CANNT JOURNAL
JOURNAL ACITN

Official publication of the Canadian Association of Nephrology Nurses and Technologists

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IN THIS ISSUE

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

WE MISSED YOU !

GUIDING OUR WAY TO THE FUTURE

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CANNT | ACITN 2022

OCTOBER 27–29

HAMILTON CONVENTION CENTRE

Hamilton, Ontario

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

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Letter from the Editors

Welcome to the 2022 *CANNT Journal* summer issue! We hope you feel renewed now that we are approaching the next normal. Although restrictions have been lifted, we remain ever so cautious against the different COVID strains and other emerging viruses. The thread that has kept us all grounded has been our commitment to providing safe and quality kidney care to our patients. Much research is being done about the quantifiable impacts of the pandemic on patient and systems-related outcomes. This will be fertile ground for research for many years to come. Just as important is the impact of the pandemic on the health care provider and ancillary staff – nurses, nephrologists, allied health staff, management team, renal technologists, renal assistants, clerical staff, and volunteers. We look forward to publishing research that describes the experience of the provider, particularly during these unprecedented times, in the hope that the findings will help to ensure the delivery of optimal care of our vulnerable patients.

There is a critical shortage of nurses nationwide, and nephrology is not exempt, particularly as this is compounded by the pandemic. We are fatigued – patients and care providers alike. In this issue, *CANNT Journal* has partnered yet again with ANNA to bring you a timely offering that may help mitigate the effects of workplace stress and burnout in nephrology care settings, in our lead article, *Prevention strategies to cope with nurse burnout in nephrology settings*, by Kurosaka and Payton (2020). This article highlights the primacy of mental health in our daily clinical practice.

In our continuing education series offering, we revisit contrast-induced injury. Individuals with eGFR <30 mL/min/1.73 m^2 who undergo cardiac catheterization may be at higher risk of developing contrast-induced acute kidney injury. Packiyanathan et al. (2022) provide recommendations to reduce this risk in this issue's CE article, *Preventative care to reduce the risk of acute kidney injury in people with chronic kidney disease undergoing cardiac catheterization*.

At *CANNT Journal*, we are always on the hunt for new and emergent ideas, perspectives, and initiatives that would improve the plight of individuals with kidney failure. We have many exceptionally talented clinicians and non-clinicians working in nephrology nursing and technological practice who are making a difference. We encourage you to share these innovative practices with the CANNT community through *CANNT Journal*. It is through sharing that we can learn together.

We are gearing up for our upcoming national conference in Hamilton, Ontario on October 27-29, 2022. We hope to see many of you there to support Canadian nephrology nursing and technological education, research, and innovation. The CANNT organization is only as good as those who support its mission and vision. As we go through the next normal, the need to have a platform from which to speak as a unified voice on issues that matter, has never been greater. CANNT and, by extension, *CANNT Journal*, can be that platform for you. We're here for you.

Have a wonderful summer.

Warm regards,

Jovina Bachynski, MN-NP(Adult), RN(EC), CNeph(C), PhD Student

Rosa M. Marticorena, CNS, CNeph(C), DClinEpi, PhD

Message des rédactrices en chef

Bienvenue au numéro de l'été 2022 du *Journal ACITN*! Nous espérons que vous vous sentez régénérés maintenant que nous nous dirigeons vers la nouvelle normalité. Bien que les restrictions aient été levées, nous demeurons toujours aussi prudents face aux différentes souches de la COVID-19 et aux autres virus émergents. Le fil conducteur qui nous a permis de garder les pieds sur terre a été notre engagement à fournir des soins néphrologiques sûrs et de qualité à nos patients. De nombreuses recherches sont menées sur les répercussions mesurables de la pandémie sur les résultats liés aux patients et aux systèmes. Il s'agit d'un terrain propice à la recherche pour de nombreuses années à venir. Les répercussions de la pandémie sur les fournisseurs de soins de santé et le personnel auxiliaire œuvrant en néphrologie, soit les infirmières et infirmiers, les néphrologues, le personnel paramédical, l'équipe de gestion, les technologues, les assistantes et assistants, le personnel de bureau et les bénévoles, sont tout aussi importantes. Nous comptons publier des recherches qui décrivent l'expérience du fournisseur, en particulier pendant cette période sans précédent, dans l'espoir que les résultats aideront à assurer la prestation de soins optimaux à nos patients vulnérables.

Il y a une grave pénurie d'infirmières dans tout le pays, et la néphrologie n'y échappe pas, d'autant plus que cette situation s'est aggravée pendant la pandémie. Nous sommes fatigués, les patients tout comme les fournisseurs de soins de santé. Dans ce numéro, le *Journal ACITN* s'est de nouveau associé à l'ANNA (American Nephrology Nurses Association) pour vous présenter une solution opportune qui pourrait contribuer à atténuer les effets du stress et de l'épuisement professionnel dans les milieux de soins néphrologiques dans notre article principal, *Prevention strategies to cope with nurse burnout in nephrology settings*, par Kurosaka & Payton (2020). Cet article souligne la prépondérance de la santé mentale dans notre pratique clinique quotidienne.

Dans notre série d'éducation continue, nous revisitons les lésions secondaires à l'injection de produits de contraste. Les personnes affichant un DFGe < 30 mL/min/1,73 m^2 et qui subissent un cathétérisme cardiaque peuvent présenter un risque plus élevé de développer une lésion rénale aiguë induite par un produit de contraste. Packiyanathan et coll. (2022) donnent des recommandations pour réduire ce risque dans l'article d'éducation continue de ce numéro intitulé *Preventative care to reduce the risk of acute kidney injury in people with chronic kidney disease undergoing cardiac catheterization*.

Au *Journal ACITN*, nous sommes toujours à la recherche d'idées, de perspectives et d'initiatives nouvelles et émergentes susceptibles d'améliorer le sort des personnes souffrant d'insuffisance rénale. Nous comptons parmi nous de nombreux cliniciens et non-cliniciens exceptionnellement talentueux qui œuvrent dans le domaine des soins infirmiers et des technologies en néphrologie et qui font la différence. Nous vous encourageons à partager ces pratiques novatrices avec la communauté de l'ACITN par l'entremise du *Journal ACITN*. C'est par le partage que nous pouvons apprendre ensemble.

Nous nous préparons à notre prochain Congrès national qui se tiendra à Hamilton, en Ontario, du 27 au 29 octobre 2022. Nous espérons vous y voir nombreux afin de soutenir la formation, la recherche et l'innovation en matière de soins infirmiers et de technologies en néphrologie au Canada. La valeur de l'ACITN est déterminée par la qualité de ceux qui appuient sa mission et sa vision. Maintenant que nous transitons vers la nouvelle normalité, la nécessité de disposer d'une plateforme permettant de parler d'une seule voix sur les questions importantes n'a jamais été aussi grande. L'ACITN et, de surcroît, le *Journal ACITN* peuvent être cette plateforme pour vous. Nous sommes là pour vous.

Passez un très bel été.

Avec nos salutations les plus cordiales,

Jovina Bachynski
Sc. Inf., IP (soins aux adultes), inf. aut. (cat. sup.), CNéph(C), aspirante au doctorat

Rosa M. Marticorena
ICS, CNéph(C), D.E.S. Épidémiologie clinique, Ph. D.

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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, au 4, rue Cataraqui, bureau 310, Kingston (Ontario) K7K 1Z7.

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President's Report

We made it through another long pandemic winter, and we are eager to start enjoying this beautiful weather. We are witnessing many federal and provincial restrictions being lifted and we feel optimistic, as we look to the future. It seems like a fresh start, not only with the weather, but our lives as well. It is very understandable that many of us will remain a little anxious as we cautiously open our doors to friends and a return to "normal" living. Please take this time to care for yourself and return to whatever activities you find enjoyable like hiking, golfing, or fishing or take up something new. Remember these activities are necessary for our physical and mental health so get out and enjoy some time outside. It is important that we acknowledge the stress we have all been under and really work towards spending more time with family and friends over the summer.

It is with absolute delight that I welcome you to join us in Hamilton for the annual CANNT conference on October 27-29, 2022. As everyone is aware, the pandemic mandated a virtual version for the past two years. Although they were very successful with the large number of online attendees, we are very excited to be face-to-face again. We look forward to seeing our old colleagues and meeting new friends, as we participate in "Guiding our Way to the Future." This conference will provide many workshops and sessions to enhance your learning and opportunities to network with industry partners. We know that this conference will prove to be invaluable, as we come together to share our knowledge and experiences. I encourage everyone to make every effort to attend.

I would encourage those who have submitted to consider writing a manuscript for our journal. We can provide many supports for the novice author and can help guide you through the development and publication process. For more information, please contact our journal team at **CANNT.journal1@gmail.com**

For those nurses who were successful in attaining their CNA certification in nephrology, let CANNT be the first to congratulate you. This is an important professional accomplishment that required your time and energy to prepare, so congratulations once again. I also want to encourage any member thinking of writing that CANNT has resources on our website available to you. We wish you the best of luck and encourage you to attend the exam writing session at the CANNT conference.

CANNT wants to send their continued support to the people of Ukraine and the refugees who have come to Canada. We want to send out a big thank-you to all of our members who have graciously dedicated their energy to supporting refugees in their units and towns. Your caring for these vulnerable people does not go unnoticed.

On behalf of the CANNT Board of Directors, I would like to wish everyone a safe and most enjoyable summer. Please take some time to reflect and renew acquaintances with friends and family.

Sincerely,

Cathy Cake, M.Ed., BN, RN, CNeph(C)
CANNT President 2021–2023

Rapport de la présidente

Nous avons passé un autre long hiver de pandémie et nous avons hâte de commencer à profiter de ce beau temps. Nous assistons actuellement à la levée de nombreuses restrictions fédérales et provinciales et nous envisageons l'avenir avec optimisme. C'est un nouveau départ non seulement pour ce qui est de la température, mais aussi de nos vies. Il est tout à fait compréhensible que beaucoup d'entre nous ressentent encore un peu d'anxiété, alors que nous ouvrons prudemment nos portes aux amis et au retour à une vie « normale ». Prenez le temps de prendre soin de vous et de reprendre vos activités préférées, comme la randonnée, le golf et la pêche, ou d'en adopter de nouvelles. N'oubliez pas que ces activités sont nécessaires à la santé physique et mentale, alors sortez et profitez du grand air. Il est important que nous reconnaissions le stress que nous avons tous subi et que nous nous efforcions de passer plus de temps avec notre famille et nos amis pendant l'été.

C'est avec grand plaisir que je vous invite à vous joindre à nous à Hamilton pour le Congrès annuel de l'ACITN, du 27 au 29 octobre 2022. Comme chacun le sait, la pandémie nous a imposé une version virtuelle au cours des deux dernières années. Bien que les congrès virtuels aient connu un franc succès avec un grand nombre de participants en ligne, nous sommes très heureux de nous retrouver en personne. Nous nous réjouissons de revoir nos anciens collègues et de rencontrer de nouveaux amis en participant au congrès sous le thème « Orienter notre chemin vers l'avenir ». Ce congrès proposera bon nombre d'ateliers et de séances pour enrichir votre apprentissage et des occasions de réseauter avec des partenaires de l'industrie. Nous savons que ce congrès s'avérera inestimable, alors que nous nous réunissons pour partager nos connaissances et nos expériences. J'incite tout le monde à faire tout son possible pour y assister.

J'invite les personnes qui ont soumis une présentation à envisager de rédiger un article pour notre journal. Nous pouvons fournir de nombreux outils à l'auteur débutant et vous guider tout au long du processus de création et de publication. Pour obtenir de plus amples renseignements, veuillez communiquer avec notre équipe du journal à l'adresse : **CANNT.journal1@gmail.com**.

Aux infirmières qui ont obtenu avec succès leur certification de l'AIIC en néphrologie, laissez l'ACITN être la première à vous féliciter. Il s'agit d'un accomplissement professionnel important qui a exigé de vous temps et énergie, alors, de nouveau, toutes nos félicitations. Je souhaite également rappeler à tous les membres qui envisagent d'obtenir la désignation CNéph(C) que l'ACITN met à leur disposition des ressources sur son site Web. Nous vous souhaitons pleine réussite et vous invitons à vous présenter à l'examen de certification en néphrologie durant la séance réservée à cet effet dans le cadre congrès de l'ACITN.

L'ACITN veut continuer à soutenir le peuple ukrainien et les réfugiés qui sont venus au Canada. Nous voulons adresser un grand merci à tous nos membres qui ont généreusement consacré leur énergie au soutien des réfugiés dans leur unité et leur ville. L'attention que vous portez à ces personnes vulnérables ne passe pas inaperçue.

Au nom du conseil d'administration de l'ACITN, je souhaite à tous un été sécuritaire et des plus agréables. Prenez le temps de réfléchir et de renouer avec vos amis et votre famille.

Sincèrement,

Cathy Cake, M. Éd., BN, infirmière, CNeph(C)
Présidente de l'ACITN 2021–2023

NOTICE BOARD

- Canadian Nurses Association (CNA) Exam Timeline. **https://www.cna-aiic.ca/en/certification#st-hash.42OltDcz.dpuf**

	Spring 2022	Fall 2022
Initial exam or renewal by exam application window	February 28–March 31, 2022	June 1–September 1, 2022
Certification exam window	May 1–15, 2022	November 1–15, 2022
Renewal by continuous learning application window	**February 10–November 1, 2022**	

- **August 11–14, 2022.** International Society for Peritoneal Dialysis (ISPD) Congress Singapore 2022. Suntec Convention Centre, Singapore. **www.ISPD2022.com**
- **September 10–13, 2022.** 50th Annual European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) International Conference: *50 Years of Commitment in Kidney Care*. De Doelen – the International Conference Centre, Rotterdam, the Netherlands. **https://www.edtnaerca.org/conferences/conferences-rotterdam-2022**
- **September 20, 2022.** Nephrology Health Care Professionals' Day (celebrated every third Wednesday of September annually)
- **October 27–29, 2022.** CANNT National Conference – *Guiding Our Way to the Future*. Hamilton, ON. **https://cannt-acitn.ca/2022-cannt-conference/**
- **November 1–6, 2022.** American Society of Nephrology (ASN) 2022 Kidney Week. Orange County Convention Center, Orlando, Florida. **https://www.asn-online.org/education/kidneyweek/archives/future.aspx**

Nephrology Certification Registration Status Report 2021

Initial and Renewal by Exam to Renew in 2021	Renewal by Continuous Learning (CL) Hours	Total of Initials and Renewals	Due
80	52	132	186

Your Board in Action

It is a delight to write to you as your President-Elect/Treasurer for CANNT. I want to extend a sincere thank-you for your dedication. I continue to be amazed and inspired by the aptitude, talent, and commitment represented by the CANNT Board of Directors and nephrology colleagues throughout Canada. Thank you for everything you do for the advancement of nephrology nursing and technological practice, and CANNT, as we thrive to achieve new heights in making Canada a healthier and better place. CANNT continues to acknowledge and applauds your hard-work in providing exemplary nephrology care.

MEMBERSHIP

Being a part of CANNT allows you to contribute in the innovative, cutting edge development of best practice in nephrological care. CANNT has successfully maintained our membership to 280 as of June 14, 2022. As a CANNT Board of Directors, our goal is to ensure our members are kept up to date with developments in healthcare. There are many advantages and members enjoy many different benefits, including:

- Online access to the quarterly peer reviewed *CANNT Journal* for all members
- Online access to the *Vascular Access Guidelines*, *Standards of Nursing Practice*, and *Standards of Technical Practice*
- Discount of the annual conference registration fee
- Educational opportunities at a reduced cost or free to members
- Connections to the latest information and resources related to nephrology nursing and technological practice
- Networking opportunities with colleagues practicing in your nephrology specialty on a national level
- Opportunities for collaborative networking and problem solving through participation in a refined clinical practice group
- CANNT awards, bursaries, and research grants offered to individuals in recognition of their excellence in the workplace and/or to further their studies in nephrology
- CANNT represents its membership as affiliates of various organizations and acts as your link to those organizations to help keep you connected and informed
- Access to exclusive job postings

Please help us to share the membership benefits with colleagues and contact us with suggestions to improve membership @ https://cannt-acitn.ca/

JOURNAL

Guidelines for journal article submission can be found under the "CANNT Journal" section of the CANNT website. Please send your manuscripts that present new clinical information or address issues of special interest to nephrology nurses and technologists. E-mail your manuscript to one of our co-editors, Jovina Bachynski or Rosa M. Marticorena at CANNT.journal1@gmail.com.

The CANNT Journal is published four times a year, and will be distributed in an electronic version. Scientific articles are peer reviewed, and manuscripts that present new clinical information or address clinical practice issues of special interest to nephrology nurses and technologists, are accepted. There is also the opportunity for industry partners for sponsored education and advertising.

COMMUNICATIONS

CANNT continues to develop new strategies to promote engagement and communication of timely and relevant information with our members. We continue to support our members with access to timely information. Thank you to all for supporting World Kidney Day and National Volunteer Week. We will continue to provide the necessary resources to support members on our website. The *CANNT Connection*, which is our bimonthly email, is another successful means of communication that provides personalized information on a continual basis. If you have an idea, question, or an event to promote please contact Jessica Andrews, our Director of Communications.

ANNUAL CONFERENCE

CANNT National Conference 2022 themed **"Guiding Our Way to the Future"** is scheduled to be held in-person at the Hamilton Convention Centre on October 27-29, 2022. CANNT is excited to announce that Mark Matthews will be hosting the CANNT 2022 conference. CANNT has secured conference room blocks at the Sheraton Hamilton Hotel located in downtown Hamilton. The hotel also offers access to the city's premier attractions. Please see https://cannt-acitn.ca/2022-cannt-conference/ for more details. We hope to see you there!

FINANCES

As a "Not for Profit" professional association, our goal is to continue with the development of a robust financial plan that will create stability in these unprecedented time. Our management team continues to work tirelessly to develop new lucrative opportunities with our industry partners and to successfully secure funding to maintain the viability of CANNT. In the vein of maintaining transparency, our association is providing our membership with the 2021 Annual Report on the CANNT website at https://cannt-acitn.ca/ We thank you for your commitment to our association.

Sincerely,

Alicia Moonesar, DNP, MScN, NP-PHC
CANNT President-Elect/ Treasurer
2021–2023

Votre conseil à l'œuvre

Je suis ravie de vous écrire à titre de présidente désignée et trésorière de l'ACITN. Je souhaite vous remercier du fond du cœur pour votre dévouement. Les aptitudes, le talent et le dévouement des membres du conseil d'administration de l'ACITN et de nos collègues en néphrologie de partout au Canada continuent de m'émerveiller et de m'inspirer. Merci de tout ce que vous faites pour l'avancement de la pratique infirmière et technologique en néphrologie et merci à l'ACITN qui s'efforce d'atteindre de nouveaux sommets pour faire du Canada un endroit plus sain et meilleur. L'ACITN continue de reconnaître et de saluer votre travail acharné afin de fournir des soins de santé exemplaires en néphrologie.

ADHÉSION

En tant que membre de l'ACITN, vous avez la chance de contribuer au développement avant-gardiste et novateur des meilleures pratiques en soins néphrologiques. En date du 14 juin 2022, l'ACITN a réussi à garder ses 280 membres. En tant que directeurs du conseil d'administration de l'ACITN, nous visons à faire en sorte que nos membres sont tenus à jour des derniers progrès en santé. Les membres profitent de nombreux avantages, y compris :

- Accès en ligne au *Journal ACITN*, la revue trimestrielle évaluée par les pairs;
- Accès en ligne aux publications *Vascular Access Guidelines, Standards of Nursing Practice* et *Standards of Technical Practice*;
- Réduction des frais d'inscription au Congrès annuel;
- Possibilités de séances de formation gratuites ou à prix réduit;
- Liens vers l'information et les ressources les plus récentes en matière de soins infirmiers et de technologies en néphrologie;
- Occasions de réseauter à l'échelle nationale avec des collègues évoluant dans votre spécialité néphrologique;
- Possibilité de collaborer et de contribuer à la résolution de problèmes grâce à la participation à un groupe de pratique clinique attitré;
- Prix, bourses et subventions de recherche de l'ACITN attribués pour souligner l'excellence du travail de certaines personnes ou pour leur permettre de poursuivre leurs études en néphrologie;
- L'ACITN représente ses membres dans les diverses organisations auxquelles elle est affiliée et avec lesquelles elle agit comme intermédiaire pour vous tenir au courant et vous informer;
- Accès en exclusivité aux avis de postes à pourvoir.

Veuillez partager les avantages de l'adhésion avec vos collègues et communiquez avec nous si vous avez des suggestions sur la façon d'améliorer l'adhésion à l'adresse : https://cannt-acitn.ca/

JOURNAL

Vous trouverez la marche à suivre pour soumettre un article à publier dans notre revue sous l'onglet « Publications », section *CANNT Journal*, du site Web de l'ACITN. Veuillez envoyer vos articles qui portent sur de nouvelles données cliniques ou qui traitent de sujets présentant un intérêt particulier pour les infirmières et infirmiers et les technologues en néphrologie. Envoyez votre article par courriel à l'une des corédactrices en chef, Jovina Bachynski ou Rosa M. Marticorena, à l'adresse suivante : CANNT.journal1@gmail.com

Le *Journal ACITN* est publié quatre fois par an et sera distribué dans un format électronique. Les articles scientifiques sont examinés par des pairs, et les articles qui portent sur de nouvelles données cliniques ou qui traitent de sujets présentant un intérêt particulier pour les infirmières et infirmiers et les technologues en néphrologie sont acceptés. Nos partenaires de l'industrie ont également la possibilité de commanditer des activités de formation ou de la publicité.

COMMUNICATIONS

L'ACITN continue d'élaborer de nouvelles stratégies afin de promouvoir l'engagement de ses membres et de leur communiquer des renseignements pertinents en temps opportun. Nous continuons de soutenir nos membres en offrant un accès à de l'information actuelle. Merci à tous pour votre soutien à la Journée mondiale du rein et à la Semaine de l'action bénévole. Nous continuerons de fournir aux membres les ressources nécessaires à leur soutien sur notre site Web. Le CANNT Connection, notre bulletin d'information par courriel bimensuel, est un autre moyen de communication efficace qui fournit des renseignements personnalisés de façon continue. Si vous avez une idée, une question ou un événement à promouvoir, veuillez communiquer avec Jessica Andrews, notre directrice des communications.

CONGRÈS ANNUEL

Le Congrès national 2022 de l'ACITN sous le thème « Orienter notre chemin vers l'avenir » est prévu se dérouler en présentiel au Centre des congrès de Hamilton, du 27 au 29 octobre 2022. L'ACITN est heureuse d'annoncer que Mark Matthews animera le Congrès 2022 de l'ACITN. L'ACITN a réservé des blocs de salles de conférence à l'hôtel Sheraton Hamilton, situé au centre-ville de Hamilton. L'hôtel permet aussi d'accéder aux principales attractions de la ville. Consultez le site https://cannt-acitn.ca/2022-cannt-conference/ pour obtenir tous les détails. Nous espérons vous y voir!

FINANCES

À titre d'association professionnelle « sans but lucratif », notre objectif est de poursuivre l'élaboration d'un plan financier solide qui créera de la stabilité en ces temps sans précédent. Les membres de notre équipe de gestion continuent de travailler sans relâche pour imaginer de nouvelles activités lucratives en collaboration avec nos partenaires de l'industrie et pour réussir à obtenir des fonds pour assurer la viabilité de l'ACITN. Par souci de transparence, notre association fournit à ses membres le Rapport annuel 2021 sur le site Web de l'ACITN à l'adresse : https://cannt-acitn.ca/. Nous vous remercions de votre engagement envers notre association.

Cordialement,

Alicia Moonesar, DPI., M. Sc. Inf., IPSPL
Présidente désignée et trésorière de l'ACITN 2021–2023

Prevention strategies to cope with nurse burnout in nephrology settings

By Angie Kurosaka and Jennifer Payton

ABSTRACT

Nurses in nephrology are susceptible to nurse burnout. This article discusses the causes, signs, and symptoms associated with burnout. Prevention strategies, as well as patient and nurse safety, are reviewed.

Keywords: nurse burnout, suicide, pandemic, prevention strategies, depression, COVID-19, nephrology nurse burnout

Burnout is common in all areas of nursing practice, including that of nephrology. A survey by CareerBuilder (2017) found that 70% of nurses responding felt burned out, and 54% rated their stress level as high. Healthy Nurse Healthy Nation (2018) noted that nurses are almost twice as likely to experience depression than people in other professions. Further, suicide may be a severe consequence of clinician burnout (Davidson et al., 2018; National Academy of Medicine, 2019). Davidson and colleagues (2020), in a long-term study on nurse suicide in the United States, found that nurses are at a higher risk for suicide than the general population. In addition, while dealing with a pandemic from COVID-19, nurses are also dealing with a public health epidemic of nurse burnout, depression, and suicide.

Flynn and colleagues (2009), in a study that investigated the effects of workload, practice environment, and care processes on burnout among nurses working in chronic hemodialysis centres in the United States, found that one in three nurses in the sample was suffering from burnout. In another study of 233 staff nurses working in outpatient hemodialysis centers, 28% of the nurses reported a moderate level of burnout, while 33% of respondents reported a high level of burnout (O'Brien, 2011).

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WHAT IS BURNOUT?

The American Nurses Association's (ANA) *Healthy Nurse Healthy Nation* (2020) describes nurse burnout as a state of emotional, physical, and mental exhaustion that stems from work. The National Academy of Medicine (2019) characterizes burnout as "a syndrome characterized by high emotional exhaustion, high depersonalization (i.e., cynicism), and a low sense of personal accomplishment from work" (p. 1). The World Health Organization's (2020) *International Classification of Diseases – 11th edition* (ICD-11) characterizes burnout as feelings of energy depletion or exhaustion, increased mental distance from one's job, and reduced professional efficacy.

CAUSES OF BURNOUT IN NURSES

There are many potential contributors to burnout in nurses, including lack of control, unclear expectations, dysfunctional work dynamics, extremes of activity, lack of social support, and work-life imbalance (Mayo Clinic, 2020). Mismanagement of personnel and resources, lack of follow-through, extended shifts, and stretched personal requirements can also lead to feelings of burnout (Gutson et al., 2018). Longer shifts of 10 to 11 hours, compared to shifts of 8 to 9 hours, in hospital nurses, increase the likelihood of being burned out and dissatisfied with the job (Stimpfel et al., 2012). High workloads and non-supportive practice environments are significant predictors of nephrology nurse burnout in hemodialysis centers (Flynn et al., 2009).

SIGNS AND SYMPTOMS

Nurse burnout may affect each nurse differently. Burnout can begin with benign feelings of excessive tiredness or irritability. As nurses, it is easy to ignore these early indicators of one's natural milieu. When it continues for prolonged periods, other signs and symptoms begin to occur. The National Library of Medicine (2020) identifies three main area of symptoms associated with burnout: exhaustion, alienation from work activities, and reduced performance. The Mayo Clinic (2020) identified several questions for nurses to use to self-assess burnout (see Table 1). Answers to these questions can help determine the level of nurse burnout.

Table 1

Nurse Burnout Self-Assessment

Ask yourself:

- Have you become cynical or critical at work?
- Do you drag yourself to work and have trouble getting started?
- Have you become irritable or impatient with coworkers, patients, or clients?
- Do you lack the energy to be consistently productive?
- Do you find it hard to concentrate?
- Do you feel disillusioned about your job?
- Are you using food, drugs, or alcohol to feel better or to simply not feel?
- Have your sleep habits changed?
- Are you troubled by unexplained physical complaints?

Source: Mayo Clinic, 2020, p. 1.

Cynicism and depersonalization, symptoms of burnout, can begin a vicious cycle – we cannot see the good in the situation and cannot determine the cause for the concern or a resolution to change behaviour. In the news outlets, we see an increase in addictive behavior, such as drugs and alcohol. We use these as excuses to deal with a situation; however, it becomes an issue when used to escape reality. Families and patients suffer when we turn to negative addictive behaviours.

Managers and leaders are not exempt from burnout. Signs and symptoms of burnout in nurse leaders can include an increase in absences, missed deadlines, and arriving late to work. Other burnout symptoms include disorganization, difficulty focusing, and sudden fluctuations in weight (Wolters Kluwer, 2016). When the nephrology nurse manager faces burnout, there is nothing left for the manager to give to patients or employees.

In *Five Dysfunctions of a Team*, Lencioni (2002) described dysfunctions that prevent teams from success. We can adapt those same dysfunctions to nephrology nursing (see Table 2). Nurses have moral distress issues if faced with challenging work environments, such as a lack of culture, short staffing, working in a pandemic, or second victim syndrome. Though improvement has been reported (Hudson-Weires et al., 2020), we do not always take the time to grow and nurture new graduates or nurses new to nephrology. This can lead to high turnover, which creates a circular event with seemingly no way out.

Table 2

Lencioni's Five Dysfunctions Adapted for the Nephrology Nurse

Lencioni's 5 Dysfunctions	Nephrology Nurse Adaptations
Absence of Trust	Moral Distress
Fear of Conflict	Second Victim
Lack of Commitment	No Team Culture
Avoidance of Accountability	Failure to grow and nurture new graduates or nurses new to nephrology
Inattention to Results	High Turnover

Source: Lencioni, 2002 (with adaptations for nephrology nurses).

Without interventions for workplace stress, the consequences of burnout are mental/physical issues, depression, and even suicide. Mindlessness (the use of reflexive and habitual patterns) is another characteristic of burnout and depression exhibited by reflexive and predictable cognitive and emotional reactions. It can lead to stereotypes, blind us to new opportunities, and result in unwholesome health and personal consequences (Chen, 2017).

PATIENT SAFETY

In the outpatient dialysis unit, reducing nurse burnout is vital to retaining nurses and ensuring patients receive the quality of care essential to their needs (O'Brien, 2011). Burnout compromises job performance and patient safety (Gutsan et al., 2018). Staff well-being may play an essential role in patient safety. Poor well-being, as defined by depression, anxiety, poor quality of life, and stress. High levels of burnout have been associated with more health care self-reported errors (Hall et al., 2016), and higher levels of burnout have been correlated with lower ratings of quality of care (Poghosyan et al., 2010).

NURSE SAFETY

Nurses and employers must collaborate to reduce the risk of nurse fatigue associated with shift work and promote nurses' wellness (ANA, 2014). Medical errors caused by nurse fatigue pose a severe threat to the patient and the nurse. Medical mistakes could result in loss of employment, legal actions, or civil actions against the nurse. Compassion fatigue, first diagnosed in the early 1950s, also known as secondary traumatic stress, is a condition in which there is a gradual lessening of compassion over time (Sheppard, 2016). This condition is exacerbated when participating in long shift work, as experienced in kidney care facilities. It leads to mental and physical fatigue due to the requirement to stay alert and changes in patients' conditions during a shift, with all of the other demands placed on the nurse (Moreno et al., 2018).

Nurses as the second victim were first conceptualized in 1954 when two surgeons shared catastrophes and impacts that followed (Stone, 2020). In recent years, we understand more as it becomes more present in our profession, though it is not recognized in many organizations. Second victims are defined as "healthcare providers who are involved in an unanticipated adverse patient event, in a medical error and/or a patient-related injury and become victimized in the sense that the provider is traumatized by the event." (Scott et al., 2009. p. 326). Research shows that second victims' rates can be higher than 40%, and more than 60% experience anxiety, depression, burnout, and questioning their ability to be nurses (Stone, 2020). Nephrology nurses, in particular, are at risk for stress because their profession is not limited to nursing care activities, but those of a technical nature, as

well (Moreno et al., 2018). More research will be needed to better understand the pandemic's impact on nursing second victim rates, survivor syndrome, and healthcare.

During the COVID-19 pandemic, nurses are torn by their sworn oath to care for patients and being afraid of contracting the virus, or worse yet, passing it on to their family. Nurses are sleeping in their cars, garages, campers, and hotels to prevent the spread of COVID-19, creating social isolation. Nurses are facing many emotions during the pandemic. Some are angry due to personal protective equipment (PPE) shortages. Some are experiencing physical discomfort with extra PPE being worn the whole shift, and they are emotionally exhausted (Zhang et al., 2020).

Emerging diseases, such as COVID-19, contribute to a general fear that needs to be studied through research to understand the possible negative impact on mental health and potential for burnout. This research can lead to developments of programs to mitigate the burnout, in particular, those who are in the front line of counteracting the disease (Talaee et al., 2020). We know from research that burnout occurs from stress factors, and some postulate that is not the factors themselves but the way the nurse faces and manages the factors themselves (Pérez-Fuentes et al., 2019).

COPING AND PREVENTION STRATEGIES

A mindfulness mindset and skills are one way to keep from being swept away or immobilized by stress that can lead to burnout (Greenberg, 2016). It enables self-awareness, reflection, and intentional growth of leadership capacities. Mindfulness has positive effects on sleep, anxiety, depression, and overall resilience (Pipe et al., 2016). You learn how to become peaceful with your thoughts and feelings in the present moment. It is both a skill and an attitude toward living (Greenberg, 2016).

Melnyk (2020) offers six tips for nurses in coping with the pandemic (see Table 3). Nurses can use these strategies, and not only during the pandemic. Many strategies can assist nurses with self-care to reduce or eliminate burnout. Many apps are available to help with self-care strategies, such as activity trackers, yoga, journaling, meditation, and sleep. It is about finding the right application that will give you the best chance at success. Anecdotally, some nurses enjoy guided meditation because it helps keep them on track and keeps their mind from wandering. Explore several apps to find the best one that fits your needs.

Table 3

Tips for Nurses to Coping with the COVID-19 Pandemic

- Breathe deeply.
- Practice staying in the moment.
- Use cognitive-behavioral skills.
- Read 3 to 4 minutes in a positive thinking book every day before starting work.
- Stay active.
- Talk to someone.

Source: Healthy Nurse Healthy Nation, 2020.

A time management guide is an excellent tool to help you visualize how much time you have in a week. Start with a piece of paper and write down the main categories of life activities: work (40 hours), sleep, eating, exercise, family, and any other necessary types. There are 168 hours in a week; subtract the amount of time in each category and see what, if any, is leftover; then you can easily adjust or make informed decisions about what to do that particular week. It can be such a simple exercise, but very valuable.

Institutional strategies are sometimes slow to change. In 2017, the National Academy of Medicine (2020) created an action collaborative to address clinician well-being. Its goals were to "raise the visibility of clinician anxiety, burnout, depression, stress, and suicide; improve baseline understanding of challenges to clinician well-being; and advance evidence-based, multidisciplinary solutions to improve patient care by caring for the caregiver" (National Academy of Medicine, 2020, p. 1). The collaborative has recommended strategies for health care organizations to use to eliminate clinician burnout and enhance professional well-being (see Table 4). Creating an executive-level position (i.e., Chief Wellness Officer) to lead the effort was also encouraged. This role's primary responsibility is to collaborate, develop, and promote ways to offer employee wellness resources. The University of California San Diego School of Medicine

Table 4

Eliminating Clinician Burnout and Enhancing Professional Well-Being – Recommendations for Healthcare Organizations

- **Create positive work environments:** Transform health care work systems by creating positive work environments that prevent and reduce burnout, foster professional well-being, and support quality care (p. 8).
- **Create positive learning environments:** Transform health professions' education and training to optimize learning environments that prevent and reduce burnout and foster professional well-being (p. 12).
- **Reduce administrative burden:** Prevent and reduce the negative consequences on clinicians' professional well-being that result from laws, regulations, policies, and standards promulgated by health care policy, regulatory, and standards-setting entities, including government agencies (federal, state, and local), professional organizations, and accreditors (p. 14).
- **Enable technology solutions:** Through collaboration and engagement of vendors, clinicians, and expert health information technology system developers, optimize the use of health information technologies to support clinicians in providing high-quality patient care (p. 15).
- **Provide support to clinicians and learners:** Reduce the stigma and eliminate the barriers associated with obtaining support needed to prevent and alleviate burnout symptoms, facilitate recovery from burnout, and foster professional well-being among learners and practicing clinicians (p. 17).
- **Invest in research:** Provide dedicated funding for research on clinician professional well-being (p. 18).

Source: National Academy of Medicine, 2019.

(2020) developed a program called the Healer Education Assessment and Referral (HEAR) using the Patient Health Questionnaire-9 (PHQ-9) depression screen tool and early referral. They found that 97% of the nurses screened were at moderate to high risk of depression (Davidson et al., 2018). These results further demonstrate the need for wellness and institution programs. Many corporations now offer, as part of the employee benefits package, an Employee Assistance Plan (EAP), including a free consultation with a behavioural or mental health professional. However, Agovino (2019) reported that EAP utilization averages less than 10% nationally. Employees are afraid of confidentiality breaches and the stigma of not holding one's stress.

EMPLOYEE ENGAGEMENT

In healthcare and corporate America, we are seeing a surge in employee engagement surveys. These surveys are essential to provide the workforce's pulse and develop action plans to improve employee satisfaction, which could offer mitigation activities to reduce burnout and the effects of burnout. Companies that have embraced employee engagement tools have been able to utilize the knowledge to track productivity, satisfaction, quality of work-life balance, and workplace interactions (Burnett & Lisk, 2019). Highly engaged employees can outperform their disengaged coworkers by 20% to 30% (Greenleaf Center for Servant Leadership, 2016). The 2019 PRC National Nursing Engagement Report found three key drivers that predicted nurses' engagement: autonomy, RN-to-RN teamwork and collaboration, and leadership access and responsiveness (King & Bradley, 2019). Their survey found that overall, 15.6% of nurses reported feelings of burnout. In addition, burnout appeared to be related to engagement: 41.9% of the nurses who were unengaged reported being burned out compared to 14.9% of those engaged, and 7.6% of the nurses who were fully engaged. In addition, 50% of the nurses reporting burnout said they had no plans to leave their organization (King & Bradley, 2019). These are discouraging statistics and should be focused on by nurse leaders and institutional leaders to disrupt the pattern. As nurse leaders, we need to offer methods for nurse engagement to prepare for potential demand on nurses.

Nurses' plans to leave nephrology due to burnout, stress, or retirement can add to the stress of nurse managers and as well to other staff nurses in the nephrology setting. In a national study on the health and safety of nephrology nurses (Ulrich & Kear, 2018), 40% of the respondents indicated their intent to leave their job in the next three years. The Joint Commission (2011) issued a sentinel event alert on health care worker fatigue. Such alerts can provide necessary data over time to support the need with empirical data to support reducing the workload of nephrology nurses.

Make time to STOP, which is simply stop, take a breath, observe, and proceed (Greenberg, 2016). We can all take just a minute to STOP what we are doing and focus on ourselves. Work with the leadership team of your place of employment, office fun activities, even create a fun committee. The committee can set up fresh fruit Fridays, where you put fresh fruit in the breakroom, picture contests, and holiday decorating contests. There are many low-cost ways to put fun into employee engagement.

SUMMARY

Nurses need outlets to manage their workplace stress as well as their home life stressors if we want to see positive change in employee engagement, less burnout, depression, suicide, better patient outcomes, and better overall health outcomes for nurses. The Greenleaf Center for Servant Leadership (2016) noted that as "the factors that prevent U.S. businesses from turning and maintaining a profit become more acute, it will be the firms that achieve the highest level of engagement that will have the greatest potential for emerging on the other side – battle scarred, perhaps, but with an intact, strong workforce in tow" (p. 1).

As nephrology nurses and nurse leaders, our call to action is to work toward ideals and innovations to improve employee engagement, methods to reduce stress burnout, depression, and nurse suicide. As nurses, we have to move past the stigma of mental health and ask for help (Davidson et al., 2018). If you or someone you know is struggling with burnout, depression, or suicide, encourage the use of an EAP program or the National Suicide Prevention Lifeline at 1-800-273-8255.

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Preventative care to reduce the risks of acute kidney injury in people with chronic kidney disease undergoing cardiac catheterization

By Gayathirie Packiyanathan, Joy A. Gatmaitan, Simerdeep Chouhan, Shy Amlani, and Rosa M. Marticorena

OBJECTIVES

By the end of this module, readers will be able to:

1. Define the purpose, benefits, and risks of coronary angiography and angioplasty procedures
2. Describe the pathophysiology manifestation of contrast-induced acute kidney injury (CI-AKI) in patients who have undergone cardiac catheterization procedures
3. Evaluate a patient's risk for developing CI-AKI based on patient-associated and procedure-associated risk factors
4. Define various strategies to lower the patient's risk for developing CI-AKI
5. Describe the nursing interventions for high-risk patients with an estimated glomerular filtration rate (GFR) of 30mL/min/1.73m^2

BACKGROUND

Cardiovascular disease (CVD) is the most prevalent cause of mortality globally with 17.3 million deaths per year; unfortunately, the prevalence continues to grow as the population ages (Husein et al., 2021). People with chronic kidney disease (CKD) are at a higher risk of manifesting coronary artery disease (CAD), and the incidence of cardiovascular events is much higher in people within estimated GFR categories 3a (45–59 mL/min/1.73 m^2), 3b (30–44 mL/min/1.73 m^2), 4 (15–29 mL/min/1.73 m^2), and 5 (<15 mL/min/1.73 m^2) (Akbari et al., 2015) compared to the general population (Jankowski et al., 2021). CVD is the major cause of mortality in this patient population (as well as in hemodialysis) (Jankowski et al.) and is 20 times higher than in the general population (Cozzolino et al., 2018). People with CKD undergo frequent cardiac diagnostic and interventional procedures for transplant purposes and to monitor cardiac-related symptoms.

Coronary angiography is the gold standard diagnostic procedure to identify the presence and extent of stenosis due to plaque build-up in the coronary arteries using contrast enhanced imaging through iodinated contrast medium (ICM). However, ICM is hard for the kidneys to clean and filter out of the blood and can lead to a serious complication called contrast-induced acute kidney injury (CI-AKI) (Macdonald et al., 2022). People with CKD who are planning for transplant or experiencing cardiac symptoms will undergo diagnostic coronary angiography. Unfortunately, one of the common causes of hospital-acquired AKI is believed to be from intravascular contrast media exposure (Weferling et al., 2021). The incidence of CI-AKI is associated with the severity and the number of risk factors such as CKD. People with eGFR ⩽ 30mL/min/1.73 m^2 have been shown to be at a higher risk of developing CI-AKI (Macdonald et al., 2022). There is no current therapy for CI-AKI; therefore, effective risk management and prevention are critical.

This article describes the current understanding about the pathogenesis of CI-AKI, benefits and risks of cardiac catheterization in people with CKD, ongoing research about possible therapeutic options, and recent guidelines on how to mitigate these risks in people with CKD undergoing this procedure.

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CORONARY ANGIOGRAPHY

Coronary angiography is a procedure that uses X-ray guided imaging to diagnose and treat narrowing or blockages of the coronary arteries. The procedure is performed percutaneously by accessing the radial, ulnar, or femoral arteries. The puncture site is injected with local anaesthetic such as lidocaine, then a needle guidewire is used to secure the artery, and a 6-French sheath is inserted to allow the guidewire and the cardiac catheter to be advanced to visualize the left ventricle and coronary arteries through the ascending aorta by injecting ICM (Watson & Gorski, 2011).

Coronary angiography allows for the assessment and quantification of stenoses and calcification of coronary arteries (Schmermund et al., 2018). Percutaneous coronary interventions (PCI) such as balloon angioplasties with or without stent placements have been shown to preserve ventricular function and increase survival in acute myocardial infarction (MI) by quickly re-establishing coronary artery patency, which benefits patients who suffer from angina and atherosclerosis, and lowers the risk of having an acute MI and other cardiac-related problems (Keeley et al., 2003).

Like any invasive procedure, coronary angiography poses risks such as bleeding, hematoma formation, infection at the incision site, and arrhythmias, and can cause dissection of the coronary vessels. Certain medical comorbidities increase the chances of complications occurring after an angiogram, which include older age, kidney insufficiency, diabetes mellitus, obesity, congestive heart failure (CHF) with low ejection fraction, recent MI, or stroke (Tavakol et al., 2012). A potential serious complication is CI-AKI regardless of baseline kidney function. Although the chance of kidney impairment is low (about 2% for the general population), the risk increases to 20% depending on the risks and characteristics of the individual, especially those with CKD and/or CVD (Zhou et al., 2022; Firouzi et al., 2020).

CONTRAST-INDUCED AKI

CI-AKI is defined as acute kidney impairment presenting with 44 mol/L or 25% increase in serum creatinine (SCr) levels after 48–72 hours following contrast exposure compared to baseline SCr, despite other potential causes of kidney impairment ruled out (Mehran & Nikolsky, 2006; Zhang et al., 2020). Patients with a past medical history of AKI and other comorbidities such as diabetes may make them vulnerable to CI-AKI (Zhang et al.).

CI-AKI Pathophysiology

The exact pathophysiology by which CI-AKI occurs is not clearly understood. It has been attributed to the toxic effects of the contrast agent, which induces hemodynamic changes in the kidney and oxidative stress on renal tubular epithelial and vascular cells (Zhou et al., 2022), swelling, inflammation, and epigenetic regulation (Zhang et al., 2020). McCullough et al. (2016) state that the contrast produces a high osmotic environment in the kidneys, which plays a role in cell apoptosis (cell death) and necrosis.

The kidneys undergo numerous hemodynamic changes following contrast exposure. First, there is momentary vasodilation, followed by persistent vasoconstriction with increased vascular resistance and reduced blood flow and oxygen supply in the kidneys (Zhang et al., 2020). Endothelin and adenosine are released because of the contrast's toxic effects which reduces prostaglandin and nitric oxide (NO) concentration; prostaglandin and NO are secreted to increase oxygen supply and local blood flow while down-regulating ion-exchange (Dugbartey & Redington, 2018). The GFR is reduced as outer medullary ischemia is elicited because of vasoconstriction induced by the contrast (Zhang et al.).

Hypoxia causes increased free radical and reactive oxygen species (ROS) production in the mitochondria and a lack of oxidative phosphorylation, which is a vital step in adenosine triphosphate (ATP) production. The ICM speeds up the breakdown of ATP into adenosine diphosphate (ADP) and adenosine monophosphate (AMP), and limits the mitochondrial enzyme actions (Zhang et al., 2020). Since the plasma membrane is not intact, excessive ROS can harm renal tubular epithelial cells and surrounding cells by inducing apoptosis via intrinsic pathway and stress kinase activation, such as p38 mitogen-activated protein kinase (MAPK) stress kinases (Mamoulakis et al., 2017). The combination of several stress stimuli such as those mentioned above cause a significant amount of apoptosis, which may lead to kidney damage (Zhang et al.).

Individuals who are coming in for cardiac catheterization procedures with past inflammatory states who had no known risks for CI-AKI, had a greater chance of developing CI-AKI, as their C-reactive protein levels are increased (Kwasa et al., 2014). In experimental animal models, contrast exposure caused renal failure and tubular damage, along with a substantial rise in inflammatory cytokines such as interleukin 6 (IL-6) and tumor necrosis factor alpha (TNF-) (Zhang et al., 2020). Recent studies propose a range of stressors such as ROS and osmotic stress caused by contrast activate NOD-like receptor pyrin domain containing 3 (NLRP3) and nuclear factor kappa B (NF-B), likely triggering an inflammatory response (Zhang et al.).

Risk Factor Development of CI-AKI

The risk factors for CI-AKI can be separated into two categories – patient-associated and procedure-associated risk factors. Patient-associated risks include kidney insufficiency with a GFR 60 mL/min, diabetic nephropathy, age > 70 years, hypertension, CHF, anemia, hyperuricemia, and taking nephrotoxic drugs such as NSAIDs (Zhang et al., 2020). Procedure-associated factors include excess ICM, use of high-osmolality contrast media, repeated contrast exposure (Zhang et al.; Zhou et al., 2022), and transfemoral access (TFA) compared to transradial access (TRA) (Firouzi et al., 2020). The risk of CI-AKI increases with TFA compared to TRA when undergoing angiography or PCI procedures (Firouzi et al.). As can be noted, procedure-associated risks can be mitigated to reduce the chances of patients experiencing CI-AKI.

PREVENTATIVE MEASURES AND CARE

Previous studies have shown that CI-AKI is associated with severe clinical outcomes, including risk of hospitalization, end-stage kidney failure, and death (Zhou et al., 2022), heavily emphasizing the importance of preventative protocols as at the present time there are no treatments available. Many catheterization labs will develop their own risk prediction models, as there is no universal risk prediction model presently available. Intervention is based on the results of the scoring. Mehran et al. developed a risk score that is the most widely studied CI-AKI risk model for patients undergoing cardiac catheterization (Mehran et al., 2004; Zhang et al., 2020). The risk model includes eight identified variables such as hypotension, intra-aortic balloon pump, CHF, CKD, diabetes, age > 75 years, anemia, and contrast volume. Patients are also categorized by their risk of developing CI-AKI into four levels from low to very high risk. This risk model was created in 2004 and it has been reviewed and used in many research studies with good clinical results. However, this model does not include some procedure-related factors, and comparable risk models had the same limitations (Zhang et al., 2020), warranting the need for further developments of risk models.

Screening patients prior to the procedure is an important step as it allows for examining kidney function, comorbidities and to identify risks for CI-AKI. This will determine what kind of preventative measures will be used by the interventional cardiologist (Macdonald et al., 2022), which will be discussed later in this article.

Measuring Biomarkers

Since one of the main risk factors for CI-AKI occurring is pre-existing kidney insufficiency, it is important to screen for kidney function prior to contrast exposure. SCr is frequently utilized as a marker to measure how well the kidneys are filtering waste from the blood. When the kidneys are functioning normally, creatinine is filtered out from the blood and excreted out of the body as a waste product in urine. Another way to test for kidney function is measuring the GFR, which indicates how much blood passes through the glomeruli each minute. An eGFR of 60 mL/min/1.73 m^2 is considered within normal limits. Normally in clinical practice, SCr levels are monitored and GFR is calculated prior to the patient being exposed to contrast to assess the risk of CI-AKI (Zhang et al., 2020).

Unfortunately, SCr levels may not quickly detect declining renal function as it can be within normal limits even if there is a degree of impaired kidney function (Wang et al., 2016). SCr levels are affected by other factors not related to CI-AKI such as age, gender, diet, muscle mass, arteriosclerosis, and renal tubular secretion (Bellomo et al., 2004). Multiple studies have made advancements to find novel biomarkers that are more sensitive and for earlier detection of kidney functioning (e.g., IL-8, KIM-1, Cys-C; Zhang et al., 2020). These biomarkers present many advantages such as stability and sensitivity for kidney function (Wang et al., 2016). However, given that these novel biomarkers can easily be influenced by other variables, such as thyroid dysfunction, age, and systemic inflammation, more controlled prospective research is required to determine the viability of these biomarkers for CI-AKI prediction (Zhang et al., 2020).

Appropriate Use of Contrast

Fortunately, effective preventative approaches and care are presently available, and more research is ongoing to find therapies to lower the incidence of CI-AKI for patients. Clinicians should choose contrast agents and monitor the volume used cautiously as direct contrast toxicity is largely reliant on the composition of the contrast medium. CI-AKI can be brought on by using any ICM. High-osmolality contrast medium has been progressively phased out of usage due to its increased nephrotoxicity opposed to other ICM (Zhang et al., 2020). Presently, low-osmolality contrast medium and isotonic osmolality contrast medium have been frequently utilized for cardiac catheterization procedures. Iohexol (Omnipaque) is the standard contrast used in procedures and iodixanol (Visipaque) is used for patients with impaired kidney function with an eGFR 30 mL/min/1.73 m^2 as it is less viscous (Eivindvik & Sjøgren, 1995) and has the lowest osmolality of all available contrast media (From et al., 2010).

Using less contrast volume is another way to mitigate the risks of CI-AKI. It was found that there was a positive correlation among contrast volume and the extent of kidney injury (Mehran et al., 2019). There was a lower occurrence of CI-AKI when less contrast volume was used in people with impaired kidney function (Chaabouni et al., 2021). Currently, carbon dioxide (CO_2) angiography has been characterized as a non-nephrotoxic and non-anaphylactic option to ICM for those allergic to iodinated medium and high-risk patients (Zhang et al., 2020). CO_2 displaces the blood and generates a negative contrast for digital subtraction imaging. Although CO_2 angiography presents potential benefits, the use of CO_2 as a visualizing medium is not suggested for use in the coronary arteries. (Cho, 2015). Stegemann et al. (2016) proposed a hybrid angiography approach utilizing CO_2 and a lower dose of ICM, which considerably reduced CI-AKI occurrence in peripheral vascular interventions. Last, if possible, avoiding angiography for high-risk patients is the last resort. Other imaging options include intravascular ultrasound and magnetic resonance angiography (Zhang et al., 2020).

Other Therapy Options

Zhang et al. (2020) proposed hydration therapy to be an effective therapy, as the contrast's excretion is rapid when the patient is hydrated compared to greater absorption when in a volume-depleted state. Although, hydration has been used frequently and seen to be helpful, it is not a definitive cure for CI-AKI, hence, emphasizing the importance of preventative measures (Zhan et al., 2019).

It has been postulated that certain pharmacological agents such as statins and antioxidants could provide

protective role in high-risk patients of CI-AKI (Zhang et al., 2020). High dose rosuvastatin (Leoncini et al., 2014) and atorvastatin (Quintavalle et al., 2012) have been shown to have potential in preventing the incidence of CI-AKI. This protective effect mainly relies on the statin's anti-inflammatory characteristics. One of the recognized pathogeneses of CI-AKI is oxidative stress. Intracellular ROS created from contrast exposure causes an oxidative-antioxidant imbalance (Zhang et al., 2020). N-acetylcysteine (NAC) (Trivedi et al., 2009) and sodium bicarbonate (Calvin et al., 2010) are two antioxidants frequently used to prevent CI-AKI. Nonetheless, further research is needed to support the evidence and efficacy of the above pharmacological agents (Zhang et al., 2020).

Several trials have explored the effects of remote ischemic condition (RIC) in the prevention of CI-AKI, suggesting a protective effect against renal ischemia (Zhan et al., 2019; Zhang et al., 2020). In RIC, brief episodes of reversible ischemia produced by alternating cycles of inflation and deflation of a blood pressure cuff in a limb will induce a protective effect to remote tissues and organs with an increase of blood supply to the kidneys (Er et al., 2012). RIC is incorporated prior to and after coronary angiography. Interestingly, a meta-analysis of 1,167 patients showed a reduced incidence of CI-AKI in patients who had undergone RIC prior to the procedure (13.5% vs 6.5%, $p < 0.001$) (Hu et al., 2016). Unfortunately, CI-AKI was not preventable in people with diabetes (Moretti et al., 2018).

INTERVENTIONS FOR PATIENTS WITH GFR 30 ML/MIN

In May 2022, the Canadian Association of Radiologists published the consensus guidelines for prevention of CI-AKI (Macdonald et al., 2022). Pre-procedure risk analysis and intervention should be done on a case-by-case basis. The benefits and risks need to be assessed for people with kidney insufficiency, as the procedure would be saving the heart but killing the kidneys. In the event an individual with kidney impairment presented with a life-threatening event, such as an MI, the benefits of the procedure would outweigh the risks. The procedure should not be delayed for emergent life-threatening illnesses even if bloodwork results may not be available (Macdonald et al.). The following include some guidelines healthcare professionals (HCPs) can implement.

Blood work and laboratory tests should be obtained within six weeks prior to the procedure and should include hemoglobin/hematocrit, white blood cell count, platelet count, sodium, potassium, blood urea nitrogen, creatinine, international normalized ratio (INR) for patients on warfarin, and current eGFR. Any test results that are outside normal limits and ranges should be evaluated by the physician prior to the procedure in order to determine if additional interventions such as intravenous (IV) hydration should be implemented to prevent CI-AKI. In patients with severe CKD (eGFR is 30 mL/min/1.73 m^2) and patients with pre-existing AKI, it is suggested to consider if contrast exposure is required (Macdonald et al., 2022).

In patients with known AKI or severe CKD, metformin should be stopped prior to and during the time of contrast exposure, and it should not be restarted for at least 48 hours and only if kidney function remains stable (Macdonald et al., 2022). This is done because metformin is heavily excreted by the kidneys and contrast slows down kidney function, causing a build-up of metformin in the body leading to lactic acidosis.

Although there is a lack of evidence on the benefits of IV hydration as a cure, patients with reduced kidney function may receive IV hydration using normal saline, 0.9% saline, or 1.26% sodium bicarbonate, or oral salt and water prior to the procedure (Macdonald et al., 2022).

Visipaque, a contrast agent with lower osmolality, compared to Omnipaque, can be administered by hand injection instead of auto-injection, allowing the physician to reduce the volume of contrast to 50% benefitting high-risk patients (Watson & Gorski, 2011). Patients with end-stage kidney disease (ESKD) receiving hemodialysis or peritoneal dialysis will need dialysis post-procedure. This allows for effective removal of the contrast from the blood (Lee et al., 2007).

After the procedure, patients are instructed to seek medical attention if they develop shortness of breath, peripheral edema, or decreased urine output (Macdonald et al., 2022). Discharge instructions include increasing hydration to help excrete the contrast through urination. It is also recommended to do follow-up bloodwork to measure SCr levels 48 hours up to one week after contrast injections, to identify if there is development of AKI and provide immediate treatment in a timely manner.

SUMMARY

Cardiac catheterization presents many benefits for the patient and their well-being. The use of ICM allows for visualization of the coronary arteries and left ventricle, but poses the risk of CI-AKI and AKI. Preventative measures to prevent CI-AKI must be implemented in the care of people with CKD with eGFR < 30 mL/min/1.73m^2. Healthcare providers (HCPs) can mitigate the risk of CI-AKI development from ICM exposure by implementing care for patients in many ways, such as assessing the patient's kidney function from blood work and laboratory testing. IV hydration and holding certain medications such as metformin are additional ways to reduce this risk in clinical practice. There are other less harmful contrast agents that can be used in the catheterization lab to reduce CI-AKI development further. Following the procedure, HCPs can continue supporting people with ESKD through dialysis and follow-up care one week after ICM exposure.

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CONTINUING EDUCATION STUDY QUESTIONS

CONTACT HOUR: 2.0 HRS

Preventative care to reduce the risks of acute kidney injury in people with chronic kidney disease undergoing cardiac catheterization

By Gayathirie Packiyanathan, Joy A. Gatmaitan, Simerdeep Chouhan, Shy Amlani, and Rosa M. Marticorena

1. Angiography allows for the:
   a) Assessment of stenoses
   b) Quantification of calcification
   c) Quantification of stenoses
   d) All the above

2. CI-AKI is the ___ increase in serum creatinine (SCr) levels after 48–72 hours following contrast exposure compared to baseline SCr.
   a) 15%
   b) 25%
   c) 35%
   d) 45%

3. An eGFR of ___mL/min is considered high-risk for CI-AKI.
   a) 30
   b) 60
   c) 45
   d) None of the above

4. RIC incorporates the application of intermittent inflation and deflation of a BP cuff to a limb prior to the procedure to cause a protective effect in the kidneys.
   a) True
   b) False

5. Procedure-based factors can be mitigated to reduce the incidence of CI-AKI. Which of the following does not reduce the incidence of CI-AKI?
   a) Use of high-osmolality contrast
   b) Less volume of contrast
   c) Other imaging options like magnetic resonance angiography
   d) CO_2 angiography

6. Which biomarkers can be used to monitor kidney function?
   a) Ca^{2+} and K+
   b) Na+
   c) SCr and eGFR
   d) All the above

7. Angiography and PCI preserve ventricular function and increase survival of MI patients by:
   a) Improving blood flow in the heart
   b) Preventing further damage to heart muscles
   c) Re-establishing coronary artery patency
   d) All the above

8. Patients with an eGFR of 30mL/min should stop metformin use prior and during contrast injections. When can metformin be restarted?
   a) After the procedure
   b) 48 hours after with stable kidney function
   c) 24 hours after with unstable kidney function
   d) None of the above

9. Patients should be instructed to seek medical attention if they develop SOB, peripheral edema, or decreased urine output following the days after contrast imagining.
   a) True
   b) False

10. Some studies have found high dose rosuvastatin and atorvastatin showed potentiation in preventing the incidence of CI-AKI due to _____ characteristics.
    a) Anti-inflammatory
    b) Antioxidant
    c) Anticoagulant
    d) Antihistamine

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

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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
  4 Cataraqui Street, Suite 310
  Kingston, ON K7K 1Z7
  or submit online to www.cannt.ca
- Enclose a cheque or money order payable to CANNT.
- Post-tests must be postmarked by June 30, 2023.
- 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		
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b		
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 Journal Manuscript Submission Guidelines

DESCRIPTION

CANNT Journal is a quarterly publication that showcases excellence in nephrology nursing and technological writing through peer-reviewed articles that examine current issues and trends in nephrology nursing and technological practice, education, and research. *CANNT Journal* is the official journal of the Canadian Association of Nephrology Nurses and Technologists and supports the association's mission to serve its membership by advancing the development of nephrology nursing and technological knowledge. The journal is indexed in MEDLINE and CINAHL.

EDITORIAL POLICIES

CANNT Journal welcomes manuscripts related to nephrology nursing and technological education, practice, research, or health policy. The manuscript must be the sole intellectual property of the authors. Once accepted, manuscripts become the permanent property of *CANNT Journal*, and may not be reproduced elsewhere without written permission from the publisher.

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

- Original research reports
- Relevant clinical articles
- Innovative quality improvement reports
- Narratives that describe the nursing experience
- Interdisciplinary practice questions and answers
- Literature or systematic reviews

We also encourage letters to the editor as a way to promote dialogue and alternative perspectives to articles published in *CANNT Journal*. Choose "Letters to the Editor" from the Section dropdown on the submissions page.

SUBMISSION DECLARATION

Submission of the article implies that the work described has not been published elsewhere (except in the form of an abstract or a published lecture), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and responsible authorities where the research was carried out, and that, if accepted, it will not be published elsewhere in the same form without the written consent of the copyright holder. Upon acceptance of the submitted material, the author(s) must transfer copyright ownership to *CANNT Journal*. Statements and opinions contained within the work will remain the responsibility of the author(s).

PEER REVIEW

CANNT Journal operates on a double-blind peer review process. The names of the reviewers will not be disclosed to the author(s) submitting the manuscript, and the name(s) of the author(s) will not be disclosed to the reviewers.

All contributions will be initially assessed by the editors for suitability for the journal. Manuscripts deemed suitable are sent to two independent expert reviewers to assess the quality of the paper. A manuscript will only be sent for review if the editors determine that the paper meets the appropriate quality and relevance requirements in keeping with the particular aim and scope of *CANNT Journal*.

The editors are responsible for the final decision regarding acceptance or rejection of the manuscript. Editors are not involved in decisions about papers that they have written themselves or have been written by family members or colleagues, or which relate to products or services in which the editor has an interest. All manuscript submissions are subject to the journal's usual independent peer review process.

The criteria for acceptance for all manuscripts include the quality and originality of the research or intellectual material, its significance/appeal to journal readership, and the general writing style.

PREPARING THE SUBMISSION

The following components are required for all submissions. Manuscripts that do not meet these requirements will be returned to the corresponding author for technical revisions before undergoing peer review.

The manuscript should be submitted in separate files in the following order: title page; abstract with key words; main text including references; and figures/tables. A cover letter may be supplied at the authors' discretion.

Title page

Include:

- Title of the manuscript (concise and informative)
- Short running title of fewer than 40 characters
- Full names, highest academic degrees, and affiliations of all authors with email address and telephone/fax number of corresponding author
- Authors' institutional affiliations (department, institution, city, country) where research work was conducted
- Any acknowledgements (including disclosure of funding), credits, or disclaimers, conflict of interest statement for all authors

Abstract and keywords

Submit structured or summary abstract of up to 250 words. Word limit includes headers in a structured abstract (e.g., *background*, *purpose*, *method*, *findings*, and *discussion*).

The abstract should be a succinct summary of the major issue, problem, or topic being addressed, and the findings and/or conclusions in the manuscript. It should not duplicate material in the main text. It should not contain subheadings, abbreviations, or reference citations.

Provide up to eight keywords that describe the contents of the manuscript.

Main text (manuscript, reference list)

Main text:

- Maximum length 15–20 pages, double-spaced
- Use the *Publication Manual of the American Psychological Association* (APA) 7th edition (copyright 2020) for style and format guidelines.
- As manuscripts are double-blind peer reviewed, the main text should not include any information that might identify the authors. Therefore, do not include any identifying information (i.e., authors' names).
- Number all pages consecutively in the upper right-hand corner.
- Cite tables/figures consecutively.
- Be sure to approve or remove all tracking changes in your Word document before uploading.

References:

- Use only sources from credible and high-quality journals.
- Double-spaced at the end of the manuscript
- Citations and reference list is to be styled according to the APA 7th edition (copyright 2020).
- Provide URL for all references where available.
- Ensure that every reference cited in the text is also present in the reference list (and vice versa).

Tables/figures

- Submit each table or figure as a separate file, and as editable text and not as an image.
- Prepare tables/figures according to APA 7th edition (copyright 2020).
- Cite tables/figures consecutively in the text, and number them in that order. Do not embed tables/figures in the manuscript text file.
- Number table and figure consecutively in accordance with their appearance in the text and place the title of the table/figure and any table/figure notes below the table/figure body.
- Use tables sparingly and ensure that the data presented in them clarify and supplement, rather than duplicate, results described in the main text. Only tables that are 3 manuscript pages or shorter will be accepted to be published within the article.
- Authors using previously published tables and figures must include written permission from the original publisher. Such permission must be attached to the submitted manuscript.

MANUSCRIPT SUBMISSION

Once the submission materials have been prepared in accordance with instructions in "Preparing the Submission" above, manuscripts must be submitted online at: **https://cannt-acitn.ca/journal/ojs/index.php/canntj**

New users must click "Register" at the upper right of the page. Once logged in, select "Submissions" from the "About" dropdown.

AFTER SUBMISSION

There are three stages of manuscript review prior to the final decision about the article's status for publication.

Preliminary

Preliminary review by the editors to determine the suitability of the article for peer review. The editors assess all manuscript presentation requirements including style and format of the manuscript.

Editorial peer review

The peer review process determines scholarly merit of the article. All manuscripts are reviewed by two members of the Editorial Review Panel. The acceptance criteria for all papers lie in the quality and originality of the work and its significance to journal readership. Manuscripts are only sent to reviewers if the editors determine that the paper merits further review.

Determination of eligibility for publication

After the peer review, the editors make a decision regarding the eligibility of the article for selection based on the comments and recommendations of the reviewers. Based on the peer review evaluation, the editors make one of the following decisions:

- Accept without revisions
- Accept after completing minor revisions
- Re-submit after completing major revisions – re-review by original reviewers
- Reject

AFTER ACCEPTANCE

Corresponding authors will receive a PDF proof of the article. The page proof should be carefully proofread for any copyediting or typesetting errors. It is the authors' responsibility to ensure that there are no errors in the proofs. Authors should also make sure that any renumbered tables, figures, or references match text citations and that figure legends correspond with text citations and actual figures. Proofs must be returned within the deadline specified by the editors.

Alterations to the proof that are beyond those required to correct errors or to answer queries, or are a reworking of previously accepted material will **not** be allowed. The editors reserve the right to deny any changes that do not affect the accuracy of the content.

POST PUBLICATION

The corresponding author will receive a hard copy of the journal issue as well as a PDF copy of the article.

If accepted, your article must not be published elsewhere in similar form, in any language, without the consent of the publisher. You may not post the PDF file of your copyedited article, or your final published article in any repository or online social media site.

OPEN ACCESS OPTION

Authors of accepted peer-reviewed articles have the choice to pay a fee to allow perpetual unrestricted online access to their published article to readers globally, immediately upon publication. This option has no influence on the peer review process. All manuscripts are subject to *CANNT Journal*'s standard double-blinded peer-review process and will be accepted or rejected based on their own merit.

The article processing charge of $250.00 is charged on acceptance of the manuscript and should be paid within 5 days by the author(s). Payment must be processed for the article to be published open access.

CONFLICTS OF INTEREST AND SOURCE OF FUNDING

At the time of manuscript submission, authors should disclose any potential sources of conflict of interest, which includes any financial interest or relationship that might be perceived as influencing the authors' objectivity. The existence of a conflict of interest does not preclude publication. Authors must also declare if they have no conflict of interest to declare. Sources of funding should be included on the title page under the heading "Conflicts of Interest and Source of Funding." Each author must complete and submit the journal's copyright transfer agreement, which includes a section on the disclosure of potential conflicts of interest.

COPYRIGHT TRANSFER AGREEMENT

At the time of submission, the submitting author will be presented with the copyright transfer and conflict of interest form. Co-authors will receive an email with instructions to also complete the form in order to proceed with the review process.

EDITORIAL OFFICE CONTACT DETAILS

Jovina Bachynski and Rosa Marticorena, Editors
cannt.journal1@gmail.com

SUBMIT YOUR MANUSCRIPT ONLINE TODAY

https://cannt-acitn.ca/journal/ojs/index.php/canntj

Lignes directrices pour la soumission des manuscrits au *Journal ACITN*

DESCRIPTION

Le *Journal ACITN* est une revue publiée trimestriellement qui met en valeur l'excellence des écrits sur les soins infirmiers et les technologies en néphrologie par le biais d'articles évalués par des pairs qui examinent les questions et les tendances actuelles de la pratique, de la formation et de la recherche dans ce domaine. Le *Journal ACITN* est la revue officielle de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie et soutient la mission de l'association pour servir ses membres en perfectionnant le développement des connaissances en matière de soins infirmiers et de technologies en néphrologie. La revue est référencée dans les bases de données MEDLINE et CINAHL.

POLITIQUES RÉDACTIONNELLES

Le *Journal ACITN* accepte les manuscrits portant sur la formation, la pratique, la recherche sur les soins infirmiers et les technologies de néphrologie ou la politique en matière de santé. Le manuscrit doit être la propriété intellectuelle unique des auteurs. Une fois acceptés, les manuscrits deviennent la propriété permanente du *Journal ACITN* et ne peuvent être reproduits ailleurs sans l'autorisation écrite de l'éditeur.

Nous préférons les manuscrits qui présentent de l'information clinique nouvelle ou qui abordent des problématiques d'intérêt particulier pour les infirmières et infirmiers et les technologues en néphrologie. Plus précisément, nous recherchons :

- Rapports de recherche originaux;
- Articles cliniques pertinents;
- Rapports sur des approches innovatrices en matière d'amélioration de la qualité;
- Textes narratifs relatant une expérience de pratique infirmière ou technologique;
- Textes sous forme de questions et de réponses sur la pratique interdisciplinaire;
- Revues de littérature ou revues systématiques.

Nous encourageons également les tribunes libres sous forme de courrier des lecteurs comme moyen de promouvoir le dialogue et des perspectives de rechange aux articles publiés dans le *Journal ACITN*. Veuillez choisir « Courrier des lecteurs » dans le menu déroulant de la Section sur la page des soumissions.

DÉCLARATION RELATIVE À LA SOUMISSION

La soumission de l'article laisse entendre que l'œuvre décrite n'a pas été diffusée autre part (sauf sous la forme d'un résumé ou d'une présentation orale publiée), qu'elle n'est pas à l'étude pour publication ailleurs, que sa publication est approuvée par tous les auteurs et les autorités responsables où la recherche a été réalisée, et que, si elle est acceptée, elle ne sera pas publiée ailleurs sous la même forme sans le consentement écrit du titulaire du droit d'auteur. À l'acceptation du document soumis, le ou les auteurs devront transférer la propriété du droit d'auteur au *Journal ACITN*. Les déclarations et les opinions contenues dans l'œuvre demeurent la responsabilité de l'auteur ou des auteurs.

ÉVALUATION PAR LES PAIRS

Le *Journal ACITN* fonctionne selon un processus d'évaluation par les pairs à double insu. Les noms des évaluateurs ne seront pas divulgués à l'auteur ou aux auteurs qui auront soumis le manuscrit, de même que le ou les noms des auteurs ne seront pas divulgués aux évaluateurs.

Toutes les contributions seront initialement évaluées par les rédactrices en chef pour leur pertinence à la revue. Les manuscrits réputés acceptables sont envoyés à deux experts indépendants qui en évalueront la qualité. Un manuscrit ne sera envoyé pour évaluation que si les rédactrices en chef déterminent que le manuscrit répond aux exigences de qualité et de pertinence appropriées, conformément à l'objectif et au champ d'application particuliers du *Journal ACITN*.

Les rédactrices sont responsables de la décision définitive en ce qui a trait à l'acceptation ou au rejet du manuscrit. Les rédactrices en chef n'interviennent pas dans les décisions relatives aux articles qu'elles-mêmes ont rédigés ou que des proches ou des collègues ont écrits ou encore qui portent sur des produits ou services pour lesquels elles sont en conflit d'intérêts. Toutes les soumissions de manuscrit font l'objet du processus habituel d'évaluation par les pairs indépendants de la revue.

Les critères d'acceptation de tous les manuscrits comprennent la qualité et l'originalité de la recherche ou du matériel intellectuel, son importance ou son attrait pour le lectorat de la revue et le style d'écriture en général.

PRÉPARATION DE LA SOUMISSION

Les éléments suivants sont requis pour toutes les soumissions. Les manuscrits qui ne répondent pas à ces exigences seront renvoyés à l'auteur-ressource en vue de révisions techniques avant d'être soumis à l'évaluation par les pairs.

Le manuscrit doit être soumis en fichiers séparés dans cet ordre : page titre; résumé avec mots clés; corps du texte incluant les références; et les figures ou les tableaux. Une lettre de présentation peut être fournie à la discrétion des auteurs.

Page titre

Inclure :

- Titre du manuscrit (concis et descriptif)
- Titre court comptant moins de 40 caractères
- Nom complet, diplôme de plus haut grade et affiliations de tous les auteurs, adresse courriel et numéros de téléphone/télécopieur de l'auteur-ressource
- Affiliations institutionnelles des auteurs (département, établissement, ville, pays) où les travaux de recherche ont été réalisés
- Tous les remerciements (y compris la divulgation du financement), les crédits ou les avertissements, un énoncé de conflit d'intérêts pour tous les auteurs

Résumé avec mots clés

Soumettre un résumé structuré ou succinct de 250 mots au maximum. La limite de mots inclut les en-têtes dans un résumé structuré (p. ex., *contexte*, *objet*, *méthode*, *résultats* et *discussion*).

Le résumé doit être une description succincte de la question, du problème ou du sujet principal abordé dans le manuscrit, ainsi que les résultats ou conclusions présentés. Il ne doit pas reproduire le corps du texte. Il ne doit pas contenir de sous-titres, d'abréviations ou de citations de référence.

Fournir jusqu'à huit mots clés qui décrivent le contenu du manuscrit.

Corps du texte (manuscrit, liste de référence)

Corps du texte :

- Longueur maximum de 15 à 20 pages, à double interligne
- Se servir du guide de style *Publication Manual of the American Psychological Association* (APA), 7e édition (droit d'auteur 2020) pour les lignes directrices en matière de style et de format
- Comme les manuscrits font l'objet d'une évaluation par des pairs à double insu, le corps du texte ne doit inclure aucune information pouvant servir à identifier les auteurs. Par conséquent, il ne faut pas inclure de renseignements d'identification (p. ex., noms des auteurs)
- Paginer sans interruption dans le coin supérieur droit
- Citer les tableaux ou les figures à la suite
- S'assurer d'approuver ou d'éliminer toutes les modifications de suivi de votre document Word avant le téléversement

Références :

- N'utiliser que des sources publiées dignes de foi et de qualité
- À double interligne à la fin du manuscrit
- La liste de citations et de références doit être conforme au guide de style de l'APA, 7e édition (droit d'auteur 2020)
- Fournir les adresses URL pour toutes les références, le cas échéant
- S'assurer que toutes les références citées dans le texte figurent dans la liste de référence (et vice versa)

Tableaux ou figures

- Soumettre chaque tableau ou figure dans un fichier séparé, sous forme modifiable et non sous forme d'image
- Préparer les tableaux ou les figures selon le guide de style de l'APA, 7e édition (droit d'auteur 2020)
- Citer les tableaux ou les figures à la suite dans le texte et les numéroter dans cet ordre. Ne pas incorporer les tableaux ou les figures dans le fichier texte du manuscrit
- Numéroter les tableaux et les figures à la suite selon leur apparition dans le texte et positionner le titre du tableau ou de la figure et toute note connexe sous le corps du tableau ou de la figure
- Utiliser les tableaux avec retenue et s'assurer que les données qui y sont présentées clarifient et complètent les résultats décrits dans le corps du texte, sans toutefois les reproduire. Seuls les tableaux sur 3 pages de manuscrit ou moins seront acceptés aux fins de publication dans l'article.
- Les auteurs qui utilisent des tableaux ou des figures précédemment publiés doivent inclure l'autorisation écrite de l'éditeur original. Cette autorisation doit être jointe au manuscrit soumis.

SOUMISSION DU MANUSCRIT

Après avoir préparé le matériel de soumission conformément aux directives indiquées dans la rubrique « Préparation de la soumission » ci-dessus, les manuscrits doivent être soumis en ligne à cette adresse : **https://cannt-acitn.ca/journal/ojs/index.php/canntj**

Les nouveaux utilisateurs doivent cliquer sur « Register » (S'inscrire) dans le coin supérieur droit de la page. Une fois inscrit, sélectionner « Submissions » (Soumissions) du menu déroulant « About » (À propos de).

APRÈS LA SOUMISSION

L'examen du manuscrit se déroule en trois étapes avant que la décision ultime soit prise sur le statut de l'article aux fins de publication.

Examen préliminaire

Examen préliminaire par les rédactrices en chef afin de déterminer la pertinence de l'article aux fins d'évaluation par les pairs. Les rédactrices en chef examinent toutes les exigences de présentation de manuscrits, notamment le style et le format du manuscrit.

Évaluation rédactionnelle par les pairs

Le processus d'évaluation par les pairs détermine la valeur scientifique de l'article. Tous les manuscrits sont évalués par deux membres du comité d'évaluation rédactionnelle. Les critères d'acceptation pour tous les textes reposent sur la qualité et l'originalité de l'œuvre et sur son importance aux yeux du lectorat de la revue. Les manuscrits sont envoyés aux évaluateurs uniquement si les rédactrices en chef décident que le texte mérite un examen plus approfondi.

Détermination de l'admissibilité aux fins de publication

Après l'évaluation par les pairs, les rédactrices en chef prennent une décision concernant l'admissibilité de l'article à la sélection en se fondant sur les commentaires et les recommandations des évaluateurs. Selon l'évaluation par les pairs, les rédactrices en chef prennent l'une des décisions suivantes :

- Accepter le manuscrit sans modifications
- Accepter le manuscrit une fois les modifications mineures apportées
- Soumettre de nouveau le manuscrit une fois les modifications majeures apportées – réévaluation par les évaluateurs d'origine
- Rejeter le manuscrit

APRÈS L'ACCEPTATION

Les auteurs-ressources recevront une épreuve en format PDF de l'article. L'épreuve d'imposition doit être soigneusement relue afin de détecter toute erreur d'édition ou de composition. Il incombe aux auteurs de s'assurer que les épreuves sont exemptes d'erreurs. Les auteurs doivent également s'assurer que les tableaux, les figures ou les références renumérotés correspondent aux citations du texte et que les légendes des figures correspondent aux citations du texte et aux figures réelles. Les épreuves doivent être renvoyées dans le délai précisé par les rédactrices en chef.

Les modifications apportées à l'épreuve qui vont au-delà de ce qui est nécessaire pour corriger des erreurs ou pour répondre à des questions ou qui constituent un remaniement du matériel précédemment accepté **ne** seront **pas** permises. Les rédactrices en chef se réservent le droit de rejeter toute modification qui n'influe pas sur l'exactitude du contenu.

APRÈS LA PUBLICATION

L'auteur-ressource recevra une copie papier du numéro de la revue ainsi qu'une copie PDF de l'article.

S'il est accepté, votre article ne doit pas être publié nulle part ailleurs sous une forme similaire, en toute autre langue, sans le consentement de l'éditeur. Vous ne pouvez pas publier le fichier PDF de votre article révisé ou de votre article définitif publié dans un service d'archives ou sur un site de médias sociaux en ligne.

OPTION D'ACCÈS LIBRE

Les auteurs d'articles acceptés dans le cadre d'une évaluation par les pairs peuvent choisir de payer une redevance pour permettre aux lecteurs du monde entier d'accéder en ligne à leur article publié, sans restriction et à perpétuité, dès sa publication. Cette option n'a aucune influence sur le processus d'évaluation par les pairs. Tous les manuscrits font l'objet d'un processus standard d'évaluation par les pairs à double insu et seront acceptés ou refusés en fonction de leur propre valeur.

Des frais de traitement de l'article de 250,00 $ sont facturés à l'acceptation du manuscrit et doivent être payés dans les cinq (5) jours par le ou les auteurs. Le paiement doit être traité pour que l'article soit publié en accès libre.

CONFLITS D'INTÉRÊTS ET SOURCE DE FINANCEMENT

Au moment de la soumission du manuscrit, les auteurs doivent divulguer toute source potentielle de conflit d'intérêts, ce qui inclut toute relation ou tout intérêt financier qui pourrait être perçu comme influençant leur objectivité. La présence d'un conflit d'intérêts n'empêche pas la publication. Les auteurs doivent également déclarer qu'ils n'ont aucun conflit d'intérêts à déclarer. Les sources de financement doivent figurer sur la page titre sous la rubrique « Conflits d'intérêts et source de financement ». Chaque auteur doit remplir et soumettre le formulaire d'entente de transfert du droit d'auteur de la revue, lequel comprend une section sur la déclaration de conflits d'intérêts potentiels.

ENTENTE DE TRANSFERT DU DROIT D'AUTEUR

Au moment de la soumission, l'auteur qui soumet un manuscrit recevra un formulaire d'entente de transfert du droit d'auteur et de déclaration de conflits d'intérêts. Les coauteurs recevront des directives par courriel pour aussi remplir le formulaire afin d'amorcer le processus d'évaluation.

COORDONNÉES DU BUREAU DE LA RÉDACTION

Jovina Bachynski et Rosa Marticorena, rédactrices
cannt.journal1@gmail.com

LOCATION DETAILS

We are so excited to announce CANNT 2022 will be BACK IN PERSON on October 27–29 in Hamilton, Ontario! The Conference will take place at the Hamilton Convention Centre, and a room block is available at the Sheraton Hamilton Hotel.

Preliminary Program Schedule

CANNT 2022 will start Thursday, October 27 through Saturday, October 29. The program will include plenaries and four streams with sessions focused on Education, Treatment Options, Hemo, Tech, and Allied Health. Our plenary topics include the future of transplant, infectious diseases, ethics, a patient empowerment panel, and more!

We are looking forward to highlighting our speakers in upcoming communications!

INTRODUCING MARK MATTHEWS –
YOUR CANNT 2022 MC & KEYNOTE SPEAKER

A former dialysis patient and kidney transplant recipient, Mark is the co-founder and producer of the annual Komedy for Kidneys Gala which has raised over $85,000.00 to date for Dialysis Patient Care in Niagara. Mark will keep us on track throughout the CANNT Conference, and will close the conference with "Koping with Komedy" – a touching and humorous reflection on two modalities (PD and Hemo) and the transplant experience from the patient's point of view.

Social Program

CANNT 2022 is taking place close to Halloween, so we have some spooky social opportunities lined up!

Thursday, October 27 – Ghost Walk of Downtown Hamilton

Ghost stories and dark history of the core. Stops at landmarks like the Royal Connaught, Right House, Hamilton Place, St. Paul's Church and the Gothic Pigott Building. Experience the haunted city in a unique way! This event will directly follow the Opening Reception. This is a ticketed event. Tickets are available when you register for the Conference.

Friday, October 28 – Murder Mystery Dinner

This year's Evening of Entertainment will be a Murder Mystery extravaganza! The event includes a buffet dinner - as you dine, a murder mystery show will take place and you can watch as the hilarious mystery unfolds. This is a ticketed event. Tickets are available when you register for the Conference.

VIEW THE CONFERENCE DETAILS AND REGISTER ONLINE:
https://cannt-acitn.ca/2022-cannt-conference/

Registration Now Open!

EVERYONE WHO REGISTERS UNDER THE EARLY RATE WILL BE ENTERED INTO A DRAW FOR A FREE REGISTRATION!

CANNT Members receive discounted registration rates.

REGISTRATION RATES:

Full Conference Rates

- Member Early **$575.00**
- Member After August 31 $675.00
- Member After September 23 or onsite $725.00

- Non-Member Early **$710.00**
- Non-Member After August 31 $810.00
- Non-Member After September 23 or onsite $860.00
- Student $300.00

Per Day Rates

- Member Per Day Early **$380.00**
- Member Per Day After August 31 $430.00
- Member Per Day After September 23 or onsite $455.00

- Non-Member Per Day Early $440.00
- Non-Member Per Day After August 31 $500.00
- Non-Member Per Day After September 23 or onsite $525.00
- Student Per Day $160.00

Sponsor-Exhibitor

- Sponsor Complimentary[1] $0.00
- Exhibitor Nametag Complimentary[2] $0.00
- Exhibitor Nametag Additional $75.00
- Sponsor Full $395.00

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[1] *Number of Complimentary registrations determined by sponsorship level*

[2] *One complimentary exhibitor nametag per booth*

Baxter

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FEWER HOSPITALIZATIONS[1]

HAVE YOU CONSIDERED **COMBINING AUTOMATED PERITONEAL DIALYSIS WITH REMOTE PATIENT MANAGEMENT?**

Remote Patient Management may be associated with a significantly reduced rate of hospitalization

Remote Patient Management (RPM) technology is designed to be integrated into automated peritoneal dialysis (APD) systems, enabling clinical teams to access dialysis data and make adjustments to treatment. Consequently, combining APD with RPM enables early intervention if therapy complications are encountered, and may improve treatment adherence and clinical outcomes.

A multicenter, retrospective cohort study matched n=63 APD patients without RPM to n=63 APD patients with RPM. Patients using APD with RPM had a 39% lower rate of hospitalization (p=0.029) and spent 54% fewer days in hospital (p=0.028) compared to APD without RPM. RPM may represent a useful tool for improvement of APD treatment.

Read more about the study here **baxter.ca/healthcare-professionals/renal-care/sharesource-remote-patient-management**

Sharesource

1. Sanabria M, et al. *Remote Patient Monitoring Program in Automated Peritoneal Dialysis: Impact on Hospitalizations.* Perit Dial Int 2019 Sep-Oct;39(5):472-478

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