Kidney disease and the requirements for renal replacement therapy (dialysis or transplant) continue to increase at an alarming rate. Manitoba has the highest prevalence and incidence in the country. The number of dialysis patients in Manitoba has tripled over the last decade.

BY EARLY IDENTIFICATION OF PATIENTS WHO MAY BE AT RISK FOR DEVELOPING KIDNEY DISEASE, YOU CAN HELP PREVENT KIDNEY DISEASE AND PROGRESSION TO END STAGE RENAL DISEASE (ESRD).

Kidney Disease: Patients with intrinsic renal disease with normal or supernormal renal function that may be at risk for progression to renal failure. This includes various chronic glomerulonephropathies (e.g. such as diabetic nephropathy, IgA nephropathy, glomerulosclerosis) and non-glomerular disease (e.g. PCKD, obstructive uropathy).

Renal Failure: Kidney disease associated with declining function (as determined by decreasing creatinine clearance).

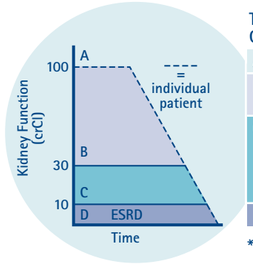
ESRD (End Stage Renal Disease): The point at which renal replacement therapy; dialysis or transplant is required.

Patients with the following problems may be at high risk for developing kidney disease or failure:

- **Diabetes Mellitus**
- **Hypertension**
- **Urinary tract abnormalities**
- **Known systemic auto immune disorders such as SLE**
- **Excessive use of known toxins such as analgesics (NSAIDs), lithium and others**
- **Symptoms suggestive of a systemic illness**

Chronic Kidney Disease Stages*

Without intervention, once kidney function begins to decline it does so in a progressive downhill fashion. It is useful to divide the decline into stages, as shown.



THERAPEUTIC FOCUS/ GOAL AT EACH STAGE	
A	• Prevent kidney failure
B	• Anti-progression therapy to decrease rate of decline
C	• Management of chronic renal failure complications • Preparation for renal replacement therapy
D	• Renal replacement therapy

(An alternative staging schema has described five numerical stages separating "Stage B" to Stage 2 and 3)

- Early detection ideally occurs before the serum creatinine increases, i.e. Stage A, (Normal 100 – 120 umo/L) but at the latest when it is <250 umo/L, i.e. late Stage B
- Normal creatinine clearance: 80-120 ml/min/1.73m^2

EARLY SYMPTOMS:

- **Asymptomatic**
- Foaming, bloody (resembling cola or tea) or cloudy urine
- Edema
- Nocturia

EARLY WARNING SIGNS:

- Microscopic hematuria
- Proteinuria
- Albuminuria in patients with Diabetes Mellitus

LATE SYMPTOMS:

- Nausea and vomiting
- Persistent generalized itching
- Bone or joint pain
- Oliguria
- Generalized edema
- Shortness of breath

MRP Renal Management Guidelines

The WRHA Manitoba Renal Program has developed guidelines to help manage high-risk patients. These guidelines are recommended for patients that may require nephrologic care or assessment, and are evidenced-based where possible. Where evidence was lacking, these recommendations are opinion-based and derived by consensus from a panel of Manitoba nephrologists and family physicians.

Non-dialysis nephrology care is provided through the **Renal Health Outreach (RHO).** The **RHO** is a component of the Manitoba Renal Program (MRP) responsible for renal health promotion, disease prevention and management through education and clinical care for all of Manitoba.

Patients may require nephrologic care or assessment to:

- Determine etiology of presumed renal abnormality
- Determine their risk for progressive renal failure and/or
- Prepare them for end stage renal care management

While it is best to identify high-risk patients early, they may present with acute abnormality or at various stages of chronic kidney disease where both focuses of investigations and therapies may be different.

Patients may present with:

- Asymptomatic hematuria or proteinuria noted on U/A, or
- Elevated serum creatinine, or
- Symptoms suggestive of renal disease including: edema, gross hematuria, systemic symptoms such as anorexia, nausea and vomiting, puritus and pericarditis, or
- Either acute or chronic renal disease

MRP Renal Management Guidelines

AN APPROACH TO:

I. Elevated Creatinine

II. Hematura

III. Proteinuria

IV. Diabetic Nephropathy

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Detach Here

- Immune work-up abnormal
- Family history of renal disease
- Protein electrophoresis abnormal

IV. Diabetic Nephropathy

ISSUES:

- **Screen diabetics for risk progression:**
  - **Type 1: Screen @ 5 years diabetes duration over the age of 15 years old.**
  - **Type 2: Screen @ diagnosis**
- **Determine if alternative diagnosis for renal abnormality**

1. OBTAIN:

- Blood pressure (BP) assessment
- Dipstick urinalysis
- If negative or trace for protein, then screen for microalbuminuria with albumin/creatinine ratio
- If negative for microalbuminuria, screen annually

2. IF POSITIVE FOR MICROALBUMINURIA:

- Confirm results; repeat 2 to 3 times over 3 months
- Consistently positive results, confirm with 24-hour urine for microalbumin
- Monitor 24-hour urinary protein and creatinine clearance every 6 to 12 months
- Check fasting Lipid profile

3. IF URINALYSIS POSITIVE FOR PROTEIN (greater than a trace):

- Proceed to quantitative 24-hour urinary protein plus baseline creatinine clearance to determine the presence of overt nephropathy
- Obtain renal ultrasound (to assess kidney size, symmetry and rule out stones or cystic disease)
- CBC, blood urea, creatinine, electrolytes (Na, K,Cl, HCO3), calcium, phosphorus, glucose and albumin

4. INTERVENTION FOR INCIPIENT NEPHROPATHY
(microalbuminuria – albumin 30-300 mg/day):

- Treat hypertension: target blood pressure <125/80 mmHg
- Type 1: Treat with ACE inhibitors or ARB for kidney protective effect even in the absence of hypertension
- Type 2: Treat with ACE inhibitors or ARB for kidney protective effect even in the absence of hypertension
- Monitor serum potassium and creatinine at routine follow-up visits or within two weeks of dose change for those taking ACE inhibitors or ARB
- Monitor 24-hour urinary protein and creatinine clearance every 6 to 12 months
- Maintain optimal glycemic control

5. INTERVENTION FOR OVERT NEPHROPATHY
(macroalbuminuria >300 mg/day):

- Treat hypertension: target blood pressure <125/75 mmHg
- Treat with ACE inhibitors or ARB for kidney protective effect even in the absence of hypertension
- Monitor serum potassium and creatinine at routine follow-up visits or within two weeks of dose change for those taking ACE inhibitors or ARB
- Monitor 24-hour urinary protein and creatinine clearance every 6 to 12 months
- Maintain optimal glycemic control

6. ASSESS FOR OTHER RISK FACTORS SUCH AS LIPIDS, SMOKING AND NUTRITION

7. REFER TO NEPHROLOGIST IF:

- Clinical presentation atypical:
  - Associated with hematuria
  - Early onset overt nephropathy
- Serum creatinine is elevated
- Refractory hypertension

Winnipeg Regional Health Authority
Office régional de la santé de Winnipeg

MRP Renal Management Guidelines

Manitoba Renal Program
Programme manitobain des maladies rénales

Kidney disease in its early stages is often asymptomatic. It is important for high-risk individuals to be tested regularly to reduce the progression of kidney disease and ultimately reduce the need for dialysis.

DID YOU KNOW:

- Up to 50% of new dialysis patients present acutely requiring urgent dialysis.
- Late referral increases the patients' morbidity (with increased pulmonary edema, acidosis, temporary access, and prolonged hospitalization).
- Late referral also negates any opportunity to have prevented kidney failure or at least attenuated the rate of decline.
- Late referral prevents appropriate renal replacement therapy planning that includes pre-emptive transplant (i.e. before ever being dialysed), elective creation of vascular access and initiation of hemodialysis or commencement of peritoneal dialysis. Patients with end stage renal disease should be started on replacement therapy before they become symptomatic.
- 30% of patients starting dialysis have diabetes as the underlying etiology, but diabetes is also associated with an increased incidence of non-diabetic kidney disease.
- Many of the remaining 70% of new dialysis patients may have had asymptomatic kidney disease that if identified earlier may have been prevented.

Although there are clinical symptoms associated with renal failure, people who have kidney disease are frequently asymptomatic.

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RENAL HEALTH:

Information for Health Care Providers

Manitoba Renal Program
Programme manitobain des maladies rénales

- **Urgency of investigations dependent upon associated features such as symptoms or renal function**
- **Patient may present with edema and associated symptoms, or asymptomatic proteinuria**

1. OBTAIN:

- Blood pressure (BP) assessment
- CBC
- Blood urea, creatinine, electrolytes (Na, K,Cl, HCO3), calcium, phosphorus, glucose, total protein and albumin
- (Repeat) urinalysis
- 24-hour for creatinine clearance and protein
- Renal ultrasound (assess kidney size, symmetry and R/O cystic disease)
- If over 40 years old, serum and urine protein electrophoresis

2. DETERMINE IF GLOMERULAR ORIGIN:

- If proteinuria >2.0 gm/24hrs /1.73m^2 or RBC cast, assume glomerular
- If not, exclude:
  - Anatomical abnormality with renal ultrasound
  - Obvious tubulo-interstial or overflow cause where applicable
  - If negative, assume glomerular

3. IF GLOMERULAR ORIGIN:

- Do limited immune work-up: ANA ,C3, C4
- If immune work-up negative:
  - With normal serum creatinine and BP with proteinuria <1.0 gm/day, follow-up q3-6 months assessing renal function, protein excretion and BP (as likely good prognostic GN)
  - If protein excretion >1.0 gm/day but <2.0gm/day, consider ACE Inhibitor without referral to Nephrologist
- Target Blood Pressure for above patient **<125/75** mmHg
- Assess for other progression risk factors (eg. hyperlipidemia and smoking)

4. REFER TO NEPHROLOGIST IF:

- Serum creatinine elevated
- Protein excretion >2.0gm/24hrs/1.73m2

I. Elevated Creatinine

ISSUES:

- **Determine if acute and rapidly rising vs. chronic and stable**
- **Identify etiology, potential reversibility or attenuation of progression**

1. OBTAIN AT LEAST TWO SERUM CREATININE MEASUREMENTS (2 to 6 weeks apart) in order to determine if stable or progressive.

2. OBTAIN:

- Blood pressure (BP) assessment
- CBC
- Blood urea, electrolytes (Na, K, Cl, HCO3 if readily available), calcium, phosphorus, glucose, total protein, albumin
- Urinalysis
- 24-hour urine for creatinine (and protein if dipstick has protein) along with a simultaneous blood sample for measurement of creatinine clearance

3. MAY BE INDICATED:

- Renal ultrasound: to assess kidney size, symmetry, consistency (echogenic kidneys) and to rule out obstruction

4. IF SERUM CREATININE NORMAL BUT CREATININE CLEARANCE SUBNORMAL, DETERMINE IF COLLECTION IS ADEQUATE BY:

- Assessing 24-hour creatinine content (should be 0.15 mmol/kg +/- 0.03)
- Calculate the estimated creatinine clearance without a 24-hour urine (based upon Gault-Cockroft formula):

$$\text{CrCl} = \frac{140 - \text{age} \times \text{Wt (kg)}}{\text{PCr (umol/l)}}$$ **(multiply by 1.2 for male)**

5. REFERRAL TO NEPHROLOGIST:

i. Non-Urgent:

- Persistently elevated but stable serum creatinine under 300umol/L without an identifiable reversible cause
- Timing of assessment depends upon acuity and severity

ii. Urgent:

- If serum creatinine is rapidly rising (increases by 20% over 1 to 30 days; obtain a third to confirm)

- Newly discovered and >250 umol/L; appointment depends upon stability of serum creatinine
- Check serum creatinine and electrolytes at regular intervals while patient awaits nephrologic assessment to determine the rate of rise *eg. serum creatinine:*

<200	umol/L	q1mo
200–400	umol/L	q2weeks
400	umol/L	q1week

iii. Emergent:

- Severe homeostatic derangements; severe fluid overload, acidosis or hyperkalemia
- Severe uremic signs and symptoms (eg. pericarditis, somnolence, etc.)

II. Hematuria

ISSUES:

- **Determine if glomerular vs. non-glomerular disease, in particular urinary tract cancer**
- **Urgency dependent upon associated features such as symptoms or renal function**
- **Patient may present with gross or macroscopic hematuria (either red or tea coloured urine) or microscopic hematuria with or without associated symptoms**

1. OBTAIN:

- Blood pressure (BP) assessment
- CBC
- Blood urea, creatinine, electrolytes (Na, K, Cl, HCO3 if readily available), calcium, phosphorus, glucoses and albumin
- (Repeat) urinalysis and urine culture
- 24-hour for creatinine clearance (and protein if dipstick has protein)
- Renal ultrasound (to assess kidney size, symmetry and rule out tumor, stones or cystic disease)

2. DETERMINE IF GLOMERULAR ORIGIN:

- If proteinuria > 2.0 gm/24hrs/1.73m^2 or RBC cast present on U/A, assume glomerular
- If not, exclude anatomical abnormality with ultrasound:
  - Urine cytology
  - Consider referral to Urologist for cystoscopy to exclude bladder tumor or if persistent urinary tract symptoms especially in patients over 40, who are at greatest risk for bladder cancer
  - If ultrasound and cytology/cystoscopy negative, assume glomerular

3. IF GLOMERULAR ORIGIN:

- Do limited immune work-up: ANA, C3, C4
- If immune work-up negative:
  - With normal serum creatinine and BP with proteinuria <1.0 gm/day (assuming complete 24-hour urine collection), follow-up q3-6 months assessing renal function, protein excretion and BP (as likely good prognostic GN such as IgA or Thin Membrane Nephropathy)
- If protein excretion >1.0 gm/day but <2.0 gm/day, consider ACE Inhibitor without referral to Nephrologist (see Proteinuria section below)

4. REFER TO NEPHROLOGIST IF:

- Serum creatinine elevated
- Hypertensive
- Protein excretion >2.0gm/24hrs/1.73m^2
- Immune work-up abnormal
- Family history of renal disease or neurosensory deafness
- Ominous signs or symptoms such as malaise, weight loss, fever, or hemoptysis
- You are unsure

III. Proteinuria

ISSUES:

- **Determine if glomerular vs. non-glomerular proteinuria**
- **Proteinuria is defined by protein excretion rate per day**
- **Urinalysis is only a screening test for proteinuria; it is neither quantitative nor does it detect microalbuminuria required for screening diabetics**
- **Glomerular range proteinuria may be any amount depending upon severity, but >2.0 gm/24hrs/1.73m^2 in the absence of an overflow cause or severe hypertension is usually a glomerular disease**
- **Non-glomerular causes include tubulo-interstitial (always <2.0 gm/day) and overflow (as in myeloma, may be any amount)**