Ultrasound should be easily available to establish renal size and to investigate possible renal obstruction for an extended working day, Monday to Friday (e.g. 8.00-22.00) and at least 9:00 to 17:00 at weekends. Ultrasound imaging in acute kidney injury should be performed within 24 hours of admission and, if there is clinical evidence of an infected, obstructed kidney, within 6 hours. In patients with worsening and progressive acute kidney injury with an unclear precipitant such as sepsis or hypoperfusion, renal tract ultrasound should be performed within 24 hours to aid with diagnostic workup i.e. to determine whether a kidney biopsy will be required.

For all ultrasound services we recommend you consult the Clinical Governance in Ultrasound (2008) document. [http://www.18weeks.nhs.uk/Asset.ashx?path=/Imaging/ClinicalGovernanceInUltrasound_061108.pdf](http://www.18weeks.nhs.uk/Asset.ashx?path=/Imaging/ClinicalGovernanceInUltrasound_061108.pdf)

**Who should deliver this service?**

This service should be delivered by appropriately skilled and trained staff involved in ongoing audit and revalidation. If the operator is not a consultant radiologist there should be a system in place that will allow review by a radiologist where needed, which would include ongoing advice regarding further imaging and/or intervention. It would be possible to use teleradiology to provide at least some of the facilities for supervision, support and specialist advice.

- **Consultant Radiologist**
  A consultant radiologist can undertake further imaging investigations if appropriate and may perform urgent or emergency intervention including nephrostomy if needed. However, not all departments have sufficient consultant radiologists to provide extended day/weekend cover and there are increasing competing demands for on call services.

- **Imaging Departments with a Clinical Radiology Training Scheme**
  Clinical Radiology trainees contributing to out of hours service work will be able to perform renal ultrasound and to undertake further investigations. Some senior trainees will have achieved competence in the performance of a nephrostomy without direct supervision. For training schemes this may allow a full imaging and nephrostomy service at all times, for others, this will depend on the seniority of the trainee on call. It is recommended that a formal referral service is established for intervention (nephrostomy) of patients first seen and diagnosed at other hospitals. This would require formal agreements between Trusts.

- **Sonographers**
  Most sonographers work daytime hours Monday to Friday and do not currently deliver an out of hours service. Some deliver services at week-ends and some cover an extended working day. However if an out of hours service is to be delivered by sonographers, this must be within a multidisciplinary team structure with immediate availability of consultant radiologist opinion, if required. Protocols must be agreed (for example with the receiving team of a
training department) for transfer of a patient for image guided intervention and for referral for further imaging investigations, where necessary. It is, however, accepted that there is a shortage of sonographers and it may not be an efficient use of this group of staff to develop further training to deliver an out of hours renal service.

- **Non Imaging Personnel e.g. Renal Physicians**
  This group of staff can triage patients into those with normal or abnormal kidneys and work to agreed protocols with their local imaging department. A service of this kind would need adequate supervision to ensure that appropriate training and quality assurance measures are in place and maintained. Onward referral for further imaging would need to be to agreed protocols.

**Percutaneous Nephrostomy**

All departments that offer an on call service should include the facility for abscess drainage and nephrostomy. Treatment of an infected, obstructed kidney is a medical emergency and should be performed as soon as possible, at least within 6 hours of ultrasound diagnosis. However, safe performance requires an experienced team who may need to be called in.

Other indications for nephrostomy, including renal failure, do not need a nephrostomy out of hours. The procedure should be done within 24 hours and preferably within core hours by a trained interventional radiology team consisting of a radiologist, radiographer and nurse.

Where percutaneous nephrostomy is not available locally within these time frames a negotiated service level agreement should be set up to enable transfer to a neighbouring trust by prior agreement. This transfer must be available within 12 hours. Provision for the continued care of the patient and liaison with the referring team must be established particularly if the patient was transferred from another trust. This will require inter trust co-operation and commissioners will have a key role in ensuring that appropriate networked services are developed.

Communication between the consultant radiologist and the consultant urologist is essential in all cases where nephrostomy is being considered. This will avoid unnecessary interventions and emergency out of hours interventions in patients who are not septic or where medical treatment of renal failure is the appropriate management.

Similarly, alternative surgical interventions may be more appropriate. For example it may be that in cases of a vesico-ureteric junction (VUJ) stone, retrograde drainage and stent insertion via a ureteroscope may be better for the patient.
Who should deliver the service?

The operator should be appropriately skilled and trained and involved in ongoing audit and revalidation. A radiologist who performs ultrasound guided drainage or biopsy procedures is also likely to be proficient at nephrostomy. Ideally he/she should also be competent to insert an antegrade ureteric stent. This allows the procedure to be undertaken as a single stage procedure where appropriate rather than having to recall the patient after the initial nephrostomy insertion. Appropriate facilities, equipment and trained support staff (nurses and radiographers) must be available out of hours to support the delivery of this service.

Individual trusts should decide what service they offer and where a trust needs to network the provision of such a service by agreement with the other local institution. The arrangements should be formal, adequately resourced and appropriate to the geography of the region. Where the service is to be provided locally, job planning should make sure that the consultant workforce is sufficient to provide the service offered.
Reporting Renal Ultrasound in Medical Renal Disease

An imaging report for medical renal disease should include:

- Comparison with previous imaging where relevant and available.
- Renal size with a stated length and whether the kidneys appear normal.
- A description of the renal outline for example smooth, irregular, any scarring and evidence of fetal lobulation.
- Any evidence of normal anatomical variants such as a duplex system.
- A comment on the proportion of renal sinus fat and the echogenicity of parenchyma and cortico-medullary differentiation.
- If the cortex is thinned a measurement of maximal and minimal thickness.
- If any cortical or medullary cysts are present these should be described in terms of their position and size.
- Evidence of calyceal dilatation and dilatation of the renal pelvis. This should be described and the level of any visible obstruction also determined.
- In cases of renal obstruction the ultrasound practitioner should make an assessment of the cause of obstruction where possible.
- If calcification is visualised the size of the foci, their location and distribution should be described.
- Doppler should be used, where appropriate for the assessment of renal artery stenosis and renal vein thrombosis and in the evaluation of transplanted kidneys. When Doppler is used the report should clearly state whether the vessel studied is intrarenal or the main or branch vessel (or both). Flow indices relevant to the clinical presentation should be recorded.
- If the appearances suggest a particular diagnosis or differential diagnosis this should be described in the report.

Further information

Further information can be found at


Service Improvement for Radiologists (2007) Radiology Service Improvement Team

http://www.improvement.nhs.uk/diagnostics/LinkClick.aspx?fileticket=8sGwVFktf4Y%3d&tabid=63