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PHARMACY: ADULT AND PAEDIATRIC SERVICES

3.1 ADULT SERVICES

The fundamental objective of adult renal pharmacy services is to provide effective pharmaceutical care (direct and indirect), to promote and deliver medicine optimisation, supporting people with CKD to get the best healthcare outcomes from their medicines. The pharmacist is an integral member of the renal multi-professional team, who provides support to renal services in addition to direct pharmaceutical patient care by:

- Writing, reviewing and implementing medicines-related clinical guidelines;
- Overseeing medicine expenditure analysis including management of high cost medicines, compliance with regulatory authorities, medicines evaluation and horizon scanning;
- Providing patient/staff education and training;
- Undertaking audit and clinical/practice research.

Experienced renal pharmacists also contribute to and influence national medicines policies.

Chronic kidney disease and medicine optimisation

People with CKD are prescribed on average ten to twelve regular medications per day.¹ Drug dosing is frequently complex due to renal impairment. Polypharmacy is commonplace for patients with CKD. It is well documented that around 1 in 20 admissions to hospital are related to adverse drug reactions.² Frequent medication changes, from different healthcare providers, also pose a risk of drug related morbidity. One medication related problem is reported to be identified within this population for every 6.5 medications prescribed. It is reported that in CKD, 20% of hospital admissions are directly related to medication related problems and 5% of these hospital admissions are avoidable.³ Dialysis patients see multiple prescribers which further increases the risk of errors in records.³ Hospitalisation rates amongst haemodialysis patients in the United States are reported at 1.7 admissions per patient year, double that of transplant patients (0.8 admissions per patient year).⁴ Improving the medicines reconciliation process decreased the length of hospital admission for renal transplant patients, therefore regular pharmacist medication review and medicine optimisation is essential for these 'at risk' patients.⁵

Clinical pharmacists have an essential and enhanced role in management of renal patients and can identify potential or actual medication problems.⁶ Individualised medication regimens require frequent monitoring and evaluation to ensure optimal pharmacotherapy, adherence to medication together with control of co-morbidities and other risk factors to produce specific health outcomes.⁷ Medicines reconciliation, medicine review and optimisation should be undertaken throughout the renal patient pathway, especially during admission and discharge from hospital/transfer to another care setting; at each outpatient clinic visit; when a new medicine is commenced or there is a change in kidney function.^{5,8}

As many medicines are renally excreted and/or potentially nephrotoxic, renal pharmacists have a key role to review and optimise medication regimens.⁵ Therapeutic aims and recommendations include:

- Adjusting medicine/dose/dosage frequency in relation to kidney function to maximise therapeutic effect and minimise adverse effect;
- Change, initiate or discontinue medicines as appropriate;
- Additional monitoring e.g. drug levels or blood tests, especially when rapidly changing kidney function;
- Improve patients' knowledge and understanding of their medicines;
- Identify/manage medicine-associated side effects/allergies/contraindications;
- Identify and avoid potential interactions with other medicines, especially immunosuppressants, when initiating any new medicine;
- Detect potential medication errors;
- De-prescribe and reduce pill burden;
- Improve disease-orientated and person-centred outcomes by optimising medicines;
- Prevent disease progression by optimising medicines;
- Aid management of co-morbid conditions;
- Referral to a nephrologist when necessary.

Medication adherence

It is estimated 30-50% of medicines prescribed for long-term conditions are not taken as intended.⁹ Complex medicine regimens and pill burden are barriers to adherence. Adherence is well recognised as a significant modifiable factor that can affect treatment outcome and quality of life in chronic disease management.⁷ No single intervention has proven decisive in improving adherence and clinicians should consider a variety of options to improve adherence with prescribed medicines. Regular structured patient review with a renal pharmacist can support adherence, improve patient medication knowledge, and optimise medication regimens to align with patients' wishes and lifestyle.⁷

Pharmacy homecare provision

As most renal units are involved with supply of medicines via pharmacy homecare teams (e.g. immunosuppressants, Eculizumab and erythropoietin-stimulating agents) the renal pharmacist often prescribes and arranges homecare medication. Pharmacy homecare staffing (processing/invoicing prescriptions) is usually separate from clinical renal pharmacy services and has not been included in this review. Further information on homecare staffing is detailed by the National Homecare Medicines Committee.¹⁰

Hospital pharmacy standards

Renal pharmacy services observe the Royal Pharmaceutical Society (RPS) Hospital Pharmacy Standards¹¹ to deliver person-centred care, medicines optimisation, with regular reviews to ensure safe, appropriate and cost-efficient prescribing. Robust medicines reconciliation processes are also key to prevent medication error at the time of hospital in-patient admission, and on transfer between care settings. Clinical pharmacy services should be available seven days a week, as per NHS England guidance.¹² However, as a minimum renal pharmacy services should be provided five days a week (Monday-Friday), with on-call pharmacy support outside of these hours.

Advanced level practice and the renal pharmacy team

Advanced level pharmacists may be independently assessed by the RPS Faculty across six domains of pharmacy practice using the RPS Advanced Pharmacy Framework.¹³ Three levels are awarded to recognise the stage of advanced practice: Advanced Stage I, Advanced Stage II and Fellow (Mastery).¹⁴

A senior pharmacist with specialist renal training who is competent at Advanced Stage II would be responsible for the provision and delivery of pharmaceutical care of people with kidney disease due to their complex needs and requirements. Advanced Stage I pharmacists should have access (locally or via network) to at least Advanced Stage II renal pharmacists for advice and referral. Where there is a renal pharmacy team, there should be a structured range of expertise, from trainee to Fellow level and appropriate skill mix to optimise service delivery. Accredited pharmacy technicians are also integral members of many renal pharmacy teams and have numerous and varied supporting roles (see Table 1). They may also have specific involvement to assist with management of homecare services.

The components of renal pharmacy services have been described in Table 1, and professional competencies assigned using this nomenclature in line with the RPS specialist Renal Expert Professional Practice Curriculum.¹⁵ Examples of enhanced/advanced models of renal pharmacy practice are included separately in Table 2.

TABLE 1. COMPONENTS OF THE RENAL PHARMACY SERVICE, INCLUDING PROFESSIONAL COMPETENCIES.

Activity (direct and indirect pharmaceutical patient care)	Technician support	Pharmacist support & experience required to complete work		
		Advanced Stage I	Advanced Stage II	Fellow
Patient medicines optimisation clinics/specialist clinics/prescribing			●	●
Homecare governance – assurance, technical/invoice reconciliation	●	●		
Patient telephone consult service			●	●
Consultant/MPT medicine enquiries		●	●	●
GP/primary care pharmacist enquiries			●	●
Support writing evidence based clinical guidelines and attendance/presentation at unit clinical guideline meetings			●	●
Writing/reviewing Essential Shared Agreements for wider health economy e.g. Mycophenolate			●	●
Support with implementing medicine guidelines (National & local)		●	●	●
Implementation and compliance with national patient safety alerts e.g. alfacalcidol, mycophenolate			●	●
Management (procurement, prescribing and funding +/- blueteq) of high cost medicines e.g. etelcalcetide, eculizumab			●	●
Management (reporting) of out-of-tariff medicines	●	●	●	●
Support with completion of individual funding requests for individual medicines			●	●
Inpatient support, including medicines reconciliation, use of patients' own medicines, self-medication training	●	●	●	●
Anti-microbial stewardship (in-patient & out-patient)		●	●	●
Review of medicine-related patient safety incidents, implement change as needed			●	●
Unit governance meetings – prepare/present pharmacy report, implement change as needed			●	●
Procurement of unlicensed drugs e.g. levamisole		●	●	●
Education and training: Undergraduate/postgraduate – medical, nursing, pharmacy			●	●
Research, audit and service development	●	●	●	●
Horizon scanning			●	●

Renal Pharmacy Service provision detailed in Table 1 includes five principle areas of kidney care:

- Chronic Kidney Disease;
- Acute Kidney Injury;
- Haemodialysis and home therapies;
- Transplantation;
- Young peoples' and transition services.

Conservative management, whilst not specifically reviewed, would include the same core service components.

Many renal pharmacists are non-medical prescribers and use this advanced role in their daily clinical practice. They work as independent practitioners, often in outpatient clinics, providing pharmaceutical care to patients with complex medicine management and clinical needs, including:

- Hypertension;
- Vasculitis;
- Autosomal Dominant Polycystic Kidney Disease;
- Anaemia;
- Transplantation.

Some examples of extended/advanced renal pharmacy practice roles are included in Table 2.

TABLE 2. EXAMPLES OF ENHANCED RENAL PHARMACY PRACTICE ACROSS UK.

Enhanced renal pharmacy practice	Advanced level pharmacist activity
General nephrology: Autosomal Dominant Polycystic Kidney Disease management: Tolvaptan management	Undertake joint multi-professional clinics (including prescribing) or independent clinics to support the management of these patients, who require frequent monitoring and review.
Transplant: Individualised immunosuppression dose finding/tolerability trial for transplant assessment	Pharmacist-led, individualised trials are an essential component of transplant workup, with the aim of maximising success of transplantation and minimising rejection and adverse effects. Patients include: <ul style="list-style-type: none"> • Specific co-morbid states (e.g. HIV, MELAS) where complex drug-drug, pharmacodynamic drug interactions arise • Previous immunosuppression intolerance, adherence difficulties
Specialist/complex renal disease: Glomerular Disease Clinics	Pharmacists work autonomously and with the wider multi-professional team to: <ul style="list-style-type: none"> • Provide specialist and bespoke drug education to facilitate shared decision making • Initiate and monitor subsequent immunosuppressive therapy, including chemotherapy and monoclonal antibody therapies • Secure funding for individual patient; manage the clinical, governance and financial risks
Renal anaemia	Example: South West Wales has a dedicated regional anaemia service whereby renal pharmacy technical staff co-ordinate all elements of the service, while pharmacists and anaemia nurses provide clinical management, electronically prescribe drug treatments and authorise blood transfusion
Acute Kidney Injury (AKI)	Involvement in AKI teams, including: <ul style="list-style-type: none"> • Review medications and their dosing in general hospitals and renal centres • AKI prevention: setting up initiatives across secondary and primary care. e.g. a prescribing quality scheme which encourages primary care prescribers to give patients sick day guidance and supporting written information developed for patients prescribed ACEi and other medications

Pharmacy service staffing

There is countrywide variation in renal pharmacy service skill mix and staffing levels ranging from a sole renal pharmacist practitioner, possibly part time, to a multi-staffed and multi-skilled renal pharmacy team (incorporating 8-10 WTE staff graded between band 3-8c Agenda for Change [AfC]).¹⁶ In line with recent and updated guidance, some localities have and others may review and identify a need and opportunity to appoint a consultant pharmacist to deliver care and drive change across the healthcare system.¹⁷

The reason for this variation is multifactorial, often based on historical, local funding arrangements, renal unit size, MPT skill mix and direct patient need. Transplanting centres generally are found to have the higher staffing levels.

The UK RPG staffing summary recommendation is derived from three principle sources:

1. Pharmaceutical renal patient care (direct and indirect) – expert opinion;
2. Royal Stoke Pharmacy Workforce Calculator (RSPWC) – evidence based, single unit data;¹⁸
3. Shelford Group, Renal Pharmacy team staffing levels –2018 real-time staffing levels.¹⁹

Service provision for renal, as for other services, should be based upon local patient case-mix whilst considering acuity, dependency and patient complexity. Where electronic prescribing systems (EPR) are in place, pharmacy medicines reviews and prescribing are inherently more time-consuming and this should be borne in mind when reviewing the figures below. The time/activity data in Table 3 does not allow for use of EPR but will be revised in future as EPR becomes more commonplace across the country.

Consideration must also be given to renal pharmacy service continuity during annual leave, sick leave and training leave. Additional resources will be required to provide this cover (20% minimum is recommended).

Pharmaceutical patient care (direct and indirect)

Experienced renal pharmacists (Advanced Stage II or Mastery level) have reviewed and agreed the time required to complete the following essential core pharmaceutical activities (direct patient care) (Table 3). This can be used to support local service development, as mentioned previously, where full electronic prescribing systems are in place, these activities are inherently more time consuming.

TABLE 3. CORE PHARMACEUTICAL CARE (DIRECT PATIENT CARE) PRACTICE FOR RENAL PHARMACY SERVICES.

Essential Core Renal Pharmacist Activity – direct patient care (Technician & Pharmacist)	Time/patient activity (excluding use of full EPR systems)
Nephrology ward <ul style="list-style-type: none"> New inpatient admission pharmacist review, medicines reconciliation and checking patients own drugs (POD) on admission Existing in-patient daily pharmacy review Discharge planning Complex discharges – e.g. patients requiring multi-compartmental compliance aids (dosette boxes), care home referrals, district nurse/other healthcare professional referrals. This is set up time and does not include dispensing 	40 mins/patient 10 mins/patient 20 mins/patient 60 mins/patient
Transplant ward <ul style="list-style-type: none"> New transplant in-patient admission pharmacist review, medicines reconciliation and admission POD checking Existing in-patient daily pharmacy review New transplant discharge planning and health education Discharge planning (for any subsequent admission) 	45 mins/patient 10 mins/patient 60 mins/patient 20 mins/patient
AKI patient review (if not nephrology admission)	15 mins/patient
Day case attenders e.g. IV cyclophosphamide, home IV therapy, medication teaching	30 mins/patient
Haemodialysis (HD) patient out-patient medication review (on HD unit) <ul style="list-style-type: none"> New HD patient review 6monthly HD patient review 	30 mins/patient 20 mins/patient
Specialist clinic work (e.g. Tolvaptan, Medicine Optimisation clinics, Transition) <ul style="list-style-type: none"> New patient Follow up 	30-40 mins/patient 20 mins/patient
Transplant and autoimmune immunosuppression review clinics, including homecare prescribing	10-20 mins/patient
Patients with multi-compartmental compliance aids (set up time, excludes dispensing time)	20-30 mins/patient
MPT reviews e.g. CKD/MBD, anaemia, other	60 mins per week per MPT

Indirect pharmaceutical patient care has not been formally evaluated but is integral to renal pharmacy service provision. There is, again, variation across the country, and experienced renal pharmacists have stated that between 10% and 50% of their time is involved with indirect pharmaceutical patient care. These activities are detailed in Table 1.

For example, using the time/patient activities for direct pharmaceutical patient care practice from Table 3, a 30 bed renal ward (per day: 2 new admissions, 26 in-patient reviews, 2 discharges, of which one complex) would require 1.65WTE pharmacist. This calculation allowed for 70:30 direct versus indirect patient care, 5 day/week service and allowance for continued service during annual/training leave.

Royal Stoke Pharmacy Workforce Calculator (RSPWC)

University Hospitals of North Midlands NHS Trust (UHNM) developed and validated a Pharmacy Workforce Calculator (RSPWC) on a range of medical and surgical wards in 2017.¹⁸

Using the RSPWC, preliminary data from a single centre, renal inpatient 28 bedded ward, demonstrated pharmacy staffing for delivery of pharmaceutical patient care (direct and indirect) to be:

- 1.71 WTE pharmacist (band 8a)
- 1.12 WTE pharmacy technician (band 5)

where average length of stay was 5.1 days, average 18 drug chart items (included regular, as required and injectable medicines) and a 365 day pharmacy service was provided.

The UK RPG is currently collaborating with UHNM to trial and validate this tool in the highly specialised area of renal and transplant. Once data are available UK Renal Pharmacy Group (RPG) renal pharmacy service provision recommendations will be revised.

Shelford Group, renal pharmacy team staffing levels

The Shelford Group is a collaboration between ten of the largest teaching and research NHS hospital trusts in England.¹⁹ Nine out of these ten NHS Trusts have renal units, and eight also have renal transplant units. Renal Pharmacy teams staffing levels from a 2018 data set are included below and support previous data for multi-staffed and multi-skilled renal pharmacy team incorporating 8-10WTE staff.¹⁶

TABLE 4. RENAL PHARMACY TEAM STAFFING LEVELS.¹⁹

Renal pharmacy team WTE staffing	Mean	Median	Range
Pharmacist – Nephrology ward	1.2	1	0.5-2
Pharmacist – Renal transplant ward	1.19	1	0.2-2
Pharmacist – Renal dialysis unit	0.41	0.05	0-1.3
Pharmacist – Outpatient clinics	0.7	0.4	0-2.5
Pharmacy technicians	0.8	1	0-2
No. of pharmacist non-medical prescribers within team	2	2	0-6

Staffing summary

Whilst work is being undertaken to validate the specific requirements for renal pharmacy staffing, based on the data outlined above, the UK RPG expert panel recommendations for minimum staffing complement to provide essential and core adult renal pharmacy service (using average 70:30 direct versus indirect pharmaceutical patient care), as a five day clinical service are presented within Figure 1. The WTE pharmacist range is indicative for renal unit staffing at District General Hospitals and Teaching Hospitals and relates specifically to activities that can only be performed by the pharmacist.¹¹ Enhanced and extended clinical pharmacy practice, examples of which were outlined earlier in this document, will require local business case submission as part of service development and MPT staff skill mix review. It is for this reason that a recommendation for pharmacist staffing in outpatient clinics and homecare medication-related activities has been excluded.

FIGURE 1. UK RPG EXPERT PANEL RECOMMENDATIONS FOR MINIMUM STAFFING FOR ESSENTIAL AND CORE ADULT RENAL PHARMACY SERVICE (DIRECT AND INDIRECT PATIENT CARE)

1-2 WTE pharmacist for nephrology ward
 1-2 WTE pharmacists for transplant ward (transplant centres only)
 0.5-1.5 WTE pharmacists for Renal Dialysis Units
 1-1.5 WTE pharmacy technician

Career pathway, qualifications and competencies

Pharmacist professional registration is revalidated annually by the General Pharmaceutical Council, the regulatory body for pharmacists in England, Scotland and Wales, to ensure professional skills and knowledge are up to date.

Chief pharmacists (or equivalent) have a responsibility to ensure that pharmacists are competent for their role. The RPS Advanced Pharmacy Framework¹³ and specialist renal professional practice curriculum, identifies the key knowledge, skills, experience and behaviours required to be an advanced specialist renal pharmacist.¹⁵ The UK RPG developed this specialist curriculum and recommends and supports its members to become RPS faculty members.

Whilst no specific qualifications are required to become an advanced specialist renal pharmacist (adult or paediatric) the individual should have undergone a recognised credentialing process to verify their competence level of advanced pharmacy practice (see page 21 for further information).

3.2 PAEDIATRIC SERVICES

Introduction

Clinical pharmacy is an integral part of the paediatric renal multi-professional team, optimising medicine use for individual patients and on a service-wide strategic level. Due to their in-depth knowledge of the complexities of medicines, paediatric renal pharmacists are pivotal to the delivery of effective and safe pharmaceutical care to children of all ages with a wide variety of acute and chronic kidney conditions.²⁰ When sufficiently resourced, paediatric renal pharmacists provide all of the roles outlined in Table 1 of the adults section to children living with kidney disease, drawing on the support of other pharmacist colleagues working in procurement and finance, medicines information and medicines safety as required. These key roles are in line with the RPS Professional Standards for Hospital Pharmacy Services.¹¹ Further detail is provided within the Paediatric Renal Pharmacy Standards document.²¹

Medicines optimisation in children with Acute Kidney Injury (AKI) and Chronic Kidney Disease (CKD)

The challenges associated with polypharmacy and medication adherence highlighted in the adult renal pharmacy services section (see pages 20-21) are also commonplace in both paediatric AKI and CKD.^{22,23} Additionally, children and young people with acute and chronic kidney disease have complex medication needs due to altered pharmacokinetics, over and above the normal variation seen with age and development.

Information on how medicine doses should be adjusted for children with renal dysfunction and in those receiving different forms of renal replacement therapy is often sparse. Paediatric renal pharmacists are often required to consider conflicting information from a range of sources when making recommendations on dosing adjustments; frequently needing to extrapolate data from adult studies. Determining the current level of a patient's renal function can also be complex, especially in AKI and in infants. All these factors mean that a high degree of clinical judgment and expertise are required to determine the optimal approach to an individual patient's treatment.

As well as the many complexities of caring for patients with acute or chronic kidney disease, there is a need for paediatric renal pharmacists to consider and navigate the challenges inherent in prescribing and administering medicines to children more generally. These include a significant proportion of off-label medicines use, the need to use unlicensed medicines and in many patients administration of medicines via enteral feeding tubes. These challenges are exacerbated by a need to calculate drug doses according to age and body weight, and the need to manipulate medicine formulations that are only licensed for use in adults. Consequently, children are known to be at a higher risk of medication errors than adult patients²⁰ and pharmacists are in a prime position to maximise the safe and effective use of medicines in children and young people.²⁴ Internationally too, the World Health Organisation (WHO) recognises pharmacists as an essential resource for the safe and effective use of medicines.²⁵

Pharmacists are central to the identification and prevention of potential medication errors in paediatric patients, both in centres using paper-based medication charts and those using electronic prescribing systems.²⁶ Minimising the harm from medication is the key aim in the latest WHO global patient safety challenge – medication without harm.²⁷ The National Kidney Foundation's KDOQI recommends medication reviews at all visits to hospital, to prevent problems such as inappropriate doses, drug interactions, inadequate monitoring, potential adverse drug effects and disease complications.²⁸

Person-centred care and improving outcomes

Medicines reconciliation and medication review and optimisation should be undertaken throughout the paediatric renal patient pathway, especially at admission and discharge from hospital or transfer to another care setting; at each out-patient clinic visit; when a new medicine is commenced or there is a change in kidney function.^{5,8}

As with adult pharmacy services, a regular structured patient review with a paediatric renal pharmacist can support adherence, improve knowledge, optimising medication regimens to align with the wishes and lifestyle of patients and their families.⁷ The paediatric renal pharmacist can help provide tailored information about medicines used for paediatric kidney diseases, maintaining confidence in both the therapy and the MPT.²⁴ Evidence suggests that a significantly greater proportion of patients adhere to their immunosuppressive medications 1 year after transplant when a pharmacist is involved in their care.²⁹

Repeat prescribing and shared care

Many of the medicines used for paediatric renal patients are highly specialist, requiring repeat prescribing to remain within the hospital, either via Homecare or hospital pharmacy dispensing rather than being undertaken in primary care. Paediatric renal pharmacists are often responsible for the clinical screening of these prescriptions, and in some cases will increasingly have a role in prescribing these medicines.

Due to the large geographical coverage of each paediatric renal service in the UK, many tertiary centres provide outreach care in other hospitals within their region. This adds to the complexity regarding medicine prescribing and supply, and there is often variation in the availability of medicines within different regions. The paediatric renal pharmacist has a key role in facilitating the supply of medicines across affiliated Trusts in their region, liaising with colleagues in primary and secondary care as required.

Paediatric renal pharmacy services and staffing

The full Paediatric Renal Pharmacy Standards document can be downloaded from the Neonatal and Paediatric Pharmacists Group (NPPG) website.²¹ As highlighted within the adult renal pharmacy section (page 21), NHS England guidance on the availability of clinical pharmacy services over seven days a week also applies to paediatric pharmacy services.¹² As a minimum, specialist paediatric renal pharmacy services should be provided daily Monday-Friday; it is recognised that outside of these hours it will be necessary for non-specialists to provide ad-hoc support.

Lord Carter's 2016 report highlighted unwarranted variations in care between different NHS organisations.³⁰ Paediatric renal pharmacists are key to standardising medication use both within and between centres, particularly given the hub and spoke nature of many of these services.

The following suggested staffing levels, based on expert consensus, describe the resource required solely within a single tertiary paediatric renal centre: additional pharmacy staff resource is required to support significant pharmacist input into outreach centres and Operational Delivery Networks where they exist. Due to the higher proportion of paediatric repeat prescribing in secondary care, when compared to adults and the regional nature of services, describing workforce requirements relative to population size is more appropriate than basing resource on the number of inpatient beds.

1. Clinical pharmacists are essential practitioners within the paediatric renal MPT and are vital to the routine delivery of medicines optimisation within the specialty. Every tertiary paediatric renal service must have access to a senior pharmacist practising in this field.
2. The lead senior pharmacist must be practising at Advanced Stage II as a minimum. Clinical pharmacist cover can be provided by change to equivalent pharmacist at Advanced Stage I, with support from the more experienced lead pharmacist.
3. The paediatric renal pharmacist must have sufficient time allocated to fulfil their specialist role. In practice, a team of individuals is usually required to deliver the clinical pharmacy service to paediatric renal patients. There should be a minimum of 0.2 WTE pharmacist per million total (i.e. adult and children combined) population for the geographical area covered by the tertiary paediatric renal service.

For example:

If the geographical area covered by the service has a total population of 5 million, the minimum pharmacist resource required is $5 \times 0.2 \text{ WTE} = 1 \text{ WTE}$.

This staffing resource is required to allow sufficient "non-patient-facing" time to support the full range of clinical pharmacist activities, including (but not limited to) guideline development, multidisciplinary education and training, supporting repeat prescribing and patient review, as well as audit and quality improvement work. Where the staffing resource falls short of the recommended level, direct patient care will be prioritised over other activities. A team-based approach helps to ensure service resilience, succession planning and provide the necessary educational and professional support.

4. In addition to the above recommendations, consideration must also be given to service continuity during planned and unplanned leave; an uplift of 20% minimum is recommended.
5. The pharmacist must attend daily multidisciplinary inpatient ward rounds and other relevant meetings of the paediatric renal MPT.
6. Paediatric renal pharmacists should be encouraged to be active independent prescribers.
7. Alongside pharmacist provision, inpatient paediatric renal wards need suitable levels of pharmacy assistant and technician time to ensure access to medicines seven days a week, with regular stock top ups in accordance with demand, but no less than once a week.
8. Ward-based pharmacy technicians also provide a valuable role, supporting medicines reconciliation, medicines management and expenditure reporting, releasing more time for medicines optimisation activities by clinical pharmacists. A 10-bedded inpatient paediatric renal ward should have ward-based technician support to a level of 0.2 WTE as a minimum.

Career pathway, qualifications and competencies

In addition to the information provided in the corresponding section of the adult renal pharmacy section (see page 21), the specialist competencies set out by the Royal Pharmaceutical Society Faculty and the NPPG in the Neonatal and Paediatric Care Expert Professional Practice Curriculum are also required.^{31,32}

Paediatric renal pharmacists should undergo an independent, recognised process to verify competence level. Specialist paediatric renal pharmacists must be able to demonstrate competency at least to the level of advanced stage II, and should progress towards mastery level.

Professional support

A paediatric pharmacist in a district general hospital is likely to be a lone specialist, as is a paediatric renal pharmacist working in a smaller unit. As such peer support, often from outside of the individual's own organisation, is critical to ensuring competency. Senior renal pharmacist support should preferably be provided within the organisation, but may be provided through a professional network or on a regional basis.

Pharmacists practising in paediatrics should be members of the NPPG to enable shared working, and provide peer support for lone paediatric pharmacists.³³ Those specialising in paediatric renal medicine should also consider being members of the UK RPG.³⁴ Access to pharmacists practising in critical care is also available through professional bodies such as NPPG or the RPG.

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