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Join us at the RPG breakfast at FNCE next October, sponsored by Diehl, Inc., makers of Vitamite® 100 non-dairy beverage. Contest winners will be announced at the breakfast. Look for more information on the breakfast in the fall issue of this newsletter.

**Contest rules and information:** To enter, create an original recipe appropriate for renal patients which uses at least 1/2 cup of Vitamite® 100, liquid or 1/4 cup of the powder form. Recipes must fit into one of these categories: entrée, soup, side dish or dessert. Winners will be announced at the RPG breakfast at FNCE in San Antonio, TX and by mail/phone if not present at the breakfast. First place winner will receive a check for \$200, second place will receive \$100 and third place will receive \$75. Two runners-up will receive non-cash prizes. Send typewritten entries, along with your name, address and phone number to: Vitamite® 100 Recipe Contest, c/o K. Broihier, 42 Stanley St., S. Portland, ME 04106. **All entries must be received by September 1st, 2003.** All decisions are final. All recipes become the property of Diehl, Inc. and may be reproduced in printed materials or electronically without permission from the recipe's creator.

### Nutritional Comparison For Vitamite 100 vs. Vitamite Ultra

Serving Size	Vitamite 100 240 mls - 8 oz	Vitamite Ultra 240 mls - 8 oz
<b>Per Serving Analysis</b>		
Calories	100	110
Calories from Fat	45	15
Total Fat	5g	1.5g
Saturated Fat	0g	1.5g
Polyunsaturated Fat	0g	1g
Monounsaturated Fat	3.5g	0g
Cholesterol	0g	0g
Sodium	120mg	230mg
Potassium	140mg	290mg
Total Carbohydrates	14g	16g
Dietary Fiber	0g	3g
Soluble Fiber	0g	0g
Sugars	4g	7g
<i>% Daily Values are based on a 2,000 calorie diet</i>		
Protein	3g	6.25g
Vitamin A	10%	10%
Vitamin C	0%	8%
Calcium	30%	30%
Iron	2%	6%
Vitamin D	25%	25%
Vitamin E	0%	25%
Thiamin	10%	20%
Riboflavin	15%	20%
Niacin	0%	2%
Vitamin B6	10%	15%
Vitamin B12	30%	30%
Pantothenic Acid	10%	15%
Phosphorus	15%	20%

10/11/02

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# Renal Dietitians

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SUMMER 2003

## Homocysteine: The Newest Uremic Toxin?

By Louise Clement, MS, RD, CSR, LD

Louise has worked in an out-patient dialysis unit for 17 years. She has served on the Medical Review Board for Network 14 in Texas, and teaches undergraduate nutrition courses at Texas Tech University. She can be reached at 806-799-2992.

**H**omocysteine is gaining more notoriety as research reveals its role in the pathogenesis of cardiovascular disease (CVD). Recent studies have demonstrated that homocysteine plays a role in other disease states, including chronic kidney disease (CKD) and Alzheimer's. The focus of this article is to review the physiology of homocysteine, its role in cardiac disease and CKD, treatment options, and the results of a quality improvement evaluation.

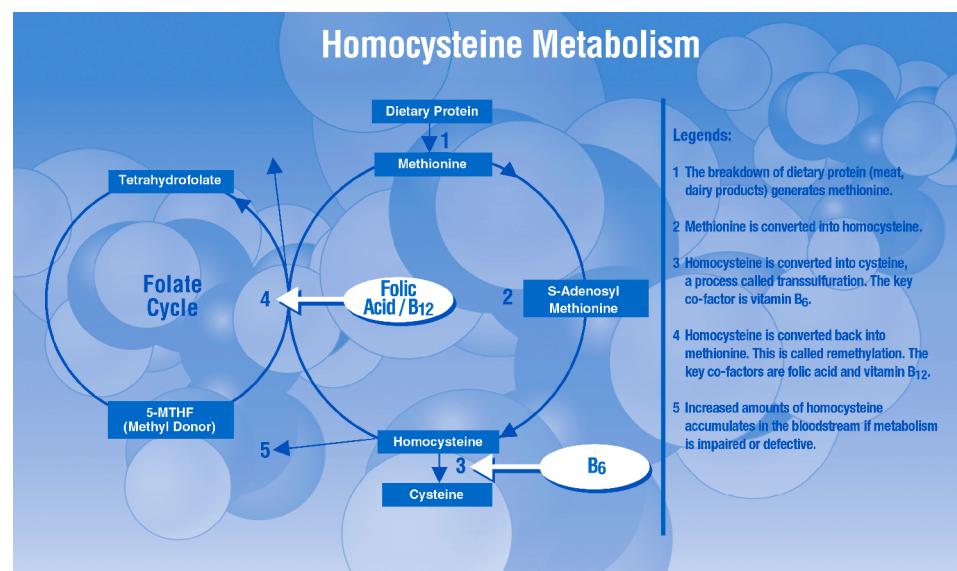
### Physiology

Homocysteine is a sulfur-containing intermediate of the essential amino acid methionine. It plays a key role in the synthesis of nucleic acids that affects all new cell production, including red blood cells. Homocysteine was first described in 1932, but the biochemical finding of homocysteinuria occurred in 1962.

In human physiology, methionine is converted to homocysteine by a process called demethylation and can then be metabolized by one of two pathways. In the trans-sulfuration pathway, which is dependent on vitamin B6, it is converted into cysteine and inorganic sulfates. In the remethylation pathway, homocysteine is converted back to methionine with the aid of folate and vitamin B12-dependent enzymes.

**Figure 1.**

### Cardiovascular Disease



Elevated Homocysteine Levels Are Found In Almost One-Third Of Patients With Established Atherosclerosis

pro-thrombotic by releasing excess tissue factor. Surplus homocysteine also promotes platelet aggregation. The initiation of procoagulant reactions can produce acute events such as myocardial infarction, deep vein thrombosis and thrombotic stroke. Lastly, in the presence of homocysteine, oxidized low density lipoproteins penetrate endothelial cells with less difficulty and are deposited to form foam cells. This constellation of abnormalities helps explain the relationship seen between homocysteine levels and peripheral artery disease, coronary artery disease, and the aforementioned venous thrombosis and stroke (2).

Elevated homocysteine levels can also predict future cardiovascular events, including death. In a Norwegian study

Continued on page 4

# From the Editor's Desk

Renal Nutrition Forum is published quarterly (Winter, Spring, Summer, Fall) as a publication of the Renal Dietitians Dietetic Practice Group of the American Dietetic Association.

The views expressed in this publication are those of the author and are not necessarily those of The American Dietetic Association.

Articles about successful programs, research interventions, evaluations and treatment strategies, educational materials, meeting announcements and information about educational programs are welcome and should be sent to the Managing Editor by the next deadline.

Future Deadlines  
September 1, 2003  
December 1, 2003  
March 1, 2004  
April 1, 2004

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Serendipity: that has been my experience. Cathi Martin, RD, CSR, came to our clinic a couple of years ago, to help our patients with exercise and to continue research that she conducts as a member of Dr. Alp Ikizler's lab at Vanderbilt University. With her contagious enthusiasm, she recruited me to become the assistant editor of the Renal Nutrition Forum, and with this issue, I move to the editor's position. I am thankful for the work Cathi has done, and I know I have some big shoes to fill.

I will do my best, and continue to rely on her as my mentor. Marianne Hutton, RD, CDE, continues to serve the Forum as Advertising Manager. We are very fortunate that she is willing to share her significant talents in this area. I want to especially thank our advertisers in this issue. In addition, I want to thank our tireless group of RD-peer reviewers. Together, we are bringing you an issue that should enhance your practice of renal dietetics.

Meet our new Renal Practice Group chair, Jenny Smothers, RD, who shares her vision for the coming year. Many thanks to our outgoing chair, Jill Goode, MS, RD. Jill and Susan Reams, RD, CSR, the chair of the NKF Council on Renal Nutrition, have worked hard to build bridges between our two organizations.

Lastly, please remember that there are many extra items on the Renal Practice Group website, [www.renalnutrition.org](http://www.renalnutrition.org). You can find the RNF Index, listings of Area Coordinators, stipend and mentor applications. Also, don't forget to watch for the RPG activities at FNCE this October. Hope to see you there!

Louise Clement, MS, RD, CSR, brings us up to date on a contemporary topic, reviewing homocysteine metabolism, and sharing a CQI project that encourages further research into the unique effects of homocysteine in the CKD population. After reading this, I encourage you to read "Prevalence and Progression of

Peripheral Arterial Calcifications in Patients with ESRD" (AJKD 2003; 41(1):140-148).

Also in this issue, as always, we have features that you will not want to miss, from our regular contributors, whom we value greatly. Philippa Norton, M Ed, RD, CSR, inspires us to counsel our clients to exercise and improve their outcomes significantly. Maureen McCarthy, MPH, RD, CSR, brings us a message by Jo Reeder, PT, MCSP, on utilizing the services of a physical therapist in facilitating increased exercise.

Sharon Schatz, MS, RD, CSR, CDE, in her very popular column, brings it to the common denominator: food. She helps us in our complex task of translating science and theory into the real world of how our patients eat, and how we might help them to better self-manage.

If your head has been spinning like mine, in learning our new rules and regs about Medical Nutrition Therapy, you will appreciate the column by Jessie Pavlinac, MS, RD, CSR. She gives us an overview of codes and forms required by the new law. This is Jessie's last column as she passes the baton to the new Reimbursement Chair.

Also presenting her last column is Kristine D'Angelo David, RD. With upwards of 40% of our patients having diabetes, we have benefited greatly from Kristine's columns that help us integrate the care of those with dual morbidities. Thanks to Kristine and Jessie for the guidance they have given.

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RPG Vision: RPG members will be leaders in providing scientifically sound renal nutrition care and education for patients, the profession and the public.

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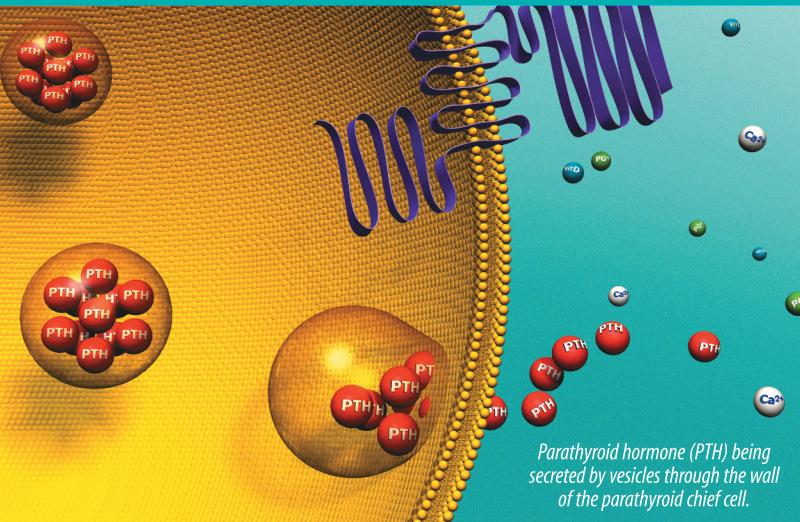
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We want all members to receive this publication.

Where are You? If you have moved recently, or had a name change, please send changes to ADA using the change of address card in the Journal to avoid delayed issues of your Renal Nutrition Forum.

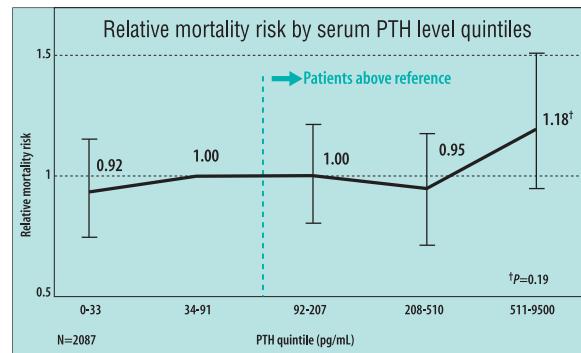
# THERE'S ONLY ONE THING AT RISK FOR PATIENTS WITH SECONDARY HPT. EVERYTHING.

Elevated PTH and Ca x P levels are associated with an increased mortality risk in ESRD patients<sup>1,2</sup>



Emerging data are providing a better understanding of the cardiovascular risks and consequences of secondary hyperparathyroidism (HPT) and elevated PTH in patients with end-stage renal disease (ESRD). With this new information, it may be necessary to reassess priorities in managing secondary HPT.

**Elevated levels of PTH are associated with an increased risk of mortality<sup>1\*</sup>**



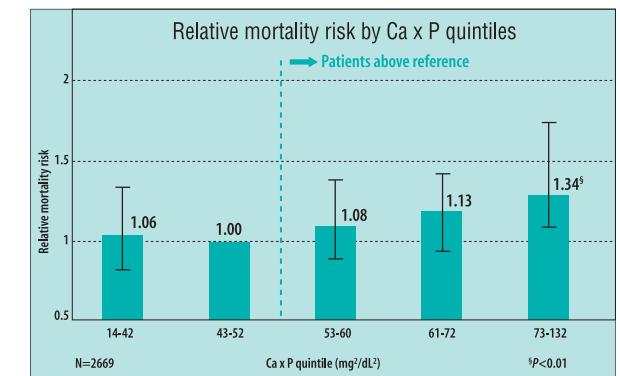
\*Compared with patients in the reference range (PTH level of 34-91 pg/mL). There was a significant difference in relative risk of mortality by log PTH as a continuous variable ( $P=0.03$ ).

## Consequences beyond bone

Recent work by Block and Ganesh demonstrates that elevated PTH is associated with increased mortality.<sup>12</sup> Attempts to lower PTH with current therapies often result in elevations of calcium-phosphorus product (Ca x P) levels.<sup>3</sup> In fact, elevated Ca x P alone has been linked to mortality in ESRD patients.<sup>12</sup> In addition, evidence from various investigators links elevated Ca x P to calcification of soft tissues, joints,

blood vessels, myocardium, lung, liver, and kidney, as well as to the progression of atherosclerosis (Bommer et al.).<sup>1,2,4,5</sup> Soft-tissue and vascular calcification is also believed to be a major risk factor for mortality due to cardiovascular disease, the leading cause of death in patients with ESRD.<sup>10-12</sup>

**34% increased risk of mortality in patients with Ca x P > 72 mg<sup>2</sup>/dL<sup>2,12</sup>**



<sup>†</sup>Compared with patients in the reference range (Ca x P level of 43-52 mg<sup>2</sup>/dL).

## A critical need for balance

To avoid the consequences of secondary HPT and elevated PTH, it is critically important to control PTH secretion while balancing calcium and phosphorus levels.<sup>1,3</sup> Draft Clinical Practice Guidelines for Bone Metabolism and Disease in Chronic Kidney Disease written by the Kidney Disease Outcomes Quality Initiative (K/DOQI) were presented at the American Society of Nephrology Meeting in 2002. These draft guidelines state that PTH levels should be maintained at 150 to 300 pg/mL and that Ca x P should be  $\leq 55$  mg<sup>2</sup>/dL<sup>2</sup> in order to minimize the risks of vascular disease, uremic calcification, and cardiac death.<sup>13</sup> Therefore, cardiac health should assume primary importance when evaluating therapeutic approaches to elevated levels of PTH, Ca x P, and phosphorus.<sup>3,14</sup>

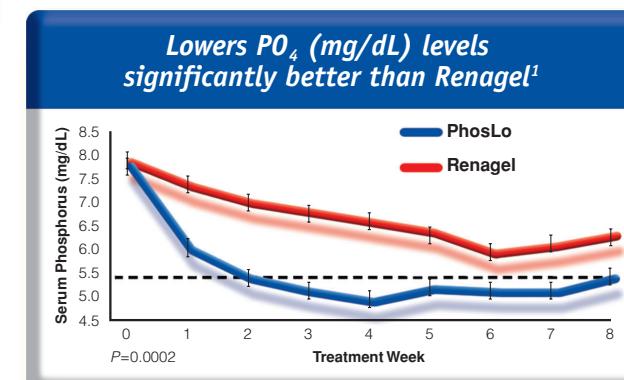
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**PhosLo is more effective than Renagel in reducing serum phosphate below 5.5 mg/dL<sup>1,2</sup>**



Double-blind, randomized, parallel, prospective clinical trial comparing PhosLo and Renagel in 98 ESRD patients for 8 weeks. Dosages were consistent with PhosLo and Renagel prescribing information.

**Renagel patients experienced more hypocalcemia (50%)<sup>1</sup>**

**PhosLo patients experienced more hypercalcemia (17%)<sup>1</sup>**

**At study conclusion, based on an average daily dose, the annual cost attributed to PhosLo is \$586 compared to \$4018 for Renagel<sup>1</sup>**

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667 mg**



**PhosLo® is indicated for control of hyperphosphatemia in end-stage renal failure. Patients with higher-than-normal serum calcium levels should be closely monitored and their dose adjusted or terminated to bring levels to normal. PhosLo is contraindicated in patients with hypercalcemia. No other calcium supplements should be given concurrently with PhosLo.**

**Brief Summary:** Before prescribing, see complete prescribing information. **Contraindications:** Patients with hypercalcemia. **Indications and Usage:** PhosLo is indicated for the control of hyperphosphatemia in end stage renal failure and does not promote aluminum absorption. **Warnings:** Patients with end stage renal failure may develop hypercalcemia when given calcium with meals. No other calcium supplements should be given concurrently with PhosLo. Progressive hypercalcemia due to overdose of PhosLo may be severe as to require emergency measures. Chronic hypercalcemia may lead to vascular calcification, and other soft-tissue calcification. The serum calcium level should be monitored twice weekly during the early dose adjustment period. **The serum calcium times phosphate (CaXP) product should not be allowed to exceed 66.** Radiographic evaluation of suspect anatomical region may be helpful in early detection of soft-tissue calcification. **Precautions:** Excessive dosage of PhosLo induces hypercalcemia; therefore, early in the treatment during dosage adjustment serum calcium should be determined twice weekly. Should hypercalcemia develop, the dosage should be reduced or the treatment discontinued immediately depending on the severity of hypercalcemia. PhosLo should not be given to patients on digitalis, because hypercalcemia may precipitate cardiac arrhythmias. PhosLo therapy should always be started at low dose and should not be increased without careful monitoring of serum calcium. An estimate of daily calcium intake should be made initially and the intake adjusted as needed. Serum phosphorus should also be determined periodically. PhosLo should be taken with meals to insure the mixing of calcium with dietary phosphate. **Carcinogenesis, Mutagenesis, Impairment of Fertility:** Long term animal studies have not been performed to evaluate the carcinogenic potential, mutagenicity, or effect on fertility of PhosLo. **Pregnancy:** Teratogenic Effects: Category C. Animal reproduction studies have not been conducted with PhosLo. It is not known whether PhosLo can cause fetal harm when administered to a pregnant woman or animal. **Pediatric Use:** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use:** Of the total number of subjects in clinical studies of PhosLo (n = 91), 25 percent were 65 and over, while 7 percent were 75 and over. No overall differences in safety or effectiveness were observed between these subjects and younger subjects, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out. **Adverse Reactions:** In clinical studies, patients have occasionally experienced nausea during PhosLo therapy. Hypercalcemia may occur during treatment with PhosLo. Mild hypercalcemia (Ca>10.5 mg/dL) may be asymptomatic or manifest itself as constipation, anorexia, nausea and vomiting. More severe hypercalcemia (Ca>12 mg/dL) is associated with confusion, delirium, stupor and coma. Mild hypercalcemia is easily controlled by reducing the PhosLo or discontinuing PhosLo therapy. Decreasing dialysate calcium concentration could reduce the incidence and severity of PhosLo induced hypercalcemia. The long-term effect of PhosLo on the progression of vascular or soft-tissue calcification has not been determined. Isolated cases of pruritus have been reported which may represent allergic reactions. **Drug Interactions:** PhosLo may decrease the bioavailability of tetracyclines.

**References:** 1. Nolan C, Qunibi W, Hootkins R, Cleveland MvB, Pelham RW. CARE (Calcium Acetate Renagel Evaluation) Study. A prospective, randomized, multicenter, double-blind study comparing the safety and efficacy of PhosLo and Renagel in patients with end stage renal disease. Paper presented at: Annual Meeting of the ASN/ISN World Congress of Nephrology; November 1-4, 2001; San Francisco, Calif. 2. Block GA, Port FK. Re-evaluation of risks associated with hyperphosphatemia and hyperparathyroidism in dialysis patients: recommendations for a change in management. *Am J Kidney Dis.* 2000;35:1226-1237.

\*Renagel (sevelamer hydrochloride) is a registered trademark of Genzyme Corporation.

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## **Homocysteine: The Newest Uremic Toxin**

continued from page 1

(3), 587 adults with diagnosed coronary artery disease were followed for a mean of 4.6 years. Cause of death was compared to homocysteine levels that were drawn at the beginning of the study. A marked association was demonstrated between mortality rates and four classifications of homocysteine: <9.0, 9.0–14.9, 15.0–19.9, and >20.0 mmol/L. While the mortality rate of persons with homocysteine levels below 9.0 was 3.8%, it was 24.7% for those with levels of >15.0.

After adjustment for gender and age, the factors with the strongest predictive power to homocysteine were serum folate, creatinine, uric acid, vitamin B12, and left ventricular ejection fraction.

### **Homocysteine and Alzheimer's**

Elevated homocysteine levels have been implicated in additional disease states including Alzheimer's and other forms of dementia. In a study by Seshadri et al (4), 1092 persons from the Framingham Study, without dementia, were followed for a median of 8 years. The incidence of dementia was compared with homocysteine levels drawn before and after the study period. The authors concluded that an elevated homocysteine was a strong, independent risk factor for developing Alzheimer's and other forms of dementia. A 5-point increase in the homocysteine level raised the risk of Alzheimer's by 40%. The risk of Alzheimer's was nearly doubled when homocysteine levels were above 14 mmol/L.

### **Role of Folic Acid**

The role of folic acid in homocysteine metabolism is well known. Folic acid serves as a methyl donor in the remethylation pathway, being "consumed" by that chemical process. In the dialysis population, supplemental folic acid helps, but does not normalize elevated homocysteine levels. Boston, et al described results from an eight week trial providing 15 mg of folic acid, 100 mg of vitamin B6 and 1 mg of vitamin B12 for a group of 27 persons on dialysis, who were already consuming

a standard renal vitamin (1 mg folic acid, 10 mg of B6, and 12 mcg of B12). After 8 weeks, the subjects experienced a 25.8% drop in homocysteine levels, from 29.5 to 21.9 mmol/L (5). The lower value is still more than twice the recommended level established by the American Heart Association of <10.0 mmol/L. Ten of the 15 subjects ended the study with homocysteine values above 15 mmol/L (5). In another study by Moustapha (6), plasma folate levels in 130 persons on hemodialysis were negatively correlated with the homocysteine levels, and were significantly lower than the folate levels of the 46 study participants on peritoneal dialysis.

### **Role of Vitamin B6**

Vitamin B6 (pyridoxine) is involved in the trans-sulfuration pathway of homocysteine metabolism. By itself, it does not seem to decrease the elevated homocysteine levels that are seen in End Stage Renal Disease (ESRD). Arnadottir et al (7) provided 300 mg of pyridoxine daily for four months to a group of 12 persons on hemodialysis and six persons on peritoneal dialysis, who received no other vitamin supplementation. Homocysteine levels rose from a mean of 26.7 to 32.9 mmol/L during the four months. It was postulated that the increase was due to a concurrent decline in blood folate levels, which dropped from 780 to 423 nmol/L during the same time period. A previous folic acid supplement had been discontinued four months prior to the pyridoxine trial.

Another study analyzed the effects of pyridoxine in non-dialyzed white males with creatinine clearances between 10 and 80 ml/min. The provision of 70 mg of vitamin B6 without other vitamin supplementation did not significantly decrease homocysteine levels (8).

### **Homocysteine in Chronic Kidney Disease (CKD)**

Although pyridoxine supplementation does not independently decrease homocysteine levels in CKD, its use should not be ignored. Suboptimal levels of vitamin B6 in both pre-dialysis and dialysis patients are well documented, related to uremic toxin interference, dialysis losses, insufficient dietary intake, and potential drug interference (9). Tremblay et al (10) reported vitamin B6 deficiency in nearly 40% of a group of 65 persons on hemodialysis, who had previ-

ously received no vitamin supplementation.

### **Role of Vitamin B12**

Vitamin B12 (cobalamin) is primarily absorbed by active transport in the terminal ileum, mediated by intrinsic factor in gastric acid. Various plasma proteins, plus two transport proteins, transcobalamin I and II, carry cobalamin to peripheral tissues. Vitamin B12 status can be compromised by abnormalities such as atopic gastritis, gastrectomy, use of Omeprazole, Crohn's disease, and/or genetic deficiencies or antibodies to intrinsic factor or transcobalamin I or II.

Interestingly, one percent of large oral doses is absorbed by passive diffusion. Kuzminski et al concluded, in a randomized study, that a high oral cobalamin dose of 2 mg was as effective as intramuscular injections for vitamin B12 repletion (11).

Vitamin B12 is needed in the remethylation pathway of homocysteine to methionine. While folic acid acts as a substrate by providing the methyl group, vitamin B12 acts as a cofactor in this reaction.

A negative correlation has been shown to exist between homocysteine and vitamin B12 levels in persons on hemodialysis (6). Vitamin B12 is also removed during dialysis. Chandra et al (12) demonstrated a significant decrease in serum B12 levels after 12 months of hemodialysis that could lead to a functional vitamin B12 deficiency.

This further exacerbates rising homocysteine levels, according to Herrmann et al (13). These authors also noted that methylmalonic acid detects intracellular vitamin B12 deficiency with more sensitivity than serum vitamin B12 levels (13).

Continued on page 5

## **Rehab Corner**

**By Maureen McCarthy, MPH, RD, CSR** Maureen is a Renal Dietitian with Renal Care Group—Pacific Northwest Renal Services, Portland, OR and can be reached at mmccarthy@renalcaregroup.com.

This column features an article submitted to the web page of the Life Options Rehabilitation Advisory Council (LORAC) by Jo Reeder, PT, MCSP, of UVA Health Systems. For other articles filled with helpful ideas, go to LORAC's home page ([www.lifeoptions.org](http://www.lifeoptions.org)), select the "For Renal Professionals" link, and then select "Showcase of Ideas".

**Getting PT Services for Your Patients** By Jo Reeder, PT, MCSP Physical therapy (PT) can be a valuable resource for the dialysis unit team as it treats patients' physical decline. A variety of payers will cover PT services, but certain procedures must be followed.

**How Physical Therapy Services Are Prescribed** In most states, a physician must make the actual PT referral. However, any health care professional (i.e., RN, RD, SW, PCT) can recommend physical therapy to a patient's doctor. PT referrals are for functional decline, decreased muscle strength, decreased joint range, gait problems, new onset of stroke or head injury, and/or a wound affecting function.

After the referral and a patient eval-

uation, the physical therapist develops a written plan of therapy. This plan includes the diagnosis, treatment plan, goals of therapy, and frequency and duration of the intervention. The physician reviews and approves the plan of care; there is an expectation that the condition will improve in a reasonable length of time.

Most insurance providers allow a set number of visits, and this varies from company to company. If your patient has commercial insurance, check with the patient's insurance carrier about coverage for physical therapy. There are also limitations on Medicare coverage of physical therapy. If your patient has Medicare, a physical therapy provider or the Center for Medicare and Medicaid Services (CMS) regional office can give you information about Medicare coverage for physical therapy services. You can find the phone number for your CMS (formerly HCFA) regional office at [www.medicare.gov/Contacts/Home.asp](http://www.medicare.gov/Contacts/Home.asp).

The American Physical Therapy Association (APTA) has posted information about reimbursement for physical therapy services on its website at [www.apta.org/reimbursement](http://www.apta.org/reimbursement). You can find a chart of state regulations pertaining to direct access to physical therapy evaluation, examination, and intervention at [www.apta.org/pdfs/gov\\_affairs/directlaws.pdf](http://www.apta.org/pdfs/gov_affairs/directlaws.pdf).

**Where Physical Therapy Services Are Provided** Dialysis unit staff can help patients access

PT services in different settings. Patients can go to a free-standing, outpatient physical therapy clinic; go to an inpatient rehabilitation center; receive home health physical therapy if they qualify as "homebound" (for definition, see [www.hcfa.gov/pubforms/transmit/a0121.pdf](http://www.hcfa.gov/pubforms/transmit/a0121.pdf)); or they can go to the physical therapy department of a hospital.

At University of Virginia Health Systems, for example, physical therapy is provided within the dialysis center so the patients can get their physical treatment before, during, or after dialysis. This on-site PT has been very effective for both patients and staff. It is easier to facilitate on-site physical therapy in a hospital-based unit, but with a little extra planning it can be achieved in a free-standing unit.

Physical therapy intervention can break the spiral of debilitation and decompensation frequently observed in the ESRD population. In addition, a more physically active, higher functioning end-stage renal disease population may have significantly better long-term survival rates.

Jo Reeder, PT, MCSP is willing to reply to readers' questions and can be reached at [jr3f@virginia.edu](mailto:jr3f@virginia.edu).

Do you have a rehab success story highlighting the role of renal dietitians in the process? Contact Maureen McCarthy for an interview that may lead to an article in this column ([mmccarthy@renalcaregroup.com](mailto:mmccarthy@renalcaregroup.com); or phone 503-250-5011).

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## Kidney Friendly Food Facts

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tablespoon honey and ½ cup mayonnaise. Chinese mustard – mix ¼ cup mustard powder with 2 tablespoons cold water. For yellow color add a little turmeric. This is good with cold shrimp.

Hot dogs go with mustard. Most hot dog recipes combine meat, meat fat, and a cereal filler with herbs and seasoning. The ground ingredients are stuffed into a casing. Although we often counsel patients to avoid hot dogs due to sodium content, we may also need to look at the potassium and phosphorus contents. Per ESHA the average hot dog (57 grams) has 6.4 grams

Table I – Hot Dog Nutrients

Brand	Wt-gm	Prot-gm	Fat-gm	Carb-gm	Sodium-mg	K+ -mg
Boars Head	N/A	N/A	N/A	N/A	N/A	N/A
Beef Frankfurters, natural casing	57	7	14	1	440	N/A
Beef Frankfurters, skinless	45	6	11	0	350	N/A
Lite Beef Frankfurters	45	7	6	0	270	N/A
Miller's	N/A	N/A	N/A	N/A	N/A	N/A
Colossal Beef Frankfurters, skinless	56	7	11	3	530	N/A
Farmer John	N/A	N/A	N/A	N/A	N/A	N/A
Wieners, pork & beef	46	6	11	N/A	470	N/A
Beef franks	46	5	12	N/A	470	N/A
Dodger Dogs, extra long	76	8	21	N/A	780	n/a
Berks	N/A	N/A	N/A	N/A	N/A	N/A
Grill Meat Franks	57	7	16	0	590	N/A
Beef Franks	57	7	14	0	590	N/A
Ball Park	N/A	N/A	N/A	N/A	N/A	N/A
Beef Franks	56	6	16	3	620	460
Franks, beef & pork	56	6	16	3	610	450
Kosher Beef Franks	42	6	12	2	440	N/A
Beef Singles	45	5	13	2	500	370
Fat Free Franks, beef & pork	50	6	0	6	490	520
Beef Fat Free Franks	50	7	0	7	490	530
Lite Franks	50	6	7	3	540	410
Beef Lite	50	6	7	3	510	440
Hebrew National	N/A	N/A	N/A	N/A	N/A	N/A
Reduced Fat Beef Franks	49	6	10	0	360	N/A
97% Fat Free Beef Franks	49	6	1.5	3	400	N/A
Beef Franks	49	6	14	1	370	N/A
Healthy Choice	N/A	N/A	N/A	N/A	N/A	N/A
Meat Franks	50	6	2.5	6	440	N/A
Beef Franks	50	6	2.5	7	440	N/A
Sabrett	N/A	N/A	N/A	N/A	N/A	N/A
Skinless Beef Frankfurters	57	7	15	1	530	N/A

protein, 650 mg sodium, 89 mg potassium, and 91 mg phosphorus. However, not all hot dogs fall into this range as I discovered web surfing (refer to Table I). Data isn't always available for potassium and phosphorus, but what I found made me rethink the issue. The phosphorus and potassium content could be higher depending upon the filler used or whether potassium phosphates have been added. Referring to carbohydrate content might help indicate this. Some brands are much lower in sodium. Realistically patients are probably eating hot dogs, so perhaps we need to advise them how to do it.

Debbie Alexandrowicz, MA, RD, CSR, shared a hand-out, Thirst Quencher Guide for Hemodialysis Patients. This highlighted cold beverages as being better choices or not recommended based on phosphorus, potassium, sodium, and sugar content. Each area of the country has beverages that may be more commonly used, so you may want to do a similar one for your patients. Reformulation of some beverage recipes has increased the amounts of potassium and/or phosphorus. Although we generically advise patients regarding sodas or other drinks, specifying brand names may be more helpful to patients in making soda and soft drink selections from supermarket shelves.

I found information on the Pepsi web site for potassium content of the following items, all per 8 oz serving: Fruitworks: Apple Raspberry, 25 mg; Peach Papaya, 40 mg; Pink Lemonade, 55 mg; Strawberry Melon, 70 mg; and Tangerine Citrus, 25 mg. Although Mountain Dew regular doesn't have potassium, the diet version has 45 mg. Slice: Regular Orange, 70 mg; Diet Orange, 60 mg; Fruit Punch, 28 mg; and Strawberry, 27 mg. Remember, most soft drink cans are 12 ounces which would be 1.5 servings.

Try these quick flavor tricks for beverages. Add a small amount of non-dairy creamer to cream soda for a mock ice cream soda. Combine ginger ale with cranberry juice cocktail products. Experiment with cranberry or raspberry flavored ginger ales as well as cranraspberry or cran-grape drinks. Persons with diabetes could use fat free or low sugar versions.

Check out these informative web sites on produce, courtesy of Y. Jeffries, MS, RD, LD: <http://www.specialtyproduce.com/>, <http://www.nre.vic.gov.au/trade/asia veg/thes-00.htm>

## Homocysteine: The Newest Uremic Toxin?

*continued from page 4*

levels are a well-known risk factor in hyperhomocysteinemia (8). This rise in homocysteine has also been evident after dialysis has been initiated (6), reflecting progressive decline in renal function.

In the dialysis population, elevated homocysteine levels are commonplace. One study documented that 91% of persons on hemodialysis and 67% of those on peritoneal dialysis experienced an elevated homocysteine level (6). The means were significantly different from each other, however. Mean homocysteine levels in those on hemodialysis averaged 29.8 mmol/L, compared with 19.9 for peritoneal dialysis. These differences were attributed to the significantly lower plasma folate levels observed in persons on hemodialysis.

### Homocysteine and ESRD Mortality

Are cardiovascular risk factors affected in ESRD as they are in the general population? This topic was examined by Mallamaci et al who followed 175 persons on hemodialysis for an average of 29 months, and monitored cardiovascular outcomes. Their results showed a clear association between atherosclerotic events, such as thrombotic stroke, myocardial infarction, mesenteric infarction, and pulmonary embolism, and homocysteine. Even more significant was the finding that homocysteine levels independently predicted cardiovascular mortality. The risk of fatal and non-fatal atherosclerotic events was 8.2 times higher in persons in the third homocysteine tertile compared to the first tertile (16).

With the small sample size, however, further research is needed to corroborate the potential benefits on cardiovascular outcomes in patients with ESRD. A trend was observed between baseline homocysteine levels and the duration of dialysis. When persons new to dialysis (less than 1 year) were compared to those on dialysis for 3-8 years, or more than 8 years, significant differences were noted using Post Hoc comparisons ( $p < .03$ ). This is probably related to the decline in kidney function commonly seen as the disease process continues over time, even after dialysis is initiated. Persons on hemodialysis had significantly higher homocysteine values than those on peritoneal dialysis at baseline using

5 mg of folic acid, 1 mg of cobalamin, 50 mg of vitamin B6, plus standard amounts of thiamine, riboflavin, niacin, pantothenic acid, biotin, and vitamin C. Pan American Laboratories, LLC provided all the vitamins used during the 6 month study period. No grant or research funds were requested or provided. Laboratory evaluation of homocysteine was covered by the Centers for Medicare and Medicaid Services.

### Methods

Sixty-five persons on dialysis consented to use of the study vitamin, while 24 remained on standard renal multivitamin therapy. Homocysteine levels were measured quarterly. Mean homocysteine values at baseline were not statistically different, with 26.2 mmol/L for the intervention group, and 27.8 for the control group. See Table 2 for demographics.

### Results and Discussion

After 3 months, the intervention group's mean homocysteine values dropped 16% below the control group, and after 6 months, the drop was 25%. Both of these were statistically significant, using Pearson Correlation Coefficients ( $p < .01$ ).

Age was not related to homocysteine levels at baseline or after 3 months. No differences were seen between males and females and their homocysteine levels at baseline, but males were significantly higher after 3 months using MANOVA ( $p \leq .05$ ). The cause of renal failure or primary diagnosis did not predict homocysteine levels. This may be because non-functioning kidney tissue, regardless of the cause, results in elevation in homocysteine levels.

The differences in homocysteine levels with regard to race were demonstrated. Blacks had significantly higher homocysteine levels at 3 months compared to whites and Hispanics ( $p < .0005$ ). Their values at 6 months showed an overall decline when compared to their baseline values.

However, this decline was noticeably lower than the decline in the white and the Hispanic groups, approaching significance ( $p < .07$ ), both based on the ANOVA Procedure Duncan's Multiple Range Test. Blacks may need closer, earlier monitoring of their homocysteine levels both in the pre-dialysis period and while on dialysis.

### Summary

An elevated homocysteine level is an independent risk factor for CVD in the general population and in ESRD, and for Alzheimer's and other forms of dementia. Folic acid, vitamin B6, and vitamin B12 status is compromised in the dialysis population, based on current standards of practice. Our data demonstrated that a renal mul-

ANOVA ( $p \leq .013$ ), but not after 3 months of therapy with the study vitamin.

It is well known that the correction of anemia is highly correlated with quality of life and fewer medical complications. Our results demonstrated that, at baseline, the more anemic patients had higher homocysteine levels ( $p < .03$ ), and higher requirements of epoetin alfa ( $p \leq .001$ ), both of which were statistically significant using Pearson Correlation. It is postulated that, with similar vitamin requirements for red blood cell production and homocysteine control, a patient's vitamin B6, B12, and folic acid status is relevant to the management of both anemia and elevated homocysteine.

The inverse relationship between homocysteine and hemoglobin levels continued to be clinically significant by the sixth month, although statistical differences were not shown. Epoetin alfa dosing declined 15% in the intervention group over the 6 months, with a decline of 19% compared to the control group. The potential for cost savings in dialysis-related medications is obvious.

The differences in homocysteine levels with regard to race were demonstrated. Blacks had significantly higher homocysteine levels at 3 months compared to whites and Hispanics ( $p < .0005$ ). Their values at 6 months showed an overall decline when compared to their baseline values. However, this decline was noticeably lower than the decline in the white and the Hispanic groups, approaching significance ( $p < .07$ ), both based on the ANOVA Procedure Duncan's Multiple Range Test. Blacks may need closer, earlier monitoring of their homocysteine levels both in the pre-dialysis period and while on dialysis.

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tivitamin with 5 mg of folic acid, 1 mg of cobalamin, 50 mg of vitamin B6, plus standard amounts of thiamine, riboflavin, niacin, pantothenic acid, biotin, and vitamin C lowered homocysteine levels compared to standard renal vitamin therapy in a group of 89 out-patient chronic dialysis patients.

Continuing declines in homocysteine were seen during the 6 month period of study in the intervention group. These drops in homocysteine levels produced a corresponding drop in epoetin alfa requirements and suggest that folic acid is a potential ally in the management of anemia. Compliance with vitamin therapy can be monitored by regularly measuring homocysteine levels.

Males tend to have higher homocysteine levels than females, and persons on hemodialysis have higher levels on standard vitamin therapy compared to those on peritoneal dialysis. Blacks have higher homocysteine levels, compared to whites and Hispanics, and are more resistant to therapy. Higher homocysteine levels were observed as the duration of dialysis progressed for patients prior to intervention.

#### Recommendations

Monitoring homocysteine levels is indicated in chronic kidney disease, both before dialysis begins and afterward. Standard vitamin therapy needs to be re-evaluated for most persons on dialysis. Black patients need closer, earlier monitoring of homocysteine and appropriate vitamin therapy. Efforts to lower homocysteine levels could lead to potential cost savings for epoetin alfa use.

Further research is needed to determine if a reduction in homocysteine levels has a beneficial effect on cardiovascular outcomes in patients with ESRD.

**Table 2. Demographic Characteristics of Study Participants (n=89)**

Demographic Characteristics		N	%
Gender	Male	46	52
	Female	43	48
Mean Age	60		
Race	Black	13	15
	Hispanic	40	45
	White	36	40
Control Group		24	27
Treatment Group		65	73

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## Kidney Friendly Food Facts

By Sharon Schatz, MS, RD, CSR, CDE

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I'm continually amazed by the fount of informational newsletters that are available by e-mail. FoodNavigator.com originates from Europe and provides updates on the food industry. This is not always directly applicable to the U.S. market, but it increases awareness of food developments that may not have been publicized elsewhere. You might want to check this site.

In one of the recent FoodNavigator mailings, I learned that McCormick is forecasting lemongrass, turmeric, and mustard as some of the "hot" flavors for 2003. Additional items to look for are bay leaf, chili peppers, cinnamon, coriander, vanilla, and even pepper. "Americans are on a quest to experience bolder, more exciting flavor combinations at restaurants and at home," said Laurie Harrsen, director of public relations at McCormick. "Our research shows that these essential flavors are influencing the foods we eat – whether spicy, sweet, worldly, or comforting – each and every day." According to the report, American taste buds in 2003 will call for plenty of flavor, with new pairings, continued use of ingredients that heat and cool the palate, and a growing interest in authentic, regional ethnic cuisines. I'm unsure whether these trends are an effort to merchandise products or if they respond to what is wanted. Either way it may influence our patients' choices.

Mustard seems more likely than lemongrass or turmeric to be used. I like trying different prepared mustards and use them in cooking, but I never gave much thought to their origins. Use of prepared mustard dates back to ancient Egyptian times. Although mustard is prepared from the herb seed, it is generally considered a spice. Mustard seeds can be black, white (yellow), or brown. The

seeds themselves do not have an odor, but when ground they release an acrid, earthy aroma. Mustard powder, also known as mustard flour, is obtained when the whole mustard seeds are crushed, ground, and sifted. The pungent taste is determined by myrosinase, an enzyme that is activated by water. Preparations with the sharpest, hottest taste use only water for the liquid; but this is the most unstable form, as it doesn't stop the enzymatic activity. The acidic liquid that is used provides most of the resulting flavor. Vinegar gives a mild tang. Wine adds a spicier pungency. Beer yields a real heat. Do not add acid by itself or hot water as these will kill the enzyme and produce a more bitter flavor.

Prepared mustards can be smooth or whole grained and are often identified by country of origin. English mustard utilizes white seeds, is often hot or sharp, and goes well with bland foods. French mustard is milder and more delicately flavored; and usually we think of Dijon, a blend of husked black seeds, wine, and salt. Provençal mustard is influenced by garlic, red pepper, and wine. American ball-park style is made from white seeds, sugar, and vinegar with a runnier consistency. It is probably the mildest in flavor with lots of turmeric responsible for the bright yellow color. German mustards from black seeds and vinegar are often dark and bold and need foods with strong flavors to combat the robustness. Dutch mustards are strong and sour. Swedish mustard is tangy. Common herbal flavors include horseradish, marjoram, tarragon, and thyme. Sweet mustards contain additional honey or brown sugar and are good for glazing chicken or pork. Wasabi blends have additional potency from Japanese horseradish.

Commercial mustards are mostly used as a condiment but can be added to cold dressings and sauces. A simple sauce can be made by stirring prepared mustard such as Dijon or stone ground into sour cream to compliment prime rib or into mayonnaise for sandwich spread. I mix it with

white wine to form a paste that I brush onto fish prior to baking. As the fish cooks a crust layer forms from the mustard and keeps the fish moist while adding flavor. Mustards should be added towards the end of cooking with heated sauces. They can also be mixed with bread crumbs to make a coating for chicken and lamb.

Sodium content of mustard can vary depending upon its ingredients. Salt free or low sodium products are available but may not be readily available in every market. A sampling of mustard blends showed a range of 12 to 120 milligrams per 1 teaspoon (ESHA Food Processor and jar labels). Honey mustard and cranberry mustard had the lowest amount. As a rule of thumb I would estimate 60 milligrams per teaspoon. The taste value it adds seems worth this amount of sodium.

Supermarket shelves have a multitude of products with different tastes and consistencies. Or you can expand a plain mustard's flavor at home by the following: Lemon mustard (good on chicken) – stir in 1 teaspoon grated lemon rind and 1 tablespoon fresh lemon juice into ½ cup Dijon mustard. You could also use lime. Green peppercorn mustard (use on beef) – mix 1 tablespoon freshly ground green peppercorns and 1 minced shallot into ½ cup Dijon mustard. Horseradish mustard dip – combine 1 tablespoon grated horseradish root, a dash of Tabasco, and 2 tablespoons nonfat mayonnaise into ½ cup Dijon mustard.

You can easily fix these from mustard powder:

Honey mustard - mix 4 tablespoons powdered mustard with 2 tablespoons cold water and 1 teaspoon vinegar to form a stiff paste. Stir in 1 tablespoon vegetable oil until the mixture is smooth, and then add 2 tablespoons honey until combined. Honey mustard sauce – mix 4 teaspoons mustard powder with 1

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# Reimbursement Update

**By Jessie Pavlinac, MS, RD, CSR**  
Jessie is a clinical nutrition manager and renal dietitian at Oregon Health Sciences University. She can be reached at [pavlinac@ohsu.edu](mailto:pavlinac@ohsu.edu).

## Medicare MNT

Effective April 1, 2003, there were some changes in Medicare Medical Nutrition Therapy (MNT) billing and Current Procedural and Terminology (CPT) codes. These changes serve to highlight the ongoing process-improvement that happens in implementation of laws. The full text of the recent changes can be found at the Centers for Medicare and Medicaid (CMS) website, [www.cms.gov](http://www.cms.gov), using MNT in the search engine (CMS, Program Memorandum Intermediaries, A-02-115, November 1, 2002).

- If you are a hospital-based outpatient clinic providing Medicare MNT to Medicare Part B beneficiaries, that does not have computer systems in place to submit Medicare claims on the CMS-1500 form, you can use the CMS-1450 (also known as a UB92) billing form, or its electronic equivalent, for submitting Medicare MNT bills.

must still submit a bill on the CMS-1500 form.

- New G-codes should be used for re-assessment and subsequent intervention following a second referral in the same calendar year. These would be used for a change in diagnosis, medical condition, or treatment regimen, including additional hours needed above the three hours (initial calendar year) or two hours (subsequent years):

- o G0270 – Medical Nutrition Therapy; reassessment and subsequent intervention(s) following second referral in same year for change in diagnosis, medical condition, or treatment regimen, individual, face to face, each 15 minutes
- o G0271 – Medical Nutrition Therapy; reassessment and subsequent intervention(s) following second referral in same year for change in diagnosis, medical condition, or treatment regimen, group (2 or more individuals), each 30 minutes

"According to data obtained and analyzed by the American Dietetic Association, the Centers for Medicare & Medicaid Services

(CMS) paid approximately \$800,000 in 2002 for MNT services provided to individuals and groups. Although data are not complete, it appears that doctors anywhere in the United States could refer patients to area RDs enrolled as Medicare providers." (ADA "On The Pulse" March 21, 2003)

## Changes in Medicare MNT Reimbursement Rates

Nephrology News & Issues, March 2003, reported that the Medicare payment to physicians would increase 1.6% effective March 1, 2003. The entire federal ruling can be found in the *Federal Register*, vol. 68, no. 40 page 9567 – 9580. Since Medicare MNT for dietitians/nutrition professionals is tied to the physician payment (85% of the physician payment), this increase will also be applied to MNT payment. Although small, the increase is surprising, since it was announced in 2002 that Medicare fees would be cut 4.4% in 2003. Updated reimbursement and co-payment tables for RD Medicare providers of MNT are available at the American Dietetic Association's Web at [http://www.eatright.org/Member/PolicyInitiatives/83\\_11448.cfm](http://www.eatright.org/Member/PolicyInitiatives/83_11448.cfm). Scroll to the claims processing section, after logging in.

# New Directions in Diabetes Care

**By Kristine D'Angelo David, RD**  
Kristine is a Territory Sales Manager with Sigma-Tau Pharmaceuticals, Inc. She can be reached at 860-673-3407, or [kristine.david@sigmatau.com](mailto:kristine.david@sigmatau.com).

further rigorous study, especially among diabetic persons and other vulnerable populations." (2)

## Thiamine Derivative May Halt Diabetes Complications

My column this quarter reviews two interesting studies that look at the specific effects some vitamin supplements may have on people with diabetes. I will also look at a relatively new device that allows for almost continuous monitoring of blood glucose levels to help improve blood glucose control.

## Multivitamins in Diabetes

Dr. Thomas Barringer at the Carolinas Medical Center in Charlotte, NC conducted a study to see if taking some sort of vitamin or mineral supplement, as 40% of Americans do, would actually improve a person's health (1). One hundred and thirty people, age 45 or older, were divided into two groups, one receiving a daily supplement containing 23 vitamins and minerals, and the other a placebo that contained only calcium, magnesium and Vitamin B12 (so that the placebo would look and smell like a multivitamin). The results showed that only 43% of those on the supplement got an infection (classified as minor respiratory and urinary tract infections, influenza or gastrointestinal infections) during the year, compared to 73% of the placebo group. However, "All the difference in infection rates was among those with diabetes." When analyzing just those participants with diabetes, only 17% on the multivitamin got an infection compared to 93% of those with diabetes who were on the placebo. The reasons for the reduced infections in people with diabetes was unclear, although diabetes makes a person more prone to infections because high blood glucose levels compromise the immune system. Poorly controlled diabetes can also lead to deficiencies of certain minerals that are lost due to excessive urination. The editors concluded: "The potential impact of supplements merits

is not being widely used despite its ability to help improve blood glucose trends. The biggest obstacle may be the lack of awareness and understanding among physicians. The data the CGMS collects may seem overwhelming at first, but once trained in how to interpret it, physicians see that CGMS can save time in troubleshooting management problems and lead to much more productive patient visits than the usual appointment that adjusts insulin and medications using traditional fingerstick blood glucose levels.

CGMS, also known as "the sensor" is available only under a doctor's supervision. It has a small, flexible platinum electrode coated with the enzyme glucose oxidase within a semi-permeable membrane. It is inserted underneath the skin in the hip or abdomen with a needle-like device and is usually worn for three days at a time. The electrode measures glucose in interstitial tissue and converts it to an electronic signal. The information is transmitted to a pager-sized monitor that continuously collects the data. The data is downloaded in the doctor's office to be analyzed, and changes in insulin or medications can then be made. The sensor does not provide "real-time" glucose values, but provides opportunities to study trends over time.

CGMS is especially valuable in monitoring nighttime glucose levels, since patients often have no idea how widely their glucose may vary during the night. It can also help in the diagnosis of gastroparesis, a common problem for diabetic patients on dialysis.

CGMS is also useful in the following situations:

- When a person has a high Hemoglobin A1c (A1c)
- When the A1c does not correlate to the patient's self-monitoring results
- When a patient has unexplained high or low blood glucose levels

Continued on page 16

# MANY THANKS

to the dietitians who have served as Peer Reviewers for the Renal Nutrition Forum. We couldn't do it without you!

**Debbie Benner  
Sarah Carter  
Deanna Curry  
Philippa Feiertag  
Barbara Hutson**

**Yolanda Jeffries  
Linda Lackney  
Marty Loeffler  
Cathi Martin  
Pam Michaels**

**Sharon Schatz  
Lori Smuckler  
Patricia Weber  
Laura Yates**

## Advances in Practice

### Improving health outcomes with exercise in patients with end-stage renal disease

By Philippa Norton Feiertag, MEd, RD, CSR, LD. Philippa is a Clinical Analyst/Renal Nutrition Specialist with Clinical Computing, Inc. in Cincinnati, OH. She can be reached at feier@fuse.net.

**C**ardiovascular disease (CVD) is a major contributor to morbidity and mortality in patients with chronic renal disease, and CVD mortality is approximately 15 times higher in patients undergoing dialysis than in the general population (1). However, early implementation of strategies used in the general population can reduce CVD risk factors in patients with end-stage renal disease (ESRD) (1,2).

Both the American Heart Association (AHA) and the National Kidney Foundation (NKF) Task Force on Cardiovascular Disease recommend moderate levels of physical activity for 30 minutes per day on most days of the week (3,4). A 12-month endurance exercise training program comprising cycling, walking and jogging improved lipid profiles and insulin sensitivity, and decreased dosages of antihypertensive medications required in hemodialysis patients (5). Despite the benefits of increased physical activity, exercise interventions are the least frequently implemented rehabilitation activities, according to a recent survey of Texas dialysis facilities (6).

Since the renal dietetics professional has early and ongoing contact with patients to evaluate lifestyle interventions for improving their health and well-being, this member of the multidisciplinary team can play an important part in promoting exercise in the ESRD population (7). Optimizing functional ability is an important goal of both nutrition and exercise therapy, and the registered dietitian has the expertise to ensure adequate calorie and protein intake to maintain or increase muscle mass, and improve physical performance (7,8).

Resistance training characterized by resisting, lifting and lowering weights has been associated with increased energy intake and

protein utilization in patients with chronic renal insufficiency (CRI) consuming a low-protein diet (9,10). As a result, muscle mass and nutritional status improved in these patients. Since nutritional status at initiation of maintenance dialysis therapy seems to determine subsequent improvement in nutritional parameters (11), the ability of resistance training to counteract the catabolic effects of low-protein diets during CRI may have important implications when the patient reaches ESRD.

This column will review the benefits of exercise for patients with ESRD undergoing maintenance dialysis therapy and explore strategies for increasing physical activity in this population.

Beneficial effects of exercise for patients with ESRD can be categorized as follows:

**Increased quality of life:** Exercise coaching and rehabilitation counseling provided to both pre-dialysis and dialysis patients increased their quality of life compared with non-exercising control patients (12). In this study, hematocrit and sickness impact profile scores served as indicators of quality of life. Greater benefits were realized in pre-dialysis than dialysis patients.

**Increased appetite and improved nutritional status:** Protein-energy malnutrition (PEM) affects up to 70% of adults with ESRD undergoing maintenance dialysis therapy and despite aggressive nutrition intervention, its prevalence has remained virtually unchanged over the past decade (13-15).

Patients undergoing HD who participate in intradialytic exercise programs report improved appetite and show small increases in mean energy and protein intake; estimated dry weight and serum albumin levels also increase when compared with non-exercising dialysis patients (16,17). In these programs, patients were given the option of cycling before or during HD, walking on a treadmill before HD, or stretching and exercising with light weights during HD (16) and

cycling on a stationary bicycle (17).

Patients on continuous ambulatory peritoneal dialysis (CAPD) who underwent thrice weekly exercise training on a treadmill, bicycle or arm ergometer showed no significant changes in serum albumin (18).

Although the effects of exercise on nutritional status are subtle, research conducted to date has involved small numbers of patients participating in exercise programs of 3 to 12 months duration. Nutritional changes may be better assessed in studies that include larger numbers of patients participating in long-term exercise programs.

**Improved lipid profile:** Lipid abnormalities and defective cholesterol transport contribute to atherosclerosis in patients with ESRD (19). Fifty to 75% of patients undergoing maintenance dialysis therapy have hypertriglyceridemia and decreased high-density lipoprotein (HDL), and patients on CAPD have significantly higher serum triglycerides, total cholesterol and low-density lipoprotein (LDL), than those undergoing HD (20-22).

Endurance exercise training (cycling, walking and jogging) results in decreased serum triglycerides and increased HDL in HD patients (5,23). A similar exercise program elicited an increasing trend of HDL in patients on CAPD (18). However, a self-monitored program of aerobic activity for 15 minutes thrice weekly had no effect on lipid profile in patients with ESRD after 8 months (24). This suggests that supervised exercise programs of high intensity may be necessary to improve lipid profiles in this population.

**Better glycemic control:** Glucose uptake by skeletal muscle and adipose tissue decreases in patients with CRF, resulting in glucose intolerance and hyperglycemia (25). In patients with diabetic nephropathy, poor glycemic control prior to dialysis initiation is a risk factor for increased mor-

Continued on page 9

## Thought of the Month

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## NEW from Dietitians in Nutrition Support:

"Sharpening Your Skills As A Nutrition Support Dietitian - Study Guide"

This booklet highlights the proceedings from the DNS 25th Anniversary Conference held May 15-17, 2003 in New Orleans, LA. The study guide includes syllabus material and case presentations for the following topics:

- professional issues
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- parenteral nutrition
- enteral nutrition
- adult & pediatric nutrition assessment
- home care
- metabolic support
- GI Nutrition

There are 145 self assessment questions. The Commission on Dietetic Registrations (CDR) has approved this program for 18 hours of Continuing Professional Education (CPE). Price is \$85.00 plus \$10.00 shipping/handling. For order form or more information, e-mail [DNSDPG@aol.com](mailto:DNSDPG@aol.com) or visit [www.dnsdp.org](http://www.dnsdp.org).

## New Directions in Diabetes Care\*

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When there is an urgent need to control glucose levels such as during pregnancy or when trying to determine if hypoglycemia is a factor in seizures.

CGMS has shown that hypoglycemia is more prevalent than was previously thought, and patients are often able to decrease insulin use. It is also useful in monitoring after-meal blood glucose levels allowing patients to adjust insulin or oral medications to keep these levels in acceptable ranges. (4) For the dialysis patient, CGMS could be used to determine if a patient is experiencing low blood-glucose during treatment. This information could then be used to counsel the patient about how to adjust medications and/or meals on dialysis days.

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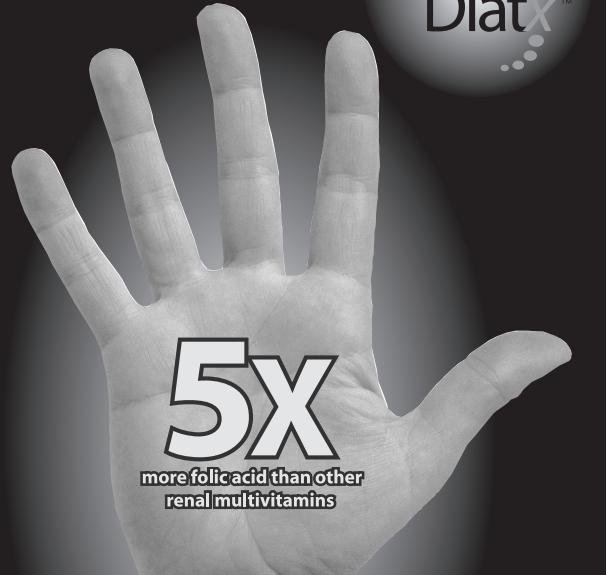
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THIAMINE (B1)	1.5 mg	1.5 mg	1.5 mg	1.5 mg	1.5 mg
RIBOFLAVIN (B2)	1.5 mg	1.7 mg	1.7 mg	1.7 mg	1.7 mg
NIACINAMIDE OR NIACIN	20 mg	20 mg	20 mg	20 mg	20 mg
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## Advances in Practice

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tality, and improving glycemic control can decrease cardiovascular damage (26,27).

Diabetic and non-diabetic HD patients participating in exercise programs experience a decrease in serum glucose (16,23). This is attributed to increased insulin sensitivity and responsiveness of skeletal muscle during exercise (23,26). The intradialytic period may be the safest time for diabetic HD patients to exercise because their blood glucose is maintained within normal limits by dialysate (19).

**Improved serum phosphorus control:** It is estimated that 60% of HD patients have serum phosphorus levels above 5.5 mg/dL, the upper limit of normal (28). Phosphorus elevates the calcium-phosphorus product ( $Ca \times P$ ) and stimulates secretion of parathyroid hormone (PTH), promoting vascular calcification and increasing the risk of CVD (29-31). Another consequence of altered phosphorus and PTH levels in patients beginning dialysis is increased risk for bone fracture due to lower bone mineral density compared with healthy people of the same age and gender (32,33).

A significant decrease in serum phosphorus from  $6.02 \pm 1.4$  mg/dL to  $4.48 \pm 0.9$  mg/dL has been reported in HD patients participating in a 12-month exercise program (16). Furthermore, in women undergoing HD, energy expenditure during daily physical activity showed a strong relationship to bone mineral density (34). Thus, exercise may decrease CVD risk and bone fractures in HD patients through its effects on serum phosphorus and bone mineral density.

**Improved fluid removal and blood pressure control:** The majority of patients with ESRD are hypertensive, and fluid status is significantly related to blood pressure (35,36). Since blood circulates through the body up to 4 times faster during exercise than at rest, fluid removal may be easier in patients who exercise during HD (19). Cardiac output in HD patients can also be improved by thrice weekly aerobic training sessions (37).

HD patients participating in a 12-month in-center, intradialytic exercise program experienced a decrease in mean pre-dialysis systolic and diastolic blood pressure, mean post-dialysis systolic and diastolic blood pressure, and mean average interdialytic fluid gain (16). In a more recent study, patients performing stationary cycling during HD were able to reduce antihypertensive medications by 36%, resulting in an average annual cost savings of \$885 per patient year (38).

**Increased strength and functional capacity:** Inactivity during HD treatments or illness, and after surgery, contributes to weakness, fatigue and decreased exercise capacity in HD patients (19).

Oxygen consumption during maximal exercise ( $VO_2$  peak) is considered the best indicator of exercise capacity (19,39) and exercise training has a significant effect on this parameter in HD patients (40). However, overall changes in  $VO_2$  peak are small in HD patients undergoing exercise training, and remain lower than in age-matched healthy individuals.

Patients receiving HD therapy who participate in aerobic exercise and resistance training show improvements in muscle strength and physical function (41-43). In these studies, patients trained on cycle ergometers and participated in progressive resisted quadriceps and hamstrings exercises. Outcome measures included walking speed and distance covered, handgrip strength and peak muscle torque, and scores on Medical Outcomes Study Short Form-36 (SF-36).

Thus, exercise training in HD patients improves the muscles' ability to use oxygen, leading to improved capacity for exercise. Improvements in self-reported physical functioning during exercise training may be significant because these scores are also predictive of hospitalization rates and mortality (40).

Clearly, exercise programs provide multiple benefits for patients with ESRD and these are summarized in Table I. However, there is little evidence to suggest that exercise counseling provided to patients in a primary care setting promotes increased

physical activity, and dialysis patients may be even less likely than the general population to receive advice about exercise from healthcare providers (44,45). Results from a survey conducted in 2001 indicate that rates of exercise counseling among nephrologists are low, with only 38% of respondents frequently assessing patients' physical activity levels and counseling inactive patients to increase activity (45).

A summary of these findings can be seen in Table 1.

Since rehabilitation activities provide more benefits in pre-dialysis than dialysis patients, exercise interventions should begin prior to the onset of maintenance dialysis therapy (12,19). Both the Life Options Rehabilitation Advisory Council (LORAC) and the National Kidney Foundation (NKF) have developed exercise programs and resources for patients with CRI and ESRD (7,46).

Research indicates that patients with ESRD benefit most from supervised exercise programs (24,47). Problems with adherence led to higher dropout rates among patients participating in thrice weekly aerobic and strength-training sessions on non-dialysis days (24%) than in patients who completed an exercise program during HD (17%). However, intense training on non-dialysis days resulted in a 43% increase in  $VO_2$  peak, compared with a 24% increase in the intradialytic exercise group (47).

For the ESRD facility wishing to promote exercise, LORAC suggests 5 levels ranging from the least to the most involved commitment (7). At Level 1, incorporating an exercise prescription into the patient's care plan promotes the perception that exercise is an essential component of the treatment program. Levels 2 and 3 involve making routine referrals for physical therapy and providing information on community resources, respectively. At Level 4, motivational programs are provided to encourage exercise. Beginning an in-center exercise program is a Level 5 activity.

The success of any exercise program depends on educating patients and

Continued on page 12

# ADA-RPG Stipend Application

The ADA-RPG financially supports continuing education of its members in the area of renal nutrition. Before submitting this application, please read the attached policies and procedures.

## Please print or type application

Applicant Name: \_\_\_\_\_ Social Security #: \_\_\_\_\_

ADA Registration #: \_\_\_\_\_

Phone Number: \_\_\_\_\_

DAY

EVENING

Email address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Program Title: \_\_\_\_\_

Program Date(s): \_\_\_\_\_

Is the program approved for ADA CPE hours? Y N If so, how many? \_\_\_\_\_

How do you plan to travel to the program? \_\_\_\_\_

Program registration fee: \$ \_\_\_\_\_ Amount requested from RPG: \$ \_\_\_\_\_

Do you have financial assistance from place of employment or others? Y N Amount: \$ \_\_\_\_\_

State your objective for the meeting: \_\_\_\_\_

Do you have a paper to present? Y N If yes, state topic: \_\_\_\_\_

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If you have any questions, please call or email Mary Jo at 1-612-347-3927; [MJDahms@DaVita.com](mailto:MJDahms@DaVita.com)

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**Table 1** Summary of beneficial effects of exercise for patients with end-stage renal disease

Benefit	Observed effect
1. Increased quality of life	Increased hematocrit and sickness impact profile score (12)
2. Increased appetite and improved nutritional status	Small increases in mean energy and protein intake, estimated dry weight and serum albumin in patients undergoing hemodialysis (HD) (16,17)
3. Improved lipid profile	Decreased plasma triglycerides and increased high-density lipoprotein (HDL) (5,18,23)
4. Better glycemic control	Improved insulin sensitivity, resulting in decreased serum glucose in diabetic and non-diabetic HD patients (5,16,23)
5. Improved serum phosphorus control	Decreased average serum phosphorus over 12 months in HD patients (16)
6. Improved fluid removal and blood pressure control	Decreased average interdialytic fluid gain and mean pre- and post-dialysis systolic and diastolic blood pressure (16).  Reduction in antihypertensive medications in HD patients (5,38)
7. Increased strength and functional capacity	Increased oxygen consumption during maximal exercise, indicating improved exercise capacity (40)  Improved muscle strength, walking speed and scores on Medical Outcomes Study Short Form-36 (41-43)

**Table 2** Exercise program resources for end-stage renal disease (ESRD)

Organization/Contact information	Exercise program resources
Life Options Rehabilitation Advisory Council (LORAC) <a href="http://www.lifeoptions.org">http://www.lifeoptions.org</a> (800) 468-7777	<ol style="list-style-type: none"> <li>1. Just the Facts: Exercise for Life 2-page fact sheet for patients emphasizing benefits of exercise and providing tips for overcoming obstacles to physical activity.</li> <li>2. Exercise: A Guide for People on Dialysis 44-page booklet with instructions for starting an exercise program focused on strength, endurance and flexibility.</li> <li>3. Feeling Better with Exercise: A Video Guide for People on Dialysis.</li> <li>4. Exercise for the Dialysis Patient comprehensive program comprising resources for the dialysis patient and healthcare professionals.</li> <li>5. Exercise Speaker's Kit resources to help the healthcare professional promote increased physical activity in patients with ESRD.</li> </ol>
National Kidney Foundation (NKF) <a href="http://www.kidney.org">http://www.kidney.org</a> (800) 622-9010	Staying Fit with Kidney Disease brochure for patients, addressing benefits of exercise and providing tips on type, frequency and length of exercise sessions appropriate for people with kidney disease.

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# Chair Messages

**By Jenny Smothers, RD,LD**

Jenny is a Regional Dietitian Coordinator for the Mid-South Region of Renal Care Group. She can be reached at [jsmothers@renalcaregroup.com](mailto:jsmothers@renalcaregroup.com)

**And By Susan M. Reams, RD, CSR, LD**

Susan is Chair of the Council on Renal Nutrition of NKF and a renal dietitian at Mercy Medical Center in Des Moines, IA. She can be reached at [sreamswdm@prodigy.net](mailto:sreamswdm@prodigy.net).

Jenny:

Thank you, RPG members, for the honor and privilege of serving as your Chair this year. I also see it as a big responsibility, as I try to serve you to the best of my ability! My goals this year are to continue many of the projects Jill Goode and the past Board worked on last year, such as our continued work with CRN on projects to benefit all renal dietitians. I will also look for ways to make our group more visible and more 'recognized' in the ADA structure, and ways to strengthen our specialty area of dietetics. I also want to welcome into the RPG leadership, Anne Ishmael, MS, RD, CD, Chair-Elect, and Caroline Chinn, MS, RD, CDE, Treasurer. Patricia Weber, MS, RD, CSR, LDN, is also transitioning into the Editor's role of this newsletter, with Cathi Martin, RD, CSR, LDN shifting gears into the Managing Editor's position. Marianne Hutton, RD, CDE will use her special talents as Advertising Editor. Sarah Carter, RD, CDE, LDN will begin a year as Assistant Editor.

I hope many of you will be able to attend the upcoming FNCE meeting in San Antonio this October. Plans are still in the early stages at this writing, but RPG should be sponsoring a major session on "Nutrition and Transplantation". Also,

past Chair Pam Kent will be presenting a session on "The Critical Role of Nutrition in Chronic Renal Insufficiency". We are working with Diehl, Inc. on a sponsored RPG Breakfast Meeting also; please plan to attend this fun event for renal dietitians. It will be Sunday, October 26, from 7:30 to 8:30 am in Conference Room 12 at the San Antonio Marriott Rivercenter. Recently, I had to respond to a survey question asking, "What do you enjoy most about being a renal dietitian?" This caused some soul-searching, after a long, hectic day! But, I know that the relationships with my patients and other staff and professionals is what keeps me going. I hope to get to know more of you in RPG this year – please contact me if I can be of service to you, or if you would like to become more involved in the group. There are many exciting projects and committees that need help – we will find a place of service for you!

Susan:

The bridge has been built! As the CRN Chairperson well into my second year, I would like to take this opportunity to welcome the newest RPG officers whom have recently transitioned into their positions. But first, I want to personally thank Jill Goode, MS, RD, LD, the out-going RPG Chairperson and now Immediate Past Chair for her willingness and cooperation in working with me on selected joint projects with the NKF-CRN. I feel that the CRN-RPG bridge, so long in need of repair, now has new footings which have established a stronger base from which to expand our two organizations and unite in our endeavors. Jill was my co-engineer with this goal that she and I have both had

for many years, even prior to our positions on our two Executive Committees.

Jenny Smothers, RD, LD, is the new Chairperson. She has had a year of mentoring under the direction of Jill, and I am looking forward to mutually carrying on the action plans that CRN and the RPG have established. It will be an honor for me to be able to work with her and all of the incoming RPG Board, and I can foresee even greater things happening between our two organizations.

I'd also like to recognize the new CRN Executive Committee officers who began their tour of duty in April of this year. Rita Solomon-Dimmitt, RD, CSR, LDN is the new Region II Representative. Rita works as a renal dietitian for the Vanderbilt Dialysis Clinic in Nashville, TN. She is teamed with her new partner, Catherine Pless, MS, RD, LD, who is the new Region II Alternate Representative. Catherine works for Abbott Renal Care out of Ackworth, GA. Next, is Bruce Smith, MS, RD, LD, who works for DaVita North Houston Kidney Center, Houston, TX, as the new Region IV Representative. His Region IV Alternate Representative colleague is Jennie Lang House, RD, CSR, LD, who works for Permian Basin Dialysis Center in Midland, TX.

I would like to warmly welcome these four individuals into their CRN Executive Committee offices and I pledge to the RPG Executive Board that our talents and ideas, in collaboration with the RPG, will enhance CRN's commitment to excellence, with our joint projects.

## American Dietetic Association Renal Practice Group Stipends for Professional Education

**Policy:**

The ADA-RPG supports continuing education in the area of renal nutrition for Renal Practice Group members. As a result, RPG allocates funds each year to assist members wishing to attend programs of interest. The amount of funding allocated will be determined annually by the RPG Executive Board. No more than two persons will be funded per meeting, and funding will be determined on first come, first served basis. The application form and procedure will be printed annually in the Renal Nutrition Forum and will be available at other times from the RPG Awards Chairperson.

1. The applicant must be a member of ADA-RPG.
2. A copy of the program must accompany the application.
3. The program must deal primarily with issues concerning the patient with ESRD or treatment of ESRD.
4. National ADA and CRN meetings will qualify. International meetings will be considered.
5. Applications can be made retrospectively if applicants desire.
6. One stipend per person per year is allowed.
7. Persons presenting original research or review papers may be given preference.

**Procedure:**

1. The applicant will send the completed application and a copy of the program to the Awards Chairperson.
2. Funds will be provided retrospectively.
3. The Awards Chairperson will review the application and forward with recommendation to the ADA-RPG Chair-elect for approval.
4. ADA-RPG will award stipends up to \$5,000 per year, with a maximum \$500 per stipend per fiscal year.\*
5. The Awards Chairperson will notify the applicant of approval.
6. The RPG Treasurer will send a check to the applicant when notified of approval by Awards Chairperson.
7. The applicant will summarize the meeting/program attended and send the summary to the Awards Chairperson no later than two weeks after the meeting. Applicants should refer to the "Guidelines For Authors", available from the Newsletter Editor, for writing the summary.
8. The applicant will send verification of meeting attendance to the Awards Chairperson no later than two weeks after the meeting.
9. The Awards Chairperson will send the applicant's summary to the Newsletter Editor.

\* Applicants will be awarded stipends on first come, first served basis. The RPG Executive Committee will review all applications.

## Advances in Practice

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program (7). Equally important is the individualization of exercise prescriptions to accommodate patients' needs and limitations (19). For example, patients with renal bone disease can be introduced to low-impact exercise instead of avoiding exercise completely; those with peripheral neuropathy may be encouraged to use a stationary bicycle for aerobic exercise, instead of walking.

Registered dietitians who work in facilities that promote exercise should monitor patients to ensure adequate calorie and protein intake to support their activity levels (16). Even if time constraints and high patient to staff ratios prevent an in-center exercise program from being offered, registered dietitians can also motivate patients to become more physically active by being prepared with recommendations and referrals. Table 2 lists resources available to patients and healthcare professionals for encouraging exercise. In addition, lists of local organizations, fitness centers, physical therapists and personal trainers can be compiled and maintained so that patients can be provided with appropriate information as needed.

[See Table 2]

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