



Nutritional Management of Chronic Kidney Disease (CKD) and Diabetes

Dani Renouf, RD, MSc
Renal Resource Dietitian
St. Paul's Hospital
May 25, 2017



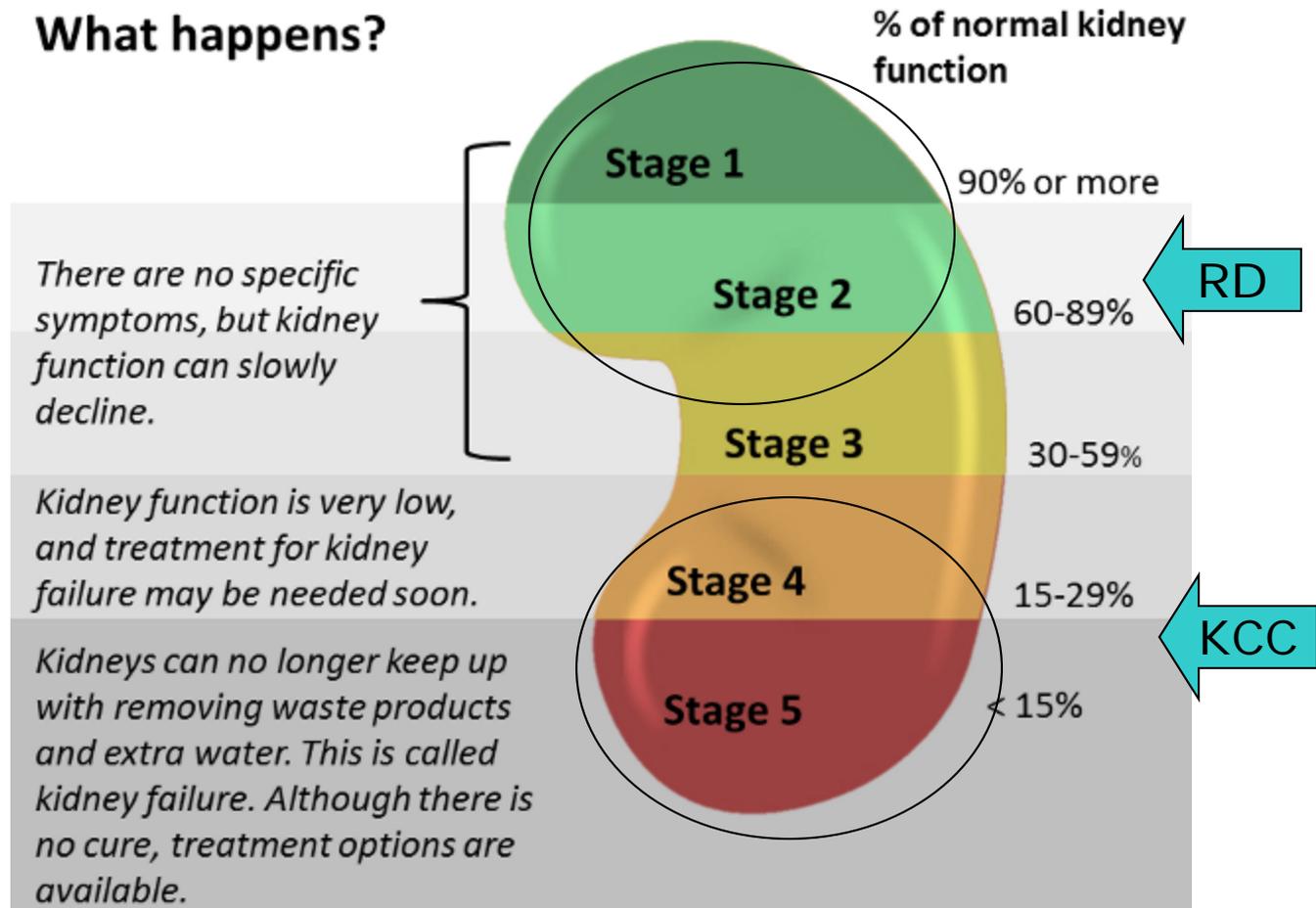
Overview

- Burden of Disease: CKD and Diabetes
- Diabetic Nephropathy
- Approaches for Nutrition Care
- Questions

Burden of Disease: Diabetes and CKD^{1,2}

- Worldwide, 200 Million have CKD
- Diabetes is the leading cause of kidney disease
- 50% of persons with diabetes demonstrate signs of kidney damage in lifetime

Stages of Kidney Disease



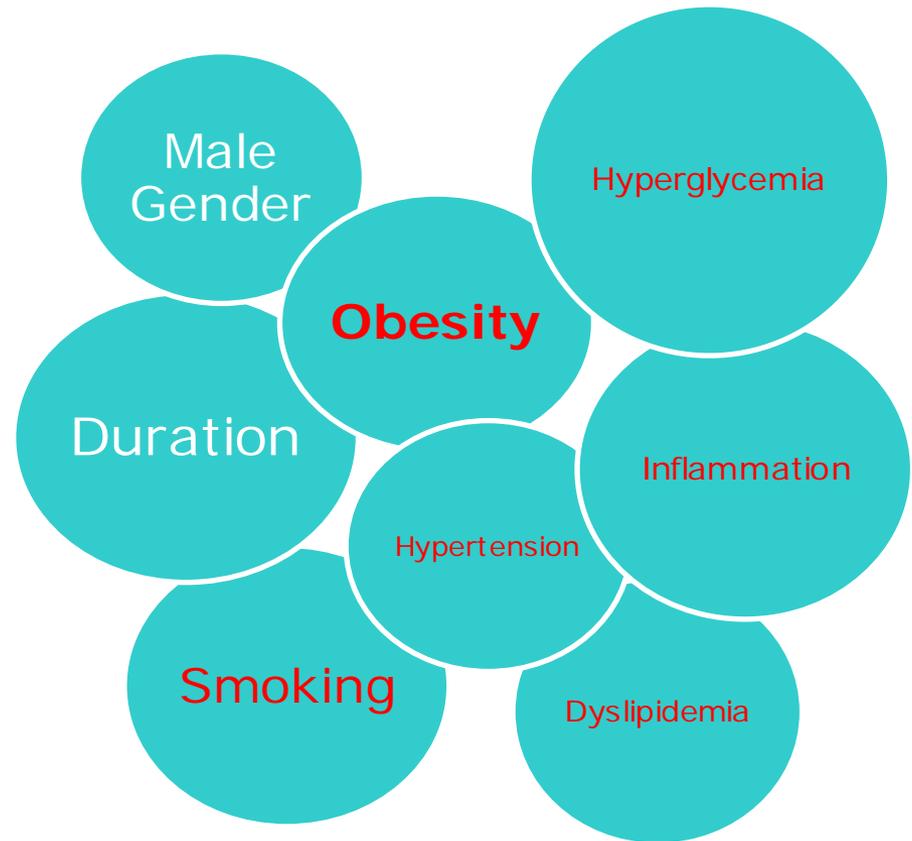
Diabetic Nephropathy

- Hyper-filtration
- Persistent Albuminuria
- Peripheral Edema
- GFR Decline
- Hypertension
- Increased Risk for CVD/Cardiac Events

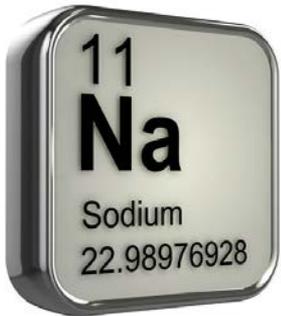
Risk Factors for Diabetic Nephropathy

Most Risk Factors Are Modifiable

Preventative Healthcare Models need to be supported



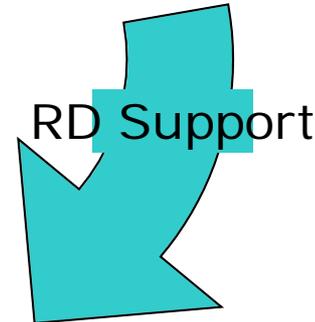
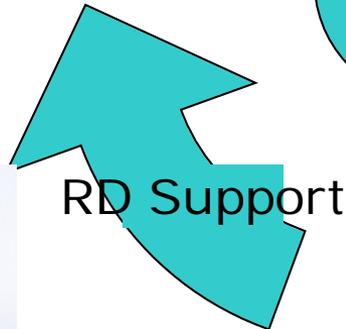
Nutritional Care Areas³



Blood Pressure Control

Glycemic Control

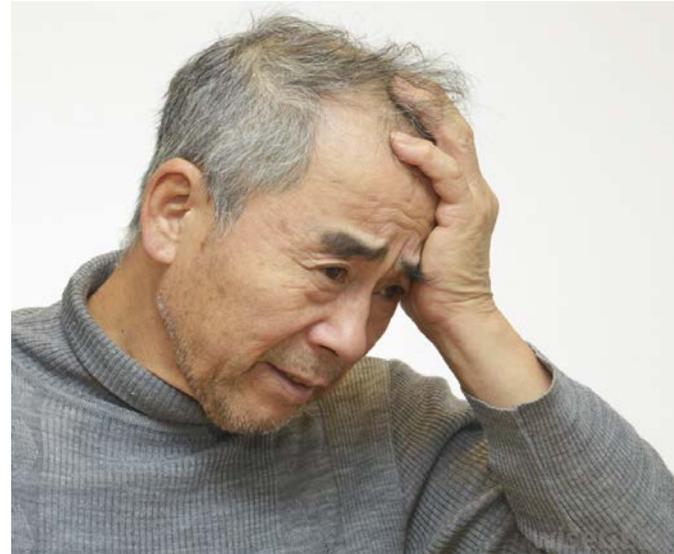
Patient-Centered
Care



Management of Lipids



Patient's Experience



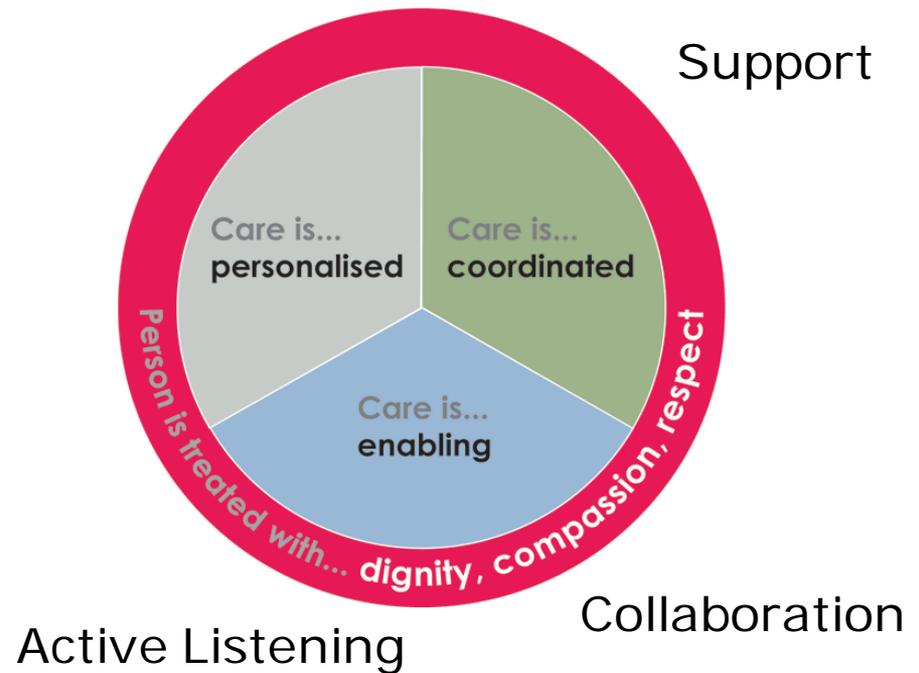
Approaches for Nutrition Care

- CKD and Diabetes are progressive and chronic diseases
- Relationship with food and dietitian needs to be sustainable in order to slow progression
 - Food Champion, not Food Police
 - Limit contraindications and focus on “what to eat”
 - STREAMLINED APPROACH TO NUTRITION

Nutrition Care

- What CAN patients eat?
- What FITS into their life?
- What SUCCESSES have they had already?
- What are their GOALS?
- What is most EFFICIENT?

The four principles of person-centred care





Nutrition Care Areas

- Glycemic Control
- Sodium Reduction
- Protein Recommendations
- Potassium Control
- Phosphate Control
- Weight Management/Physical Activity

Glycemic Control



Evidence for Glycemic Control²

- DCCT/EDIC Studies show HbA1C of 7.0% prevented nephropathy, but during follow up period, effects of reduction persisted with 8.0%
- ADVANCE/ACCORD/VADT studies showed no significant benefit on GFR with more intensive glycemic control (HbA1C < 7.0%)
- Risk of hypoglycemia plays a major role in setting targets
- HbA1C may be underestimated in anemia

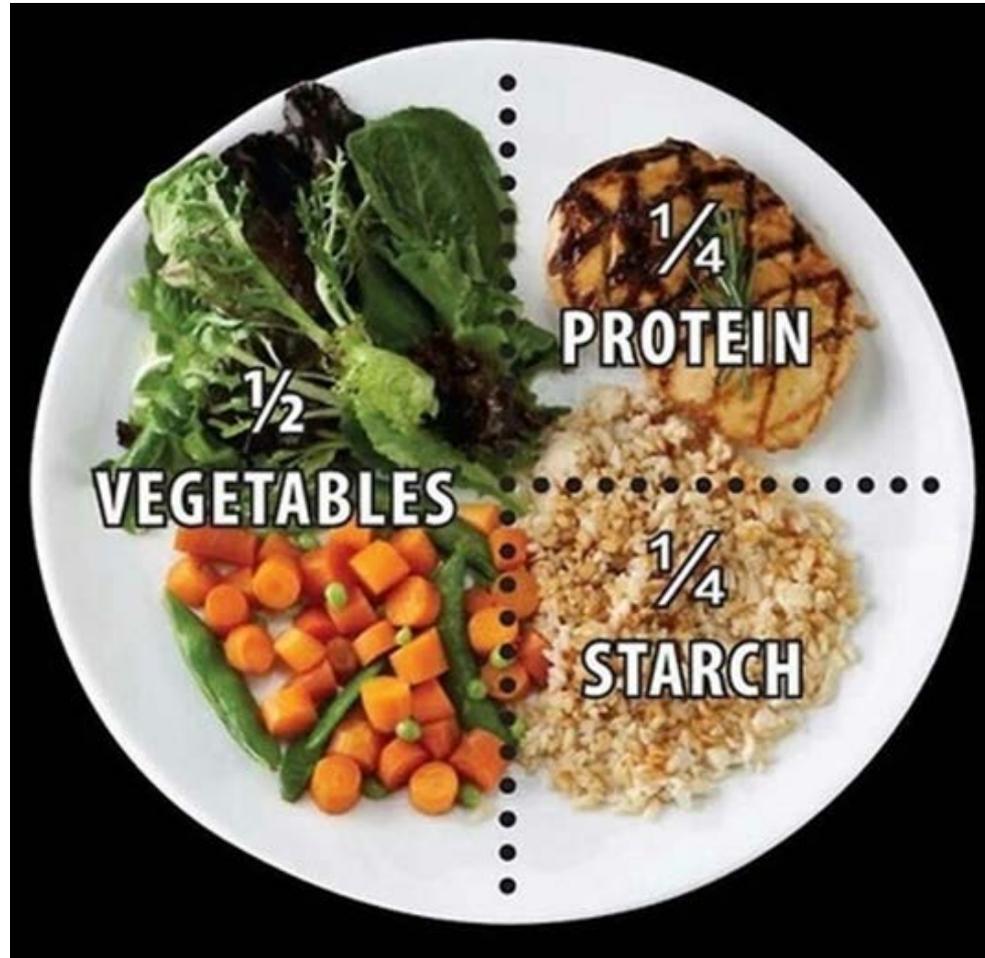
Hypoglycemia Considerations^{2,3}

- Risks are higher in our patients
- Consider insulin metabolism as GFR declines (increased half life)
- Impaired gluconeogenesis with reduced kidney mass
- Consider extension of HbA1C above 7.0% with co-morbidities
- Explore lifestyle interventions as contributing factors:
 - Erratic eating pattern
 - Decreased appetite
 - Increased exercise

Dietary Management of Diabetes

- RD visit every 3 months recommended (telehealth)²
- General meal patterns/timing/portions rather than carbohydrate counting
- Hydration
- Higher fibre diet – whole grains/fruits/vegetables
- Blood glucose monitoring (scattered)
- Physical activity, not weight loss

The Healthy Plate



Teaching Tools

Diabetes and Kidney Diet Basics



It can be hard at times to combine both diabetes and kidney diets. Here are some tips to help keep your blood sugars stable and your kidneys healthy.



Eat Three Meals a Day

- Eat your first meal within 1-2 hours of waking
- Avoid skipping meals
- If you are not able to eat full meals try 4-6 small meals per day



Space Meals No More Than Four to Six Hours Apart

- If meals are more than six hours apart, have a small snack
- An evening snack may be needed—talk with your dietitian



Eat Balanced Meals

- Include 3-4 food groups at each meal
- Include one choice from the meat and alternatives group (these have protein)
- Carbohydrates found in grains and starches, fruit, starchy vegetables, dairy and alternatives will turn into sugar and raise your blood sugar level. Keep serving sizes in mind.



Choose Healthy Fat

- Choose canola, olive, or flax oils and non-hydrogenated margarine more often
- Limit added fat to 3-6 teaspoons per day (oils, spreads and dressings)
- Choose lower fat dairy products such as skim or 1% milk and low fat cheese (check with your dietitian for the number of servings per day)
- Stew, poach, steam, or boil foods instead of frying. Use moist heat and lower temperatures when cooking.



Limit Sodium

- Buy fresh foods more often and cook meals from scratch
- Avoid packaged or processed foods and meals
- Use spices/herbs and salt-free seasonings to flavour foods instead of salt
- Rinse canned foods with water to remove extra sodium



Eat Less Sugar

- Avoid high sugar items like pop, juice, syrup, jam, honey, cakes and pastries
- Sugar substitutes can be used instead of table sugar



Avoid Foods with Added Phosphorus

- Phosphorus can be found as an additive in many processed foods and drinks
- Avoid foods with "phosph" as part of an ingredient name.
- Ask your dietitian if you need to restrict other diet sources of phosphorus



Limit Alcohol

- 2 or less drinks per day for women and 3 or less drinks per day for men
- 1 drink = 5 ounces of dry wine, 1.5 ounces of hard liquor or 12 ounces of beer. (Note: beer and some wine is higher in phosphorus)
- Use club soda or diet pop as a mixer (no colas, as they are high in phosphorus)
- Make sure you eat food if you drink alcohol

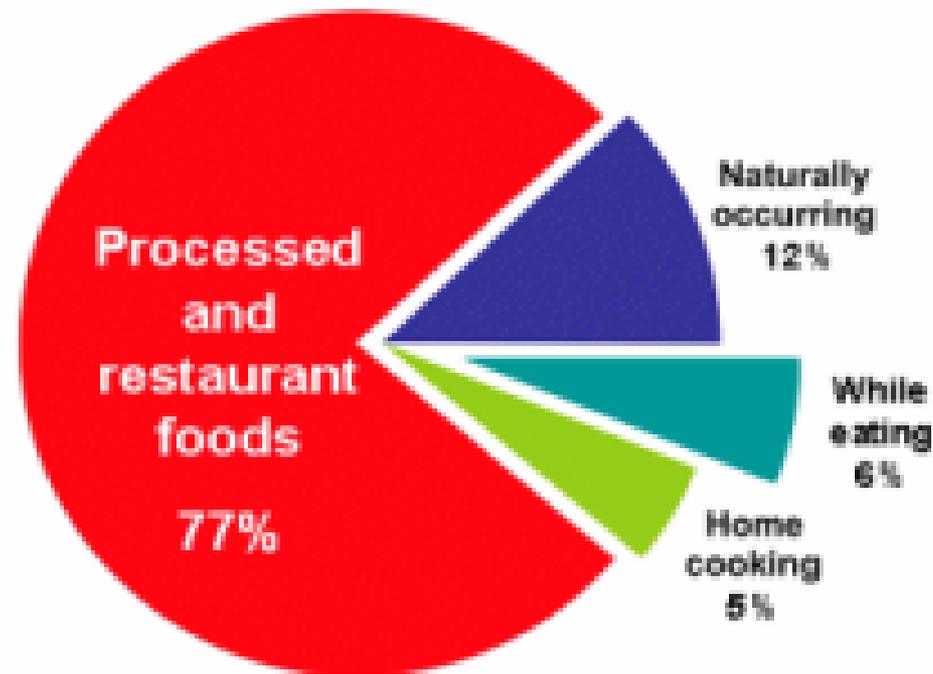


Be Active

- Regular physical activity will improve blood sugar control and may improve your energy level
- 150 minutes of moderate aerobic activity a week is recommended (this is as little as 20 minutes per day or 50 minutes 3 times per week)
- Try to include 3 days of resistance exercises like weights or stretching

Sodium Reduction

Most Sodium Comes from Processed and Restaurant Foods



Evidence for Blood Pressure Control⁷

- RCT cross-over trial
- Low sodium diet (less than 2,000 mg per day), washout, crossover
- Significant reductions in urinary sodium (-57.3 mEq/24 h; 95% CI, -81.8 to -32.9), weight (-2.3 kg; 95% CI, -3.2 to -1.5), and 24-hour systolic BP (-10.8 mmHg; 95% CI, -17.0 to -4.6) were also observed (all $P < 0.01$).
- Motivational Interviewing by RD

Salt Reduction = Label Reading

The image shows a hand holding a magnifying glass over a nutrition label. The label is titled 'Nutrition Typical values (cooked as per instructions)'. The table below shows the values for various nutrients, with the salt content highlighted in yellow. The label also includes a section for 'GDA children (5-10 yrs)' and a disclaimer at the bottom.

	per 100g	per 1/4 pack	% adult GD, 1/4 pack	GDA children (5-10 yrs)
Energy kJ	1007	2014		1800
Energy kcal	241	482	24.1%	24g
Protein	8.4g	16.8g	37.3%	220g
Carbohydrate	20.6g	41.2g	17.9%	85g
of which sugars	1.8g	3.6g	4.0%	70g
of which starch	18.8g	37.6g		20g
Fat	13.7g	27.4g	39.1%	
of which saturates	5.7g	11.4g	57.0%	
mono-unsaturates	5.9g	11.8g		
polyunsaturates	1.5g	3.0g		
Fibre	0.9g	1.8g		
Salt	0.50g	1.00g	7.5%	
of which sodium	0.20g	0.40g	16.7%	

GDA = Adult Guideline Daily Amounts are based on a 70kg male. GDAs are guidelines and personal requirements vary depending on age, gender, weight and activity level.

Streamlining Food Lists

BREADS

These breads have fibre, and are lower in sodium, potassium, and phosphorus.

Read the label and aim for a Daily Value (DV) **less than**:

Sodium: 8% (200mg)

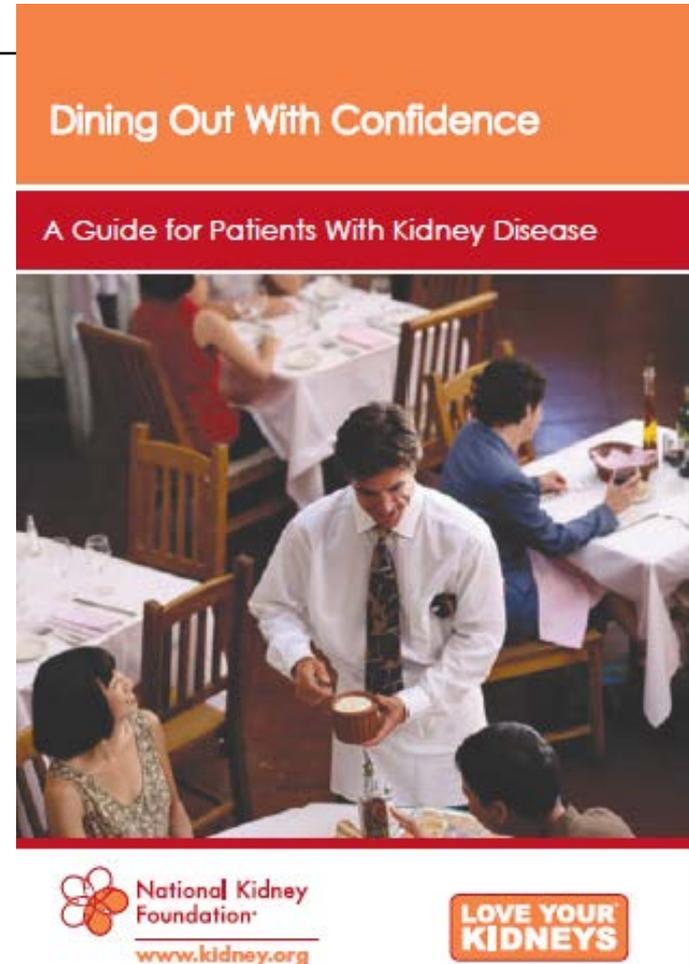
Potassium: 3% (100mg)

Phosphorus: 10% (100mg)

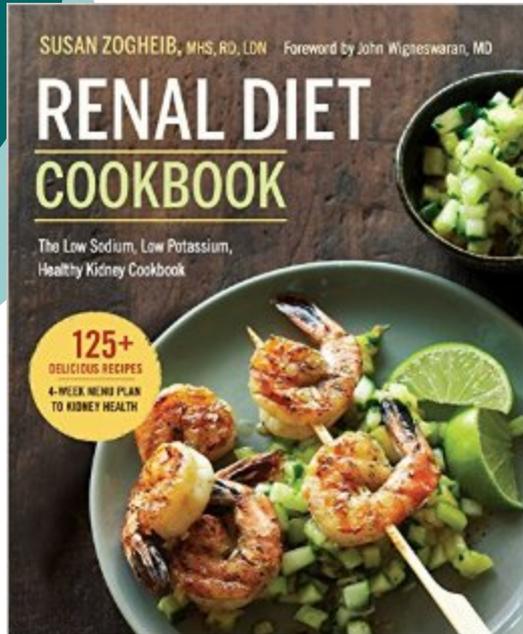
			
Silver Hills Little Big Bread	Silver Hills Steady Eddie	Silver Hills The Big 16	Country Harvest Fibre
			
Country Harvest 7 Grains	Wonder Whole Wheat Fibre	Wonder 100% Whole Wheat	Dempster's 100% Whole Wheat

Salt Reduction = Food Selection While Dining Out

- Dressings on the Side
- Limit Soups, Dips, Appetizers
- Ask the restaurant staff to “Not Salt Food” or offer lower salt options (call ahead)



Salt Reduction = Meal Preparation



Kidney Community Kitchen

Welcome to the Kidney Kitchen Cookbook with recipes chosen specifically for people living with kidney disease as well as meal plans created by our dietitians. The Kidney Foundation of Canada plans for this resource to continue to grow and evolve: more recipes and meal plans will be added regularly, seasonal and celebration meals will be included and we encourage you to submit your recipes, thoughts and ideas. *Bon Appetit!*

Browse recipes by meal type:

- Appetizers & snacks
- Beef
- Beverages
- Breakfasts & brunch
- Casseroles
- Desserts & sweets
- Dips & spreads
- Fish & seafood
- Grains & pasta
- International cuisine
- Mariades
- Pork
- Poultry
- Salads
- Sandwiches & wraps
- Soups & stews
- Vegetables
- Vegetarian main dishes

Browse by diet type:

Recipes
High Protein
Low Phosphorus

Featured Dietitian Approved Recipe

Vegetable and Tofu Stir-Fry
A healthy vegetarian stir-fry
Diet Type: Low Phosphorus / Low Potassium / Low Sodium
[VIEW RECIPE >](#)

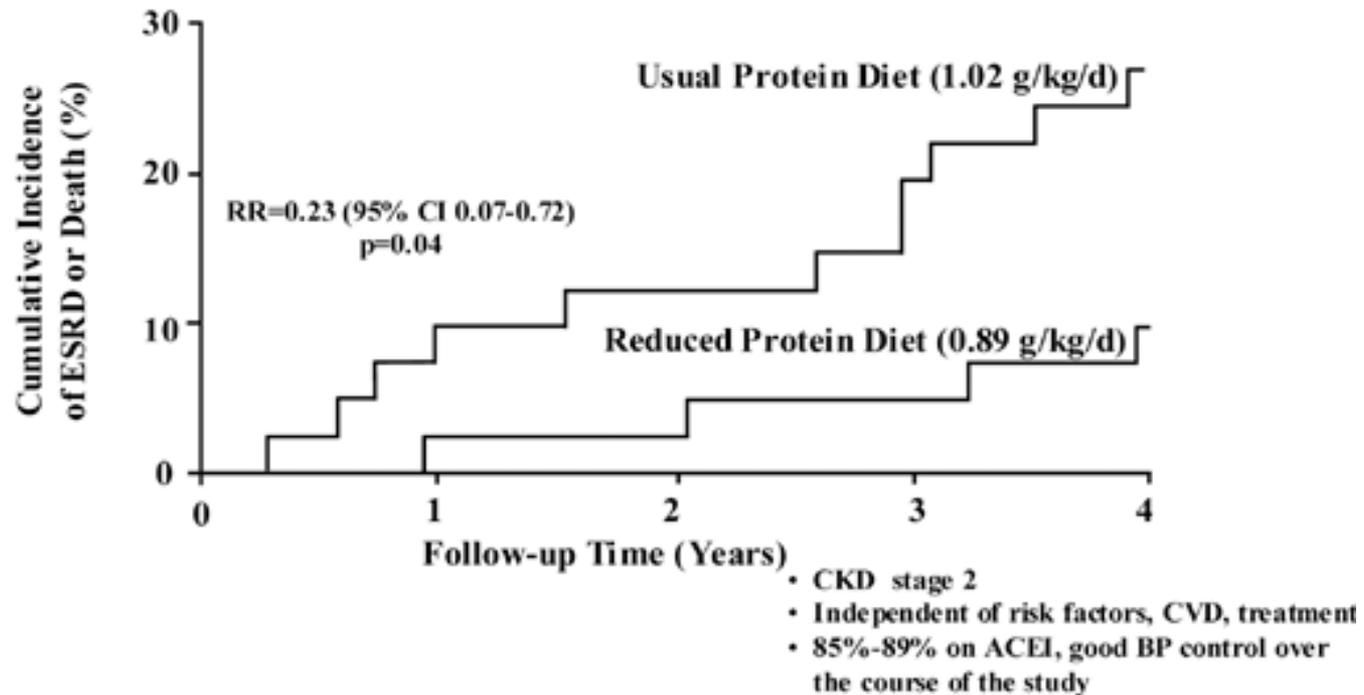
Featured Dietitian Approved Meal Plan

Hearty High Protein Meal Plan
If you start your meal plan on Sunday, you can take advantage of extra time on the weekend to prepare food for the week, such as muffins or meals. This high protein meal plan will ensure you have the renal nutrition you need, while also providing a good diversity of recipes using similar ingredients so you are not running to the store to buy multiple products over and over again.
Diet Type: High Protein

Protein Recommendations



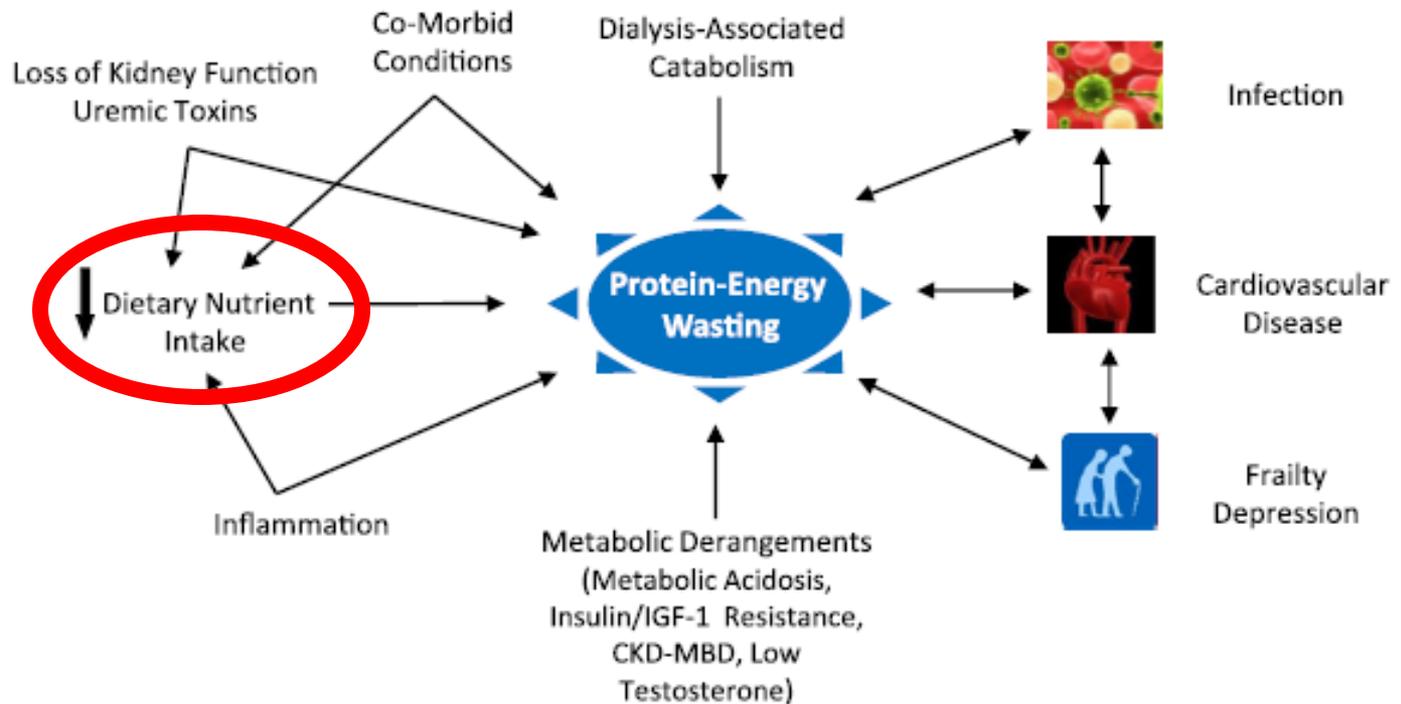
Protein Guidelines⁴



Protein: A Juggling Act



Protein Energy Wasting⁵



Protein Calculations

- Protein distribution/amounts based on preservation of muscle mass
- (0.8-1.3g/kg) – include vegetarian proteins to help reduce metabolic acidosis
- Use adjusted body weight calculations:
 - Obesity
 - Edema
 - Underweight

Protein Education

Protein and your Kidneys 2016 - Microsoft Word

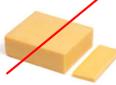
File Edit View Insert Format Tools Table Window Help

Normal + (Latn) Comic Sans MS 14

PROTEIN AND YOUR KIDNEYS

Good quality protein keeps you healthy, heals wounds and helps to protect you from infection. With kidney disease, you may need to change the amount and type of protein in your diet.

You need _____ servings each day.
Choose from the following high-protein foods

 Fish	 Canned Fish	 Eggs	 Egg whites
 Poultry	 Pork	 Lamb	 Beef
 Milk & Soy Beverage*	 Beans and Lentils*	 Nut Butters*	 Nuts
 Milk & Soy Beverage*	 Yogurt*	 Cottage Cheese (no added salt)*	 Cheese*

*These are high in potassium and phosphorus. Discuss with your [Dietitian](#).

Examples of One Serving

Page 1 Sec 1 1/2 At 0.5" Ln 1 Col 1 REC TRK EXT OVR

Start BC PRA VCH-PHC Application... Protein query-getjobid2... Microsoft PowerPoin... PROMIS - 10.24.0 ... What is person-cent... PHC Connect - Micro... Renouf, Dani [PH] ... Protein and your ... 3:27 PM

Potassium Control



Was it REALLY the banana?



Dairy?



Additives?



Soups?

Hyperkalemia

- #1: Explore Non-Dietary Causes
 - Blood glucose patterns before/after meals
 - Recent hospitalization/surgery (blood loss)
 - Factors affecting hydration
 - Bicarbonate therapy (acidosis)
 - Medication changes
- #2: Explore Dietary Causes
 - Meal Pattern/Portions/Spacing
 - Processed Foods
 - Salt Substitutes
 - Beverages – Wine, Coffee, Juice, Milk, Pop
 - Protein portions/meal timing/spacing
 - Fruits and Vegetables

Lipid Management^{2,6}

- Statin + Ezetimibine therapy
- Reduction of saturated fats, processed foods
- Inclusion of monounsaturated and polyunsaturated fats (nuts, canola, olive, salmon)
- Physical activity

Phosphate Control



- Organic (from food) has 40-60% absorption versus Inorganic (from additives) which has >90% absorption
- Start education when patient has pattern of levels greater than 1.4 mg/dL
- Dietary intervention prior to starting binders preferred

Phosphate Teaching

HIGH PHOSPHORUS VS. LOWER PHOSPHORUS FOOD CHOICES

HIGH Phosphorus Food Choice	LOWER Phosphorus Food Choice	HIGH Phosphorus Food Choice	LOWER Phosphorus Food Choice
Processed meat 	Fresh meat 	Processed cheese 	Cream or hard cheese 
Canned salmon or sardines (with bones) 	Canned tuna 	Ice cream 	Popsicle 
Nuts and seeds 	Pretzels, air-popped popcorn 	Dairy products, non-dairy creamer 	Almond milk, Rice Dream Original™ 
Peanut/nut butter 	Jam, jelly, honey 	Cola, root beer, ice tea 	Clear soda, sparkling water, salt-free club soda 
Bran cereal 	Corn, rice, wheat cereal 	Hot chocolate 	Herbal tea 
Muffin 	Bagel, croissant or donut 	Chocolate bar 	Hard candy, gummy candy 
Dark rye, pumpernickel bread 	Whole wheat, light rye or white bread 	Pizza, alfredo pasta 	Pasta with garlic, basil and olive oil 

Counseling for Weight Loss

- Avoid statements to patient such “lose weight”
- Losing weight usually is synonymous with losing muscle mass in CKD 4-5
- Sarcopenia results in poorer outcomes in CKD⁹
- Focus should be on physical activity goal setting based on functional ability⁹

Physical Activity in CKD

- NHANES III showed that CKD groups who were physically active had lower rates of mortality when compared to inactive CKD groups (HR 0.44)¹⁰

Like Child's Play!





Suggestions for Physical Activity

- Walking (Nordic Walking)
- Swimming
- Cycling
- Chair Exercises (NHS)¹¹
- Strength Training

Nordic Walking at St. Paul's Hospital

 **Providence**
HEALTH CARE
How you want to be treated.

Here's your opportunity to

WALK & ROLL

with the Renal Program!

Learn how you can walk to improve your health!



All levels are welcome

Poles are included & optional – instructions will be provided

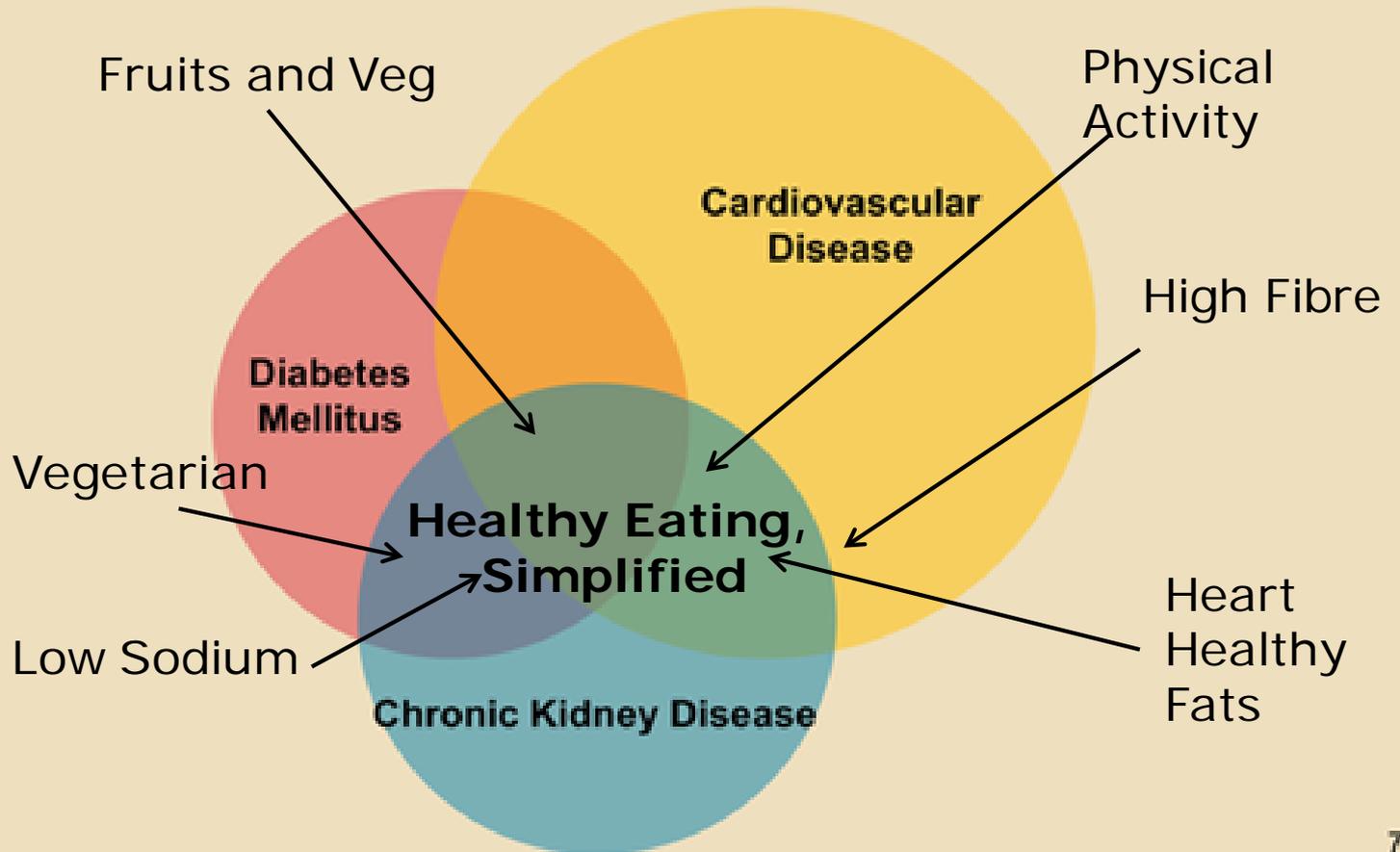
Days, times & duration of walk is customizable to your goal

Contact Leonora at 604-682-2344 ext 66783 if you are interested!



Anyone interested is welcome to join!

Meeting In The Middle



A Positive Experience for Patients

- Food Champions
- “What-to-Eat” Philosophy
- Streamlined Approach
 - Fewer Rules, Lists, and Records



Our relationship
with **food** is
reflective of
our relationship
with **life**.

References

1. McFarlane, P. et.al. Canadian Diabetes Association Clinical Practice Guidelines. *Canadian Journal of Diabetes*. 2013; 37: S129-S136.
2. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Diabetes and CKD: 2012 Update. *American Journal of Kidney Disease*. 2012; 60(5):850-886.
3. National Kidney Disease Education Program. Chronic Kidney Disease (CKD) and Diet: Assessment, Management, and Treatment. Treating CKD Patients Who Are Not on Dialysis: An Overview Guide for Dietitians. April 2015.
4. National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease. 2007.
http://www2.kidney.org/professionals/KDOQI/guideline_diabetes/guide5.htm
5. Carrero, JJ et.al. Etiology of the Protein-Energy Wasting Syndrome from Chronic Kidney Disease: A Consensus Statement From the International Society of Renal Nutrition and Metabolism (ISRNM). 2013; 23(2): 77-90.
6. Halverstadt, A. et.al. Endurance exercise training raises high-density lipoprotein cholesterol and lowers small low-density lipoprotein and very low-density lipoprotein independent of body fat phenotypes in older men and women. *Metabolism Clinical and Experimental*. 2007; 56(4): 444-450.
7. Saran, R. et.al. A Randomized Crossover Trial of Dietary Sodium Restriction in Stage 3–4 CKD. *Clinical Journal of the American Society of Nephrology*. 2017; 12(3); 399-407.\
8. Bump, M. Organic Phosphorus Versus Inorganic Phosphorus; Empowering Adult Kidney Patients with Nutrition Education. *Journal of Renal Nutrition*. 2016; 26(5): e31-e33.
[http://www.jrnjournal.org/article/S1051-2276\(16\)30044-9/pdf](http://www.jrnjournal.org/article/S1051-2276(16)30044-9/pdf)
9. Roshanravan, B. et.al. Exercise and CKD: Skeletal Muscle Dysfunction and Practical Application of Exercise to Prevent and Treat Physical Impairments in CKD. *American Journal of Kidney Disease*. 2017;
10. Beddhu, S. et.al. Physical Activity and Mortality in Chronic Kidney Disease (NHANES III). *Clinical Journal of the American Society of Nephrology*. 2009; 4: 1901-1906.
11. National Health Service. Exercises for Older People.
https://www.nhs.uk/Tools/Documents/NHS_ExercisesForOlderPeople.pdf