

# Approach to Proteinuria

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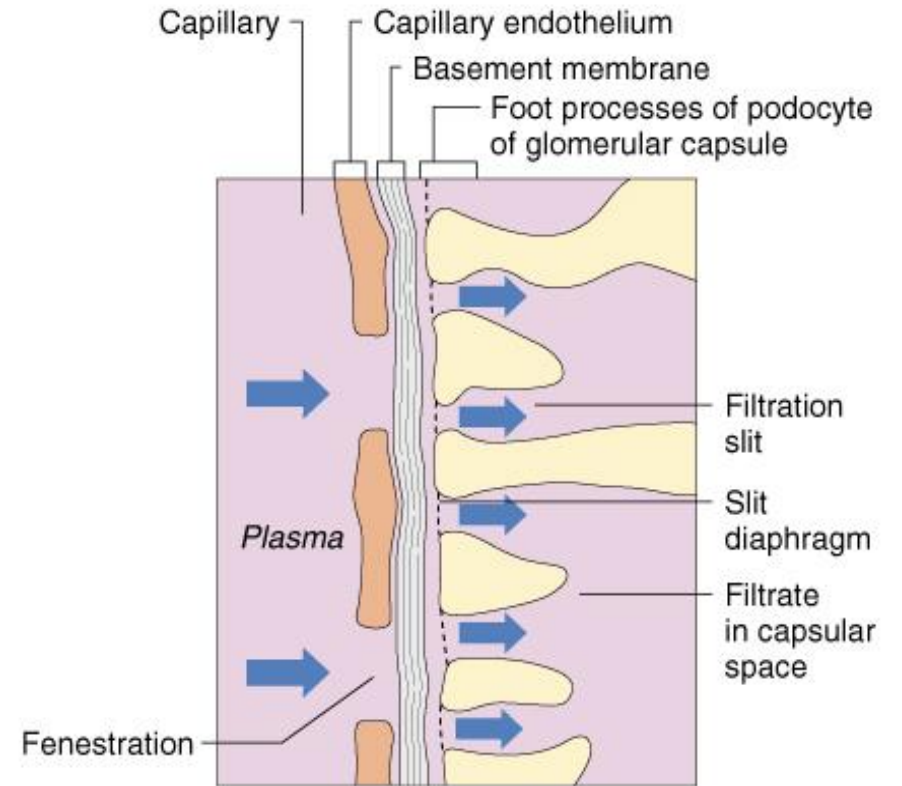
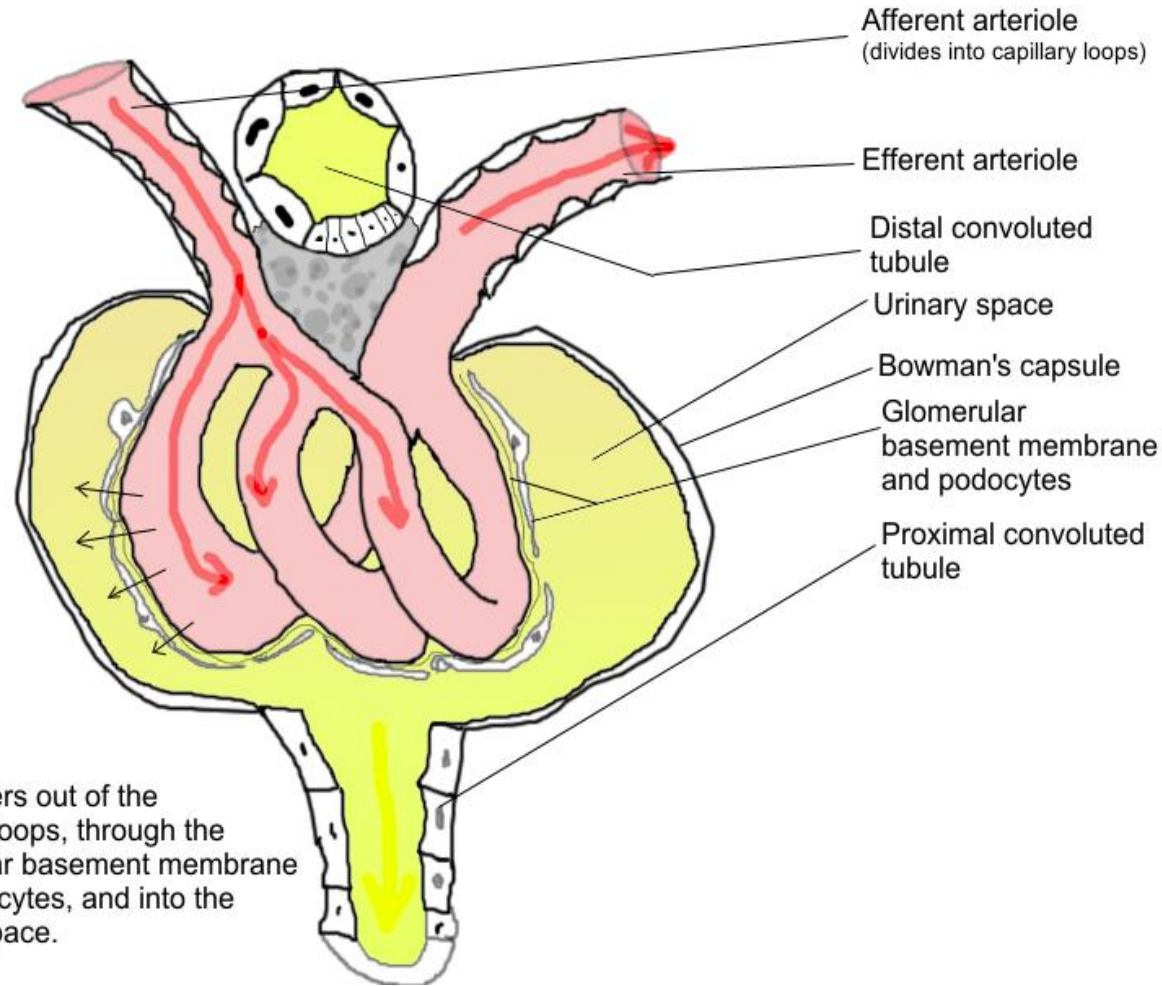
# Case History

- 72 year-old male presents with three months of fatigue accompanied by pain in back, shoulders and arms, and swelling of feet. He has noted unintended 7 kg weight loss.
- On examination, he is pale and has dullness to percussion at lung bases and 3+ pitting oedema up to the knees.
- Urinalysis is strongly positive for proteinuria by dipstick.

# What questions should we be asking?

- What could be causing the proteinuria?
- How should this be managed now?
- When should this patient be referred for further investigation?

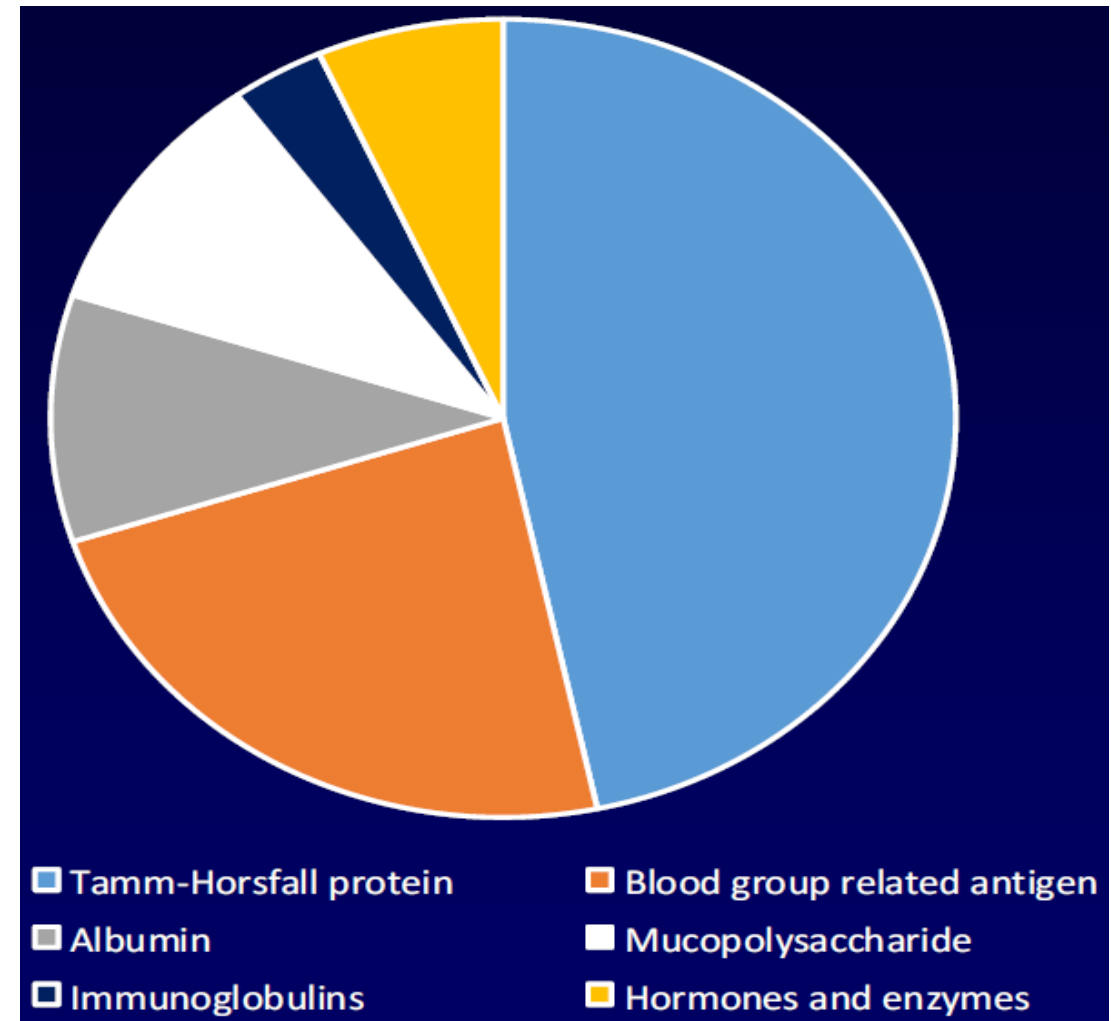
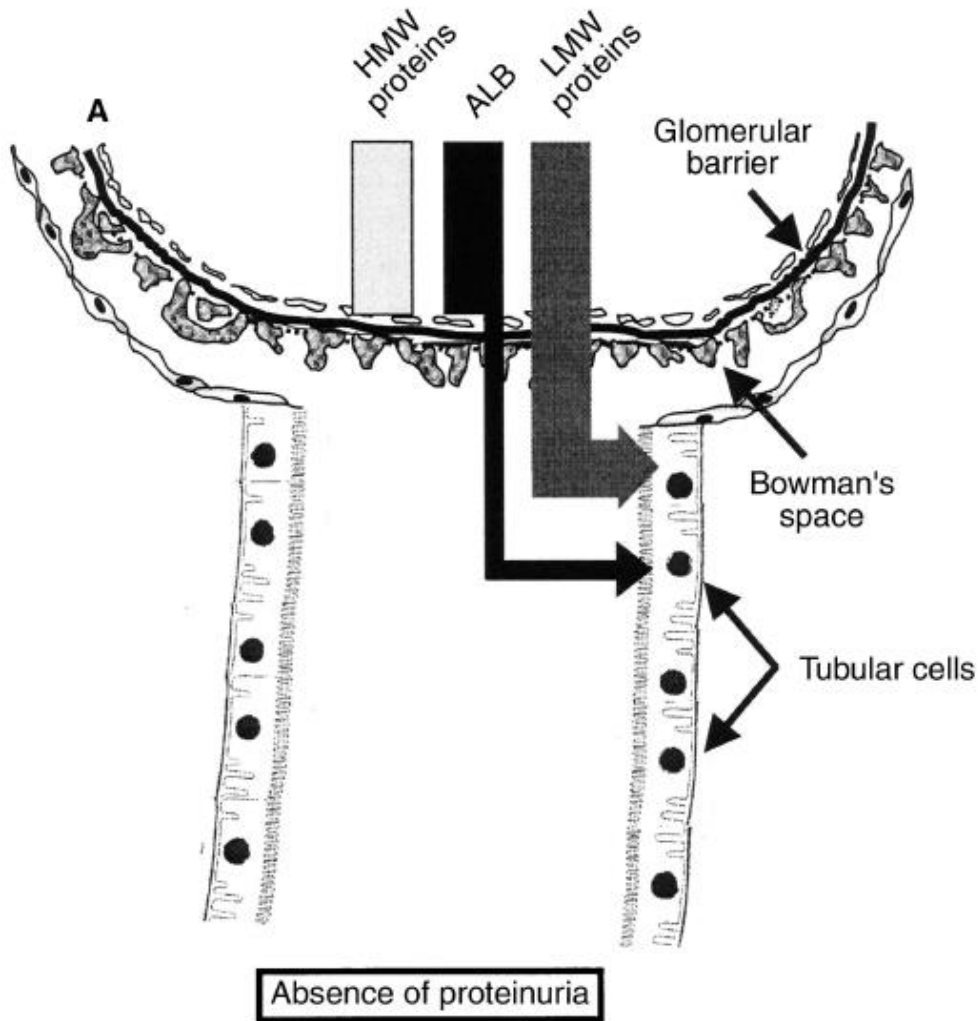
# Anatomy



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# Physiological urine protein



**Urine protein < 150 mg/day**  
**Urine albumin < 20 - 30 mg/day**

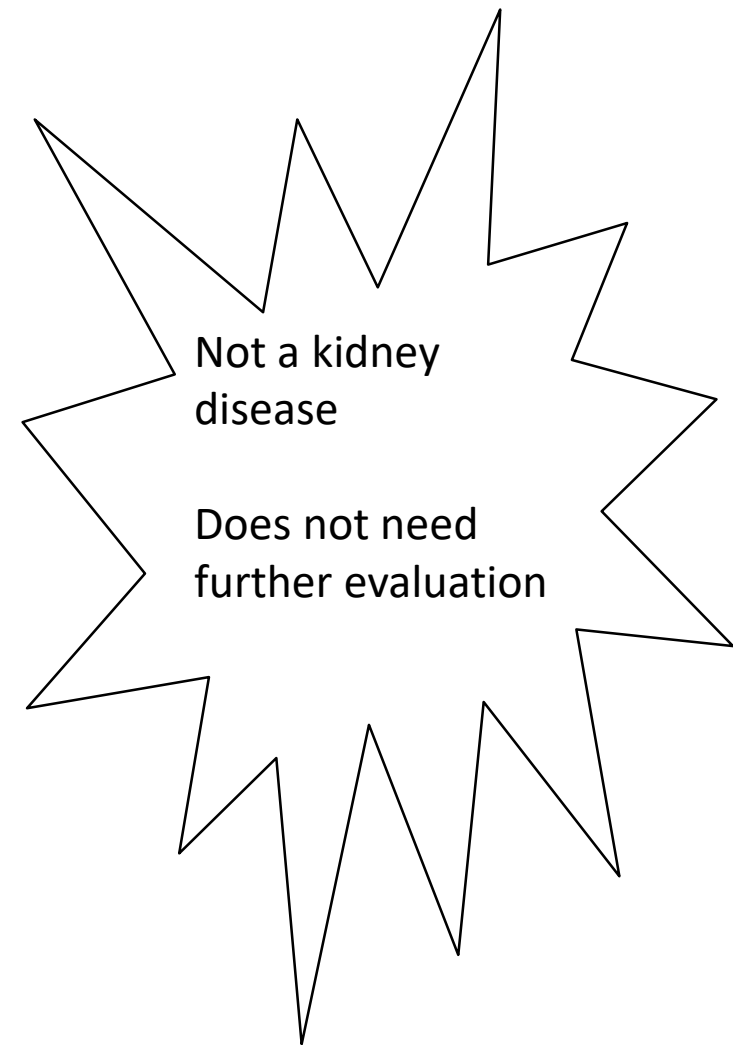
# Urine quantification

Stage of kidney damage	Male ACR (mg/mmol) ≈ ACR x 10 mg/day	Female ACR (mg/mmol) ≈ ACR x 10 mg/day
Normalbuminuria	< 2.5 (< 25mg/day)	< 3.5
Microalbuminuria	2.5 – 25 (25 – 250mg /day)	3.5 – 35
<b>Macroalbuminuria</b>	> 25 (250mg/day)	> 35

- Urine Protein:Creatinine ratio (PCR) is quantified
  - if patient has established MACROalbuminuria
  - ACR is about 50 – 60% of PCR

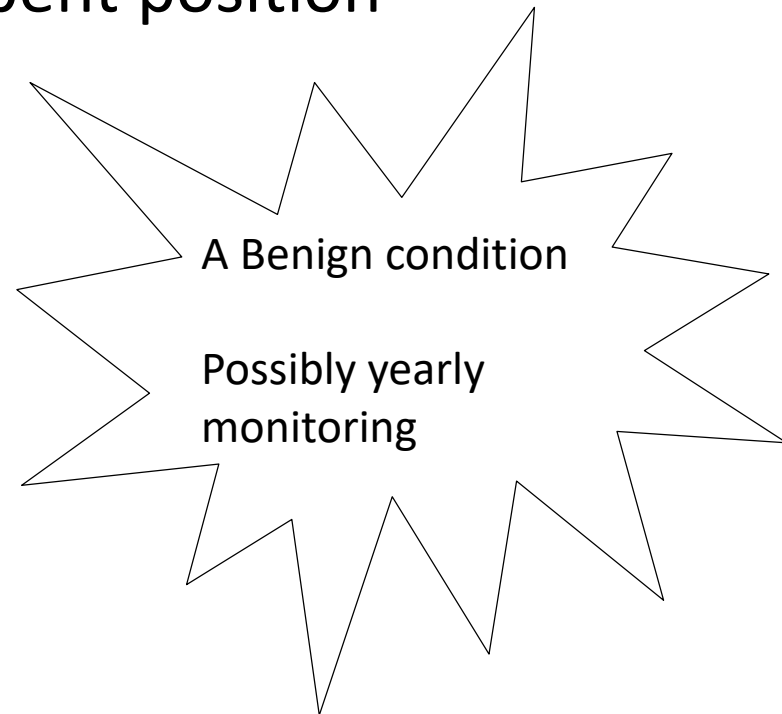
# Functional *transient* proteinuria

- Relatively common
  - Age < 18 years: 8 – 12 %
  - > 18 years: 4%
- Not orthostatic
- No hematuria and/or reduced eGFR
- Usually < 1g /day, but can go up to > 2g / day
- Resolves when a causative factor is no long present
  
- Marked exercise, febrile illness such as, UTI, emotional stress, most acute illness, decompensated cardiac failure



# Orthostatic proteinuria

- Relatively common in adolescents (2 – 5%);
- Uncommon over the age > 30 years
- Normal protein excretion in the recumbent position





# Pathological proteinuria

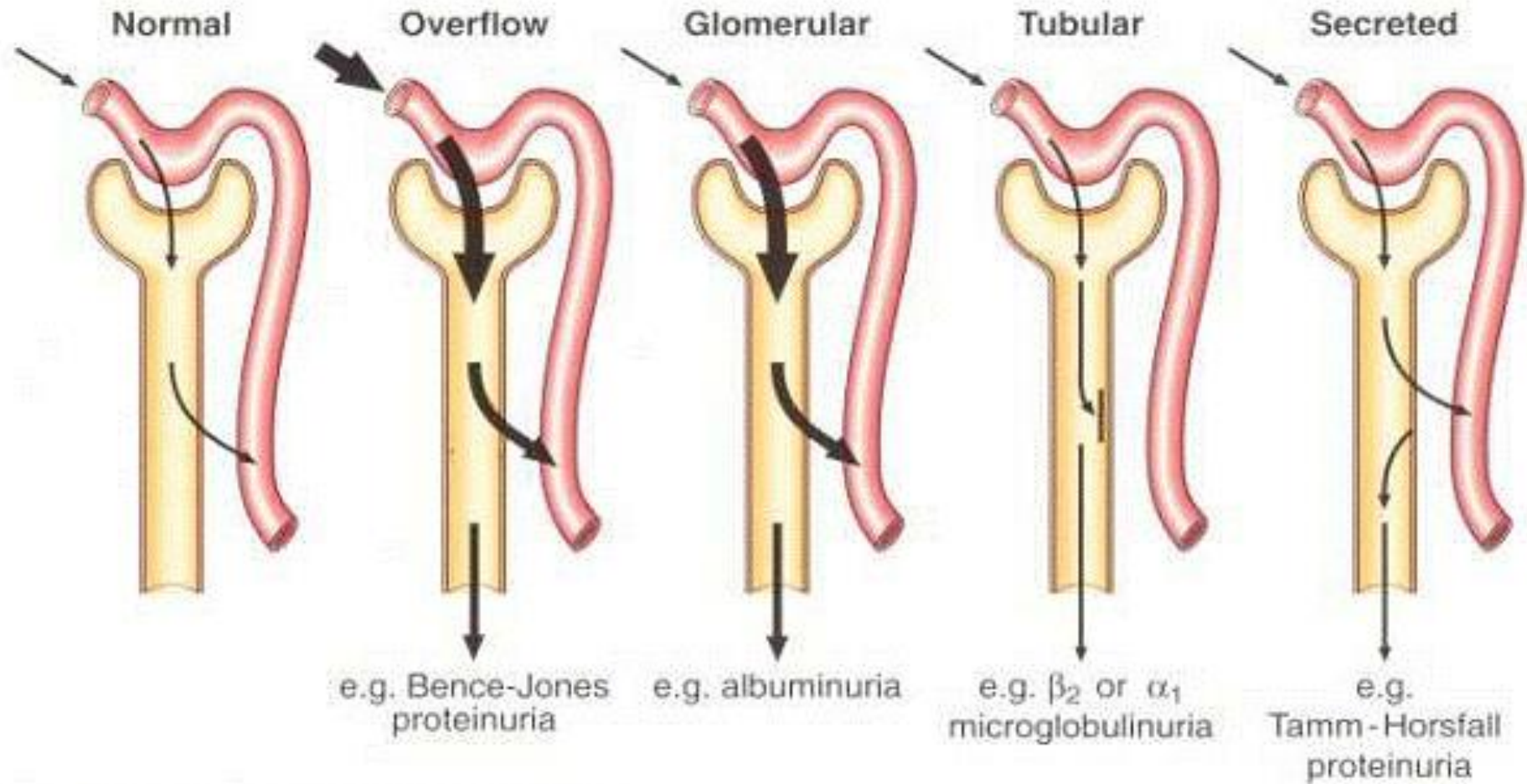


Fig. 1 The classification of proteinuria.

# Glomerular proteinuria

- Diabetic nephropathy
- Minimal change disease
- Focal segmental glomerulosclerosis
- Membranous nephropathy
- Amyloidosis
- Lupus nephritis
- Pre-eclampsia

# Overflow proteinuria

- Multiple myeloma
- Myoglobinuria
- Haemoglobinuria
- Amyloidosis

# Tubular proteinuria

- Hypertensive nephrosclerosis
- Tubulointerstitial disease, e.g. interstitial nephritis

# Back to the case

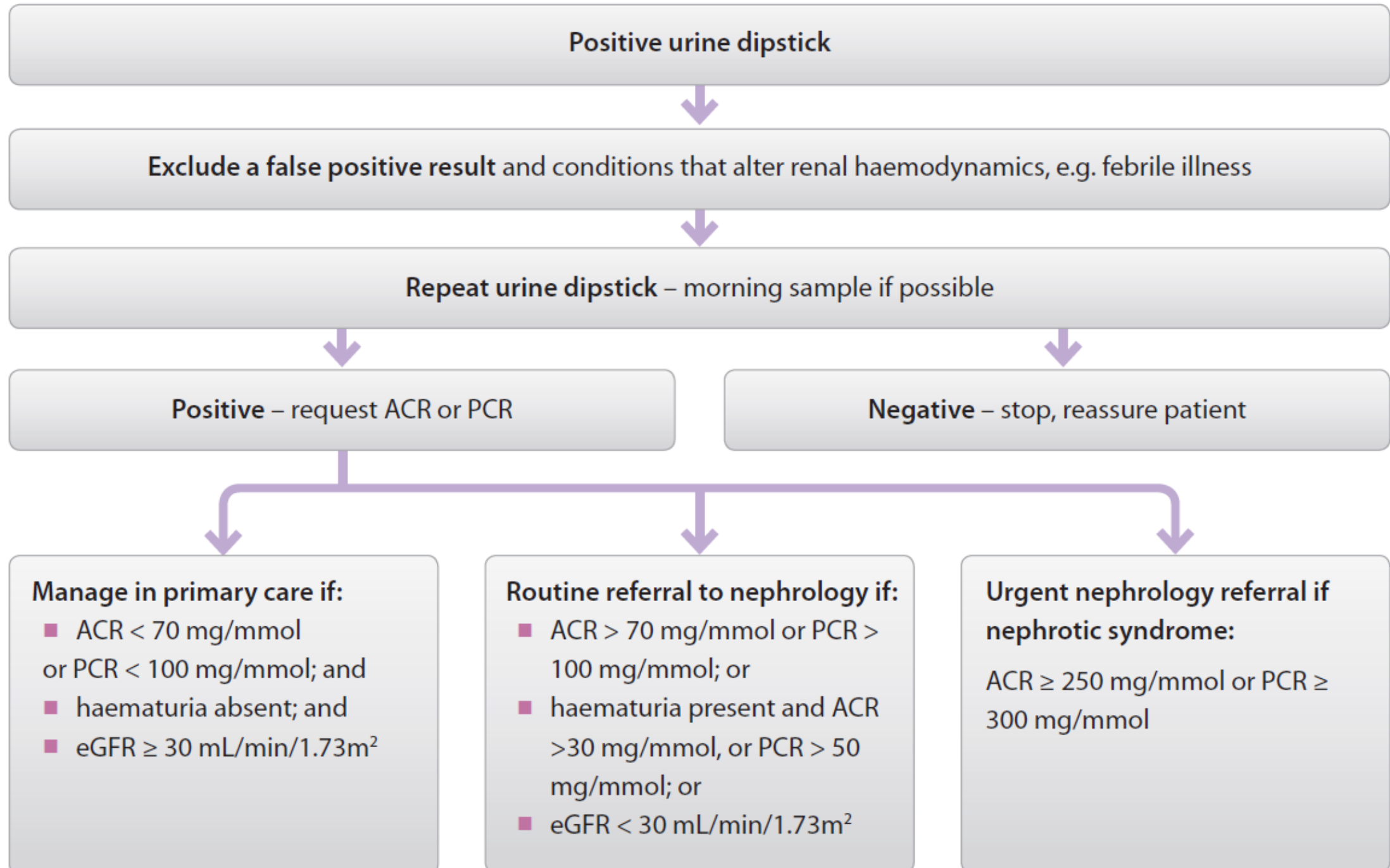
- **72 year-old** male presents with **three months of fatigue accompanied by pain in back, shoulders and arms**, and swelling of feet. He has noted **unintended 7 kg weight loss**.
- On examination, he is **pale** and has **dullness to percussion at lung bases** and **3+ pitting oedema** up to the knees.
- Urinalysis is **strongly positive for proteinuria** by dipstick.

# Differential diagnoses

- Membranous nephropathy
- Minimal change disease
- Amyloidosis
- FSGS

# Likely diagnoses

- **Membranous nephropathy**
  - **Minimal change disease**
  - **Amyloidosis**
  - **FSGS**
- *Malignancy can be associated with the above 3 kidney diseases*





# Investigations in general

- Urine:
  - Urine microscopy
  - Urine protein:creatinine ratio
  - Urine albumin:creatinine ratio
- Blood (Basic):
  - UE + creatinine, albumin, liver function, calcium, lipid profile and full blood count
- Blood (renal secondary screen)
  - Protein electrophoresis, serum free light chains and immunoglobulins
  - ANA
  - Hepatitis B, C and/or HIV
  - Anti-PLA2R (if nephrotic syndrome)
  - HbA1C
- *\*\*C3, C4, ANCA, anti-GBM and streptococcal serology if there is concurrent hematuria*

# Management in general

- A RAS blockade agent
  - ACE-I or ARB
- Target blood pressure 130/80 mmHg
- Target HbA1c 53 mmol/mol (if diabetic)
- Target BMI < 30, ideally <= 25
- Regular exercise >= 30 min a day
- Reduce dietary salt intake < 6g/day
- Smoking cessation
- Normal daily intake of protein 0.75 – 1g/kg/day

Do you have any questions?

