



Renal dialysis

Costing approach learning extension (formerly CA3)

Version 1, March 2022

Renal dialysis

Purpose: To ensure renal dialysis is costed in a consistent way.

Objective

1. To improve the quality of cost data for renal dialysis.

Scope

2. This standard should be applied to all renal dialysis activity performed by all organisations whether you are a renal specialist centre or not.

Overview

3. Chronic kidney disease is a long-term condition in which the kidneys do not work effectively, notably in filtering waste products from the blood. It is usually caused by damage to the kidneys from other conditions, most commonly diabetes and high blood pressure.
4. The kidneys also:
 - help to maintain blood pressure
 - maintain the correct levels of chemicals in the body, which is important for heart and muscle function
 - produce the active form of vitamin D that keeps bones healthy
 - produce erythropoietin, a substance that stimulates red blood cell production.
5. No cure exists for chronic kidney disease, although treatment can slow or halt its progression and prevent other associated serious conditions. Many patients can be managed in primary care but if the disease progresses to kidney failure or end-stage kidney disease, patients may need dialysis or a kidney transplant. This guidance focuses on costing dialysis.

6. Patients with acute kidney injury (AKI) may also receive dialysis. Their kidney function deteriorates very quickly, often as a complication of another serious illness.
7. The care pathway varies according to type of treatment and organisation.
8. **Haemodialysis** (diverting blood into an external machine, where it is filtered before being returned to the body) can be given in an acute hospital, a satellite unit (a community hospital, GP surgery or completely separate building) or at home. Most patients have three sessions per week with each treatment lasting about four hours. Patients at home may have more than three sessions a week.
9. **Peritoneal dialysis** (pumping dialysis fluid (dialysate) into the space in the abdomen (peritoneal cavity) to draw out waste products from the blood passing through the vessels lining the abdomen, and then draining this fluid from the abdomen) is given at home. There are two types:
 - continuous ambulatory peritoneal dialysis (CAPD): four bag exchanges a day, seven days a week is usual
 - automated peritoneal dialysis (APD): a machine filters a patient's blood at night while they sleep; a variation is assisted APD, where a healthcare professional goes into the patient's home to help them set this up (often necessary because of the size of the bags).
10. Some patients (eg those with AKI) may be admitted to hospital (eg to an intensive care unit or renal ward) for treatment.
11. Healthcare resource groups (HRGs) are generated from the information flowing to the renal registry dataset (UKRR)¹ so this data source may be helpful in improving the costing. There is no requirement to reconcile the UKRR to Feeds 1a, 1b and 1c: Admitted patient care (APC), or Feeds 3a, 3b and 3c: Non-admitted patient care (NAPC), for costing.
12. However, please be aware that activity may or may not be recorded in the patient administration system (PAS) or in the APC Commissioning Data Set (APC CDS) or Outpatient CDS.

¹ <https://www.renalreg.org/datasets/the-uk-renal-registry-dataset/> This dataset is not part of the patient-level information feeds described in Standard IR1: Collecting information for costing.

Approach

13. Discuss with clinical and service leads to understand how the data is recorded locally, and therefore how it will be available for the costing process. Also discuss whether the care pathway for children and young people differs from that for adults.

Identifying the activity

14. Different types of renal dialysis have different currencies and counting methods:
 - haemodialysis is counted per session (HRGs LD01* to LD10*):
 - home haemodialysis is counted by week
 - providers must identify patients seen away from their normal base (holiday haemodialysis)
 - peritoneal dialysis is counted per day (HRGs LD11* to LD13*)
 - acute kidney disease haemodialysis is counted per session (HRGs LE*).
15. Renal dialysis is an unbundled HRG. If the patient attends solely for renal dialysis, a core HRG of LA97A or LA97B is generated.
16. Some organisations may not record haemodialysis-at-home activity, particularly where it is contracted to an independent sector provider. As a superior method, you can find out from the renal department the average number of sessions of home haemodialysis per patient aged 19 and over, as well as the total number of patients receiving this treatment, and create proxy records to ensure the costs are allocated to a patient event.
17. Where there is no patient or proxy event recorded, ensure the costs of equipment, consumable items and staff used for the homecare service in the GL remain identifiable as homecare dialysis and are not allocated across patients who did not receive the service. This information will form part of the Homecare exclusion in the National Cost Collection.
18. For dialysis provided by a hub-and-spoke configuration, the activity and costs should be recorded in the submission from the NHS provider contractually responsible for delivering the care.
19. Table CA3.1 is an excerpt from Spreadsheet CP3.3 showing the resource and activity combinations to use for renal dialysis. This issue is known to have caused variability in national unit costs.

Table CA3.1: Excerpt from Spreadsheet CP3.3 showing the resource and activity links for renal dialysis session costs.

Resource	Activity			
	Renal dialysis	Supporting contact 1:1 inpt unit	Dispensing high-cost drugs	Dispense patient level medicine scripts
Patient-specific consumables	£X			
Medical and surgical consumables	£X			
Medical and surgical equipment and maintenance	£X			
Consultant	£X			
Non-consultant medical staff	£X			
Nurse	£X			
Specialist nurse	£X			
Healthcare assistant	£X			
Dietitian		£X		
Psychologist		£X		
Medicines			£X	£X

Identifying the costs

20. You need to identify with finance colleagues all costs directly associated with the procedure. These fall into the main areas outlined below.

Medical staff

21. You should use Standard CM1: Medical staffing, to allocate medical staff costs – based on job plans, rotas or through discussion with clinicians and managers – at the patient level, after checking what the medical input is during dialysis.
22. If medical input relates directly to the delivery of dialysis or there is a zero-cost core HRG, flag these costs in your costing system. Otherwise, leave the medical costs with the core HRG.
23. Medical staff may undertake sessions at satellite sites. For example, they may undertake two programmed activities per week, one for patient clinics and one for clinical multidisciplinary team (MDT) meetings to discuss patient progress with nurses and other healthcare professionals. You need to allocate these costs to the correct satellite unit in your cost ledger.
24. In some organisations medical staff input during the actual dialysis will be minimal. Others carry out ward rounds. Discuss the level of input with clinical and service leads and apportion their costs accordingly.
25. Some organisations find it hard to identify the proportion of medical staffing costs recorded under sub-specialty TFC 361 (nephrology) that should be allocated to dialysis and non-dialysis activity. Discuss how the TFC is used with the service and the informatics team.
26. Anaesthetic medical staff may be required at times to insert dialysis lines.² Work with the renal dialysis department and anaesthetic medical staff to identify this care and develop an appropriate relative weight value for each procedure.

² A dialysis 'line' is a tube inserted into the patient to take the blood to the dialysis machine and return it to the body.

Specialist nurses

27. Work with the renal service team to identify the staff involvement in administering dialysis. Use timetables to allocate costs between outpatients, inpatients, and the administration of dialysis itself, including by treatment type. You may need to ask what the average nursing input is for each type of dialysis, to determine this allocation by treatment type.
28. Most organisations have nurses who visit patients on home dialysis. This activity may be recorded as a non-admitted patient care (NAPC) patient event. Establish the frequency of these visits and allocate the costs accordingly.

Other healthcare professionals

29. The dialysis patient requires a wide clinical MDT. This may include but is not limited to:
 - dietitians, social workers, psychologists and counsellors – allocate over the renal dialysis unit activity or as a superior method use the ‘supporting contact’ activity and Feed 7: Supporting contacts, as the information source to match the staff input to the patient event
 - specialist pharmacists – use the ‘pharmacy work’ activity and the relative weight value developed in line with Standard CM10: Pharmacy and medicines.

Dialysis centre/ward

30. Meet the service/clinical lead for renal dialysis to get a clear understanding of the machinery and ward space (for patients not on home dialysis) used for the different types of treatment.
31. The way in which a patient’s circulation is accessed for dialysis will impact on the consumable costs of a dialysis patient event. You should discuss this with the dialysis team to understand if the costs of consumables are material. If they are, you should include them in Feed 15: Prostheses and high-cost devices, according to Standard CM21: Clinical non-pay items.
32. There are two types of access to the body for the dialysis process, both of which are installed before the start of dialysis. The cost of the procedures to

install access should not be included in the cost of dialysis events (see 'Other considerations' below):

- Arteriovenous fistula – patients undergoing haemodialysis have an arteriovenous fistula (a special blood vessel) made by surgically connecting an artery to a vein four to eight weeks before dialysis begins. Alternatively, these patients may have an arteriovenous graft (synthetic tubing) or a neck line.
 - Catheter – patients on peritoneal dialysis have a catheter inserted into an incision in their abdomen; dialysate is pumped through this into the peritoneal cavity. The catheter is permanently attached to the abdomen.
33. Dialysis machines may be dedicated to particular patients on a one-to-one basis or restricted to use by a group of patients with blood-borne viruses. If the cost of capital charges, leasing and/or consumable items is material, you need to determine:
- which patients use machines that are for their use only and allocate each machine's capital charges from the asset register to the dialysis treatment
 - which patients use machines restricted to use by a specific group of patients and allocate each machine's capital charges from the asset register to the dialysis treatment across the patients who use a machine.
34. You should obtain information from engineering and technical staff to allocate their and other maintenance costs across all equipment in the hospital.
35. Be aware that a hospital dialysis unit may treat different groups of patients:
- patients with defined end-stage kidney disease whether as outpatients or inpatients – both pay and non-pay costs fall within the chronic dialysis HRGs
 - patients with AKI – often sicker patients needing higher staffing ratios; associated staffing costs should be allocated to an AKI HRG (when available) and not included in costing for chronic dialysis
 - patients undergoing non-dialysis treatments, eg plasma exchange, antibody removal therapy for transplantation – although pay and non-pay costs for these procedures may be included in the dialysis unit ledgers, they should not be included in chronic dialysis HRG costing.

36. The water used in dialysis units is specially treated. Some organisations plumb their water treatment plant directly into the ward. Others use a mobile water treatment unit taken with the dialysis equipment to the patient on a main ward. Allocate the costs of these mobile water treatment units as suggested for machines.

Dialysis facilities in critical care or on wards

37. You can use the UKRR to identify patients who received dialysis outside the dedicated setting, either directly or by cross-matching with ward data. Then allocate the costs of machinery to those patients on the same basis as above (dialysis ward/satellite units).

Satellite sites

38. Repeat the process above for any satellite sites.
39. The standardised cost ledger in Spreadsheet CP2.1 is set up to easily identify the relevant costs, particularly if your organisation has multiple satellite units. For example, use cost centres:
- XXX073 – Renal dialysis home
 - XXX086 – Renal dialysis main hospital
 - XXX087 – Renal dialysis satellite
 - XXX088 – Renal dialysis peritoneal.
40. You can customise these codes for identification purposes or to disaggregate costs – for example to identify different satellite centres.
41. Individual satellites may be set up in different ways (even in the same organisation). For example:
- Satellite 1 is provided and run by your organisation; the costs and activity should be reported according to the main site.
 - Satellite 2 is provided by an independent sector provider – the level of information provided will vary (a cost per treatment may be given with no breakdown of costs or any activity information); you may provide different levels of input, eg just medical staffing or medical staffing and the machines. (see Standard CM8: Clinical and commercial services).

- Satellite 3 is provided by your organisation, but the activity is for another organisation; the activity and/or costs should not form part of your organisation's return (see Standard CM8: Clinical and commercial services).
42. You may need to create proxy patients in the costing system to allocate the income and costs where activity information is unavailable – for example where home dialysis has no patient event. These records should be identifiable as proxy records. See Standard IR1: Collecting information for costing for more information on creating proxy records.

Medicines³

43. Medicines – including high-cost drugs – should be matched to the correct patients using Feed 10: Medicines dispensed. This will include medicines used for dialysis such as erythropoiesis stimulating agents
44. Any non-patient-identifiable medicine costs used on the dialysis unit are allocated using the allocation methods in Spreadsheet CP3.3.

Medical and surgical consumables and equipment

45. Consumables are major cost drivers for renal dialysis, so need to be carefully allocated. You should refer to Standard CM21: Clinical non-pay items and allocate material items to patients using Feed 15: Prostheses and high-cost devices. For non-material items you need to set up relative weight values to allocate cost across the patients who used the service.
46. The renal department will keep track of the supplies ordered for each patient at home, so with its help you should be able to agree which items are material and get the information for Feed 15: Prostheses and high-cost devices, if required,⁴ or to identify as homecare dialysis costs without a patient-level event recorded. If the consumables and fluids for peritoneal dialysis are not material, you can use the department information to divide them between treatment types.

³ For further guidance on costing methods for pharmacy and medicines, please see Standard CM10: Pharmacy and medicines.

⁴ Be aware there may not be a patient event to match these items to if you do not have a proxy/anonymised patient event for home services, so the items will show as 'unmatched'.

47. Equipment and maintenance costs are also significant in renal dialysis. The department will keep track of the equipment and maintenance for the dialysis machines, so you can use this information to inform the development of relative weight values by procedure type.
48. Be aware that the consumables delivered to the satellite units may have been ordered by a central unit (eg main hospital). These costs are not always allocated to the correct satellite unit but remain in the main hospital's costs, overstating the main site's costs and understating the satellite units' costs.
49. Where the independent sector is used, these costs may be covered by the charge to the NHS provider (cost per treatment) and the consumables are not purchased by the NHS provider. This should be established with the service.
50. The size of the bags varies (standard is two litres, but it may be up to five litres). Different types of fluid are also available (with very different costs).

Patient travel

51. Patient travel to dialysis has been identified as a significant cost to providers therefore clear information about this is helpful. Include patient transport costs in renal dialysis patient events, using overhead ID: T1S405 Patient transport to retain clarity. This will allow patient events to be reviewed with or without the patient transport element.⁵

Home delivery

52. Work with the management accountant and service lead for renal medicine to identify costs of home delivery. These are usually in a separate cost centre and should include the costs of machine maintenance and delivery of consumables and medicines to the patient's home.
53. The cost ledger should contain sufficient information to split the costs between dialysis treatments. If not, invoices received directly may have to be analysed with the help of the accountant and directorate. However, we do not intend you to manually enter patient-level data from invoices.

⁵ Please review treatment of patient transport costs within the National Cost Collection Guidance.

54. Use the resource and activity matrix in Table CA3.1 for home delivery renal medicine.

Patients seen away from their normal base

55. Providers must identify patients dialysed away from their normal base (holiday haemodialysis). Patients must apply to the specialist commissioning group in the part of the country they wish to visit, and this then funds the treatment.
56. The cost and activity for these patients shows in the organisation that provides the care. This allows renal service analysis across the country to be reviewed at national level, following the National Cost Collection which is matched to the national activity datasets.

Information technology

57. Bespoke renal IT systems are often needed to collect data from dialysis sessions for internal electronic patient record use and mandatory returns to the UK Renal Registry. These systems' pay and non-pay costs should be included in dialysis costing.
58. A mandatory capitation fee for all dialysis patients is payable to the UK Renal Registry. This cost needs to be allocated to dialysis patient events.

Other considerations

59. Other activities may be performed before treatment, eg insertion of an arteriovenous fistula or catheter.
60. Where these procedures and the clinic review associated with them are in a separate patient event from the dialysis, they should **not** be included in the dialysis cost.
61. Some organisations report issues coding these patients. Discuss overall activity figures for each of the treatment types with the service lead to identify the overall activity count expected for the year. This can then be used to verify the activity information provided by the informatics department.

62. Considerable capital costs are involved, eg the cost of a water treatment plant at the main hospital site. This includes maintenance costs, some of which may be paid for under a contract, and some internal maintenance staff costs.
63. Organisations procure dialysis machines in different ways. Some have a rolling capital programme where machines are replaced about every seven to twelve years (or by number of hours used), while others lease machines on a cost per treatment (or per year) basis. This machine cost must be included in the cost of treatments. A patient on home dialysis uses their own machine, whereas in a centre machine are usually shared, and cost should be apportioned appropriately. Some in-centre patients also require single or group-specific use machines for infection control.
64. For patients receiving dialysis at home, conversion costs are involved, including nursing assessment costs, electricity and water supply, and drainage facilities. These costs should be included in the cost of home haemodialysis. The machines provided for home use may be purchased new, may be ex-hospital machines or may be leased on a cost per treatment basis (which may include machine and consumables).
65. Patients dialysed at home may be reimbursed for their raised utility bills. This is particularly relevant for haemodialysis if the patient has a water meter and for some dialysis machines that use a lot of electricity.

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