CANNT JOURNAL
JOURNAL ACITN

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CANNT JOURNAL
JOURNAL ACITN

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

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Letter from the Editor: Gillian Brunier

Passing the torch

It was the summer of 1997 that I, along with Colleen Turpin and a certain amount of trepidation, took over from Leanne Dekker (1992–1997) as the new co-editors of the *CANNT Journal*. Rita Brownrigg (1989–1992) and Jocelyn Larivière (1986–1989) had been the journal editors prior to Leanne. A few years later, Colleen stepped down to pursue other interests, while I continued on as editor. What a journey it has truly been. So many wonderful people I have had the opportunity to connect with.

Most of you will not be aware that, prior to becoming co-editor, then editor, of the *CANNT Journal*, I had been on the editorial board of the then named *ANNA Journal*, where, through editorial board meetings under Sally McCulloch, I learned much of what I needed to know to become a novice editor. Sally, as Editor of the *ANNA Journal* for 19 years, headed a stellar group of editorial board members who all shared willingly their knowledge and skills of being department editors. But it was Sally from whom I learned much about the intricacies of being an editor.

At the same time that I became co-editor of the *CANNT Journal* with Colleen, I connected with an oncology nurse by the name of Bev Page, who was then editor of the journal of the Canadian Oncology Nurses Association. Bev, by chance, worked at the same hospital as I do in Toronto and both of our journals were managed by Pappin Communications in Pembroke, Ontario. It was Bev who helped me understand what needs to be done to obtain listing on MEDLINE as a peer reviewed publication. It was Rita Brownrigg, former CANNT Journal Editor, whom I first emailed when I realized that searches for *CANNT Journal* articles were coming up on MEDLINE. She was as thrilled as I was!

In the year 2000, at the CANNT conference in Ottawa, Colleen and I formed our first CANNT Journal Editorial Board. This small group of colleagues from across Canada included: Linda Ballantine, who wrote for several years an *On Education* column; Eleanor Ravenscroft (still today department editor of the *Practice Corner*—see page 39); Lee Beliveau (you will see her final *Bedside Matters* column on page 42); Jennifer Dykeman (renal pharmacist), who started the *Pharmacy News and Reviews* column; Mukesh Gajaria, renal technologist who started the *Technically Speaking* column; Rob Huizinga, who started his *Nephrology and the Internet* column; and Rosalie Starzomski who writes on ethical issues. You can see that some have stayed, while others have moved on. Now new ones have joined us (see the side of this page for the listing of current members). But what a contribution all these CANNT Journal Editorial Board members have made and continue to make year in and year out toward the success of our journal.

Above all, the *CANNT Journal* would not be what it has become without a group of dedicated manuscript reviewers. It is largely unseen work, but each feature article you read in the journal has been reviewed by two members of the manuscript review panel. I always try to match the special focus of each article to be reviewed with the specific knowledge and expertise of different nephrology nurses and technologists from across Canada. For example, for this issue of the journal, the paediatric focus of the article on page 15 meant I had to find two paediatric nephrology nurses to review this article, which, through contacts at CANNT 2011, I did. It has always been a constant source of amazement to me, the willingness of these reviewers to give so much of their time and effort to ensuring the quality of each of the 187 articles received for publication over these last 14-plus years!

Lastly, I would like to thank all the different CANNT board members and presidents with whom I have worked so closely over these many years and who have always been supportive of my work. As well, Debbie Maure at the CANNT National Office, and Heather Reid, our CANNT Conference Planner, have been a delight to work with. You can see Heather's work for our upcoming CANNT 2012 conference to be held in Ottawa on pages 10–11 Heather's usual request to me is "When is the drop-dead deadline?" and my usual response would be "Now!"

Thus, it is with a certain amount of sadness in my heart, but also a sense of personal fulfilment, that I am now handing over to Alison Thomas and Jan Baker as the two new editors of the *CANNT Journal*. I'm certain they will continue to receive the support they will need from all of you and move the journal to new heights and new frontiers.

Passer le flambeau

Ce fut à l'été 1997 que Collen Turpin et moi avons repris, non sans une certaine appréhension, le flambeau à la suite de Leanne Dekker (1992–97) en qualité de corédactrices en chef du Journal de l'Association canadienne des infirmières, infirmiers et technologues de néphrologie (ACITN), communément appelé *CANNT Journal*. Rita Brownrigg (1989–92) et Jocelyn Larivière (1986–89) ont été tour à tour rédactrice et rédacteur en chef avant Leanne. Quelques années plus tard, Colleen s'est retirée pour entreprendre de nouveaux projets, alors que je suis restée en poste. Ce fut une véritable aventure, au cours de laquelle j'ai eu la chance de faire connaissance avec un très grand nombre de personnes merveilleuses!

Pour la plupart d'entre vous, vous ignorez peut-être qu'avant de devenir corédactrice en chef, puis rédactrice en chef du Journal de l'ACITN, je siégeais au comité de rédaction du Journal de *l'American Nephrology Nurses' Association* (ANNA), où, grâce aux réunions du comité de rédaction, sous la direction de Sally McCulloch, j'ai appris tout ce que je devais savoir pour devenir une apprentie rédactrice. Sally, en tant que rédactrice en chef du Journal ANNA depuis 19 ans, dirigeait un groupe de brillants chroniqueurs spécialisés qui partageaient tous volontiers leurs connaissances et savoir-faire. Toutefois, ce fut auprès de Sally que j'ai appris le plus sur les subtilités du métier.

À l'époque où je suis devenue corédactrice en chef du Journal de l'ACITN avec Colleen, je me suis liée d'amitié avec une infirmière en oncologie, Bev Page, qui était rédactrice en chef de la Revue canadienne de soins infirmiers en oncologie (RCSIO). Par chance, Bev travaillait dans le même hôpital que moi à Toronto et nos publications respectives étaient mises en page et imprimées par Pappin Communications à Pembroke, en Ontario. C'est Bev qui m'a aidée à comprendre ce qu'il fallait faire pour obtenir une inscription à MEDLINE à titre de publication évaluée par des pairs. Ce fut à Rita Brownrigg, ex-rédactrice en chef du Journal de l'ACITN, à qui j'ai envoyé un premier courriel quand j'ai constaté que les demandes pour les articles du Journal de l'ACITN provenaient de MEDLINE. Elle était tout aussi transportée que moi!

En 2000, lors du Congrès de l'ACITN à Ottawa, Colleen et moi avons formé notre premier comité de rédaction du Journal de l'ACITN. Ce petit groupe pancanadien de collègues était composé des personnes suivantes: Linda Ballantine, qui a écrit pendant plusieurs années la chronique *On Education* (Formation continue); Eleanor Ravenscroft (toujours chroniqueuse pour le *Practice Corner* (Coin de la pratique)—voir page 39); Lee Beliveau (vous pourrez lire sa dernière chronique *Bedside Matters* (Affaires de chevet) à la page 42); Jennifer Dykeman, pharmacienne en néphrologie, qui a lancé la chronique *Pharmacy News and Reviews* (Pharmacie: Nouvelles et mises à jour); Mukesh Gajaria, technologue de néphrologie à l'origine de la chronique *Technically Speaking* (Techniquement parlant); Rob Huizinga, qui a instauré la chronique *Nephrology and the Internet* (La néphrologie et Internet) et Rosalie Starzomski qui écrit sur les enjeux en matière d'éthique. Comme vous pouvez le constater, certains chroniqueurs sont toujours à l'œuvre, alors que d'autres ont relevé de nouveaux défis. Aujourd'hui, de nouveaux chroniqueurs se sont joints à nous (voir le bandeau latéral ci-contre pour la liste de nos chroniqueurs). Chapeau à tous nos chroniqueurs qui ont contribué au succès de notre Journal au fil des ans et à tous ceux et à toutes celles qui continuent de porter haut et fort le flambeau.

Par-dessus tout, le Journal de l'ACITN ne serait pas ce qu'il est devenu sans son groupe dévoué de réviseurs. Ce genre de travail se fait principalement dans l'ombre. En fait, chaque article de fond que vous lisez dans le Journal de l'ACITN a été révisé par deux membres du comité de révision. J'ai toujours essayé de jumeler le sujet de chaque article à réviser aux connaissances et à l'expertise de chaque réviseur provenant d'un bout à l'autre du pays, qu'il soit infirmier ou technologue. Par exemple, pour ce numéro, l'article de fond en page 15 porte sur la pédiatrie, ce qui signifie que j'ai dû faire appel, parmi mes personnes ressources au sein de l'ACTIN de 2011, à deux infirmières en néphrologie auprès des enfants pour le réviser. Cela a toujours été pour moi une source intarissable d'étonnement de constater l'empressement avec lequel les réviseurs acceptaient de consacrer autant de temps et d'efforts pour assurer la qualité de chacun des 187 articles que nous avons reçus pour publication au fil des 14 dernières années!

Enfin, j'aimerais remercier les différents présidents et administrateurs du Conseil d'administration de l'ACITN avec qui j'ai si étroitement travaillé au cours de ces nombreuses années et qui ont toujours témoigné un vif soutien à l'égard de mon travail. Je tiens aussi à remercier Debbie Maure, adjointe administrative au bureau national de l'ACITN, et Heather Reid, planificatrice de congrès pour l'ACITN; mesdames, j'ai été enchantée de travailler avec vous! Vous pouvez lire un aperçu en pages 10 à 11 de ce que nous réserve Heather pour le prochain congrès de l'ACITN de 2012 qui aura lieu à Ottawa. Heather avait l'habitude de me demander: « Jusqu'à quand avons-nous? » et à moi de répondre: « Aujourd'hui! »

C'est donc avec un pincement au cœur, mais avec le sentiment du devoir accompli que je passe le flambeau à Alison Thomas et à Jan Baker, les deux nouvelles corédactrices en chef du Journal de l'ACITN. Je suis persuadée qu'elles continueront de recevoir votre appui dont elles auront besoin et guideront le Journal vers de nouveaux sommets et de nouveaux horizons.

Le Journal ACITN
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Site web: www.cannt.ca

• Voici les échéanciers à rencontrer pour soumettre des articles/nouvelles au journal:
Janvier–mars: le 15 janvier, pour publication le 15 mars
Avril–juin: le 15 avril, pour publication le 15 juin
Juillet–septembre: le 15 juillet, pour publication le 15 septembre
Octobre–décembre: le 15 octobre, pour publication le 15 décembre
Le journal CANNT est maintenant répertorié dans le « Cumulative Index to Nursing and Allied Health Literature (CINAHL) », « International Nursing Index » (INI), « MEDLINE », « EBSCO », « ProQuest » et « Thomson Gale ».
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Le journal CANNT est préparé par Pappin Communications, The Victoria Centre, 84 rue Isabella, Pembroke, Ontario K8A 5S5.

Proud to be a CANNT member

It is with great pleasure that I submit my first journal report as your 2011–2012 CANNT president. I hope you have had a relaxing holiday season and are ready for the New Year to unfold.

Starting a new year is a time for us to reflect on the year gone by and make plans for our year ahead. I'm sure we all make similar plans; to eat healthy, get more exercise, spend more time with friends and family, possibly go back to school… the list is endless… but I urge you to remember to make time for you! As health care professionals, we often concentrate on taking care of others… in 2012, I hope you make YOU a priority.

I have been a nephrology nurse for 16 years, and have been a CANNT member since 2005. I was co-chair of CANNT 2007 in Winnipeg and Western VP for CANNT from 2008–2010. I am a country girl at heart… I grew up on a little farm four hours north of Winnipeg, am married to a wonderfully supportive man, and am a 28-year cancer survivor! Being told you have cancer at age 13 really changes your outlook on life, and I learned early on that we need to celebrate life's accomplishments while we can. This is why the speech I made in Calgary centred on celebration.

Moving from the role of patient to nurse has taught me empathy and compassion. We have a responsibility to our patients and to ourselves to ensure we are giving 100% every day. As health care professionals, what we do and how we interact with people has a lasting effect on our patients... and this is a very special gift. We come into people's lives when they are at their most vulnerable, and I don't know if there is any other profession that can impact a patient or their family as much as we do. I urge you to remember this the next time you are feeling frustrated with your patients… remember why you chose to become a health care professional and, most of all, be proud of the great work that you do.

I am proud to be a CANNT member, and am so grateful for the relationships I have built with CANNT members across Canada, as well as with American Nephrology Nurses Association (ANNA) members who have attended our national conference. Our CANNT conference in Calgary was very successful, and I would like to congratulate Heather Dean and Janice MacKay (co-chairs) and the rest of their planning committee: Angie Arcuri, Erick Chacon, Sharon Gulewich, Lorin Hompton, Janice James, Leasa Sulz, and Tracy Schwartz. Thank you… you all did a fabulous job in providing not only a scientific program, but a fun program as well!

Please mark your calendars for the 44th annual CANNT conference, which will be in Ottawa, October 25–27, 2012. Gail Sprott and Rita Brownrigg are the Co-chairs of the Ottawa conference and plans are underway. Patty Quinan is our CANNT Board of Director's representative. Don't miss out on an exciting opportunity to network with friends from across Canada and have the opportunity to meet ANNA President-elect Norma Gomez.

Thank you for your continued support of our association, for without your membership, we could not have a viable association. Please take the time to visit our website at www.cannt.ca, where you will find our regional reports, our exciting informative discussion boards, and something new we have added this year: words from your president under the board of director's section.

You can also find us on Facebook and you can follow us on Twitter at @CANNT1.

I wish you all the best in 2012 and I look forward to representing you this year as your CANNT president.

Marilyn Muir, RN, CNeph(C)
CANNT President 2011–2012

Fière d'être membre de l'ACITN

C'est avec grand plaisir que je vous transmets mon premier communiqué en tant que présidente de l'Association canadienne des infirmières, infirmiers et technologues de néphrologie (ACITN) de 2011–2012. J'espère que vous avez tous passé une période des Fêtes agréable et reposante et que vous êtes d'attaque pour relever les défis de la nouvelle année.

Entreprendre une nouvelle année consiste à se pencher sur celle qui vient de s'écouler et à dresser des plans pour celle qui s'amorce. Je suis persuadée que nous prenons tous des résolutions similaires : manger sainement, faire plus d'exercice, passer plus de temps entre amis et en famille, entreprendre un retour aux études, etc. Cette liste est sans fin… mais j'insiste vivement pour que vous preniez soin de vous! En qualité de professionnels de la santé, nous portons souvent toute notre attention à prendre soin des autres. En 2012, faites de VOUS une priorité!

Je suis infirmière de néphrologie depuis 16 ans et membre de l'ACITN depuis 2005. J'ai été coprésidente du Congrès de l'ACITN de 2007 qui s'est tenu à Winnipeg et vice-présidente pour l'Ouest canadien de 2008 à 2010. En mon for intérieur, je suis restée une fille de la campagne. J'ai grandi sur une ferme à 4 heures de route au nord de Winnipeg, je suis mariée à un homme merveilleux et compréhensif et je suis une survivante du cancer depuis 28 ans! Apprendre à l'âge de 13 ans que j'étais atteinte d'un cancer a réellement changé ma perception de la vie. J'ai appris très tôt qu'il est important de célébrer chaque réalisation de la vie tant qu'on est en mesure de le faire, d'où le discours que j'ai prononcé lors de notre dernier congrès à Calgary et qui était centré sur la célébration.

Passer du rôle de patiente à celui d'infirmière m'a enseigné l'empathie et la compassion. Nous avons une responsabilité envers nos patients et nous-mêmes afin d'assurer que nous donnons notre cent pour cent chaque jour. À titre de professionnels de la santé, les gestes que nous posons et la manière dont nous interagissons avec les gens entraînent un effet durable sur nos patients. Il s'agit là d'un don exceptionnel. En effet, nous entrons dans la vie des gens à une période où ils sont le plus vulnérables. J'ignore s'il y a d'autres professions qui, comme la nôtre, arrivent à exercer une telle influence sur les patients ou leur famille. Rappelez-vous ceci la prochaine fois que vous éprouverez un sentiment de frustration vis-à-vis de vos patients… rappelez-vous pourquoi vous avez choisi de devenir un professionnel de la santé et, de façon plus importante encore, soyez fiers de l'excellent travail que vous faites.

Je suis fière d'appartenir à l'ACITN et très heureuse des relations que j'ai su établir avec les membres de l'ACITN ainsi qu'avec ceux de *l'American Nephrology Nurses' Association* (ANNA) qui ont assisté à notre dernier congrès. Le Congrès annuel de l'ACITN à Calgary fut une véritable réussite et je tiens à féliciter Heather Dean et Janice MacKay (coprésidentes) ainsi que leur comité organiseur composé des membres suivants : Angie Arcuri, Erick Chacon, Sharon Gulewich, Lorin Hompton, Janice James, Leasa Sulz et Tracy Schwartz. Un grand merci! Vous avez tous et toutes fait un travail fabuleux en nous présentant non seulement un programme scientifique, mais aussi un programme où le plaisir était au rendez-vous!

Veuillez noter à votre calendrier le 44e Congrès annuel de l'ACITN qui aura lieu à Ottawa, du 25 au 27 octobre 2012. Gail Sprott et Rita Brownrigg en seront les coprésidentes, et la planification va bon train. Patty Quinan est la déléguée du Conseil d'administration de l'ACITN au comité organisateur. Ne ratez pas cette occasion en or de réseauter avec vos collègues d'un bout à l'autre du Canada et de faire la connaissance de Norma Gomez, présidente élue de l'ANNA.

Je vous remercie de votre soutien continu envers votre association. Sans votre adhésion, nous ne pourrions avoir une association viable. Prenez le temps de visiter notre site Web à www.cannt.ca, où vous trouverez les comptes rendus régionaux, notre forum de discussion informatif et stimulant et, fait nouveau cette année, la rubrique News from your President (Nouvelles de votre présidente), sous Board of Directors and Contacts (Conseil d'administration et personnes ressources) sous l'onglet About (À propos de l'ACITN). Vous pouvez également consulter notre page Facebook et nous suivre sur Twitter à @CANNT1.

Je vous souhaite beaucoup de succès en 2012 et me réjouis à l'avance de vous représenter cette année à la présidence de l'ACITN.

Marilyn Muir, inf., CNéph(C)
Présidente, ACITN de 2011–2012

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Awards for Research, Education and Clinical Excellence

Deadlines:

May 1, 2012:

Amgen Grants, CANNT Awards of Excellence, Bursaries & Grants

Each year there are <u>many</u> opportunities available for awards, bursaries and grants for CANNT members.

Also, take the opportunity to recognize a colleague or two for their excellent and outstanding work in the field of nephrology nursing or technology. Nominate a fellow nephrology professional who makes a difference in your workplace (experienced and novice). If selected, they will receive verbal recognition at the CANNT Annual General Meeting in Ottawa, Ontario, a plaque to commemorate the award, and a monetary reward.

Go to **www.cannt.ca** for more detailed information about the opportunities available. You might be surprised that you are eligible to apply for funding or a bursary to assist you in furthering your studies or promote excellence in nephrology care.

Prix d'excellence en recherche, éducation et pratique clinique

Dates limites :

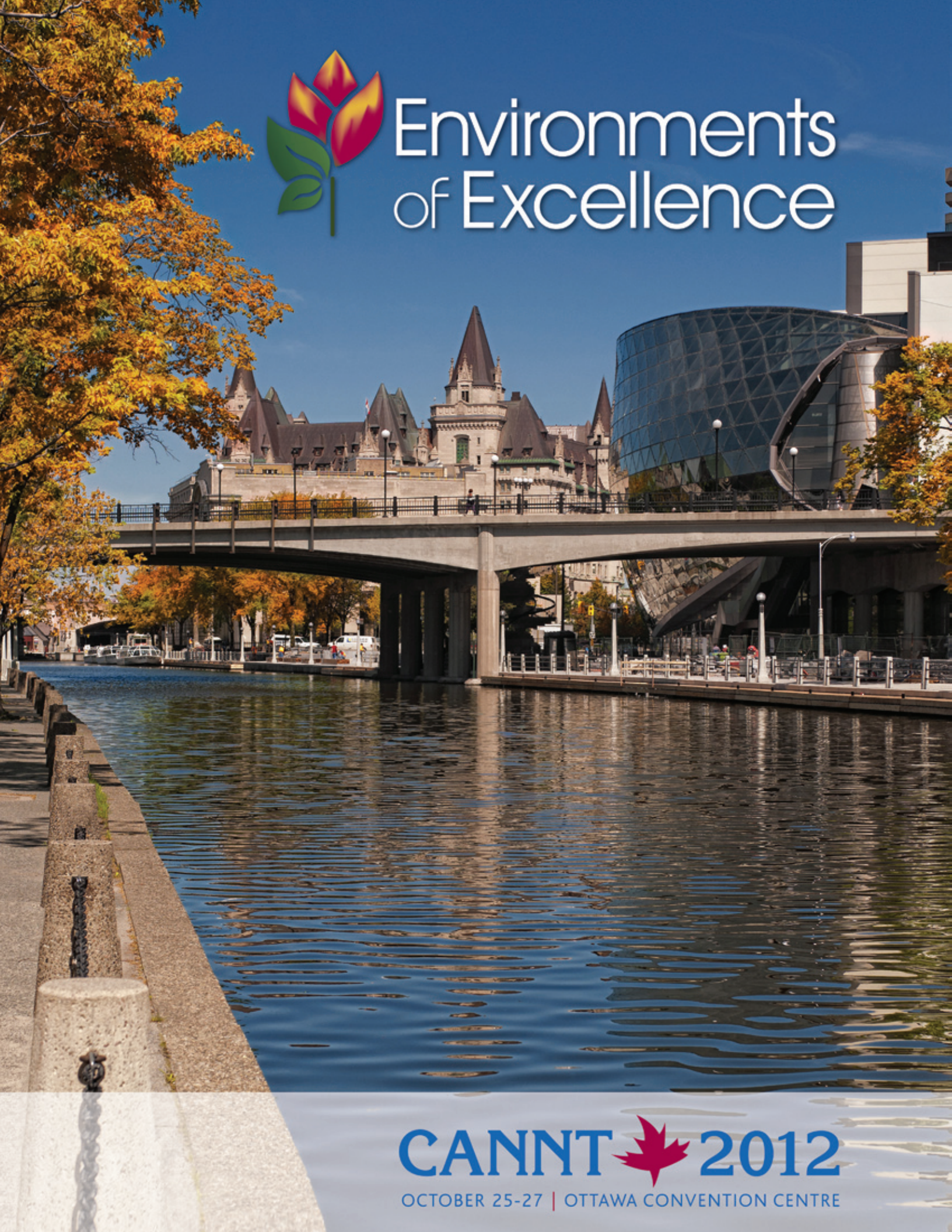
Le 1er mai 2012

Subventions Amgen, bourses, subventions et prix d'excellence de l'ACITN

Chaque année, de nombreux prix d'excellence et de nombreuses bourses et subventions sont offerts aux membres de l'ACITN.

Nous vous invitons également à saisir cette occasion pour reconnaître un ou deux collègues pour leur excellent travail et leur contribution exceptionnelle dans le domaine des soins infirmiers ou de la technologie en néphrologie. N'hésitez pas à soumettre la candidature de professionnels œuvrant en néphrologie qui font la différence dans votre milieu de travail—les lauréats recevront une reconnaissance verbale à l'Assemblée générale annuelle de l'ACITN, qui aura lieu à Ottawa, en Ontario, ainsi qu'une plaque commémmorative et une récompense en argent.

Rendez-vous à **www.cannt.ca** pour obtenir une information détaillée sur les occasions qui vous sont offertes—vous seres peut-être étonné(e) d'apprendre que vous êtes admissible à une subvention ou à une bourse pour vous aider dans la poursuite de vos études ou pour promouvoir l'excellence dans les soins de néphrologie.


Environments
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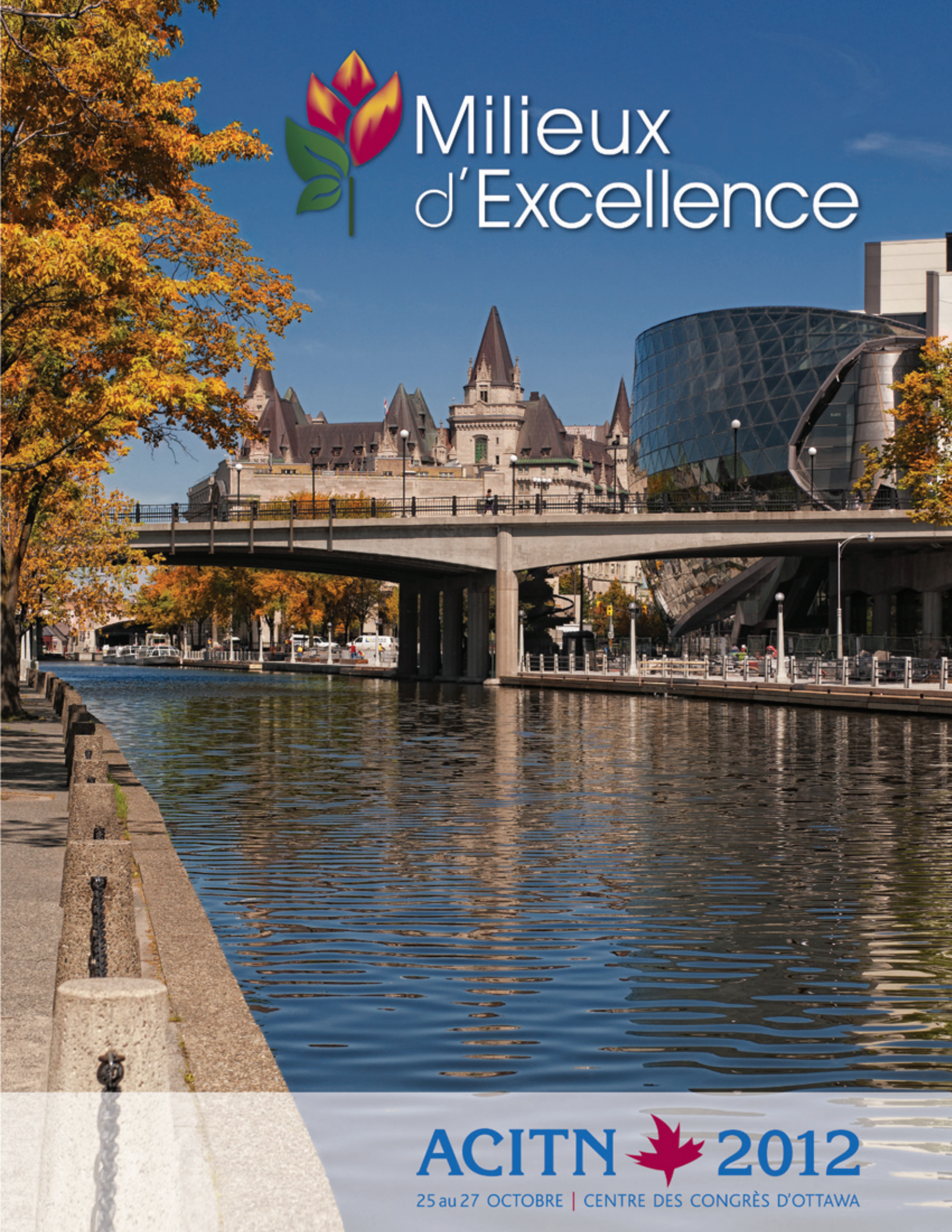
CANNT 2012
OCTOBER 25-27 | OTTAWA CONVENTION CENTRE


Milieux
d'Excellence
ACITN 2012
25 au 27 OCTOBRE | CENTRE DES CONGRÈS D'OTTAWA

Ask the Green Tech

Conference greening

Dear Green Tech,

I had a fantastic time at the 2011 CANNT conference in Calgary. It was very obvious that the planning committee had put some thought into making this year's conference a more eco-friendly event, as it coincided with the national Waste Reduction Week. Thinking about the 2012 Ottawa conference and other future CANNT-related events, what kind of tips can you offer those individuals looking to be involved on such committees who have a like-minded vision of hosting a marquee event for its members, but in keeping with a low carbon footprint agenda? Thanks for any advice you can offer.

Clean Karl from Cornwall

Dear Clean Karl,

A Happy New Year and a fantastic 2012 to all of my fellow Green Techies, from Rejean "Green Machine" Quesnelle. I would also like to echo those same sentiments about the Calgary conference. On a scale of 1 to 10 it was a 10.5. The Calgary conference planning committee did a stellar job of making the east coast folks feel right at home in their western stomping grounds. The entire event was a huge success with more than 600 attendees including delegates and exhibitors. What a blast it was hanging out in Canada's western frontier capital. I have to give a big shout-out and kudos to the two best cowgirls the west has to offer—the conference planning chairs Janice and Heather. Their energy and cowgirl get-up-and-go really made the conference a hit. One of the highlights was showing off my hot line dancing moves, but I must say that getting branded was quite possibly my favourite highlight (besides singing karaoke with The Renal Brothers—but you kind of had to be there—yee haw!). So, I guess that I am now considered an honourary cowboy—with his trusty steed Streak—the one with a tiny green streak in its mane.

Now back to your original question. There are many things to consider when planning any green event. According to The David Suzuki Foundation (DSF), an organization dedicated to creating a sustainable and healthier Canada: *"Virtually all aspects of any event can have a reduced climate impact. Climate-friendly practices can range from waste minimization and energy conservation to using renewable energy and carbon offsets to mitigate emissions that remain after reduction efforts".*

What are the major areas on the green agenda that we should contemplate in the initial stages of planning? They should include: the destination and venue, accommodations, food, registration/give-aways and, of course, most importantly, transportation/travel. Some other possible factors to consider may include the presenters/presentations, logistics, and positive social initiatives. Keep in mind that these are just starting points, so in order to better understand what specific areas we can look at painting green, I will discuss each main key point separately and in greater detail.

When planning a green/sustainable event you first need to consider *where do you intend to host the event*? Large conference facilities are major contributors of greenhouse gas emissions due to the energy required for heating/cooling, to power the lighting for the 600-plus delegates and exhibitors, the water used for various applications such as the washrooms, and the waste generated by those in attendance. The nice thing about these facilities is that many of the existing conference centres have made numerous upgrades to create a more carbon-friendly facility. Any new large building constructions are pre-greened, as a result of modern design specifications around carbon reduction strategies, such as Leaders in Energy and Environmental Design (LEED) certification. Nearly all (if not all) new large facility builds today are using the LEED standards as their benchmark for construction.

If we use the CANNT 2011 conference venue, the Calgary TELUS Convention Centre (CTCC), as our point of reference, there are numerous green initiatives the moment you walk in the door. Here are just a few of the green initiatives I was able to scope out during my stay: Upon entering the north conference centre, you can see the green etching on the walls, so to speak. It is powered by green energy purchased from Bullfrog Power, and large windows allow ambient lighting to shine into the main registration area. Modern washroom facilities are equipped with waterless urinals, water-saving sensors on every faucet, and paper towels not derived from trees (they use post consumer recycled paper instead). Incorporated into the facade of the CTCC facility are the exterior walls from some of Calgary's historic buildings—a way of preserving history while at the same time reducing construction waste that would have resulted from complete demolition.

To ensure that I had the whole picture, I contacted the CTCC's Sales Manager of Canadian Associations, Melissa Kon, to get her input into what kind of ongoing green initiatives are happening at the CTCC. She began by stating that the CTCC takes pride in offering its clients and delegates a memorable experience.

The following quote comes directly from the CTCC website:

"Environmental stewardship isn't just a handy phrase; it's a way of life at CTCC. From the sales team who work with clients to encourage greener meetings, to the day-to-day operations of facilities and offices, every aspect of our operations is reviewed. CTCC has an Environmental Committee that meets regularly and all employees receive environmental stewardship training.

Building systems, office equipment and low-flow water fixtures are selected and operated for optimum energy efficiency. We buy renewable "green" power. Extensive recycling and reduction programs are in place across the entire facility. We utilize green cleaning products and recycled paper products whenever possible, and every effort is made to use suppliers who employ environment-friendly products and procedures. We're constantly reviewing and improving in order to ensure we make good on our mission to provide an eco-friendly facility for the enjoyment of our employees, stakeholders, and the public."

What's the bottom line? Try to search out a facility that can meet all of your various wants including water and energy conservation and eco design.

That takes care of the venue aspect. Now, what about the destination and travel/transportation? Quite often, associations like ours have rotating conference destinations in order to accommodate all member regions and give them the opportunity to showcase their accomplishments and talents. Typically we start in the central region, then go out east, back to central and then west. The destination and transportation components are probably the hardest to deal with. The more metropolitan you get, the easier it is to accommodate mass transportation means, like bus, trains, or subway. With CANNT 2012 taking place in Ottawa, many of us from Ontario and Quebec can carpool or take the train in order to save on flight costs and carbon emissions. For some organizations like the U.S.-based National Association of Nephrology Technicians/Technologists, (NANT), the annual conference is held in Las Vegas. The majority of attendees will, therefore, have to fly in order to attend, unless they are from the western U.S.

There are very few options available to address this. One option is to always have the conference in a central area that will have the most possible local attendees. I know this does not accommodate the other regions well, but it serves the greater number. In our case, we visit the central region every two years. Another option for dealing with the environmental impact is to purchase what are called carbon offsets. You can purchase a carbon credit to offset your personal impact due to the flight, but this is unfortunately not easy to justify when requesting reimbursement—paying for something you don't physically possess. It's okay for actors like Leonardo DiCaprio or Ed Begley Jr. to fork out the dough, but even Reggie the Green Machine can't come to terms with paying for this (just yet); so definitely an area to work on! One thing though, if you want to travel around the city and you don't have a vehicle, you do have some green options—either using the transit system (many buses have been retrofitted to be more eco-friendly) or opting for something a little more sleek, like renting a vehicle through ZipCar or renting a hybrid vehicle through any standard car rental agency.

Next on the agenda is the lodging, or the "*where do I get my beauty sleep after my day of networking?*" option. Most hotel chains are greening their operations all the time. When choosing a lodging venue for guests try to select one that is connected to conference facilities (as in the case with the CTCC). It keeps things more centralized. Look to see what their eco policies are (if they have any) and what types of programs they offer—like washing linens, and any water conservation or reuse in the laundry facility. Do they purchase green power from Bullfrog Power? Do they have any social programs, like sending their used soaps to third world countries or sending any unused food to a local shelter? Do what you can when it comes to your selection criteria. Determine your "must haves" and "can't haves", weigh your options, and go from there. There are many things to consider, but if the hotel is adjoining the conference facility, it's not likely you will turn them away and choose something on the other end

NOTICE BOARD

- Ottawa Supper Clubs—Contact Janet Graham, Nephrology Unit, Ottawa Hospital, **jgraham@ottawahospital.on.ca**
- April 21, 2012. Exam date for CNeph(C) certification exam. Contact Canadian Nurses Association Certification Program, email: **certification@cna-aiic.ca**. Website: **www.cna-aiic.ca**. Toll-free phone number: 1-800-361-8404
- April 29–May 2, 2012. The American Nephrology Nurses Association (ANNA) National Symposium. Walt Disney World Dolphin Resort, Orlando, Florida. Website: **www.annanurse.org**
- September 1, 2012. Registration time begins for the Nephrology Certification Exam. Contact Canadian Nurses Association Certification Program, email: **lvachon@cna-aiic.ca**. Website: **www.cna-aiic.ca**. Toll-free phone number: 1-800-450-5206
- September 9–12, 2012. 14th Congress of the International Society of Peritoneal Dialysis (ISPD), Kuala Lumpur, Malaysia. Website: **www.ispd2012.org.my**
- September 19, 2012. Nephrology Health Care Professionals Day.
- October 15, 2012. Deadline for applications for Allied Health Research Grants, Kidney Foundation of Canada. Contact: Coordinator, Research Grants and Awards, 1-800-361-7494, ext. 232, email: **research@kidney.ca**. Website: **www.kidney.ca**
- October 25–27, 2012. CANNT 45th National Symposium. Ottawa, Ontario. Conference Planner: Heather Reid: email: **hreid@innovcc.ca**. Website: **www.cannt.ca**

of town and have the attendees commute. So, as always, life is about compromise and trying to do your best.

With all of this typing, I seem to be getting a case of the munchies, which leads me to my next key consideration—food. When thinking about food provision and its footprint, we need to consider where it comes from. There is a huge movement to provide locally grown foods to communities thanks to the resurgence of farmer's markets and the 100-mile movement. The closer you are to the food source, the less environmental impact. Consider creating your menu around what is in season locally at the time of your conference. CANNT occurs typically in October, when we are at the height of the fall bounty in Canada—so say no to Florida oranges or Mexican avocados when planning the menu. Also consider opting for organic produce. It may cost a little more, but the two benefits are that you are supporting the local economy by supporting local farmers, and you are reducing the impact of needless chemicals being sprayed and ingested. A health care professionals' conference should include this consideration on its priority list, since we should be considering our health as well. There is a direct link between conventional foods and toxic chemical exposure.

If a must-have ingredient comes from a far-off land, then ensure that the food is organically grown and, more importantly, is certified fair trade, whereby the workers are fairly compensated for their work. Look at providing more vegetarian options to save costs and promote wellness. Try to limit the meat/dairy portions to maybe one meal or even consider meat-free days. If meat or dairy are served, they should be free of antibiotics and hormones—again, organic. Ask about these possibilities when developing the menu with the facility.

Another initiative the CTCC offers to its clients is to ship any leftover food to an off-site composting facility. Some larger facilities like the Direct Energy Centre (DEC) in Toronto (another marquis green facility) have the capability to compost their waste on site. Any and all food, packaging, and drink containers at the DEC are compostable. Avoid serving your clients food of any kind in packaging. Try never to use anything disposable. For example, use linen napkins rather than paper, metal utensils rather than plastics, and ceramic or glass mugs for juices and your morning coffee rather than paper cups.

With respect to registration, CANNT currently offers online registration through the **cannt.ca** website, but is not fully automatic with a PayPal type of registration. Consider also what info is mailed (if any) to your members. Currently, each member is sent a complete registration package by mail. Unfortunately, it may end up in the blue bin (if we're lucky). Many large conferences like the Ontario Hospital Association's annual conference, have gone completely paperless and even offer apps for your smart phone. This is a huge cost savings for any organization including ours and definitely something to consider for the future. Paperless registration is achievable!

When it comes to presenters and their presentations, a few key tips come to mind. Notify all presenters to not offer handouts during their presentation to reduce waste. If anyone would like more info, the presenter could take that individual's contact info and send their presentation electronically. A common trend now is to offer online content from the conference after it has come to an end. CANNT offers online PowerPoint copies of the presentations (for a limited time) for all members to view. Other associations have online libraries of presentations for members to view for a nominal fee. The NANT conference offers an audio voiceover that accompanies its presentations. Presentations can be videotaped and translated as well. There are numerous ways to get the content to your members—you do need to consider cost and the needs of the end user when considering this option.

Everyone likes free stuff and the swag bag is no different. It's always great to get lunch bags or small totes with your registration, especially if they are eco-friendly in design—namely, made from post-consumer products and transformed into new goods. But often the papers that are packed inside, things like maps and brochures, are not eco-friendly. Now some may be handy (like a map or an attractions brochure or attendees list), but their viable usage is limited and inevitably they end up in the trash or (hopefully) the recycling bin. It would be most responsible to insert only what is truly important in the bag and cut back on paper and wasted trees. Any free swag from vendors should also follow suit. I suggest only eco-friendly goodies, such as recycled notepads, or biodegradable pens be made available.

The final area to consider is the area of social commitment. Huge props go to the Calgary planning committee for requesting that attendees bring any opened or unopened hotel toiletries to the registration desk so that they could be delivered to a local women's shelter. This is just one of many examples of social commitment that is easy to incorporate at any conference. This need not only be a planning committee initiative, it could also be supported by vendors. They could either commit to the same initiative, or promote something different on their own. Either way, significant impact can be made through a conference with more than 600 attendees. Increased participation in this initiative would have been achieved if it was announced in the conference written materials. We need to always be reminded and be thankful for what we have, and what better way to show our compassion towards others than to contribute en masse to those less fortunate.

An excellent reference for anyone looking to host a green event of any size is the David Suzuki Foundation's *How to Host a Sustainable Event:* **http://www.davidsuzuki.org/what-you-can-do/reduce-your-carbon-footprint/how-to-host-a-sustainable-carbon-neutral-conference-or-other-event/**

To all members of the CANNT 2012 Ottawa planning committee, I wish you a fantastic green event, which is already underway with the venue chosen being the new LEED-certified Ottawa Convention Centre. I look forward to attending and presenting yet again something on the spectrum of greening. For any further information or questions regarding hosting a green event at your hospital or elsewhere, feel free to contact me at **regq101@gmail.com**.

As I ride off into sunset on my green stallion, I leave you with these words from the Wild West: "Keep'r Green Cowpokes… Yee Haw!"

Rejean Quesnelle, AScT
Renal Technologist, Halton Healthcare Services, Oakville, ON

For any and all questions, feel free to email me, Reg, aka "Green Tech," Quesnelle at regq101@gmail.com

Contact hour: 2.0 hrs

The dangers of substance abuse in adolescents with chronic kidney disease: A review of the literature

By Melanie R. Steele, Vladimir Belostotsky, MD, PhD, MRCPCH, and Keith K. Lau, MBBS, FAAP, FRCPCH

Objectives

After reading this article, readers should be able to:

1. Recognize that substance abuse in adolescence is common, and that adolescents suffering from chronic illness may be more predisposed to substance abuse.
2. Discuss the nephrotoxic effects of various substances of abuse in adolescents with chronic kidney disease (CKD).
3. Understand the role of the nephrology team in educating CKD patients about the risks of substance abuse.

Abstract

Although there exist no specific data on the prevalence of substance abuse among children and adolescents with chronic kidney diseases (CKD), the magnitude of this problem should not be underestimated, as almost half of twelfth-graders in the U.S. admit to a history of using illegal drugs at least once when asked (National Institute on Drug Abuse, 2011). According to the 2010 Canadian Alcohol and Drug Use Monitoring Survey (Health Canada, n.d.), the prevalence of drug abuse among Canadian youths and young adults aged 15 to 24 remains higher than in adults older than 25 years of age, and the rates of drug use (excluding cannabis) in the past years were 7.9% and 0.8%, respectively, illustrating an almost 10 times higher rate in the younger age group (Health Canada, n.d.). Drug abuse can lead to numerous medical problems, including renal injury, and it is clearly a major public health concern, especially in patients with subnormal kidney function (Vupputuri et al., 2004). As most of the children and adolescents that suffer from CKD have long-term and trustful relationships with the nephrology team, we have the obligation and are in an excellent position to address this particular health issue (Finkelstein & Finkelstein, 2000; Kimmel, 2002; Kimmel, Cohen, & Peterson, 2008). This review summarizes the available data on the nephrotoxic effects of various commonly abused drugs with special emphasis on the additional damage that occurs in patients with pre-existing CKD. These data were obtained from a thorough search of the available primary literature, specifically using the PubMed database. The purpose is to provide health professionals with a resource to properly educate their CKD patients on the dangers of these drugs.

Key words: chronic kidney diseases, drug abuse, children

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Neurodevelopment during the adolescence period involves growth and remodelling of various areas of the brain that are associated with impulsivity and addiction, thereby predisposing them to risk-taking behaviours, including substance abuse (Chambers, Taylor, & Potenza, 2003; Crews, He, & Hodge, 2007). Health Canada has recently released the results of the 2010 CADUMS, which demonstrated that among the young individuals surveyed (aged 15 to 24), 41.4% reported lifetime use of cannabis (Health Canada, n.d.). Even more worrisome is that among these young drug users, 24.7% also reported harm to self in the past year. Children and adolescents with CKD are constantly exposed to stresses, which may further aggravate the situation. There are also studies in the literature suggesting that adolescents with chronic illnesses are more predisposed to smoking, drinking and drug addiction (Scaramuzza et al., 2010; Suris & Parera, 2005). Specifically, according to a study from the National Center on Addiction and Substance Abuse at Columbia University, nine in 10 people who suffer from drug addiction begin to smoke or drink and/or use other drugs before the age of 18 (The National Center on Addiction and Substance Abuse at Columbia University, 2011). The 2004 Canadian Addiction Survey analyzed the risks associated with tobacco use among youth aged 15 to 19, and the results indicated that tobacco use is a significant indicator for drug abuse (Davis, 2006). Studies have also suggested that young individuals are more prone to develop drug dependency and to suffer from the mental side effects, when compared to adults. Therefore, the risk of smoking and drinking behaviours among pediatric patients with chronic kidney diseases should not be underestimated (Chen, O'Brien, & Anthony, 2005; DeWit, Adlaf, Offord, & Ogborne, 2000; Raphael, Wooding, Stevens, & Connor, 2005). Moreover, it is important to keep in mind that not all adolescents will admit to drug use when asked by a

health care provider. It is imperative for the team to have a high index of suspicion and be ready to provide education and guidance to adolescent patients about the risks of substance abuse. Table 1 depicts the most commonly abused drugs and their common physiologic side effects that are listed on the web page of the National Institute on Drug Abuse (n.d.). Nephrotoxicities related to drug abuse can vary according to individual situations. It may be due to the direct or indirect toxic effects of the drugs on the kidneys and may encompass a spectrum or combinations of vascular, glomerular and interstitial damage (Milroy & Parai, 2011). Table 2 depicts some common mechanisms of nephrotoxicities secondary to various drugs. The renal toxic effects of the commonly abused drugs are being discussed below. Although most of the information available in the literature originated from studies in adult patients, these experiences should also be useful in the care of adolescents.

Cannabinoids: Marijuana and hashish

Marijuana

Marijuana has different names (grass, joint, bud, Mary Jane, pot, weed and skunk) and health care providers should familiarize themselves with the names that are being used on the streets. Patients may display symptoms of euphoria, delayed reaction, poor coordination, deterioration in learning and loss of memory. According to the most recent CADUMS, the median age for the initiation of marijuana abuse among young adults was 15.7 years (Health Canada, n.d.). Despite the fact that marijuana has been one of the most commonly abused drugs in history, only a few reports of renal infarctions in patients with a history of heavy marijuana use could be found in the literature, (Lambrecht, Malbrain, Coremans, Verbist, & Verhaegen, 1995; Le Guen, Gestin, Plat, Quehe, & Bressollette, 2011). The exact mechanism has not yet been elucidated and no direct links of renal injury to its use have been established (Crowe, Howse, Bell, & Henry, 2000).

On the other hand, as cannabinoids are metabolized by the cytochrome P450 enzyme system of the liver, they may interfere with the metabolism of cyclosporine and tacrolimus, thereby increasing the risk of calcineurin inhibitor toxicities (Davison & Davison, 2011; Yamaori, Okamoto, Yamamoto, & Watanabe, 2011). As the kidney is the primary route of elimination, the risk of accumulation of the metabolites of cannabinoids increases in patients with impairment of glomerular filtration (Davison & Davison, 2011). Additionally, Bohatyrewicz et al. reported a case of a 27-year-old kidney allograft recipient who developed de novo membranous nephropathy after transplantation (Bohatyrewicz, Urasinska, Rozanski, & Ciechanowski, 2007). Even though the patient denied any previous exposure to nephrotoxic agents, his urine showed high levels of Δ9-tetrahydrocannabinol (THC) (Bohatyrewicz, et al., 2007). This case suggests a possible association between marijuana abuse and membranous nephropathy (Bohatyrewicz, et al., 2007). Moreover, a recent study from Australia provides compelling evidence that adolescents who abuse marijuana are at risk of continuing to abuse other illicit drugs later in life (Swift et al., 2011).

Opioids: Heroin and opium

Heroin

Heroin is an acetylation product of morphine and has been one of the most commonly abused illicit drugs in the United States (Dettmeyer, Preuss, Wollersen, & Madea, 2005; Jaffe & Kimmel, 2006). It may be called white horse, China white or smack. It can be taken by sniffing, inhalation or injection. Although the data on heroin use among young adults are not available in the most recent CADUMS, it has also been a majorly abused drug among Canadians in the past (Fischer et al., 2005). Unlike marijuana, there is a wide spectrum of heroin-associated renal injuries, including injury secondary to rhabdomyolysis, glomerulonephropathies and interstitial nephritis (Sreepada Rao, Nicastri, & Friedman, 1977).

Renal injuries secondary to rhabdomyolysis are commonly reported among patients with heroin overdose. Various

Table 1. Commonly abused drugs and their physiologic effects
Adapted from the web page of the National Institute on Drug Abuse (National Institute on Drug Abuse).

Drugs	Physiologic Effects
Cannabinoids	Euphoria; decreased coordination; memory and learning impairment; delayed reactions; increased heart rate; increased appetite; anxiety
Opioids	Euphoria; sedation; nausea; confusion; constipation; respiratory depression; infectious disease
Stimulants	Energetic; increased irritability; sleeping difficulties; increased body temperature, blood pressure and heart rate; loss of appetite and weight loss; violence; anxiety; paranoia; tremors; cardiovascular complications; seizures; stroke
Dissociative drugs	Feelings of separation from oneself; memory impairment; nausea; tremors; analgesia; hallucinations; violent behaviours; coordination difficulties; psychosis
Hallucinogens	Increased blood pressure, heart rate and body temperature; distorted perception; Hallucinogen Persisting Perception Disorder; insomnia; impulsivity; emotional instability; reduced appetite; tremor; dizziness; flashbacks
Inhalants	Varies depending on the specific chemical. Possible effects include: weakness; impaired coordination; headache; lowered inhibitions; impaired memory; decreased level of consciousness; nausea and vomiting; depression; cardiovascular effects; neurologic effects
Ethanol	Euphoria; lowered inhibitions; lethargy; nausea; emotional instability; decreased level of consciousness; memory impairment; violent behaviours; liver damage; cardiovascular disease; hypertension
Tobacco (nicotine)	Respiratory and cardiovascular disease; CVA; increased heart rate and blood pressure; various cancers

Table 2. Nephrotoxicities associated with various drugs of abuse

Drugs	Associated nephrotoxicities reported in literature
Cannabinoids	Drug interactions (via cytochrome P450)
Opioids	Rhabdomyolysis Glomerulonephropathies (including heroin associated nephropathy) Membranoproliferative glomerulonephritis Interstitial nephritis Granulomatous nephritis
Cocaine	Rhabdomyolysis Anti-glomerular basement membrane glomerulonephritis Interstitial nephritis Renal vascular diseases Infarction Malignant hypertension Thrombotic microangiopathy
Amphetamines	Rhabdomyolysis Necrotizing angiitis Interstitial nephritis
MDMA (ecstasy)	Rhabdomyolysis Necrotising vasculitis Proximal tubulopathy
Phencyclidines	Rhabdomyolysis Hypertension
Ketamine	Inflammatory cystitis
Lysergic Acid Diethylamide and Psilocybin	Rhabdomyolysis Medullary edema Tubular cell necrosis
Benzodiazepines	Rhabdomyolysis Interstitial nephritis
Inhalants	Microscopic hematuria, proteinuria, pyuria Tubular injury Glomerulonephritis Interstitial nephritis Nephrolithiasis Goodpasture's syndrome
Ethanol	Acute tubular necrosis IgA nephropathy Rhabdomyolysis Hypertension Electrolyte abnormalities Hyperuricemia
Ethylene glycol	Acute renal failure Renal tubular necrosis COM-induced renal failure
Tobacco	Renal cell carcinoma Proteinuria Kidney allograft loss in transplant recipients

mechanisms, which include direct toxicity to muscles, pressure injuries during coma due to overdose, and allergic reactions to adulterants, have been proposed to be the etiologies of rhabdomyolysis (Cunningham, Venuto, & Zielezny, 1984; Dettmeyer, et al., 2005; Dubrow, Mittman, Ghali, & Flamenbaum, 1985; Grossman, Hamilton, Morse, Penn, & Goldberg, 1974; Kosmadakis, Michail, Filiopoulos, Papadopoulou, & Michail, 2011).

On the other hand, glomerulonephritis compatible with post-infectious acute glomerulonephritis has also been reported (Freeman, Kreps, Ronsheim, Lejano, & Sommers, 1974). The pathomechanism is probably related to the exposure to infectious agents via intravenous or subcutaneous injections (Roberts & Rabson, 1962; Tuazon, Hill, & Sheagren, 1974). Although not commonly seen in children, chronic kidney diseases associated with amyloidosis have also been documented in adult drug addicts (do Sameiro Faria, Sampaio, Faria, & Carvalho, 2003; Jaffe & Kimmel, 2006; Manner, Sagedal, Roger, & Os, 2009; Neugarten et al., 1986). Heroin-associated nephropathy (HAN) is probably the most commonly reported nephropathy among heroin addicts, particularly among African Americans addicts (Dettmeyer et al., 2005; Haskell, Glicklich, & Senitzer, 1988). Despite no uniform histological or immunofluorescence pattern being identified, patients usually present with heavy proteinuria and are at risk of rapid deterioration of renal function (Dettmeyer et al., 2005). Other renal injuries in which heroin abuse has been implicated include membranoproliferative glomerulonephritis, interstitial nephritis and granulomatous nephritis (Dettmeyer et al., 2005; Haskell et al., 1988; Sreepada Rao et al., 1977). However, it is still debatable whether these injuries are directly related to heroin or its adulterants, or the infectious contaminants such as hepatitis B and C viruses and Staphylococcus (Dettmeyer et al., 2005). Since the main metabolic byproduct of morphine, morphine-6-glucuronide, is mainly excreted through the urine, drug addicts with impaired glomerular filtration rates are predisposed to develop renal complications (Dettmeyer et al., 2005).

Stimulants: Cocaine, amphetamine and methamphetamine

Cocaine

Cocaine is less commonly used among Canadian drug addicts between the ages of 15 to 24, as only 2.7% of those surveyed admitted to cocaine use in the past year (Health Canada, n.d.). Although cocaine is well known for its cardiovascular effects, cocaine abuse can also be harmful to the kidneys, and both acute and chronic kidney injuries have been associated with cocaine use in healthy individuals (Garg et al., 2011; Gitman & Singhal, 2004; Jaffe & Kimmel, 2006; Nzerue, Hewan-Lowe, & Riley, 2000). Like other commonly abused drugs, the metabolites of cocaine also rely on the kidneys as their main route of excretion and, thus, the risk of accumulation of these products is much higher in CKD patients (Churchwell & Mueller, 2007; Nzerue et al., 2000).

The most common cocaine-induced acute kidney injury is acute rhabdomyolysis (Byard, Summersides, & Thompson, 2011; van der Woude, 2000). While the exact mechanism by which cocaine causes rhabdomyolysis is unknown (Nzerue et al., 2000), it is likely due to direct myocyte toxicity, as well as

ischemia resulting from vasoconstriction (Gitman & Singhal, 2004). Acute kidney injuries have also been reported in cocaine users who developed anti-glomerular basement membrane glomerulonephritis and interstitial nephritis (Nzerue et al., 2000; Sirvent et al., 2007; Wojciechowski, Kallakury, & Nouri, 2008). The exact mechanism is still unknown, but it may be related to the endothelial damage induced by cocaine that leads to antibody production (Nzerue et al., 2000). Cocaine can also lead to renal vascular diseases and malignant hypertension, thus induce acute kidney injury by vasoconstriction (Gitman & Singhal, 2004; Gu & Herrera, 2007; Nzerue et al., 2000). It may also lead to thrombotic microangiopathy and endothelial damage by not-yet-understood mechanisms (Gitman & Singhal, 2004; Gu & Herrera, 2007; Jaffe & Kimmel, 2006).

It is speculative that cocaine abuse is more likely to induce injury in patients with underlying renal insufficiencies by hastening the progression of renal disease. A recent study has also shown that cocaine users developed end stage renal diseases and required dialysis at younger ages than the group not using cocaine (Gitman & Singhal, 2004).

Amphetamines

Amphetamines have been implicated in different forms of renal diseases (Citron et al., 1970; Halpern & Citron, 1971; Koff, Widrich, & Robbins, 1973; White, 2002). Acute kidney injuries secondary to rhabdomyolysis have been associated with intravenous use of methamphetamines (Ginsberg, Hertzman, & Schmidt-Nowara, 1970; Kendrick, Hull, & Knochel, 1977). Furthermore, necrotizing angiitis has also been described in adult amphetamine abusers (Citron et al., 1970). Initial presentations include constitutional symptoms such as weight loss, fever and chronic fatigue, and then progress to severe abdominal and joint pain, cutaneous rashes and ulcers (Citron et al., 1970). Patients with renal involvement usually have hematuria, proteinuria, rapid progression of hypertension and worsening of renal function, with histological findings that are very similar to polyarteritis nodosa (Halpern & Citron, 1971). Interstitial nephritis has also been reported, and some of these patients recovered with corticosteroid therapy (Foley, Kapatkin, Verani, & Weinman, 1984).

Methylenedioxymethamphetamine, also known as ecstasy, is another amphetamine that has been very popularly abused at rave parties (Crowe et al., 2000). Besides acute renal injuries due to rhabdomyolysis, there are other case reports on ecstasy abusers who suffered from hyponatremia, necrotising vasculitis, proximal tubulopathy and chronic kidney diseases (Bingham, Beaman, Nicholls, & Anthony, 1998; Campbell & Rosner, 2008; Kwon, Zaritsky, & Dharnidharka, 2003; Woodrow & Turney, 1999).

Dissociative drugs: Phencyclidine and ketamine

Phencyclidines

Phencyclidine (PCP) is commonly known as angel dust, crystal and hog (Cogen, Rigg, Simmons, & Domino, 1978). Consumption of low doses is typically associated with euphoria, but ingestion in large dose can cause severe complications, such as hypertension, hyperthermia and rhabdomyolysis (Akmal, Valdin, McCarron, & Massry, 1981; Bey & Patel, 2007).

Ketamine

Ketamine is a commonly used anesthetic drug with amnesic effect. It is structurally related to PCP and is also known as special K. Case reports have linked ketamine use to the development of inflammatory cystitis and acute renal injury (Chu et al., 2007; Selby et al., 2008; Shahani, Streutker, Dickson, & Stewart, 2007).

Hallucinogens: Lysergic acid diethylamide and psilocybin mushroom

Although hallucinogens such as lysergic acid diethylamide and psilocybin mushroom have potent psychotic effects, adverse renal effects are also possible. Renal injuries due to rhabdomyolysis have been reported in individuals using Lysergic acid diethylamide (Berrens, Lammers, & White, 2010; Mercieca & Brown, 1984). Additionally, acute renal injuries that required renal replacement therapies have also been reported in individuals after consumption of the Psilocybe specis mushroom (Bickel et al., 2005; Raff, Halloran, & Kjellstrand, 1992). The exact mechanism of renal injury is still unclear, but renal biopsies from these victims showed medullary edema and necrosis of tubular cells (Bouget et al., 1990; Holmdahl, Mulec, & Ahlmen, 1984).

Others: Commonly abused drugs

Prescription drugs with addictive effects

Prescription drug abuse, including hydrocodone and benzodiazepines, is one of the fastest growing addiction problems. According to the 2011 estimated world requirements of narcotic drugs, Canadians rank third for top consumers of oxycodone, only after France and the United States, and are the top users of hydromorphone (Estimated World Requirements of Narcotic Drugs for 2011, October update). Although there are no nephrotoxic effects reported in patients who abuse hydrocodone, there is evidence that benzodiazepine overdose may lead to renal injuries including rhabdomyolysis and interstitial nephritis in patients with pre-existing chronic renal diseases (Hojgaard, Andersen, & Moller-Petersen, 1988; Sadjadi, McLaughlin, & Shah, 1987).

Inhalants

The inhalation of different types of volatile solvents has been reported in the literature (Meadows & Verghese, 1996). Among the commonly abused solvents, such as glue, thinner, gasoline, correction liquids and toluene, only toluene has been reported to cause renal injuries (Flanagan, Meredith, & Ramsey, 1989; Gupta, van der Meulen, & Johny, 1991; Kamijima et al., 1994; Patel & Benjamin, 1986; Ramsey, Anderson, Bloor, & Flanagan, 1989). The presentation of renal injuries is protean, ranging from mild symptoms such as microscopic hematuria, proteinuria, and pyuria, to more severe damage with long-term consequences, such as tubular injury, glomerulonephritis, interstitial nephritis, nephrolithiasis and Goodpasture's syndrome (Bonzel et al., 1987; Gupta et al., 1991; Kaneko, Koizumi, Takezaki, & Sato, 1992; Kondo et al., 1995; Russ, Clarkson, Woodroffe, Seymour, & Cheng, 1981; Streicher, Gabow, Moss, Kono, & Kaehny, 1981; Taverner, Harrison, & Bell, 1988; Venkataraman, 1981). However, the exact mechanisms of such injuries are still unclear (Kaneko et al., 1992).

Ethanol

Although alcohol is not an illegal drug in Canada, it is a commonly consumed beverage in adolescents that has the potential for harmful effects. Alcohol was used during the past 30 days in 52.3% of youth surveyed in the 2010 CADUMS report (Health Canada, n.d.). Binge drinking in the past month has also been reported in 22.3% of students in grades 7 to 12 according to the Ontario Student Drug Use and Health Survey (OSDUHS) (Paglia-Boak, 2011). Long-term consumption of ethanol can have many deleterious effects on kidney function. Chronic alcoholism has been shown to cause acute tubular necrosis and dysfunction (De Marchi et al., 1993; Presti, Carollo, & Caimi, 2007). An autopsy series on chronic alcoholics demonstrated a high incidence of IgA deposition in the kidneys, which suggested the possible association of chronic alcoholism and IgA nephropathy (Cecchin & De Marchi, 1996). Furthermore, there are cases of acute kidney injuries resulting from alcohol-induced rhabdomyolysis (Haapanen, Pellinen, & Partanen, 1984). Lastly, ethanol consumption has also been implicated in hypertension when consumed in amounts greater than 80 g daily in men and greater than 40 g daily in women (Vamvakas, Teschner, Bahner, & Heidland, 1998). Electrolyte abnormalities such as salt and water retention, and renal loss of calcium, phosphate and magnesium due to alcohol-induced hypoparathyroidism have also been linked to chronic alcoholism (Vamvakas, et al., 1998). Moreover, long-term alcohol consumption is also associated with hyperuricemia and predisposition to gout (Vamvakas, et al., 1998). Thus, alcohol consumption should be discouraged in patients with pre-existing CKD, as they would be at higher risk for these alcohol-related kidney injuries.

Ethylene glycol

The ingestion of antifreeze, or other forms of ethylene glycol (EG), often results in acute renal failure. U.S. poison centre statistics show that about 5,000 people are treated for EG poisoning in the United States every year, with about 20 to 40 fatalities (Bronstein et al., 2009). The mechanism has not been established, but is thought to result from the production of a toxic metabolite. Although the "aldehyde" metabolites of EG, glycolaldehyde, and glyoxalate have been suggested as the metabolites responsible, recent studies have shown definitively that the accumulation of calcium oxalate monohydrate (COM) crystals in kidney tissue produce renal tubular necrosis that leads to kidney failure (McMartin, 2009). The blockade of EG metabolism with fomepizole (or ethanol) to prevent formation of glycolate and oxalate is the mainstay of current therapy for early stages of EG poisoning. However, there are significant numbers of patients who remain undiagnosed, either because of delay in getting to a hospital or difficulties in making the diagnosis (Jacobsen, 1999). In these cases, EG metabolism will have occurred before diagnosis, thus leading to serious morbidity, including COM-induced renal failure. The only current treatment for EG-induced renal failure is hemodialysis/hemodialfiltration.

Tobacco

Tobacco use is widespread, making it the greatest cause of morbidity and mortality in the United States (Ehlers et al., 2006). While tobacco is notorious for its damaging effects on the respiratory and cardiovascular systems, there is also evidence for its harmful effects on the kidneys. Firstly, tobacco use increases the risk for kidney cancers such as renal cell carcinoma (Cooper, 2006). Furthermore, nicotine, a component of tobacco, has been shown to worsen proteinuria (Cooper, 2006). Smoking has been shown to increase the risk of developing microalbuminuria in healthy individuals (Hillege et al., 2001) and accelerate the progression of CKD in diabetic patients (Cooper, 2006). A prospective study in hypertensive patients has also suggested that smoking is one of the major risk factors of renal function deterioration (Regalado, Yang, & Wesson, 2000). Among renal allograft recipients, smoking has also been associated with higher rates of graft loss (Kasiske & Klinger, 2000; Sung, Althoen, Howell, Ojo, & Merion, 2001).

The role of nephrology nurses

As nephrology nurses have had long-term and trustful relationships with the adolescents with CKD, they are, thus, in the best position to help those who are struggling with substance abuse at different levels. Hence, it is pivotal for nephrology nurses to keep abreast of their knowledge regarding how to detect the signs and symptoms of drug abuse and familiarize themselves with the relevant resources within their community. As it is not the routine for the nephrology team to screen their patients, it is imperative that we have a high index of suspicion, especially in those at high risk for drug abuse, including those with a co-existing psychiatric illness and a family history of substance abuse (Leslie, 2008; Swadi, 1999). Signs may be subtle and easily missed, such as non-adherence to a therapeutic regimen and mood instability. If in doubt, the physicians need to be notified for further evaluations. There are a number of validated clinical tools that can be used in adolescents for assessment of substance abuse, including the Personal Experience Screening Questionnaire (PESQ), Alcohol Use Disorders Identification Test (AUDIT) and the CRAFFT Screening Test (Knight, Sherritt, Shrier, Harris, & Chang, 2002; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993; Winters, 1992). The authors find their colleagues in the Adolescence Medicine and Clinical Psychology Departments particularly helpful in administering these tests. When intervention is necessary, the nephrology team can work with the family to arrange counselling and psychological support. It is not the intention of the authors to discuss the community resources for youth suffering from drug abuse; rather, it is recommended that readers refer to the National Anti-Drug Strategy website of the Government of Canada for further information.

Conclusion

Adolescents are at a neurodevelopmental stage that renders them more prone to addiction, and there is substantial evidence that such behaviour has significant health consequences. The deleterious effects of drug abuse on the kidney, especially in patients with pre-existing renal insufficiencies, cannot be over emphasized. Since experimenting with various drugs is common in the teenage years, it is crucial for pediatric patients with CKD to recognize that they are particularly vulnerable to the complications. It is the responsibility of the renal team to be their advocates and provide advice and guidance. Nephrology nurses are in a position to recognize and assist adolescents who suffer from CKD and substance abuse by screening for related signs and referring them to appropriate counselling services.

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CONTINUING EDUCATION STUDY QUESTIONS **Contact hour: 2.0 hrs**

The dangers of substance abuse in adolescents with chronic kidney disease: A review of the literature

By Melanie R. Steele, Vladimir Belostotsky, MD, PhD, MRCPCH, and Keith K. Lau, MBBS, FAAP, FRCPCH

1. A 14-year-old renal transplant recipient admits to smoking marijuana on the weekends with his friends. This is concerning because of the risk of:
(a) drug interactions
(b) rhabdomyolysis
(c) interstitial nephritis
(d) granulomatous nephritis

2. Alcohol consumption in a patient with CKD can be associated with all of the following, *except:*
(a) rhabdomyolysis
(b) acute tubular necrosis
(c) membrano-proliferative nephropathy
(d) electrolyte abnormalities

3. What is the most common nephropathy among heroin users?
(a) post-infectious acute glomerulonephritis
(b) heroin-associated nephropathy
(c) rhabdomyolysis
(d) membranoproliferative glomerulonephritis

4. Which of these statements is NOT true about cocaine?
(a) cocaine users require dialysis at younger ages than non-cocaine users
(b) cocaine is solely metabolized by the liver
(c) cocaine use can lead to acute rhabdomyolysis
(d) cocaine use can lead to renal vascular disease

5. Nephrotoxic effects have been reported in patients that abuse all of the following, *except:*
(a) benzodiazepines
(b) ecstasy
(c) amphetamines
(d) hydrocodone

6. Which of the following substances has been reported to be associated with higher rates of graft loss in renal allograft recipients?
(a) marijuana
(b) red wine
(c) cigarettes
(d) ketamine

7. Which commonly abused solvent is known to cause renal injuries?
(a) glue
(b) toluene
(c) gasoline
(d) thinner

8. A reasonable way to approach an adolescent with CKD and suspected substance abuse is to:
(a) use the Personal Experience Screening Questionnaire (PESQ)
(b) notify the patient's parents
(c) notify the police
(d) order a urine toxicology screen

9. Which of the following is true about adolescents?
(a) 41.4% of Canadian adolescents reported lifetime use of cocaine
(b) adolescents with chronic illnesses are less likely to smoke compared with healthy adolescents
(c) adolescents are less likely to develop drug dependency compared to adults
(d) not all adolescents will admit to drug use when asked by a health care provider

10. Which of the following characteristics would cause the nephrology team to screen an adolescent for substance abuse?
(a) family history of substance abuse
(b) male
(c) diabetic
(d) family history of CKD

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 hrs continuing education

The dangers of substance abuse in adolescents with chronic kidney disease: A review of the literature

Volume 22, Number 1

By Melanie R. Steele, Vladimir Belostotsky, MD, PhD, MRCPCH, and Keith K. Lau, MBBS, FAAP, FRCPCH

Post-test instructions:

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- Complete the evaluation.
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5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d

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Impact of incident comorbidity on functional loss in elderly chronic kidney disease patients undergoing hemodialysis

By Juan José Mansilla Francisco, RN, Francisco Díez De los Ríos Cuenca, RN, Sandra Cabrera Azaña, RN, Joaquín Cortés Torres, RN, Mª José Macías López, RN, José Antonio González Castillo, RN, and Juan Luís Ferreras Duarte, RN

Editors note: *We are very pleased to be publishing this manuscript from our colleagues in Spain. When asked why they chose the CANNT Journal for their manuscript submission, they said the following: "I don't think that Canadian nurses realize the importance they hold for us; in Spain, the terms 'Canadian Nursing' and 'quality' are almost synonymous. We are proud to have been accepted to publish in the CANNT Journal."*

Abstract

The incidence of end stage renal disease in older persons has been increasing progressively over the last 10 years. Improved survival rates with renal replacement therapy are making this increased prevalence even more pronounced. The usual risks of morbidity and requirements for specialized care associated with older people increase dramatically when they have chronic kidney disease (CKD).

It has been seen that the majority of patients in hemodialysis units are over the age of 60, and have significant co-morbidities. The relationship between older age, chronic disorders and functional dependence (FD) is well known. Accordingly, nursing care planning must be designed with this in mind. The aim of this study was to assess whether the comorbidity associated with CKD modifies FD in patients on hemodialysis. We undertook a prospective longitudinal cohort study of hemodialysis outpatients in Málaga, Spain, using the Barthel test to establish FD and the Charlson comorbidity index to quantify comorbidity. All health events were analyzed to select those study patients with incident comorbidity, understood as the appearance of a new disease that could modify the Charlson comorbidity index, and determine the change in FD. Multivariate linear regression showed that the best model for predicting functional loss was that which considered comorbidity adjusted for age, particularly when it occurred as a result of hospital admission, as it was shown to have an important predictive value for the onset of a decrease in functional dependency scores in patients with CKD.

Key words: older patient, functional dependence, dialysis, comorbidity

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Introduction and literature review

One of the consequences of the aging population in Spain is the high number of older patients with CKD who require renal replacement therapy with hemodialysis. Older patients (>60 years of age) on dialysis frequently have additional comorbidities that compound their illness, the ability to be independent, and consequent care needs. Several studies have attempted to define the more important epidemiological factors affecting the use of resources, prognosis and workload (Lamping et al., 2000; Collins et al., 2009; Lorenzo et al., 2010). The relationship between older age, chronic disease and functional dependence (FD) has been demonstrated (Becker, 1994; WHO-ICF, 2001).

Indeed, the Spanish law 39/2006, the Personal Autonomy and Dependent Care Law (Ley 39/2006, 2006) clearly indicates the intention of the Spanish national health system to assist those who have lost autonomy and independence due to disability or age. Thus, nephrology nurses need to adapt care to the characteristics of these patients in accordance with the law. It is necessary to be aware of the prevalence of FD of patients in order to plan and provide nursing care to meet patients' needs, as well as manage workload and resources. The regional nursing care plans of the Health Ministry of the Andalusian Government, as well as its 2008 Program Contracts, specify that nurses should identify frail and fragile elderly patients—with special attention to those patients with multipathologic processes, as age by itself is not necessarily a definitive conditioning factor of dependence.

Other studies have echoed the importance of these multipathological processes in older persons and their impact on health and health care (Medrano et al., 2007; Carlos et al., 2009).

The Spanish Society of Nephrology Quality Group included the Charlson comorbidity index among the indicators of quality care in hemodialysis in 2003, thus recognizing the need for assessing comorbidities in planning quality care.

The mean prevalence of patients with CKD on replacement therapy according to the Spanish Registry of Renal Patients for 2009 is 1,039 cases per million inhabitants, with a mean incidence of 129 cases per million inhabitants, with close to 60% of those on renal replacement therapy being over the age of 60 (SEN, 2010). Thus, due to the advanced age of patients seen in dialysis units in Spain, nursing care planning should take this factor into account. In one article (Jassal et al., 2009) authors identified how important it is to assess frailty and function when older patients start dialysis.

In our provincial reference hospital with a hemodialysis program, we have established permanent evaluation of the FD—using the Barthel index—of the outpatients on the program, and have studied the factors that might affect this dependency in an attempt to foresee its possible onset and establish the most suitable strategy and best treatment options to improve the quality of life of these patients. Within this framework we have recognized comorbidity as an important factor triggering functional loss.

Methodology

Theoretical framework

We used the University of California, San Francisco, Symptom Management Model (UCSF-SMM) (Dodd et al. 2001), which considers the presence of a two-way relationship between the onset, perception and response to disease symptoms by the individual and their functional status and morbidity–comorbidity-mortality. This relationship is expressed in the three domains of scientific nursing: person, health-illness and environment. These domains can be represented by a Euler-Peirce diagram with zones of intersection and mutual influence. Each variable in our study belongs to one of these three interrelated domains.

Design

The study hypothesis was that incident comorbidity triggers functional loss. We undertook a prospective, observational, longitudinal cohort study of the 101 outpatients over the age of 60, who agreed to be studied, with no initial acute active diseases and who were on the outpatient hemodialysis program in June 2009. The observation period was 12 months. We evaluated all of the health-related incident events in the study group and the change in FD during the study period.

We chose the Barthel index to measure FD because of its ability to discriminate between the World Health Organization International Classification of Functioning, Disability and Health (WHO-ICF, 2001) categories in section 2, named "Activity Limitations and Participation Restriction". This test is one of the standards of care in nursing practice in hospitals of our National Health System, so it was easily recorded. The Barthel index is scored from 0–100, with cut-off points set at 20, 60 and 90 to define a FD scale. A lower score indicates a higher FD, thus: 0 to 20 points represents total dependency; 20 to 60: severe; 60 to 90: moderate and 90 to 99: mild dependency. Only a score of 100 indicates independence. Nurses can measure FD when they suspect that a patient's baseline is changed and always at their own discretion. Functional loss (FL) was defined as a difference of at least 10 points between two measurements of the Barthel index, before and after a particular event (Mahoney & Barthel, 1965).

For the purposes of this study, the event was defined as the appearance of a diagnosis of ongoing comorbidity. The Charlson Comorbidity Index (CCI) was used to measure this comorbidity (Charlson et al., 1987).

This index provides an overall score obtained by summing up partial scores depending on whether events are diagnosed during the natural history of the patient's disease. These partial scores are weighted according to the severity of the event. The comorbid conditions listed are diseases accompanying the main one (in this case CKD) and not considered an acute illness. This study was done using Beddhu's modification for nephrologic patients (Pittsburgh University) (Beddhu et al., 2000) (see Table 1). In order to stratify the sample we consider mild disorders those scoring 1 or 2 points on the CCI table, and severe those scoring 3 or 6 points.

The CCI can be adjusted for age by adding one point to the total score for each 10 years above the age of 40 years (CCIage) (Charlson et al., 1994). The CCI was used to measure the comorbidity alone, and the CCIage was used to analyze the impact of age on comorbidity. The cut-off points were analyzed in quartiles. A patient was considered to have an initial comorbidity value according to the diagnoses reported in the clinical history, as determined by chart review.

Incident comorbidity was considered to be that which modified the baseline CCI or CCIage.

Both the Barthel index and Charlson score are user-friendly tools, largely used by the scientific community, and are validated to Spanish language and contrasted for many purposes, including nephrology scope (Cid-Ruzafa, 1997; Camps et al., 2009; SEN, 2007). This study was approved by the bioethics committee of Málaga Regional Hospital and all participants signed an informed consent prior to being included in the study.

Table 1. Charlson Comorbidity Index modified by Beddhu

Coronary artery disease[1]	1	[1] included AMI [2] Including intermittent claudication, aortic aneurysm, non-cardiac bypass surgery [3] includes TIAs [4] Or any chronic cognitive impairment [5] Lupus, vasculitis, chronic and disabling rheumatic disease, polymyositis ... [6] Any chronic digestive disease with evidence of active bleeding upper or lower [7] Any type of hepatitis without systemic involvement [8] with pharmacologic treatment [9] no evidence of metastasis [10] Cirrhosis of any etiology
Congestive heart failure		
Peripheral vascular disease[2]		
Cerebrovascular disease[3]		
Dementia[4]		
Chronic pulmonary disease		
Connective tissue disorder[5]		
Peptic ulcer disease[6]		
Mild liver disease[7]		
Diabetes[8]		
Hemiplegia	2	
Moderate or severe renal disease		
Diabetes with end-organ damage		
Any tumour, leukaemia, lymphoma[9]		
Moderate or severe liver disease[10]	3	
Metastatic solid tumour	6	
AIDS		

Statistical analysis

The independent variables considered were sex, age, initial FD (FDstart) (all of them belonging to the UCSF-SMM person domain), etiology of the CKD, hospital admission during the observation period, initial CCI (CCIstart) or CCI after an event (CCIend), death (UCSF-SMM health-disease domain), and time on dialysis (UCSF-SMM environment domain). The study variables were final FD (FDend) and functional loss (FL) (UCSF-SMM person domain).

Sociodemographic, medical, and treatment-related data were obtained from medical records and patient interviews. Comorbid conditions were determined through chart review of documentation by the nursing personnel of the dialysis unit. These conditions were verified through review of physician notes in the clinical history. Any queries related to the diagnosis of comorbidities were resolved during joint clinical review sessions.

We analyzed the correlation between age, modifications in the CCI and subsequent FD changes. Kaplan Meier and log rank survival curves were analyzed. Multivariate logistic regression was used with independent variables. Other statistical tests used included ANOVA for the FD score, $\chi 2$ test, Wilcoxon and Mann Whitney U tests for non-parametric tests (mainly to study the interquartile ranges of the CCI score). The Kolmogorov-Smirnov Z test was used to determine non-normal distributions, the Student t test to compare the means of related samples (between comorbidity groups), and the odds ratio (OR) for the dichotomous model of independent variables generating the presence or not of functional loss. All calculations were made using SPSS v.15, under license from Málaga University, and EpiInfo 6.0 from the CDC in Atlanta.

Results

Of the 101 patients who started the study, 81 (80.2%) completed the follow-up. The reasons for loss were: transplant (n = 6; 5.9%), transfer to another dialysis centre (n = 5; 4.9%) and death (n = 9; 8.9%). The sociodemographic characteristics of the cohort were (mean ± SD): age: 58.8 ± 18 years, time on hemodialysis: 89.2 ± 78.7 months (interquartile range: 34–132, median: 50) and sex: 56.8% male.

No significant association was found between sex, age or treatment time. The time during which patients were transplanted was excluded from the hemodialysis time in this study.

The etiology of CKD did not differ significantly from other prevalence studies in Spain (Portolés et al., 2007; Herrero et al., 2006) or Italy (Di Iorio et al., 2004): glomerulonephritis (22%), interstitial disorders (21%), vascular disorders (12%) and diabetes (13.6%).

The FDstart of the cohort was as follows: independent, 59.3%; mild dependence, 12.3%; moderate dependence, 7.4%; severe dependence, 16%; and total dependence, 4.9%. The overall changes in FD and the CCIage (44 patients experienced comorbid events) were: FDstart 83.2 ± 26.3 to FDend 78.2 ± 32.1 (mean ± SD) and CCIage-start five to CCIage-end six (median). Three patients had more than one episode that modified CCI. In these cases we analyzed changes in FD after last change in comorbidity, taking the sum of scores of several events in one step.

Analysis of the whole sample showed a significant bilateral correlation ($P < 0.01$) between age, CCI and FD with the Pearson (-0.4 for FD and 0.8 for the CCI) and the Spearman coefficients (-0.3 and 0.8, respectively). A bivariate correlation was also seen between comorbidity and dependence (Pearson: 0.4; Spearman: 0.5). These findings showed a strong relationship between the three variables taken two by two. The FDend was 93.7 ± 17.3 for the patients with a CCI below the median (P50) and 68.6 ± 35.4 for the group with a CCI above P50 ($P < 0.01$).

The distribution by sex showed a significant difference for the Barthel score at the end of the study. Overall, FD in the women worsened over the study period, but with no significant association with the proportional worsening on the CCI. This could be because, at the start of the study, the women were generally situated in the group with a CCI above P50 and, thus, started at a disadvantage (Table 2).

As the groups were dispersed when we stratified the sample according to the CCI percentiles, as in the study by Beddhu et al. (2000), we divided the sample into just two groups, above and below the median. The study group comprised the patients who experienced a change in their CCI, as they had diagnostic events that increased their comorbidity. Table 3 shows the median CCIend. The difference between the FDstart and FDend in the group with increased comorbidity (CCIage-end > CCIage-start) compared with the group that did not experience an increase was significant (Student t test for related samples, $P < 0.01$). That is, all increases in comorbidity resulted in an overall functional loss, a result that has been demonstrated elsewhere (Medrano et al., 2007). During the study period there were 22 admissions. To evaluate the influence of these admissions on the loss of functionality, the 22 admissions were divided between those that produced incident comorbidity (seven episodes: pulmonary thromboembolism with sequelae, solid tumour, COPD, congestive heart failure and three related to ulcers) and those that did not (15 others). A diagnosis of incident comorbidity made as a consequence of hospital admission was significantly associated with FL ($\chi 2$: 20.7; $P < 0.01$).

As those patients who experienced a worsening in the CCI did not do so linearly, two groups were considered, according to the number of associated accompanying disorders, in order to assess the effect on FD of the onset of various adverse conditions: Group 1, with a difference in score (not attributable to age) of two or three points (two mild accompanying disorders); Group 2, with a difference of four or more points (at least one severe accompanying disorder). The decline in FD of these two groups is shown in Table 4.

At initial data interpretation, sex was not considered to be an independent variable, as originally thought, because it was contaminated by lower initial scores for FD and CCIage. In other words,

Table 2. Distribution of sample by sex, CCIstart and CCIend above or below median

	CCIage-start < P50	CCIage-start > P50	OR (95% CI)	CCIage-end < P50	CCIage-end > P50	OR (95% CI)
Men n = 46	23	23	2.89 (1.01; 8.41)	20	26	1.68 (0.61; 4.68)
Women n = 35	9	26		11	24	

- CCIage-start vs P50: Initial CCI modified by age below or above median.
- CCIage-end vs P50: Final CCI modified by age below or above median

in this cohort, women had poorer health status initially. Linear regression analyses showed that the model that best predicted the FDend was that which considered the FDstart group, initial comorbidity modified for age older than the median (CCIage-start > P50), a greater increase in the CCIage (ΔCCIage) and having been admitted with a diagnostic comorbidity event with a corrected $r^2 = 0.62$ ($P < 0.001$), with no association with time on dialysis or CKD etiology. No model explained consistently the number of points lost between FDstart and FDend (ΔFD) (Table 5).

Taking FL (at least 10 points between FDstart and FDend) as a dichotomous dependent variable, the independent variables with the greatest impact in the binary regression model were Admission with OR 3.1 (95% CI: 0.5–19) and ΔCCIage with OR 1.6 (95% CI: 1.1–2.2).

The survival study — taking into account mortality, stratified according to the P50 of the CCIend without modifying for age (3 cases with less comorbidity than the median and 6 cases with more comorbidity) — was not significant (log Rank: 1.5. P = 0.2) (Figure 1).

Discussion

The FD of patients is a known modifier of the workload of nursing teams and the instruments used for its measurement are user-friendly and provide a useful analysis of our patients' needs. The combination of an aging population and the sequelae of comorbidity (understood as new chronic disease) represent a great source of consumption of health care resources and workload (Lendínez et al., 2007; Medrano et al., 2007). This scenario also applies to nephrology and dialysis treatments (Beddhu et al., 2000). In this epidemiologic study we mapped the general characteristics of the dialysis population in our hospital, which were similar to other Western Europe results (Portolés et al., 2007; Herrero et al., 2006; Di Iorio et al., 2004).

With improvements in hemodialysis technology, patients are surviving longer and tend to be a more elderly population, lending to a higher burden of comorbidities. As direct care providers, nurses are in a unique position to assist with evidence-based assessments and planning that may assist in determining FD and associated resources that may be required in providing their care.

The population in our hospital-based outpatient dialysis program is composed mostly of patients older than 60 years of age, with varied causes of CKD, including cardiovascular disease and diabetes, and with a median time of four years undergoing renal replacement therapy. While there are external, ambulatory hemodialysis units in our area, they cater to a lower acuity population—and therefore the hospital-based dialysis unit cares for those patients with more significant health problems. In light of this, this study has assisted us in designing the overall nursing care delivered in dialysis units, recognizing that ancillary needs for this population are just as important, if not more so, than the quality of the hemodialysis itself.

The CCI-age is a very simple and user-friendly tool to administer and has proved useful as a prognostic factor for survival, resource allocation, admission and early readmission (Collins et al., 2009; Medrano et al., 2007; Beddhu et al., 2000). For nursing care, the CCI can be used as a complement to the functional evaluation scales, e.g., Karnofsky, Katz or WHODAS 2. Using these tools, continuous evaluation by the nurse of the onset of new events or diagnoses can be used to predict future care requirements in one or more functional areas, even before they appear.

Table 3. Relationship between age, FDend and CCI above or below median

	< P50 CCIend* (mean±SD)	> P50 CCIend* (mean±SD)	χ2	ANOVA
n	50	31		
Age	43 ± 12.6	68.5 ± 13.4		< 0.01
FDend	93.7 ± 17.3	68.6 ± 35.4		< 0.01
Sex (Female)	11	24	1.4 NS; P = 0.22	

*CCI calculated without adding points for decade of age passed

Table 4. Evolution of FD between groups by mild or severe co-morbid events

	FDstart (mean±SD)	FDend (mean±SD)	Mean ΔFD (mean±SD)	Wilcoxon*
Group 1 n = 14	72.8 ± 37.6	57.1 ± 36.8	15.7 ± 20.2	P < 0.01
Group 2 n = 8	81.8 ± 31.3	64.3 ± 42.3	17.5 ± 37.3	P < 0.01

* Kolmogorov-Smirnov Z: P<0.01

Table 5. Regression model of significant independent variables and associated weight

Variable	Standardized coefficient	P
Group FDstart	0.68	< 0.01
ΔCCIage	0.23	< 0.01
CCIage-start > P50	0.16	< 0.05
Admission	0.14	< 0.05

- Group FDstart: independent, mild dependence, moderate dependence, severe dependence and total dependence.
- ΔCCIage: comorbidity increase (modified by age)
- CCIage-start > P50: higher comorbidity than median at the beginning of the study

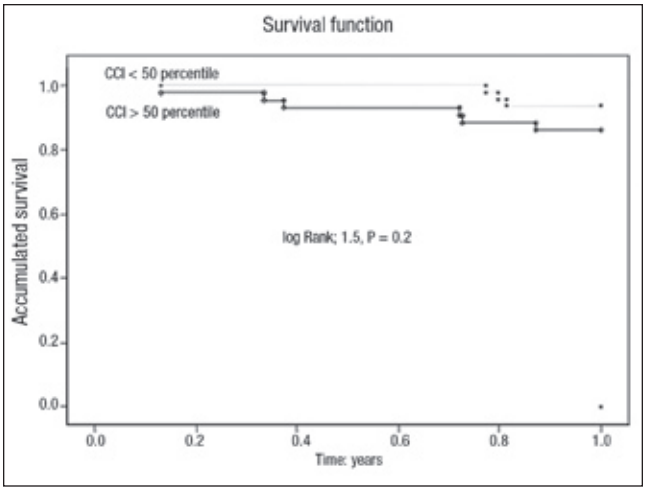

Figure 1. Survival according to Charlson comorbidity index score (CCI) (above or below the 50th percentile)

The limitations of this study include the lack of examination of other study variables such as nutritional status, efficacy of dialysis or the subjective perception of health, in relationship to the dependent variable of FD. Antoine et al., 2004, explain that psychological disorders such as depression are higher in dialyzed elderly patients. Marcen et al., 1997, shows how malnutrition increases risk of comorbidity. Although we consider that subjective perceptions of health or nutritional status represent different aspects of the health-illness dimension on the UCSF-SMM, and should be brought together with the wider variables affecting morbidity-comorbidity, this would require more detailed study.

Our study indicates that incident comorbidity triggers functional loss, especially when it occurs concurrently with an event that culminates in hospital admission. This is particularly true when patients have previously suffered some degree of FD and have any known comorbidity, especially in the older patient. This finding corroborates with others carried out in both non-nephrology (Boyd et al., 2008; Abizanda et al., 2007) and nephrology studies (Lo et al., 2008).

As a prognostic factor, our findings warn of the increased need for assistance with activities of daily living upon return to the hemodialysis unit for an older patient returning from a complex hospital admission. Frail, elderly persons just at the onset of decline could have differing needs as a result of FD. The identification of the onset of health problems that may predict future admission, e.g., cardiac ischemia that worsens during hemodialysis, or diabetes that is progressively more difficult to control, would allow nurses to begin planning for supportive care, falls prevention strategies, or other care supports.

In conclusion, this study contributes to nursing knowledge by identifying that attention to older patients who experience intercurrent illness, particularly with hospital admission, is important, as this has been demonstrated to be a trigger for functional decline. Therefore, nurses should develop care plans that include supports following hospital admission such as increased monitoring, assistance for activities of daily living, and referrals for rehabilitation and additional homecare services.

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Hypoglycemics for the treatment of type 2 diabetes in patients with chronic kidney disease: A focus on new agents

By Victor Fang, Lori D. Wazny, PharmD, and Colette B. Raymond, PharmD, MSc

Objectives

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

- Compare and contrast currently available pharmacological agents for type 2 diabetes.
- Understand the benefits and limitations of new hypoglycemics and their place in therapy.
- Understand the benefits and limitations of each pharmacological agent in patients with chronic kidney disease.

Introduction

This article will review the use of medications to treat type 2 diabetes in patients with chronic kidney disease (CKD). The efficacy, advantages and limitations of each medication and considerations and recommendations for their use will be discussed. New hypoglycemic agents will be highlighted.

Epidemiology

CKD is commonly complicated by the presence of other health conditions (Go, Chertow, Fan, McCulloch, & Hsu, 2004). Diabetes is very common among patients with CKD, affecting approximately 50.8% of patients in Canada receiving dialysis, and is the leading cause of renal failure in Canada (Arbor Research Collaborative for Health; Canadian Diabetes Association, 2008). Pharmacotherapy of diabetes is complicated in patients with CKD due to changes in the absorption, distribution, metabolism, and elimination of endogenous insulin and hypoglycaemic medications.

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Goals of therapy

The goals for glycemic control in diabetics with CKD are the same as other people with diabetes (Canadian Diabetes Association, 2008). A target glycated hemoglobin (A1C) of 7% or less is the recommendation for most patients with type 2 diabetes (Canadian Diabetes Association, 2008). Reduction of A1C to 7% can reduce the risk of developing microalbuminuria and associated complications in patients with type 2 diabetes (UKPDS Group, 1998; Shichiri, Kishikawa, Ohkubo, & Wake, 2000). Studies suggest that reducing A1C to less than 7% may reduce macroalbuminuria and that optimal control of hyperglycemia may help preserve renal function. However, the strength of this evidence is limited by small patient numbers (Shichiri et al., 2000; Brocco et al., 2001; Holman et al., 1983; Viberti, Bilous, Mackintosh, Bending, & Keen, 1983). It is important to note that the accuracy of A1C readings correlating to glycemic control in patients on hemodialysis has been debated. A1C assays should use high-performance liquid chromatography and be standardized to the Diabetes Control and Complications Trial (DCCT) assay to minimize the production of uremia-induced carbamylated hemoglobin, which can falsely increase A1C readings (Sharif & Baboolal, 2010). A1C readings are increased in patients with iron or folate deficiences. Metabolic acidosis, common in predialysis CKD patients, also leads to increased A1C levels (Sharif & Baboolal, 2010). Factors that falsely decrease A1C readings include blood loss, during treatment or from frequent blood sampling, in patients receiving hemodialysis, shortened red blood cell survival, red blood cell transfusions, and treatment with erythropoietic stimulating agents (Uzu et al., 2009). Hence, A1C readings of patients with CKD may be over or underestimating actual average blood glucose levels (Morgan, Marenah, Jeffcoate, & Morgan, 1996). The A1C should be interpreted along with the patient's home blood glucose readings before making a determination of diabetic control.

Glycemic control should be considered part of a multifaceted approach to managing patients with CKD (Levin et al., 2008). It is also important to assess the patients' cardiovascular risks and steps should be taken, as necessary, to manage hypertension and dyslipidemia. To best optimize health outcomes, patients should also be encouraged to make any necessary lifestyle changes, such as nutritional management, smoking cessation and increasing physical activity.

Pharmacotherapy

The pharmacologic management of hyperglycemia should be individualized for each patient. Patient factors such as degree of hyperglycemia, risk for hypoglycemia and other comorbidities should be considered to guide clinical judgment. Pharmacotherapy should be initiated if glycemic targets are not met after two to three months of lifestyle modifications (Canadian Diabetes Association, 2008). For patients with an A1C greater than or equal to 9% at presentation, pharmacotherapy should be initiated along with lifestyle recommendations (Canadian Diabetes Association, 2008). Combination therapy with two agents may be considered in these patients. Timely adjustments to regimens and dosages should be made to target an ideal A1C within six to 12 months (Canadian Diabetes Association, 2008). A review of each class of agents is presented in Table 1 (conventional agents, page 34) and Table 2 (new agents, page 35).

Metformin

Metformin is considered a first-line agent for the treatment of hyperglycemia in most patients with type 2 diabetes (Canadian Diabetes Association, 2008). This is, in part, due to data suggesting reduced cardiovascular disease outcomes and all-cause mortality, no weight gain, lack of hypoglycemia when used alone, and low cost (Lipska, Bailey, & Inzucchi, 2011). Recent studies have also suggested that metformin may decrease the risk of breast and prostate cancer and cancer-related mortality in diabetic patients (Belda-Iniesta, Pernia, & Simo, 2011). It is recommended for patients with type 2 diabetes with concomitant stage 1 or 2 CKD and stable renal function (Sanofi-aventis, 2009). Although the product monograph warns against its use in patients with a creatinine clearance less than 60 ml/minute, some experts advocate that metformin may be continued in stage 3 patients already taking metformin before the diagnosis of renal dysfunction (Arroyo et al., 2011). Metformin should be discontinued in the presence of acute changes in renal function or if a patient is experiencing an illness that may lead to acute changes in renal function such as vomiting, diarrhea or severe dehydration (Levin et al., 2008). Regardless of renal function, all patients on metformin should be counselled on monitoring for these signs of illness. Metformin is contraindicated in patients with stage 4 or 5 CKD or an estimated glomerular filtration rate (eGFR) of less than 30 ml/min/1.73m2 as advanced CKD may increase the risk of lactic acidosis (K/DOQI Workgroup, 2005). However, the actual risk of lactic acidosis has come under scrutiny, and some studies suggest that the benefits from metformin pharmacotherapy may outweigh its potential risks in patients with type 2 diabetes and renal insufficiency (McCormack, Johns, & Tildesley, 2005).

Insulin

Insulin pharmacotherapy provides the greatest reduction in A1C. For patients with significant hyperglycemia at presentation (A1C ≥ 9%), insulin is considered an appropriate initial therapy (Canadian Diabetes Association, 2008). Insulin may also be considered an add-on agent for patients with inadequate glycemic control with other medications (Canadian Diabetes Association, 2008). Insulin may be used in patients with CKD but it must be used cautiously, particularly in patients with Stage 4-5 CKD. The kidney is responsible for one third of insulin metabolism and the presence of renal insufficiency may lead to a longer half-life, increasing the risk of hypoglycemia in these patients (Hasslacher & Wittmann, 2003). Compared to patients without renal impairment, patients with advanced CKD will likely have lower insulin requirements (Rave, Heise, Pfutzner, Heinemann, & Sawicki, 2001). It is recommended that treatment be individualized for patients by carefully titrating to desired glycemic targets and closely monitoring for hypoglycemia.

Sulfonylureas (glyburide, gliclazide, tolbutamide)

Sulfonylureas are widely used for the treatment of type 2 diabetes and include glyburide, gliclazide and tolbutamide. These agents work by increasing the responsiveness of pancreatic beta cells to glucose, resulting in an increase in insulin secretion. They may be used as monotherapy or in combination with other agents. Sulfonylureas are considered to have good efficacy in A1C lowering. However, their side effect profile is considered a limitation to use in patients at increased risk of hypoglycemia such as the elderly and patients with CKD. Nonetheless, due to differences in pharmacokinetics some sulfonylureas are considered appropriate for the treatment of hyperglycemia in patients with CKD. First generation sulfonylureas, like chlorpropamide, should generally be avoided due to active metabolites and hypoglycemia risk. However, tolbutamide is exclusively hepatically metabolized and may be used in patients with CKD(American Society of Health-Systems Pharmacists, 2011c). Caution should be exercised when using second generation sulfonylureas, particularly glyburide, as it has renally excreted active metabolites and cases of prolonged hypoglycemia in patients with advanced CKD have been reported. Gliclazide is the preferred second-generation sulfonylurea for patients with advanced CKD as it does not have any active metabolites and does not require dose adjustments for stage 3, 4, or 5 CKD (National Kidney Foundation, 2002).

Meglitinides (repaglinide and nateglinide)

Meglitinides are short-acting insulin secretagogues that work similarly to sulfonylureas by increasing insulin secretion from pancreatic beta cells. Being structurally different from sulfonylureas, meglitinides may be a useful alternative for patients with an allergy or intolerance to sulfonylureas. These medications are an appropriate choice for patients with type 2 diabetes with inadequate glycemic control from lifestyle changes or as an adjunct to pharmacotherapy. Repaglinide (Gluconorm®) and nateglinide (Starlix®)are both approved to be used in combination with metformin (Novartis Pharmaceuticals, 2009; Novo Nordisk, 2010). Repaglinide may also be used in combination with rosiglitazone if there is an intolerance to metformin (Novo Nordisk, 2010). Repaglinide is mainly hepatically metabolized, with renal excretion accounting for less than 10% (Snyder & Berns, 2004). It has a good safety profile for patients with renal impairment and may even be an appropriate choice for patients with more severe CKD (Hasslacher & Multinational Repaglinide Renal Study Group, 2003). Nateglinide is also hepatically metabolized but should be used with caution in patients with renal impairment, as active metabolites are produced and accumulation of these metabolites has been observed (Inoue et al., 2003).

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Table 1. Conventional hypoglycemics for the treatment of type 2 diabetes				
Medication	**A1C reduction with monotherapy**	**Advantages**	**Disadvantages**	**Renal considerations**
Metformin (Glucophage®)	1% to 2%	First line agent for patients with type 2 diabetes. Well tolerated, good side effect profile.	Side effects: Abdominal discomfort, stomach upset, diarrhea, nausea. Potential for lactic acidosis.	May be used in Stage 1–2 CKD with stable renal function that has been unchanged in the last 3 months. May be continued in Stage 3 CKD already on metformin before diagnosis of renal dysfunction. Contraindicated in patients with a eGFR less than 30ml/min/1.73m^2 (CKD Stage 4–5)
Insulin	1.5% to 3.5%	Most effective A1C lowering.	Requires injections. High risk for hypoglycemia. Weight gain.	Patients with renal impairment have lower insulin requirements compared to patients without renal impairment. No clear consensus on dosage adjustments. Adjustments should be made accordingly to attain desired glycemic targets with close monitoring for hypoglycemia.
Sulfonylureas (e.g., tolbutamide, glyburide, gliclazide [Diamicron®])	1% to 2%	Widely used, lots of clinical experience. Effective A1C lowering.	Side effects: Hypoglycemia (incidence varies among agents), nausea, weight gain. Hypoglycemia risk restricts its use in certain patient groups.	Gliclazide preferred in patients with CKD, no dose adjustments required (National Kidney Foundation 2002). Tolbutamide may be used without dose adjustments (American Society of Health-Systems Pharmacists 2011c). Avoid glyburide in patients with CrCl < 50ml/min (American Society of Health-Systems Pharmacists, 2011b).
Meglitinides repaglinide (Gluconorm®) nateglinide (Starlix®)	0.5% to 1.5%	Flexible dosing as can skip dose if meal is missed or add extra dose with extra meals. Well tolerated.	Potential for hypoglycemia if a dose is taken but meal is missed.	Repaglinide: CrCl < 40ml/min recommend initiating at lower doses (0.5 mg before meals) and use caution with dose titrations. Nateglinide: use cautiously in patients with CKD as accumulation of metabolites has been observed with regular use (Inoue,et al., 2003).
Thiazolidinediones rosiglitazone (Avandia®) pioglitazone (Actos®)	0.5% to 1.4%	Low risk for hypoglycemia.	Side effects: edema, weight gain. Rosiglitazone may be associated with an increased risk of serious cardiac issues. Requires special consent process.{{226 Canada, GlaxoSmithKline Health, 2010}} Pioglitazone may be associated with an increased risk for bladder cancer.{{225 Canada Health, 2011}}	Extensively hepatically metabolized, no dosage adjustments required for renal impairment. Pharmacokinetics not affected by hemodialysis.
Abbreviations: CKD = chronic kidney disease, A1C = glycated hemoglobin, eGFR = estimated glomerular filtration rate, CrCl = creatinine clearance				

Table 2. New hypoglycemic agents for the treatment of type 2 diabetes				
Medication	**A1C reduction with monotherapy**	**Advantages**	**Disadvantages**	**Renal Considerations**
DPP-IV Inhibitors sitagliptin (Januvia®) saxagliptin (Onglyza®) linagliptin (Trajenta®)	0.6% to 0.8%	Well tolerated. Low incidence of hypoglycemia in both monotherapy and combination therapy. Weight neutral.	Side effects: hypersensitivity reactions. Post-marketing case reports of acute pancreatitis and acute renal failure. Compared to conventional oral agents, DPP-IV inhibitors are more expensive and not as effective in lowering A1C ($95-$100/30 days).	Sitagliptan & saxagliptan: Moderate CKD (CrCl≥30ml/min, <50ml/min) Sitagliptin: 50 mg once daily Saxagliptin: 2.5 mg once daily Severe CKD (CrCl<30ml/min) or dialysis Sitagliptin: 25 mg once daily Saxagliptin: 2.5 mg once daily (Chan et al, 2008; Boulton et al., 2011; Nowicki et al., 2011) Linagliptin: mainly eliminated through the enterohepatic system and some studies suggest that renal impairment has little impact on its pharmacokinetics (Gupta & Kalra, 2011). U.S. monograph states no dose adjustments necessary for renal impairment. Canadian monograph states not recommended in those with severe renal impairment due to lack of clinical experience
Incretin Mimetics liraglutide (Victoza®) exenatide (Byetta®)	0.8% (exanatide) – 1.1% (liraglutide) when added to metformin and/or sulfonylurea	Clinically significant weight loss is seen with these agents, which may be useful in obese patients. Low incidence of hypoglycemia, reported cases were mild in nature.	Side effects: nausea, vomiting, diarrhea, hypoglycemia. Requires subcutaneous injections. Post-marketing case reports of acute pancreatitis. Post-marketing case reports of acute kidney injury and worsening renal function. Cost Liraglutide: $250/30 days Exenatide: $160/30 days Liraglutide: increased incidence of thyroid C-cell tumours in rodents. Contraindicated in patients with a history of medullary thyroid carcinoma or multiple endocrine neoplasias.	Liraglutide: eliminated primarily by proteolysis and clearance is not significantly affected by renal impairment. U.S. monograph states no dose adjustments necessary for renal impairment. Canadian monograph states not recommended in those with severe renal impairment due to lack of clinical experience. Exenatide: Studies have found evidence of decreased clearance of exenatide in patients with moderate and severe renal impairment (Linnebjerg et al., 2007). No dosage adjustment required for mild renal impairment (CrCl 50–80 ml/min). Use with caution in patients with moderate renal impairment (CrCl 30–50 ml/min).
Abbreviations: BID = twice daily, TID = three times daily, QID = four times daily, SC = subcutaneous, CKD = chronic kidney disease, A1C = glycated hemoglobin, eGFR = estimated glomerular filtration rate, CrCl = creatinine clearance				

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Thiazolidinediones (rosiglitazone and pioglitazone)

Thiazolidinediones or "glitazones" work to improve insulin sensitivity and glucose utilization in various tissues. Although the exact mechanism of action is not well understood, these effects are thought to be achieved through activation of peroxisome proliferator-activated receptors (PPARs). Rosiglitazone (Avandia®) and pioglitazone (Actos®) are considered appropriate adjuncts to metformin. They may also be considered as an option for monotherapy when unsatisfactory glycemic control is seen with all other oral hypoglycemics, as monotherapy or combination therapy (GlaxoSmithKline, 2011; Takeda Canada, 2011). The use of thiazolidinediones is limited by reports and warnings about serious adverse events associated with these agents. A warning for the use of rosiglitazone was recently issued by Health Canada about increased risk of serious cardiac events (Health Canada, 2010). Health Canada has also warned about the use of pioglitazone and its potential to increase the risk of bladder cancer (Health Canada, 2011). Rosiglitazone and pioglitazone are almost exclusively hepatically metabolized and do not require dose adjustments in patients with reduced renal function (Charpentier, Riveline, & Varroud-Vial, 2000). Hemodialysis has also been found to not have a significant effect on the pharmacokinetics of these agents (Charpentier et al., 2000). However, rosiglitazone should be used cautiously, if at all, in patients with severe CKD due to limited clinical data and concerns for increased cardiac events (GlaxoSmithKline, 2011).

DPP-IV Inhibitors (sitagliptin, saxagliptin and linagliptin)

Sitagliptin (Januvia®), saxagliptin (Onglyza®) and linagliptin (Trajenta®) work by inhibiting the enzyme dipeptidyl peptidase IV (DPP-IV), which is responsible for the degradation of the endogenous hormone incretin (also known as glucagon-like peptide-1 or GLP-1). The release of incretin in response to meals helps to regulate blood glucose levels by increasing insulin release, prolonging the effects of insulin, and inhibiting glucagon release (Langley, Suffoletta, & Jennings, 2007). Incretin has also been shown to slow gastric emptying and increase satiety. In patients with type 2 diabetes, the incretin effect is usually limited or completely lost (Langley et al., 2007). Sitagliptin and linagliptin are both approved in Canada as an appropriate choice for monotherapy in patients with type 2 diabetes (Boehringer Ingelheim, 2011; Merck, 2010). Saxagliptin does not have an approved indication for monotherapy (Bristol-Myers Squibb—AstraZeneca, 2011). Sitagliptin, saxagliptin and linagliptin are also indicated as an adjunct to metformin or a sulfonylurea when monotherapy with either agent does not result in adequate glycemic control (Boehringer Ingelheim, 2011; Bristol-Myers Squibb—AstraZeneca, 2011; Merck, 2010). To account for a potential increased risk of hypoglycemia when adding these agents to a sulfonylurea, the dose of the sulfonylurea should be initially reduced by 50% and titrated up, as needed (Gupta & Kalra, 2011; Scheen, 2010). For patients with creatinine clearance of 50 ml/minute or higher (CKD Stage 1–early Stage 3), sitagliptin and saxagliptin may be used without dosage adjustments. In patients with a creatinine clearance of 30 ml/min to 49 ml/min (CKD Stage 3), sitagliptin's area under the curve (AUC) was increased two-fold compared to patients without CKD. In patients with a creatinine clearance of less than 30 ml/min or on hemodialysis (CKD Stage 4–5), a four-fold increase in AUC was seen compared to patients without CKD (Merck & Co., 2010). With saxagliptin, patients with a creatinine clearance of less than 50 ml/min were observed to have a 2.1-fold increase in drug and a 4.5-fold increase in its major metabolite (Bristol-Myers Squibb, 2009). Product monographs in Canada for both agents do not recommend their use in patients with CKD Stage 3–5 due to limited experience in this subset of patients (Bristol-Myers Squibb—AstraZeneca, 2011; Merck, 2010). However, at least one study has suggested that sitagliptin provides effective glycemic control at reduced doses in patients with moderate to severe impairment and the U.S. product monograph provides dosing recommendations (Table 2) (Chan et al., 2008; Merck & Co., 2010). However, sitagliptin is only available in Canada as a 100 mg unscored tablet, so it is difficult to reduce the dose to 25 mg and 50 mg, as recommended in the U.S. monograph. The 100 mg tablets may be split, as needed for reduced dosing, but there is currently no stability data on the split tablets (Merck Canada). Similarly, several studies of saxagliptin recommended a reduced dose in patients with CKD Stage 3–5 and the U.S. product monograph provides some dosing recommendations (Boulton et al., 2011; Bristol-Myers Squibb, 2009; Nowicki et al., 2011). For patients with renal impairment, linagliptin does have one key advantage over the established DPP-IV inhibitors in that it primarily undergoes non-renal elimination and is extensively eliminated through the enterohepatic system (Gupta & Kalra, 2011). Dose adjustments for linagliptin are not required in patients with CKD Stage 1–3 (Boehringer Ingelheim, 2011). Although some studies suggest that renal impairment has a minimal impact on the pharmacokinetics of linagliptin, its use is currently not recommended in patients with CKD Stage 4–5 due to limited experience as per the Canadian monograph (Barnett, 2011; Boehringer Ingelheim, 2011; Graefe-Mody et al., 2011). However, the U.S. product monograph states that no adjustment is required (Boehringer Ingelheim Pharmaceuticals, 2011).

Incretin Mimetics (liraglutide and exenatide)

Liraglutide (Victoza®) is the first incretin-mimetic, or GLP-1 receptor agonist to be introduced to the Canadian market. It is a synthetically-produced analogue of GLP-1 that is more resistant to DPP-IV metabolism, resulting in prolonged pharmacologic activity. Liraglutide stimulates the GLP-1 receptors to increase glucose-dependent insulin secretion, suppress glucagon release, promote pancreatic beta-cell proliferation, slow gastric emptying and enhance satiety. Liraglutide is currently indicated as an adjunct to metformin monotherapy or metformin/sulfonylurea combination therapy when therapies fail to achieve adequate glycemic control in patients with type 2 diabetes (Novo Nordisk, 2011b). In a comparative study with exenatide, liraglutide was found to result in greater improvements in glycemic control (decreased mean A1C by 1.12% compared to 0.79% with exenatide over six weeks, $p < 0.0001$) and was also found to be better tolerated as well (Buse et al., 2009). Liraglutide is primarily metabolized by proteolysis in a similar manner as endogenous GLP-1, therefore its pharmacokinetics are not significantly affected by hepatic or renal impairment

(Russell-Jones, 2010). For patients with CKD Stage 1–2, dose adjustments are not required (Novo Nordisk, 2011b). Limited clinical experience however restricts the use of liraglutide in patients with CKD Stage 3–5, although the U.S. product monograph states that no dosage adjustment is required (Novo Nordisk, 2011a; Novo Nordisk, 2011b). Preliminary evidence has shown an increased incidence of thyroid C-cell tumors in rodents exposed to clinically relevant concentrations of liraglutide. However, it is currently unknown if this is a risk when liraglutide is used in humans. As a precaution, liraglutide is currently contraindicated in patients with a history of medullary thyroid carcinoma or multiple endocrine neoplasias (Novo Nordisk, 2011b).

Exenatide (Byetta®) is the second incretin-mimetic, or GLP-1 receptor agonist to be introduced to the Canadian market. Much like liraglutide, exenatide is also a synthetic GLP-1 analogue with a similar mechanism of action. It is indicated to be used in combination with metformin and/or a sulfonylurea for the treatment of type 2 diabetes when maximally tolerated doses of each fail to provide adequate glycemic control (Novo Nordisk, 2011b). For patients with CKD, no dosage adjustment is required for patients with CKD Stage 1–2 (Novo Nordisk, 2011b). There have been case reports of worsened renal function in patients using exenatide. Some of these patients were on other medications that affected renal function (e.g., ACE inhibitors, NSAIDs) or were dehydrated. In some cases, reversibility of altered renal function was observed when the offending medications were discontinued (Novo Nordisk, 2011b). Therefore exenatide should be used with caution in patients with CKD Stage 3, particularly when initiating therapy or when increasing a dose. It is not recommended to use exenatide in patients with CKD stage 4–5 including those receiving dialysis (Novo Nordisk, 2011b).

Conclusion

Agents useful for patients with type 2 diabetes complicated by CKD are summarized in Tables 1 and 2. While insulin remains the most effective agent at lowering A1C, many patients are resistant to starting subcutaneous injections and would prefer to remain on oral medications for as long as possible. Out of the newer agents available, linagliptin and liraglutide may be used in patients with CKD, but their high cost and moderate reductions in A1C are limiting factors to their widespread use.

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CONTINUING EDUCATION STUDY QUESTIONS **Contact hour: 2.0 hrs**

Hypoglycemics for the treatment of type 2 diabetes in patients with chronic kidney disease: A focus on new agents

By Victor Fang, Lori D. Wazny, PharmD, Colette B. Raymond, PharmD, MSc

1. Targeting an A1C of 7% or less in patients with type 2 diabetes is associated with all of the following except:
(a) reduced risk of developing microalbuminuria
(b) reduced risk of developing macroalbuminuria
(c) improved renal function
(d) preserved renal function

2. For patients on hemodialysis with blood loss due to the hemodialysis treatment or frequent blood draws, which of the following statements regarding A1C readings is the best response?
(a) A1C readings in patients on hemodialysis are accurate representations of glycemic control
(b) caution should be used for A1C readings in patients on hemodialysis as they may be falsely decreased due to blood loss
(c) caution should be used for A1C readings in patients on hemodialysis as they may be falsely increased due to blood loss
(d) A1C readings are inaccurate in patients on hemodialysis and, therefore, do not need to be monitored

3. True or False: Patients with advanced CKD generally have lower insulin requirements.
(a) true
(b) false

4. The preferred sulfonylurea for patients with CKD is:
(a) glyburide
(b) chlorpropamide
(c) metformin
(d) gliclazide

5. The mechanism of action of sitagliptin (Januvia®), saxagliptin (Onglyza®) and linagliptin (Trajenta®) involves:
(a) inhibiting the activity of the DPP-IV enzyme to prolong the effects of incretin
(b) inhibiting the activity of the DPP-IV enzyme to reduce the effects of incretin
(c) inducing the activity of the DPP-IV enzyme to prolong the effects of incretin
(d) These agents are structural analogues of endogenous incretin

6. The effects of endogenous incretin include all of the following except:
(a) increase glucose-dependent insulin production from pancreatic beta cells
(b) enhance feelings of satiety
(c) increase gastrointestinal motility
(d) decrease glucagon production from pancreatic alpha cells

7. Which of the following statements are correct?
(a) saxagliptin (Onglyza®) has an approved indication for monotherapy in the treatment of type 2 diabetes
(b) due to risk of hypoglycemia, linaglipin (Trajenta®) is not recommended in patients taking sulfonylureas
(c) no dosage adjustments are required for saxagliptin (Onglyza®) in patients with CKD
(d) cases of acute pancreatitis have been reported with the DPP-IV inhibitors

8. Which of the following statements about liraglutide (Victoza®) is correct?
(a) liraglutide (Victoza®) is indicated as an appropriate choice for monotherapy in patients with type 2 diabetes
(b) liraglutide (Victoza®) is associated with an increased incidence of serious cardiac events
(c) according to the U.S. product monograph, no dosage adjustments are required for patients with renal impairment
(d) liraglutide (Victoza®) is given as a subcutaneous injection

9. Which of the following statements about exenatide (Byetta®) is false?
(a) use of exenatide is associated with clinically significant weight gain
(b) exenatide is an incretin mimetic
(c) associated side effects include nausea, vomiting, and diarrhea
(d) decreased clearance of exenatide has been observed in patients with moderate to severe renal impairment

10. Which of the following agents is currently contraindicated in patients with a history of medullary thyroid carcinoma or multiple endocrine neoplasias?
(a) linagliptin (Trajenta®)
(b) liraglutide (Victoza®)
(c) exenatide (Byetta®)
(d) pioglitazone (Actos®)

CONTINUING EDUCATION STUDY ANSWER FORM

CE: 2.0 hrs continuing education

Hypoglycemics for the treatment of type 2 diabetes in patients with chronic kidney disease: A focus on new agents

Volume 22, Number 1

By Victor Fang, Lori D. Wazny, PharmD, Colette B. Raymond, PharmD, MSc

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

Evaluation

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2. The content was related to the objectives.	1	2	3	4	5
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Redesigning peritoneal dialysis catheter exit-site classification

By Patsy Cho, RN, MScN, Emelie Exconde, RN, Virginia Sulit, RN, Gillian Brunier, RN(EC), MScN, CNeph(C), Araceli Espiritu, RN, Elena Taruc, RN, and Shirley Drayton, RN, BA

Practice consistency through technique standardization has been driving peritoneal dialysis (PD) practice at our 32-bed acute general medicine and nephrology (22 acute general medicine and 10 nephrology beds) in-patient unit at Sunnybrook Health Sciences Centre, a teaching hospital in Toronto, Ontario. With funding from the Ontario Ministry of Health and Long-Term Care Late Career Nurse Initiative (LCNI)* we undertook and completed a knowledge translation to practice initiative that focused on the implementation of an ISPD recommendation (Piraino et al., 2005) to integrate exit-site classification methodology into practice. This 2010-11 LCNI initiative was implemented by two experienced nurses under the direction of the unit's Advanced Practice Nurse (APN) and is a continuation of a previous 2009-10 LCNI initiative to support advanced competence in peritoneal dialysis.

We set out to complete the 2010-11 LCNI initiative with these three goals/objectives in mind:

1. To establish best practice in documentation of PD exit site.
2. To ensure standardization of practice in classifying PD exit sites.
3. To simplify the practice of PD exit-site classification such that it is understandable and easy to apply by nurses and also patients.

The initiative took 240 hours and was implemented in three phases:
Phase 1: Conducted a needs assessment to determine the level of satisfaction with the current method of documenting the condition of PD exit sites,
Phase 2: Designed training materials and practice tools to support exit-site classification, and
Phase 3: Implemented exit-site classification.

** The Late Career Nurse Initiative (LCNI) is a funding program established to create alternative, less physically demanding role alternatives for RNs 55 years of age or older to utilize their knowledge, experience and skills without loss of work hours or income.*

Phase 1: Needs assessment

We learned from focus group discussions with unit staff that there had been an attempt by the previous APN to introduce exit-site classification. Overall, nurses agreed with the concept of exit-site classification, but felt it would "take too long to carry out" and that it "depends on how experienced the nurse was".

Our two LCNI nurses reviewed documentation on all PD patients for the month of January 2010 and found that 100% (3/3) of exit-site documentation audited (pre-study) used the descriptor "D&I" (to mean "dry and intact") to describe the PD exit site.

We considered that the use of the descriptor "D&I" was inadequate for the purposes of exit-site classification, as it was not consistent with College of Nurses of Ontario documentation standards or what was recommended by the current literature. We, therefore, concluded that PD exit sites were poorly documented and a change in practice was needed.

Based on the findings from this documentation audit, our unit APN proposed a business case to redesign our existing PD documentation record to include a page for PD exit-site classification.

Phase 2: Development of training materials and practice tools

Exit-site classification methodology first introduced in 1966 (Twardowski & Prowant, 1996) is the basis for the Exit Site Infection (ESI) Scoring System (Piraino et al., 2005) presented in the 2005 ISPD Guidelines.

The APN used the ESI Scoring System as the basis for a pocket tool that our nurses could refer to when performing PD exit-site care. In the context of three key criteria (simple, useful, understandable), we redesigned the one-page documentation form used to record daily PD treatments, converting it to a four-page/two-sided documentation form. The first three pages were available to record PD treatments. The single "cell" on the old one-page form used to describe the exit site as "D&I" was replaced with a one-page risk assessment checklist on page 4 of the new form.

The idea of marrying a checklist with risk assessment came from the APN's observation of a daily skin assessment screening tool used throughout our hospital to assess a patient's risk for pressure ulcers. Instead of the parameters of "sensory perception, friction, pressure, moisture, nutrition", we would assess parameters of "swelling, crust, redness, pain, drainage". Paralleling the process used to assess skin risk, we could score each exit-site parameter using Twardowski's ESI Scoring methodology. The key difference in our unit's approach to the traditional exit-site classification methodology is that nurses are *not asked* to classify the exit site. Instead, the tool focuses on "monitoring" (versus diagnosing) and requires the nurse to total the individual ESI scores to compute "risk" and apply a predetermined set of interventions to mitigate the risk.

Nurses had expressed concerns that the process was time consuming and subjective and, so, simplicity was essential to the design of the new form to ensure timeliness of completion. The concept of a checklist was appealing because nurses would not have to "spin their wheels" trying to memorize or spend time thinking about which descriptors to use if they were already on a preprinted a template. Using

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Department Editor: Eleanor Ravenscroft, RN, PhD, CNeph(C)

risk totals to drive nursing interventions structured by a decision-tree algorithm provided nurses with a pragmatic (useful) tool for daily use and guaranteed consistency of language (understandable).

Phase 3: Implementation of exit-site classification

The result was a change in practice that resulted in technique standardization on the unit, high staff satisfaction scores and, most importantly, positive patient outcomes. In addition to all nursing staff, the nephrology nurse practitioner, staff nephrologists, and the hospital forms committee were engaged in the change process.

Concurrent with the rollout of the new documentation tool was the delivery of a training program to all nurses performing peritoneal dialysis. The training program comprised a pocket tool, a six-minute training video, a game and an exit-site classification demonstration on a real patient.

The implementation of the final documentation tool was preceded by emails to everyone involved in the change process requesting feedback on the proposed revisions to the documentation form and focus group sessions with nursing staff. The revised Daily PD record with space added for RNs to document the condition of the PD catheter exit site has been approved by the hospital forms committee and is now being used on our unit.

Implications for future nursing practice and patient education

PD exit-site classification is a well-known methodology used to diagnose exit-site infections, but it has had limited usefulness for nurses practising at the bedside. An alternative application for the methodology is to embed the concepts in a screening tool that is tied to a decision algorithm. The screening tool, when used by nurses at the bedside, has the following benefits:

- Early detection of possible complications or infection by nursing staff
- Enables practice consistency and continuity of care between nurses (strengthens transfer of accountability)
- Provides data to support evidence-based research on exit-site infection prevention.

The tools developed from this initiative have only been used on nurses, but may also have broader applications such as a self-care education tool for outpatients on home dialysis. Potential benefits of using the screening tool by patients at home would parallel benefits for nurses at the bedside:

- Early detection of possible complications or infection by patient

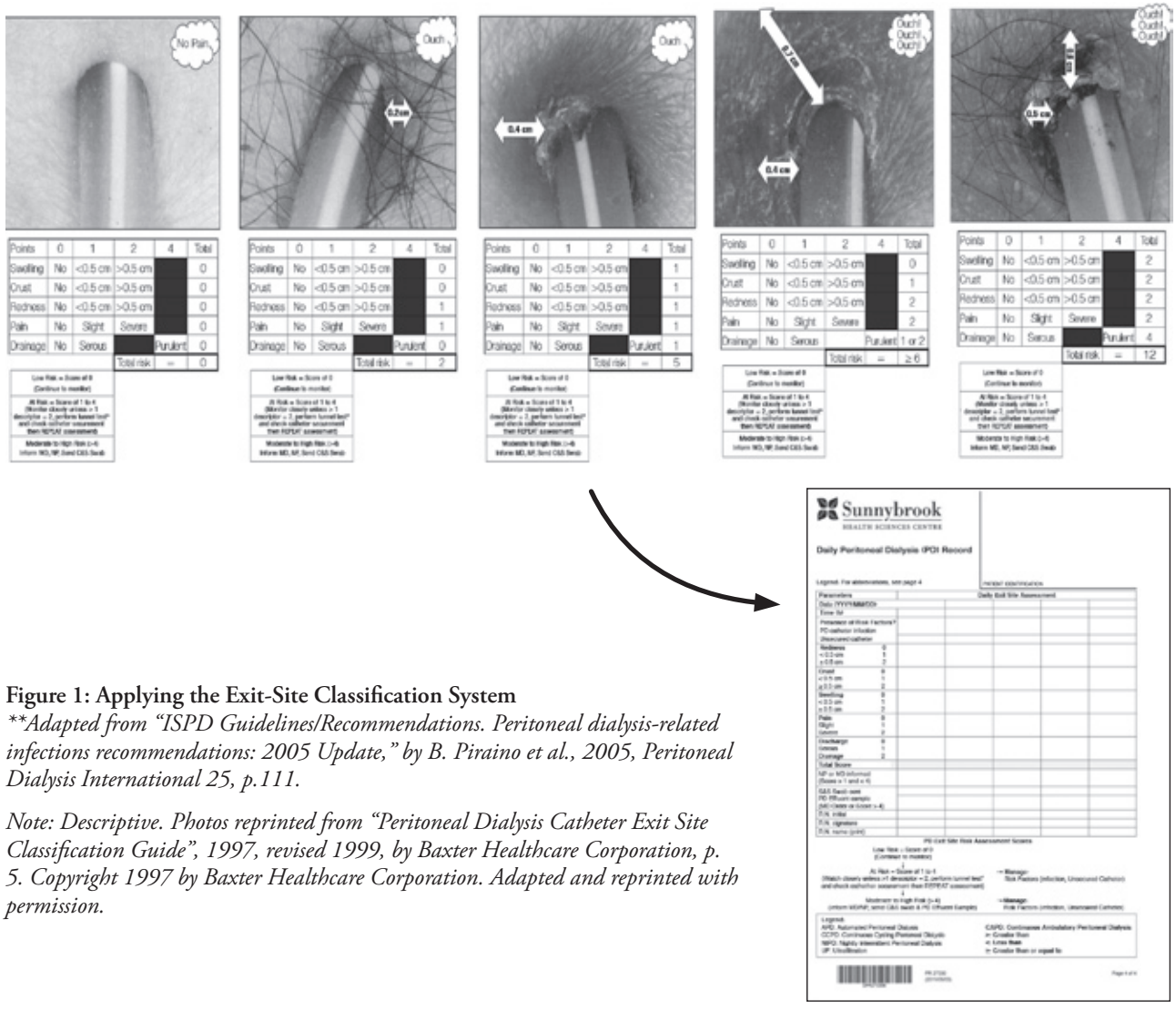

Figure 1: Applying the Exit-Site Classification System
***Adapted from "ISPD Guidelines/Recommendations. Peritoneal dialysis-related infections recommendations: 2005 Update," by B. Piraino et al., 2005, Peritoneal Dialysis International 25, p.111.*

Note: Descriptive. Photos reprinted from "Peritoneal Dialysis Catheter Exit Site Classification Guide", 1997, revised 1999, by Baxter Healthcare Corporation, p. 5. Copyright 1997 by Baxter Healthcare Corporation. Adapted and reprinted with permission.

- Enable practice consistency and continuity of care between nurse and patient (strengthens therapeutic nurse-patient relationship)
- Provides data to support evidence-based research on exit-site infection prevention.

Conclusions

Practice consistency in classifying peritoneal dialysis (PD) catheter exit sites promotes the standardization of technique throughout a hospital, and enhances prevention and monitoring of exit-site infections. It also reduces the risk of peritonitis. To achieve practice consistency, nephrology nurses responsible for carrying out PD in a hospital environment must have appropriate training and tools to support best practice in PD exit-site classification.

Practice consistency requires re-education of nursing staff and is achievable with the use of simple and pragmatic training and practice tools.

We developed an innovative and valuable screening tool and hope that other dialysis units will adopt the training methods and tool we developed. Since the implementation of the exit-site pocket tool and roll-out of the new documentation tool there is:

- Improved monitoring of PD exit sites by nurses
- 100% of documentation completed using the re-designed PD exit site classification tool
- No hospital-acquired PD exit-site infections post-implementation
- Improved transfer of accountability related to PD exit-site classification
- Documentation to support useful, objective data on which to base treatment decisions
- Simplification of the task of PD exit-site classification
- Enhanced patient awareness of PD exit-site care
- Available qualitative and quantitative data for trending PD exit-site conditions
- Increased staff satisfaction.

All nurses interviewed to date (10/26 unit PD nurses) including the nephrology nurse practitioner expressed satisfaction with the new tool rating it on average, "10 out of 10" on: simplicity, usefulness, and understandability (post-study).

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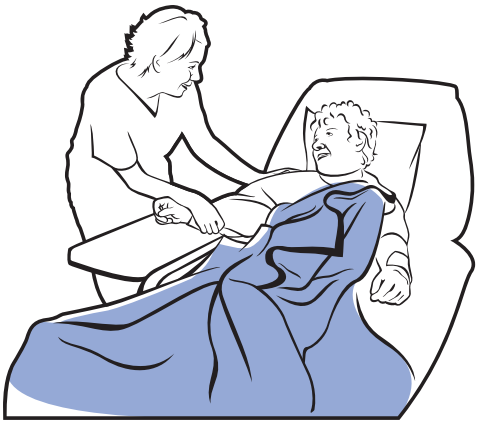
Bedside matters…

Both sides now



At the wise age of 20, I chose a song for my nursing yearbook. It was a chance to express a piece of myself through the type of lyrics I liked. The song was "Both Sides Now" by Joni Mitchell. It was 1971. Joni looked at love from varied perspectives. She pondered the clouds, how they looked different from alternate angles. She concluded that life itself could be viewed in different ways and that she didn't really understand it all.

The previous year I had lived in the big city of Montreal. My experiences included three months in psychiatry, learning how to time contractions and deliver babies at the obstetric affiliation, as well as looking after very sick children. I also wrote my first poem.

Many years of life have flowed past since then. Marriage. Crisis. Major moves. One child. Divorce. Mortgage. Motor vehicle accident.

Nursing was a constant through it all. Forty years' worth. Specialties of surgery, ICU, cardiology, pacemaker clinic, office nurse, chemotherapy, gastroenterology, day care, hemodialysis and palliative care.

Colleagues I will never forget.

Patients who opened their souls in trust of my listening ear.

At age 60 I can look at life from many sides now. I have witnessed, as you have, a host of human trials and have celebrated the resources people have within themselves.

There have been dark sides, as well as moments full of light.

Work like ours takes a great deal of energy. Energy that needs to be shared out evenly over the factions of your life.

In retirement there is time to rest. To take stock. Were there ways I could have managed my health, my family life better? Where do I want to spend my energy now? I'm beginning to explore, keeping my eye on any doors that may open. At this point, I'll be likely to have some common sense and enough battery recharged to make some wise choices.

I wish you all good health and life with time built in for balance and personal growth. Perhaps one of you will continue with this column to tell the matters of the bedside…

If so, just let the CANNT editors know.

Many thanks to Gillian Brunier, a tireless supporter of enhanced professionalism.

Lee Beliveau, RN, CNeph(C), former staff nurse hemodialysis unit, Surrey Hospital, Surrey, British Columbia. Now retired.

Profiling…

Meet the 2011 CANNT bursary, award and research grant winners

Sponsored by Fresenius Medical Care

Jovina Concepcion Bachynski, recipient of the Franca Tantalo Bursary (Graduate Level)

By Jovina Concepcion Bachynski, RN, BScN, CNeph(C), Vascular Access Coordinator, William Osler, Brampton, ON

Thank you to the CANNT Board of Directors for selecting me to be the recipient of the 2011 Franca Tantalo Graduate Bursary Award. It is with great pride and honour that I accept this award. I am currently pursuing a Master of Nursing (Nurse Practitioner Field) degree at the Lawrence S. Bloomberg Faculty of Nursing at the University of Toronto. As of this writing, I am in the last term of my studies.

I obtained my baccalaureate degrees in psychology and nursing from the University of Toronto in 1990 and 1994, respectively. Since then, I have held both clinical and non-clinical positions in nursing. After a stint in peritoneal dialysis, I have largely devoted my nursing career to hemodialysis. I am currently working as a vascular access coordinator in the William Osler Health System nephrology program. I obtained my nephrology certificate from Humber College in 2000 and my CNA certification in nephrology in 2002.

The decision to pursue graduate studies in nursing was born out of my commitment and passion to excellence in nephrology nursing. Patients with chronic kidney disease have complex health and illness needs. It is my intent to apply my MN/NP degree to provide leadership and mentorship, and sharing my knowledge and expertise to advance quality care in this patient population. I can only hope that such aspirations are reflective of Ms. Tantalo's spirit within which this award was given.

Rajneet Atkar, recipient of the CANNT 2011 Research Grant

By Rajneet Kaur Atkar, RN BN CNeph(C), Clinical Nurse Educator, AB

I graduated from Mount Royal College nursing diploma program in 1993. Following graduation, I worked as a staff nurse in northern B.C., Kitimat General Hospital, for about three years. As a new grad, I had the amazing opportunity to work in all the different areas of the hospital. My love of hemodialysis nursing was sparked in B.C. while working as a home hemodialysis nurse. As I was the only hemodialysis trained nurse in Kitimat, I had to learn very quickly how to work independently. The nearest help for technical or patient issues came from Vancouver via phone!

In 1996, I moved to Calgary and enrolled in the nursing degree program at the University of Calgary. During this time I also worked as a hemodialysis staff nurse with the Southern Alberta Renal Program. Although I had previous hemodialysis experience I had a huge learning curve; it was very different dialyzing one patient in his or her home compared to dialyzing several patients in the hospital acute care setting. I completed my nursing degree in 1999 and shortly thereafter accepted a Clinical Nurse Educator (CNE) position in the Southern Alberta Renal Program. I taught in the acute care unit at Foothills Medical Centre for about six years. In the following five years I held the core instructor position and was able to standardize and structure the nursing orientation process for the renal program. During my time as a CNE I have been involved in several projects such as accreditation, conferences, safety engineered device implementation, and licensed practical nurse and nursing attendant role expansion. Currently, I teach in the community and long-term care hemodialysis programs.

I became interested in research while working on the buttonhole research study with Dr. Jennifer MacRae. I became captivated by the research process, but realized that I needed additional research skills. Therefore, I enrolled in the Master of Nursing Thesis program at the University of Calgary in 2010. I have completed the required courses and will be working on my thesis this year.

The topic for my thesis is "Intradialytic heparin reduction" in chronic hemodialysis patients. Heparin is an integral part of a successful hemodialysis treatment. There is no research evidence currently available related to testing and validation of heparin dosage adjustment algorithms for hemodialysis therapy. My exploratory observational study stems from a randomized clinical trial examining Citrasate. The purpose for the study is to determine the efficacy of a study heparin protocol designed to reduce the heparin cumulative dose and validate the visual observation clotting score currently used in the study heparin protocol through correlation with transonic measurement of Fibre Bundle Volume.

I believe that in order to advance nephrology nursing, research needs to be at the forefront. I would like to thank CANNT for the research bursary in support of my educational goal.

Lee Beliveau, recipient of the Award of Excellence in Clinical Practice

By Lee Beliveau, RN, CNeph(C), Hemodialysis RN, Surrey Memorial Hospital, Surrey, BC

When I entered nursing school in Sherbrooke, Quebec, at the age of 17, I chose the right profession. Forty years later, the connections with patients and families still provide inspiration. Throughout specialties of surgical, ICU, cardiology, oncology, GI and, finally, renal, I have been observing and learning.

Halfway through my career, I started a writing course and nursing itself became my muse. I feel strongly that people don't fully understand our roles and my aim has been to illustrate these in stories based on real events. While writing for the *CANNT Journal* Bedside Matters column, I have hoped to remind colleagues that they should recognize and appreciate their own special skills. Perhaps reading anecdotes of mine can help others to articulate their meaningful encounters.

Renal nursing offers endless opportunities for growth. The certification program and conferences offer us new perspectives and kinship. Our journal is a wealth of pertinent support.

Since 2003, our team at Fraser Health has been most progressive in the improvement of end-of-life care, including Advance Care Planning. There has been no more fulfilling professional meaning to me than learning a patient's own wishes for end of life and being able to accompany him on this journey with the new skills I have learned. In retirement I will volunteer with hospice with some wisdom gained from my renal world.

Lorin Hompoth, recipient of the Award of Excellence, Technical

By Lorin Hompoth, Biomedical Technologist, Alberta Health Services, AB

2011 was a very busy year. I first joined CANNT in 2010 and then volunteered to be the technical representative for the 2011 CANNT conference organizing committee. This was a much bigger task then I had imagined and very rewarding. I worked with a great group of people and had an excellent time being part of the organizing committee. I have spent the last 18 years working in dialysis and the last nine years up to the present time working in the Southern Alberta Renal Program for Alberta Health Services.

It was a huge surprise and honour to be nominated for the Excellence in Technical Award and to be selected as the recipient of this award. I enjoyed the challenges of working in dialysis these past 18 years. When I first started in dialysis, I was working as a Biomedical Engineering Technologist in Regina, Saskatchewan. The challenges moving into dialysis were a huge change from what I was doing previously. The move has been very rewarding for me. The dialysis community is full of wonderful people who enjoy sharing their knowledge and helping others. I enjoy working within this multidisciplinary team and helping the staff get the most from the equipment that we use every day.

Leslie Holm, recipient of the Award of Excellence, Administration Leadership

By Leslie Holm, RN, CNeph(C), Nurse Clinician for the Southern Alberta Renal Program working in the Olds Hemodialysis Satellite Unit, AB

I graduated from the Calgary General Hospital School of Nursing in 1968. After an extensive and varied nursing career, most of which was in different rural Alberta locations, I started working for the Southern Alberta Renal Program in 1993, in its smallest satellite hemodialysis unit. At the time I didn't even know what an AVF was and had only a vague idea of what dialysis actually did. That little unit grew and so did my knowledge and love for dialysis nursing. I became certified in nephrology nursing in 1999 and have continued to be recertified and a member of CANNT from then. I have worked in Olds since 2002 and have been the nurse clinician since 2007. I love that there is always something to learn and to teach in dialysis. I enjoy watching nurses, new to dialysis, increase in their knowledge and confidence. I feel we are privileged to be a part of our patients' lives and I know we do make a difference.

I received notice of this award with amazement and feelings of gratitude and humbleness. It is an honour to receive this award and to have work in the smaller units recognized. I would like to thank Rajneet for nominating me and CANNT and the awards committee for giving me this award. My biggest thanks go to the wonderful nurses, techs, instructors, and nursing assistants who make up the Olds Unit. They make my job easy and I am very fortunate to be working with them.

Janice Mackay, recipient of the Award of Excellence Research

By Janice Mackay, RN, CNeph(C), CCRP, Clinical Research Coordinator, University of Calgary, Division of Nephrology Research Group, Calgary, AB

As this year's recipient of the Excellence in Research Award I would like to express my sincere appreciation for the nomination. I have been very fortunate to have spent the majority of my nursing career practising in the area of nephrology within the Southern Alberta Renal Program in Calgary, Alberta. I received my CNA certification in nephrology in 2006, and take satisfaction in being one of 1,168 nurses in Canada with this designation. Over the past nine years I have held the position of Clinical Research Coordinator in nephrology. Being involved as a nephrology nurse assisting in the coordination of nephrology-based research leading to evidence-based practice to improve the lives of the patients in our care has been both an exciting and an ongoing learning experience. In 2009, I obtained my designation as a Certified Clinical Research Professional (CCRP) and I am also currently enrolled in university and continuing to work towards my undergraduate degree.

In helping to support patients and families affected by kidney disease, I am proud to say that I have participated in the 2010 and 2011 Kidney March, organized by the Southern Alberta Branch of the Kidney Foundation. I cannot begin to describe the personal satisfaction I have experienced being a part of the Kidney March family and I am proud to say that our team raised the most funds to support research, as well as families and patients living with kidney disease.

I have been a member of CANNT for many years and have always been impressed with their mission to provide leadership and promote the best nephrology care and practice through education, research and communication. I was honoured to be a co-chair of last year's annual CANNT conference in Calgary, Alberta. This experience gave me insight into our CANNT organization and the commitment of our board members and, with much gratitude, I thank them for this award.

Sponsored by CANNT

Terra Townsend, recipient of the Certification/Recertification Bursary, Western Region

By Terra Townsend, RN, CNeph(C), Alberta Health Services, AB

I recently attended the CANNT conference in Calgary, Alberta, from October 20–22, 2011. This was my first time attending a CANNT nephrology conference and the experience has greatly enhanced my practice.

I recently obtained my Canadian Nurses Association Certification in nephrology nursing. Attending the conference has allowed me to obtain the education hours that I needed in order to maintain my nephrology certification. Maintaining this certification will benefit me professionally with my nursing position in Northern Alberta Renal Program (NARP).

As an RN working in a satellite dialysis unit, I have limited access to support services such as the nephrologists, dietitian, and access nurses. Most patient concerns are addressed via telephone or email. The support services rely on the RN's assessment skills and knowledge base when dealing with patient concerns. Attending the CANNT conference has increased my nephrology nursing knowledge, which has assisted me in caring for my patients.

I have prepared a binder for my coworkers that includes all of the information I collected during CANNT 2011. This includes the PowerPoint presentation handouts, as well as information pamphlets that I collected. I felt this was the best way to share the information with my coworkers. I truly enjoyed this conference and I thank the NARP trust fund committee for making it possible for me to attend.

Lisa Harley, recipient of the CANNT 2011 Journal Award

By Lisa Harley, RN, BScN, CNeph(C), Home Peritoneal Dialysis Nurse, Toronto General Hospital, Toronto, ON

I am currently a staff nurse in the Home Peritoneal Dialysis Unit of Toronto General Hospital. While working as a student on the inpatient nephrology unit, I completed my BScN at the University of Toronto in 1991. In 1996, I precepted an undergraduate student who challenged me to write the CNeph(C) exam.

Staff of the Home Peritoneal Dialysis Unit is involved in the training and follow-up of a diverse patient population and we often need to tailor our program to meet patients' unique needs. "Thinking outside the Box" is the story of a young woman with special needs and what I call the "village" of people who worked to get her home and continue to follow her at home on peritoneal dialysis. I would like to dedicate this award to champions of special needs and diversity everywhere.

On behalf of the multidisciplinary team of the University Health Network, "Holly's" visiting nurses, "Holly" and her family, I am honoured to accept the CANNT Journal award. Special thanks again to Editor Gillian Brunier and Nephrology Nurse Practitioners Betty Kelman and Diane Watson for support, patience and encouragement on this, my first journal article.

Editor's note: *Lisa published her article "Thinking outside the box: An extraordinary woman on home peritoneal dialysis" in the April/June 2011 issue of the CANNT Journal.*

Anita Amos, recipient of the CANNT 2011 Manuscript Award

By Anita Amos, RN, BScN, CNeph(C), Case Manager, Diabetes Comprehensive Care Program, Project Lead Renal Disease Management Initiative, St. Michael's Hospital, Toronto, ON

I would like to start by thanking a wonderful team of committed professionals who made this manuscript and its presentation possible. Tracey Skov and Linda Kloosterman, Project Managers from Baxter Canada, have been inspiring and a wealth of information and support, as we progress through the Renal Disease Management Initiative (RDMI) at St. Michael's. Nordia Hines, the St. Michael's RDMI Quality Lead, an invaluable resource regarding corporate and ministry initiatives, brings to the table her unequalled skills in terms of data capture and analysis, as well as insights into the cultural aspects of our centre. Colleen Johns, Clinical Leader Manager of the Nephrology/Urology In-Patient and Home Dialysis Units, ably stepped in to present the work behind this manuscript at CANNT 2011. All willing supported the manuscript's development though their contributions and editorial comments.

Winning the CANNT 2011 Manuscript Award, my third since 1995, came at a time in my 30-plus years in nephrology nursing when I have moved into yet another phase. All of my experiences have enriched my career and what I offer in both my work and personal life.

I began my nursing career in 1980, having graduated from Centennial College in Toronto. My first nursing position took me to St. John's, Newfoundland, where I had the opportunity to work in various clinical areas of the St. John's Health Centre. I provided care for patients in surgery, general medicine, family practice, respiratory, intensive care, the burn unit and nephrology. This is where I learned to do CAPD and had the opportunity to observe hemodialysis. I was hooked! My next employment opportunity brought me back to Ontario where I worked at the Toronto General Hospital in a variety of roles: staff nurse in in-patient nephrology, the intermittent peritoneal dialysis unit, in-patient transplant, hemodialysis, and renal transplant coordinator.

During that time, I enrolled in the BScN program at Ryerson University. In 1990, I took a hiatus from nursing, but continued my undergraduate studies. During one of those classes, I entered into a discussion with two of my classmates about our respective careers. When they heard about my nephrology background they suggested that I apply to The Wellesley Hospital for the Renal Program Educator position. I had decided many years before that teaching was my passion. The rest, as they say, is history! This led to other opportunities including teaching in the Humber College Nephrology Certificate Program, research, and beginning my active affiliation with CANNT.

In 1995, I ran for office on the CANNT board and was elected as president-elect. Again, more opportunities opened up including item writing for the CNA Nephrology Certification Exam on two occasions, and participating in the development of the first Preparation Guide. In 1996, I co-chaired my first national CANNT conference. Having attended the ANNA conference in my capacity of CANNT president in 1997, I came back with many ideas to move our organization forward such as a formal strategic plan, the creation of interest groups, a board orientation program and excellence in practice awards. I recognized that in order to personally promote these ideas, I would have to be at the table, so I ran for office again in 1999 and was rewarded with re-election. During my second term, the board and membership approved the first formal five-year strategic plan; the first Board Orientation Program was held and the Board Resource Manual was revamped to include policies and procedures for all of the business activities; the Excellence in Practice Awards program was initiated and attempts were made to begin Special Interest Groups. In 2002, I co-chaired my second national CANNT conference.

Concurrent with my CANNT participation, I had a number of life and career changes including the birth of my daughter, Laura, in 1996. Career changes included Patient Care Coordinator at Toronto General in 1997, Renal Program Educator at Lakeridge Health Corp in 1999, Clinical Leader in Hemodialysis at Lakeridge Health Corp. in 2001 and Hemodialysis Specialist, Baxter Canada, in 2002. I was also involved as Education Consultant with Amgen Canada during the development of the initial learning modules of the Essential Concepts in Chronic Renal Failure: A Practical Continuing Education Series, as well as providing training to members of the sales teams at other companies providing products to the nephrology community.

In 2006, I broadened my horizons by working in sales for Cardio Med Inc., learning about products and care in areas beyond nephrology. Late in 2007, I began at St. Michael's in the capacity of case manager within the hemodialysis unit where I implemented a number of process changes addressing patient and staffing flow, scheduling and communication. In January 2011, I formally began the work involved in Renal Disease Management. This role allows me to use the knowledge and skills I have garnered through a long and rewarding career, as well as integrating new learning to effectively meet the demands of this challenging initiative.

Patsy Cho, Emelie Exconde, Virginia Sulit, Gillian Brunier, Shirley Drayton, recipients of the CANNT 2011 Poster Award (1st place)

By Patsy Cho, RN, MScN, Advanced Practice Nurse, In-Patient Nephrology, Sunnybrook Health Sciences Centre, North York, ON

On behalf of myself, the project team, and the nursing staff of the In-Patient Nephrology Unit at Sunnybrook Health Sciences Centre, I would like to extend our appreciation and thanks for awarding our poster, "Redesigning peritoneal dialysis (PD) exit-site classification" first place at CANNT 2011. The impetus for redesigning Twardowski's exit-site classification arose from a goal to improve documentation of PD exit sites. A previous attempt to implement Twardowski's exit-site classification system on our unit was unsuccessful because it was perceived by nurses to be a time-consuming classification exercise that would be mentally cumbersome and too complicated to fit into everyday nursing practice. The idea to develop a risk assessment tool to monitor PD exit sites for infection risk came from the skin assessment tool used throughout our hospital to monitor pressure ulcer risk.

We created a template by rearranging five of Twardowski's external attributes (redness, crust, swelling, pain, discharge) into a five-parameter checklist, and condensed Twardowski's six-level risk scale to a three-level scale. This condensed checklist format enabled nurses to appreciate that exit-site classification was not a cumbersome task, but a meaningful process that enhances a PD nurse's assessment skills.

The success of this redesign project hinges on the passion, commitment and creativity of the nurses involved in this project. It is an honour to have won first place and a privilege to have led the development of an innovative tool that we believe can provide value for PD nurses everywhere. It is especially rewarding to know that the fruits of our labour are recognized and appreciated nationally and within the renal community.

Renata Marco, recipient of the CANNT 2011 Poster Award (2nd place)

By Renata Marco, RN, CNeph(C), Kidney Function Coordinator, St. Joseph's Healthcare, Kidney Function Program, Hamilton, ON

I would like to extend my heartfelt thanks and appreciation for awarding my poster, "Modality Education: Does it make a difference?", second place at CANNT 2011. I have attended several CANNT conferences and find the entire experience a great learning endeavour. Being recognized by my peers is most gratifying and an honour.

I began my nursing career at St. Joseph's Healthcare in Hamilton in 1984, with the majority of the next 13 years spent working in the intensive care unit and post anesthetic care unit. During this time, I cared for many dialysis and chronic kidney disease patients, but didn't fully discover the complexities of their care until I transferred to the in-centre dialysis unit in 1997. During the next 10 years I worked as a staff nurse, charge nurse and eventually had the good fortune to assume a new role in the chronic kidney disease clinic (Kidney Function Program-KFP) where I have spent the last five years.

Our clinic cares for patients with advanced chronic kidney disease (eGFR < 30), with one of the objectives being improving patient care through education. Patients are given detailed information on all modes of therapy in order to assist them in selecting the particular renal replacement therapy (RRT) that will give them the utmost quality of life. Yet, does all our hard work and time spent make a difference? This was the question that I was constantly asking myself.

My poster evaluated the effectiveness of modality education in the KFP in preventing the emergent initiation of a modality not of the patient's choice. Thankfully, my results showed unequivocally that modality education does make a difference, as more than 80% of patients who received modality education successfully progressed to the RRT of their choice. My question was answered and I knew that what we do in the KFP does make a difference.

Thank you, CANNT, for allowing me to share my results with the renal community, where others may have been struggling with the same question.

Mari Sarian, recipient of the CANNT 2011 Poster Award (3rd place)

By Mari Sarian, RN, Clinical Nurse Specialist, Hemodialysis, Jewish General Hospital, Montreal, QC

It was such a pleasure to win this poster presentation award, a nice way to thank all those who contributed to our project. Our poster was created in order to showcase a tool that was created to help peritoneal dialysis patients maintain an optimal fluid balance. The tool, "How do I choose a dialysis bag?" began as a Master's course requirement at the University of Ottawa. I undertook the project under the guidance of Professor Dr. Jacqueline Ellis who encouraged her students to develop projects based on real clinical issues. The issue of patients failing to choose the right dialysis bag was highlighted by the peritoneal dialysis clinic nurse, Nathalie Perreault. Afterwards, all members of the multidisciplinary team at the Jewish General Hospital in Montréal contributed to the creation of the tool. Management provided the financial support necessary to contract the services of a professional medical illustrator, Mrs. Linda van Inwegen. The entire process, however tedious, became a source of professional and personal satisfaction; what began as a course requirement has become a clinical tool that is utilized regularly by our patients. My colleagues, Diane Brault and Nathalie Perreault, and I thank CANNT for giving us the opportunity to share this tool with nurses in the nephrology community across Canada.

Sponsored by Amgen Canada

Jan Baker, recipient of the International Nursing Travel Grant

By Jan Baker, RN, BN, CNeph(C), Patient Care Manager, Renal, Halton Healthcare, Oakville, ON

What an honour and privilege to receive the Amgen Canada International Nursing Travel Grant. My thanks to Amgen for providing this award and to the CANNT Board of Directors for allowing me this opportunity.

Nephrology nursing has become my passion over the past 14 years. Prior to joining the nephrology team at Halton Healthcare I was a neonatal nurse. I fell into nephrology almost by accident and now you couldn't pull me out if you tried. One of the main reasons I am still in nephrology is because of Alison Thomas. She was our staff educator when our renal unit opened, and she made me remember how much there is to learn in life, that it can be hard, but also great at the same time. Since she took me under her wing, I have gone from nurse in dialysis to Nurse Clinician in CKD and now to the Patient Care Manager position.

I have had the opportunity to publish, speak at conferences related to nephrology and be a member of the CANNT BOD. Our world is ever changing and I think it's a huge responsibility to stay updated on best practice in order to provide the very best care possible to our renal patients. My plan is to take the funding from this grant and attend as many educational events as possible. I am shortening my stays, using some Air Miles and getting myself out there to hear about the latest and greatest in nephrology. Part of the responsibility of receiving education is sharing the new knowledge.

Winning this award will give me the opportunity to learn, experience and share all that I have seen and learned.

Lynn Dufresne, recipient of the Preceptorship/Mentorship Grant—Vascular Access

Par Lynn Dufresne, infirmière spécialisée en néphrologie, unité d'hémodialyse au CSSS (CHAUR) de Trois-Rivières, QC

Je venais à peine de recevoir mon diplôme d'infirmière que j'étais orientée au département d'hémodialyse à Trois-Rivières et cela fait aujourd'hui 26 ans que j'y travaille. J'ai occupé plusieurs fonctions dont en 2001 je suis devenue responsable des accès vasculaires avec la venue de l'appareil «Transonic» mais deux ans plus tard, les néphrologues m'ont offert d'être coordonnatrice de recherche clinique et j'ai occupé ce poste jusque 2010 mais j'ai eu à nouveau l'opportunité de redevenir responsable des accès vasculaires. Comme j'ai toujours été passionnée de ce domaine, j'ai accepté de relevé un nouveau défi puisque le mandat incluait beaucoup plus de responsabilités et l'objectif premier était d'augmenter le nombre d'accès au bras versus le nombre de cathéters très élevé dans notre centre. Pour y arriver, mon travail commence maintenant à la clinique d'insuffisance rénale où je dois m'assurer que les patients puissent débuter l'hémodialyse avec un accès au bras qui soit fonctionnel et surtout le convaincre d'avoir la chirurgie ce qui demande beaucoup d'enseignement. Ensuite je fais le suivi de l'accès en étant en étroite relation avec le chirurgien vasculaire et le radiologiste interventionnel et bien entendu lorsque le patient se retrouve en hémodialyse je vois à ce que l'accès demeure toujours fonctionnel. Je suis aussi formatrice et personne ressource auprès du personnel infirmier du département d'hémodialyse.

Comme nous voulons développer la technique «Trou de bouton» et assurer une bonne qualité de soin des accès vasculaires en respectant les lignes directrices, je veux utiliser la bourse de Amgen pour améliorer mes connaissances sur cette nouvelle technique et être à jour sur tout ce qui concerne les accès vasculaires soit par formation, par conférence ou congrès. Ainsi je pourrai transmettre l'information à tout le personnel infirmier et assurer une formation continue.

Rosa Marticorena, recipient of the Nephrology Research Grant (Experienced)

By Rosa Marticorena, RN, BScN, CNeph(C), DCE, Clinical Research Coordinator Nephrology Research Office, St. Michael's Hospital, Toronto, ON

My career in nephrology started in 1983 and for the past 14 years I have been working in clinical nephrology research under the supervision of Dr. Sandra Donnelly. I obtained my post-graduate diploma in clinical epidemiology in 2004 at the University of Toronto and I hope to complete doctoral studies in vascular access research at the University of Toronto Institute of Medical Science in a couple of years. The focus of my thesis is in vascular access for hemodialysis, specifically fistula maturation and cannulation practices.

I wish to thank CANNT for supporting my research. This grant will help me complete a project entitled: "Development of cannulation skill with the use of bedside ultrasound in phantom models".

The objective of this project is to develop added support to help nursing staff obtain cannulation skills in environments in which there is minimal exposure to cannulation practice.

I would like to take this opportunity to thank the staff in the Nephrology Research Office at St. Michael's Hospital: Stella Curvelo, Niki Dacouris, Sanja Neskovic, Jennie Huckle, and St. Michael's Hospital Vascular Access Coordinator Joyce Hunter for providing continuous support in the development and implementation of these projects.

CANNT Nominations

Call for nominations

The nominations committee is calling for nominations for the position of:

President-Elect
Vice-President Ontario Region
Vice-President Western Region
Vice-President of Technologists

Eligibility for office: Member in good standing.

General requirements:

Each candidate must:

- ✓ Understand the responsibilities of each position.
- ✓ Must be willing to commit the required amount of time to fulfil the duties of office.
- ✓ Must be willing to work within parliamentary procedure, which is used to ensure an efficient and fair voting procedure by self-governing organizations.
- ✓ Will submit a National Officer Candidate Information Form available online at www.cannt.ca or from the National Office (see address below).

Position descriptions:

1. **President-Elect:** Elected by membership for a period of one year after which he/she will become President, then Past-President. Assists the President in the overall administration of the Association while becoming familiar with the operation of CANNT in preparation to assume the presidency. The total commitment would be for a three-year period.

2. **Regional Vice-President:** Elected by membership for a two-year period. Promotes and facilitates the goals and objectives of the Association throughout the region. The Vice-President represents his or her region's concerns and acts as a liaison between the Board of Directors and the membership.

3. **Vice-President of Technologists:** Elected by membership for a period of two years. Promotes and facilitates the goals and objectives of the association. The Vice-President represents the concerns and addresses issues of the technologists on a local and national level to the Board of Directors.

Deadline for nominations is May 15, 2012. Information on candidates will be available online after May 15, 2012 and voting will take place online.

Please submit nominations to:

CANNT
336 Yonge St., Ste 222
Barrie, ON L4N 4C8
Telephone: 705-720-2819
Toll-free: 1-877-720-2819
Fax: 705-720-1451
Email: cannt@cannt.ca

CANNT ACITN

Nominating Form

Position:

_____

Name of Candidate:

_____

Membership Number:

_____

Nominated by*:
1. Name:

_____

2. Membership Number:

_____

*Nominations can only be made by current members.

**I agree to let my name stand for office and if elected, I agree to serve my term of office.

_____
Signature of candidate**

Date: _____

Élection à l'ACITN

Appel de mises en candidature

Le Comité des candidatures lance un appel de mises en candidature pour les postes suivants :

Président(e) élu(e)
Vice-président(e) de l'Atlanique
Vice-président(e) du Québec
Coordonnateur(rice) du site Web/Trésorier(ière)

Critère d'admissibilité : Être membre en règle.

Exigences générales :

Chaque candidat(e) doit :

- ✓ Comprendre les responsabilités associées au poste.
- ✓ S'engager à consacrer le temps nécessaire afin de s'acquitter des tâches inhérentes au poste.
- ✓ Suivre les règles et procédures parlementaires qui sont utilisées par les organismes indépendants afin d'assurer un processus de votation efficace et équitable.
- ✓ Remplir et soumettre un Formulaire de mise en candidature qui est accessible en ligne à www.cannt.ca ou envoyer le Formulaire dûment rempli au Bureau national à l'adresse ci-dessous.

Descriptions des postes :

1. **Président(e) élu(e) :** Élu(e) par les membres pour une période d'un an après quoi il/elle devient Président(e), puis Président(e) sortant(e). Aide le/la Président(e) dans l'administration générale de l'Association, tout en se familiarisant avec le déroulement des activités de l'ACITN dans le but d'assumer le rôle présidentiel.

2. **Vice-président(e) régional(e) :** Élu(e) par les membres pour une période de deux ans. Fait la promotion et facilite l'atteinte des buts et des objectifs de l'Association dans sa région respective. Représente les intérêts de la région et agit à titre de liaison entre le Conseil d'administration et les membres.

3. **Vice-président(e) des Technologues :** Élu(e) par les membres pour une période de deux ans. Fait la promotion et facilite l'atteinte des buts et des objectifs de l'Association. Représente les intérêts des technologues à l'échelle régionale et nationale au sein du Conseil d'administration.

La date limite pour déposer les mises en candidature est le 15 mai 2012. Les informations concernant chaque candidat(e) seront accessibles en ligne après le 15 mai 2012 et le vote aura lieu en ligne.

Veuillez faire parvenir votre mise en candidature à www.cannt.ca ou :

CANNT/ACITN
336 Yonge St. Ste 322
Barrie, ON
L4N 4C8
Tél. : 705-720-2819 / Sans frais : 1-877-720-2819
Téléc. : 705-720-1451 / Courriel : cannt@cannt.ca

Demande de mise en candidature

Poste :

_____

Nom du/de la candidat(e) :

_____

Numéro de membre :

_____

Proposé par* :
1. Nom :

_____

2. Numéro de membre :

_____

*Les mises en nomination ne peuvent être faite que par les membres en règles.

**J'accepte la nomination du poste mentionné çi-haut. Si je suis élu(e), j'accepte d'assumer les responsabilités du poste dans son intégralité.

_____

Signature du candidat
ou de la candidate**

Date : _____

CANNT Membership

First Name _____

Last Name _____

Home Address _____

City _____

Province _____ Postal Code _____

Telephone (H) (_____) _____ - _____

(W) (_____) _____ - _____

Fax (_____) _____ - _____

Email _____

Employer _____

Employer Address _____

City _____

Province _____ Postal Code _____

Mailing Address Preferred ❑ Home ❑ Work

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

❑ New Member or ❑ Renewal

CANNT # (if renewal): _____

Person who recommended joining CANNT: _____

Membership Fee (GST #100759869)
Membership fee is tax deductible.
❑ One Year: $70.00 + HST/GST
❑ Two Years: $130.00 + HST/GST
❑ Student Rate: $35.00 + HST/GST*
**Proof of full-time enrolment must accompany application*
BC: 12% HST; AB/SK/MB/PE/NT/NU/QC/YT: 5% GST;
ON/NL: 13% HST; NS: 15% HST

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

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

Cardholder Name: _____

Visa Number: _____

Expiry Date: _____

Signature: _____

❑ I have attained CNeph(C)/cdt designation
Year of designation _____

Professional registration # _____

Date last renewed: _____

❑ I am a member of CNA

Ontario applicants only
Do you belong to RNAO?
❑ Yes ❑ No

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

Number of years in nephrology _____

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

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

Highest level of education

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

I am at present studying toward

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

Primary area of practice
❑ Progressive renal insufficiency (pre-dialysis)
❑ Transplantation
❑ Hemodialysis
❑ Peritoneal
❑ Pediatrics
❑ Other (Specify) _____

Return to **CANNT**
Mailing Address:

Debbie Maure, CANNT,
Suite #322, 336 Yonge St., Barrie, Ontario, L4N 4C8
Telephone (705) 720-2819 Fax (705) 720-1451

Demande d'adhésion

Prénom _____

Nom de famille _____

Adresse à domicile _____

Ville _____

Province _____ Code postal _____

Téléphone (D) (_____) _____ - _____

(T) (_____) _____ - _____

Télécopieur (_____) _____ - _____

Courrier électronique _____

Employeur _____

Adresse de l'employeur _____

Ville _____

Province _____ Code postal _____

Adresse de correspondance ❑ domicile ❑ travail

Acceptez-vous que l'ACITN ajoute votre nom et votre adresse sur des listes d'envois qu'elle juge pertinentes et appropriées? ❑ Yes ❑ No

❑ Nouveau membre ou ❑ Renouvellement

Numéro de l'ACITN # (si renouvellement):_____

Nom de la personne qui vous a recommandé de joindre l'ACITN : _____

Frais d'adhésion (TPS #100759869)
Les frais d'adhésion sont deductibles d'impots.
❑ Un an : 70,00 $ + TVH/TPS
❑ Deux ans : 130,00 $ + TVH/TPS
❑ Tarif étudiant : 35,00 $ + TVH/TPS*
**La demande doit inclure une preuve d'inscription à plein temps*
BC : 12 % TVH; AB/SK/MB/PE/NT/NU/QC/YT : 5 % TPS; ON/NL : 13 % HST; NS : 15 % TVH

Je joins $ _____
payable à l'ACITN.

Mode de paiement :
❑ Chèque ❑ Mandat de poste ou chèque visé
❑ Visa ❑ Mastercard

Nom du titulaire de la carte : _____

Numéro de la carte : _____

Date d'expiration : _____

Signature : _____

❑ J'ai obtenu la désignation CNeph(C)/cdt
Année de désignation _____

Numéro d'enregistrement professionnel : _____

Date du dernier renouvellement : _____

❑ Je suis membre de l'ACI

Demandeurs de l'Ontario seulement
Faites vous partie de l'AOIA?
❑ Oui ❑ Non

Statut professionnel
❑ Infirmière(ier) autorisée(sé)
❑ Infirmière(ier) auxilaire autorisée(sé) / infirmière(ier) auxilaire
❑ Technicienne /technicien
❑ Technologue
❑ Autre (spécifier) _____

Années d'éxperience en néphrologie _____

Domaine de responsabilité
❑ Soins directs
❑ Administration
❑ Technologie
❑ Enseignement
❑ Recherche
❑ Autre (spécifier)

_____

Milieu de travail
❑ Soins actifs
❑ Unité d'autosoins
❑ Services de santé indépendants
❑ Secteur privé

Plus haut niveau d'instruction?

Infirmière(ier)	*Autres*
❑ Diplôme	❑ Diplôme
❑ Baccalauréat	❑ Baccalauréat
❑ Maîtrise	❑ Maîtrise
❑ Doctorat	❑ Doctorat

Je poursuis présentement des études

Domaine infirmière(ier)	*Autre domaine*
❑ Certificat	❑ Certificat
❑ Baccalauréat	❑ Baccalauréat
❑ Maîtrise	❑ Maîtrise
❑ Doctorat	❑ Doctorat

Secteur de pratique spécialisé
❑ Insuffisance rénale progressive (pré-dialyse)
❑ Transplantation
❑ Hémodialyse
❑ Péritonéale
❑ Pédiatrie
❑ Autre (spécifier) _____

Poster à **ACITN**
Adresse postale :

Debbie Maure, ACITN,
336 Yonge St., pièce 322, Barrie, Ontario, L4N 4C8
Téléphone (705) 720-2819 Télécopieur (705) 720-1451

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.

What types of manuscripts are suitable for publication?
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
- Relevant clinical articles
- Innovative quality improvement reports
- Narratives that describe the nursing experience
- Interdisciplinary practice questions and answers
- 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),** Sixth Edition (2009), available from most college bookstores.

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: Abbreviations 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.

Tables/Figures: Manuscripts should only include those tables or figures that serve to clarify details. Authors using previously published tables and figures must include written permission from the original publisher. Such permission must be attached to the submitted manuscript.

How should the manuscript be submitted?
Email your manuscript to: **athomas6@cogeco.ca**
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.

How are manuscripts selected for the CANNT Journal?
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 criteria for acceptance for all articles include originality of ideas, timeliness of the topic, quality of the material, and appeal to the readership. Authors should note that manuscripts will be considered for publication on the condition that they are submitted solely to the **CANNT Journal.** Upon acceptance of submitted material, the author(s) transfer copyright ownership to CANNT. Material may not be reproduced without written permission of CANNT. Statements and opinions contained within the work remain the responsibility of the author(s). The editor reserves the right to accept or reject manuscripts.

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.

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 :

- 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 films
- Articles en éducation 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), 6e édition (2009), offert dans la plupart des librairies universitaires.
Page titre : La page titre doit inclure le titre du manuscrit ainsi que les renseignements suivants : nom de chacun des auteurs (incluant 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 adresse 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 : 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.

De quelle manière doit-on soumettre les manuscrits ?
Veuillez envoyer par courriel votre manuscrit à :
gillianbrunier@sympatico.ca
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 de l'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 de l'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. 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 auteurs doivent prendre note que les manuscrits seront considérés pour publication à la condition qu'ils ne soient soumis qu'au **Journal de l'ACITN.** Sur acceptation du matériel soumis, les auteurs transfèrent leur droit d'auteur à l'ACITN. Aucune reproduction n'est permise sans l'autorisation écrite du **Journal de l'ACITN.** Les déclarations et opinions émises par les auteurs dans leurs articles, textes ou manuscrits demeurent leur responsabilité. La rédactrice en chef se réserve le droit d'accepter ou de refuser tout manuscrit.

Aide-mémoire à l'intention des auteurs
✓ Lettre de présentation
✓ Article
- Page titre incluant les renseignements suivants :
  - Titre de l'article
  - Nom de chaque auteur (incluant prénoms au complet)
  - Titres de compétences
  - Titre du poste actuel
  - Nom et adresse de l'employeur
  - Nom de l'auteur à qui la correspondance doit être envoyée (incluant 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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6775 Financial Drive
Mississauga, ON L5N 0A4

Membre R&D

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