l'éducation, les lignes directrices/trajectoires cliniques et les ensembles de modèles d'ordonnances d'antimicrobiens.

Dans ce numéro, vous trouverez aussi les résumés qui seront présentés lors de l'assemblée nationale annuelle de l'ACITN en octobre à Halifax. Je vous invite à lire ces résumés, qui touchent un vaste éventail de champs d'intérêt. Halifax s'annonce comme un autre congrès marquant dans le cadre duquel nous aurons le privilège de présenter divers sujets en néphrologie susceptibles d'enrichir les expériences vécues par nos patients tout au long de la trajectoire incertaine de la néphropathie chronique, et de nourrir simultanément notre pratique professionnelle collective.

Jovina Bachynski
Rédactrice en chef du *Journal de l'ACITN*

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 (manuscrits) 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
The Victoria Centre, 84 rue Isabella, suite 2,
Pembroke, Ontario K8A 5S5.

Rédactrice en chef
Jovina Bachynski, MN, RN(EC), CNeph(C)
T: (905) 845-2571 ext 6307
Courriel : cannt.journal1@gmail.com

Éditeur
Heather Coughlin, Pembroke, Ontario

Conception et design
Sherri Keller, Pembroke, Ontario

Publicité
Heather Coughlin, Pappin Communications
84 Isabella St., Unit 2, Pembroke, ON K8A 5S5
T: (613) 735-0952; F: (613) 735-7983
Courriel : heather@pappin.com
Publicité : www.pappin.com

Message from the President

Spring in Canada is always such an interesting time of the year. One minute the sun can be shining, with the hope of long sunny days ahead; in the next, we can be shovelling our driveways, and cursing ourselves for taking off the winter tires before the May long weekend.

Working with renal patients is similar. When we head into our workplaces, we have no idea what will greet us when we cross the threshold. Our patients and their families share this experience. The disease trajectory for a kidney patient is as unpredictable as the weather. Our patients can bask in the sunshine for a few months, even years, and then be hit with a storm of changes. In some cases, it feels more like a tsunami that turns their lives into something they cannot recognize. When the tsunami hits their families, they try to hold on tight. However, despite their best efforts, they are often left on high ground, looking at the destruction, wishing they could do more. Our patients are the most resilient people I know. They pick themselves up, dust themselves off and look to their healthcare team and ask, "Where do I go from here?" I also see them reaching out their hands to their family members saying, "I am okay, come walk beside me as I find a new normal." We also have those patients who decide to stay right where they are, and let nature take its course. I feel very privileged to be a part of the renal community where we can meet and support our patients wherever they are in their journey. The renal journey is a lifelong journey: Once you step on the path, you are on it for the remainder of your life. This is truly a unique experience for our patients, something about which the general public has little, if any, understanding.

Variable weather patterns change our moods, our activities, and the way we interact with each other. They provide a different backdrop to frame our lives. Natural disasters forever shape our lives. They can destroy families and communities, or they can bring people together with the resolve to rebuild a new life.

I view our renal teams as storm trackers. We look at storms from all angles. What do we do when they hit? How do we prevent the next storm? How do we help the people affected by the storm? How do we educate a community to protect themselves from the storm? What conditions warn us that a storm is approaching? How do we provide comfort and compassion during all weather conditions?

Perhaps the old saying "We cannot control the weather" has some truth. What a privilege it is to be invited to journey with our patients and families. Together we learn from each other how to adapt, change, and accept a new normal.

Thank you to each and every one of you for all you do each and everyday.

Yours in Nursing,
Heather Dean, RN, CNeph(C)
CANNT President 2017–2018

Le mot de la présidente

Le printemps au Canada est une saison qui est tout sauf monotone. Une minute, le soleil brille, annonçant de longues journées ensoleillées; la minute d'après, nous sommes en train de déneiger nos entrées de cour en nous blâmant d'avoir enlevé les pneus d'hiver avant le long week-end de mai.

Le travail auprès de patients souffrant d'insuffisance rénale est similaire. En allant au travail, nous n'avons aucune idée de ce qui nous attendra lorsque nous franchirons le seuil. Nos patients et leurs familles partagent cette expérience. La trajectoire de la maladie de ces patients est aussi imprévisible que la météo. Nos patients peuvent profiter d'une éclaircie pendant quelques mois, voire des années, puis être frappés par une période de perturbations. Dans certains cas, cela ressemble davantage à un tsunami qui transforme leur vie en quelque chose d'inédit. Lorsque le tsunami frappe leurs familles, les patients essaient de se cramponner de leur mieux; cependant, malgré tous leurs efforts, ils échouent souvent sur un haut plateau, contemplant les dégâts, et souhaitant pouvoir en faire plus. Nos patients sont les personnes les plus résilientes que je connaisse. Ils se relèvent, secouent la poussière, regardent leur équipe de soins de santé et demandent : « Quelle est la prochaine étape? » Je les vois aussi tendre la main aux membres de leur famille en disant : « Je vais bien, viens marcher à mes côtés pendant que je m'adapte à ma nouvelle situation. » Nous avons aussi des patients qui décident de rester là où ils se trouvent et de laisser la nature suivre son cours. Je me sens très privilégiée de faire partie de la communauté de la néphrologie, dans laquelle nous pouvons rencontrer et accompagner nos patients où qu'ils se trouvent dans leur cheminement. Le parcours de la néphropathie s'apparente à un voyage au long cours : une fois le premier pas franchi, il n'y a plus de retour possible. C'est véritablement une expérience unique pour nos patients, une situation méconnue, voire inconnue de la population en général.

Les conditions météorologiques variables affectent notre humeur, nos activités et notre façon d'interagir. Elles offrent une toile de fond différente qui influence nos vies. Les catastrophes naturelles façonnent pour toujours notre vie. Elles peuvent détruire des familles et des collectivités, ou rapprocher les gens et leur donner la volonté de reconstruire leur vie.

Je considère nos équipes de soins en néphrologie comme des chasseurs de tempêtes. Nous examinons les perturbations sous tous leurs angles. Que faisons-nous quand elles frappent? Comment prévenir la prochaine tempête? Comment aider les personnes touchées? Comment enseigner à une collectivité à se protéger de la tempête? Quels sont les signes avant-coureurs de l'approche d'une tempête? Comment offrir du réconfort et de la compassion, quelles que soient les conditions météorologiques?

Peut-être y a-t-il du vrai dans le vieil adage voulant qu'on ne peut pas décider du temps qu'il fera. Quel privilège que d'être convié à accompagner nos patients et leurs familles dans ce périple! Ensemble, nous apprenons les uns des autres à nous adapter, à évoluer et à accepter une nouvelle normalité.

Merci à tous autant que vous êtes pour tout ce que vous faites au quotidien.

Salutations cordiales,
Heather Dean, inf. CNéph(C),
Présidente de l'ACITN, 2017–2018

CANNT REPRESENTATIVES/ CONTACTS; REPRÉSENTANTS/ CONTACTS ACITN

CNA Liaison/Liaison pour AIIC :
Heather Dean, RN, CNeph(C)
T: 403-943-9400
CANNT.president@gmail.com

Kidney Foundation of Canada, MAC Representative/Fondation du rein—Comité de médical consultatif :
Heather Dean, RN, CNeph(C)
T: 403-943-9400
CANNT.president@gmail.com

Bursary Committee/ Comité des Bourses :
Heather Dean, RN, CNeph(C)
T: 403-943-9400
CANNT.president@gmail.com

CANNT Administrative Office/ Bureau National de l'ACITN :
PO Box 10, 59 Millmanor Place
Delaware, ON N0L 1E0
New phone: 519-652-6767
Same Toll Free: 877-720-2819
New fax: 519-652-5015
General email: cannt@cannt.ca

Contacts:
Sharon Lapointe,
Manager, Member Services
sharon@cannt.ca

Susan Mason
Manager, Website and Social Media
susan@cannt.ca

Heather Reid
National Administrator/Board
heather@cannt.ca

2017 Conference: October 19–21, 2017 Halifax, NS
Heather E. Reid, ARCT, MSc
Principal Planner & Owner
Innovative Conferences & Communications
PO Box 319, 59 Millmanor Place
Delaware, ON N0L 1E0
T: 519-652-0364
F: 519-652-5015
hreid@innovcc.ca
Website: www.innovcc.ca

Journal advertising contact/Personne contact pour la publicité du Journal :
Heather Coughlin
Pappin Communications,
84 Isabella Street, Pembroke, ON K8A 5S5
T: 613-735-0952; F: 613-735-7983
heather@pappin.com
Rate card: www.pappin.com

This year's conference promises nephrology professionals... nurses, technologists, administrators, researchers, pharmacists and more... many opportunities to learn, share, network, discuss, and socialize together.

Experience all that CANNT 2017 has to offer:

- Share in the plenary addresses: Be inspired towards peak performance, re-affirm your call to your profession, and incorporate leading edge science into your everyday work!
- Choose from concurrent sessions and workshops suited to all interests... with topics ranging from mental health, innovations in practice, technology, research, and much, much more.
- Learn from poster presentations with contributing authors from across Canada!
- Engage with our corporate partners as they showcase their latest products and services. Come prepared with questions and issues—our exhibitors want to hear from you!
- Immerse yourself in this year's conference theme, recognizing the untapped capabilities of both your patients and yourselves.
- Explore innovative strategies for "CHARTING OUR COURSE – Setting Sail for the Future"!

Hosted at the Halifax World and Trade Convention Centre, this conference will re-energize, motivate, and engage you!

Register today! CANNT 2017 information is available at **www.cannt.ca**

We are excited to welcome Canadian nephrology professionals to Halifax, NS!

Come and join CHARTING OUR COURSE—Setting Sail for the Future!

ABSTRACTS

Some of the key strategic goals of CANNT are to disseminate educational materials to CANNT members, profile scientific research, and provide opportunities for nephrology colleagues to network.

CANNT's national conference, **CANNT 2017**, provides an excellent venue for accomplishing these goals. However, only a portion of CANNT members are able to attend the national conference annually. Cognizant of this, CANNT is pleased to be printing the abstracts to be presented in both oral and poster format at this year's annual conference in this issue of the CANNT Journal.

The following abstracts celebrate the diversity of nephrology topics being investigated and discussed across Canada. It is our hope that CANNT members interested in pursuing a profiled topic will contact our national office at 519-652-6767 or 1-877-720-2819 or **cannt@cannt.ca** to receive information regarding how to contact the author about the work.

We hope you will carefully review these abstracts!

Jovina Bachynski
Editor, CANNT Journal

WHAT IS SUCCESSFUL CANNULATION OF THE ARTERIOVENOUS FISTULA? REACHING CONSENSUS WITH PATIENT AND HEALTHCARE PROVIDER PERSPECTIVES

Barbara Wilson, MScN, RN(EC), CNeph(C), London, ON, Lori Harwood, PhD, RN(EC), CNeph(C), London, ON

There is a lack of consensus on what outcomes constitute cannulation success of the arteriovenous fistula (AVF). The purpose of this study was to understand what successful cannulation of the AVF means to people on hemodialysis (HD) and to healthcare providers working with this population. A mixed method descriptive study design was used with qualitative methodology to explore the patient experience around successful cannulation through participation in a one-to-one interview. Content analysis was used to identify a number of themes. Quantitative methodology was used to elicit data from healthcare providers by way of a one-time online survey.

The sample was purposeful and included 17 people on hemodialysis from one renal program. The views of international physician and nursing experts in vascular access were also elicited. The results of patient interviews demonstrated that pain during cannulation is the primary concern and that it has a negative impact on the patient experience leading to resignation and, ultimately, acceptance. A positive nurse-patient relationship enabled the patients' positive coping with cannulation. Preliminary survey results from healthcare providers will be presented.

The results of this study are useful to nephrology nurses and educators regarding cannulation skills. Efforts to improve nurses' cannulation skills and reduce complications associated with failed cannulation will lead to charting the course for better patient outcomes.

INTRODUCING THE NEW SATELLITE HEMODIALYSIS SUPPORT NURSE!

Sandy Lee Cranston, RN, Halifax, NS

Historically, the six hemodialysis units in our outlying communities, 143 patients, and the staff required to run these units, were supported through our Home Therapies Department. There was no continuity in care for these patients in regards to their clinics, telehealth, or bloodwork review, as it was always a different nurse carrying out these tasks.

The component of "satellites" was removed from the Home Therapies Department and a new role was created for one nurse to solely concentrate on all aspects of satellite support. One nurse would be doing all the clinics and telehealth, along with other nephrology team members, thus creating trusting relationships with the patients and having a good knowledge base of each patient, providing better follow-up for the patients, satellite staff, and nephrology team. Satellite nursing staff now have the Satellite Support Nurse to help them for ongoing plans of care for patients, daily assessment, and education and mentoring with new policies.

Nephrology team members, including social workers, a dietitian, pharmacist, and nephrologists, have already expressed the positive change in the way the satellites are functioning, with a nurse providing continuity in knowing the patients and their issues, and goals of care. Satellite nurses feel that they are listened to and that issues requiring follow-up are happening due to this new role. All team members who are involved with a patient's care now have the Satellite Support Nurse to keep them informed, and provide support and open and easily accessible communication.

BALANCING THE SCALES OF GOAL WEIGHT MANAGEMENT

Diane Lum, BSN, RN, Vancouver, BC, Leilani Ocampo, BSN, RN, CNeph(C), Vancouver, BC, Jodi Mok, BSN, RN, Vancouver, BC, Sarah Formales, BSN student, Vancouver, BC, Anita Wong, BSN student, Vancouver, BC, Layla Lascano, BSN student, Vancouver, BC, Henry Quach, BSN student, Vancouver, BC, Taryn Sudul, BSN student, Vancouver, BC, Lucas Shoblom, BSN student, Vancouver, BC, Emily Yu, BSN student, Vancouver, BC, Michelle Trask, MIPH, BSN, RN, Vancouver, BC

Goal weight (GW) management is an integral component of hemodialysis. No known tool exists to address the multifactorial aspects of GW management when patients fail to reach the prescribed GW. Ethical dilemmas may arise when nurses are expected to reach a GW prescribed, yet the patient desires to remove only a certain portion of the total fluid to avoid unpleasant side effects.

Ongoing fluid retention contributes to cardiovascular disease and, thus, increases morbidity, making this a prime reason to achieve prescribed GWs. On the other hand, hypotension and other side effects affect the quality of patients' treatments and possibly their quality of life on non-dialysis days. These potential threats to well-being restrict patients' wishes to remove more than they believe they can manage. This is where the problem lies, as nurses feel they must achieve the GW to prevent potential harm versus abiding by the patients' wishes to only remove a portion of the total amount.

Tools were developed to guide the nurse in coordinating with other members of the interprofessional team

(nephrologists, nurse practitioner, and dietitians) to address the multiple factors involved in GW management and provide a consistent approach to reduce excessive fluid intake and its potential harm. A patient teaching pamphlet was created for patients to better understand the various factors when making choices. Pre- and post-surveys were administered to patients, nurses, and prescribers to determine the efficacy of using such tools.

HIGH PREVALENCE OF ELEVATED COBALT LEVELS IN PEDIATRIC CKD PATIENTS

Lisa Wolfs, MPH, BScN, RN, London, ON, Marta Kobrzynski, BSc, London, ON, Susan Huang, MD, PhD, FRCPC, London, ON, Christopher McIntyre, MD, PhD, FRCPC, London, ON, Guido Filler, MD, PhD, FRCPC, London, ON

Background: Trace element concentrations in adult dialysis patients can be unaffected by end-stage renal disease; they can be diminished, such as manganese, selenium and zinc, or they can accumulate, such as cadmium, chromium, nickel, molybdenum, and vanadium, as well as possibly lead. Little is known about the effect of cobalt in adult dialysis patients, and even less in children with CKD before dialysis. However, cobalt has been implicated in patients with high cobalt ingestion-related cardiomyopathy (Tonelli et al., 2009). As cardiomyopathy is a major cause of death later in life for these patients, we were interested if cobalt accumulates.

Patients and Methods: *Design*: Ancillary cross-sectional study to a prospective longitudinal randomized controlled trial (NCT02126293; HC #172241; REB #104976). *Setting*: Children's Hospital of Western Ontario, London Health Sciences Centre, London, Ontario, Canada. *Participants*: 36 children and adolescents 4–18 years of age with CKD. *Interventions*: 1–6 trace element measurements per patient. Cystatin C (CysC) estimated glomerular filtration rate (eGFR) was calculated using the Filler formula. Plasma cobalt levels were measured using HR-SF-ICP-MS. Anthropomorphic data and blood parameters were collected from our electronic chart program. Water cobalt data were obtained from the Ontario Water (Stream) Quality Monitoring Network. *Primary and Secondary Outcome Measures*: Plasma Cobalt; age, CysC, CysC eGFR, and cobalt levels in environmental water.

Results: eGFR and Cobalt levels were not normally distributed. Median (IQR) eGFR was 51 mL/min/1.73 m^2 (35, 75). Median (IQR) Cobalt level was 0.39 ug/L (0.29, 0.52) ug/L, which was significantly higher than the normal mean of 0.22 (reference range of 0.03 to 0.40 ug/L, $p<0.0001$, Wilcoxon signed rank test). However, while the highest values (up to 5.31 ug/L) were in patients with the lowest eGFR, there was no significant correlation between the CysC eGFR and the level (Spearman r=-0.12, Figure 1). Repeated measures analysis showed no change over time. There was also no correlation between the regional water levels and the cobalt levels.

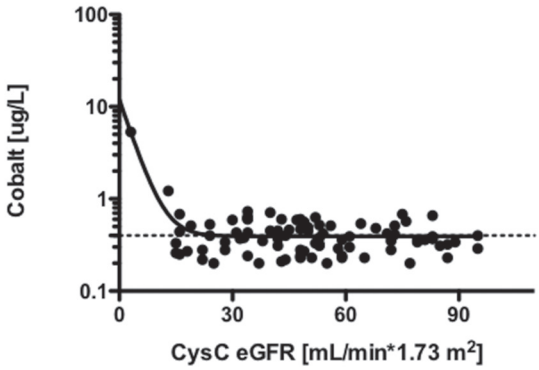


Figure 1. Cobalt vs. CysC eGFR

Conclusion: Ouxr study suggests that pediatric patients with CKD have elevated plasma levels of cobalt. This may be the result of both environmental exposure and a low eGFR. It may be necessary to monitor cobalt levels in patients with an eGFR<30 mL/min/1.73m^2. Future correlation with left ventricular mass index and ejection fraction may be useful.

REFERENCES

Tonelli, M., Wiebe, N., Hemmelgarn, B., Klarenbach, S., Field, C., Manns, B., ... Alberta Kidney Disease Network. (2009). Trace elements in hemodialysis patients: A systematic review and meta-analysis. *BMC Medicine*, *7*, 25. doi:10.1186/1741-7015-7-25.

PERITONEAL DIALYSIS CENTRE OF PRACTICE – SHARING OUR SUCCESS

Yolanda Berghegen, BSN, RN, CNeph(C), Hamilton, ON, Judith Flaherty, RN, CNeph(C), Hamilton, ON, Suzanne Gunby, RN, CNeph(C), Hamilton, ON

Background: At St Joseph's Healthcare Hamilton, 95 percent of peritoneal dialysis (PD) catheter insertions since 2008 resulted in dialysis initiation. The insertion methods used almost exclusively are the bedside, unguided technique, and fluoroscopy/ultrasound-guided insertion technique. In order to share our successes and foster PD growth in the province and beyond, we developed a PD Catheter Insertion Course. This abstract will discuss the role of the PD nurse in the two insertion techniques and at the insertion course.

Method: We established a curriculum and resource manual for the insertion course. The agenda for the course allowed for dedicated time to discuss specific insertion assistant

topics and to participate in joint sessions with the physicians, as well as to learn their role in assisting with the insertions during hands-on experience in the wet lab using a surgical model.

Results: It has been our experience that having the experienced PD nurses assist with the insertions streamlines the process and helps to troubleshoot any potential catheter problems. Nurses attending the insertion course have provided positive feedback.

Conclusion: The PD Catheter Insertion Course is exciting and unique in North America. The PD nurse, with extensive knowledge of PD catheter functioning, has a valued position in the expanded role of assistant during the insertions. Successful insertion of PD catheters contributes to the growth of a PD program. This has made our program a recognized Centre of Practice, and we consider ourselves privileged to share our experience.

ENGAGING WITH THE LOCAL ABORIGINAL COMMUNITY TO INCREASE AWARENESS OF CHRONIC KIDNEY DISEASE AND THE LONG-TERM IMPLICATIONS OF DIABETES

Krista Morgan, BScN, RN, CNeph(C), Peterborough, ON

Chronic Kidney Disease (CKD) has been shown to have a significant health burden on Aboriginal communities throughout the world. The high rate of diabetes among Indigenous Canadians is a contributing factor to the rising rates of CKD in this population. Diabetes has been the leading cause of end-stage renal disease among the Aboriginal people initiating dialysis in Canada for the last decade (Yeates & Tonelli, 2010).

As per the Canadian Diabetes Association Clinical Practice Guidelines (2013), Aboriginal Canadians are among the highest risk populations for diabetes and related complications including CKD. It was noted that community-based and culturally appropriate prevention strategies, and surveillance of diabetes indicators are essential in reducing diabetes in this population.

In 2015, the Peterborough Regional Renal Program was approached by a member of the Aboriginal community requesting assistance in the development of a Peer Support Group focusing on CKD and complications of diabetes. A partnership was built and support was provided to assist with this initiative. Monthly peer support and information-sharing gatherings have been occurring in a community setting since June 2015. Renal and diabetes professionals attend and share information, and answer questions on a variety of topics. In addition, there is time for peer-to-peer support, and traditional knowledge exercises occur.

From the original Peer Group, the need for patients and families to have access to traditional health and healing opportunities while in the hospital setting was noted. To bridge this gap, monthly spiritual services were started in an effort to support health and wellness using traditional Aboriginal healing practices.

The strategic goals of the Peterborough Regional Renal Unit, Peterborough Regional Health Centre, Ontario Renal Network, and the Recommendations in the Truth and Reconciliation Report are reflected in this project.

The poster will share the path, successes, lessons learned, and future steps in raising awareness of CKD and diabetes within the Aboriginal community in our region.

REFERENCES

Canadian Diabetes Association Clinical Practice Guidelines Expert Committee (2013). Canadian Diabetes Association 2013 clinical practice guidelines for the prevention and management of diabetes in Canada. *Canadian Journal of Diabetes, 37*(suppl 1), S1-S212.

Yeates, K., & Tonelli, M. (2010). Chronic kidney disease among Aboriginal people living in Canada. *Clinical Nephrology*, *74*(Suppl. 1), S57–60.

INNOVATION IN HEMODIALYSIS EMERGENCY TRAINING USING HIGH-FIDELITY SIMULATION

Jarrin Penny, BSN, RN, CNeph(C), London, ON

Introduction: High-fidelity simulation-based training is a profoundly effective educational tool for healthcare providers in which critical events are actualized without risk to patients. Simulation-based training provides situational awareness for low-frequency yet high-intensity events with an environment and philosophy of learning and safety. The multidisciplinary approach to simulation-based training has many benefits including skills development, competency and confidence enhancement, team building, collaboration, communication, and systems/environmental analysis, as well as needs and cultural assessments.

It is imperative that dialysis nurses are able to identify when their patients are at risk of dialysis-related complications/emergencies and implement appropriate and timely intervention. Confidence levels vary significantly among nurses when dialysis-specific emergencies arise. This is largely due to the infrequency of such events, as well as inadequate specialized training to prepare for them. These factors can act as barriers to the acquisition of confidence and competence, and erode already established resources.

Methods: Our pilot study included 14 renal nurse participants. Years of hemodialysis nursing experience ranged from six months to 16 years. All participants (13 registered

nurses [RNs] and one registered practical nurse [RPN]) were hemodialysis nurses from the renal program at London Health Sciences Centre: 50% were from in-hospital acute centres and the remaining staff were from a shopping mall-based satellite unit. Each session involved four to five hemodialysis nurses. Three training sessions were offered, each lasting approximately three hours. Training scenarios were created based on typical hemodialysis-related emergencies. Training sessions took place in the simulation lab within the Canadian Surgical Technologies & Advanced Robotics (CSTAR) at London Health Sciences Centre using a high-fidelity simulator Laerdal SimMan 3G in conjunction with a "dummy" hemodialysis treatment using the Fresenius 5008 dialysis machine. Four scenarios were simulated, which included: hypoglycemia, intradialytic hypotension (IDH), cardiac arrest, and venous needle dislodgement. Debriefing sessions took place after each scenario lasting approximately 20 minutes. Participants were given a confidence survey using a 10-point Likert scale after the session was completed. They were asked to rate their confidence both before and after the training session for comparison.

Results: Confidence scores were proven to increase after the simulation-based training sessions. Scores increased by 2.1 points for the hypoglycemia scenario, 1.5 points for the IDH scenario, 2.8 points for cardiac arrest, and 2.8 points for the venous needle dislodgement scenario. Collectively, confidence scores increased on average by 2.3 points on the Likert scale. It is important to note those situations that occur less frequently (cardiac arrest and venous needle dislodgement) were the scores that increased the most, supporting the benefits of simulation-based training for low-frequency/high-intensity events. Narrative comments submitted by staff were positive, indicating that there is a prominent need and desire for simulation-based training in the dialysis setting, and it was felt that this should be a mandatory component of education for all dialysis nurses regardless of years of experience.

Outcomes: ***Nurse*** – Simulation-based training in dialysis will prove to be a successful tool if nurses experience increased confidence when handling dialysis related emergencies. Also, the early identification and appropriate treatment of emergencies led to reduced length of stay or transfers.

Patients – Patients will experience reduced anxiety levels and improved confidence in care during adverse events in the dialysis unit with a reduction in transfers/length of stay post dialysis.

Discussion: Simulation-based training adds a component of competency when high-risk situations arise in the dialysis setting and time is of the upmost importance. We believe that the implementation of such an educational program will not only improve the patient safety, but will also enhance desired health outcomes for patients receiving hemodialysis. Our pilot project was held in the controlled environment of CSTAR, which provided an opportunity for staff to be removed from the distraction of their familiar unit; however, there is also an immense benefit to moving into this familiar environment. An in-situ simulation-based training opportunity is now available, the benefits of which include the ability to identify cultural/environmental gaps and needs assessment for functionality and efficiency.

We are now planning the second phase of this project, which will take high-fidelity simulation on the road; in partnership with CSTAR, we will be travelling to each of our eight regional satellite dialysis partners to provide them with this rich learning opportunity using high-fidelity simulation for dialysis-specific emergencies. The evaluation and metrics for phase 2 will be available at the time of CANNT 2017.

LESSONS LEARNED: CAPITAL EXPANSION IN COMMUNITY DIALYSIS

Ethan Holtzer, MHSc, CHE, Pickering, ON, Ryan Hingco, Chief Technologist, Markham ON

Nephrology programs across the country are growing and, with that, large capital expansion projects occur routinely. Rarely though are the challenges and lessons learned shared amongst programs. Dialysis Management Clinics representatives will share key takeaways from the various project phases of a nine-station capital expansion project completed in February 2017. The expansion incorporated a 2000-square-foot addition into a vacant adjacent unit of the existing dialysis unit. Work on the extension overlapped with the existing operations and included some significant interior alterations such as removal of walls. The presentation will highlight the development of a case for expansion, design of the space, which involved patients and staff, and overseeing the various phases of construction. It will highlight some of the unique requirements for construction of dialysis facilities, navigation of different regulations and the importance of involving patients and staff in creating a shared vision for the unit.

TO GLUE OR NOT TO GLUE: MEETING THE CHALLENGE OF URGENT START PERITONEAL DIALYSIS (PD)

Dana Foisy, MHS, RN, CNeph(C), Ottawa, ON, Mary Ann Murray, PhD, RN, CON(C) GNC(C) CHPCNC(C), Ottawa, ON, Brendan McCormick, MD, FRCPC, Ottawa, ON, Caitlin Hesketh, MD, FRCPC, Ottawa, ON

Purpose: To facilitate timely access to peritoneal dialysis (PD) for patients requiring urgent dialysis and avoiding placement of a central venous catheter and in-centre hemodialysis.

Description: The usual time to access a PD catheter following placement is four to six weeks; earlier attempts to use the catheter can result in leakage and treatment delay. For patients requiring urgent or unplanned dialysis, this can present a barrier to timely PD care and add to the burden of emergency central line placement and in-centre care. The use of fibrin glue at the deep cuff and laparoscopic surgical sites may facilitate earlier catheter use.

Outcomes: Over a one-year period, we tracked the mechanical and infection outcomes of patients (n=34) who had a laparoscopic insertion of a PD catheter with fibrin glue. Of these, 24 started PD within 14 days with six experiencing an exit site leak; most (n=5) resolved over time with successful transition to PD. Two patients experienced peritonitis and another two patients experienced an exit site infection. Only one mechanical failure was documented.

Implications for nephrology care: Urgent start PD using fibrin glue is a viable alternative to urgent in-centre hemodialysis with placement of a central venous catheter. Patients can avoid risks associated with central venous catheter placement. Patients can also benefit from continuity of care by avoiding disruptions associated with transition between modalities and can access their preferred renal replacement modality in a timely manner.

NURSE-LED BEDSIDE ROUNDS: AN INNOVATIVE APPROACH TO REAL TIME LEARNING, CLINICAL LEADERSHIP AND PATIENT-CENTRED CARE

Ofelia Magat, BScN, RN, Calgary, AB, Carol Ewashen, PhD, RN, Calgary, AB, Lai-King Wu, BN, RN, Calgary, AB, Xiao Yan Sun, BN, RN, Calgary, AB

How do you empower nurses to be confident, make better-informed decisions, and provide clinical leadership as we move forward in the future? In this oral presentation, we will show you how nurse-led bedside rounds (NLBR), a traditional teaching model in medicine, adopted and modified in the context of hemodialysis (HD) by a team of nurses, can fire up nurses' passion to perform, advance real time learning, and promote patient-centred care behaviour.

We conducted a single blinded, quasi-experiment in a large, urban dialysis facility to evaluate the efficacy of NLBR in enhancing nurses' confidence in delivering patient-centred care. To gain a broader and deeper understanding of the learning experiences of nurses on this rounding model, we added a qualitative framework to the overall research design. A dialysis rounding tool, created by the nursing team, was instrumental to the success of the project. Results of pre- and post-study surveys administered to the 34 participating HD nurses, using matched T-test and thematic analysis, showed that learning becomes more powerful in the presence of the patient who can share stories of their disease and sufferings. Opportunities for collaboration, repetitive exposures to critical thinking, and improved communication provided mastery of practice in real time.

We will share our experiences, discuss the study results, provide valuable insight on how this teaching strategy can benefit nurses, and describe the successes and challenges of the project. We hope that NLBR will be considered a part of standard practice in hemodialysis.

NURSE-LED BEDSIDE ROUNDS: AN INNOVATIVE APPROACH TO BEDSIDE TEACHING AND PATIENT-CENTRED CARE

Ofelia Magat, BScN, RN, Calgary, AB, Carol Ewashen, PhD, RN, Calgary, AB, Lai-King Wu, BN, RN, Calgary, AB, Xiao Yan Sun, BN, RN, Calgary, AB

Dialysis nurses are faced with increasing pressure to perform and keep up with the constant changes and advancement in practice. They are expected to be highly knowledgeable and skilled. Although it is important to fulfill these roles, nurses must confidently and competently act on these expectations. In moving forward, how can nurses' continuous learning be supported beyond the traditional models of education? How do we integrate patient-centred behaviour in every nurse-patient encounter?

Nurse-led bedside round (NLBR), an innovative teaching approach, was adopted to promote work-based education and patient-centred care. To evaluate its efficacy, a quasi-experiment and reflective narratives were conducted, with the goals of gaining a deeper understanding on how NLBR can enhance nurses' level of confidence in enacting patient-centred care behaviour and exploring nurses' experiences in the context of learning. In a large, urban dialysis facility, 34 dialysis nurses completed the pre- and post-study survey in this exploratory study.

The benefits and challenges of NLBR in building nurses' skills and knowledge will be showcased in this poster

presentation through analysis of qualitative data, and the increase in the level of confidence of nurses in enacting patient-centred care behaviour will be validated using statistical analysis and graphs. An innovative model of care diagram describing the multi-system implications of NLBR will be featured.

IMPROVING EDUCATION EFFECTIVENESS IN A HEMODIALYSIS SETTING

Kim Wilson, CNeph(C), RN, DSW, Ingersoll, ON, Mary Touzel, CNeph(C), RN, Ingersoll, ON, Kim Wilson, CNeph(C), RN, DSW, Ingersoll, ON

This presentation outlines the benefits of streamlining teaching and amalgamating reference material for dialysis technicians (DT), registered nurses (RN), and registered practical nurses (RPN) for hemodialysis training. This presentation will utilize a three-dimensional display board plus a computer-based simulation demonstrating the rewards of utilizing multiple teaching mediums in addition to hands-on teaching. By utilizing OneNote, it has helped our teaching environment by systemizing teaching, appealing to multiple teaching genres, and thereby staying current with advancing technology and integrating teaching of the future.

Content:

a. Utilize a three-dimensional display board to demonstrate the key benefits of OneNote technology.
b. Demonstrate using the laptop how using available technology can enhance the students' learning experience.
c. Identify how standardization of teaching consolidated staff learning across a large program.
d. Discuss the development of a tool for streamlining orientation within a unit that had a complete turnover of staff and no formalized teaching material.
e. Recognize that the various generations within nursing utilize different methods of learning and, therefore, adaptations need to be incorporated.
f. Distinguish the differences in teaching within an in-centre versus a satellite environment.

PRECISE CANNULATION WITH SAX-NAP TECHNIQUE

Neil A. Penalosa, BSN(Ph), RN, CNeph(C), Surrey, BC

For decades, renal nurses have struggled with accurate needle placement. Even seasoned cannulators may occasionally experience some daunting scenarios. Even with good hand-eye coordination, patience, and due diligence, miscannulations may still become apparent.

With the advance in technology, ultrasound-guided cannulation has been introduced, thus leading to the ascertainment of the position of the needle in the renal vasculature. Current literature has introduced the short (SAX) and the long (LAX) axes methods. The Short Axis-Neil A. Penalosa (SAX-NAP) technique employs simultaneous manoeuvres of the dialysis needle and the ultrasound transducer that provide great precision in cannulation and confidence to the cannulator. This maximizes the benefits to patients and subsequently averts unnecessary costs to the health care system.

VASCULAR ACCESS LINK RN'S INITIATIVE: AN EXTRAORDINARY CAMPAIGN BY ORDINARY RNS

Neil A. Penalosa, BSN(Ph), RN, CNeph(C), Surrey, BC

Every nurse has his or her unique motives and career plans. Some are just content with the day-to-day life in the renal unit and, consequently, have become stagnant with practice, getting them nowhere apart from being an "eternal novice" in the renal world. Our team started with the idea of getting together and simply sharing our experiences and findings, thus coming up with a unified understanding in the care and management of the AV Fistula and AV Graft. Amidst all challenges, our team has managed to promote such initiative with compassion, commitment, and camaraderie. Subsequently, the team's motivations and plans of action were consolidated for the greater benefit of the patients and for their own professional practice.

SETTING A NEW COURSE FOR HEPATITIS SURVEILLANCE

Betty Herman, RN, London, ON, Margo Leonard, RN, London, ON

Hepatitis B remains a significant risk to patients receiving hemodialysis due to concurrent factors such as uremia, malnutrition, and immunosuppression. They are further at risk for potential exposure to blood-borne pathogens through contaminated machines and medical equipment. Our renal program has had a hepatitis B vaccination program in place for many years, but has encountered difficulties with an inconsistent approach, outdated ordering method, and a recording system that led to lost or difficult-to-locate data, missed doses, and inconsistent follow-up.

In an effort to better our program, we implemented several significant changes to our protocol over the last few years. To improve our immunization program, we found it essential to have a dedicated nursing staff member track

and record patient response and support the providers. Initially, our dialysis program instituted an efficient paper model that eventually transitioned to a more user-friendly online version, as well as online orders for the vaccine. This necessitated education/collaboration with physicians and nurse practitioners for a standardized method of ordering online, followed by educating bedside nursing staff. Patients are also included in the education process, i.e., need for immunization and the dosing schedules.

This program-wide standard tool and online tracking system has allowed access to our patients' vaccine history starting in pre-dialysis clinics, peritoneal dialysis clinics, and our in-centre and numerous satellite units. These advancements in data collection, recording, and education have streamlined our process and improved our efficiency for hepatitis B surveillance.

BEYOND THE DIALYSIS CHAIR

Ruthann MacMillan, RN, CNeph(C), Ottawa, ON

As part of our initial assessment of a new patient, the nursing history has traditionally been an important data collection tool. With recent advancements in electronic charting and the use of care maps in nephrology, does the traditional nursing history still have a place in gathering information from the patient himself? Is it just a case of a few papers that get stuck in the paper chart and are not referred to again? Or can it be revised into a tool that we can use in the future to ensure a more personal connection with our patients?

Our "New Patient Care Map" ensures the completion of 19 tasks that ensure an adequate baseline in specific areas such as falls risk, MRSA status, consents, tour of the clinic, advance directives, etc. The nursing history is sometimes taken home and filled in by a patient, then returned to the nurse. However, by taking the time to sit with a patient, we can ask them what their career was, what type of living accommodation they currently have, and what hobbies they enjoy, as well as their detailed medical history. Do we practise active listening with our patients? Do we know the struggles they are facing at home? At our clinic, we have limited social work resources, so our patients depend on us to answer questions and to see them beyond their dialysis chairs as individuals with histories and families, as well as their medical issues. We are currently revising our nursing history to make it more concise and relevant, while encouraging discussion with our patients.

The outcomes we are anticipating include:

- A more concise nursing history that can be transferred into electronic format
- More efficient and personal information about our patients.

By taking more time with our patients, using a concise but efficient nursing history, we can enhance the nurse/patient relationship and help improve the level of patient trust in staff.

THE FUTURE OF LIVING ORGAN DONATION: EMBRACING THE ROLE OF SOCIAL MEDIA TO FIND A DONOR

Beth Montesi, BScN, BA, RN, London, ON, Christy Masse, BScN, RN, London, ON

During the past few years, it has become apparent that social media has found a place in the world of living organ donation. There have been some high-profile cases where social media was used, and the response was overwhelming. The result can be effective when the information shared is clear and accurate. Some potential recipients need guidance from healthcare providers, as they navigate through social media in their search for a suitable living donor.

This presentation provides an overview of current literature regarding social media and the pursuit of living organ donors. We also review specific cases in our own living donor program. Both the literature and our experience reveal that many kidney patients are not comfortable asking potential donors to consider donation. Often a close family member or friend is more comfortable sharing the recipient's story on social media, acting as their advocate. We also discuss some of the positive and negative aspects of social media. A positive aspect is that patients have a forum to share their personal story with large groups while providing the contact information of their living donor program. A negative aspect is that personal information cannot be retracted or "unshared" once it enters the public forum.

Members of the healthcare team can provide guidance to recipients and their advocates regarding social media, including written information and oral communication. With accurate information and knowledge of the donation process, patients can use social media effectively to search for potential living donors.

ACKNOWLEDGING GRIEF IN A DIALYSIS UNIT

Angela Andrews, BScN, RN, London, ON

When providing prolonged care for patients with a chronic disease such as renal failure, it is common for healthcare professionals to develop unique relationships with patients and their families. In a hemodialysis unit, it is also common for patients and families to rely on fellow patients for support, resulting in the creation of meaningful relationships. When renal patients pass away, there is often

an abrupt end to these relationships with little chance for surviving patients, family members, and healthcare professionals to achieve closure.

In an effort to acknowledge grief experienced when dialysis patients pass, the renal program at London Health Sciences Centre holds an annual dialysis memorial service. This service brings closure to renal care team members, as well as remaining patients and their families. Those who attend are given the chance to reflect and say goodbye to patients they may have known for many years. This also provides the opportunity to comfort and provide support for family members and friends of former patients who are grieving a loved one.

The objective of this presentation is to discuss the importance of acknowledging grief that staff members in a hemodialysis unit experience when patients under their care pass away, as well as the importance of helping patient family members achieve closure after the death of a loved one. Bereavement support will be looked at, and the positive therapeutic benefits of a dialysis memorial service will be demonstrated.

IS THE CAPTAIN OF THE SHIP HOPEFUL OR NOT?

Peggy Kajah, MScN, RN, CNeph(C), Dundas, ON

What is the relationship between hope and self-management in pre-dialysis patients navigating chronic kidney disease (CKD)? Evidence shows that patients identify hope as a life-promoting force, which can be enhanced through a therapeutic alliance with caregivers (Jevne, 1993; Kylma, Hannele, & Perala, 1996). Examining hope, as it pertains to pre-dialysis renal patients and self-management outcomes, may provide insight on a link between the two. Healthcare goals in a pre-dialysis CKD clinic focus on prevention of progression strategies, symptom management, and promoting healthy living with CKD. Equipped with a greater understanding of hope, as it relates to the level of self-management, may better inform care planning, specifically self-management strategies that nurture hope across the continuum of the patient's chronic kidney disease. Assessing hope in a pre-dialysis setting may help to inform how to better support self-management of pre-dialysis CKD patients for improved outcomes. This pilot project seeks to establish baseline correlations between levels of hope and measures of self-management with statistical analysis of data measured using two validated questionnaires: the Chronic Disease Self-Management Program (CDSMP) Sample Questionnaire and the Integrative Hope Scale (IHS). The Chronic Disease Self-Management Program Sample Questionnaire was utilized to measure overall self-management of disease. The Integrative Hope Scale was utilized to measure the participant's level of hope. Data analysis will include plotting data collected on a "scatterplot graph" for visual representation to see the type of relationship, direction of relationship, and degree of relationship, if any. A Pearson coefficient r will be applied to determine the strength of the relationship between the two main variables (self-management and hope). It is the necessary first step for a future research project that will test a targeted intervention study for pre-dialysis CKD patients who self-report low levels of hope.

REFERENCES

Jevne, R. (1993). Enhancing hope in the chronically ill. *Humane Medicine*, *9*(2), 121–130.

Kylma, J., Turunen, H., & Perala, M. (1996). Hope and chronic illness: The meaning of hope and the ways of fostering hope experienced by chronically ill Finnish people. *International Journal of Nursing Practice*, *2*, 209–214.

KNOCKING DOWN THE WALLS

Linda MacPherson, BN, RN, St. John's, NL, Eileen Penney, BN, RN, St. John's, NL, Sharon McDonald, BN, RN, St. John's, NL

Anyone applying to the Home Dialysis Program has to meet certain criteria. Failure to do this means they do not get a chance to participate. This has been our practice since 2005. The purpose of this presentation is to share the experience we had with extraordinary clients. They have changed the mindset and direction of our department when selecting patients. Our approach for teaching in the Home Dialysis Program has also been altered. This presentation will show the challenges and successes we had and how we tailor-made the Home Dialysis Program in order to safely meet the needs of S.K. and our other clients who participated in our program.

S.K. is a 42-year-old female with end-stage renal disease. Some of her other health challenges include albinism, which affects her vision. She is medically designated as legally blind. Her spouse J.K. also suffers from a vision deficit and is legally blind as well. When I first spoke to S.K. and J.K., I informed them that S.K. would not be a candidate for the Home Program because of their collective vision impairments.

Our time spent with these clients has taught us, as a department, to look at all patients as potential candidates for the home program. We have learned to think outside the box and to be able to fit a square peg into a round hole but, more importantly, break down the barriers that existed in home therapies.

IS HEMODIAFILTRATION THE ULTIMATE FIX?

Carolyn Mack, RN, CNeph(C), London, ON, Michelle Masson, RN, CNeph(C), London, ON, Dennis Smith, MN, NP, London, ON, Sarah Spence, MN, NP-PHC, London, ON, Sheryl Forrest, RD, CDE, London, ON

Hemodiafiltration is a form of dialysis that uses both convective and diffusive clearances, which is used in standard hemodialysis. In comparison to standard hemodialysis, hemodiafiltration has the potential to remove mid to large molecular weight solutes like phosphate. Although hemodiafiltration is much more demanding on the health practitioner and patient, it can lead to the following improvements: improvement in dialysis clearance (Kt/V), lower serum phosphates, decrease in phosphate binding agents, improvement in hemodynamic stability, decrease in inflammatory markers (CRP), reduction in erythropoietin stimulating agent dosing, reduction in anticoagulation agent, and possibly improvement in nutritional markers (nPNA). There has also been some evidence that hemodiafiltration maintains dialysis patients' global cardiac function in comparison to standard hemodialysis.

This quality improvement initiative will monitor the effects of hemodiafiltration on eight patients at one-month intervals for a total of three months. An overall cost analysis will be studied with respect to hemodiafitration versus hemodialysis treatment, nursing training time, and possibly, over time, a decrease in usage of erythropoietin stimulating agent and phosphate binding agents. We will utilize the quality-of-life measurements from the ESAS-r:Renal questionnaire to evaluate any impact of hemodiafiltration on our patient population. The goal of this project is to determine whether the above measurements have a positive impact on clinical outcomes.

POPULATION-BASED SCREENING IN WIKWEMIKONG UNCEDED FIRST NATION

Stephanie Winn, BScN, RN, Sudbury, ON, Ruth Morton, RN, Sudbury, ON, Marc Hébert, MBA, Sudbury, ON

Health Sciences North (HSN) and the Ontario Renal Network (ORN) have worked closely with Wikwemikong Unceded First Nation to pilot and deliver chronic kidney disease (CKD) and risk factor (hypertension and diabetes) screening in a community-based delivery model (based on the Manitoba Renal Program's FINISHED project). This was based on an identified gap in diabetes epidemiology in the community. Through collaboration with the community health centre and leadership, a protocol was developed to screen HgA1C, ACR, and eGFR values, and refer appropriately. Patients with elevated HgA1C (over 5.5) were referred to community diabetes services, and those at risk of CKD (based on the Kidney Failure Risk Equation) were managed by primary care with HSN nephrology support (using the Kidneywise Toolkit). Out of 378 individuals who were screened, 271 were referred to diabetes services (with 20 newly identified as diabetic), and 22 were newly identified as Stage 3 CKD requiring primary care intervention. The screening process took approximately 20 minutes at a cost of approximately $93 per person. Results will be used to review existing community health services and collaborate with provincial and federal governments to address service gaps. The screening model is being developed for expansion, with standard operation procedures and manuals being developed, and engagement underway with Aboriginal communities in the North-East Local Health Integration Network to identify future screening sites. This model serves as an example for Aboriginal community engagement and co-design, as well as screening and referral for CKD and risk factors.

DALTEPARIN REPLACEMENT OF UNFRACTIONATED HEPARIN (UFH) FOR EXTRACORPOREAL CIRCUIT (ECC) ANTICOAGULATION IN AN OUTPATIENT HEMODIALYSIS UNIT

Lesley Campbell, RN, CNeph(C), Lindsay, ON, Maryann Schneider, PharmD, RPh, BSP, ACPR, Lindsay, ON

Anticoagulation is routinely required during hemodialysis to prevent clotting within the extracorporeal circuit (ECC). Although several methods of anticoagulation exist, unfractionated heparin (UFH) has, for many years, been the agent most commonly used in most hemodialysis units. The Institute of Safe Medical Practices (ISMP) has long identified UFH as a high-alert medication. Accordingly, Accreditation Canada's Required Organizational Practices 2017 have recommended limiting its availability to ensure that high-dose formats of heparin not be stocked in client service areas. As a result, our hemodialysis unit recently switched from UFH to the low molecular weight heparin (LMWH), dalteparin. Considered equally efficacious as UFH in ECC anticoagulation, pre-filled syringes of dalteparin were chosen because of greater product familiarity in dosing and administration within our regional renal program, superior device safety with retractable needle guards, and documented clinical experience in terms of safety and efficacy from other Ontario dialysis centres.

Dalteparin was administered at the beginning of dialysis for all patients currently receiving UFH. UFH was discontinued and a dose of 2,500 IU of dalteparin was substituted as a replacement. Dalteparin data will be tracked from March 2017 until Sept 2017 for these patients. Patients are evaluated for circuit/dialyzer clearing effectiveness, clotting/

bleeding events, and final dose requirements to maintain the ECC.

Through our evaluation, we hope to show that dalteparin is a suitable alternative to UFH for ECC anticoagulation. With the data collected, we hope to observe similar benefits as documented by other Ontario dialysis centres using this medication.

NAVIGATING THROUGH THE WATERS OF OUR DIALYSIS CLINIC: THE MENTOR/STUDENT NURSE JOURNEY

Robin McDonell, RN, CNeph(C), Monkland, ON, Donna Vivarais, RN, CNeph(C), Monkland, ON

In our outpatient hemodialysis unit, we provide a nurturing and supportive environment for student nurses to grow. Our nursing team has embraced the CNO's standards to assist and support in the development of student nurses. We offer the student nurse customized learning based on their current academic year and the length of their community placement. Students have the opportunity to learn unique assessment skills in a specialized environment including how to develop and provide education regarding renal disease and its associated comorbidities. At the beginning of their placement, students are provided with a challenge to develop a learning/teaching tool based on the current patient demographic needs. To further their experience, students present their developed material to the staff and then to the patients.

Having nursing students in our unit allows staff the opportunity to share their knowledge while gaining nephrology certification education hours. It also gives us the opportunity to learn along with the students and rekindles our passion for nephrology. Patients benefit not only from the new education that they have received, but also learn from the running dialogue between the mentor and student nurse at the bedside.

Post-placement interviews conducted with both students and liaison nurse/teachers from the university have confirmed high student satisfaction with our process. This poster presentation will demonstrate how our clinic provides for a positive and smooth sailing learning and teaching environment.

INTERIM RESULTS OF HOME WELLNESS REMOTE MONITORING USING CURRENT TECHNOLOGY IN PERITONEAL DIALYSIS

Jo-Anne McMullen, RN, CNeph(C), London, ON

Feelings of isolation and patient disengagement are major barriers to home dialysis for many renal patients. The CONNECT Trial, a multi-centre randomized controlled trial, began in June 2016 to evaluate the impact of a mobile and browser-based home dialysis management platform on patient engagement, clinical outcomes, and operational efficiency in peritoneal dialysis clinics. Interim results of this trial highlight how utilization of this infrastructure has significantly improved quality of care by enabling healthcare team members to identify and intervene early in clinical situations. As well, we will explore how data sharing and improved communication have identified key re-education opportunities and increased confidence, and reduced feelings of isolation in patients to empower them to manage their self-care. This study shows the significant positive impact that a home dialysis management platform can have on patient confidence and health outcomes, as well as healthcare team efficiency, through optimized workflows that enable proactive identification of clinical complications.

OPTIMIZING CARE IN VASCULAR ACCESS: A SEVEN-YEAR SNAPSHOT

Karen MacDonald, RN, CNeph(C), Sydney, NS, Heather MacQueen, MN, RN, CNeph(C), Sydney, NS

As many are aware, vascular access (VA) is the cornerstone of hemodialysis (HD) adequacy and is a significant quality indicator used to determine patient outcomes. As we merge services to one provincial health authority, tracking patient outcomes related to VA is of the utmost importance to sustain and guide our practice for the new population we will serve.

Over the last seven years, the former Cape Breton District Health Authority Renal Program collected data related to hemodialysis VA. In particular, we looked at initial start access, existing access, interventions required, and access clinic visits. We discovered that, on average, 73% of our population have an AV fistula with 36% present at the start of HD. With timely referrals and a unified interdisciplinary approach, we hope to maintain this high standard and provide the best possible access for our patients.

Overall, our data demonstrate that we are headed in the right direction for best practice and highlights areas for improvement. While our patient population is changing, which is challenging, it is our hope that by taking a look back before moving forward, VA care will be optimized. Without a reliable access, there is no dialysis.

"CORRECT START INITIATIVE (CSI)": A PATIENT ENGAGEMENT APPROACH TO PROMOTE SHARED DECISION-MAKING FOR PATIENTS NEW ON HEMODIALYSIS

Johanne Denis, RN, BScN, CNeph(C), Richmond Hill, ON, Barb Gray, RN, MScN, CNeph(C), Richmond Hill, ON, Kimmy Lau, RN, MN, CNeph(C), Richmond Hill, ON

Patients starting hemodialysis (HD) often have many complex and unresolved issues. With the role of the New Start Coordinator (NSC), all admitted new HD patients are seen in the hospital. When seen by the NSC, education regarding options begins. Whether acute, sub-optimal, or planned, all new start patients on HD are booked to attend a CSI appointment with their primary nephrologist ideally within six weeks. Attendees at this 30-minute appointment include: the patient, family/caregiver, nephrologist, and NSC. Issues discussed include: modality choice, body access, transplant status, advanced directives including code status. In supporting the shared decision-making process, if further information is requested by the patient/caregiver regarding independent therapies or body access, the NSC will provide a tour of the home dialysis area and/or make appropriate referrals as required, for example, to the interdisciplinary team members.

In 2016, 85 CSI appointments occurred and 100% of patients left with a plan of care in place. If required, a follow-up CSI is arranged. Of our acute and suboptimal HD starts for 2016, 35.63 % chose a home modality with a further 18.39% still pending decision. CSI supports patients who are new on HD to play an active role in their care needs. By being offered education and a variety of tools, patients learn to self-manage living with end-stage kidney disease and participate in the shared decision-making process. CSI enables patients to understand what to expect and the available options/resources to assist them in adjusting to the new dialysis regimen. CSI appointments have successfully demonstrated improved clinical outcomes and quality indicators while enhancing our patients' experience.

INTEGRATION OF THE RPN ROLE IN THE ACUTE CARE HOSPITAL SETTING

Valerie Cameron, RN, London, ON

The hemodialysis unit at London Health Sciences Centre (LHSC) implemented the role of the RPN four years ago. Integration of this role has been challenging. Our hemodialysis unit at LHSC is a 25-station fast-paced ever-changing environment. We support a complex mix of patient groups including new starts from CKD clinic, acute starts, chronic patient, transplant assessments, and acute inpatients. In an effort to support the registered practical nurse (RPN) within the dialysis unit, the charge nurses in the renal program developed communication tools to aid in providing awareness and dialogue amongst nursing staff about the RPN scope of practice to ensure that the skill mix is optimized. A review of barriers such as lack of knowledge of role clarity and managing appropriate nurse assignment will be reviewed. Strategies for promoting trust and respect within the nursing team will be explored. The objective of this project is to maximize the effectiveness of the RPN role and retention of the RPN who has expanded knowledge and experience caring for the renal patient.

DEVELOPMENT AND IMPLEMENTATION OF A RENAL PASSPORT TO ASSIST WITH EFFECTIVE AND INDIVIDUALIZED PATIENT CARE PLANS IN A MULTI-CARE KIDNEY CLINIC

Debbie Mathew, RN, CNeph(C), Peterborough, ON, Krista Morgan, BScN, RN, CNeph(C), Peterborough, ON

In 2015, our kidney clinic experienced a surge of patients referred from the nephrology office setting within a six-month period. Our traditional methods of assessing newly referred patients and providing patient education were no longer effective. This resulted in gaps in patient care plans.

The need to standardize education across the regional program, while providing individualized care and incorporating the Ontario Renal Network's (ORN) expectations of increasing AVF and independent dialysis (ID) rates, became increasingly difficult.

The Renal Passport allowed for standardized education and assessment processes for modality, vascular access, advanced care planning, and transplant. Shared decision-making, patient engagement, self-management, and goal setting techniques were embedded into the passport. This passport would capture the Ontario Renal Plan (ORP) II goal of empowering and supporting patients and family members to be active in their care.

This poster will discuss the development and rollout of the patient passport, lessons learned, evaluation process, and future steps.

NOVICE TO EXPERT IN HEMODIALYSIS

Primrose Mharapara, MScN, NP-PHC, Oshawa, ON

Hemodialysis nursing has grown complex over the years. Increased patient acuity, proliferation of hospital technology, and specialization of hemodialysis have led to an intensified need for nurses with appropriate skills in assessing and monitoring hemodialysis treatment. Hence,

the complexity and responsibility of hemodialysis nursing today requires ongoing career and self-development. An understanding of the differences between the experienced and the novice nurse is required, and the Dreyfus Model of Skill Acquisition is utilized as a useful tool (Benner, 1989). The Dreyfus model takes into account increments in skilled performance based upon experience and education, and provides a basis for clinical knowledge development and career progression in nursing (Benner, 1989). The Dreyfus model posits that in the acquisition and development of a skill, one passes through five levels of proficiency; novice, advanced beginner, competent, proficient, and expert (Registered Nurses' Association of Ontario (RNAO), 2005). The purpose of this project is to highlight the knowledge acquisition of novice hemodialysis nurses and the supports available for them to master, maintain, and share knowledge gained. A qualitative study conducted in a hemodialysis unit providing care to renal inpatients and outpatients employed surveys to gather data from nurses on the process of knowledge acquisition, both theoretical and practical, and ongoing support. A significant finding was the extensive knowledge possessed by expert nurses utilized to effectively guide and support novice nurses. Acquisition of knowledge in hemodialysis is required to enable expert nephrology nursing practice and considered a tool for nurse satisfaction and retention.

REFERENCES

Benner, P. (1989). From novice to expert. *The American Journal of Nursing, 82*(3), 402-407.

Registered Nurses Association of Ontario. (2005). *Educators resource: Intergration of best practice guidelines*. Retrieved from http://rnao.ca/sites/rnao-ca/files/Educators_Resource_-_Integration_of_Best_Practice_Guidelines.pdf

REDUCING PREVENTABLE PATIENT HARM: THE SAFE HEMODIALYSIS JOURNEY CHECKLIST

Sonia Balinas-Thomas, RN, Milton, ON, Denise Williams, MN, RN, CNeph(C), Milton, ON, Vanessa Godfrey, MScN, RN, CNeph(C), Milton, ON

According to the Institute of Medicine [IOM] report "To Err is Human: Building a Safer Health System", up to 98,000 patients die each year from preventable medical errors (Kohn et al., 2000). Safety risks commonly found in dialysis units include communication breakdowns, medication errors, vascular access mishaps, mistakes in dialyzer and machine setup, breaches of infection control policies, and falls (Thomas-Hawkins, 2015).

The purpose of this quality initiative is to prevent or minimize patient harm through implementation of a standardized safety checklist into current nursing care flowsheets. Initially, a needs assessment and audit of overall incidence of errors and documentation in our hemodialysis unit were conducted and analyzed. A standardized safety checklist was developed with input from patients and healthcare team members. The safety checklist covers the patient journey at pre, intra, and post dialysis phases of care. Examples of safety checks include patient identification, medication and laboratory orders, tracking of patient education, falls, and transfer of accountability between nursing staff. A four-month trial of the safety checklist is part of the implementation plan to gain feedback.

The desired outcomes of this project are to reduce overall incidence of nursing care errors in our in-centre hemodialysis units by 20% in October 2017 and to improve patient satisfaction. Evaluation will include: chart audits of documentation, incident tracking, and quarterly patient and staff surveys post implementation. Evidence shows that the use of safety checklists improves teamwork, patient safety, education, communication, adherence to protocols, and consistency of care by standardizing procedures (Treadwell, 2014).

REFERENCES

Kohn, L.T., Corrigan, J.M., & Donaldson, M.S. (Eds.). (2000). *To err Is human: Building a safer health system*. Washington, DC: National Academies Press.

Thomas-Hawkins, C., Flynn, L., Lindgren, T.G., & Weaver, S. (2015). Nurse manager safety practices in outpatient hemodialysis units. *Nephrology Nursing Journal, 42*(2), 125–133, 147.

Treadwell, J.R., Lucas S., & Tsou A.Y. (2014). Surgical checklist: A systematic review of impacts and implementation. *BMJ Quality & Safety, 23*, 299–318.

EXPLORING HOW HOPE AND DEPRESSION IN FORMER DIALYSIS PATIENTS ARE RELATED TO QUALITY OF LIFE POST RENAL TRANSPLANTATION

Annemarie Siebert Tait, MN, NP-Adult, CNeph(C), Hamilton, ON

Kidney transplants are effective and efficient, but there are complications associated with this treatment. "Approximately 7% to 12% of kidney transplants fail within a year and rates of failure increase over time" (Gill & Lowes, 2009, p. 114). Given that kidney transplant may have both positive and negative impact on the patient's well-being, it is important to understand factors that may influence these outcomes. One factor that influences negative outcomes is depression, a serious issue after kidney transplantation and one that leads to reduced patient and graft survival (Zelle et al., 2012). Conversely, it has been demonstrated that hope is associated with positive health outcomes in patients with

renal disease (Frieson & Frieson, 1997). Hope is "the confident assumption or faith that a certain outcome must occur or that a dread event or its consequences will not occur" (Huelskoetter, 1983 in Frieson & Frieson, 1997, p. 3739). This study will examine whether long-term dialysis patients' levels of hope and depression prior to their transplant will influence their post-transplant quality of life, which, in turn, can provide insight into the strategies necessary to improve care and, ultimately, to promote better outcomes for this population.

Research design and methodology

The purpose of this study is to gain an understanding of the interrelationships among depression, quality of life and hope in former dialysis patients after renal transplant. The exploratory study will be useful to help define groups of individuals who may benefit from targeted interventions, with the ultimate goal of improving outcomes for this population of patients. The results of this exploratory study can also inform a future prospective study that measures hope, depression, quality of life, and clinical outcome measures pre and post transplant.

The project will use a correlational quantitative research approach. According to Burns and Grove (2005) and Walker (2005), correlational designs involve the systematic investigation of the nature of relationships, or connections between and among variables, instead of direct cause-effect relationships.

REFERENCES

Burns, N., & Grove, S.K. (2005). *The practice of nursing research: Conduct, critiques, and utilization* (5th ed.). St Louis, MO: Elsevier Saunders.

Frieson, T.C., & Frieson, C.W. (1997). Relationship between hope and self-esteem in renal transplant recipients. *Transplantation Proceedings*, *29*, 3739–3740.

Gill, P., & Lowes L. (2009). The kidney transplant failure experience: A longitudinal case study. *Progress in Transplantation*, *19*(2), 114–121.

Walker, W. (2005). The strength and weaknesses of research designs involving quantitative measures. *Journal of Research in Nursing*, *10*(5), 571–582.

Zelle, D.M., Dorland, H.F., Rosmalen, J.G.M., Corpeleijn, E., Gans, R.O.B., Homan van der Heide, J.J., … Bakker, S.J.L. (2012). Impact of depression on long-term outcome after renal transplantation: A prospective cohort study. *Transplantation, 94*(10), 1033–1040.

EMERGENCY PREPAREDNESS PAMPHLET: GUIDELINES FOR DIALYSIS PATIENTS

Tracy Chambers, LPN, Berwick, NS, April Smith, LPN, Berwick, NS

Purpose: Distribute an emergency pamphlet for patients receiving peritoneal dialysis or hemodialysis in hospital, satellite, or home setting. The instructional pamphlet contains critical information on management of the condition during power outages, severe weather, and other natural disasters that may prevent patients from receiving dialysis treatment. This enables patients to make informed decisions about their healthcare.

Description: The pamphlet contains a description of emergencies, contact information, importance of keeping updated contact information with the clinic, precautions to take (adherence to diet/fluid restrictions, keeping prescriptions such as sodium polystyrene sulfonate filled), and equipment information for home hemodialysis and peritoneal dialysis. The pamphlet also contains a Frequently Asked Questions section. Nursing staff review the pamphlet with the dialysis patient and family when distributing to assess for understanding and to receive feedback.

Evaluation/outcomes: Evaluation has been ongoing as pamphlets began being distributed and were reviewed with patients early in 2015. To date, the pamphlet has been reported as helpful by patients and staff during snowstorm emergencies. Polling of patients and staff will be completed in winter 2017; feedback received will be used to evaluate effectiveness. Re-evaluation of the emergency pamphlet will be completed in spring 2017.

Implication for nephrology practice: Patients are empowered to make informed decisions to manage their condition when emergencies prevent them from having dialysis treatment. Improved management of their condition by the patient results in fewer complications such as hyperkalemia and fluid overload. Patient safety will increase and incidences of damage to home dialysis equipment will decrease.

PERCEPTION OF THE NURSE PRACTITIONER ROLE AMONG HEALTH CARE PROFESSIONALS IN THE HEMODIALYSIS UNIT

Ann Jones MSN, NP, CNeph(C), Toronto, ON, Alicia Moonesar, MScN, NP-PHC, Toronto, ON, Alison Thomas MN, NP, CNeph(C), Toronto, ON, Elizabeth Ball, MScN, NP-PHC, Toronto, ON, Mimi Cheng, MN, NP, Toronto, ON, Orla Smith, PhD, RN, Toronto, ON

The Nurse Practitioner (NP) role is well established in a variety of outpatient and inpatient settings with research suggesting positive impacts on patient care. In our outpatient hemodialysis (HD) program, four NPs work in collaboration with at least two attending nephrologists and a patient population of approximately 250 patients. Working with various interprofessional (IP) team members, the NP is responsible for advanced patient assessment, diagnosis, and intervention.

Purpose: To explore IP staff perceptions of and satisfaction with the NP role, as well as barriers and facilitators to collaboration with hemodialysis NPs.

Methods: All 125 IP team members in the outpatient HD program will be invited to participate. Participation will be voluntary and responses will be de-identified. The survey instrument has been adapted and modified with permission from prior surveys by Mitchell, DiCenso, Pinelli, and Southwell. (1996) and Harwood, Wilson, Heidenheim, and Lindsay (2004). Item responses to 42 questions in the domains of communication, satisfaction, collaboration, professionalism, patient care, and clinical skills will be measured on a five-point Likert scale from "strongly disagree" to "agree." Seven open-ended questions will provide additional insight into team members' perceptions of the NP role.

Anticipated findings: The findings of this study will identify opportunities to strengthen collaboration, communication, problem solving, and working relationships between NPs and other team members in the outpatient HD program. As a result, we anticipate the ability to further improve care delivery to HD patients and their families.

REFERENCES

Harwood, L., Wilson, B., Heidenheim, A.P., & Lindsay, R.M. (2004). The advanced practice nurse–nephrologist care model: Effect on patient outcomes and hemodialysis unit team satisfaction. *Hemodialysis International, 8*(3), 273–82.

Mitchell, A., DiCenso, A., Pinelli, J., & Southwell, D. (1996). Introduction and evaluation of an advanced nursing practice role in neonatal intensive care. In *Outcomes of Effective Management Practices,* Kelly, K. (Ed.), 171–186. Thousand Oaks, CA: Sage Publications.

ACUTE HD TECHNICAL QUALITY ASSURANCE AUDIT

Sudarshan Meenakshi Sundharam, Cdt, Toronto, ON, Adrian Ungureanu, C.E.T., Toronto, ON

Purpose of the project: We will describe our quality improvement project, and the development of quality safety measures and effective monitoring of off-unit machines and water treatment equipment utilized in acute hemodialysis at the University Health Network (Toronto General Hospital).

Discussion: Maintaining comparable quality in an acute HD setting compared to an in-center setting can create enormous challenges. This poster presentation will highlight what has been achieved by our UHN acute dialysis technical team and educate others with regards to parameters needing attention. Our team is currently in the process of creating a standardized checklist to monitor all the off-unit dialysis machines and water treatment cart based on data collected from the renal unit at Toronto General Hospital. Our team has completed a comprehensive examination of technical aspects such as electrical and plumbing requirements, daily and periodic testing, and national/international safety standards for all associated hemodialysis equipment. Our project also examined what quality improvements are still necessary that go beyond CSA standards for acute dialysis at the University Health Network (Toronto General Hospital).

Summary: This poster presentation can be utilized as a guide for any acute dialysis or off-unit set-up and it will display the UHN acute dialysis technical team's practical application.

PUT YOUR BEST FOOT FORWARD

Betty VanBeek, RN, CNeph(C), Brockville, ON, Margo Wright, RN, Brockville, ON, Donna Knott, RN, Brockville, ON, Eduard A. Iliescu, MD, Brockville, ON

The aim of this retrospective report is to examine the prevalence of foot problems in stable hemodialysis (HD) patients who had not previously been systematically screened in the dialysis unit. The patients underwent foot examination while on HD by the unit RNs using a 60–second diabetic foot screen including: appearance, temperature, range of motion, sensation (including monofilament testing), and vascular status. There were 22 patients in one satellite unit: eight (36%) females, mean age 73 years; 14 (64%) patients with diabetes, and 12 (55%) had foot care previously in the community. The examinations were easily performed. They revealed that 18 (82%) scored < 6 in either foot (recommended yearly screening), 4 (18%) (all diabetics) scored 7–12 (recommended screening every six months), and none scored 13–19 or 20–25. Most of the problems were related to decreased sensation. The foot examinations can easily be carried out in the HD unit and are well received by patients. The prevalence of foot problems among stable HD satellite patients is low, but these results cannot be generalized to sicker in-centre HD patients. Some, but not all, have foot care already in the community. A foot problem screening program can easily be integrated into the care of HD patients.

NURSE PRACTITIONER ROLE VITAL FOR VULNERABLE PATIENT POPULATIONS LIVING WITH RENAL DISEASE

Paulina Bleah, MN, NP-PHC, Toronto, ON

The roles of nurse practitioners have been well described in the literature as influential with respect to quality of care, patient safety, and patient outcomes. Particularly in nephrology, nurse practitioners have been shown to be valuable assets to the nephrology team, whether this is within the context of healthcare provision in chronic

kidney disease clinics, in-centre dialysis units, or inpatient nephrology units. Nurse practitioners looking after patients with renal disease address care needs holistically, provide consistency in care, and play a vital role in bridging the gap, as patients transition from acute care to the community.

In a diverse metropolitan area, patients with renal disease often present with complex medical and social issues that make them vulnerable. Examples of vulnerable patients living with renal disease include elderly patients, patients with housing challenges, patients without health coverage, and palliative patients. Given the vulnerability of these patients, a quality improvement initiative was conducted to further develop the inpatient nurse practitioner role around meeting the unique needs of these patient populations.

The first initiative was to build the inpatient interdisciplinary team, as the functionality of the team was critical to the effectiveness of the nurse practitioner role. Therefore, a team-building retreat was conducted to explore client needs, preferred team culture, team purpose, and roles and responsibilities. A post-retreat survey was conducted to solicit feedback and explore opportunities for further team building. The team-building retreat proved successful in building a more collaborative and cohesive team. To build the nurse practitioner competencies in the care of the elderly and palliative renal patients, mentorship with the geriatrics-nephrology consult service was initiated to guide the nurse practitioner in comprehensive management of these patients. Collaboration with the social worker team to support patients with housing and health coverage challenges remains ongoing. The focus of the nurse practitioner role on these vulnerable patient populations has proven to have an impact on the quality of care, transition of care, and, in addition, has focused care on patients who would otherwise fall through the cracks.

USING PROSPECTIVE RISK ASSESSMENT TO IDENTIFY OPPORTUNITIES FOR IMPROVEMENT WITHIN AN ELECTRONIC DOCUMENTATION SYSTEM FOR DIALYSIS PATIENTS

Elaina Orlando, MPH, St. Catharines, ON, Nicole Macneil, RN, CNeph(C), St. Catharines, ON, Lezlie Lambert-Burd, BAdEd, BScN, RN, CNeph(C), St. Catharines, ON, Cynthia Bryson, RN, CNeph(C), St. Catharines, ON, Martin Ruaux, MHM, RN, St. Catharines, ON

Purpose: The Failure Modes Effects Analysis (FMEA) is a prospective risk assessment tool making it a critical organizational tool for improving patient safety. The goal of this project is to conduct an FMEA on the medication administration process using a newly implemented electronic dialysis documentation record.

Description: The FMEA focuses on reducing the risk of future incidents in complex processes by exploring all the possible ways a system will fail. This is a common practice of high-reliability organizations and is gaining increasing importance in the complex realm of healthcare. In 2016, Niagara Health implemented REDS, an electronic health record, with the intention of improving efficiency and effectiveness of documentation and care for dialysis patients. To conduct the FMEA, we have put together an interdisciplinary team including nursing, pharmacy, education, and a REDS super-user. Over the span of one day, the team will map the steps of medication administration using REDS, exploring all possible opportunities for failure within the process. Each failure is assigned a score based on severity, frequency, and detectability.

Outcomes: The final step in the FMEA is for the team to explore improvement opportunities on the highest scored potential failures. The team will proactively build a safer process by redesigning and reimagining key steps.

Implications for nephrology practice/education: As nephrology practitioners, it is important to ensure we build our systems to create fail safes within our daily processes. Our goal is to create care systems that support staff to provide the highest quality of care to patients by proactively assessing risks and developing preventive strategies and ensuring a culture of safety.

ASSESSMENT OF THE HEMODIALYSIS UNIT INTAKE PROCESS AT A TERTIARY HOSPITAL IN A MAJOR URBAN CENTRE

Camille Jagat Betts, RN, Toronto, ON, Stéphanie Lagacé, RN, Toronto, ON

Purpose of study: Evaluative study to determine if the current process used to receive patients into the hemodialysis unit at St. Michael's Hospital (Toronto) is meeting the needs of patients and registered nurses.

Methods: A self-report questionnaire was designed and developed to assess perceptions amongst patients and registered nurses regarding the current intake process in the hemodialysis unit. Two registered nurses developed the questionnaire and a panel of 13 (eight registered nurses, three patients, the unit manager, and an external research professional) reviewed the instrument for content and face validity. The survey was administered from February 1 to March 1, 2017.

Results: A total of 127 patients and 52 registered nurses in the hemodialysis unit completed the survey. Most of the nurses (90%) indicated that the current system is

ineffective. Half of the patients surveyed (52%) reported no knowledge of the current formalized intake process. A majority of the patients (82%) perceived their treatment start time to be late despite treatment initiation falling within the designated timeframe. Among nurses, 71% reported feeling rushed to begin therapy for patients. A preference for an alternative intake process was evident for patients and nurses, 57% and 62%, respectively.

Conclusions: Based on the survey results, the current intake process is perceived as ineffective. A change in process is favoured.

Implications for nephrology care: Increased awareness and collaboration amongst patients and nurses is necessary in order to optimize the hemodialysis unit intake process.

A PATH TO INDEPENDENCE FOR NEW HEMODIALYSIS PATIENTS – A PILOT PROJECT

Karen Siemon, RN, Kitchener, ON, Mary Milton, BScN, RN, CNeph(C), Kitchener, ON, Pam Cerqueira, RN, CNeph(C), Kitchener, ON, Sandra Nuttin, RN, CNeph(C), Kitchener, ON, Pamela Xuereb, BScN, RN, Kitchener, ON, Mary Margaret Taborek, BScN, RN, Kitchener, ON, Maria Diemert, RN, Kitchener, ON, June Martin, RD, CDE, Kitchener, ON, Jennifer Lowry, RPh, Kitchener, ON, Frances Fraser, RSW, Kitchener, ON

Purpose of project: In 2012, the Ontario Renal Network (ORN) introduced a collaborative providing a structured framework for quality initiatives. Our program chose, in August 2016, to pilot a "new start" unit.

Project objectives:

1. Identify patient and organization specific barriers to independence.
2. Foster a culture of independence through the innovative and collaborative use of the multidisciplinary team.
3. Overcome barriers to independence and increase rates of home therapy.

Description: We believe that every patient should have the opportunity to be actively involved in his or her care. Our pilot unit provides individualized education from nursing and allied health. The unit consists of three rooms: two private rooms conducive to quiet and private teaching sessions, and a larger room with two stations to promote team teaching and patient-to-patient support and encouragement. Staff selection was done with emphasis on adult learning and supporting independence and self-management.

Evaluation and outcome: This pilot project has shown an increase in patients receiving dialysis at home. Since the implementation of the pilot unit, 65% to 70% of people who have gone through this pilot unit are now dialyzing in the comfort of their own home. Feedback from the patients as well as the staff in home hemodialysis and peritoneal dialysis, has been overwhelmingly positive. In light of this success, we are looking into making this pilot a permanent part of our renal program.

STANDARDIZATION OF THE PRE-KIDNEY TRANSPLANT EVALUATION PROCESS

April Huang, BMSc, RN, Toronto, ON, Rhonda Allan, RN, Toronto, ON

Kidney transplantation is the gold standard treatment for patients with end-stage renal disease (ESRD). Currently in Ontario, there are approximately 10,000 patients on dialysis or awaiting pre-emptive transplant. Delays in the pre-transplant process can greatly reduce patient satisfaction as well as health outcomes. Toronto General Hospital has the largest kidney transplant program in Canada with more than 400 referrals and more than 150 patients listed a year. However, it was taking the program 336 days in 2014 to evaluate patients from time of referral to final disposition (when a decision is made about listing). In this quality improvement project that spanned six months, the objective was to standardize the pre-renal transplant evaluation process that leads to a 25% reduction in time from referral to final disposition. This process included changes in the presentation of transplant coordinators, systemic changes in workflow, and productive use of weekly meetings through standardization of procedure. Outcome measures included pre and post staff engagement and satisfaction surveys, as well as the measure of the amount of time for patients to reach final disposition. After implementation of standardized processes, the results showed that the median time of evaluation was reduced by 60% to 135 days from 336 days, and that there was more staff engagement and satisfaction. This project has significant implications for practice, as programs look to maximize efficiency using available resources. Standardization of procedures has shown to drastically affect patient wait times in the process of transplant evaluation.

CONVERSION OF HEPARIN TO DALTEPARIN FOR DIALYSIS CIRCUIT ANTICOAGULATION—COMPARATIVE ANALYSIS OF PRE AND POST CONVERSION SAFETY PROFILE

Grace Hepburn, RN, CNeph(C), Barrie, ON, Diana Russo, PharmD, RPh, Barrie, ON, Karen Hill, BScPhm, RPh, Barrie, ON

Purpose: To measure any significant differences in prolonged bleeding and/or changes in clotting of the extracorporeal circuit with implications on patient safety and decreased nursing workload.

Method: A tracking tool was developed to observe changes in prolonged bleeding and stages of clotting in circuits in 101 patients receiving hemodialysis. Data were collected for three months pre conversion using unfractionated heparin (UFH) and for three months post conversion to low molecular weight heparin (LMWH).

Results: During the identified period, the data collected for 24 patients were insufficient during the trial. In the remaining 77 patients, four patients had increased prolonged bleeding, 12 patients had decreased prolonged bleeding, and in two patients the bleeding time was unchanged. Clotting issues in circuits were increased in 29 patients, decreased in 44 patients, and unchanged in four patients.

Conclusion and implications: The results supported the conversion to LMWH. From a safety perspective, dalteparin is a prefilled syringe, reducing nursing preparation time and risk of error. Another impact was decreased nursing workload due to decreased number of circuit changes. Most importantly, improved patient outcomes were noted with the decreased number of patients experiencing prolonged bleeding and circuit changes.

ANNUAL DEVELOPMENT DAY FOR HEMODIALYSIS STAFF EXPLORING CASE STUDIES IN CLASSROOM AND SIMULATION LAB

Anita Fenn, BScN, RN, CNeph(C), Barrie, ON

The Northern Alberta Renal Program Clinical Nurse Educator (CNE) team along with the support of management implemented mandatory Annual Development days for the hemodialysis staff. The purpose of this day, which is offered numerous times throughout the year, as well as in various locations, is to provide staff—experienced, as well as newer staff—with the opportunity to spend a day of focused learning opportunities.

The format of the day is divided into classroom learning, as well as simulation (SIM) lab. In the classroom, presentations highlight case scenarios of Alberta Kidney Care Practice Direction Documents (PDD) that had been identified as areas of increased knowledge gaps (including anemia management and immunization—hepatitis B). SIM lab learning focused on providing staff with a safe environment to capture case scenarios that provide staff the opportunities to practise, and highlight and review common and uncommon complications experienced by chronic kidney disease (CKD) hemodialysis clients. SIM lab routine includes a pre-brief, case scenario simulation, and debrief. Case scenarios such as hypotension, hypoglycemia, anaphylaxis management, and hemolysis, are managed by the CNE team to track the progress of staff and reflect the interventions staff have performed. Debrief allows the opportunity for staff to reflect on the situation and the CNE team to capture key elements of the PDD.

Overwhelmingly positive feedback on evaluations from staff have provided the CNE staff with suggestions for potential areas for future scenarios and requests for regular Annual Development days, to allow for improved client care with continuing educational opportunities for hemodialysis staff.

HAND IN HAND—TRANSITIONAL CARE

Hong Gao BScN, RN, CNeph(C), Toronto, ON, Tara Robertson, RN, Toronto, ON, Mina Kashani, RN, CNeph(C), Toronto, ON

Transitioning is a very important part of all patients' care. Transitioning is especially important for patients in our Kidney Care Centre (KCC) or pre-dialysis clinic, as most have Stage 4 or 5 chronic kidney disease. They will eventually need to transition to dialysis, renal transplantation or, for those patients choosing conservative approach, to palliative care. These patients can have feelings associated with anxiety, denial, and frustration, and can have great difficulty in trying to make decisions.

To help patients with this transition, we have a multidisciplinary team approach consisting of the nurse, nephrologist, pharmacist, dietitian, social worker, diabetes nurse educator, transplant nurse coordinator, and the nurse navigator. The nurse navigator provides information and support to patients and their families in order to help them understand their choices and to assist them in making the right decision, one that will best fit their lifestyle and be less disruptive to their everyday life.

In order to provide seamless transition, effective communication is very important. We provide verbal, as well as written patient information when transferring the care to hemodialysis and home dialysis nursing staff. We have meetings to review our KCC patients with our transplant coordinator for those patients being considered for live donor renal transplant. We frequently review our patients to ensure they have chosen their renal replacement therapy (RRT). In addition, we review their dialysis access status with our body access coordinators. For those who have chosen conservative care, we continue to provide support and our social worker has an important role in connecting them with palliative care, as needed.

There are still more opportunities to improve the transition of care within our program such as providing follow-up and further emotional support to patients and their families, and connecting with primary care providers. We will continue to work towards providing transitional care that is seamless and most beneficial to our patients.

Your Board in Action

By Janice Mackay, CANNT President-Elect

As I put pen to paper, or rather, type away at my computer keyboard, I would like to start by sincerely hoping that each of you took some time to reflect on your practice and celebrate your commitment to nephrology nursing during "Nurses Week". The Canadian Nurses Association (CNA) National Nurses Week theme for this year and for 2018 is **#YESThisIsNursing**. The nurse who authored this theme felt inspired by the influence of technology in our practice and how this affects our awareness and connections across the globe. This truly resonated with me on May 10 as St. Joseph's Healthcare Hamilton provided live–streaming of kidney transplant surgery to raise awareness about kidney disease and the importance of organ donation. How amazing it is to have this opportunity to connect on a national scale.

Along the theme of connections, I was fortunate to attend the ANNA National Symposium in Washington, DC, in April 2017. The symposium featured a diverse program with more than 700 delegates in attendance. I was so pleased to see members of CANNT presenting at the symposium!

ANNA President Sheila J. Doss-McQuitty with CANNT President-elect Janice MacKay

My main take-home message from this event started with featuring the documentary film *The American Nurse*. The film follows five nurses along with their patients, which included nurses working with maximum-security prison inmates, home health clients, soldiers returning from war, mothers giving birth, and nursing home patients at the end of life. It reinforced the respect I have for my own profession. As described by the producer/creator, she hoped to inspire a "newfound appreciation for this indispensable figure on the front lines of health and healthcare today: the American nurse".

Be sure to take a moment and check out Carolyn Jones's website (americannurseproject.com). I believe that all of us can be inspired by her words that set the tone of the symposium: "*At some point in our life, each of us will encounter a nurse, whether it be as a patient or as a loved one. And that one encounter can mean the difference between suffering and peace, between chaos and order.* **Nurses matter".**

Back in Canada, the CANNT Nominating Committee is looking for CANNT/ACITN members to apply for open positions on the CANNT/ACITN Board of Directors. The positions commence in October 2017 in Halifax, NS.

Your BOD has been active over the past few months in setting short- and long-term goals to achieve sustainability and value to our members. We are actively engaging in conversations around our current website and what is needed to be useful to CANNT …Stay tuned.

MEMBERSHIP

We currently have a membership of 449 renal professionals, as of March 2017. The Board of Directors (BOD) continually 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 me via email at **CANNT.presidentelect@gmail.com**.

CANNT membership provides you with access to our member's only section of the website. This area provides many resources at your fingertips such as the vascular access guidelines and Standards of Nursing and Technical Practice, which are readily available to our members for use in enhancing their knowledge and supporting their professional practice. Our seasonal peer-reviewed journal is touted as both an educational and informational resource for nephrology professionals across the nation. Becoming a part of this professional organization offers opportunities to apply for CANNT bursaries and grants, and funding for CNA certification and re-certification in nephrology. We also recognize our professionals nationally with our yearly awards nominations.

JOURNAL

Guidelines for journal article submission can be found under the "CANNT Journal" section of the CANNT website. We prefer manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists.

E-mail your manuscript to Jovina Bachynski at **CANNT.journal1@gmail.com**.

Include a covering letter with contact information for the primary author and a one-sentence biographical sketch (credentials, current job title, and location) for each author.

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 works to provide 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 from the very start, and successfully motivate our members.

Starting in June 2017, we will be taking advice requests. If you have a burning question, clinical or otherwise, speak to our Director of Communications at **CANNT.directorcom@gmail.com**
CANNT website (www.CANNT.ca)
Twitter CANNT (@CANNT1) | Twitter

ANNUAL CONFERENCE

CANNT 2017 is themed "Charting Our Course—Setting Sail for the Future" 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 Halifax on October 19–21, 2017.

FINANCES

As a "Not for Profit" professional association, our objective is to provide value to our members that stays true to our mission and vision. In an effort to keep upright and steady, we are consistently seeking out growth and development opportunities to assist in maintaining the viability of the association. We remain fiscally responsible in governing our costs to function, as your BOD. Your BOD realizes the need for forecasting and budgeting to support our efforts at representing fiscal responsibility to the membership and has identified this as our priority over the first part of 2017. Your association 2016 Annual Report is available on the CANNT website.

Votre conseil d'administration en action

Par Janice Mackay, Presidente-Élue de l'ACITN

Au moment de prendre mon stylo, ou plutôt mon clavier d'ordinateur pour vous adresser ces lignes, j'espère sincèrement que chacun d'entre vous a pris le temps de réfléchir à sa pratique et de célébrer son engagement envers les infirmiers et infirmières en néphrologie pendant la Semaine nationale des soins infirmiers de l'Association des infirmières et infirmiers du Canada (AIIC). Le thème de cette semaine nationale pour 2017 et 2018 est #VoiciLesSoinsInfirmiers. L'infirmière qui a suggéré ce thème s'est inspirée de l'influence de la technologie sur notre pratique ainsi que sur notre prise de conscience et nos relations à travers le monde. Cela a vraiment eu un écho en moi le 10 mai, alors que le centre hospitalier St. Joseph's Healthcare Hamilton a diffusé en direct une transplantation rénale pour sensibiliser davantage la population à la néphropathie et à l'importance du don d'organes. C'est formidable d'avoir cette occasion de tisser de tels liens à l'échelle nationale.

Toujours sur le thème des relations, j'ai eu la chance d'assister au symposium national de l'American Nephrology Nurses Association (ANNA) à Washington, D.C., en avril 2017. La programmation diversifiée du symposium a attiré plus de 700 délégués. J'étais ravie de voir des membres de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) faire des présentations au symposium!

La présidente de l'ANNA, Sheila J. Doss-McQuitty, en compagnie de la présidente désignée de l'ACITN, Janice MacKay

L'essentiel du message que je retire de cet événement réside dans la présentation du documentaire The American Nurse. Ce film suit le travail de cinq infirmières auprès de leurs patients : des détenus dans un pénitencier de sécurité maximale, des patients à domicile, des soldats revenant de la guerre, des mères qui accouchent et des patients en fin de vie en centre d'hébergement. Ce film a renforcé le respect que j'ai pour ma propre profession. La productrice/créatrice explique qu'elle a voulu susciter une « nouvelle appréciation de ce personnage indispensable sur le front de la santé et des soins de santé aujourd'hui : l'infirmière américaine ».

Assurez-vous de prendre quelques minutes pour consulter le site Web de Carolyn Jones (Americannurseproject.com). Je crois que chacun d'entre nous peut être inspiré par les paroles de M^me^ Jones, qui donnaient le ton au symposium : « *À un moment ou à un autre de notre vie, nous serons tous appelés à rencontrer une infirmière, que ce soit comme patient ou comme proche d'un patient. Et cette rencontre peut changer la donne en apportant paix plutôt que souffrance, et ordre plutôt que chaos.* **Les infirmières comptent. »**

Revenons au Canada. Le comité des candidatures de l'ACITN recherche des membres de l'ACITN/CANNT aptes à pourvoir des postes vacants au conseil d'administration (CA). L'entrée en fonction se fera en octobre 2017 à Halifax (N.-É.).

Votre CA a été actif au cours des derniers mois pour fixer des objectifs à court et à long terme, gages de durabilité et de valeur pour nos membres. Nous nous penchons activement sur notre site Web actuel et sur ce qui est nécessaire pour être utile à l'ACITN… surveillez ces pages.

MEMBRES

En date de mars 2017, notre association comptait 449 professionnels en néphrologie. Le CA évolue continuellement pour offrir des avantages durables à tous nos membres. Je sollicite les commentaires de nos précieux membres, et j'aimerais entendre votre avis sur les moyens d'accroître notre effectif. Merci de me faire parvenir vos remarques par courriel à **CANNT.presidentelect@gmail.com**.

L'adhésion à l'ACITN vous donne accès à la section de notre site Web réservée aux membres. Ces ressources, par exemple les lignes directrices relatives à l'accès vasculaire ainsi que les normes de pratique infirmière et technologique en néphrologie, sont mises à la disposition des membres qui souhaitent approfondir leurs connaissances et perfectionner leur pratique professionnelle. Notre revue périodique évaluée par les pairs est considérée comme une ressource éducative autant qu'informative pour les professionnels en néphrologie partout au Canada. En devenant membre de cette organisation professionnelle, vous aurez la possibilité de demander des bourses et des subventions de l'ACITN et d'accéder à un soutien financier pour la certification infirmière en néphrologie de l'AIIC ou le renouvellement de la certification. Nous reconnaissons également l'excellence de nos professionnels, au moyen d'un programme de reconnaissance annuel.

JOURNAL DE L'ACITN

Les lignes directrices pour la publication d'articles se trouvent (en anglais seulement) dans la section « CANNT Journal » du site Web de l'ACITN. Nous préférons les manuscrits qui présentent de l'information clinique nouvelle ou qui abordent des problématiques d'intérêt particulier pour le personnel infirmier et les technologues en néphrologie.

Veuillez envoyer votre manuscrit par courriel à Jovina Bachynski à l'adresse **CANNT.journal1@gmail.com**.

Joignez une lettre d'accompagnement avec les coordonnées de l'auteur principal et une présentation biographique d'une phrase (titres, emploi actuel et lieu de travail) pour chaque auteur.

COMMUNICATIONS

Nous continuons d'élaborer de nouvelles stratégies pour stimuler la participation de nos membres et communiquer à ces derniers des informations actuelles et pertinentes. Votre connexion avec l'ACITN est notre courriel bimestriel dans lequel nous nous efforçons de fournir à nos membres des informations stratégiques, ciblées, personnalisées et correctement segmentées.

De plus, nous essayons de garder le contenu simple, direct, pertinent et utile dans le but de susciter l'intérêt des membres dès le début et de les motiver efficacement.

À partir de juin 2017, nous prendrons vos demandes de conseils. Si vous avez une question brûlante, clinique ou autre, adressez-vous à la direction des communications à **CANNT.directorcom@gmail.com**

Site Web de l'ACITN (www.CANNT.ca); Twitter CANNT (@CANNT1)

CONGRÈS ANNUEL

Le Congrès annuel 2017 de l'ACITN se déroulera sous le thème « Tracer notre voie – cap sur l'avenir » (Charting Our Course – Setting Sail for the Future). Votre comité organisateur travaille fort pour créer une programmation novatrice et captivante susceptible de répondre aux besoins des professionnels en néphrologie, quel que soit leur niveau d'expertise. Nous espérons vous voir à Halifax du 19 au 21 octobre 2017.

FINANCES

En tant qu'association professionnelle à but non lucratif, notre objectif est d'offrir une valeur ajoutée à nos membres conformément à notre mission et à notre vision. Dans le but d'assurer la pérennité et la stabilité de nos services, nous recherchons constamment des occasions de croissance et de développement propres à assurer la viabilité de l'association. En tant que CA, nous demeurons responsables de la gouvernance de nos coûts sur le plan financier. Le CA est conscient de la nécessité de faire des prévisions et d'établir un budget de façon à assumer sa responsabilité financière envers les membres et en a fait sa priorité durant la première partie de 2017. Le rapport annuel de 2016 de l'association est accessible sur le site Web de l'ACITN.

Janice Mackay
Présidente élue/trésorière de l'ACITN pour 2016–2018

NOTICE BOARD

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

FALL 2017

- **June 1–September 1, 2017:** initial exam or renewal by exam application window
- **November 1–15, 2017:** exam period
- **January 3–November 30, 2017:** application window to renew by continuous learning

- **June 3–6, 2017.** 54th European Renal Association–European Dialysis and Transplant Association (ERA-EDTA) Congress, IFEMA Feria de Madrid, Madrid, Spain. **www.era-edta2017.org**
- **September 9–12, 2017.** 46th Annual European Dialysis and Transplant Nurses Association/ European Renal Care Association (EDTNA/ERCA) International Conference, Krakow Congress Centre, Krakow, Poland. **www.edtna-erca.com**
- **September 20, 2017.** Nephrology Health Care Professionals' Day
- **October 19–21, 2017.** Canadian Association Nephrology Nurses and Technologists (CANNT) 49th National Symposium 2017—Charting our Course: Setting Sail for the Future, Halifax, Nova Scotia. **www.cannt.ca**
- **October 31–November 5, 2017.** The American Society of Nephrology (ASN) 2017 Kidney Week, Morial Convention Center, New Orleans, Louisiana. **www.asn-online.org**

Chaos through the continuum of kidney dysfunction: A conceptual framework

By Julie Émelie Boudreau, MN, RN, CNeph(C), and Anik Dubé, PhD, RN

ABSTRACT

Aim: *Describe a conceptual framework that enhances the advanced practice nurse's (APN) ability to achieve positive health outcomes in nephrology nursing by implementing a systematic approach in direct clinical practice, as well as research framed within chaos theory.*

Method: *An explorative literature search was completed from January 2011 to April 2012 for relevant theoretical and research articles using the following search engines: EBSCO, ERIC, CINAHL, ProQuest, and PubMed. Inclusion criteria consisted of key words such as chaos theory, nephrology nursing, advanced practice nursing, and advanced nursing practice related to graduate level education. Exclusion criteria consisted of expert nursing practice and advanced nursing practice not related to graduate level education, as well as quantum physics or complexity science theories other than chaos theory implemented in clinical practice.*

Description: *Chaos theory was used to describe the intricate relationships between a patient's environment and health-related quality of life (HRQOL). The framework guides the APN's systematic approach to providing healthcare services effectively and efficiently. A clinical case study describes its integration to direct clinical practice.*

Implications for nephrology practice: *The APN implements chaos theory to acknowledge and understand the dynamic and complex nature of end-stage kidney disease (ESKD) and its impact on daily life within the psycho-socio-political environment. The APN develops individualized care plans tailored to the patients' needs to maximize the use of healthcare services by an interdisciplinary team.*

Key words: end-stage kidney disease, advanced practice nursing, chaos theory, and health-related quality of life

BACKGROUND

Canadian demographics reveal an aging population with an increasing prevalence of chronic disease and poor health outcomes (Canadian Institute for Health Information [CIHI], 2015). The healthcare needs of the contemporary Canadian population are becoming more complex and require efficient healthcare approaches to deliver an integrated model of care for both nurses and patients (Canadian Nurses Association [CNA], 2008). The advanced practice nurse (APN) position emerged in response to the increasing demands on the Canadian healthcare system. The APN is an umbrella term that denotes both clinical nurse specialist (CNS) and the nurse practitioner (NP) roles. APNs are required to provide comprehensive care to both rural and urban populations, who often need complex and multifactorial disease management. In the context of nephrology, the APN plays a pivotal role within the interdisciplinary team in providing effective patient-centred and family-oriented care to individuals living with end-stage kidney disease (ESKD) (Canadian Association of Nephrology Nurses and Technologists [CANNT], 2014). The purpose of this article is to describe a conceptual framework that enhances the APN's ability to achieve positive health outcomes in nephrology nursing by implementing a systematic approach in direct clinical practice, as well as research framed within chaos theory. Health-related quality of life (HRQOL) measures the patient's quality of life (QOL) in relation to renal replacement therapy (RRT) in the context of ESKD; it is the outcome measured by the APN's practice in nephrology nursing. The conceptual framework developed guiding the APN's systematic approach is grounded in the tenets of chaos theory in which the individual's life is perceived as a complex dynamic system that is inseparable from his or her environment. The APN's collaborative approach within the interdisciplinary team is intended to enhance the HRQOL of patients living with ESKD by providing individualized care that is adapted to their individual needs. A clinical case is further presented to illustrate the conceptual framework in clinical practice for the APN practising in nephrology nursing.

SETTING

Nephrology nursing is a dynamic practice that is grounded on evidence-based knowledge, as it relates to complex chronic disease management, such as ESKD. This specialty focuses on empowering the patient's ability to take charge of their chronic disease and achieve their optimal quality of life. The debilitating and devastating complications of ESKD alter a person's physical, psychological, and social behaviours in daily life (Al-Arabi, 2006). Individuals living with ESKD face the prospect of renal replacement therapy (RRT) (i.e., hemodialysis, peritoneal dialysis, or kidney transplantation) or may opt for conservative or palliative care management. Additionally, dietary restrictions, medication regimens, and RRT involve major lifestyle changes that often require nursing-led

ABOUT THE AUTHORS

Julie Émelie Boudreau, MN, RN, CNeph(C), Instructor, School of Nursing Science, University of Moncton, NB

Anik Dubé, PhD, RN, Assistant Professor, School of Nursing Science, University of Moncton, NB

Address for correspondence: Julie Émelie Boudreau, University of Moncton, Pavillon Jacqueline Bouchard 042, 51 Antoinine Maillet Avenue, Moncton, NB EIA 3E9.

Tel: (506) 858-4266, fax: (506) 858-4017

Email: ***julie.e.boudreau@umoncton.ca***

education and guided interventions for patients and their families. Nephrology nurses have a significant role to play in the gradual modification of activities of daily life for patients in the management of ESKD. Nurses are required to work within the patient's social system and professional environment, as both are influential factors in an individual's perception of his or her QOL (Cleary & Drennan, 2005; Ferri & Pruchno, 2009; Finkelstein, Wuerth, & Finkelstein, 2009; Noble, 2008).

METHODS

The metaparadigm of the nursing discipline consists of the person, environment, health, and nursing, and is considered to be the starting point for developing a conceptual framework. The framework acts as an analytical tool to interpret and understand the concepts from the metaparadigm, as well as other pertinent concepts in a specific situation related to nursing practice (Jabareen, 2009). A conceptual framework is also described as a group of concepts drawn into a dynamic scheme that explains a relational system that exists between the concepts in a given experience (Wiederman & Whitley, 2002). According to Spross (2014), the conceptual framework allows the APN in nephrology nursing to conceptualize her role within her professional competencies, which provides the basis for holistic, comprehensive, and collaborative care delivery. According to Verschuren, Enzlin, Dijkstra, Geertzen and Dekker (2010), the conceptual framework should be based on an extensive analysis of the research literature and clinical experience. The combination of research and clinical practice is important, as noted by Verschuren et al. (2010), because it allows the author to draw together relevant factors in one inclusive and comprehensive model.

An explorative literature search was completed from January 2011 to April 2012 to estimate the relative importance of HRQOL in nursing and health science literature pertaining to ESKD. The following search engines were utilized: EBSCO, ERIC, CINAHL, ProQuest, and PubMed. Search strategies were restricted to the following key words in each database: advanced nursing practice, advanced practice nursing related to graduate level education, chaos theory, and nephrology nursing. The primary author established the following exclusion criteria: expert nursing practice and advanced nursing practice not related to graduate level education, as well as any other theory from quantum physics or complexity science theories other than chaos theory implemented in clinical practice. Search strategies were restricted to the English language and were devised using appropriate key words in each database. Once the review was completed and the framework was conceptualized, the primary author implemented a case study method to apply the conceptual framework for clinical practice in nephrology nursing. Figure 1 presents the conceptual framework described and developed by the primary author.

ETHICS

The University of Calgary gave ethical approval to a unified agreement with Alberta Health Services; written consent was completed between the student researcher, academic supervisor, and clinical instructor. Verbal consent to participate was then obtained from the patients and their families in clinical practice. The consent allowed the student-researcher to enter a research partnership with patients from an Alberta renal program. This partnership granted the student researcher the ability to evaluate the conceptualization of the framework in the context of an advanced nursing practice in nephrology.

ADVANCED PRACTICE NURSING

To meet the complex and ever-increasing healthcare needs of the Canadian population, the national healthcare system is undergoing substantial restructuring in both institutional and community settings (Lewis, Donaldson, Mitton, & Currie, 2001). Nurses continue to be the most suitable healthcare professionals to provide direct clinical care that is comprehensive and culturally competent for patients with complex, unstable, and rapidly changing health statuses (CNA, 2002). The professional mandate for nurses is to ensure patient safety, prevent the occurrence of disease by reducing risk, and promote health among individuals, populations, and communities (CNA, 2002).

Advanced practice nursing (i.e., CNS or NP) is broadly defined as a higher level of nursing practice that utilizes graduate level education and in-depth nursing knowledge directly to influence clinical practice and health outcomes (CNA, 2008; Hamric, 2014). Graduate level education gives the APN the ability to conceptualize interventions and offer support to patients living with ESKD while seeking to achieve a higher rating of HRQOL. Additionally, the skills required to develop critical analysis are cultivated through clinical practicums, which enable APNs to develop a formal and systematic approach to delivering care and to meet the complex healthcare needs of Canadians, as individuals, families, groups, communities, and populations (CNA, 2008). A systematic approach enables the APN to view the individual as a biological, psychological, and spiritual being within the socio-political environment that shapes their daily life. In order to better respond to the needs of patients living with ESKD, APNs need to consider HRQOL to guide clinical practice with an innovative and patient-centred approach (Finkelstein et al., 2009; Watson, 2008). In doing so, APNs are respecting their patient's choice of living life in a manner that relates to their definition of HRQOL.

While using a systematic approach, the APN can provide holistic care to support a patient's willingness toward self-actualization and in becoming an active participant in the establishment of a patient-centred healthcare plan. The ability of APNs to analyze and synthesize knowledge, as well as understand, interpret, and apply research findings to clinical practice, enables them to evolve constantly to meet the needs of the population and to intervene according to these requirements. Therefore, the conceptual framework in Figure 1 was developed to meet the needs of patients in nephrology nursing, particularly those undergoing RRT. Chaos theory was chosen to guide the APN's practice in nephrology nursing in the context of ESKD. Although complex, the human being is perceived as a dynamic system. This understanding has helped to conceptualize ESKD and explain the different factors influencing health for the APN to provide comprehensive care to patients and their families.

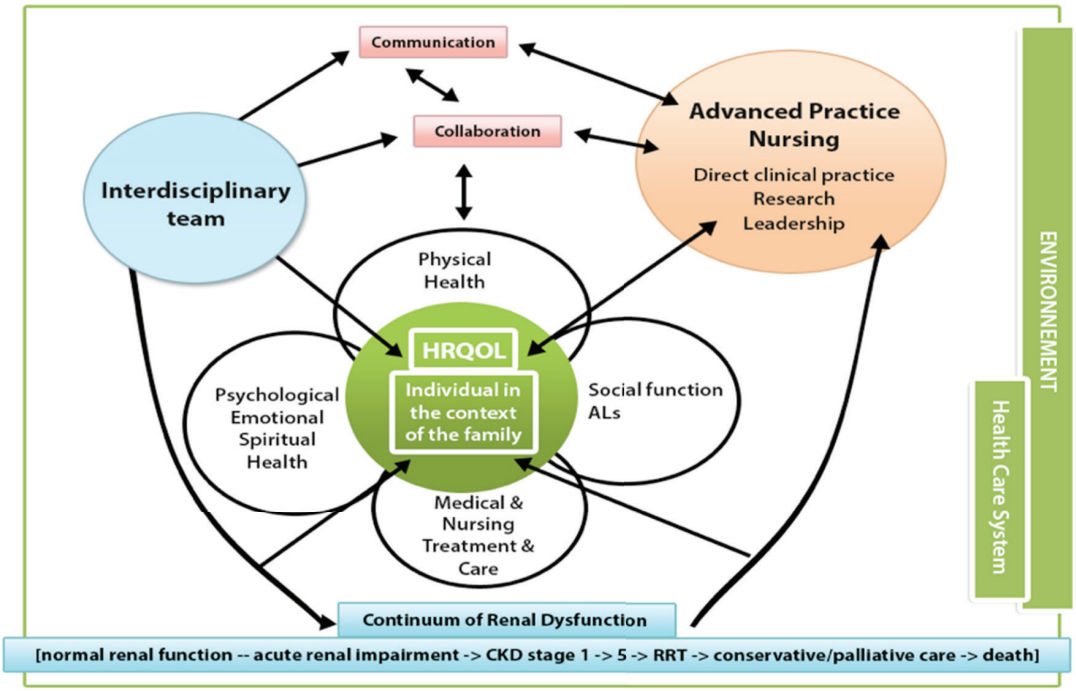


Figure 1. Conceptual framework for advanced practice in nephrology nursing

Chaos theory

Chaos theory emerged in 1961 when Edward Lorenz, a meteorologist, identified geometrical patterns in dynamic systems, which originated from quantum physics (Briggs, 1992). In the 1970s, nursing science theorists and researchers began integrating theories from quantum physics to explain phenomena in clinical practice. In chaos theory, a geometric fractal is a natural phenomenon, which displays a pattern that is self-similar and repeats itself by continuously folding and unfolding over itself, while feeding back information into the dynamic system (Briggs, 1992). It describes behaviour patterns of a dynamic system as the butterfly effect in which are small variations in the initial condition of a dynamic system that can dramatically alter its long-term behaviour patterns, thus creating a butterfly effect by new information feeding into the system (Haigh, 2002). A dynamic system in motion is constantly changing, never returning to its initial condition to maintain balance. Human physiologists have implemented tenets of this theory to study and explain the mechanism of homeostasis within the internal human environment. Even in the unforeseeable circumstances, chaos is defined as the randomness of irregular patterns that arise in a system, which is caused by crisis, disease, and pain (Glass & Mackey, 1988a; Smith, 2011).

The social and political environment directly influences the patient's health-related behaviours and use of health care services. In the renal patient population, chaos can be precipitated by the implementation of RRT, which significantly influences the physical and social environment of the patient that creates conditions favourable to change. Individuals wanting to modify their activities of daily living to implement RRT can perceive their actions as the butterfly effect, where small changes in their habits have the potential to enhance their long-term health-related behaviours and outcomes. This effect is sensitive to the initial conditions of the individual's environment and determinants of health, which evolve towards a transient state of change between chaos and equilibrium, while being influenced by attractors such as the nurse and patient relationship (Briggs, 1992; Haigh, 2002). Such attractors influence the components of the patient's initial health condition by allowing them to interact as a dynamic system, causing chaotic patterns of behaviour demonstrated by the multidirectional arrows in Figure 1, thus creating the butterfly effect. The intricate relationships that the patient develops with health care professionals (i.e., collaborating with the interdisciplinary team by continuous communication) create the potential for behavioural changes, which influence the patient's HRQOL in unpredictable ways. Balance is maintained in the system by patterns of behaviour unfolding and folding over each other to respond to external environmental fluctuations (Glass & Mackey, 1988a; Kamminga, 1990).

The alterations of trajectories of patterns in a dynamic system demonstrate the simultaneous order and disorder, along with the order beneath disorder within the same system. Equally, human systems that demonstrate patterns of periodic behaviours with little variability have been associated with disease processes. For example, lack of physical activity to activate the circulatory system negatively impacts the renal system, which increases the risk of glomerular dysfunction (Glass & Mackey, 1988b). Likewise, chaotic patterns in human systems have been associated with features of health and well-being. For example, blood pressure fluctuations during physical activity create oscillating patterns within the cardiovascular system, which is favourable to glomerular perfusion and is related to patterns of health and well-being for kidney function (Glass & Mackey, 1988a). Regular physical activity maintains optimal function within the circulatory system, which adequately perfuse the kidneys (Glass & Mackey, 1988a). Consequently, the dynamic exchange of information

magnifies small changes in behaviour patterns, which enables the transformation of the system, as a whole. Compliant behaviours, such as adherence to diet and medication, feed into each other to positively influence self-actualization of other health behaviours. Therefore, the complete system is bigger than the sum of its parts. Health patterns within the system are created continuously by simultaneous interactions with the environment and the nurse-patient relationship.

The APN plays a pivotal role within the interdisciplinary team in direct clinical practice in collaboration with patients and their families to improve the HRQOL. Since an individual is a dynamic system in motion, the APN can utilize chaos theory to understand and interpret patients' behaviour patterns, as well as the influence of those behaviours on their physical and social environments. Tenets of chaos theory allow the APN to demonstrate creativity and innovation to enhance healthcare outcomes in direct clinical practice (Black, 2008). Individual patterns of health and disease are recognized as complex situations where the APN alters routine plans of assessment and care. Therapeutic communication with patients initiated by the APN builds therapeutic relationship, which acts as an attractor that represents more than mere dialogue between two beings (Naef, 2006; Rodgers, 2005). The APN acknowledges the non-verbal communication shared by patients since they convey health-related behaviours with their actions. Critical analysis of verbal and non-verbal interactions with patients requires considerable reflection by the APN to understand how the patient perceives healthcare services within their lived experience and QOL (Haigh, 2002; Rodgers, 2005).

HEALTH RELATED QUALITY OF LIFE

To measure the effectiveness of the conceptual framework in Figure 1, Boudreau and Dubé (2014) carried out a concept analysis of QOL in the context of ESKD utilizing the process of concept analysis by Walker and Avant (2010) on the basis of chaos theory's tenets being defined as one's ability to adapt behavioural patterns in relation to the social and political environnement that impacts it. The findings indicated that to measure QOL in clinical practice needed to include the incidence of the various treatment regimens and intervention outcomes for patients living with ESKD in relation to one's definition of QOL, which defines HRQOL. This concept is accepted by many healthcare professionals practising in the field of nephrology (Al-Arabi, 2006; Finkelstein et al., 2009). Results from Smith, Avis, and Assmann's (1999) meta-analysis indicated that QOL and health are clearly two distinct constructs when interpreted from a patient's perspective. The participants expressed a greater emphasis on mental health in comparison to physical function when rating QOL, whereas physical functioning had a greater impact when attributing significance to their health compared to mental health ($p < 0.001$) (Smith et al., 1999). Health is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization [WHO], 1946, p. 100). Therefore, health is often the basis for the interpretation of QOL, which is an individual perception of oneself within the context of culture and values in relation to individual expectations, goals, standards, and concerns of daily life (Al-Arabi, 2006; Finkelstein et al., 2009; WHOQOL Group, 1993). In the context of ESKD, HRQOL is a personal definition of QOL in relation to the medical condition and the treatment modalities affecting physical, psychological, and social health (Al-Arabi, 2006; Finkelstein et al., 2009; National Kidney Foundation (NKF), 2005).

The Medical Outcomes Study Short Form-36 Health Survey (SF-36™) is an instrument of measure that is considered reliable and valid when measuring the HRQOL of patients living with ESKD (Kosinski, Bayliss, Bjorner & Ware, 2000; NKF, 2005; Tobita & Hyde, 2007). Using a cross-sectional and observational design, researchers from the NKF (2005) recruited 634 participants from a nephrology outpatient clinic to evaluate HRQOL of patients living with chronic kidney disease (CKD) in comparison to patients living with ESKD. Kidney dysfunction consists of acute kidney injury and five stages of CKD that lead to ESKD requiring RRT (NKF, 2014). The study findings indicated that patients living with ESKD had a much lower perception of their HRQOL than individuals living with CKD ($p < 0.0001$). Therefore, to better manage kidney disease, treatment regimens associated with ESKD must be tailored to meet the individual needs of patients and their families (Brenner & Brohart, 2008; Finkelstein et al., 2009). Individuals living with ESKD who are satisfied with their HRQOL can engage in vigorous activities, perform activities of daily living, as well as engage in social and occupational roles that contribute to the function of society (Kring & Crane, 2009; Noble, 2008; White & Grenyer, 1999). Acknowledging the patient's lived experience validates their collaboration with the interdisciplinary team and enables them to be the expert guiding the care plan. In collaboration with the patient, the APN can assess HRQOL to facilitate the implementation of a comprehensive and integrated inter-professional healthcare plan (Finkelstein et al., 2009). Through the tenets of chaos theory, the APN can implement a systematic approach to intervene with patients and their families that improves HRQOL, which is the outcome measured, as seen in Figure 1.

CLINICAL CASE

A brief clinical case is described to highlight the major concepts presented in the conceptual framework and to enhance the understanding of APN's practice in nephrology nursing in the context of ESKD. Mr. Jack White is a 52-year-old male living with ESKD secondary to hypertensive nephrosclerosis caused by long-standing hypertension. Mr. White is a widower with two teenage sons. For many years, Mr. White was the primary caregiver for his wife and children, having been employed for 22 years in a federal administrative position. Mr. White had difficulties accepting ESKD and refused to discuss treatment modalities with the primary nephrologist. Four months prior, Mr. White began outpatient hemodialysis (HD) three times per week.

In reviewing Mr. White's recent bloodwork, Ms. Grey, an NP student in nephrology nursing, noticed a trend of hypercalcemia, hyperphosphatemia, and hyperparathyroidism, indicating a pattern of dysfunctional mineral metabolism. Mr. White's attending registered nurse (RN) reported that the patient was non-adherent with his medication regimen and was considered to be a difficult patient to work with. Ms. Grey introduced herself to the patient seeking to explore how

he was coping with RRT and how it was impacting his daily life. The patient expressed his appreciation for Ms. Grey's interest in his feelings about ESKD and RRT—this represented an attractor to change for the patient's behaviours. After a lengthy discussion, the patient confided that he had not been coping well with his new treatment regimen and expressed his frustration. He admitted to having a stressful schedule, having had to adjust his work hours to accommodate his hemodialysis schedule, which has caused chaos in his daily life. The patient admitted to forgetting to have meals and take his scheduled medications while being preoccupied with his workload. In addition, the patient expressed feelings of guilt over not being actively involved in his sons' lives.

An in-depth understanding of dynamic systems enabled Ms. Grey to understand the patient's lived experience and his difficulties with adhering to his new treatment modality. Mr. White created patterns of behaviour that were influenced by his environment, where intricate relationships interacted with each other within his social and occupational roles, as well as treatment modalities. Acknowledging Mr. White's unique lived experience enabled Ms. Grey to build a therapeutic relationship with him that acted as an attractor and catalyst for positive behaviour change. The patient's behaviour patterns had been negatively influenced by the initiation of RRT. His role function as a provider for his family had defined his HRQOL; therefore, no longer being able to engage in his activities of daily life, role function, and vigorous activities had made him feel miserable, drastically reducing his HRQOL.

In collaboration with the interdisciplinary team, Ms. Grey provided education regarding management of bone mineral metabolism, and offered memory-enhancing strategies to mitigate the perceived lack of adherence to medication management. Moreover, the patient successfully transitioned to home dialysis via continuous cyclic peritoneal dialysis (CCPD), which had a significant and positive impact on the patient's HRQOL. This transition resulted in a more stable work schedule that allowed him to take his breaks and have regular meals and, therefore, take his medications regularly; this brought inherent order to his previously disrupted patterns in life. Equally, CCPD enabled him to attend his sons' extracurricular activities. Recent bloodwork indicated normalized patterns and stabilized mineral metabolism. The interdisciplinary team acknowledged a tailored approach improved this patient's healthcare outcomes.

IMPLICATIONS FOR ADVANCED PRACTICE NURSING

The human body makes use of chaos in its systems to achieve multiple responses, while sustaining human life in ways mechanical function could not (Briggs, 1992). The tenets of chaos theory underline the uniqueness of human existence within its continuously changing physical and social environments (Davidson & Ray, 1991; Young, 1991). Individuals who live with ESKD are often surrounded by chaos, unpredictability, and uncertainty, which fit with the tenets of chaos theory. The behavioural patterns acquired through the environment influence the patient's initial condition and create elements of unpredictability in behavioural patterns, which also affect long-term health outcomes.

In practice, the APN implements chaos theory to understand the dynamic, as well as complex nature of ESKD and its impact on the individual's daily life (Davidson & Ray, 1991; Phillips, 1991; Young, 1991). Understanding dynamic systems enables the APN to approach ESKD with the openness and flexibility required to manage complex health-related needs in both acute and chronic patterns of disease synergistically (Haigh, 2002; Phillips, 1991). The APN recognizes and understands the different psychosocial, physiological, and cultural patterns influencing individuals living with ESKD and their families (i.e., diverse roles and functions; navigation of the healthcare system; willingness to participate in care and to self-actualize). Identifying the natural order, patterns, and rituals of daily life of patients and their families is important, as pattern recognition enables the APN to understand the many variables that affect individual behaviours and long-term outcomes. As illustrated in Figure 1, the holistic approach provided through the implementation of chaos theory facilitates the APN's ability to recognize patterns within each of the psychosocial, physiological, cultural, and environmental systems. These systems become important variables that influence the stability and relationships among the patient's various sub-systems. The APN embraces the reality of uncertainty, and accepts that change is constant and creates unpredictable consequences. This enables the APN to work through the organizational structures of the health care system to generate efficient and innovative approaches to care (Black, 2008; Micevski et al., 2004).

CONCLUSION

The aging of the Canadian population increases the complexity of health-related needs in chronic disease management. The APN provides continuity of patient-centred care and actively participates with the interprofessional team across various healthcare settings where ESKD is increasing in its prevalence, due to the growing number of Canadians living with chronic illnesses that affect kidney function. Critical analysis skills, gained through graduate level education, guide the APN's ability to understand the psychosocial needs of patients and their families. The APN can meet the health-related needs of Canadians by implementing a systematic approach guided by a conceptual framework, allowing them to achieve optimal ratings of HRQOL. Recognizing their unique lived experiences enables the APN to provide cost-effective strategies to deliver healthcare services. Providing individualized care that acknowledges the diversity present in contemporary Canadian society enables APNs to improve healthcare outcomes for the Canadian population. An advanced understanding of dynamic systems and chaos can facilitate the APN's role of ensuring that the specific health-related needs of patients living with ESKD, as well as the needs of their family, are met. This privileged position highlights the pivotal role of the APN within the nephrology interdisciplinary team in improving the HRQOL of patients living with ESKD and their families.

ACKNOWLEDGEMENT

The primary author gratefully acknowledges her colleague Joanne Peterson, MN, ACNP, CNeph(C), Acute Care Nurse Practitioner for her guidance, kindness, and support in the development of this scholarly work.

REFERENCES

Al-Arabi, S. (2006). Quality of life: Subjective descriptions of challenges to patients with end stage renal disease. *Nephrology Nursing Journal, 33*(3), 285–293.

Black, J. (2008). Clinical transformation through the application of chaos theory. *Nurse Leader, 6*(6) 38–40. doi:10.1016/j.mnl.2007.11.017

Boudreau, J.E., & Dubé, A. (2014). Quality of life in end stage renal disease: A concept analysis. *Canadian Association of Nephrology Nurses and Technologists Journal,* 24(1), 12–20.

Brenner, I., & Brohart, K. (2008). Weekly energy expenditure and quality of life in hemodialysis patients. *Canadian Association of Nephrology Nurses and Technologists Journal, 18*(4), 36–40.

Briggs, J. (1992). Introduction: Obvious and hidden order: Chaos, fractals, and a new aesthetic. In J. Briggs (Eds.), *Fractals: The patterns of chaos: A new aesthetic of art, science, and nature* (pp. 13–34). New York, NY: Simon & Schuster.

Canadian Association of Nephrology Nurses and Technologists. (2014). *Nephrology nursing standards and practice recommendations.* Barrie, ON: Author.

Canadian Institute for Health Information. (2015). *Canadian organ replacement register annual report: Treatment of end-stage organ failure in Canada, 2004 to 2013.* Ottawa, ON: Author.

Canadian Nurses Association. (2008). *Advanced nursing practice: A national framework.* Ottawa, ON: Author.

Canadian Nurses Association. (2002). *Discussion guide for the unique contributions of the registered nurse.* Ottawa, ON: Author.

Cleary, J., & Drennan, J. (2005). Quality of life of patients on haemodialysis for end-stage renal disease. *Journal of Advanced Nursing, 51*(6), 577-586. doi: 10.1111/j.13652648.2005.03547.x

Davidson, A.W., & Ray, M.A. (1991). Studying the human-environment phenomena using the science of complexity. *Advances in Nursing Science, 14*, 73–87.

Ferri, C., & Pruchno, R. (2009). Quality of life in end-stage renal disease patients: Differences in patient and spouse perceptions. *Aging & Mental Health, 13*(5), 706–714. doi:10.1080/13607860902845558

Finkelstein, F., Wuerth, D., & Finkelstein, S. (2009). Health related quality of life and the CKD patient: Challenges for the nephrology community. *Kidney International, 76*(9), 946–952. doi:10.1038/ki.2009.307

Glass, L., & Mackey, M. (1988a). Introduction: The rhythms of life. In L. Glass & M. Mackey (Eds.), *From clocks to chaos: The rhythms of life* (pp. 1–17). Princeton, NJ: Princeton University Press.

Glass, L., & Mackey, M. (1988b). Dynamical diseases. In L. Glass & M. Mackey (Eds.), *From clocks to chaos: The rhythms of life* (pp. 172–182). Princeton, NJ: Princeton University Press.

Haigh, C. (2002). Using chaos theory: The implications for nursing. *Journal of Advanced Nursing, 37*(5), 462–469. doi:10.1046/j.1365-2648.2002.02113.x

Hamric, A.B. (2014). A definition of advanced practice nursing. In A.B. Hamric, C.M. Hanson, M.F. Tracy, E.T. O'Grady (Eds.), *Advanced practice nursing: An integrative approach (5th Ed.)* (pp. 67–85). St. Louis, MO: Saunders Elsevier.

Jabareen, Y. (2009). Building a conceptual framework: Philosophy, definitions, and procedure. *International Journal of Qualitative Methods, 8*(4), 49–62.

Kamminga, H. (1990). What is this thing called chaos? *New Left Review, 181*, 49–59.

Kosinski, M., Bayliss, M., Bjorner, J.B., & Ware, J.E. (2000). Improving estimates of SF-36® health survey scores for respondents with missing data. *Medical Outcomes Trust Monitor, 5*(1), 8–10.

Kring, D., & Crane, P. (2009). Factors affecting quality of life in persons on hemodialysis. *Nephrology Nursing Journal, 36*(1), 15–25.

Lewis, S., Donaldson, C., Mitton, C., & Currie, G. (2001). The future of health care in Canada. *British Medical Journal, 323*(7318), 926–929.

Micevski, V., Korkola, L., Sarkissian, S., Shobbrook, C., Belford, L., & Kells, L. (2004). University Health Network framework for advanced nursing practice: Development of a comprehensive conceptual framework describing the multidimensional contributions of advanced practice nurses. *Nursing Leadership, 17*(3), 52–64.

Naef, R. (2006). Bearing witness: A moral way of engaging in the nurse-person relationship. *Nursing Philosophy,* 7, 146–156. doi:10.1111/j.1466-769X.2006.00271.x

National Kidney Foundation. (2005). Quality of life in chronic kidney disease (CKD): A cross-sectional analysis in the renal research institute-CKD Study. *American Journal of Kidney Diseases, 45*(4), 658–666. doi:10.1053/j.ajkd.2004.12.021

National Kidney Foundation (2014). *Primer on kidney diseases (6th Ed.).* Philadelphia, PA: Saunders Elsevier.

Noble, H. (2008). Supportive and palliative care for the patient with end-stage renal disease. *British Journal of Nursing, 17*(8), 498–504.

Phillips, J.R. (1991). Chaos in nursing research. *Nursing Science Quarterly, 4*(3), 96–97.

Rodgers, B. (2005). *Developing nursing knowledge: Philosophical traditions and influences.* Philadelphia, PA: Lippincott, Williams and Wilkins.

Smith, M. (2011). Philosophical and theoretical perspectives related to complexity science in nursing. In A. Davidson, M. Ray & M. Turkel (Eds.), *Nursing, caring, and complexity science. For human environment well-being* (p. 1–20). New York: NY: Springer Publishing Company.

Smith, K.W., Avis, N.E., & Assmann, S.F. (1999). Distinguishing between quality of life and health status in quality of life research: A meta-analysis. *Quality of Life Research, 8*, 447–459.

Spross, J.A. (2014). Conceptualizations of advanced practice nursing. In A.B. Hamric, C.M. Hanson, M.F. Tracy, E.T. O'Grady (Eds.), *Advanced practice nursing: An integrative approach (5th ed.,* pp. 27–66). St. Louis, MO: Saunders Elsevier.

Tobita, I., & Hyde, C. (2007). Quality of life research: A valuable tool for nephrology nurses. *Journal of Renal Care, 33*(1), 25–29.

Verschuren, J.E.A., Enzlin, P., Dijkstra, P.U., Geertzen, J.H.B., & Dekker, R. (2010). Chronic disease and sexuality: A generic conceptual framework. *Journal of Sex Research, 47*(2-3), 153–170.

Walker, L.O., & Avant, K.C. (2010). *Strategies for theory construction in nursing (5th ed.).* Upper Saddle River: Pearson.

Watson, D. (2008). "Post-dialysis pre-dialysis" care: The cart before the horse—Advanced practice nurse intervention and impact on modality selection. *Canadian Association of Nephrology Nurses and Technologists Journal, 18*(1), 30–33.

White, Y., & Grenyer, B. (1999). The biopsychosocial impact of end-stage renal disease: The experience of dialysis patients and their partners. *Journal of Advanced Nursing, 30*(6), 1312–1320. doi:10.1046/j.1365-2648.1999.01236

Wiederman, M.W., & Whitley, B.E. (2002). *Handbook for conducting research on human sexuality.* Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

World Health Organization. (1946). *Preamble to the constitution of the world health organization.* New York, NY: Records of the World Health Organization.

World Health Organization Quality of Life Group. (1993). Study protocol for the World Health Organization project to develop a quality of life assessment instrument (WHOQOL). *Quality of Life Research, 2*, 153–159.

Young, T. (1991). Chaos and social change: Metaphysics of the postmodern. *Social Science Journal, 28*(3), 289–305.

Conservative kidney management: An alternative care pathway for patients unlikely to benefit from dialysis

By Betty Ann Wasylynuk, BScN, RN, and Sara N. Davison, MD, MHSc (Bioethics), FRCP(C)

ABSTRACT

The prevalence of advanced chronic kidney disease (CKD) continues to soar globally with patients 75 years and older making up the fastest-growing age group being diagnosed with end-stage kidney disease (ESKD). Unfortunately, many of them suffer from functional disability, cognitive impairment and/or high levels of comorbidity. Although dialysis may provide some elderly patients with a survival advantage, this is lost in the presence of high levels of comorbidity and geriatric syndromes such as frailty or dementia. Conservative kidney management (CKM) is gaining global popularity and is an acceptable alternative care pathway for patients who are unlikely to benefit from dialysis. The purpose of this article is to define CKM and describe the key components of care along a CKM care pathway.

As the global population ages, the prevalence of advanced chronic kidney disease (CKD) continues to surge. In Canada alone, by the end of 2014, there were more than 5,200 patients newly diagnosed with end-stage kidney disease (ESKD), with the largest rates per million population increase seen in those patients 75 years and older (Canadian Organ Replacement Register, 2016). With the increased acceptance for dialysis, many elderly patients are started on dialysis. However, many of them are plagued with functional disability, cognitive impairment, and/or high levels of comorbidity, subjecting them to poor outcomes in terms of survival, functional/cognitive status, and quality of life (Schell, Da Silva-Gane, & Germain, 2013).

Dialysis is often viewed as a treatment that extends survival and improves quality of life. However, in the presence of advanced age, functional disability, impaired cognitive status, and/or extensive comorbidity, dialysis may not offer a survival advantage nor an improved quality of life, and may, in fact, be associated with more harm than benefit (Murtagh, Burns, Moranne, Morton, & Naicker, 2016). Conservative kidney management (CKM) is seen to be a legitimate alternative care pathway for those patients who are not suitable candidates for transplantation or who will not realize the benefits of dialysis. CKM, though not clearly defined until recently by the Kidney Disease Improving Global Outcomes (KDIGO), is gaining global popularity and is supported by practice guidelines and recommendations such as KDIGO's "roadmap to improving quality care" (Davison et al., 2015) and the Renal Physicians Association in the United States (Renal Physicians Association, 2010), which emphasize not only the patient's right to refuse dialysis when the burden of dialysis outweighs the potential benefit, but also the importance of shared decision-making to ensure that patients actively choose the care pathway, dialysis or CKM, that best aligns with their prognosis, values, and preferences. The purpose of this article is to define CKM and to describe the key components of that care along the CKM pathway.

ABOUT THE AUTHORS

Betty Ann Wasylynuk, BScN, RN, Kidney Supportive Care Clinical Nurse Educator, Northern Alberta Renal Program (NARP), Alberta Health Services, Edmonton, Alberta

Sara N. Davison, MD, MHSc (Bioethics), FRCP(C), Professor, Bioethicist, and Health Outcomes Researcher, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta

Address for correspondence: Betty Ann Wasylynuk, Aberhart Centre, Room 7121, 11402 University Avenue, Edmonton, Alberta T6G 2J3.

Tel: (780) 407-1163, fax: (780) 407-8220

Email: ***bettyann.wasylynuk@albertahealthservices.ca***

DEFINING CONSERVATIVE KIDNEY MANAGEMENT

According to KDIGO, CKM is orchestrated, holistic patient-centred care for patients with an estimated glomerular filtration rate (eGFR) category 5 (G5) CKD i.e., eGFR < 15 ml/min/1.73m^2, and includes: (i) delaying the progression of kidney disease; (ii) minimizing complications of CKD; (iii) shared decision-making; (iv) detailed communication including advance care planning; (v) symptom management; (vi) psychological, social, and family support; and (vii) cultural and spiritual domains of care (Davison et al., 2015). Although CKM does not include dialysis, it does not imply a "no care" philosophy nor that death is imminent. In fact, this is highly involved care for complex patients, many of whom may live for years receiving multidisciplinary, non-dialysis CKM (Carson, Juszczak, Davenport, & Burns, 2009).

HOLISTIC CARE ALONG THE CKM PATHWAY

Delaying the Progression of Kidney Disease and Minimizing CKD Complications

Delaying the progression of kidney disease and minimizing CKD complications are fundamental elements of care for most patients receiving CKM. Although patients are

usually eager to extend life where possible, their predominant focus is on maximizing quality of life, which usually entails preserving physical and cognitive functionality. This will include mitigating risks for accelerated loss of kidney function such as avoiding nephrotoxic drugs and volume depletion. However, at this late stage of the disease trajectory, strategies such as tight blood pressure and glycemic control are unlikely to result in further benefit but, rather, can pose harm for more frail CKM patients. For example, the primary goals of blood pressure control in CKM are to optimize physical and cognitive function, and minimize the risk of falls rather than reduce the risk of cardiovascular-related mortality and morbidity, and slow progression of CKD. As the eGFR declines and metabolic complications arise, it is important that therapeutic approaches remain aligned with the patient's identified goals of care. The guiding principles and standards for care for the common complications associated with advanced CKD have recently been developed and implemented across a large healthcare system in Canada in an interactive, online CKM pathway that is freely accessible (Davison, 2016) and are outlined in Table 1.

Shared Decision-Making

Choosing between dialysis or CKM is a highly complex and personal decision (Davis & Davison, 2017). The evidence suggests that patients are generally not informed fully of their treatment options, are not involved in the decision-making, and feel that they have been given no choice about starting dialysis (Ladin et al., 2016; Song et al., 2013). The result is that many patients feel either resigned to or regret their decision to start dialysis, admitting that decisions were based primarily on the wishes of family and/or their physician (Davison, 2010; Schell, Patel, Steinhauser, Ammarell, & Tulsky, 2012). However, through the process of shared decision-making, patients are encouraged to

Table 1: CKM Guiding Principles for Managing Complications Associated with Advanced CKD

Complication	CKM guiding principles
Anemia	• Can contribute to fatigue and dyspnea • Should be treated using erythropoietin stimulating agents and iron supplementation according to the patient's preference • Should continue for as long as the intervention provides symptomatic benefit
Blood pressure (BP)	• Goals are to optimize physical and cognitive function, and minimize the risk for falls while avoiding dangerously high readings • Suggested BP target (for most patients): < 160/90 • BP should be checked regularly and assessed for orthostatic hypotension. • Diuretics are a unique consideration and are used primarily to help control volume overload that leads to shortness of breath and symptomatic peripheral edema.
Cardiovascular disease and dyslipidemia	• Statins are used in CKD to reduce the risk of cardiovascular mortality and morbidity. • CKM patients are unlikely to receive benefit from statins in the last few years of life, therefore stopping statins may be appropriate and may improve the patient's quality of life by avoiding the common side effects associated with statin use.
Hyperkalemia	• Associated with risk of cardiac arrhythmias and sudden death • Interventions include potassium restricted diet and potassium binding resins (e.g., Kayexalate) • Acute treatment is recommended as long as treatment aligns with the patient's identified goals.
Metabolic acidosis	• Can contribute to bone loss, muscle wasting, and fatigue • Medical management, consisting of sodium bicarbonate, may have symptomatic benefits, but may contribute to pill burden. • Continue medication for as long as patient requests and does not find treatment overly burdensome
Calcium and phosphate imbalance	• Can contribute to pruritus, restless legs syndrome, calcium, and phosphorous depositions leading to myalgias, arthralgias, and pseudogout • Treatment is aimed at relieving these symptoms, if present, rather than correcting laboratory abnormalities • Treatment involves phosphorous-restricted diet and phosphate binders
Decreased active Vitamin D	• Can contribute to weakness, fatigue and muscle loss • If vitamin D deficiency is felt to be contributing to symptom burden, an active form of vitamin D can be started such as calcitriol at 0.25ug three times a week. • Parathyroid hormone monitoring is not required.

Note. Adapted from Conservative Kidney Management Pathway by Davison (2016).

become active participants in making their healthcare decisions. Shared decision-making includes effective communication between the patient, their family, and the healthcare team where the patient and their family receive honest information about the disease trajectory, and the benefits, risks, and potential burdens of dialysis and CKM. The patient balances the benefits and burdens of each treatment against their values, goals, and beliefs, and with the help of their care team, decides on the care pathway that best aligns with their prognosis, values, and preferences.

Comparing dialysis and CKM. Most patients want to know what to expect in terms of how long they will live and how they will feel with dialysis versus CKM. There is a clear survival advantage for many, if not most, patients with dialysis over CKM (Chandna et al. 2011; Murtagh et al., 2007). However, the benefits of dialysis are dependent upon the patient's overall health such as functional and cognitive status, burden of comorbidity and, to a lesser extent, age (Iyasere & Brown, 2017; Schell, Da Silva-Gane, & Germain, 2013). Functional status (i.e., ability to dress, bathe, toilet, walk, and transfer) is a strong predictor of outcome with dialysis (Tamura et al., 2009). The people who do best with dialysis are those who are functionally independent. Frail patients are more prone to suffer functional decline after starting dialysis (Schell, Da Silva-Gane, & Germain, 2013; Tamura et al., 2009). Cognitive impairment is also associated with poor survival on dialysis (Iyasere & Brown, 2017). Dementia will not improve after starting dialysis and, in fact, dialysis may hasten decline in cognition due to repeated cerebral ischemia associated with the dialysis procedure (Iyasere & Brown, 2017). Multiple comorbidities are associated with poor outcomes (Schell, Da Silva-Gane, & Germain, 2013). Survival advantage with dialysis is lost in patients with high comorbidity, especially elderly patients with ischemic heart disease (history of previous myocardial infarction, angina pectoris, positive coronary angiography or other diagnostic procedures) (Murtagh et al., 2010; Oliva

Table 2: Prognostic Factors: Dialysis versus CKM

Prognostic factors	Dialysis	Conservative kidney management care
Age (without factoring in comorbidity)	>70 years of age with an eGFR 10.8mL/min have a median survival of 34 months on hemodialysis. This includes 18 months at home, 14 months at dialysis and 2 months in hospital (Carson, Juszczak, Davenport, & Burns, 2009).	>70 years of age with an eGFR 10.8mL/min have a median survival of 14 months. This includes 13 months at home and ½ month in hospital (Carson et al., 2009).

Physical function	Nursing home patients starting dialysis:
	• 3 months after initiation
	  • 39% have maintained functional status
	  • 61% have either died or have functional decline
	• 12 months after initiation
	  • 13% have maintained functional status
	  • 29% have experienced functional decline
	  • 58% patients have died
	(Tamura et al., 2009).
	
	Patients > 80 years of age living independently starting dialysis
	• 6 months after initiation
	  • 30% have suffered functional decline and loss of independence such that they require additional caregiver support or transfer to a nursing home
	(Jassal, Chiu, & Hladunewich, 2009).
		CKM patients typically maintain functional ability until the final 1–2 months of life when there is a quick decline (Koncicki & Swidler, 2013).

Comorbidities	Patients ≥ 70 years of age: In the presence of more than one significant comorbidity or having ischemic heart disease, there is no survival difference between dialysis or conservative kidney management (Foote et al., 2016; Murtagh et al., 2007).	
Cognitive function	• Up to 70% of hemodialysis patients aged 55 years and older have moderate to severe chronic cognitive impairment that is largely undiagnosed and is associated with an increased risk for mortality. • Believed to be due to cerebrovascular disease and vascular dementia, as opposed to retained metabolites • May worsen with the dialysis treatment (e.g., intradialytic hypotension causing cerebral ischemia) (Iyasere & Brown, 2017; Murray, 2008; Tamura et al., 2017; Ying, Levitt, & Jassal, 2014).	The research data remain scarce, but cognition may be protected by avoiding intradialytic episodes (e.g., hypotension); it may also be protected by preserving residual kidney function (Ying, Levitt, & Jassal, 2014).

et al., 2013). Lastly, although age is a consideration in prognostication, robust elderly patients may do well on dialysis with a survival advantage in the absence of functional disability, cognitive impairment, and/or high levels of comorbidity. Table 2 compares the prognostic factors (functional status, cognitive status, degree of comorbidity and age) for dialysis versus CKM.

Modality selection does not depend entirely on prognosis, but also on the careful consideration about what life will be like with various care pathways and how treatment options align with the patient's values and goals for living and dying well. For example, patients were more likely to choose dialysis over CKM if dialysis offered a survival advantage, a flexible dialysis schedule, and subsidized travel. Conversely, patients were more likely to choose CKM if it meant being able to travel for pleasure and having fewer trips to the hospital (Morton et al., 2012). Patients were willing to forgo seven months of survival in order to lessen the number of visits to a dialysis unit by one visit a week and forgo 15 months of survival for the ability to travel for pleasure (Morton et al., 2012). Moreover, many patients have to relocate to receive dialysis, yet elderly patients would trade off a median of nine years of life rather than relocate (Tonelli et al., 2015). Thus, even if dialysis offers a modest survival benefit, patients must assess whether this is worth the burden of treatment and whether this affords them an acceptable quality of life. Table 3 highlights additional values and preferences patients may consider when choosing between dialysis or CKM.

Patient decision aids. A patient decision aid (PDA) is an interactive tool (e.g., web-based, pamphlet, workbook, video) used to support shared decision-making. A PDA is used where there is more than one treatment option, each having their unique benefits, harms, and burdens that the patient will value differently, and where no one treatment option has a clear superior outcome advantage (Stacey et al., 2014). A PDA will help the patient understand their options and the benefits and risks, and help them reflect on each option from their personal context (Stacey et al., 2014). Studies have shown that patients who use a PDA have increased knowledge about their options and the associated outcomes, feel more clear about what matters most to them, participate more in decision-making and are more likely to make decisions consistent with their values (Stacy et al., 2014).

Table 3: Patient values and preferences: Dialysis versus CKM

Patient values & preferences	Dialysis	Conservative kidney management care
Hospital-free days	Dialysis patients spend 6.8% of their days (25 days per patient-year) in hospital (Carson, Juszczak, Davenport, & Burns, 2009).	CKM patients spend 4% of their days (16 days per patient-year) in hospital (Carson et al., 2009).
Quality of survival days	Hemodialysis patients spend 47.5% of survival days (or 173 days/year) with their treatment and activities related to their treatment (travel time, time on dialysis, post-treatment fatigue, hospitalization) (Carson et al., 2009).	CKM patients spend 4.3% of survival days (or 16 days/year) related to their treatment (Carson et al., 2009).
Place of death	Dialysis patients are more likely to die in the hospital (Murtagh, Burns, Moranne, Morton, & Naicker, 2016).	CKM patients are 4 times more likely to die at home or in a hospice (Carson et al., 2009).
Quality of Life (QOL)	The Satisfaction with Life score is seen to dramatically drop after the initiation of dialysis and not noted to rebound (Schell, Da Silva-Gane, & Germain, 2013). Elderly patients starting dialysis generally experience functional status decline, which is a critical element of quality of life (Tamura et al., 2009). Dialysis may offer regular social contact that patients may not otherwise have.	QOL is seen as "preserved" or maintained until the final 1-2 months before death (Davis & Davison, 2017).
Symptoms	Symptoms are common for patients with advanced CKD. Dialysis may not improve overall symptom burden. Dialysis may cause or worsen some symptoms such as muscle cramps and fatigue (Burns & Davenport, 2010).	Symptoms are common for patients with advanced CKD. The severity of symptoms tends to remain relatively stable until the last 1–2 months of life, but can be addressed by palliative care (Brown et al., 2015; Davis & Davison, 2017).

Until recently, PDAs aimed at choosing a dialysis modality tend to address CKM in a peripheral way, if at all, and place the focus of the main decision support around which form of dialysis (or transplantation) to choose. They also do not include patient-specific risk factors required for individualized prognosis for clinically relevant outcomes. This is needed to help patients weigh quality of life versus survival advantage. To improve shared decision-making around appropriate CKM and dialysis choices, an interactive web-based PDA was designed to support the wide-spread implementation of the CKM Pathway; this can be found on the CKM website (**www.ckmcare.com**). This PDA was designed to: (i) enhance patient's knowledge about dialysis and CKM; (ii) provide evidence-based prognosis for important outcomes such as survival (using pictographs), quality of life, symptom burden, and functional status based on their current age, function, cognition, and degree of comorbidity; and (iii) elicit from the patient what matters most to them and how this might be affected by dialysis versus CKM.

Detailed Communication Including Advance Care Planning

Detailed communication between the healthcare team and the patient and their family is not only needed during the shared decision-making process, but is also critical within all patient and family interactions. Communication and education must be culturally sensitive and appropriate for the patient's health literacy (Davison et al., 2015).

Detailed communication also includes advance care planning (ACP) whereby patients, along with their family and healthcare team, engage in conversations about the patient's future healthcare wishes should the patient become unable to direct their own healthcare. The patient's values, beliefs, and goals for care are explored and preferences for end-of-life care are clarified. End-of-life care planning is a critical component of CKM, ensuring the patient's healthcare wishes will be honoured. The patient identifies a substitute decision-maker who will speak and make healthcare decisions on their behalf if they are unable to do so. It is recommended that ACP be started early in the patient's illness trajectory and continue throughout their illness, as healthcare wishes may change. For this reason, advance care plans should be revisited regularly and updated as required to ensure the patient's current end-of-life care wishes are always known. ACP for patients with advanced CKD, including the essential components and the communication strategies required for successful implementation, have recently been reviewed elsewhere (Wasylynuk, 2016a; Wasylynuk, 2016b).

Symptom Management

CKM patients tend to experience a symptom burden similar to those on dialysis, which can be significant and, if not addressed, adversely affects their quality of life (Murphy, Murtagh, Carey, & Sheerin, 2009). For this reason, symptom screening and aggressive symptom management are priorities while delivering CKM. It includes a thorough symptom assessment (physical, emotional and spiritual) at regular intervals, as symptoms will change as disease progresses (Murphy et al., 2009). Screening for spiritual distress can be done at each clinic visit by simply asking the patient whether they have any spiritual concerns they would like to have addressed or would like to discuss and, if so, inquiring who on the multidisciplinary team they would like to speak with. Screening for physical and emotional symptoms can be done using valid global symptom assessment tools such as the Edmonton Symptom Assessment System Revised: Renal (ESAS-r: Renal) or the Integrated Palliative Care Outcome Scale - Renal (IPOS-renal); both are accessible on the CKM website (**www.ckmcare.com**). When a symptom is present, it is important to determine whether the symptom is impairing the patient's quality of life, as its presence may not necessarily justify immediate intervention. However, if management is warranted, it should follow a systematic approach comprising: (i) assessing possible modifiable or contributing factors (e.g., anemia causing fatigue; pain causing problems with sleep) and then correcting the underlying cause; (ii) having patients become active participants in their own symptom management by providing them conservative strategies to relieve symptoms (e.g., encouraging patients to pat dry and moisturize their skin within two minutes of getting out of the tub to relieve uremic pruritus); and (iii) if the previous interventions do not work, consider pharmacological management. This requires vigilant monitoring to ensure efficacy while avoiding toxicity. Symptom guidelines for common symptoms experienced by CKM patients can be found on the CKM website (**www.ckmcare.com**). These guidelines follow the systematic approach as described.

Another aspect of comprehensive CKM is ensuring that patients have a crisis management plan in place to address sudden complications such as severe symptom distress. Knowing what medication(s) they can take, who they should call, and when to call provide patients with strategies to manage their care and help avoid unnecessary emergency room and hospital admissions.

Patient and Family Supports

The CKM patient and their family require ongoing follow-up and support from their multidisciplinary nephrology team, the patient's primary care physician, and, over time, from community agencies such as home care and palliative care. Early on, the nephrology team should inform the CKM patient about the importance of keeping their primary care physician involved in their care and should provide ongoing updates to the patient's physician with regards to the patient's health and continued interest in CKM. Patients should be informed about the importance of a timely referral to home care to support them living safely for as long as possible in their preferred location, which is usually their home. Likewise, a timely referral to palliative care is important to ensure that plans are in place for enhanced symptom management or for organizing end-of-life care in accordance with the patient's wishes (e.g. access to hospice), as the patient's health deteriorates. At this juncture, it may be appropriate to transition CKM care from the nephrology team to the patient's primary

care physician in conjunction with community palliative care. Not all patients choosing CKM will want to attend, or for that matter need to attend a nephrology clinic for their CKM. The CKM pathway and website (**www.ckmcare.com**) have been designed to help equip the patient's primary care physician, along with community supports (e.g., home care and palliative care), with the tools and resources to safely and effectively deliver evidence-based, high-quality CKM.

Family and caregivers are often unsure of how to best care for their loved one, especially near the end of life. By making frequent inquiries with the patient and their family, care teams should actively solicit and address any unmet needs, thereby increasing patient and family confidence and comfort, knowing they are all well supported through this journey.

Cultural and Spiritual Domains of Care

The patient's cultural and spiritual domains of care should be acknowledged and addressed throughout CKM. For instance, during the shared decision-making process, the patient should have been supported to make a modality choice based on their values, beliefs, and culture. Likewise, the patient's advance care plan should address these issues. Finally, ongoing interaction with the multidisciplinary care teams provides opportunities to ensure that all cultural and spiritual domains of care have been adequately addressed.

SUMMARY

Patients 75 years and older are the fastest growing age group to be diagnosed with ESKD. Many of these elderly patients suffer from functional disability, impaired cognitive status, and substantial comorbidity. Although dialysis may provide some elderly patients with a survival advantage, this is lost in the presence of high levels of comorbidity, including those with geriatric syndromes such as frailty or dementia. The burden of dialysis is also high, and many will experience poor outcomes such as progressive loss of physical and cognitive function and poor quality of life. Dialysis should not be considered the default treatment. CKM is an alternative care pathway for those patients unlikely to benefit from dialysis. CKM provides holistic patient-centred care aimed towards preserving function and quality of life through active disease management, aggressive symptom control, and detailed supportive care until the end of life. Patients need to be supported to ensure they choose the care pathway that best meets their needs.

REFERENCES

Brown, M.A., Collett, G.K., Josland, E.A., Foote, C., Li, Q., & Brennan, F.P. (2015). CKD in elderly patients managed without dialysis: Survival, symptoms, and quality of life. *Clinical Journal of the American Society of Nephrology, 10*, 260–268.

Burns, A., & Davenport, A. (2010). Maximum conservative management for patients with chronic kidney disease stage 5. *Hemodialysis International, 14*, S32–37.

Canadian Organ Replacement Register (2016). *Treatment of end-stage organ failure in Canada, Canadian Organ Replacement Register, 2005–2014.* Retrieved April 21, 2017, from https://www.cihi.ca/sites/default/files/document/2016_corr_snapshot_enweb.pdf

Carson, R.C., Juszczak, M., Davenport, A., & Burns, A. (2009). Is maximum conservative management an equivalent treatment option to dialysis for elderly patients with significant comorbid disease? *Clinical Journal of the American Society of Nephrology, 4*(10), 1611–1619.

Chandna, S.M., Da Silva-Gane, M., Marshall, C., Warwicker, P., Greenwood, R.N., & Farrington, K. (2011). Survival of elderly patients with stage 5 CKD: Comparison of conservative management and renal replacement therapy. *Nephrology Dialysis Transplantation*, *26*, 1608–1614.

Davis, J.L., & Davison, S.N. (2017). Hard choices, better outcomes: A review of shared decision-making and patient decision aids around dialysis initiation and conservative kidney management. *Current Opinion in Nephrology and Hypertension, 26*(3), 205–213.

Davison, S.N. (2010). End-of-life care preferences and needs: Perceptions of patients with chronic kidney disease. *Clinical Journal of the American Society of Nephrology, 5*(2), 195–204.

Davison, S.N. for the Kidney Supportive Care Research Group and Alberta Health Services. (2016). *Conservative Kidney Management Pathway*. Retrieved from www.ckmcare.com

Davison, S.N., Levin, A., Moss, A.H., Jha, V., Brown, E.A., Brennan, F., …Obrador, G.T. (2015). Executive summary of the KDIGO controversies conference on supportive care in chronic kidney disease: Developing a roadmap to improving quality care. *Kidney International, 88*(3), 447–459.

Foote, C., Kotwal, S., Gallagher, M., Cass, A., Brown, M., & Jardine, M. (2016). Survival outcomes of supportive care versus dialysis therapies for elderly patients with end-stage kidney disease: A systematic review and meta-analysis. *Asian Pacific Society of Nephrology, 21*, 241–253.

Iyasere, O., & Brown, E.A. (2017). Cognitive function before and after dialysis initiation in adults with chronic kidney disease—A new perspective on an old problem? *Kidney International*, *91*, 784–786.

Jassal, S.V., Chiu, E., & Hladunewich, M., (2009). Loss of independence in patients starting dialysis at 80 years of age or older. *New England Journal of Medicine*, *361*(16), 1612–1613.

Koncicki, H.M., & Swidler, M.A. (2013). Decision making in elderly patients with advanced kidney disease. *Clinics in Geriatric Medicine, 29*, 641–655.

Ladin, K., Lin, N., Hahn, E., Zhang, G., Koch-Weser, S., & Weiner, D.E. (2016). Engagement in decision-making and patients' satisfaction: A qualitative study of older patients' perceptions of dialysis initiation and modality decision. *Nephrology Dialysis Transplantation*, *0*, 1–8.

Morton, R.L., Snelling, P., Webster, A.C., Rose, J., Masterson, R., Johnson, D.W., & Howard, K. (2012). Factors influencing patient choice of dialysis versus conservative care to treat end-stage kidney disease. *Canadian Medical Association Journal, 184*(5), E277–283.

Murphy, E.L., Murtagh, F.E., Carey, I., & Sheerin, N.S. (2009). Understanding symptoms in patients with advanced chronic kidney disease managed without dialysis: Use of a short patient-completed assessment tool. *Nephron Clinical Practice, 111*(1), 74–80. doi:10.1159/000183177

Murray, A.M. (2008). Cognitive impairment in the aging dialysis and chronic kidney disease populations: An occult burden. *Advances in Chronic Kidney Disease, 15*(2), 123–132.

Murtagh, F.E., Marsh, J.E., Donohoe, P., Ekbal, N.J., Sheerin, N.S., & Harris, F.E. (2007). Dialysis or not? A comparative survival study of patients over 75 years with chronic kidney disease stage 5. *Nephrology Dialysis Transplantation, 22*(7), 1955–1962.

Murtagh, F.E., Addington-Hall, J., Edmonds, P., Donohoe, P., Carey, I., Jenkins, K., … Higginson, I.J. (2010). Symptoms in the month before death for stage 5 chronic kidney disease patients managed without dialysis. *Journal of Pain and Symptom Management, 40*(3), 342–352.

Murtagh, F.E., Burns, A., Moranne, O., Morton, R.L., & Naicker, S. (2016). Supportive care: Comprehensive conservative care in end-stage kidney disease. *Clinical Journal of the American Society of Nephrology, 11*(10), 1909–1914.

Oliva, J.S., Roa, L.M., Lara, A., Garrido, S., Salgueira, M., Palma, A., … Martin-Reyes, G. (2013). Survival and factors predicting mortality in hemodialysis patients over 75 years old. *Journal of Nephrology, 26*(01), 129–135.

Renal Physicians Association (2010). Shared decision-making in the appropriate initiation of and withdrawal from dialysis (2nd ed.). Rockville, MD: Author.

Schell, J.O., Da Silva-Gane, M., & Germain, M.J. (2013). Recent insights into life expectancy with and without dialysis. *Current Opinion in Nephrology and Hypertension, 22*(2), 185–192.

Schell, J.O., Patel, U.D., Steinhauser, K.E., Ammarell, N., & Tulsky, J.A. (2012). Discussions of the kidney disease trajectory by elderly patients and nephrologists: A qualitative study. *American Journal of Kidney Diseases, 59*(4), 495–503.

Song, M.K., Lin, F.C., Gilet, C.A., Arnold, R.M., Bridgman, J.C., & Ward, S.E. (2013). Patient perspectives on informed decision-making surrounding dialysis initiation. *Nephrology Dialysis Transplantation, 28*(11), 2815–2823.

Stacey, D., Legare, F., Col, N.F., Bennett, C.L., Barry, M.J., Eden, K.B., … Wu, J.H.C. (2014). Decision aids for people facing health treatment or screening decisions. *Cochrane Database of Systematic Reviews*, (1). doi:10.1002/14651858.CD001431.pub4.

Tamura, M.K., Covinsky, K.E., Chertow, G.M., Yaffe, K., Landefeld, C.S., & McCulloch, C.E. (2009). Functional status of elderly adults before and after initiation of dialysis. *New England Journal of Medicine, 361*(16), 1539–1547.

Tamura, M.K., Vittinghoff, E., Hsu, C., Tam, K., Seliger, S.L. Sozio, S., … Yaffe, K. (2017). Loss of executive function after dialysis initiation in adults with chronic kidney disease. *Kidney International*, *91*, 948–953.

Tonelli, M., Wiebe, N., Guthrie, B., James, M.T., Quan, H., Fortin, M., … Hammelgarn, B.R. (2015). Comorbidity as a driver of adverse outcomes in people with chronic kidney disease. *Kidney International, 88*(4), 859–866.

Wasylynuk, B.A. & Davison, S.N. (2016a). An overview of advance care planning for patients with advanced chronic kidney disease: The basics. *Canadian Association of Nephrology Nurses and Technologists Journal, 26*(1), 24–29.

Wasylynuk, B.A. & Davison, S.N. (2016b). Advance care planning in advanced chronic kidney disease: Practical communication tips for clinicians. *Canadian Association of Nephrology Nurses and Technologists Journal, 26*(3), 20–25.

Ying, I., Levitt, Z., & Jassal S.V. (2014). Should an elderly patient with stage V CKD and dementia be started on dialysis? *Clinical Journal of the American Society of Nephrology, 9*, 971–977.

CONTACT HOUR: 2.0 HRS

Antimicrobial stewardship: Is there a role in hemodialysis?

By Sylvia Sivarajahkumar, BScPhm, Miranda So, PharmD, and Marisa Battistella, PharmD, ACPR

OBJECTIVES

After reading this article, the reader will be able to:

1. Define the term antimicrobial stewardship.
2. Describe the reasons why antimicrobial stewardship is needed in hemodialysis.
3. Evaluate the literature supporting antimicrobial stewardship in the hemodialysis population.
4. Explain which antimicrobial stewardship strategies may be effective in the hemodialysis setting.

WHAT IS ANTIMICROBIAL STEWARDSHIP?

Antimicrobial stewardship has been defined in a consensus statement from the Infectious Diseases Society of America (IDSA), the Society for Healthcare Epidemiology of America (SHEA), and the Pediatric Infectious Diseases Society (PIDS), as "coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen including dosing, duration of therapy, and route of administration" (Society for Healthcare Epidemiology of America, Infectious Diseases Society of America, & Pediatric Infectious Diseases Society, 2012). Core principles of antimicrobial stewardship are to: (a) ensure patients receive timely and appropriate regimens based on indication and local susceptibility patterns; (b) de-escalate and tailor therapy based on microbiology results; (c) provide expertise and resources at point of care; and (d) monitor antimicrobial consumption transparently and continuously (Centers for Disease Control and Prevention [CDC] & Institute for Healthcare Improvement [IHI], 2012; Dellit et al., 2007; Hyun et al., 2013). The primary goal of an antimicrobial stewardship program (ASP) is to achieve best clinical outcomes related to antimicrobial use while minimizing toxicity and other adverse events (Dellit et al., 2007). The benefits of ASP include improved antimicrobial prescribing practices, improved antimicrobial susceptibility rates, and reduced adverse events, mortality and costs attributable to suboptimal antimicrobial use (Barlam et al., 2016).

ABOUT THE AUTHORS

Sylvia Sivarajahkumar, BScPhm, Pharmacy Resident, University Health Network, Toronto, ON

Miranda So, PharmD, Pharmacotherapy Specialist - Sinai Health System-University Health Network Antimicrobial Stewardship Program, University Health Network, Assistant Professor (Status-Only), Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, ON

Marisa Battistella, PharmD, ACPR, Clinician Scientist, Assistant Professor, Leslie Dan Faculty of Pharmacy, University of Toronto, Pharmacy Clinician Scientist, Clinical Pharmacist – Nephrology, University Health Network, Toronto, ON

Address for correspondence: *Marisa Battistella, University Health Network, 200 Elizabeth Street, EB 214,Toronto, ON M5G 2C4*

Email: ***marisa.battistella@uhn.ca***

WHY IS ANTIMICROBIAL STEWARDSHIP NEEDED IN HEMODIALYSIS?

There are three key reasons why antimicrobial stewardship is needed in hemodialysis (HD) units. First, the HD population is one of the most medically complex group of patients outside an acute care setting (Snyder et al., 2013). Patients on HD have multiple comorbidities and have the highest pill burden of all chronically ill patient populations with an estimated daily average of 12 medications (Chiu et al., 2009). With such a large number of medications, these patients are at increased risk of drug-drug interactions, especially when on antimicrobial therapy.

Second, the pharmacokinetics of a medication may be altered in patients on HD, which impacts their risk of adverse events with the use of antimicrobials (Smyth, Jones, & Saunders, 2016). Many antimicrobials are excreted by the kidney, and alterations in the absorption, distribution, metabolism and excretion of drugs places HD patients at increased risk of drug accumulation and toxicity (Velenosi & Urquhart, 2014).

Third, HD patients are at risk of infectious complications, including from multi-drug resistant organisms (MDROs). In Canada, infection is the second leading reason for admission to hospital, after cardiovascular disease, among patients receiving long-term dialysis (Lafrance et al., 2014). Patients on HD are prone to infection due to

numerous individual and treatment-related factors including decreased immunity, dialysis-mediated immune dysfunction, repeated healthcare visits, and repetitive vascular access procedures (Lata, Girard, Parkins, & James, 2016). In a 30-month, single-centre cohort study, patients receiving HD had a higher incidence of nosocomial infection (9.1/1000 patient-days) compared to hospitalized patients not requiring dialysis (3.8/1000 patient-days; relative risk [RR], 2.4; 95% confidence interval [CI], 1.8–3.2; $p < 0.001$) (D'Agata, Mount, Thayer, & Schaffner, 2000). According to the U.S. Renal Data System (2010) annual report, the rates of all-cause admissions to hospital remained fairly stable between 1994 to 2008 among HD patients. However, the number of hospitalizations due to infection rose by 45.8%. Unfortunately, similar data for the HD population in Canada are unavailable (Lafrance et al., 2014).

Furthermore, the outpatient HD unit is a high-risk setting for the acquisition of MDROs, as a result of extensive antimicrobial exposure. A six-month prospective study in an outpatient dialysis unit identified that 16% of the 85 chronic HD patients were colonized with MDROs (Pop-Vicas, Strom, Stanley, & D'Agata, 2008). The increased risk of MDROs represents a significant source of morbidity, potential mortality, and cost in the care of patients on HD (Snyder & D'Agata, 2012; Snyder et al., 2013). Therefore, minimizing exposure to unnecessary antimicrobials through multifaceted antimicrobial stewardship interventions is crucial for curtailing the ongoing rise of infections due to MDROs in this population (D'Agata, 2013).

It is evident from the reasons outlined above that antimicrobial stewardship is warranted in the HD population. Adverse events associated with antimicrobial exposure, such as drug-drug interactions, drug toxicity, and emergence of resistance may be more common in dialysis settings. Hence, it is imperative to implement an ASP in the HD unit to help guide the appropriate prescribing of antimicrobials to maximize benefit while minimizing harm to patients.

WHAT IS THE EVIDENCE FOR ANTIMICROBIAL STEWARDSHIP IN HEMODIALYSIS?

There is a paucity of data pertaining to antimicrobial use among the outpatient HD population. A study by Snyder et al. (2013) quantified and characterized parenteral antimicrobial prescribing among the HD population at two outpatient dialysis units in the United States. Over the 35-month retrospective study period, the rate of parenteral antimicrobial use was 32.9 doses per 100 patient-months. Vancomycin was the most commonly prescribed antimicrobial in the study, followed by cefazolin and third- or fourth-generation cephalosporins.

In the 12-month prospective component of the same study, investigators followed 278 patients among whom a total of 1,003 antimicrobial doses were prescribed. Among the 926 (92.3%) doses for which an indication for administration was available, approximately 276 (30%) were classified as inappropriate. The authors defined inappropriate administration as occasions when: (a) criteria for infection based on national guidelines were not met; (b) narrow-spectrum antimicrobials were not chosen on the basis of culture data; or (c) indications for surgical prophylaxis were not met, including prolonged duration of antimicrobial use (≥ 24 hours after the procedure). According to the results of the study, the most common reason for inappropriate administration was that the criteria for infection were not met, accounting for about 50% (146/276) of all inappropriate doses. A presumed bloodstream infection that did not meet criteria was the most common inappropriate indication and accounted for 48.6% (71/146) of doses in the study. Failure to choose a more narrow-spectrum agent represented another 25% of inappropriate doses. Snyder et al. (2013) found that approximately two-thirds of these doses represented administration of vancomycin instead of a beta (β)-lactam antimicrobial despite available antimicrobial susceptibility data and absence of a β-lactam allergy. In addition, they noted that the most common inappropriately prescribed antimicrobials were vancomycin and third- or fourth-generation cephalosporins. A limitation of this study is that the investigators only evaluated parenteral antimicrobial use and, therefore, the overall burden of both oral and parenteral antimicrobial exposure in the outpatient HD population remains yet to be defined.

In a follow-up study, Snyder et al. (2016) presented additional data describing the characteristics of HD patients at higher risk of receiving antimicrobials. They found that patients with tunnelled catheter access, a history of colonization or infection with a MDRO in the year preceding enrollment, and receiving HD sessions during daytime shifts were more likely to receive antimicrobials. In summary, based on evidence from the existing literature, it is apparent that antimicrobial use is common among the outpatient HD population and may represent an important antimicrobial stewardship opportunity.

WHICH ANTIMICROBIAL STEWARDSHIP STRATEGIES MAY BE EFFECTIVE IN THE HEMODIALYSIS SETTING?

Effective ASP strategies outlined by D'Agata (2013) include: (a) education, (b) guidelines and clinical pathways, (c) antimicrobial order sets, (d) de-escalation therapy, and (e) prospective audit and feedback. In the dialysis setting, clinician education on the treatment of common infections and antimicrobial resistance rates in this population should be considered an essential component of an ASP (D'Agata, 2013). Despite compelling reasons to use antimicrobials judiciously in the HD population, it can be challenging due to the lack of antimicrobial prescribing guidelines specific to these patients. Hemodialysis patients comprise a small population in clinical trials, and guidelines by expert groups such as the IDSA do not provide recommendations for this specific population, limiting evidence-based prescribing. Therefore, implementation of clinical practice guidelines and algorithms for the most common infections and most commonly prescribed antimicrobials in HD patients is an

effective strategy that can help standardize prescribing practices (D'Agata, 2013). In addition, antimicrobial order sets that outline when and what agents should be utilized for specific infections may help minimize excessive and suboptimal antimicrobial use (Cunha & D'Agata, 2016). Another key strategy described by D'Agata (2013) is de-escalation of therapy by changing to a more narrow-spectrum antimicrobial when culture and susceptibility data are available to reduce inappropriate antimicrobial use and associated costs. This strategy is especially relevant to dialysis units, as one of the main areas of inappropriate prescribing is the treatment of methicillin-susceptible *Staphylococcus aureus* (MSSA) infections with vancomycin instead of cefazolin in the absence of contraindications to β-lactam antimicrobials (Green, Schulman, Haas, Schaffner, & D'Agata, 2000). Awareness of antimicrobial prescribing practices and improvements by tracking, reporting, and providing feedback to prescribers is another important core element of ASP. This strategy involves reviewing clinicians' prescribing of antimicrobials, identifying areas for improvement, and then providing an intervention, such as education, with either verbal or written feedback to the prescriber.

CONCLUSION

Hemodialysis patients are at high risk for infections (including those caused by multi-drug resistant organisms), because of frequent healthcare access and increased use of antimicrobials. Thus, optimizing antimicrobial prescribing would have a substantial impact on their care. Antimicrobial stewardship programs (ASPs) aim to improve, advocate, and measure appropriate use of antimicrobials through coordinated interventions. While additional studies are needed in this area, successful implementation of an ASP will require full engagement of the dialysis care team. Developing an effective ASP requires a complete understanding of specific areas of antimicrobial prescribing practices that need improvement and careful attention to which strategies will be most effective for a particular dialysis unit.

REFERENCES

Barlam, T.F., Cosgrove, S.E., Abbo, L M., MacDougall, C., Schuetz, A.N., Septimus, E.J., … Trivedi, K.K. (2016). Implementing an antibiotic stewardship program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clinical Infectious Diseases*, ciw118.

Centers for Disease Control and Prevention (CDC) & Institute for Healthcare Improvement (IHI). (2012). *Antimicrobial stewardship driver and change package.* Retrieved from http://www.cdc.gov/ getsmart/healthcare/pdfs/Antibiotic_Stewardship_Change_Package.pdf

Chiu, Y.W., Teitelbaum, I., Misra, M., De Leon, E.M., Adzize, T., & Mehrotra, R. (2009). Pill burden, adherence, hyperphosphatemia, and quality of life in maintenance dialysis patients. *Clinical Journal of the American Society of Nephrology*, *4*(6), 1089–1096.

Cunha, C.B., & D'Agata, E.M. (2016). Implementing an antimicrobial stewardship program in out-patient dialysis units. *Current Opinion in Nephrology and Hypertension, 25*(6), 551–555.

D'Agata, E.M., Mount, D.B., Thayer, V., & Schaffner, W. (2000). Hospital-acquired infections among chronic hemodialysis patients. *American Journal of Kidney Diseases, 35*(6), 1083–1088.

D'Agata, E.M. (2013). Antimicrobial use and stewardship programs among dialysis centers. *Seminars in Dialysis, 26*(4), 457–64.

Dellit, T.H., Owens, R.C., McGowan, J.E., Gerding, D.N., Weinstein, R.A., Burke, J.P., … Hooton, T.M. (2007). Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clinical Infectious Diseases, 44*(2), 159–177.

Green, K., Schulman, G., Haas, D.W., Schaffner, W., & D'Agata, E.M. (2000). Vancomycin prescribing practices in hospitalized chronic hemodialysis patients. *American Journal of Kidney Diseases: The Official Journal of the National Kidney Foundation, 35*(1), 64–8.

Hyun, D.Y., Hersh, A.L., Namtu, K., Palazzi D.L., Maples H.D., Newland J.G., & Saiman L. (2013). Antimicrobial stewardship in pediatrics: How every pediatrician can be a steward. *Journal of the American Medical Association Pediatrics*, *167*(9), 859–866.

Lafrance, J., Rahme, E., Iqbal, S., Elftouh, N., Laurin, L., & Vallée, M. (2014). Trends in infection-related hospital admissions and impact of length of time on dialysis among patients on long-term dialysis: A retrospective cohort study. *Canadian Medical Association Journal Open, 2*(2), E109–E114.

Lata, C., Girard, L., Parkins, M., & James, M.T. (2016). Catheter-related bloodstream infection in end-stage kidney disease: A Canadian narrative review. *Canadian Journal of Kidney Health and Disease, 3*(1), 24.

Pop-Vicas, A., Strom, J., Stanley, K., & D'Agata, E.M. (2008). Multidrug-resistant gram-negative bacteria among patients who require chronic hemodialysis. *Clinical Journal of the American Society of Nephrology, 3*(3), 752–758.

Smyth, B., Jones, C., & Saunders, J. (2016). Prescribing for patients on dialysis. *Australian Prescriber*, *39*(1), 21.

Snyder, G.M., & D'Agata, E.M. (2012). Novel antimicrobial-resistant bacteria among patients requiring chronic hemodialysis. *Current Opinion in Nephrology & Hypertension, 21*(2), 211–215.

Snyder, G.M., Patel, P.R., Kallen, A.J., Strom, J.A., Tucker, J.K., & D'Agata, E.M. (2013). Antimicrobial use in outpatient hemodialysis units. *Infection Control and Hospital Epidemiology, 34*(4), 349–57.

Snyder, G.M., Patel, P.R., Kallen, A.J., Strom, J.A., Tucker, J.K., & D'Agata, E.M. (2016). Factors associated with the receipt of antimicrobials among chronic hemodialysis patients. *American Journal of Infection Control, 44*(11), 1269–1274.

Society for Healthcare Epidemiology of America, Infectious Diseases Society of America, & Pediatric Infectious Diseases Society. (2012). Policy statement on antimicrobial stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS). *Infection Control and Hospital Epidemiology, 33*(4), 322–327.

U.S. Renal Data System. (2010). *USRDS 2010 annual data report: Atlas of chronic kidney disease and end-stage renal disease in the United States*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Disease. Retrieved from https://www.usrds.org/atlas10.aspx

Velenosi, T.J., & Urquhart, B.L. (2014). Pharmacokinetic considerations in chronic kidney disease and patients requiring dialysis. *Expert Opinion on Drug Metabolism & Toxicology*, *10*(8), 1131–1143.

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

Antimicrobial stewardship: Is there a role in hemodialysis?

By Sylvia Sivarajahkumar, BScPhm, Miranda So, PharmD, and Marisa Battistella, PharmD, ACPR

1. All of the following are core principles of antimicrobial stewardship EXCEPT:
   a) De-escalating and tailoring therapy based on microbiology results
   b) Ensuring patients receive timely and appropriate regimens
   c) Monitoring antimicrobial consumption transparently and continuously
   d) Reprimanding prescribers for inappropriate prescribing of antimicrobials
2. Which of the following is NOT a benefit of antimicrobial stewardship programs?
   a) Improved antimicrobial susceptibility rates
   b) Reduced patient monitoring
   c) Improved antimicrobial prescribing practices
   d) Reduced adverse events
3. What is the primary goal of antimicrobial stewardship?
   a) Treating patients with optimal antimicrobial regimens
   b) Providing redundant antimicrobial coverage
   c) Treating non-infectious diseases
   d) Reducing costs
4. All of the following are adverse events as a result of antimicrobial exposure EXCEPT:
   a) Selection of pathogenic organisms
   b) Increased treatment failure
   c) Emergence of antimicrobial-resistant organisms
   d) Drug-drug interactions
5. Which of the following is NOT an effective strategy for antimicrobial stewardship programs?
   a) Antimicrobial order sets
   b) Guidelines and clinical pathways
   c) Unrestricting antimicrobials on hospital formulary
   d) Education
6. Patients on chronic hemodialysis are prone to infection due to:
   a) Repeated hospital exposure
   b) Decreased immune function
   c) Repetitive vascular access
   d) All of the above
7. Which of the following is a reason to consider antimicrobial stewardship in the hemodialysis population?
   a) Elevated risk for infectious complications
   b) High prevalence of multi-drug resistant organisms
   c) Lack of antimicrobial prescribing guidelines for hemodialysis patients
   d) All of the above
8. According to the results from the study by Snyder et al. (2013), which antimicrobial is most commonly prescribed in hemodialysis patients?
   a) Vancomycin
   b) Cefazolin
   c) Third- or fourth-generation cephalosporins
   d) Aminoglycosides
9. Which of the following are predominant reasons that antimicrobials are prescribed inappropriately in the outpatient hemodialysis population?
   a) Failure to de-escalate to a more narrow-spectrum antimicrobial
   b) Criteria for infection are not met
   c) Indications and duration for surgical prophylaxis do not follow recommended guidelines
   d) All of the above
10. According to the literature, approximately ___ of antimicrobial use in outpatient hemodialysis units is inappropriate:
    a) 50%
    b) 40%
    c) 30%
    d) 20%

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

Antimicrobial stewardship: Is there a role in hemodialysis?

Volume 27, Number 2

By Sylvia Sivarajahkumar, BScPhm, Miranda So, PharmD, and Marisa Battistella, PharmD, ACPR

Post-test instructions:

- Select the best answer and circle the appropriate letter on the answer grid below.
- Complete the evaluation.
- Send only this answer form (or a photocopy) to:
  CANNT National Office,
  P.O. Box 10, 59 Millmanor Place,
  Delaware, ON N0L 1E0
  or submit online to www.cannt.ca
- Enclose a cheque or money order payable to CANNT.
- Post-tests must be postmarked by June 30, 2018.
- If you receive a passing score of 80% or better, a certificate for 2.0 contact hours will be awarded by CANNT.
- Please allow six to eight weeks for processing. You may submit multiple answer forms in one mailing, however, you may not receive all certificates at one time.

CANNT member – $12 + HST ($13.56); Non-member – $15 + HST ($16.95)

POST-TEST ANSWER GRID

Please circle your answer choice:

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	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: _____

_____

_____

_____

COMPLETE THE FOLLOWING:

Name: _____

Address: _____

_____

CANNT member? ❑ Yes ❑ No Expiration date of card _____

CANNT Membership

First Name _____

Last Name _____

Home Address _____

City _____

Province _____ Postal Code _____

Telephone (H) (_____) _____ - _____

(W) (_____) _____ - _____

Email _____

Employer _____

Employer Address _____

City _____

Province _____ Postal Code _____

Do you consent to the use of your name and address on mailing lists that CANNT has considered pertinent and appropriate?
❑ Yes ❑ No

Do you consent to the use of your email for all correspondence with CANNT?
❑ Yes ❑ No

❑ New Member or ❑ Renewal

CANNT # (if renewal): _____

Membership Fee (HST #100759869)
Membership fee is tax deductible.
❑ One Year: $75.00 + HST/GST
❑ Two Years: $140.00 + HST/GST
❑ Student Rate: $37.50 + HST/GST*
**Proof of full-time enrolment must accompany application*
AB/BC/SK/MB/NT/NU/QC/YT: 5% GST; ON/NL/NB: 13% HST; PEI: 14% HST; NS: 15% HST

I enclose $ _____
made payable to Canadian Association of Nephrology Nurses and Technologists.

Method of payment:
❑ Cheque ❑ Money order ❑ Visa ❑ Mastercard

Cardholder Name: _____

Credit Card Number: _____

Expiry Date: _____ 3-digit CVV code: _____

Signature: _____

Return to **CANNT**
Mailing Address:

CANNT,
P.O. Box 10, 59 Millmanor Place, Delaware, ON N0L 1E0
Telephone (519) 652-6767 Fax (519) 652-5015

❑ I have attained CNeph(C)/cdt designation

❑ I am a member of CNA

Ontario applicants only
Do you belong to RNAO?
❑ 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
❑ Self-Care Hemo
❑ Home/Independent Hemo
❑ In-Patient Nephrology
❑ In-Patient Peritoneal Dialysis
❑ In-Patient Transplantation
❑ Home/Independent PD
❑ Out-Patient Transplantation
❑ Clinical Educator
❑ Academic Educator
❑ Corporate Education
❑ Vascular/Body Access
❑ Nurse Navigator
❑ Research
❑ Administration
❑ Corporate Sales

THANK YOU TO OUR 2016–2017 SPONSORS

PLATINUM

AMGEN® Baxter Otsuka

bellco IS NOW PART OF Medtronic

FRESENIUS MEDICAL CARE

SILVER

ALEXION Pfizer Injectables

BRONZE

Chief Medical Quality. It's in our blood.

NxSTAGE®

Connect with CANNT!

Toll-free 1-877-720-2819
or local 519-652-6767

519-652-5015

Canadian-Association-Of-Nephrology-Nurses-And-Technologists

cannt@cannt.ca

CANNT National Office,
PO Box 10, 59 Millmanor Place,
Delaware, ON N0L 1E0

@CANNT1

SHARON LAPOINTE
Membership Coordinator
sharon@cannt.ca

SUSAN MASON
Website and Social Media
susan@cannt.ca

HEATHER REID
National Administrator
heather@cannt.ca