I.2 When to refer to a nephrology clinic

Guideline I.2.1

A. Referral to nephrology should be considered when the GFR is <60 ml/min and is mandatory when the GFR is <30 ml/min.

B. If a GFR prediction or measurement is not available, patients with chronic renal failure should be referred to a nephrologist when on two consecutive measurements, plasma creatinine exceeds 150 mmol/l in men and 120 mmol/l in women, corresponding to a GFR of ~ 50 ml/min. These patients should be referred whether or not there are other indications of chronic renal disease, such as proteinuria.

Guideline I.2.2

A. Patients with a GFR <60 ml/min should have a treatment strategy aimed at:

- **Reducing the mortality and morbidity of renal failure. In general, this is similar to the strategy in dialysis patients with respect to management of renal anaemia, nutrition, acid-base, calcium, phosphate homeostasis, and blood pressure control.**
  (*Evidence level: B*)
- **Delaying or preventing the progression of renal failure. This will include specific treatment of the underlying renal condition, regular GFR and protein excretion measurements to guide therapy, strict blood pressure control, ACE inhibition in patients with diabetes mellitus and those with protein excretion >3 g/day, strict blood glucose control in diabetes, and modification of risk factors (including smoking, lipid abnormalities, excessive protein intake).**
  (*Evidence level: B*)
- **Referral to a nephrologist should be considered in order to implement this therapy.**
- **At a GFR of 60 ml/min the serum creatinine is ~ 140 μmol/l for men and 105 μmol/l for women.**

Guideline I.2.3

A. Patients whose GFR is <30 ml/min and declining despite therapy should be under the care of a nephrologist and be prepared for the onset of end-stage renal failure. This preparation includes:

- **Choosing the most appropriate location (e.g. home or hospital) and form of treatment (e.g. HD, CAPD, pre-emptive transplantation or conservative treatment). This choice will involve discussion between patients, their families and nephrology staff. This process may need support from specialist renal counsellors and social workers.**
  (*Evidence level: C*)
- **Preparing appropriate dialysis access in a timely manner.**
  (*Evidence level: B*)
- **Hepatitis vaccinations should be considered. The effects must be assessed regularly.**
- **When GFR has fallen to 15 ml/min/1.73 m^2 the assessments should be intensified to about once monthly with special attention to control of hypertension, fluid overload, biochemical abnormalities, and management of malnutrition.**

At a GFR of 30 ml/min the serum creatinine is ~ 180 μmol/l for men and 150 μmol/l for women.

Commentary on Guideline I.2.1–I.2.3

Patients with chronic renal failure and a GFR <30 ml/min generally progress (evidence level: B) [31–34], irrespective of the underlying renal condition. Progression of renal failure may be prevented or significantly slowed by various means including:

- Strict blood pressure control [36–39].
- Certain drugs (ACE inhibitors, calcium channel blockers) [36,38,40,41].
- Strict blood glucose control in patients with diabetes mellitus [42].
- Revascularization procedures in selected patients with renovascular disease [43–46].

Progression of renal failure has been associated with additional potentially modifiable risk factors, including lipid abnormalities [58] and smoking [60].

Specific treatment of any underlying renal condition may also be required.

Patients with a GFR <60 ml/min are prone to complications similar to dialysis patients, including:

- Renal anaemia [47,48].
- Fluid overload, hypertension, and left ventricular hypertrophy [49–51].
- Abnormalities in calcium and phosphate metabolism [52,53].
- Malnutrition [54–57].
- Lipid abnormalities [58,59].

Most of the deaths in dialysis patients are related to cardiovascular disease and/or malnutrition [61]. The cardiovascular disease and/or malnutrition may be preventable by appropriate pre-dialysis care and timely initiation of dialysis. Morbidity and mortality once dialysis starts may be reduced by timely placement of appropriate access and psychological preparation of the patient. Vaccination against hepatitis B

[66] should be included in the management of these patients as well as regular vaccinations against influenza [67] and possibly also against pneumococcal pneumonia [68].

The diagnosis of the underlying renal condition should be performed by a nephrologist. Also, general preventative measures require careful monitoring of renal function and protein excretion and are best undertaken under nephrology supervision. The earlier this prevention is performed, the greater the chance of avoiding the need for dialysis.

In order to maximize the preventative potential, and to reduce the morbidity and mortality associated with chronic renal failure, the EBPG group feels that referral to the nephrologist should be made as soon as the GFR drops to <60 ml/min. This requires the nephrology departments to shift their focus from providing dialysis and transplantation to prevention and disease management. This will be more ethical and may be cost-effective in the long-term. The NHANES III study in the USA determined a GFR is <60 ml/min in 12.3% of the population [70]. At present, nephrology services have insufficient capacity to cope with so many patients.

In recognition of current nephrology capacity, the EPBG group recommends referral at a GFR between 30 and 50 ml/min. Patients with a GFR <60 ml/min who are not under the care of a nephrology service should still receive preventative treatment and monitoring by a general practitioner or internist.

By the time the GFR has declined to 30 ml/min, the patient will require preparation for dialysis and specific renal failure care which can only be performed in a nephrology department with access to dialysis. The NHANES III study determined that 0.2% of the US population have a GFR <30 ml/min and are not on dialysis. Nephrology services should have the capacity to manage at least this number of patients, which is similar to the number of patients on dialysis.

In population studies, serum creatinine has been demonstrated as effective in screening for early chronic renal failure. The cut-off value for a clearance of <60 ml/min/1.73 m^2 was 137 μmol/l for men and 104 μmol/l for women. For a clearance of <30 ml/min/1.73 m^2, the cut-off value was 177 μmol/l for men and 146 μmol/l for women [35].