NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline scope

Chronic kidney disease: assessment and management (update)

This guideline will update and combine the NICE guidelines on chronic kidney disease in adults: assessment and management (CG182), chronic kidney disease (stage 4 or 5): management of hyperphosphataemia (CG157) and chronic kidney disease: managing anaemia (NG8). The guideline will be extended to cover the assessment and management of chronic kidney disease in children and young people in all areas being updated and in key areas identified during the scoping process.

The guideline will be developed using the methods and processes outlined in developing NICE guidelines: the manual.

This guideline will also be used to update the NICE quality standard for chronic kidney disease in adults.

1 Why the update is needed

New evidence that could affect recommendations was identified through the surveillance process. Topic experts, including those who helped to develop the existing guideline, advised NICE on whether areas should be updated or new areas added. Full details are set out in the surveillance review decision.

As part of the scoping process, NICE has identified 5 areas not included in the surveillance report for which the evidence needs to be reviewed:

- Cystatin C-based estimates of glomerular filtration rate (GFR) for diagnosis of chronic kidney disease (CKD).
- Proteinuria testing in children and young people.
- Haematuria testing in children and young people.

- Testing for CKD in children and young people.
- Intravenous (IV) iron for the treatment of anaemia associated with CKD.

Why the guideline is needed

Key facts and figures

- The Health Survey for England (2016) found that 13% of adults (16 years and over) had any CKD (stages 1 to 5). The prevalence of stages 3 to 5 was 5% for all adults, rising to 34% in people aged 75 and over.
- In 2016 there were 964 children and young people and 63,162 adults receiving renal replacement therapy (RRT) in the UK. Of the adult patients, 28,876 were receiving RRT in the form of dialysis. Renal registry data for adults from 2016 shows that only 59.9% of patients receiving haemodialysis and 58.7% of patients receiving peritoneal dialysis achieved serum phosphate levels in the recommended range. Inadequate control of serum phosphate can result in the development of secondary hyperparathyroidism, which increases morbidity and mortality if untreated.
- Many people with CKD or established renal failure also develop associated anaemia. The prevalence of anaemia associated with CKD increases progressively with the stage of CKD, especially when the patient reaches stage 4 or 5. Anaemia of CKD contributes significantly to the burden of CKD. However, it is potentially reversible and manageable with appropriate identification and treatment.
- The total cost of CKD in England in 2009–10 was estimated at between £1.44 and £1.45 billion, which was approximately 1.3% of all NHS spending in that year.

Current practice

- Standard management of CKD involves the use of both pharmacological and nonpharmacological interventions, as well as the provision of education and support.
- The risk of progression and adverse outcomes in a person with, or at risk of, CKD is currently determined through monitoring creatinine-based estimates of GFR (eGFRcreatinine) and urine albumin:creatinine ratio.

Estimates of GFR based on serum cystatin C (eGFRcystatinC) have a higher specificity for significant disease outcomes than those based on serum creatinine. For people with a borderline diagnosis, eGFRcystatinC is an additional diagnostic tool that may reduce over diagnosis. New evidence suggests the use of risk equations in predicting end stage renal disease in CKD patients.

- Currently, eGFR is reviewed at least annually in people with CKD to check for decline indicating CKD progression. However, there is new evidence on the potential value of smaller declines in eGFR to indicate CKD progression over 1, 2 and 3 years.
- Standard management of stage 4 and 5 CKD involves maintaining acceptable levels of serum phosphate. This can be achieved by the use of phosphate-binding agents in addition to dietary management. Calcium-based binders are current first-line treatment. If a person remains hyperphosphataemic, a non-calcium-based binder is used in combination with, or instead of, a calcium-based binder. Sevelamer hydrochloride is one of the non-calcium-based binders currently used. However, sevelamer carbonate is available at a considerably reduced cost compared to its hydrochloride form, as a generic version.
- For people with suspected CKD-associated anaemia, diagnostic measures determining iron status aim to identify which patients need iron supplementation, as well as those who do not. The threshold for investigation of CKD-associated anaemia is an eGFR below 60 ml/min/1.73m^2 in the current NICE guideline. However, new evidence indicates that this does not reflect current clinical practice, where the preferred threshold is less than 30 ml/min/1.73m^2.

2 Who the guideline is for

This guideline is for:

- healthcare professionals in primary, secondary and tertiary care
- commissioners and providers of NHS healthcare services
- people with suspected or diagnosed CKD and their families and carers.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the Welsh Government, Scottish Government and Northern Ireland Executive.

Equality considerations

NICE has carried out an equality impact assessment during scoping. The assessment:

- lists equality issues identified, and how they have been addressed
- explains why any groups are excluded from the scope.

The guideline will look at inequalities relating to age, disability, race, socioeconomic group and sex.

3 What the updated guideline will cover

3.1 Who is the focus?

Groups that will be covered

Adults, children and young people with suspected or diagnosed CKD stages 1 to 5.

The following subpopulations will be covered.

For management of mineral and bone disorder in CKD:

- Adults, children and young people who are at risk of mineral and bone disorder with:
  - stage 4 or 5 CKD who are not on dialysis and
  - stage 5 CKD who are receiving haemodialysis, haemodiafiltration or peritoneal dialysis.

For managing anaemia:

- Adults, children and young people with suspected or diagnosed anaemia caused by CKD stages 1 to 5, including those with:

  - pre-dialysis CKD
  - established renal failure receiving conservative management or receiving renal replacement therapy (RRT)
  - a functioning kidney transplant
  - a failing kidney transplant with stage 3 or above CKD

Specific consideration will be given to the assessment and management of CKD in:

- Older people.
- People from black, Asian and other minority ethnic groups.
- People at high risk of developing progressive CKD (for example, people with diabetes, hypertension or cardiovascular disease, or people recovering from acute kidney injury).
- People with a family history of renal disease.

Groups that will not be covered

- Assessment and management of CKD in:
  - people receiving RRT
  - people with acute kidney injury combined with rapidly progressive glomerulonephritis
  - pregnant women
  - people receiving palliative care.
- Management of mineral and bone disorder in CKD in adults, children and young people with stage 1–3 kidney disease.
- Management of anaemia that is not principally caused by CKD, for example anaemia caused by:
  - haematological disease
  - other acute and chronic inflammatory disease states
  - malignancy
  - acquired immunodeficiency syndrome
  - acute kidney injury
  - nutritional anomalies.

3.2 Settings

Settings that will be covered

The guideline will cover all settings where NHS-funded care is provided.

3.3 Activities, services or aspects of care

Key areas that will be covered in this update

We will look at evidence in the areas below when developing this update. We will consider making new recommendations or updating existing recommendations in these areas only.

1 Investigations for CKD in adults, children and young people.
   - accuracy of cystatin C-based estimate of GFR for diagnosing CKD in adults, children and young people
   - interpreting GFR values for diagnosing CKD in children, young people and adults from black, Asian and other minority ethnic groups
   - when to test for proteinuria in children and young people
   - when to test for haematuria in children and young people
   - which children and young people should be tested for CKD?

2 Classification of CKD in adults, children and young people
   - classification of CKD
   - determining the risk of adverse outcomes.

3 Monitoring in adults, children and young people with CKD
   - frequency of monitoring
   - defining progression of CKD.

4 Blood pressure control for adults, children and young people with CKD.

5 Management of mineral and bone disorder in CKD in adults, children and young people:
   - Calcium- and non-calcium-based phosphate binders to manage mineral and bone disorder in CKD.

6 Diagnostic evaluation and assessment of anaemia in adults, children and young people:
   - diagnostic role of glomerular filtration rate.

7 Managing anaemia in adults, children and young people:
- IV iron for treating anaemia associated with CKD.

Proposed outline for the guideline

The table below outlines all the areas that will be included in the guideline. It sets out what NICE plans to do for each area in this update.

Area of care	What NICE plans to do
Assessment and management of chronic kidney disease (original CG182)	
1.1 Investigations for CKD in adults, children and young people	
Measuring kidney function: Creatinine-based estimate of GFR (recs 1.1.1–1.1.5) Cystatin C-based estimate of GFR (recs 1.1.6–1.1.9) Reporting and interpreting GFR values (recs 1.1.10–1.1.13) When to use a cystatin C-based estimate of GFR for diagnosis of CKD (recs 1.1.14–1.1.15) When highly accurate measures of GFR are required (rec 1.1.16)	Review evidence for when to use cystatin C-based estimate of GFR for diagnosis of CKD in children, young people and adults: update existing recommendations as needed Review evidence for interpreting GFR values for diagnosis of CKD in children, young people and adults from black, Asian and minority ethnic groups: update existing recommendations as needed Retain all other recommendations in this section. Note that the existing recommendations do not cover children and young people
Proteinuria (recs 1.1.17–1.1.22) Haematuria (rec 1.1.23) Isolated invisible haematuria (recs 1.1.24–1.1.26) Who should be tested for CKD (recs 1.1.27–1.1.29)	Review evidence for children and young people No evidence review for adults: retain recommendations from existing guideline
1.2 Classification of CKD	
Classification of CKD (recs 1.2.1–1.2.2)	Review evidence: update existing recommendations as needed Review evidence for children and young people
Investigating the cause of CKD and determining the risk of adverse outcomes (recs 1.2.3–1.2.4)	Review evidence for determining the risk of adverse outcomes: update existing recommendation as needed Review evidence for determining the risk of adverse outcomes in children and young people Retain all other recommendations in this section. Note that the existing recommendations do not cover children and young people

Indications for renal ultrasound (recs 1.2.5–1.2.6)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people Cross-refer to the NICE guideline on acute kidney injury (CG169) as needed
1.3 Monitoring	
Frequency of monitoring (recs 1.3.1–1.3.2) Defining Progression (Recs: 1.3.3–1.3.6)	Review evidence: update existing recommendations as needed Review evidence for children and young people
Risk factors associated with CKD progression (recs 1.3.7–1.3.8)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people
Acute kidney injury and CKD (recs 1.3.9–1.3.10)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people Cross-refer to the NICE guideline on acute kidney injury (CG169) as needed
1.4 Information and education	
Information and education (recs 1.4.1–1.4.5)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people Cross-refer to the NICE guideline on patient experience in adult NHS services (CG138) as needed
Lifestyle advice (recs 1.4.6–1.4.9) Self-management (Recs 1.4.10–1.4.11)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people
1.5 Referral criteria	
Referral criteria (recs 1.5.1–1.5.5)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people Cross-refer to the NICE technology appraisal guidance on tolvaptan for treating autosomal dominant polycystic kidney disease (TA358) as needed

1.6 Pharmacotherapy	
Blood pressure control (recs 1.6.1–1.6.2)	Review evidence: update existing recommendations as needed Review evidence for children and young people
Choice of antihypertensive agent (recs 1.6.3–1.6.14) Statins (rec 1.6.15) Oral antiplatelets and anticoagulants (recs 1.6.16–1.6.17)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people
1.7 Other complications	
Bone metabolism and osteoporosis (recs 1.7.1–1.7.3) Vitamin D supplements in the management of CKD-mineral and bone disorders (recs 1.7.4–1.7.7)	No evidence review: retain recommendations from existing guideline. Note that the existing recommendations do not cover children and young people Cross-refer to the NICE technology appraisal guidance on Etelcalcetide for treating secondary hyperparathyroidism (TA448) as needed
Anaemia (rec 1.7.8)	Recommendation to be replaced by update of managing anaemia section
Oral bicarbonate supplements in the management of metabolic acidosis (rec 1.7.9)	No evidence review: retain recommendation from existing guideline. Note that the existing recommendations do not cover children and young people
Management of mineral and bone disorder in chronic kidney disease (original CG157)	
Dietary management: children, young people and adults (recs 1.1.1–1.1.4)	No evidence review: retain recommendations from existing guideline
Calcium and non-calcium containing phosphate binders: children and young people (recs 1.1.5–1.1.7) Calcium and non-calcium containing phosphate binders: adults (recs 1.1.8–1.1.12) Calcium and non-calcium containing phosphate binders: children, young people and adults (recs 1.1.13–1.1.15)	Review evidence: update existing recommendations as needed Footnote to be added referring reader to information on the maximum recommended dose of a calcium-based binder Retain recommendation 1.1.15 on prescribed supplements
Treatment review (rec: 1.1.16)	No evidence review: retain recommendations from existing guideline
Chronic kidney disease: managing anaemia (original NG8)	
1.1 Diagnostic evaluation and assessment of anaemia	

Diagnostic role of haemoglobin levels (rec 1.1.1)	No evidence review: retain recommendation from existing guideline
Diagnostic role of glomerular filtration rate (rec: 1.1.2)	Review evidence: update existing recommendation as needed
Diagnostic test to determine iron status and predict response to iron therapy (recs 1.1.3 and 1.1.4) Measuring erythropoietin (rec 1.1.5)	No evidence review: retain recommendations from existing guideline
1.2 Managing anaemia	
Initiation of ESA therapy in iron-deficient patients (rec 1.2.1)	No evidence review: retain recommendations from existing guideline
IV iron for the treatment of anaemia associated with CKD	Review evidence: new area in the guideline
Maximum iron levels in patients with anaemia of CKD (rec 1.2.2) Clinical utility of ESA therapy in iron-replete patients (recs 1.2.3–1.2.7) Nutritional supplements (rec 1.2.8) Androgens (rec 1.2.9)	No evidence review: retain recommendations from existing guideline
Hyperparathyroidism (rec 1.2.10)	No evidence review: retain recommendation from existing guideline Cross-refer to the NICE technology appraisal guidance on cinacalcet for the treatment of secondary hyperparathyroidism (TA117) as needed
Patient-centred care: ESAs (recs 1.2.11–1.2.15)	No evidence review: retain recommendations from existing guideline
Patient education programmes (rec 1.2.16)	No evidence review: retain recommendations from existing guideline Cross-refer to the NICE guidelines on multimorbidity: clinical assessment and management (NG56) and patient experience in adult NHS services (CG138) as needed
1.3 Assessment and optimisation of erythropoiesis	

Benefits of treatment with ESAs (rec 1.3.1) Blood transfusions (recs 1.3.2–1.3.3) Comparison of ESAs (rec 1.3.4) Coordinating care (rec 1.3.5) Providing ESAs (rec 1.3.6) ESAs: optimal route of administration (recs 1.3.7–1.3.8) ESAs: dose and frequency (rec 1.3.9) Optimal Hb levels (recs 1.3.10–1.3.13) Adjusting ESA treatment (recs 1.3.14–1.3.16) Treating iron deficiency: correction (rec 1.3.17) Treating iron deficiency: maintenance (rec 1.3.18) ESAs: monitoring iron status during treatment (rec 1.3.19) Iron therapy for people who are iron deficient and not on ESA therapy (recs 1.3.20–1.3.21) Iron therapy for people who are iron deficient and receiving ESA therapy (recs 1.3.22–1.3.24)	Review evidence for optimal Hb levels in children and young people, update existing recommendations as needed No evidence review for optimal Hb levels in adults: retain recommendations from existing guideline Retain all other recommendations in this section
1.4 Monitoring treatment of anaemia of CKD	
Monitoring iron status (recs 1.4.1–1.4.2) Monitoring Hb levels (rec 1.4.3) Detecting ESA resistance (recs 1.4.4–1.4.6) Managing ESA resistance (recs 1.4.7–1.4.8) Role of blood transfusion in managing ESA resistance (recs 1.4.9–1.4.12)	No evidence review: retain recommendations from existing guideline

Recommendations in areas that are being retained from the existing guideline may be edited to ensure that they meet current editorial standards, and reflect the current policy and practice context.

Areas that will not be covered by the guideline

1 Treating specific causes of CKD, such as glomerular and tubulointerstitial disease, or nephrotic syndrome.

2 Managing pregnancy in women with CKD.

3 Managing acute kidney injury in people with CKD.

4 Diagnosing mineral and bone disorder in people with CKD.

5 Diagnosing and managing hyperparathyroidism.

6 Diagnosing and managing renal bone disease.

7 Primary management of chronic metabolic acidosis, except as a consequence of treating mineral and bone disorder in CKD.

8 Primary management of hypophosphataemia, except as a consequence of treating mineral and bone disorder in CKD.

9 Treatments with the primary aim of increasing bone density.

10 Renal replacement therapy (dialysis and transplantation) and conservative management, including efficacy of dialysis regimens and impact on the management of acquired cystic kidney disease as covered by the NICE guideline on renal replacement therapy and conservative management (NG107).

11 Prognostic value of serum phosphate level and other biochemical markers, except when considered in the context of specified therapeutic interventions.

12 Treating malnutrition.

Related NICE guidance

Published

- Renal replacement therapy and conservative management (2018) NICE guideline NG107
- Peripheral arterial disease: diagnosis and management (2018) NICE guideline CG147
- Etelcalcetide for treating secondary hyperparathyroidism (2017) NICE technology appraisal guidance 448
- Multimorbidity: clinical assessment and management (2016) NICE guideline NG56
- Hypertension in adults: diagnosis and management (2016) NICE guideline CG127
- Diabetic foot problems: prevention and management (2016) NICE guideline NG19
- Care of dying adults in the last days of life (2015) NICE guideline NG31
- Type 2 diabetes in adults: management (2015) NICE guideline NG28
- Blood transfusion (2015) NICE guideline NG24

- Diabetic foot problems: prevention and management (2015) NICE guideline NG19
- Diabetes (type 1 and type 2) in children and young people: diagnosis and management (2015) NICE guideline NG18
- Suspected cancer: recognition and referral (2015) NICE guideline NG12
- Preventing excess weight gain (2015) NICE guideline NG7
- Tolvaptan for treating autosomal dominant polycystic kidney disease (2015) NICE technology appraisal guidance 358
- Apixaban for the treatment and secondary prevention of deep vein thrombosis and/or pulmonary embolism (2015) NICE technology appraisal guidance 341
- Cardiovascular disease: risk assessment and reduction, including lipid modification (2014) NICE guideline CG181
- Atrial fibrillation: management (2014) NICE guideline CG180
- Acute kidney injury: prevention, detection and management (2013) NICE guideline CG169
- Apixaban for preventing stroke and systemic embolism in people with nonvalvular atrial fibrillation (2013) NICE technology appraisal guidance 275
- Rivaroxaban for the prevention of stroke and systemic embolism in people with atrial fibrillation (2012) NICE technology appraisal guidance 256
- Dabigatran etexilate for the prevention of stroke and systemic embolism in atrial fibrillation (2012) NICE technology appraisal guidance 249
- Depression in adults with a chronic physical health problem: recognition and management (2009) NICE guideline CG91
- Cinacalcet for the treatment of secondary hyperparathyroidism in patients with end-stage renal disease on maintenance dialysis therapy (2007) NICE technology appraisal guidance 117

In development

- Intrapartum care for women with existing medical conditions or obstetric complications and their babies. NICE guideline. Publication expected March 2019

- Hypertension in adults: diagnosis and management. NICE guideline. Publication expected August 2019
- Shared decision making. NICE guideline. Publication expected April 2021
- Point-of-care creatinine tests to assess kidney function before administering intravenous contrast for computed tomography (CT) imaging. NICE diagnostic assessment. Publication expected October 2019
- Sodium zirconium cyclosilicate for treating hyperkalaemia. NICE technology appraisal guidance. Publication date TBC
- Patiromer for treating hyperkalaemia. NICE technology appraisal guidance. Publication date TBC

NICE guidance that will be updated by this guideline

- Chronic kidney disease: managing anaemia (2015) NICE guideline NG8
- Chronic kidney disease (stage 4 or 5): management of hyperphosphataemia (2013) NICE guideline CG157
- Chronic kidney disease in adults: assessment and management (2014) NICE guideline CG182

NICE guidance about the experience of people using NHS services

NICE has produced the following guidance on the experience of people using the NHS. This guideline will not include additional recommendations on these topics unless there are specific issues related to CKD:

- Medicines optimisation (2015) NICE guideline NG5
- Patient experience in adult NHS services (2012) NICE guideline CG138
- Medicines adherence (2009) NICE guideline CG76

3.4 Economic aspects

We will take economic aspects into account when making recommendations. We will develop an economic plan that states for each review question (or key area in the scope) whether economic considerations are relevant, and if so whether this is an area that should be prioritised for economic modelling and analysis. We will review the published economic evidence and carry out

economic analyses, using an NHS and personal social services (PSS) perspective, as appropriate.

3.5 Key issues and draft questions

While writing the scope for this updated guideline, we have identified the following key issues and review questions related to them:

Assessment and management of CKD

1 Investigations for CKD:

1.1 Which children and young people should be tested for CKD?

1.2 What is the accuracy of cystatin C-based equations to estimate GFR as a measurement of kidney function in adults, children and young people?

1.3 In adults, children and young people from black, Asian and other minority ethnic groups with CKD, what is the biological and analytical variability in eGFR testing and what factors (including fasting) affect it?

1.4 In children and young people with CKD, what is the accuracy of reagent strips for detecting protein and blood in urine?

1.5 What is the accuracy of albumin:creatinine ratio versus protein:creatinine ratio measurements to quantify proteinuria in children and young people with CKD?

2 Classification of CKD:

2.1 What is the best combination of measures of kidney function and markers of kidney damage to identify increased risk of progression in adults, children and young people with CKD?

2.2 For adults, children and young people with suspected CKD, what is the effect of proteinuria and/or albuminuria at any given eGFR on adverse outcomes?

2.3 For adults, children and young people with suspected CKD, what is the effect of interventions to lower proteinuria on favourable outcomes?

3 Monitoring:

3.1 For adults, children and young people with CKD, what constitutes a clinically significant decline in eGFR in terms of risk of kidney disease progression?

3.2 For adults, children and young people with CKD what is the optimal monitoring frequency based on different rates of decline in eGFR?

4 Blood pressure control:

4.1 In adults with proteinuric or nonproteinuric CKD, what are the optimal blood pressure ranges for slowing kidney disease progression, and for reducing cardiovascular disease risk and mortality?

Management of mineral and bone disorder in CKD

5 Managing refractory disease:

5.1 For people with stage 4 or 5 CKD who are not on dialysis, which phosphate binder, calcium and non-calcium based, is most effective in managing serum phosphate and its associated outcomes?

5.2 For people with stage 5 CKD who are on dialysis, which phosphate binder, calcium and non-calcium based, is most effective in managing serum phosphate and its associated outcomes?

Diagnosis and management of anaemia in CKD

6 Diagnostic role of glomerular filtration rate:

6.1 For people with CKD, what eGFR threshold should trigger investigation of anaemia being due to CKD?

7 Optimal haemoglobin levels:

7.1 What should be the aspirational haemoglobin target range for children and young people undergoing treatment for anaemia in CKD?

8 The use of IV iron for the treatment of anaemia associated with CKD:

8.1 For people with stage 5 CKD who are on dialysis, what amount of IV iron is most clinically and cost effective in managing anaemia and its associated outcomes?

3.6 Main outcomes

The main outcomes that may be considered when searching for and assessing the evidence are:

- mortality (all cause and cardiovascular)

- morbidity, including progression of CKD, fractures, advancement of renal bone disease, vascular calcification, cardiovascular impact, anaemia and other issues related to high serum phosphate levels
- hospitalisation
- patient safety (serious adverse events)
- health-related quality of life
- markers of mineral and bone disorder in CKD, such as phosphate, calcium, parathyroid levels
- markers of anaemia, such as haemoglobin, iron and ferritin levels.

4 NICE quality standards and NICE Pathways

4.1 NICE quality standards

NICE quality standards that may need to be revised or updated when this guideline is published

- Chronic kidney disease in adults (2011 updated 2017) NICE quality standard 5.

4.2 NICE Pathways

When this guideline is published, we will update the existing NICE Pathway on chronic kidney disease. NICE Pathways bring together everything NICE has said on a topic in an interactive flow chart.

5 Further information

This is the final scope, which takes into account comments from registered stakeholders during consultation.

You can follow progress of the guideline.

Our website has information about how NICE guidelines are developed.