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

CANNT JOURNAL
JOURNAL ACITN

Volume 31, Issue 2 April–June 2021

CONTENTS

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Letter from the Editors

We only hope that now, at the tail end of the pandemic, all of what we have endured physically, mentally, and spiritually in the past year has only strengthened our personal and professional resolve. Society worldwide adapted to medical/social changes necessary to eliminate the pandemic. We recognized early in the pandemic that normality was being taken away from patients (and their families) and healthcare providers alike. It is time now to actively assist our patients on the path to adaptation to a new normal that will remain with us perhaps for a long period of time.

We, at the *CANNT Journal,* are passionate patient advocates that aim to improve patient outcomes through education, quality, and research initiatives. With this in mind, we are excited to present to you our lead manuscript, *Integrating healthcare and research teams in the continuum of patient care: Successes and challenges*, by Famure et al. (2021). Famure et al. describe a program framework that facilitates collaboration, engagement, and learning among patients, healthcare providers, and researchers with integration of research in the clinical setting. In addition, we present our continuing education article, *What is the evidence for the treatment of osteoporosis with denosumab in the hemodialysis population?* by Lam and Battistella (2021). In this article, Lam and Battistella review the complexity of osteoporosis and the use of denosumab as a treatment for this bone mineral disorder.

As co-editors, we have the amazing opportunity to work with talented novice and experienced writers who take the opportunity to write about important nephrology topics or clinical practice issues.

We publish observational studies, clinical trials, case reports, solutions to clinical bedside problems, and quality improvement projects in order to advance our collective nephrology practice. To novice writers, we are here to guide and help you all the way to publication of your manuscript. To seasoned writers, thank you for your submissions, and we look forward to your next contribution. We need to disseminate this wealth of knowledge for the benefit of the nephrology community.

Sincerely,

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

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

Co-editors, *CANNT Journal*

Message des rédactrices en chef

Nous espérons seulement que maintenant, en cette fin de pandémie, tout ce que nous avons enduré physiquement, mentalement et spirituellement au cours de la dernière année n'a fait que renforcer notre détermination personnelle et professionnelle. La société à l'échelle mondiale s'est adaptée aux changements nécessaires pour enrayer la pandémie, tant sur le plan médical que social. Dès le début de la pandémie, nous avons constaté que les patients (et leur famille), tout comme les fournisseurs de soins de santé, étaient privés de leur normalité. Le temps est maintenant venu d'aider activement nos patients à cheminer sur la voie de l'adaptation à une nouvelle normalité, qui perdurera peut-être encore longtemps.

Au *Journal ACITN*, nous défendons avec passion nos patients par l'enseignement, la qualité et des initiatives de recherche qui visent à améliorer les résultats cliniques de nos patients. Dans cette optique, nous sommes fières de vous présenter notre premier article, *Integrating healthcare and research teams in the continuum of patient care: Successes and challenges*, par Famure et ses collaborateurs (2021). Les auteurs décrivent un cadre de programmes qui favorise la collaboration, l'engagement et l'apprentissage entre les patients, les fournisseurs de soins de santé et les chercheurs grâce à l'intégration de la recherche dans le milieu clinique. De plus, nous présentons notre article sur l'éducation continue, *What is the evidence for the treatment of osteoporosis with denosumab in the hemodialysis population?,* par Lam et Battistella (2021). Dans cet article, les auteurs examinent la complexité de l'ostéoporose et l'utilisation du denosumab comme traitement contre ce trouble minéral osseux.

En tant que corédactrices en chef, nous avons la chance incroyable de travailler avec des rédacteurs de talent, novices ou chevronnés, qui saisissent l'occasion d'écrire sur d'importants sujets en néphrologie ou sur des questions de pratique clinique.

Nous publions des études observationnelles, des essais cliniques, des études de cas, des solutions à des problèmes cliniques et des projets d'amélioration de la qualité afin de faire avancer notre pratique collective en néphrologie. Aux rédacteurs novices, nous disons que nous sommes là pour les guider et les aider tout au long de la démarche jusqu'à la publication de leur article. Aux rédacteurs chevronnés, nous disons merci pour les textes qu'ils ont soumis et nous attendons avec impatience leurs prochains écrits. Nous devons disséminer cette richesse de connaissances au bénéfice de tous dans la communauté néphrologique.

Cordialement,

Jovina Bachynski, M. Sc. inf., inf. prat. (adulte), CNéph(C), étudiante au doctorat

Rosa M. Marticorena, B. Sc. inf., inf. aut., CNéph(C), D.E.S. Épidémiologie clinique, Ph.D.

Corédactrices en chef, *Journal ACITN*

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

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

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Message from the President

Summer greetings!

I feel compelled to write about equity, diversity, and inclusion (EDI) in my *CANNT Journal* message to you. I am by no means a content expert or even feel adept enough to provide advice or guidance on the topic. The programs, courses, books, learning materials, and media attention on EDI are a focal point for many, and I have journeyed into self-reflection and learning to understand more about myself and others. It seems that there is an abundance of training and awareness initiatives in every sector of life. These words are my own interpretation as I take time to explore and understand EDI. By embracing EDI in your workplace and in your life, I believe that it helps create a trusting and nurturing culture. To bring into existence a world where EDI is just a natural part of who we are involves everyone. Each of us plays a vital role in understanding our own conscious and unconscious bias, and how they affect our attitudes, behaviours, decisions, and actions. I encourage everyone to take advantage of the wealth of resources and training available within or outside your institutions. Awareness and education are key components in supporting equality, diversity, and inclusion in your life and work.

Your CANNT Board of Directors and office management team are hard at work to provide you with some valuable educational and relevant opportunities. Check out our **website** for these upcoming events.

Please take some time to share with others the benefits of being a member of CANNT. Be my champion and tell others that your CANNT membership gives you access to the peer-reviewed quarterly *CANNT Journal*, *Vascular Access Guidelines*, *Standards of Nursing Practice*, and *Standards of Technical Practice*. You get educational opportunities eligible for hours towards CNeph(C) certification/recertification, and connections to the latest information and resources related to nephrology nursing and technological practice. Together, with your help, we can achieve growth in our membership, which will yield opportunities to expand our programs and services to members.

Your Canadian Nurses Association (CNA) wants certification to be more accessible to nurses while maintaining their history of established high quality and credibility. The CNA Certification Program has evolved to match changes in nursing curricula and practice. That is why the eligibility specialty experience hours required for nurses to apply for certification will be reduced. See more at: **https://www.cna-aiic.ca/en/certification#st-hash.42OltDcz.dpuf**

Just a reminder to those nurses who are considering writing their CNA certification in nephrology—you can receive the voucher code from CANNT to receive a 20% discount on the cost if you are a CANNT member. The discount can be applied to the CNA member rate or the non-member rate of either the initial exam fee or the recertification fee.

Wishing you a warm and relaxing summer, Janice MacKay (she/her)

Le mot de la présidente

Bonjour à toutes et à tous!

J'ai envie de parler d'équité, de diversité et d'inclusion (EDI) dans le message que je vous adresse aujourd'hui dans le *Journal ACITN*. Je ne suis pas du tout experte en la matière ni même assez compétente pour donner des conseils ou des directives à ce sujet. Mais comme les programmes, les cours, les livres, le matériel didactique et l'attention des médias en matière d'EDI représentent actuellement un point de mire pour un grand nombre de personnes, j'ai entrepris un cheminement axé sur la réflexion personnelle et l'apprentissage pour avoir une meilleure compréhension des autres et de moi-même. Il semble qu'il existe une foule d'initiatives de formation et de sensibilisation à cet égard dans toutes les sphères de la vie. Ces mots sont ma propre interprétation alors que je prends le temps d'explorer et de comprendre les principes d'EDI. L'intégration de ces principes dans notre milieu de travail et dans notre vie contribue, selon moi, à établir une culture de confiance et de bienveillance. Tout le monde doit s'impliquer dans la création d'un monde où les principes d'EDI font partie intégrante de ce que nous sommes. Chacun d'entre nous joue un rôle essentiel dans la compréhension de nos propres préjugés, conscients et inconscients, et de la façon dont ceux-ci influencent nos attitudes, nos comportements, nos décisions et nos actions. J'invite tout le monde à tirer profit de la mine de ressources et de formations offertes tant à l'intérieur qu'à l'extérieur de vos établissements. La sensibilisation et l'éducation sont des éléments clés pour favoriser l'égalité, la diversité et l'inclusion dans votre vie tant personnelle que professionnelle.

Le conseil d'administration et l'équipe de gestion de l'ACITN travaillent d'arrache-pied pour vous offrir de précieuses occasions formatrices et pertinentes. Jetez un coup d'œil à notre **site Web** pour connaître les événements à venir.

Prenez un moment pour partager avec les autres les avantages d'être membre de l'ACITN. Soyez à mes côtés pour indiquer aux autres que votre adhésion à l'ACITN vous donne accès au *Journal ACITN*, révisé par les pairs et publié quatre fois par année, ainsi qu'aux publications *Vascular Access Guidelines*, *Standards of Nursing Practice* et *Standards of Technical Practice*. Vous profitez aussi d'occasions de formation qui sont admissibles à des heures de formation continue afin d'obtenir votre certification ou votre renouvellement de certification CNéph(C), en plus de liens vers l'information et les ressources les plus récentes en matière de soins infirmiers en néphrologie et de pratiques technologiques. Ensemble, avec votre aide, nous arriverons à augmenter notre effectif, ce qui nous permettra d'élargir notre programme et nos services aux membres.

L'Association des infirmières et infirmiers du Canada (AIIC) souhaite que la certification soit plus accessible aux infirmières et aux infirmiers tout en conservant sa réputation bien établie de grande qualité et de crédibilité. Le Programme de certification de l'AIIC a évolué afin de répondre aux changements dans les programmes d'études et la pratique des soins infirmiers. C'est la raison pour laquelle les heures d'expérience requises dans une spécialité pour faire une demande de certification seront réduites. Pour en savoir plus, visitez la page suivante : **https://www.cna-aiic.ca/fr/certification**

Je souhaite rappeler aux infirmières et aux infirmiers qui envisagent de passer l'examen de certification de l'AIIC en néphrologie que vous pouvez recevoir un code promotionnel de l'ACITN, qui vous offre un rabais de 20 % sur les frais si vous êtes membres de l'association. Le rabais peut être appliqué au tarif des membres de l'AIIC ou au tarif pour les non-membres, qu'il s'agisse des frais d'examen initial ou des frais de recertification.

Je vous souhaite un été agréable et reposant
Janice MacKay

Your Board in Action

As we move cautiously toward the end of this great pandemic, we must continue to be vigilant in our efforts until vaccination programs are successfully completed. We must continue to be diligent in our practices, as we experience the effects of the COVID-19 variant strains and become knowledgeable of new information regarding vaccine safety and efficiency. With the opening of national travel on July 1, 2021, vaccine supply and hesitancy is a major concern. CANNT will continue to partner with our colleagues such as the Canadian Nurses Association to ensure all CANNT members have the education and resources needed to address this challenge. Please hold fast—the end of the pandemic is near!

CANNT continues to acknowledge and applauds your hard work necessary to provide your exemplary nephrology care. We will continue to support you and communicate new information and guidelines on our website, as we incorporate this into our practice. On behalf of our executive board of CANNT, we wish to extend a heartfelt thank-you for your dedication. CANNT will continue to support our members through virtual education, collaboration with our colleagues, and the provision of essential resources. Our 2021 virtual conference is currently being developed and we request your input to ensure all member's needs and voices are heard. Our spring virtual series for our nephrology technologists was a resounding success due to your commitment to lifelong professional learning.

MEMBERSHIP

We have successfully maintained our membership to 314 as of May 31, 2021. The Board of Directors (BOD) continually evolves to provide enduring benefits to all our members. We are pleased to announce that our *Nephrology Nursing Standards* and *Vascular Access Guidelines* are currently being published and will be available on our website in the very near future. We are also continuing to develop *Nephrology Nursing Standards* for our NP members with the aim of completion in the fall.

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

- 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.

We are seeking input from our valued membership, and we want to hear from you on ways to increase our association membership. Please share your thoughts with us by contacting your CANNT office team at https://cannt-acitn.ca/

JOURNAL

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

Include a covering letter with contact information for the primary author and a one-sentence biographical sketch (credentials, current job title and location) for each author. The *CANNT Journal* is published four times per year in electronic versions. The journal is a refereed publication and accepts only original, peer-reviewed articles. Advertising opportunities and corporate sponsored education opportunities are available.

COMMUNICATIONS

CANNT continues to lead the way through offering multiple avenues of communication to respond to the increased needs of our members during the COVID-19 pandemic. We have made every effort to support our members with access to timely information including the provision of updates regarding the pandemic and vaccine safety. Your mental health and wellbeing is important to us, and we will continue to provide the necessary resources to our website. We will continue to highlight current issues affecting our members and patients such as Indigenous inequalities and racism, and cultivate relationships to promote change towards a more diversified and inclusive community of practice. We promise to support our members in the future with information regarding current evidence-based practices communicated through all our social media platforms. Please visit our website and stay connected through our tweeter feeds and *CANNT Connection* releases. If you have a question, idea, or event to promote, please speak to our Director of Communications, Ethan Holtzer.

https://ca.linkedin.com/company/canadian-association-of-nephrology-nurses-and-technologists?trk=-public_profile_experience-item_result-card_subtitle-click

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ca.linkedin.com

CANNT website (**www.CANNT.ca**)
Twitter **CANNT (@CANNT1) | Twitter**

ANNUAL CONFERENCE

CANNT is making plans to offer another Virtual Conference Series this fall to all nephrology nurses and technologists, as well as other healthcare professionals and industry partners. We have successfully attained financial support from our industry partners to continue our promise of making this conference affordable by offering complimentary registration to all members and at a very low cost to non-members. We encourage all members to voice their educational needs to their CANNT regional representatives to ensure a more robust agenda that will appeal to the wide range of nephrology professionals and practice settings. Please reach out to the CANNT office or our Regional VPs. Details will be communicated to all members as the webinars are developed.

FINANCES

As a "Not for Profit" professional association, our objective is to provide value to our members that aligns with our mission and vision. Our organization continues to develop innovative financial strategies that will build stability to sustain us in this unprecedented time. For the second time since the beginning of our organization, our annual conference is cancelled and CANNT has responded by using fiscally responsible measures, careful budgeting, and finding alternate financial sources. 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. We thank you for your efforts and commitment to our association. Transparency improves the coherence and cohesion of our association, and provides our association membership with the 2020 Annual Report on the CANNT website at **https://cannt-acitn.ca/**

Sincerely,
Cathy Cake
CANNT President-Elect/ Treasurer 2020-2021

Votre conseil en action

Alors que nous avançons prudemment vers la fin de cette grande pandémie, nous devons continuer d'être vigilants dans nos efforts jusqu'à ce que les programmes de vaccination aient été exécutés avec succès. Nous devons aussi continuer de faire preuve de diligence dans nos pratiques alors que nous subissons les effets des souches variantes de la COVID-19 et nous tenir au courant des nouvelles informations concernant l'innocuité et l'efficacité des vaccins. Avec la reprise des voyages à l'échelle nationale le 1er juillet 2021, l'approvisionnement en vaccins et l'hésitation vaccinale sont des préoccupations majeures. L'ACITN poursuivra sa collaboration avec ses collègues comme l'Association des infirmières et infirmiers du Canada (AIIC) pour faire en sorte que tous les membres de l'ACITN possèdent la formation et les ressources nécessaires pour relever ce défi. Nous vous prions de tenir bon, car la pandémie tire à sa fin!

L'ACITN continue de reconnaître et de saluer votre travail acharné, qui est vital pour fournir des soins de santé exemplaires en néphrologie. Nous continuerons de vous soutenir et de vous communiquer les nouvelles infos et les lignes directrices sur notre site Web à mesure que nous les intégrons à notre pratique. Au nom du conseil d'administration de l'ACITN, nous souhaitons vous remercier du fond du cœur pour votre dévouement. L'ACITN continuera de soutenir ses membres par le biais d'enseignement virtuel, de collaborer avec ses collègues et de fournir les ressources essentielles. Comme notre congrès virtuel 2021 est en cours d'élaboration, nous vous prions de nous faire part de vos commentaires pour assurer que les besoins et les voix de tous les membres seront entendus. Au printemps, notre série de webinaires à l'intention des technologues en néphrologie a connu un succès retentissant en raison de votre engagement permanent envers l'apprentissage professionnel.

ADHÉSION

En date du 31 mai 2021, nous comptons toujours 314 membres. Le conseil d'administration évolue continuellement pour offrir des avantages durables à tous nos membres. Nous avons le plaisir d'annoncer que nos normes de soins infirmiers en néphrologie *(Nephrology Nursing Standards)* et nos lignes directrices sur l'accès vasculaire (*Vascular Access Guidelines)* sont en cours de publication et seront très prochainement disponibles (en anglais) sur notre site Web. Nous continuons également à élaborer des normes de soins infirmiers en néphrologie à l'intention de nos membres infirmières praticiennes, dont l'achèvement est prévu à l'automne.

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

- Accès en ligne pour tous les membres au *Journal ACITN,* la revue trimestrielle évaluée par les pairs
- Accès en ligne aux publications V*ascular Access Guidelines*, *Standards of Nursing Practice* et *Standards of Technical Practice*
- Réduction des frais d'inscription au congrès annuel
- Possibilités de formations gratuites ou à prix réduit
- Liens vers l'information et les ressources les plus récentes en matière de soins infirmiers en néphrologie et de technologies
- 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. Nous sommes à l'écoute de nos membres, que nous tenons en haute estime, et nous aimerions connaître votre opinion sur la manière d'augmenter notre nombre d'adhérents. Veuillez nous faire part de vos idées en communiquant avec l'équipe administrative de l'ACITN à **https://cannt-acitn.ca/**.

JOURNAL

Vous trouverez la marche à suivre vous permettant de soumettre un article pour publication dans notre revue sous la section réservée au *Journal ACITN* du site Web de l'Association. Nous privilégions les articles qui portent sur de nouvelles données cliniques ou qui traitent de sujets présentant un intérêt particulier pour les infirmières, les 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**.

Veuillez y joindre une lettre d'accompagnement comportant les coordonnées du principal auteur et une notice biographique d'une seule phrase (titre, emploi actuel et lieu de travail) pour chaque auteur. Le *Journal ACITN* est publié quatre fois par an dans un format électronique. Il est soumis à l'examen d'un comité de lecture et seuls les articles originaux, révisés par les pairs, sont acceptés. Des possibilités d'annonces publicitaires et de formations parrainées par des entreprises sont offertes.

COMMUNICATIONS

L'ACITN continue d'ouvrir la marche par l'intermédiaire de multiples avenues de communication afin de répondre aux besoins accrus de ses membres durant la pandémie de COVID-19. Nous nous sommes efforcés de soutenir nos membres en offrant l'accès à de l'information

actuelle, y compris des mises à jour au sujet de la pandémie et de l'innocuité des vaccins. Votre santé mentale et votre bien-être comptent à nos yeux et nous continuerons de vous fournir les ressources nécessaires sur notre site Web. Nous continuerons de mettre en lumière les enjeux actuels touchant nos membres et nos patients, tels que le racisme et les inégalités auxquelles font face les autochtones, et d'entretenir des relations pour promouvoir le changement vers une communauté de pratique plus diversifiée et plus inclusive. Nous continuerons de vous soutenir à l'avenir en vous donnant de l'information au sujet des pratiques fondées sur les données probantes, qui vous sera communiquée sur toutes nos plateformes de médias sociaux. Visitez notre site Web et restez informés par l'intermédiaire de nos publications sur Twitter et des bulletins *Your CANNT Connection*. Si vous avez une question, une idée ou un événement à promouvoir, écrivez à Ethan Holtzer, notre directeur des communications.

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Site Web de l'ACITN (**www.CANNT.ca**)

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CONGRÈS ANNUEL

Cet automne, l'ACITN prévoit d'offrir une autre série de conférences virtuelles destinée à tous les infirmiers, infirmières et technologues en néphrologie, ainsi qu'aux autres professionnels de la santé et partenaires de l'industrie. Nous avons réussi à obtenir un soutien financier de nos partenaires de l'industrie pour tenir notre promesse de rendre ce congrès abordable en offrant l'inscription gratuite à tous les membres et l'inscription à un très faible coût aux non-membres. Nous encourageons tous nos membres à faire part de leurs besoins en matière de formation à leur représentant régional de l'ACITN afin d'assurer un programme substantiel qui saura être attrayant pour un large éventail de milieux de travail et de professionnels en néphrologie. Veuillez communiquer avec le bureau de l'ACITN ou l'un de nos vice-présidents régionaux. Les détails seront communiqués aux membres lorsque les webinaires seront créés.

FINANCES

En tant qu'association professionnelle sans but lucratif, notre objectif est d'offrir à nos membres une valeur ajoutée en lien avec notre mission et notre vision. Notre organisation continue d'élaborer des stratégies financières novatrices qui assureront la stabilité pour nous soutenir durant cette période sans précédent. Pour la seconde fois depuis la création de notre organisation, notre congrès annuel a dû être annulé et l'ACITN a réagi en utilisant des mesures fiscales responsables, un budget prudent et d'autres sources de financement. 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. Nous les remercions pour leurs efforts et leur engagement envers l'Association. Comme la transparence améliore la cohérence et la cohésion de notre association, nos membres peuvent consulter le rapport annuel 2020 de l'Association sur le site Web de l'ACITN : **https://cannt-acitn.ca/**.

Sincerely,

Cathy Cake
CANNT President-Elect/ Treasurer 2020-2021

NOTICE BOARD

	Fall 2021
Initial exam or renewal by exam application window	**June 1-September 1, 2021**
Certification exam window	**November 1-15, 2021**
Renewal by continuous learning application window	**January 14 – November 1, 2021**

N.B. CNA will provide 20% discount for initial exam writers, renewal exam writers, and renewals by continuous learning in 2021 to active members of CANNT. Contact cannt@cannt.ca for the voucher code in 2021.

- **September 4-7, 2021.** 49th Annual European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA) International Conference: *Knowledge, skills and commitment – Core elements to manage care*. Cankarjev dom, Ljubljana, Slovenia. **https://www.edtnaerca.org/conferences/conferences-ljubljana-2020**
- **September 15, 2021.** Nephrology Health Care Professionals' Day (celebrated every third Wednesday of September annually)
- **October 19-December 2, 2021**. Canadian Association Nephrology Nurses and Technologists (CANNT) 52nd Annual Conference 2021, Virtual Conference every Tuesday and Thursday, 2:30 p.m. – 3:30 p.m. ET and 6:30 p.m. – 7:30 p.m. ET More details coming soon! **www.cannt.ca**
- **November 2-7, 2021.** American Society of Nephrology (ASN) 2021 Kidney Week, San Diego Convention Center, San Diego, CA. **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
56	18	74	232

Integrating healthcare and research teams in the continuum of patient care: Successes and challenges

By Olusegun Famure, Franz Marie Gumabay, Ioana Clotea, Jaya Manjunath, Heebah Sultan, Nicholas Phan, Jayoti Rana, and S. Joseph Kim

ABSTRACT

Research plays a vital role in providing evidence-based care. However, the integration of research programs with clinical practice faces indubitable challenges, both logistically and financially. This paper aims to describe a research program framework that facilitates collaboration, engagement, and learning among patients, healthcare providers, and researchers. To develop the research program framework, an environmental scan of the literature was performed. Features of successful research programs and the contents of an assessment survey provided to allied and nursing professional leads were obtained. Barriers to research participation included lack of a formal framework, resources, and adequate knowledge in applied research methodology. The Centre for Renal Research: Information technology, Innovation, Quality and Education (CR²ITIQuE) research program was developed to mediate this gap. CR²ITIQuE has a unique holistic research approach that incorporates four areas of focus—research, information technology systems, quality improvement initiatives, and education—to seamlessly integrate research into the workflow of healthcare providers.

Key words: academic medical centres, research program, organizational structure, research participation, patient engagement, quality improvement

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A primary objective of academic medical centres (AMCs) is to integrate education and research into the delivery and improvement of clinical care (Ovseiko et al., 2014; King et al., 2016). Research plays an integral role in improving clinical care as healthcare providers (HCP) often utilize evidence-based research findings to guide clinical decisions (King et al., 2016). Furthermore, AMCs involved in the clinical management of patients with chronic health conditions such as HIV, cancer, and organ transplants must employ a holistic view that considers the medical, surgical, bioethical and psychosocial aspects when implementing complex and multifaceted treatments (Kuziemsky, 2016). Thus, to optimize care, research programs dedicated to studying chronic health conditions should partner with clinicians to integrate findings into clinical practice (Feldman et al., 2010).

The University Health Network's (UHN) Transplant program was formally established in the early 1990's and is the largest of its kind in Canada, performing approximately 500 transplants per year (University Health Network, 2018). To manage this substantial patient population, the program includes a multidisciplinary team of physicians, surgeons, nurse assessment coordinators, nurse practitioners, pharmacists, bioethicists, and allied health professionals. The Kidney Transplant Program (KTP) is the largest component of the UHN Transplant program performing approximately 2/5 of the more than 500 transplant surgeries annually. Since its inception in 1966, more than 3,500 kidney transplants have been performed with greater than 2,000 patients currently in follow-up (University Health Network, 2018). The KTP recognizes each patient as a unique entity that can be studied in order to improve the quality of care provided to them. With a broad and diverse group of patients living with kidney disease at UHN, the site is ideal for researching various facets of transplantation with the goal of optimizing pre- and post-transplant care.

Clinicians within UHN KTP have historically created research projects based on their areas of interests and expertise. This led to the formation of siloed project-specific teams, which limited academic integration and research collaboration across the multidisciplinary field (King et al., 2016; Feldman et al., 2010). In addition, opportunities for the involvement of allied health and nursing staff in research were lacking, while lack of patient engagement in research hindered recruitment and the development of patient-driven programmatic research and quality improvement (South et al., 2016; Burns et al., 2013). Lastly, patients participating in research were often unaware of research findings due to the absence of appropriate knowledge translation tools.

A need was subsequently identified: to form a unified research program integrated within clinical practice to improve overall care delivery. The aims of the newly conceived comprehensive research program were to: (1) create a collaborative environment for clinical research to improve patient care; (2) provide continued training of nursing professionals in the application of rigorous research methods to programmatic quality initiatives; and (3) increase engagement and education of patients and the public. These objectives were addressed through the formal development of a distinct unit known as the Centre for Renal Research: Information Technology, Innovation, Quality and Education (CR²ITIQuE).

GAP ANALYSIS

Literature Review

As part of the development of CR²ITIQuE, an environmental scan was conducted to identify barriers and facilitators to successful research programs within AMCs, as well as the barriers to nurse participation in research.

Current literature identifies a lack of (1) knowledge around research methods and the critical appraisal of scientific literature (Whitworth et al., 2012), (2) integration of healthcare disciplines (Feldman et al., 2010) and (3) integration between healthcare and research teams as barriers to effective research programs (King et al., 2016). The lack of educational opportunities around research methodology and its application to programmatic quality initiatives frequently results in suboptimal learning and decision making (King et al., 2016). Furthermore, isolation between departments and investigators reduces collaboration and limits funding opportunities (Feldman et al., 2010). Barriers to the participation of nursing staff include low staffing levels (Sarabia-Cobo et al., 2015), lack of financial support (Dev et al., 2008), lack of knowledge about research processes (Chan et al., 2011; Edwards et al., 2009), and lack of confidence to disseminate knowledge through conferences or papers (Paget et al., 2014).

King et al. (2016) proposed the creation of organizational structures that integrate cross-functional activities across disciplinary boundaries. Such activities "integrate two or more of the academic functions (i.e. research, clinical practice, and education) by involving researchers, clinicians, educators, and/or knowledge translation experts, with goals/outputs related to two or more of the functions" (King, 2016). A British model found that transitioning healthcare staff from being aware of research to participating and/or conducting research activities resulted in an enhanced research capacity, thus increasing the translation of outcome research into practice (Feldman et al., 2010).

Barriers Assessment

To further investigate research gaps in the KTP, a short exploratory survey was developed based on the primary literature analysis and administered to five allied and nursing professional leads in the KTP – hailing from assessment coordinators and pharmacists to dietitians and social workers in the kidney transplant field of practice. (See Appendix A for the barriers assessment survey). The aim of the survey was to identify (1) barriers that restrict participation in research, and (2) strategies to overcome these barriers (Figures 1-2). Based on survey responses, lack of resources and insufficient time were identified as barriers to research participation. Strategies employed by CR²ITIQuE to overcome these barriers are found in Table 1, as well as general approaches to incorporate research practices where such barriers exist.

Figure 1. *Barriers that Restrict Participation in Research Based on Survey Responses of Allied Health Staff*

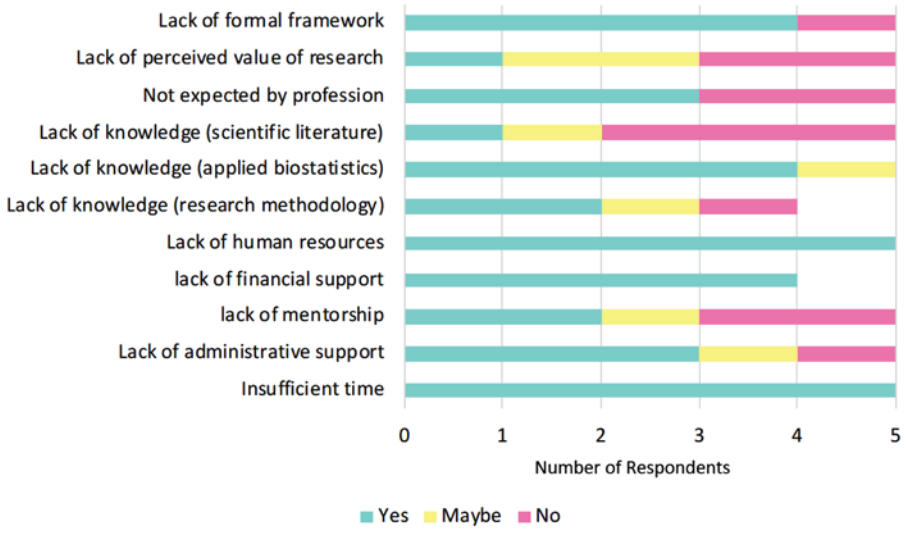


Figure 2. *Strategies to Overcome Barriers to Research Participation Based on Survey Responses of Allied Health Staff*

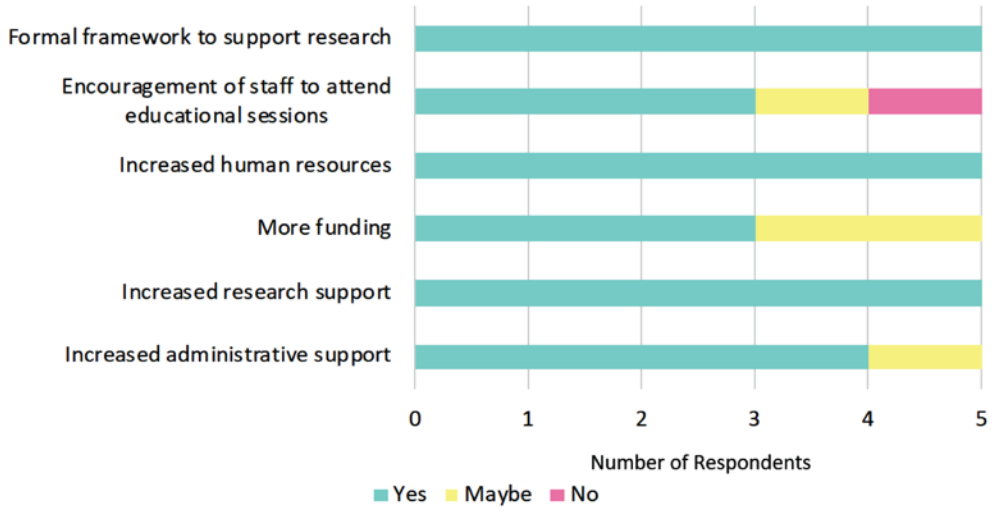


Table 1. *Barriers to Research Participation Among Allied Health Professionals and Strategies to Overcome Them*

Barrier	Strategies to Overcome Barriers	Strategies Undertaken by CR²ITIQuE
Lack of formal framework + insufficient time* *the KTP requires clinical practice be put first before other work	Formal framework be built to include allied health professionals in research	Developed unique collaborations with healthcare practitioners within the KTP to develop research sub-groups focused on specific aspects of kidney transplantation
Lack of knowledge in applied biostatistics and research methodology	Statistics-based seminar course for healthcare practitioners	Introduction of SPICE+B: Summer Program in Clinical Epidemiology and Biostatistics
Lack of resources		
Financial resources	Examination of the resources required and where funding could be made available to assist in each area	Funding and other resources were obtained through government, professional associations, institutional, and pharmaceutical sources.
Human resources / administrative support	Research trainees to receive the necessary funding to participate and be involved while supporting allied health professionals in their endeavours.	Resources were obtained through research grants including those available to allied health professionals which had not been accessed to prior.

KTP=Kidney Transplant Program

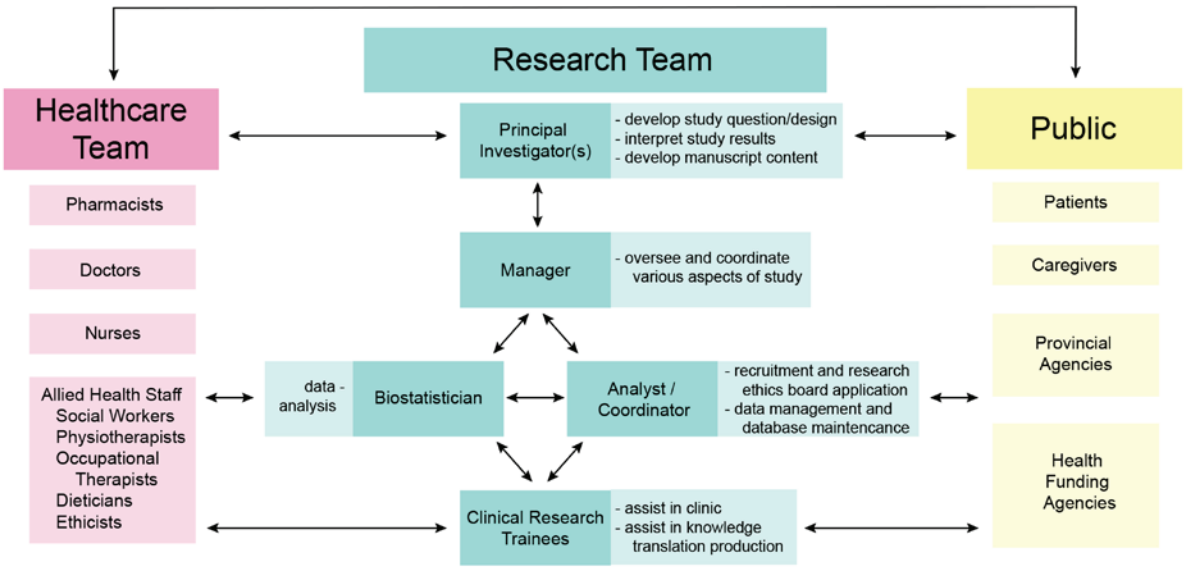
CONCEPTUAL PHASE

Using results from the barriers assessment and published literature, the KTP examined its current organizational structure, the resources being used, and the best approach to remodel the research program. As such, CR²ITIQuE's framework included four core areas of focus: (1) in-centre and multi-centre research consisting of outcomes research and clinical trials, (2) information technology (IT) systems for the management of healthcare information, (3) patient care and quality improvement initiatives and (4) education geared towards healthcare and nursing staff, students, and patients.

IMPLEMENTATION PHASE

CR²ITIQuE's organizational structure (Figure 3) was created to help meet the goals of the new research program. It creates a collaborative environment for clinical research by providing healthcare and nursing staff not otherwise involved in research with a team to facilitate studies. Thus, it allows HCP to conduct or participate in research more aligned to their clinical practice, and promote continued learning by integrating and educating research trainees as support personnel. CR²ITIQuE has fostered engagement and education of patients by integrating HCP who can identify patient-driven research questions.

Figure 3. *Organizational Structure of CR²ITIQuE: Extensive Communication Between the Research Team, Healthcare Team, and the Public*



OUTCOME PHASE

The formation of CR²ITIQuE has produced significant results in its four core focus areas.

(1) In-centre and Multi-centre Research Studies

A clinical trials team, comprised of research coordinators and clinical research trainees has helped to conduct several externally sponsored multi-centre clinical trials. Relevant healthcare and nursing staff caring for enrolled patients are made research-aware through clinical-research integration, and understand how their clinical duties contribute to the research being conducted. In addition to multi-centre clinical trials, other in-centre research projects have been undertaken. These research projects often involve multiple collaborators from different specialized research teams within the field of transplantation such as surgery, pharmacy and infectious diseases. As a result, healthcare and nursing staff have the opportunity to participate in research beyond their specialized field of practice. We found that these efforts foster a multidisciplinary and research-cognisant environment across care providers. Table 2 displays the various in-centre research studies and externally funded multi-centre clinical trials within the KTP as a result of CR²ITIQuE's emphasis on multidisciplinary collaboration.

(2) Information Technology (IT)

IT infrastructure was developed to support healthcare and involvement of nurses in relevant research and programmatic quality initiatives. The Comprehensive Renal Transplant Research Information System (CoReTRIS) is used to track patients evaluated to receive a kidney transplant and clinical outcomes thereafter (Famure et al., 2014). A 'sister-like' IT system geared towards documenting demographic, medical, psychosocial and evaluation of potential living kidney donor candidates has recently been established (Famure et al., 2019). Data linkages between the two IT systems and a programmatic biological specimen repository have also been established. Input from our multi-disciplinary team of HCP were sought at various stages of the development process. We found that integration with existing nursing procedures is conducive to their participation in research.

(3) Quality Assurance Initiatives

CR²ITIQuE continually strives to partake in quality assurance projects as a means of improving clinical processes that affect patient care. One such project is the improvement of patient health information (PHI) at the point of care, wherein our research team works closely with nurse assessment coordinators to ensure that PHI is captured at the point of care in a systematic manner that integrates seamlessly with the workflow of HCP. The development and implementation of data collection manuals and e-learning tools ensure standardized, comprehensive documentation of health information.

Access to PHI documented in a standardized manner allows for regular reviews to assess performance in healthcare delivery, identify areas for improvement, and suggest benchmarks for optimizing healthcare delivery for patients (Famure et al., 2019). Findings are continuously incorporated into nursing practice to ensure the KTP is a leader in nephrology and transplant care.

(4a) Education (Staff and Trainees)

CR²ITIQuE has developed educational initiatives aimed at improving HCP and clinical research trainees understanding of research principles and their applications through the Summer Program in Clinical Epidemiology and Biostatistics (SPICE&B). This course, facilitated by a multi-disciplinary team of experts in epidemiology, is designed to help allied

Table 2. *In-Centre and Multi-Centre Research Studies Published by CR²ITIQuE Members*

Research Themes	Publications	Journal
Biological/Physiological Research		
Infectious disease	Incidence, risk factors, and outcomes of Clostridium difficile infections in kidney transplant recipients (Li et al., 2018)	Transplantation
Non-infectious disease complications	Postoperative surgical-site hemorrhage after kidney transplantation: incidence, risk factors, and outcomes (Hachem et al., 2017)	Transplant International
Immunology/ Immunosuppression	Timing of rabbit antithymocyte globulin induction therapy in kidney transplantation: an observational cohort study (Harrison et al., 2014)	Transplantation Research
Psychosocial Research		
Medication adherence	Randomized controlled trial of a computer-based education program in the home for solid organ transplant recipients: Impact on medication knowledge, satisfaction, and adherence (Harrison et al., 2017)	Transplantation
	Psychosocial needs assessment post kidney transplant: Feasibility of a post-transplant specific support group (Brijmohan et al., 2015)	Canadian Association of Nephrology Nurses and Technologists
Barriers to transplantation	Mental health and behavioral barriers in access to kidney transplantation: A Canadian cohort study (Mucsi et al., 2017)	Transplantation
	Ethnic background is a potential barrier to living donor kidney transplantation in Canada: A single-center retrospective cohort study (Mucsi et al., 2017)	Transplantation
Quality Improvement Research		
Health services and quality improvement research	Health information management for research and quality assurance: The Comprehensive Renal Transplant Research Information System (Famure et al., 2014)	Healthcare Management Forum
	Performance measures for the evaluation of patients referred to the Toronto General Hospital's kidney transplant program (Sultan et al., 2013)	Healthcare Management Forum
Improving living and deceased kidney donation rates	Maximizing opportunities for living kidney donation (Lam et al., 2014)	Ethical, Legal, and Psychosocial Aspects of Transplantation - Global Issues, Local Solutions (Book)
Multi-Center Research Studies		
	Adverse outcomes of tacrolimus withdrawal in immune-quiescent kidney transplant recipients (Hricik et al., 2015)	Journal of the American Society of Nephrology
	Kidney function and risk of cardiovascular disease and mortality in kidney transplant recipients: the FAVORIT Trial (Weiner et al., 2012)	American Journal of Transplantation
	Levofloxacin for BK virus prophylaxis following kidney transplantation: A randomized clinical trial (Knoll et al., 2014)	Journal of the American Medical Association
	The risk of acute rejection following kidney transplant by 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D status: A prospective cohort study (Zimmerman et al., 2017)	Canadian Journal of Kidney Health and Disease
	Determinants of left ventricular characteristics assessed by cardiac magnetic resonance imaging and cardiovascular oiomarkers related to kidney transplantation (Prasad et al., 2018)	Canadian Journal of Kidney Health and Disease

health and nursing staff employ research methods and statistical approaches in clinical settings. The course is composed of both didactic and practical elements, enabling HCP to incorporate rigorous research methodology in their day-to-day work as well as quality improvement initiatives directly aligned to their clinical practice.

Supplemental training in transplantation medicine and research is available to clinical research trainees through the Multi-Organ Transplant Student Research Training Program (MOTSRTP) and the Advanced Student Placement Integrating Research Education (ASPIRE) programs (Famure et al., 2012). Trainees, research staff, and members of the healthcare team also partake in periodic 'Research in Progress' meetings to update all stakeholders on the progress of ongoing research and solicit feedback. Regular meetings ensure all members are equally informed and involved in ongoing research initiatives, bridging the gap between HCP and researchers.

(4b) Education (Patients and the Public)

In consultation with nurse coordinators, CR²ITIQuE has contributed to the development and updating of various patient education tools, such as the Kidney Transplant Recipient Manual and the Donating a Kidney Manual, which are currently utilized by the KTP (Famure et al., 2016). In addition, the Kidney Pulse biannual newsletter is a tool developed by CR²ITIQuE to improved education and engagement of patients in all aspects of pre- and post-transplant care. To help patients understand the significance of research and encourage participation in research studies, CR²ITIQuE developed a biannual news bulletin about ongoing research within the KTP titled IMPACT (Famure et al., 2016). Thus, regular communication between research teams, healthcare providers, and patients are crucial to achieving a research-conscious program.

DISCUSSION

The CR²ITIQuE research program is unique in its holistic approach to research. It strives to integrate research with clinical care by fostering a collaborative environment for clinical research, promoting HCP's understanding of research methodology, and engaging patients and the public about research.

By conducting clinical trials and internal research studies, CR²ITIQuE is cultivating a collaborative research environment among physicians, nurses, pharmacists, allied health, and other members of the multidisciplinary healthcare team. Team members' distinct perspectives are incorporated to enhance research study quality and intended clinical impact.

Education is integral to CR²ITIQuE's framework. The SPICE&B summer course for healthcare and nursing staff facilitates their integration into research activities by providing an introduction to applied biostatistics and research methodology. Skills learned in-course can be used to lead practice-specific quality improvement initiatives to ameliorate clinical practice and patient care. The availability of a comprehensive, integrated IT systems facilitates a variety of cross-discipline internal studies, which are beneficial to both patients and HCP (Famure et al., 2014; Famure et al., 2019).

CR²ITIQuE has also focused on improving patients' experiences throughout the transplant process through quality improvement initiatives. This includes making the referral and evaluation process more efficient as well as providing education to keep patients engaged (Sultan et al., 2013).

LIMITATIONS

Despite its many benefits, the CR²ITIQuE research program possesses indubitable challenges. One major limitation is the sub-optimal level of patient recruitment for on-going research initiatives, as advances in medical care rely heavily on voluntary patient participation (Selewski et al., 2016) and thus successful integration of clinical care and research in each patient's care is vital for such programs to be successful (Selewski et al., 2016). Opportunities to introduce and explain the importance of research and its successes to patients by healthcare and nursing teams at various stages of their clinical assessments should be encouraged. This may help sensitize patients' perceptions of research participation as an unrelated endeavour separate from the care they currently receive.

Challenges faced in boosting patient recruitment in research studies is not limited to patients; HCP play a role, as well. The active involvement of healthcare and nursing staff in promoting research endeavours is vital to the success of research units such as CR²ITIQuE. Aligning the goals of HCP regarding their professional development and clinical practice with those of CR²ITIQuE should be sought where possible.

A major limitation in developing and maintaining a research program is the maintenance of a continuous sustainable funding structure. Funding are obtained from a variety of sources such as pharmaceutical companies (linked to clinical trials research), scientific granting agencies (e.g. CIHR, NIH, etc.) and philanthropic entities. With today's competitive research funding environment and the uncertainty of a steady monetary flow, the maintenance of adequate staff to support the functions of CR²ITIQuE remains challenging.

Approaches to patient engagement related to research also requires revision. While our methods encourage patient awareness of research, the active solicitation of patients' input is lacking. Rather than limit patients' involvement in research to merely 'subject participants', patients should be sought as partners in all stages of the research process (Chudyk et al., 2018; Mallidou et al., 2018). Initiatives in Canada such as the Patient-Oriented Research (POR) provide frameworks for stakeholders (patients, researchers, HCP and health decision makers) to facilitate collaboration in pursuit of patients' interests (Chudyk et al., 2018; Mallidou et al., 2018) . This model of patient engagement is an approach CR²ITIQuE intends to adopt.

Overall, CR²ITIQuE has provided a net benefit to the KTP and the healthcare staff who operate within it. Although maintaining staff support and patient

participation has had its challenges, it has enabled the program to identify its research pillars and develop a multidisciplinary research focus. Regular input and active involvement from nursing staff have also resulted in the development of patient educational materials. These collaborative partnerships within the KTP have led to the development of new external connections and a platform for HCPs to meet and discuss research initiatives and clinical partnerships. More work is warranted to facilitate active patient-researcher partnerships while ensuring a steady funding source for ongoing research initiatives.

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Barriers Assessment Survey: Propagating a culture of research among health practitioners in MOT and their partners

Demographic Data

Gender
☐a. Male
☐b. Female
☐c. Other

Age
☐a. 20 - 34
☐b. 35 - 49
☐c. 50 - 64
☐d. 65+

Academic & Professional Profile

1. Please indicate your highest education level achieved:

___Completed undergraduate degree
Type(s):_____

___Completed Graduate Certificate(s)
Type(s): _____

___Completed Masters Degree
Type(s): _____

___Completed Doctoral degree
Type(s): _____

___Completed Post-Doctoral degree
Type(s): _____

2. How long have you been practicing in the healthcare field? _____ Years

3. How long have you been practicing in this profession? _____ Years

4. How long have you been working at MOT? _____ Years

Research Related Activities

5. Are you interested in taking part in research related activities?
☐a. Yes
☐b. No

6. Have you ever taken part in any research related activities?
☐a. Yes
☐b. No → skip to question **12**

7. Have you taken part in research related activities before joining MOT?
☐a. Yes
☐b. No

8. Have you taken part in research related activities after joining MOT?

☐ a. Yes
☐ b. No

9. Check all research related activities that you have taken part in:

a. Grant writing	☐
b. Use of databases	☐
c. Data collection & entry	☐
d. Data analysis	☐
e. Management of clinical trials	☐
f. Presenting at conferences	☐
g. Publications	☐
h. Other (*specify*):	☐

10. How much time do you spend per week on research related activities as part of your practice?

☐ a. 3 – 20 hours
☐ b. 21 – 50 hours
☐ c. 50+ hours

11. Are research related activities an important aspect of your professional practice?

☐ a. Yes
☐ b. No

Research Development

12. What do you feel/believe are barriers that restrict your participation in research?

	Yes	No	Uncertain
a. Insufficient time	☐	☐	☐
b. Lack of administrative support: administration will not allow for implementation of research related activities	☐	☐	☐
c. Inaccessible to/isolated from knowledgeable colleagues with whom to discuss research and gain advice (mentorship)	☐	☐	☐
d. Lack of financial support to fund research	☐	☐	☐
e. Lack of human resources/staffing levels	☐	☐	☐
f. Lack of knowledge/education in research methodology	☐	☐	☐
g. Lack of knowledge in applied biostatistics	☐	☐	☐
h. Lack of knowledge in critically appraising scientific literature	☐	☐	☐
i. Not part of the expectations of the profession	☐	☐	☐
j. Lack of perceived value of research to practice	☐	☐	☐
k. Lack of central information about research activity within the hospital	☐	☐	☐
l. Lack of formal framework to identify or develop researchers and support innovation	☐	☐	☐
m. Other (specify):	☐	☐	☐

13. What do you feel/believe are facilitators to overcome the barriers to your participation in research?

		Yes	No	Uncertain
a.	Increased research support system ('research champions' to encourage staff to participate in research related activities)	☐	☐	☐
b.	Encouragement of staff to attend and participate in educational rounds, journal clubs, and multi-disciplinary research symposiums	☐	☐	☐
c.	Availability and easy access to funding opportunities	☐	☐	☐
d.	Formal framework to support research development	☐	☐	☐
e.	Increase human resources: Either increase in staff or increase in research assistants	☐	☐	☐
f.	Increased administrative and managerial support value and expect research to be a part of the profession	☐	☐	☐
g.	Other (specify):	☐	☐	☐

Comments & Feedback

14. Please feel free to provide any comments you may have regarding the barriers and/or facilitators for research in your practice.

15. Please feel free to provide us with any feedback on the contents of the survey.

THANK YOU FOR PARTICIPATING IN OUR SURVEY!

CONTACT HOUR: 2.0 HRS

What is the evidence for the treatment of osteoporosis with denosumab in the hemodialysis population?

By Cynthia Lam and Marisa Battistella

LEARNING OBJECTIVES

1. Understand the complexity of the diagnosis and management of osteoporosis in hemodialysis patients.
2. Describe the pathophysiology of chronic kidney disease mineral and bone disorder (CKD-MBD).
3. Describe the mechanism of action of denosumab.
4. Discuss the efficacy and safety of denosumab in hemodialysis patients.

INTRODUCTION

The risk of fractures in patients with end-stage kidney disease (ESKD) is at least four-fold higher than in the general population (Khairallah & Nickolas, 2018; Nitta et al., 2017). Furthermore, people with ESKD are at a higher risk of morbidity and mortality associated with fractures compared to those without ESKD who experience a fracture (Khairallah & Nickolas, 2018; Nitta et al., 2017). Most patients with chronic kidney disease (CKD) develop chronic kidney disease mineral and bone disorder (CKD-MBD). This disorder is a major contributor to the complex pathogenesis of osteoporosis and increased incidence of fractures in the hemodialysis population. As a result of CKD-MBD, the diagnosis and treatment of osteoporosis in the general population cannot be easily extrapolated to patients on hemodialysis. Despite the increased burden of fractures in patients with ESKD, there remains a paucity of data on the most optimal strategies to diagnose and treat osteoporosis in this patient population. Osteoporosis therapies used in the general population such as bisphosphonates and denosumab have been scarcely studied in ESKD. This review article will provide an overview on the impact of CKD-MBD on osteoporosis diagnosis and management. In addition, an overview of the evidence for denosumab will be discussed.

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PATHOPHYSIOLOGY OF CHRONIC KIDNEY DISEASE MINERAL AND BONE DISORDER (CKD-MBD)

Chronic kidney disease mineral and bone disorder (CKD-MBD) is a common complication that begins early in CKD and worsens as kidney disease progresses. It is a disorder of mineral and bone metabolism associated with alterations in the homeostasis of calcium, phosphorus, activated vitamin D, and parathyroid hormone (PTH) (Tomasello, 2007). An early sign of kidney impairment is the reduced ability to excrete phosphorus. As serum phosphorus levels increase, serum calcium will bind to the phosphorus and form an insoluble salt. Over time, serum calcium levels decrease. Low calcium will stimulate the parathyroid glands to release PTH. PTH will act on target organs in an attempt to normalize the calcium. PTH stimulates bone resorption, leading to calcium release. In the kidneys, PTH will upregulate 1-alpha-hydroxylase, the enzyme responsible for the activation of vitamin D. Increasing activated vitamin D will increase the absorption of calcium from the small intestines. However, given that these patients have impaired renal function, the ability to activate vitamin D is also compromised. CKD-MBD often results in high phosphorus, low calcium, low active vitamin D, and high PTH. The biochemical abnormalities in CKD-MBD leads to bone disorders known as renal osteodystrophy (Tomasello, 2007). There are three types of renal osteodystrophy: high bone turnover disease (osteitis fibrosa cystica), low bone turnover disease

(adynamic bone disease), and osteomalacia (Tomasello, 2007). If renal osteodystrophy is left untreated, the bones persistently become weak and fracture risk increases.

DIAGNOSIS OF OSTEOPOROSIS ASSOCIATED WITH CKD-MBD

CKD-MBD complicates the diagnosis of osteoporosis in patients on hemodialysis. Osteoporosis is impacted by bone strength, which is comprised of bone density and bone quality. However, the diagnosis of osteoporosis in the general population is often only based on bone mineral density (BMD). According to the World Health Organization (WHO), osteoporosis is diagnosed based on a T-score of less than or equal to 2.5 and/or a history of a fragility fracture (Khairallah & Nickolas, 2018). The T-score is a marker that reflects an individual's bone mineral density (BMD). Not surprisingly, patients with ESKD will often have BMD levels in the osteoporosis range; however, these levels do not reflect microarchitectural changes or the type of renal osteodystrophy commonly seen in this patient population (Khairallah & Nickolas, 2018). BMD provides an incomplete picture in predicting fracture risk, particularly in patients on hemodialysis. Therefore, bone biopsy is the gold standard for diagnosis of osteoporosis in patients on hemodialysis. It is the only test that can confirm the bone quality and the underlying bone disorder in the patient with ESKD (Ketteler et al., 2017). Unfortunately, bone biopsies are rarely performed in clinical practice; this is due to limitations including its invasive nature leading to an increased risk of patient discomfort, bleeding, infections, and even fractures. Given the practical limitations of bone biopsies and the established increased risk of fractures in patients with ESKD, the Kidney Disease: Improving Global Outcomes (KDIGO) 2017 guidelines suggest BMD testing in patients with CKD G3a-5D with evidence of CKD-MBD and/or risk factors for osteoporosis if results will impact treatment decisions (Ketteler et al., 2017).

PHARMACOTHERAPY IN CKD-MBD

KDIGO and experts recommend that CKD-MBD be managed first prior to consideration of antiresorptive therapies (Ketteler et al., 2017) by normalizing phosphorus, calcium, and PTH levels. Serum phosphorus can be reduced by using calcium or non-calcium-based phosphate binders. Vitamin D analogues (i.e., calcitriol) and calcimimetics (i.e., cinacalcet) can be used to decrease high PTH levels. Managing these biochemical abnormalities will minimize the increased breakdown of bone caused by persistently high PTH levels in patients on hemodialysis.

Denosumab

Aside from the management of CKD-MBD to reduce fracture risk, many are interested in the potential use of anti-osteoporosis agents commonly used in the non-ESKD population. Antiresorptives including bisphosphonates and denosumab are some of the most common therapies in the general population. These agents aim to improve BMD and reduce risk of fracture by slowing the rate of bone breakdown. Bisphosphonates are significantly cleared by the kidneys and are thus contraindicated when the eGFR is less than30 mL/min/1.73m^2. On the other hand, denosumab is not renally cleared. As a result, some clinicians may consider denosumab as a more appropriate alternative in patients with impaired renal function (Khairallah & Nickolas, 2018). The efficacy, safety, and limitations of using denosumab in the hemodialysis population will be discussed next.

Mechanism of action

Denosumab is an antiresorptive agent that slows the progression of osteoporosis by opposing the destruction of bone by osteoclasts. This ultimately reduces the rate of bone turnover. Denosumab is a humanized monoclonal antibody that binds to the nuclear factor-kappa ligand (RANKL). Usually, osteoblasts, also known as bone-building cells, will secrete RANKL. This ligand binds to its receptor on osteoclast precursors, which then results in the formation of osteoclasts. The binding of denosumab to RANKL ultimately inhibits the formation of osteoclasts, thus reducing bone resorption (Thongprayoon et al., 2018).

Efficacy

Overall, there are few studies done to date that evaluate clinical outcomes with denosumab in CKD, as these studies only evaluated the impact on BMD. In fact, there are no studies on the desired clinically meaningful outcome, i.e., fracture prevention. In an open-label study by Chen et al. (2015), 24 patients with severe secondary hyperparathyroidism and low bone mass were treated with one dose of denosumab 60 mg subcutaneously. The follow-up period was six months. Treatment with denosumab resulted in a significant improvement in BMD (Chen et al., 2015). Festucci et al. (2017) performed a retrospective chart review of 12 osteoporotic patients on hemodialysis who received denosumab 60 mg subcutaneously every six months for an observation period of 24 months and reported a non-significant increase in BMD. A meta-analysis including six observational studies and 84 patients on dialysis showed that denosumab significantly improved BMD (Thongprayoon et al., 2018). Despite these studies demonstrating a statistical improvement in BMD, the clinical significance based on fracture prevention remains unknown.

Safety

The most commonly reported adverse effect in studies using denosumab was hypocalcemia (Thongprayoon et al., 2018; Chen et al., 2015; Festuccia et al., 2017). This occurred most often within the first month after the first dose of denosumab (Thongprayoon et al., 2018). However, the hypocalcemia was rapidly resolved, as long as serum calcium was monitored closely, and managed with calcium supplementation and calcitriol (Thongprayoon et al., 2018). In their meta-analysis, Thongprayoon et al. (2018) found that there was no significant difference in serum calcium from the beginning of studies to the end of the treatment or follow-up periods. Although hypocalcemia was rapidly

resolved in these studies, the use of excessive vitamin D analogues and calcium supplementation may increase vascular calcification. This may further increase the risk of cardiovascular events in patients with ESKD. Another theoretical, but not yet proven adverse effect is the worsening of or induction of low bone turnover disease (Thongprayoon et al., 2018; Festuccia et al., 2017). This is a form of renal osteodystrophy seen in some patients on hemodialysis. Given that denosumab is an anti-resorptive agent, it is possible that low bone turnover may be exacerbated, causing further weakening of bones (Thongprayoon et al., 2018; Festuccia et al., 2017).

LIMITATIONS

There is a paucity of studies evaluating the efficacy and safety of denosumab in patients on hemodialysis. Studies done to date have many limitations including small sample sizes, short treatment and follow-up periods, or are observational. Even between studies, there is high statistical heterogeneity due to different laboratories, testing methodology, and units of measure (Thongprayoon et al., 2018). Regarding efficacy, studies did not evaluate hard clinical outcomes such as fracture prevention. In terms of safety, studies have not been able to determine the impact of denosumab on the potential worsening of or induction of low bone turnover disease. This is often limited by the absence of a bone biopsy. Furthermore, the risk of hypocalcemia and potential worsening of vascular calcification from higher calcium supplementation are important concerns to consider.

CONCLUSION

Despite the increased burden of fractures in the hemodialysis population, there is insufficient data to support the efficacy and safety of denosumab in preventing fractures. Until further studies are done, management of the biochemical abnormalities in CKD-MBD remains the most important intervention to minimize skeletal consequences in ESKD.

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CONTINUING EDUCATION STUDY QUESTIONS

CONTACT HOUR: 2.0 HRS

What is the evidence for the treatment of osteoporosis with denosumab in the hemodialysis population?

By Cynthia Lam and Marisa Battistella

1. All of the following are a component of bone quality except:
   a) Bone microarchitecture
   b) Bone mineralization
   c) Bone density
   d) Bone geometry

2. What is the gold standard to diagnose osteoporosis in ESKD patients?
   a) T-score component of BMD
   b) Z-score component of BMD
   c) Bone biopsy
   d) Blood test to reveal markers of bone resorption and formation

3. If CKD-MBD is left untreated, which of the below would be a biochemical abnormality observed?
   a) Hypophosphatemia
   b) Hypercalcemia
   c) Hyperparathyroidism
   d) Low 1,25-dihydroxyvitamin D (activated vitamin D)

4. Which of the following is not a type of renal osteodystrophy?
   a) High bone turnover disease
   b) Low bone turnover disease
   c) Osteomalacia
   d) Vascular calcification

5. Parathyroid hormone (PTH) acts on the below target organs to increase serum calcium levels except:
   a) Bone
   b) Liver
   c) Kidneys
   d) Small intestines

6. Which of the below pharmacologic agents is used to treat high phosphorus in CKD-MBD?
   a) Calcium carbonate
   b) Calcitriol
   c) Cinacalcet
   d) Vitamin D3

7. Which of the following is part of the mechanism of action of denosumab?
   a) Denosumab increases the activity of osteoblasts
   b) Denosumab binds to the RANKL receptor
   c) Denosumab prevents the formation of osteoclasts
   d) Denosumab causes the apoptosis of osteoclasts

8. The evidence for the use of denosumab in hemodialysis patients is weak and not clinically meaningful because of the following reasons except for:
   a) Short treatment durations
   b) Small sample sizes
   c) Evidence of fracture prevention
   d) Limited randomized controlled trials

9. Which of the following is the most common adverse effect of denosumab?
   a) Hypocalcemia
   b) Worsening of low bone turnover disease
   c) Vascular calcification
   d) Hypoparathyroidism

10. What is the best way to reduce bone loss and the risk of fractures in patients with ESKD?
    a) Treat with a bisphosphonate
    b) Treat with denosumab
    c) Manage biochemical abnormalities in CKD-MBD
    d) Engage in regular aerobic and weight bearing exercises

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 HRS CONTINUING EDUCATION

What is the evidence for the treatment of osteoporosis with denosumab in the hemodialysis population?

Volume 31, Number 2

By Cynthia Lam and Marisa Battistella

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5.	a	b	c	d	e
6.	a	b	c	d	e
7.	a	b	c	d	e
8.	a	b	c	d	e
9.	a	b	c	d	e
10.	a	b	c	d	e

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

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_____

_____

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Guidelines for Authors

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

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

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

- Original research papers
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- Reviews of current articles, books and videotapes
- Continuing education articles

How should the manuscript be prepared?
Form: The manuscript should be typed double-spaced, one-inch margins should be used throughout, and the pages should be numbered consecutively in the upper right-hand corner. More formal research or clinical articles should be between five and 15 pages. Less formal narratives, question-and-answer columns, or reviews should be fewer than five pages.

Style: The style of the manuscript should be based on the *Publication Manual of the American Psychological Association (APA),* Seventh Edition (2020).

Title page: The title page should contain the manuscript title, each author's name (including full first name), professional qualifications [e.g., RN, BScN, CNeph(C)], position, place of employment, address, telephone, fax numbers, and email address. The preferred address for correspondence should be indicated.

Abstract: On a separate page, formal research or clinical articles should have an abstract of 100 to 150 words. The abstract should summarize the main points in the manuscript.

Text/Reference List: Proper names should be spelled out the first time they are used with the abbreviation following in brackets, for example, the Canadian Association of Nephrology Nurses and Technologists (CANNT). Generic drug names should be used. Measurements are to be in Standards International (SI) units. References should be cited in the text using APA format. A reference list containing the full citation of all references used in the manuscript must follow the text.

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Each manuscript will be acknowledged following receipt. Research and clinical articles are sent out to two members of the *CANNT Journal* manuscript review panel to be reviewed in a double-blind review process. All manuscripts may be returned for revision and resubmission. Those manuscripts accepted for publication are subject to copy editing; however, the author will have an opportunity to approve editorial changes to the manuscript. The editor reserves the right to accept or reject manuscripts. The criteria for acceptance for all articles include originality of ideas, timeliness of the topic, quality of the material, and appeal to the readership. Manuscripts that do not comply with APA formatting and style will be returned to the author(s).

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Checklist for authors

✓ Cover letter
✓ Article
- Title page to include the following:
  - Title of article
  - Each author's name (including full first name)
  - Professional qualifications
  - Position
  - Place of employment
  - Author to whom correspondence is to be sent, including address, phone, fax number, and email address
- Text of article, with abstract if applicable, **double-spaced, pages numbered**
- References (on a separate sheet)
- Tables (one per page)
- Illustrations (one per page)
- Letters of permission to reproduce previously published material

Revised March 2018

Lignes directrices à l'intention des auteurs

Le *Journal* de l'Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN) vous invite à faire parvenir articles, textes et manuscrits originaux pour publication dans son journal trimestriel. Nous sommes heureux d'accepter vos documents soumis dans l'une ou l'autre des langues officielles, anglais ou français.

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

Quels types de manuscrits conviennent à la publication?
Nous préférons des manuscrits qui présentent de nouveaux renseignements cliniques ou qui traitent des enjeux propres aux champs d'intérêt des infirmières et infirmiers et des technologues en néphrologie. Nous recherchons plus particulièrement des :

- Exposés 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 d'articles courants, de livres et de films;
- Articles en formation continue.

Comment les manuscrits doivent-ils être présentés?
Forme : Le manuscrit doit être présenté à double interligne avec une marge de 1 po et une numérotation consécutive des pages dans le coin supérieur droit de la page. Les articles plus formels de recherche ou d'études cliniques doivent compter de 5 à 15 pages. Les articles moins formels, tels que textes narratifs, questions-réponses ou revues, doivent compter moins de 5 pages.

Style : Le style du manuscrit doit être conforme au manuel de publication de l'Association américaine de psychologie (AAP), 7e édition (2020).

Page titre : La page titre doit inclure le titre du manuscrit ainsi que les renseignements suivants : nom de chacun des auteurs (y compris les prénoms au complet), titres professionnels (c.-à-d. inf., B.Sc. Inf., CNéph[C]), titre du poste occupé, nom de l'employeur, adresse, numéros de téléphone et de télécopieur et adresses courriel. L'adresse privilégiée de correspondance doit aussi être indiquée.

Résumé : Sur une page distincte, les articles formels de recherche ou d'études cliniques doivent être accompagnés d'un résumé de 100 à 150 mots, reprenant brièvement les principaux points du manuscrit.

Texte/Liste de références : Les sigles, abréviations ou acronymes doivent être écrits au long la première fois qu'ils apparaissent dans le texte, suivis de l'abréviation entre parenthèses : p. ex., Association canadienne des infirmières et infirmiers et des technologues de néphrologie (ACITN). Les noms génériques des médicaments doivent être employés. Les unités de mesure doivent être indiquées selon le Système international d'unités (SI). Les références doivent être citées dans le texte en utilisant le format de l'AAP. Une liste de références comprenant la bibliographie complète de toutes les références utilisées doit suivre le texte.

Tableaux/Figures : Les manuscrits ne doivent inclure que les tableaux et figures (incluant schémas, illustrations, croquis, etc.) visant à clarifier certains détails. Les auteurs qui utilisent des tableaux et des figures qui ont déjà fait l'objet d'une publication doivent fournir l'autorisation écrite de l'éditeur d'origine et la joindre au manuscrit soumis. La mise en forme des tableaux et des figures doit être conforme au style de l'AAP.

De quelle manière doit-on soumettre les manuscrits?
Veuillez envoyer par courriel votre manuscrit à : **cannt.journal1@gmail.com**.

Veuillez inclure une lettre de présentation en précisant les coordonnées de l'auteur principal ainsi qu'une notice biographique d'une phrase (incluant titres de compétences, titre du poste actuel et lieu de travail) pour chaque auteur.

Quel est le processus de sélection des manuscrits pour publication dans le *Journal ACITN*?
À la réception de chaque manuscrit, un accusé de réception est envoyé. Les articles de recherche et d'études cliniques sont envoyés à deux membres du comité de révision du *Journal ACITN* afin d'être révisés suivant un processus à double insu. Tous les articles peuvent être retournés aux auteurs pour révision et nouvelle soumission par la suite. Les manuscrits acceptés pour publication peuvent subir des changements éditoriaux; toutefois, les auteurs pourront approuver ces changements. La rédactrice en chef se réserve le droit d'accepter ou de refuser tout manuscrit. Les critères d'acceptation pour tous les manuscrits comprennent l'originalité des idées, l'actualité du sujet, la qualité du matériel et l'attrait des lecteurs. Les manuscrits qui ne sont pas conformes à la mise en forme et au style de l'AAP seront renvoyés à l'auteur ou aux auteurs.

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Les auteurs doivent prendre note que les manuscrits seront considérés pour publication à la condition qu'ils ne soient soumis qu'au *Journal ACITN*. Sur acceptation du matériel soumis, les auteurs transfèrent leur droit d'auteur à l'ACITN. Les déclarations et opinions émises par les auteurs dans leurs articles, textes ou manuscrits demeurent leur responsabilité. Les auteurs conservent le droit d'insérer leurs travaux publiés respectifs dans une thèse ou un mémoire, pour autant que ces derniers ne soient pas publiés à des fins commerciales. Bien qu'aucune permission ne soit requise en pareil cas, il est attendu que les auteurs indiquent en référence le *Journal ACITN* comme source originale. Tous les autres documents ne peuvent être reproduits sans l'autorisation écrite de l'ACITN.

Aide-mémoire à l'intention des auteurs

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  - Titre de l'article
  - Nom de chaque auteur (incluant prénoms au complet)
  - Titres de compétence
  - Titre du poste actuel
  - Nom et adresse de l'employeur
  - Nom de l'auteur à qui la correspondance doit être envoyée (y compris adresse, numéros de téléphone et de télécopieur et adresse courriel)
  - Texte de l'article avec résumé, s'il y a lieu à **double interligne et pages numérotées**
- Références (sur une feuille distincte)
- Tableaux (un par page)
- Figures (une par page)
- Lettre d'autorisation pour tout matériel ayant déjà fait l'objet d'une publication

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