# The Renal Pharmacist

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ADDRESS/INFO CHANGES

Please forward any address / phone number changes to the Website co-ordinator elaine.cheng@vch.ca. We are constantly updating our membership mailing list. Thank you

## View from the Chair

2011 started out to be quite an exciting year for the RPN. The RPN hosted its first Annual RPN Nephrology Education Day in Vancouver in April 2011, in conjunction with the World Congress of Nephrology (WCN). This was also the fist time that the RPN partnered with the American College of Clinical Pharmacy Nephrology Practice Research Network, to recruit American renal pharmacist speakers willing to share their professional experiences with us. The 2011 RPN education day and the WCN were great opportunities for our members to network with renal pharmacists from all around the world. The RPN also awarded 4 bursaries to some of our members for financial assistance to participate in these great events. Congratulations to the bursary winners! In this newsletter, our bursary winners will share with us their vision of the RPN/WCN meetings. The WCN also allowed the RPN executive to identify partnership opportunities with both the Canadian Society of Nephrology (CSN), and The Canadian Kidney Knowledge Translation and Generation Network (CANN-NET). We are hopeful that these collaborations will soon benefit our members.

Our exciting year does not end there! As per usual, the RPN will be hosting the Toronto education evening, this fall. The fall of 2011 will also mark the return of the Winnipeg and Vancouver education evenings. More details on these three events will be available shortly!

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# View from the Chair (continued)

There is fresh blood in the RPN executives this season. Following the announcement of new RPN opportunities, the executives decided to modify the committee positions available. Marisa Battistella will become our new external liaison officer, and be our link to organizations like the CSN, Kidney Foundation and CANNET. Please join me in welcoming Robert Bell and Grace Leung, as our new RPN chair elect and treasurer, respectively. Grace will be replacing Karen Wong who served on the executive for many years. A big thank you to Karen for her excellent organizational skills, managing the RPN budget, and always taking detailed meeting minutes. Karen, we wish you all the best. Amy Sood will be replacing Reshma Dole and Ryan Leppert for the position of Communication Coordinator. We would like to thank Reshma and Ryan for the excellent work done with the RPN Newsletter over the last several years. Jenny Ng and Judith Marin will occupy the Education Coordinator positions. The new RPN executive positions and their revised roles and responsibilities will be posted on the RPN website shortly. Furthermore, we are currently looking for a new RPN chair elect to join our executive team in 2012. Let us know if you would like to join our dynamic team!

The RPN executive is always searching for new opportunities to reach members. We are currently considering translating the Newsletter in French, a great initiative for our French Canadian colleagues. We are open to our members' ideas and comments on how to improve the organization.

We are half way through a very exciting year, punctuated by many education opportunities and changes in the RPN executives. We wish you all a relaxing and safe summer holidays! We look forward to seeing you all rested, and ready to participate in our education evenings in the Fall!

Have a wonderful summer!

Sincerely,
Amy Sood, BScPhm, PharmD
Judith Marin, BPharm, MSc, PharmD
Chair, RPN

# Member Profile

*Grace Leung*

Grace Leung obtained her BScPhm degree from the University of Toronto and PharmD degree from the University of Florida. She has been in the nephrology world for most of her career so far. She has been a renal pharmacist at St. Joseph's Healthcare in Hamilton, the Scarborough Regional Dialysis Program and currently at the York Region Chronic Kidney Disease Program. At one point she took a 2 ½ year break from nephrology and worked as a medical information pharmacist at AstraZeneca Canada.

Grace enjoys reading, listening to music, photography, and travelling. She is picking up cooking as a new hobby, or a survival skill rather, as she recently got married at the end of October.

Grace is looking forward to joining the RPN executive committee as the secretary/treasurer and collaborating with renal pharmacists across the country.

## Nephrology Health Care Professionals Day

*September 21st, 2011*

One of the many advantages of a career in nephrology is the interrelationship that exists amongst healthcare providers. On a daily basis across Canada, consultation occurs amongst pharmacists, technologists, nurses, dieticians, social workers and doctors – in an effort to provide quality care to our patients with Chronic or End Stage Renal Disease. It is this team approach that unites us in our day-to-day challenges and improves outcomes.

In celebration, take this day to remind each other of how much you appreciate working together. Feel free to print and distribute the posters below.

http://www.renalpharmacists.net/sites/renalpharmacists.net/files/NephrologyHealthcareProfessionalsDay2011English.pdf

http://www.renalpharmacists.net/sites/renalpharmacists.net/files/NephrologyHealthcareProfessionalsDay2011French.pdf

## RPN Bursary Winners

*WCN April 2011*

**Vivian Ng**, Grand River Hospital, Kitchener, Ontario
**Rene Breault**, University of Alberta
**Cali Orslak**, Health Sciences Centre, Winnipeg, Manitoba
**Evelena Verge**, Central Health, Newfoundland

Congratulations! Each of the Bursary winners share their WCN experience with us in the Newsleter.

## RPN Chair Elect

The RPN is currently recruiting for the position of RPN Chair Elect for the year 2012. See below for a description of the responsibilities associated with this position. The term of this position would be for 3 years – 1st year as Chair Elect, 2nd year as Chair and 3rd year as Past Chair. If you are interested in this position, or require additional information or clarification of any unanswered questions, please send an email to renalpharmacistsnetwork@gmail.com.

**Chair Elect**

- One year term
- Assumes the role of Chair in the subsequent year
- Assists the Chair in carrying out his/her responsibilities
- Assumes the role of Chair in his/her absence
- Implements new projects as identified

# World Congress of Nephrology 2011, Vancouver, BC, Highlights from the RPN Bursary Winners

## A History of Nephrology

*Submitted by: Vivian Ng, RPh, ACPR, Grand River Hospital, Kitchener, Ontario*

This year's World Congress of Nephrology was held in beautiful Vancouver during the early days of April 2011. As a first-time attendee, I was thoroughly impressed by the over 400 speakers, the 8 scientific thematic tracks for sessions, the over 1600 posters, and the representation of delegates from around the world. While there were numerous clinically relevant discussions, I wanted to concentrate on the special lecture presented by Dr Leon Fine on the closing day entitled "Two thousand years of nephrology history: Ten enduring scientific landmarks".

I had obviously misread the title of the presentation when I showed up expecting a lecture about pivotal landmark trials in the world of nephrology. However, I was pleasantly surprised to learn how interesting the topic turned out to be. Dr Fine has been the Chair of the International Society of Nephrology History Committee for over a decade and is obviously quite passionate about the topic. His talk highlighted the pivotal achievements which make up the foundation of modern nephrology practice. It reaffirmed my appreciation of the scientific discovery process and the flashes of insight which fuel new investigations.

His list of ten scientific landmarks are as follows:

1. The understanding that the kidney is the anatomical structure from which urine is produced - Claudius Galen (AD 129-217)
2. The understanding that blood is circulated around the body via arteries and veins through the pumping action of the heart - William Harvey (1578-1657)
3. The understanding that there is a fine structure to the kidney which provides insight into its function - Marcello Malpighi (1628-1694)
4. The understanding that there are different forms of kidney disease which cause dysfunction of multiple organ systems - Richard Bright (1789-1858)
5. The understanding that there exists a discrete renal "unit" and that the glomerulus acts as a filter which is linked to a tubular system - William Bowman (1816-1892)
6. The understanding that glomerular filtration can be explained on physical principles: Renal physiology emerges as a discipline - Carl Friedrich Wilhelm Ludwig (1816-1895)
7. The understanding that the kidneys serve to maintain the constancy of the body fluids - Ernest Henry Starling (1866-1927)
8. The understanding that kidney function can be determined at a cellular level - Hans H. Ussing (1911-2000)
9. The understanding that certain renal diseases have an immunological basis and are amenable to therapy - Robert Schwartz and William Dameshek (1900-1965); Richard Lerner and Frank Dixon (1920-2008)
10. The understanding that life can be extended in patients with end-stage renal disease: Dialysis and Transplantation - Willem Koff (1911-2009); Belding H. Scribner (1921-2033); Robert Schwartz and William Dameshek (1900-1965)

While reviewing this list, I realized that all the concepts were things that I have always known to be true. It amazes me to think that at some point in history, these were not accepted facts and had to be investigated by the scientists listed above. It is by examining the past that one can truly appreciate the strides by which nephrology has advanced over these past two millennia.

Dr Fine concluded his lecture with a hopeful message that perhaps, in the future, his talk will need to be revised to feature a new tenth landmark--for when kidney disease will no longer exist. While this point may not be in the immediate future, the World Congress of Nephrology will continue to be a place where scientific discoveries can be shared and built upon to aim for such a goal. The next World Congress will be held in Hong Kong in June 2013.

## Theme 5 – Chronic Kidney Disease: Pathogenesis, Epidemiology, Prevention and Consequences
## Session 2 – Anemia and EPO

*Submitted by: Rene Breault, BScPharm, PharmD, Clinical Assistant Professor, Faculty of Pharmacy, University of Alberta*

This session consisted of presentations related to anemia and the use of EPO in patients with CKD.

First, Patrick Parfrey provided a brief overview of the literature published to date on the topic before discussing information from the TREAT study, regarding the efficacy of erythropoietin simulating agents (ESAs) in the treatment of anemia. He noted the lack of benefit in cardiovascular and renal outcomes in the trial, while there was increased risk of stroke. Further, the post randomization factors excluded as predictors of stroke were systolic blood pressure, high hemoglobin, platelet count, and high darbepoetin dose. It appears the greatest risk of adverse outcomes occurred in those who were hyporesponsive to darbepoetin, and that it is likely important to limit the dose of the drug in such patients. The hypothesis of the increased stroke risk being that ESAs may exhibit some type of trophic ability, increasing the action of endothelin, and in vessels already with some degree of stenosis, further reduce the radius of the blood vessel and therefore decrease blood flow. It was also important to emphasize that this was a trial conducted in patients with moderate anemia, and to date there are no randomized trials conducted patients with severe anemia. Clinicians need to ask why these agents are to be used in their patients: To improve quality of life, in which case target a hemoglobin up to 120 g/L may be indicated, whereas to reduce the need for blood transfusions, a hemoglobin level of 100-110 g/L should suffice.

The second presentation challenged the paradigm that renal disease simply causes decreased production of EPO leading to anemia. A more complex explanation was provided involving various transcription factors in the production of EPO that are affected by low oxygen availability.

The third presentation discussed the association between ESAs and cancer, with the presenter indicating that higher doses of EPO, may potentially stimulate neurovascularization and therefore "feed" tumors and could be associated with increased malignancies in patients with existing tumor cells.

## Management of Chronic Pain & Terminal Illness in Dialysis patients

*Submitted by: Evelena Verge, Central Health, Newfoundland*

One of the sessions I attended at the WCN 2011 in Vancouver was **Management of Chronic Pain and Terminal Illness in Dialysis patients** given by Dr Sara Davidson. This session was very informative and dealt with an issue that is prevalent but often not dealt with in dialysis patients. Chronic pain affects approximately 50% of the dialysis population with about 75% of patients reporting pain not receiving analgesics. If we can adequately treat pain we can markedly improve health related quality of life. The cause of pain should be assessed and diagnosed, if possible. Unfortunately many causes of pain are not reversible. The World Health Organization Analgesic Ladder can be used for dialysis patients keeping in mind that we are dealing with a chemically sensitive patient population. The preferred analgesic and first line agent for treating pain in dialysis patients is acetaminophen. Other alternatives include hydromorphone (for dialysis patients but caution in stage 5 CKD patients not on dialysis or patients that withdraw from dialysis), fentanyl (caution with opioid naïve patients), methadone, gabapentin (up to 300 mg daily but 600 mg may be tolerated), and pregabalin (up to 75 mg daily). Caution should be used with oxycodone, tramadol (max dose 50 mg BID; sustained release is not recommended), and tricyclic antidepressants (due to adverse effect profile). Drugs to avoid include: NSAIDs (maybe OK for short term use), codeine (though this is debatable), chronic morphine, and meperidine. An excellent online resource is available from the Kidney End of Life Coalition at http://kidneyeol.org/painbrochure9.09.pdf. This brochure includes the World Health Organization Analgesic Ladder adapted for renal patients as well as algorithms for treating pain. As pharmacists we are the ideal team members to make a difference in the day-to-day lives of dialysis patients by helping them manage pain.

## Magnesium and its Potential Benefit as a Phosphate Binder

*Submitted by: Cali Orsulak, BScPhm, Health Sciences Centre, Winnipeg, MB*

Phosphate lowering is one of the many challenges that dialysis patients and renal health care professionals face on a daily basis. In patients with chronic kidney disease stage 5 (CKD 5), increasing evidence links inadequate serum phosphorus control to higher morbidity and mortality. As a consequence, serum phosphorus lowering appears to be a key therapeutic goal. In addition to optimal dialysis treatment and dietary restrictions, oral phosphate binders are the treatment of choice in patients with hyperphosphatemia.[1] Even with this armory of methods almost 50% of patients do not achieve K/DOQI serum phosphorus target level.[2]

As pharmacists the drugs used to provide phosphate binding come with their fair share of challenges. Calcium carbonate and acetate, sevelamer hydrochloride and carbonate, lanthanum, aluminum and magnesium carbonate and hydroxide have all been used for binding phosphates in ESRD. The challenges of tolerability, pill burden, cost and toxicity all come into play when selecting an agent.

Magnesium (Mg) is the fourth most abundant cation in the body. Of the total amount of Mg, 99% is intracellular and the majority is found in bone tissue (60%) the remainder is found in

muscular tissues (20%) and in non-muscle soft tissues (19%) Normal plasma Mg concentration is 0.62-1.02 mmol/L. Of this, approximately 15% is complexed as bicarbonate, citrate, phosphate or sulphate salts, 20% is protein-bound and 65% is present as free ions as the biologically active form.[3]

Rich sources of magnesium include green vegetables, seeds, peas, beans, nuts, some shellfish, spices, and soya flour. The U.S. recommended dietary allowances advise a daily intake of 320mg for women and 420mg for men.[3]

In patients with CKD, serum magnesium concentration is usually within the normal range until glomerular filtration rate declines below 30ml/min. In stage 5 CKD the severity of hypermagnesemia is usually mild and asymptomatic (<2mmol/L). At levels between 2 and 3mmol/L, lethargy, drowsiness and hyporeflexia may occur.[3] After the onset of dialysis therapy, magnesium is generally removed with dialysis fluid. However in patients with a normal serum magnesium range (0.62-1.02 mmol/L), uptake of magnesium can be assumed when a dialysate Mg concentration higher than 0.5 mmol/L is used.[3] Vegetable product restriction, highly recommended in patients with CKD also decreases magnesium ingestions.[4]

Magnesium levels in the lower range of normal are strongly associated with vascular calcification and cardiovascular mortality among patients with CKD stage 5. The incidence of cardiovascular disease is significantly greater in patients with Mg deficiency.[3]

Observational and small prospective studies suggest that increased serum magnesium or magnesium supplementation in stage 5 CKD, may have beneficial effects on vascular health and even mortality without adverse effects on bone metabolism. However no long term adequately powered studies are available.[5]

Magnesium containing compounds are not widely used in CKD stage 5 due to the perceived risk of hypermagnesemia and gastrointestinal symptoms. However, various studies have shown that Mg can be administered to many patients with stage 5 CKD with reduction in total calcium intake when substituted for other binders.[3]

Changes in tolerability profile is largely the result of using newer formulations containing magnesium carbonate (MgCO3), which produces less diarrhea than the formulations containing magnesium hydroxide (Mg(OH)2).[3]

The results of several studies have demonstrated the potential benefits attributed to MgCO3 in terms of phosphate binding and tolerability. These are generally smaller studies ranging in size from 15-255 patients, varying lengths of study designs from 21 days to 3 years and varying comparators such as sevelamer, aluminum hydroxide, calcium carbonate versus magnesium carbonate. The results generally showed no significant difference in phosphate control between the two groups.[3]

The Calmag study was a prospective, controlled, randomized, multicentre, investigator-masked, parallel-group study compared tolerability and efficacy of Calcium acetate/Magnesium carbonate combination (OsvaRen®) and sevelmer hydrochloride for 24 weeks in HD, n=255. The results showed average daily study medication intake was slightly but significantly higher in the sevelamer group (CaMg 7.3 +/- 3.03; sevelamer 8.1 +/- 2.87 tabs p=0.0420). Non inferiority was proven for the primary endpoint

serum phosphate with a significant increase in magnesium level of 0.2597 mmol/L in the CaMg group. No gastrointestinal side effect difference was seen between the 2 groups. However there was an increase incidence of treatment related adverse effects in the sevelamer group leading to withdrawal from sevelamer[1]

Although OsvaRen® by Fresenius is not currently available in Canada, OTC products containing magnesium carbonate or magnesium hydroxide could be used for phosphate binding in select patients on dialysis especially those with low serum magnesium until further long term data becomes available.


1. De Francisco ALM et al. Evaluation of calcium acetate/magnesium carbonate as a phosphate binder compared with sevelamer hydrochloride in haemodialysis patients: a controlled randomized study (CALMAG study) comparing efficacy and tolerability. Nephrol Dial Transplant 2010: DOI 10.1093/ndt/gfq292.

2. Port Fk Improving outcomes for dialysis patients in the international Dialysis Outcomes and Practice Patterns Study. Clin J Am Soc Nephol 2006 Mar;1(2):246-55.

3. Covic, A. Magnesium in chronic kidney disease-More than just phosphate binding. European Neph, 2010; 4:28-36

4. Wyskida,K et al. Daily Magnesium intake and hypermagnesemia in hemodialysis patients with chronic kidney disease J Ren Nutr 2011:1-8

5. Speigel, D. Magnesium is Chronic Kidney Disease: Unanswered questions. Blood Purif 2011;31:172-176


# Upcoming Conferences

**Prevention in Renal Disease 10th Annual Conference, Toronto, Ontario,**
*September 16-17th, 2011*

Westin Prince Hotel, 900 York Mills Road, Toronto, Ontario
More information at: http://www.nephroprevention.com/

**BC Nephrology and Renal Transplant Days, Vancouver, BC,**
*October 6-7, 2011*

Hyatt Regency Vancouver, 655 Burrard Street, Vanouvers, BC
More information at: http://www.bcrenalagency.ca/professionals/nephrologydays

**CANNT 2011 – Blazing New Trails, Calgary, Alberta,**
*October 20-22nd, 2011*

Calgary Telus Convention Centre, 120 Ninth Avenue SE, Calgary, Alberta
More information at: http://www.cannt.ca/en//files/CANNT%20PROGRAM%202011.pdf

**American Society of Nephrology, Kidney Week 2011, Philadelphia, PA,**
*November 8-13th, 2011*

Pennsylvania Convention Center, Philadelphia, PA
More information at: http://www.asn-online.org/education_and_meetings/kidneyweek/

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