CHRONIC KIDNEY DISEASE (CKD)

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Screening

1. DETERMINE RISK:

High risk	• Diabetes. • Vascular disease. • Hypertension. • History of kidney disease. • History of kidney disease in 1st degree relative.
Moderate risk	• Aboriginal people ≥ 15 yrs. • BMI > 30. • Smokers.

2. ANNUALLY TEST:

High risk	• MSU for dipstick – if nitrites, leucocytes and / or blood present, exclude infection. Send:
	  ◦ MSU for MC&S.
	  ◦ SOLVS (women) and FVU (men) for NAT (PCR) for gonorrhoea and chlamydia.
	• ACR.
	• Serum urea, electrolytes and creatinine (UEC)..
	• eGFR (see Case Definition).

Moderate risk	MSU for dipstick. If:
	• Nitrites, leucocytes and/or blood detected, send:
	  ◦ MSU for MC&S.
	  ◦ SOLVS (women) and FVU (men) for NAT (PCR) gonorrhea and chlamydia.
	• Protein and / or blood present in the absence of infection - manage as high risk; see Box 1 - Haematuria.

Case Definition

Chronic kidney disease is defined as an eGFR < 60ml/min on 2 separate occasions at least 1 week apart and not explained by an acute insult (illness, urinary infection or medications especially NSAIDs, ACE-I and ARBs).

eGFR results above 60 are currently reported by Pathwest only as ">60" rather than as actual values. However, eGFRs > 60 may include patients with early kidney disease – see table 1 below. To determine the exact value for patients with a lab report of "eGFR >60", an eGFR calculator is available at http://www.kidney.org.au. Note that eGFR values >90 may be unreliable.

TABLE 1: EGFR AND STAGES OF KIDNEY DISEASE

Stage	eGFR	Significance
1	> 90 with evidence of kidney damage	May be normal but regular monitoring recommended – declining eGFR indicates CKD. Refer to PROTEINURIA WITH EGFR > 60 protocol.
2	60 - 89 +/- additional evidence kidney damage	
3	30 - 59	eGFR declines with age. If eGFR STABLE and > 70 years old, may be normal for age if there are no other signs of kidney disease. Usually asymptomatic.
4	15 - 29	Usually mild symptoms. Need referral for predialysis education.
5	< 15	Usually marked symptoms. Imminent need for renal replacement therapy to support life.

BOX 1: HAEMATURIA

- Haematuria plus proteinuria in the absence of current or recent infection is glomerulonephritis (GN) until proven otherwise – screen annually according to high risk screening protocol and follow management guidelines according to eGFR (if eGFR > 60, see PROTEINURIA protocol).
- If clinical picture is suggestive of a systemic disease e.g. facial rash, polyarthritis, abnormal investigations (see baseline assessment) - refer to Nephrologist.
- Persisting isolated haematuria in over 40 year olds requires further urine for cytology, renal ultra sound + IVP +/- cystoscopy to exclude malignancy.

Principles of Management

- **Increased creatinine** occurs **late** in CKD and implies significant kidney damage.
- In CKD, appropriate management and referral **improves outcome.**
- **Iron deficiency, anaemia** and **electrolyte abnormalities** are common in CKD.

BASELINE ASSESSMENT:

- **Blood pressure**
- **Urine:** MSU for MC&S and ACR (if not already tested) and urine immunoelectrophoresis (for Bence-Jones protein).
- **Bloods:**
  - FBE, CRP, ESR.
  - UEC, eGFR, LFTs.
  - Corrected Ca, PO4, HCO3.
  - If not known to have diabetes, screen for diabetes (see DIABETES TYPE II protocol).
  - B12, folate, Fe studies and PTH.
  - Hep B, Hep C, syphilis and HIV serology if not performed in last 12 months.
- **Renal ultrasound scan.**

GOALS OF TREATMENT:

BP < 125/75	**PTH** 20 - 25 pmol/L
Hb 110 – 120 mg/dL	**PO4** < 1.6 mmol/L
HCO3 > 20mmol/L	**Corrected Ca** > 2.15 mmol/L
Albumin ≥ 35 g/L	

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Therapeutic Protocol

- See HEALTHY LIVING protocol.
- Encourage **smoking cessation and safe alcohol use.**
- Refer early for **dietary advice.**
- Aim for optimal control of DM, HT and dyslipidaemia.
- Ensure pneumovax and fluvax immunisations up to date. If hep B non-immune, **IMMUNISE** - CKD stages 1 - 4 = usual doses and course. CKD stages 5 + 6 = need high dose.

Avoid medications, including over-the-counter preparations, which may worsen kidney function, and remind patients at every opportunity of the need to be cautious. Medications which should be avoided include NSAIDs (including Cox 2 inhibitors).

DRUG TREATMENT – in all people with CKD, unless there are contraindications:

1. Start ramipril, if not already on ACEi, then irbesartan as per PROTEINURIA + EGFR > 60 protocol.
2. If hypertension still not controlled (<125/75), manage as per HYPERTENSION protocol.

BOX 2: B2 WEEKLY CHECKLIST WHILE CHANGING THERAPY

- **BP** – if symptomatic hypotension develops, correct any dehydration, review other medications (e.g.diuretics), reduce dose until symptoms resolve / BP normalizes, and attempt gradual increase in dosage again. Discuss with Nephrologist if not tolerating ACE-i/ARB.
- Some rise in urea, creatinine and potassium is expected after commencing an ACEI / ARB; if the increase is small and asymptomatic, no action is necessary.
- A rise in creatinine of up to 30% above baseline is acceptable.
- An increase in potassium to ≤ 5.9 mmol/L is acceptable.
- **IF** potassium ≥ 6.0 mmol/L **and / or** creatinine increases by > 30%, **STOP** medications and discuss with Nephrologist. A persistent excessive rise in creatinine may indicate bilateral renal artery stenosis and needs investigation.

TABLE 2: COMMONLY PRESCRIBED DRUGS WHICH REQUIRE CAUTION IN CKD

Drug	Risks in CKD	Action required
Metformin	Increased risk of lactic acidosis once eGFR < 60. eGFR < 30 - cease.	eGFR 30-59: reduce to max. dose of 1g per day
Diuretics	↓ eGFR; electrolyte disturbance	Avoid dehydration; monitor UEC regularly;
Glitazones	Patients with CKD are at particularly high risk of CAD – given the potential cardiac risks with glitazones, use with caution	
Digoxin, colchicine	Accumulation and drug toxicity	Reduce dose / cease – refer to therapeutic guidelines
NSAIDS	↓ eGFR	Avoid / cease
ACEIs, ARBs	If prescribed for prevention of renal disease progression ALONE, cease when eGFR < 15. For all other indications, continue but with caution – see Box 2 on this page: "2 weekly check-list while changing therapy"	

NB: Statins and low-dose aspirin can be used relatively safely

MANAGING COMPLICATIONS OF CKD

1. **HYPERPHOSPHATAEMIA:** If PO4 > 1.4 mmol/L, start **calcium carbonate** (500mg as Cal-Sup or 600mg as Caltrate) tds with meals increasing as required to maximum dose of 1000mg tds.
2. **HYPOCALCAEMIA:** If corrected Ca < 2.15 mmol/L ***and*** PO4 < 2 mmol/L OR PO4 > 2 mmol/L on maximum dose **calcium carbonate** (see above), start **calcitriol** 0.25mcg daily and double dose every 2 weeks to maximum dose of 1.0 mcg daily.
3. **ACIDOSIS:**
   - If HCO3 15 - 20 mmol/L ***and*** corrected Ca < 2.15mmol/L then treat hypocalcaemia first. Reassess after 2 weeks.
   - If HCO3 15 - 20 mmol/L ***and*** corrected Ca > 2.15mmol/L ***or*** HCO3 < 15 mmol/L, start **sodium bicarbonate** 1 tablet (840mg) daily increasing as required to 2 tablets tds. **Monitor** for exacerbation of hypertension and heart failure.
4. **ANAEMIA +/- IRON DEFICIENCY:** See page 3 of this protocol.

Follow-up

TABLE 3: FOLLOW-UP SCHEDULE

	6 monthly	3 monthly	Monthly
eGFR > 60	See Proteinuria with eGFR >60 protocol		
eGFR 30-59	Fe studies, CRP, Ca, PO4, Albumin, PTH, ACR if previously normal	UEC, eGFR, FBE, BP, weight, Cardiovascular risk factors	-
eGFR 15 - 29	Review by pre-dialysis coordinator	-	Clinical review, UEC, eGFR, FBE, BP, weight, Fe studies, Ca, PO4, Albumin, PTH
eGFR < 15	-	-	

Women of Child Bearing Age

See PROTEINURIA + EGFR > 60 protocol.

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Refer / Discuss

TO NEPHROLOGIST:

- **eGFR < 30** mL/min/1.73m2
- **PTH > 25** pmol/L
- **Rapid decline in renal function** e.g. 15% decrease in eGFR in one year
- **Suspected connective tissue disease** based on clinical picture +/- abnormal baseline investigations.
- Iron therapy according to protocol has failed to correct **iron deficiency.**

TO KIMBERLEY PRE-DIALYSIS COORDINATOR:

- When eGFR < 30 mL/min/1.73m2 for pre-dialysis education and planning. (Ph: 0400 336 069 or email: predialysis@kamsc.org.au).

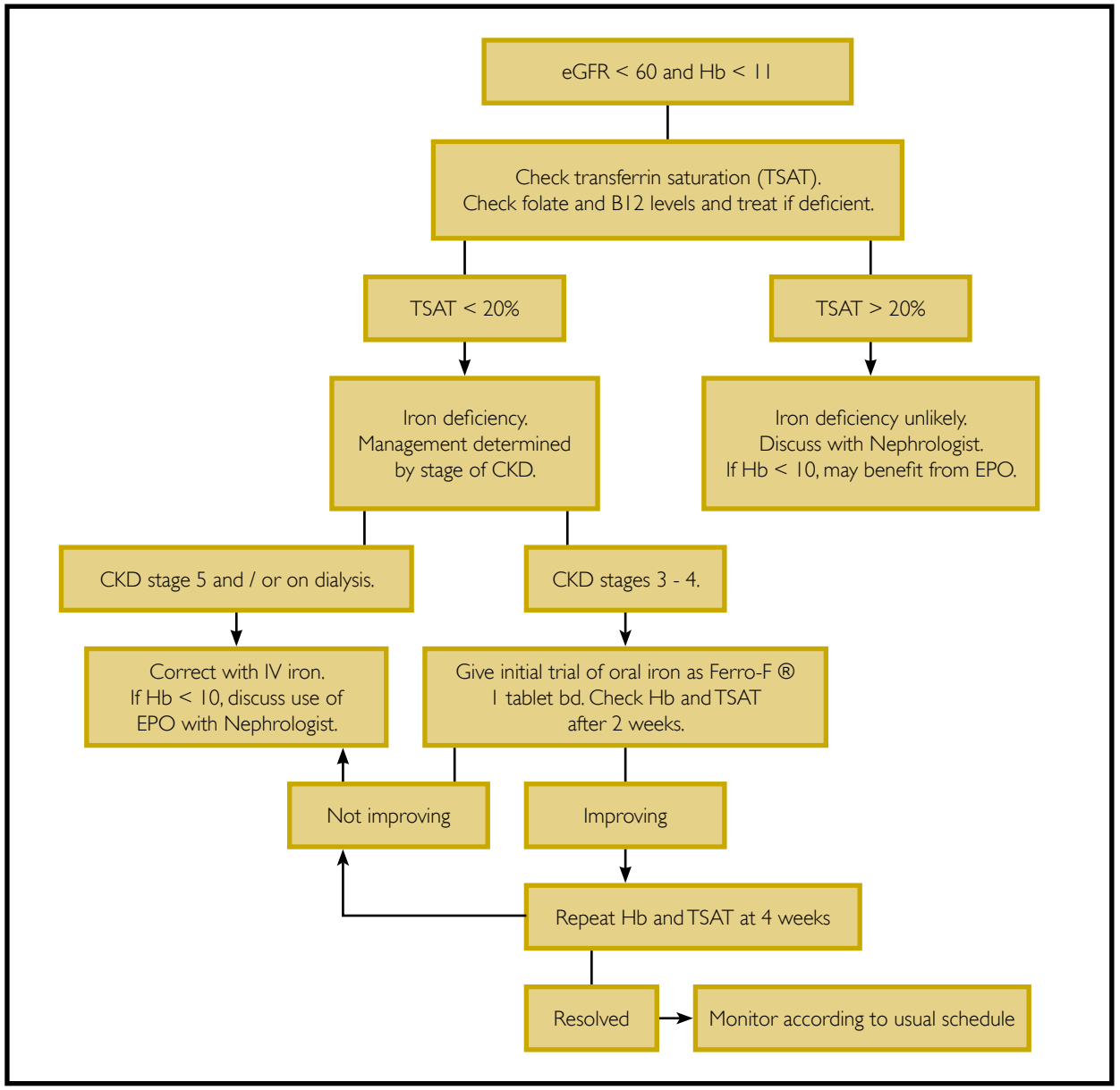
TO PHYSICIAN / OBSTETRICIAN:

- eGFR < 60 mL/min/1.73m2 or ACR > 300 mg/mmol for pre-pregnancy counselling or in early pregnancy.

ANAEMIA +/- IRON DEFICIENCY

1. Aim is to keep Hb between 110 – 120g/L.
2. Check folate and B12 and treat if deficient.
3. Check iron studies. Remember if absolute iron deficiency is confirmed, consider other possible causes including menorrhagia and GI blood loss.
4. Follow flow chart on this page for all clients with CKD and Hb <11g/L.
5. For details on administration of IV iron, refer to IV iron protocols at: www.kamsc.org.au/cd_protocols.html.

FLOW CHART – MANAGEMENT OF ANAEMIA IN CLIENTS WITH CKD



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