National Kidney Care Audit Vascular Access Audit Report 2009

Prepared in partnership with:

The Healthcare Quality Improvement Partnership (HQIP) promotes quality in healthcare. HQIP holds commissioning and funding responsibility for the National Kidney Care Audit and other national clinical audits

The NHS Information Centre for Health and Social Care (The NHS IC) is England's central authoritative source of essential data and statistical information for frontline decision makers in health and social care. The NHS IC managed the publication of the 2009 annual report.

The UK Renal Registry (UKRR) was established by the Renal Association with support from the Department of Health, the British Association of Paediatric Nephrologists, and the British Transplant Society as a resource for the development of patient care in renal disease.The Registry provides a focus for the collection and analysis of standardised data relating to the incidence, clinical management and outcome of renal disease.

The National Kidney Federation (NKF) is the only national kidney charity actually run by Kidney Patients for Kidney Patients. The NKF has a major role in campaigning for improvements to renal provision and treatment, and national patient support services.

National Kidney Care Audit Vascular Access Audit Report 2009

Reporting on the 2009 early adopter data

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Foreword

Haemodialysis can provide excellent long term treatment for people with end stage chronic kidney disease. To do so requires repeated connection to an extra-corporeal circuit and high quality vascular access is critical to the success of this modality.

Successful renal replacement therapy also requires preparation and choice. Supporting people with kidney disease to achieve the best possible experience of care and outcomes for them is an overarching aim for Renal Services. For those with progressive kidney disease that involves multi-disciplinary care planning and shared decision making including education, psychological preparation, weighing up the pros and cons of the various options and when haemodialysis is chosen, creation of the best possible vascular access. That in itself requires high quality team-working often involving radiology as well as surgical colleagues to ensure timely operation to allow full maturation of the access by the time it's needed.

Starting haemodialysis with a native arteriovenous fistula provides a significant survival advantage because of the association of other forms of access with infective and thrombotic complications. Dialysis via a fistula will also provide the option of higher blood flows during the procedure resulting in more efficient dialysis. Lines and grafts to access the circulation for dialysis are associated with more and longer inpatient admissions, with more MRSA and MSSA bacteraemias and with higher morbidity and mortality.

Here, as in other aspects of kidney care, the patient plays a key role. Even before the surgery to create the fistula they should be given the responsibility of preserving forearm veins and permission to question anyone who suggests venipuncture or placing lines in these vessels. After dialysis starts, observation, monitoring and care of the fistula during needling for haemodialysis or during hospitalisations remain important components of kidney care.

Not all people who need haemodialysis can have an arteriovenous fistula but the variability and access type between units in the United Kingdom and the international best practice comparisons reveals differences in service organisation, priority given to pre-dialysis care and quality of surgical and radiological support for access salvage. The variance points to a significant quality improvement opportunity.

Understanding the complexity of access and continuously measuring what the service is providing are crucial if we are to achieve the quality gains that we know are possible. This national audit being undertaken by the Information Centre in partnership with the UK Renal Registry is playing a vital role in establishing reporting systems to provide that understanding and knowledge. The aim is ambitious; universal coverage and embedding into Renal Registry business as usual to drive continuous quality improvement. The prize, marked improvements in patient experience and outcomes, is well worth the considerable effort of all those involved in developing, working with and using this audit.

Dr Donal O'Donoghue
National Clinical Director for Kidney Care

Foreword

Everyone I've ever met who looks after patients with kidney disease is committed to doing the best job they can for the patients they care for. However, sometimes we work so hard that we don't get a chance to look around at how care is delivered by our colleagues, let alone in other centres. This is a waste, because we can't all be the best at everything we do, so there is always something to learn about how to improve our practice. Going to meetings is only part of the solution, and we can't all get to all the meetings we want to. Learning how our own centres are performing compared to others, and learning from high performance, is also critically important, particularly in clinical areas where we know that improved performance can improve and extend the lives of our patients. So I welcome the first report of the Vascular Access component of the National Kidney Care Audit, which shows a glimpse of what we will be able to achieve when all centres are returning data on vascular access to the UK Renal Registry.

Charlie Thomson
President, Renal Association:
Consultant Physician, North Bristol NHS Trust

Acknowledgements

The National Kidney Care Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP). The audit is managed by The NHS Information Centre for Health and Social Care (The NHS IC), who are working in partnership with the National Kidney Federation and the UK Renal Registry. There are two distinct areas of audit; the provision of timely and appropriate surgery for permanent vascular access and patient transport for haemodialysis patients.

Throughout the development of the audit we have had invaluable support from patients and their representatives, clinical staff and allied health professionals, IT and operational staff within renal units and The NHS IC. We acknowledge how vital their input has been into ensuring that the audit has been successful.

In particular, we would like to express thanks to the early adopter units, the system suppliers, and the UK Renal Registry, who have made this aspect of the audit possible through their support and hard work.

Our thanks also go to the vascular access clinical lead, Dr Richard Fluck, who has drafted this report.

Introduction

Background

For a patient requiring long-term haemodialysis (HD) for established renal failure, vascular access is a crucial aspect of the therapy. Vascular access (VA) is required to remove and return blood to the patient, passing the blood through an artificial kidney or filter. Most patients have their treatment three times a week for four hours or more.

The ideal form of VA should be safe and efficient. It should be easy to use. It should provide effective therapy. It should minimise the risk of complications related to its use and presence. There are three broad categories of VA in use today.

1. Arteriovenous fistula (AVF) (Lawton and Gulesserian 1969): an artery and vein, usually in the arm above or below the elbow, are surgically joined, to create a fistula so that arterial pressure eventually enlarges the vein. The enlarged vein can then accommodate a cannula or large needle, so that blood may be removed and passed through an artificial kidney.
2. Arteriovenous graft (AVG) (Baker, Johnson et al. 1976): an artery and vein are joined surgically, using an artificial graft, usually Polytetrafluoroethylene (PTFE). The graft material itself is then used for the placement of cannulae or needles.
3. Venous catheters: a large plastic tube (catheter) is placed into a large vein, allowing a connection to be made to the dialysis circuit. The tube itself may be either passing directly from the vein through the skin to outside (non-tunnelled, NTC) or exit the vein, pass under the skin through a tunnel and then out (tunnelled, TC).

Whilst none of these fully meet the desired criteria it is recognised that an arteriovenous fistula (AVF) offers the best form of VA. An AVF has a lower risk of infection due to the lack of non-biological material and the absence of an external device. An AVF also has a longer useable lifetime and requires fewer interventions. However, it does require prior planning, surgery and time for the fistula to develop.

In some individuals, the blood vessels will not be suitable for the surgery. Consequently TC and NTC are often used when an AVF cannot be formed in time or when it is not possible. Both TC and NTC are a risk factor for infection, with considerably higher rates than an AVF (Rehman, Schmidt et al. 2009). Since infection is the second leading cause of death (Ansell, Roderick et al. 2009) and an important cause of morbidity for patients needing HD it is critical to offer the best VA for all individuals who need long-term HD. Infection directly leads to death, but may also have a role in the excess of cardiovascular mortality seen in this patient population (Ishani, Collins et al. 2005).

Figure 1
A patient receiving haemodialysis

Current UK situation

Within the United Kingdom, it is known that the proportion of patients with an AVF falls short of the Renal Association standards.

The Third Edition of the Renal Association (RA) guidelines (2002 available at www.renal.org) made the following four recommendations concerning VA:

1. At least 67 per cent of patients presenting within three months of dialysis should start HD with a usable native arteriovenous fistula. (Good practice)
2. At least 80 per cent of prevalent HD patients should be dialysed using a native arteriovenous fistula. (Good practice)
3. No patient already requiring dialysis should wait more than four weeks for fistula construction including those who present late. (Good practice)
4. All dialysis units should collect data on infections related to dialysis catheters and polytetrafluoroethylene (PTFE) grafts to allow internal audit. (Good practice)

The National Service Framework (National Service Framework for Renal Services: Part One – Dialysis and transplantation, 2004, DH (England) www.dh.gov.uk/renal) confirmed the importance of vascular access, stating in standard three the aim was:

"To improve the outcomes of permanent vascular or peritoneal dialysis access surgery, minimise complications and maximise the longevity of the access."

In the Eighth Annual Report from the Renal Registry (2005) data from the first vascular access survey was presented. In Chapter 6: The National Dialysis Access Survey – preliminary results, the overall provision of vascular access was shown to be below the Renal Association (RA) standard (67 per cent of all HD patients had either an AVF or AVG), with considerable variation between units (range 44–94 per cent). Of the 62 units that provided data, only 10 units achieved the RA standard.

For patients starting dialysis, the same survey found that only 31 per cent of those starting on HD did so with an AVF or AVG. Of those known to the renal units for a year or more, only half started HD with definitive access. For patients known to the renal units more than six months before starting Renal

Figure 2
An arteriovenous fistula

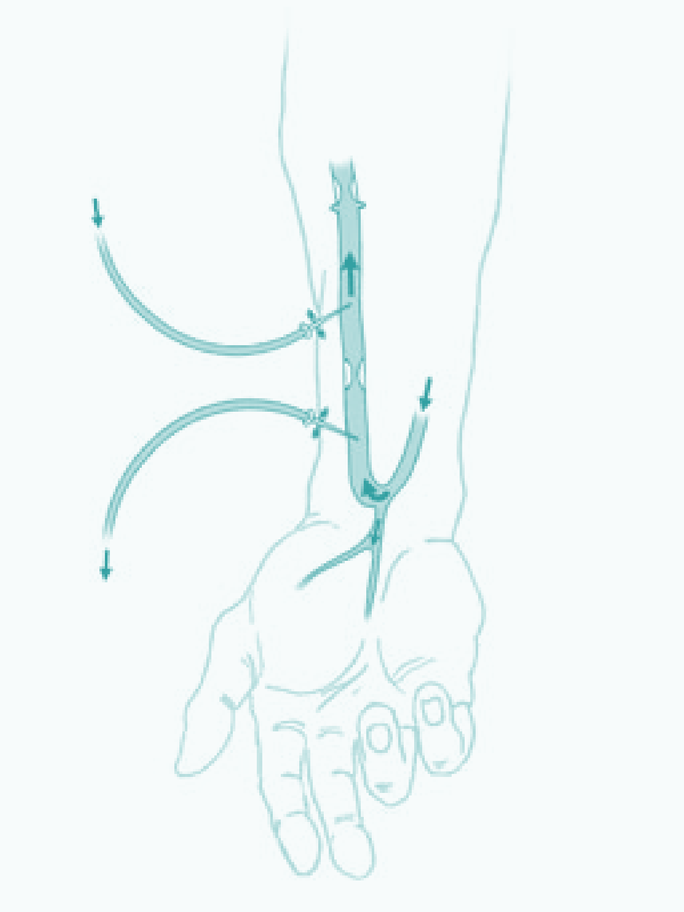
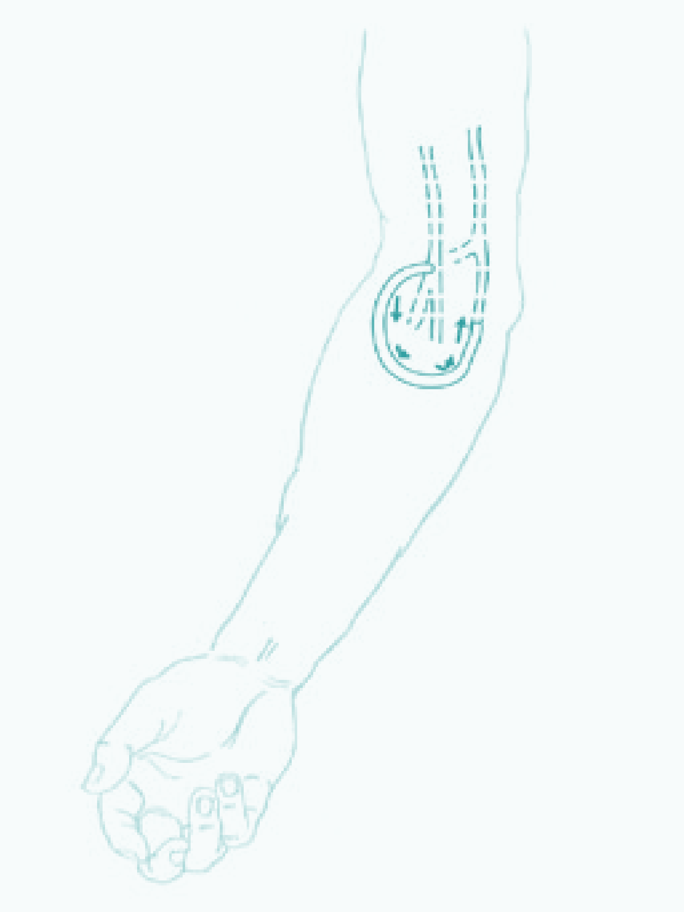


Figure 3
An arteriovenous graft



Replacement Therapy (RRT), only 13 per cent were not referred for access within six months of first RRT, suggesting planning or capacity issues for surgery. One year later, a repeat survey (Fluck, Rao et al. 2007) found that at one year 30 per cent of patients were still on dialysis with a TC.

Infection risk also remains high (Albers 1996; Butterly and Schwab 2000; Berman, Johnson et al. 2004) and remains an international concern in the treatment of end stage renal failure. Mandatory MRSA bacteraemia (MRSAB) reporting in England has been enhanced with additional reporting on dialysis related items. In 2007/8 188 episodes of MRSAB were reported in dialysis patients (Fluck, Wilson et al. 2009). This represented 4.2 per cent of all reported MRSAB, with dialysis patients having a 100 times higher risk compared to the general population. For an HD patient using a TC this risk rose 8 fold, to 800 times higher.

The overall picture is one of poor rates for patients starting haemodialysis, slow processes to provide an individual with the best available vascular access and a high risk of complications related to VA. Therefore the National Kidney Care Audit has been designed to measure and audit the provision of vascular access in the United Kingdom.

Data Flow

The Vascular Access element of the National Kidney Care Audit is run through partnership between The NHS Information Centre and the UK Renal Registry (UKRR). The UKRR has a longstanding history of collecting data from renal units, and has been one of the key partners in the development of the National Renal Dataset (NRD).

The NRD extends the existing data collections of the UK Renal Registry, UK Transplant and the British Association of Paediatric Nephrologists, and the data collection and submission of the NRD is being included within these existing collection mechanisms.

While the National Kidney Care Audit and the National Renal Dataset are separate projects, a number of the data items required for the Vascular Access audit are drawn from the NRD. As the UKRR is responsible for the collection of these elements of the NRD, this marks one of the distinct data flows present in the audit.

Figure 4
A venous catheter

These data items cover the basic demographic information about the patients, and a number of key facts about each patient's treatment. These include:

- the date the patient was first seen by a renal physician
- the date renal replacement therapy began
- the date of the first haemodialysis session
- the type of access used for the first dialysis session
- details about each access construction, such as the date of referral for construction, the date the construction took place, and the type of access constructed.

In order to address the key audit measures, data also flows into The NHS IC from other sources. Data about hospital episodes is required to investigate the number of operations and interventions patients undergo, and the amount of time spent in hospital. Each of the home countries maintains its own hospital episodes database, containing essentially the same data. Hospital episode records that match the patient details provided by the UKRR are being extracted from these databases.

The third data flow comes from the Health Protection Agency (HPA). The HPA routinely collects data on Healthcare Associated Infections (HCAIs). One of the aims of the audit is to investigate the hospital-acquired infection rates amongst haemodialysis patients. To this end, data is being extracted from the HPA's databases that relates to the patients whose details have come from the UKRR.

The "Next Steps" section, on page 17, discusses these linkages in more detail.

Permission

The processing and linking together of these separate data streams takes place at The NHS IC. A bespoke processing system and database has been developed to automate these tasks as each batch of data comes in during the rolling audit.

To be able to perform such linking, and associated activities such as validating or tracing NHS numbers, it is necessary to collect and hold patient identifiable information. The Ethics and Confidentiality Committee of the National Information Governance Board for Health and Social Care oversees and advises on matters relating to the processing of health or social care information. In particular it can grant approval, where warranted, for the collection of patient identifiable data in specific circumstances where anonymised data is not sufficient.

The National Kidney Care Audit has been granted approval under Section 251 of the NHS Act 2006 to collect and hold the required items for the purposes of the audit.

Implementation

As mentioned above, the UKRR is responsible for the collection of a portion of the NRD, through augmenting its longstanding quarterly data collections. To this end the Registry have published a dataset specification which covers the relevant items in the NRD.

Renal units extract data from their clinical systems and submit data to the Registry on a quarterly basis. With the introduction of a new specification there is inevitably a lead time between publication and the clinical systems being compliant.

There are a number of different clinical systems in use in renal units in England, Northern Ireland and Wales:

- Proton
- eMed
- Clinical Vision
- RenalPlus
- VitalData
- CyberREN

There are also systems provided by Baxter and Fresenius, as well as bespoke systems and those maintained in-house.

The system suppliers each have their own development processes and timescales for becoming compliant with version 3.14 of the UKRR specification (the first to cover the NRD items). This naturally leads to a phased rollout, with different units being able to participate in the audit as their clinical systems become capable of submitting the appropriate data to the Registry.

There is also an overhead for the staff at the renal units. Many renal units already collect much of the NRD, but not necessarily in their clinical system. The staff need to identify which items they don't currently collect, and also those that they perhaps collect in alternative systems, such as in spreadsheets.

In some cases these items will already be in the clinical system, and once the system supplier has upgraded the extract routine that compiles the UKRR submission the unit is able to contribute to the audit. Units that currently collect the items in an alternative system will need to slightly adapt their processes so they record the items in their updated clinical system. Some units will need to look at how they can collect the relevant data items as part of their standard processes.

Case study – Improving vascular access in Derby

Derby Hospitals NHS Foundation Trust was one of the first renal units to join the national vascular access audit, and they are already seeing the benefits.

The vascular access audit – part of the National Kidney Care Audit run by The NHS Information Centre on behalf of the Healthcare Quality Improvement Partnership – collects information on what methods of vascular access are used to access each haemodialysis patient's bloodstream.

Consultant Nephrologist Richard Fluck feels that the audit is something he had to take part in. "It's important to me as a clinician because it helps reduce harm to my patients. It's also important to me as a clinical director because it's a major marker of how well my unit looks after its patients. Finally, at a national level it's an important way of making sure patients get the treatment they deserve."

"The audit helps me to understand what type of vascular access my patients are using to connect to haemodialysis equipment," he says. "It's better for them to have a fistula because there are fewer infections and fewer access problems."

"The key to implementing it has been engaging my colleagues. We started with the nurses and technical staff who have the main day to day contact with patients. The trick was to integrate the data collection into their work so that it's not something extra: its part of how they provide haemodialysis care."

The unit's matron, Heather Pitt, was responsible for collecting audit data. "It really didn't involve much extra work," she says. "I record the type of haemodialysis access used every time a patient dialyses. I have to collect a bit more detail, but I was collecting a lot of the data already."

"This data has definitely helped increase the numbers of people receiving fistulas. When I refer a patient to a surgeon I can now alert them if that patient is on a permanent catheter. They will then recognise the patient as priority case which means they get treated sooner."

"The audit data also helps us monitor patients' fistulas which helps stop them failing. About 80 per cent of our patients are currently on fistulas which is a pretty good rate."

Richard agrees it has been well worth taking part. "By spending five minutes with a patient we can monitor that patient and how patients are doing across the unit," he says. "The perception of the audit being more work is not true. It actually lessens your work over time."

The consultant is confident the audit will boost his unit's efficiency. "I believe that many improvements can be made without significant cost. We can take a leaner approach which makes our service more efficient and reliable. This leads to improved care."

"We will also use the audit results to educate our patients and demonstrate to them which forms of vascular access are the best."

Richard would like to see every unit take part. "It will help every renal unit in the UK to match the best units across the country. I think the audit shows it's possible to collect non-numeric data about care and turn it into something that improves care."

Analysis

The VA audit has a complex dataset that is a subset of the National Renal Dataset. Consequently, a number of early adopter sites have been involved in testing the IT systems and the data input (Table 1). The dataset requires both an appropriate database and a robust system within the clinical environment to ensure adequate data entry.

Data are extracted from the unit database by the Registry and validated, before being passed to The NHS IC, as detailed in the "Data Flow" section on page 8. Data are extracted on incident patients only[1], with the associated vascular access data items. For this early phase too few data are available for robust analysis. The following data analysis is therefore for illustrative purpose only.

Demographics

59 per cent of incident haemodialysis patients were of male gender (Figure 5) and 64 per cent were aged 65 or older (Figure 6). The 11th annual Renal Registry report (Farrington, Udayaraj et al. 2009) reported 61 per cent of incident patients were male.

The early adopter sites reported 49 per cent of incident patients were white (Figure 7). Again the 11th Annual Report (Farrington, Udayaraj et al. 2009) reported nearly 80 per cent white. This probably reflects the early adopter site populations and small sample size.

Access at start of dialysis

As detailed in the introduction, there are three classes of vascular access (VA): arteriovenous fistulae (AVF), arteriovenous grafts (AVG) and venous catheters (Non-tunnelled NTC or tunnelled TC).

For incident patients with known access at the start of haemodialysis, 33 per cent used an AVF and 1 per cent an AVG (Figure 8). These data are very similar to the UK Renal Registry Vascular Access survey (8th Annual report 2005) and the one year follow up (Fluck, Rao et al. 2007).

There were few differences based on age or gender in these preliminary data (Figure 9 – Figure 12)

Table 1
Early adopter renal units and their IT systems

Unit	System
Birmingham – Heartlands Hospital	Proton
Bristol – Southmead Hospital	Proton
Derby City General Hospital	VitalData
Leeds – St James's University Hospital	Proton
Leicester General Hospital	Proton
London – Royal Free Hospital	In–house
Middlesbrough – The James Cook University Hospital	Proton
Plymouth – Derriford Hospital	Proton
Swansea – Morriston Hospital	VitalData
Truro – Royal Cornwall Hospital	Proton

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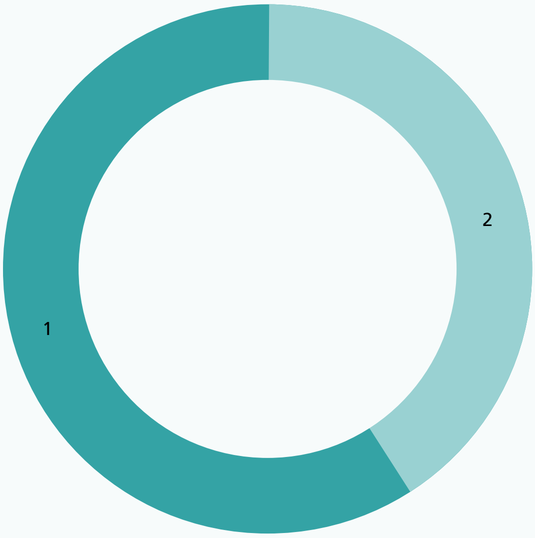
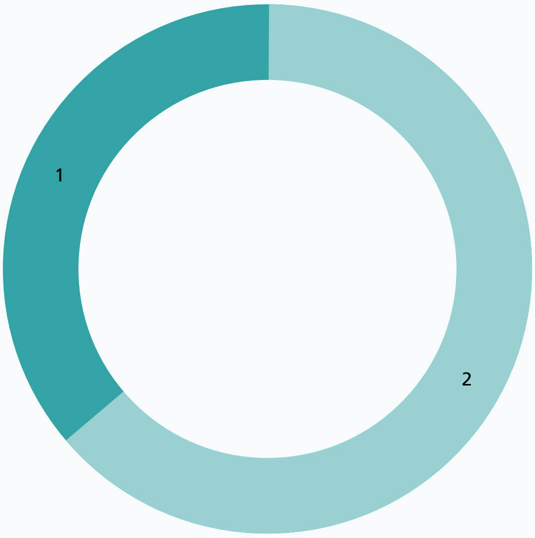
[1] For the purposes of this report "incident patients" are those starting haemodialysis during 2009

Figure 5
Gender of incident patients



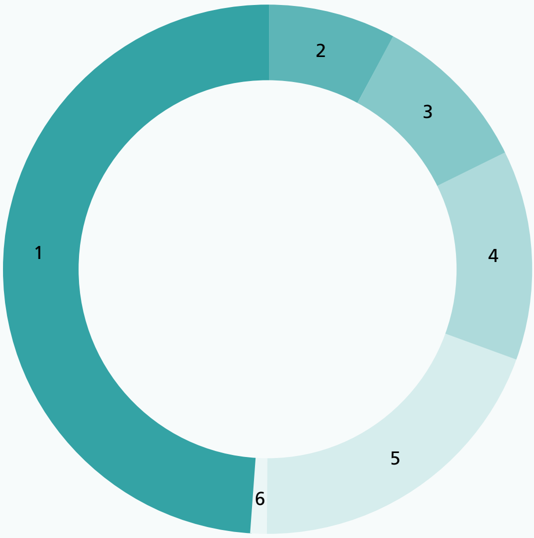
1 Male
2 Female

Figure 6
Age distribution of incident patients



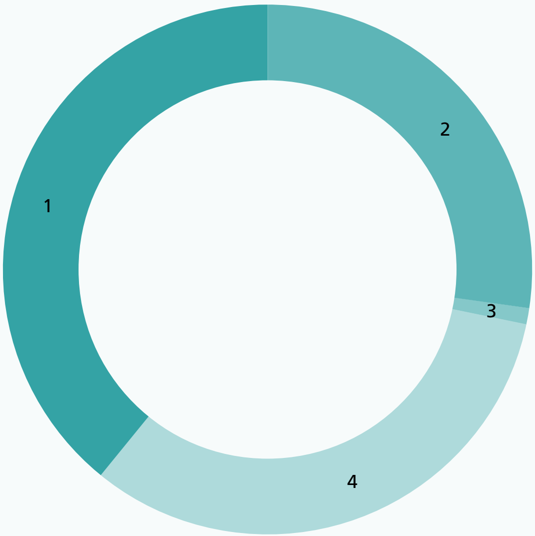
1 Years 65<
2 Years 65+

Figure 7
Ethnicity of incident patients



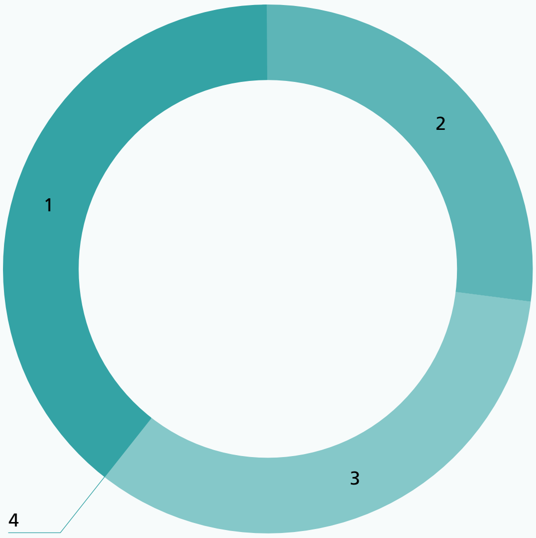
1 White
2 Not known
3 Other Ethnic Groups
4 Black or Black British
5 Asian or Asian British
6 Mixed

Figure 8
Access at time of first haemodialysis



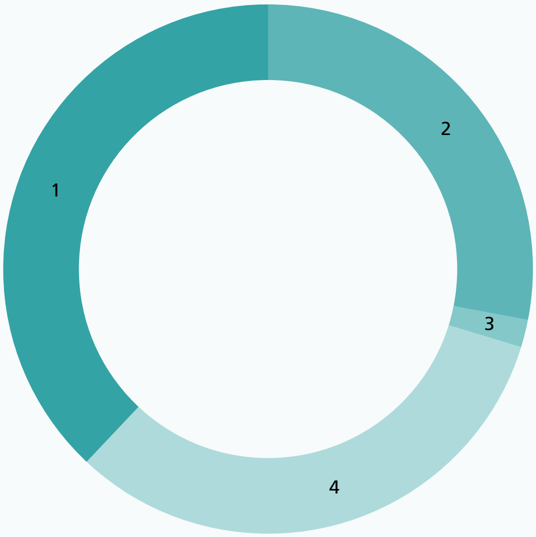
1 Tunnelled line
2 Non-tunnelled line
3 Arteriovenous graft
4 Arteriovenous fistula

Figure 9
Incident access in those aged < 65 years old



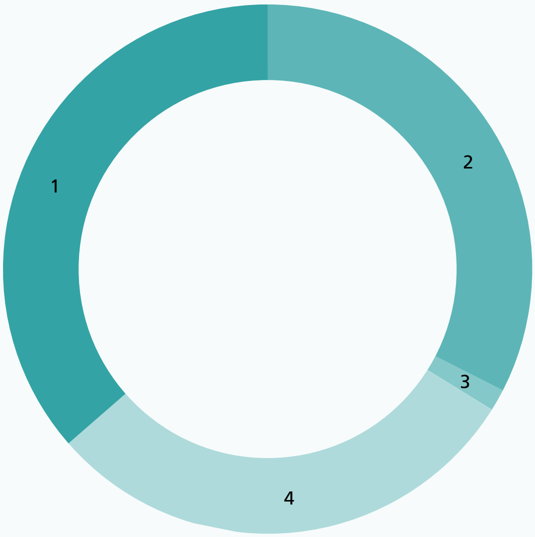
1 Tunnelled line
2 Non-tunnelled line
3 Arteriovenous fistula
4 Arteriovenous graft

Figure 10
Incident access in those aged 65 years or older



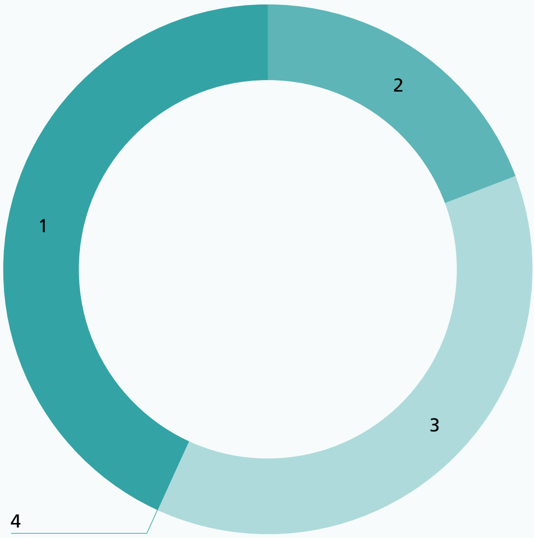
1 Tunnelled line
2 Non-tunnelled line
3 Arteriovenous graft
4 Arteriovenous fistula

Figure 11
Incident access in males



1 Tunnelled line
2 Non-tunnelled line
3 Arteriovenous graft
4 Arteriovenous fistula

Figure 12
Incident access in females



1 Tunnelled line
2 Non-tunnelled line
3 Arteriovenous fistula
4 Arteriovenous graft

Referral to first dialysis and starting access

A key question is how much time there is between being referred to a renal service and commencing dialysis, and then understanding how that impacts upon starting haemodialysis. 'Late referral' is traditionally defined as starting dialysis within 90 days of first presenting to a renal service. Late referral is one potential cause of an unplanned start onto dialysis, where a patient is insufficiently prepared physically or psychologically for the therapy. It is clear from previous work that many unplanned patients have been known to renal units for a considerable time before starting dialysis with a catheter (Fluck, Rao et al. 2007). Patients who begin dialysis on a catheter are exposed to greater risk with a poorer outcome (Polkinghorne, McDonald et al. 2004).

For this analysis, the time bands are expanded into four categories – 0–30 days, 31–90 days, 91–365 days and 366+ days.

For all incident patients 24 per cent were known less than 30 days before dialysis and another 7 per cent between 31 and 90 (Figure 13). For those with a catheter as their first access the renal unit had known nearly 40 per cent for more than one year. 36 per cent started dialysis within 30 days from first referral and another 7 per cent between 31 and 90 days (Figure 14). For those individuals starting with either an AVF or AVG (Figure 15) more than 61 per cent were known to the service for more than one year, with 3 per cent starting dialysis within 30 days of referral and a further 6 per cent in the 31 to 90 days band.

Figure 13
Days from first renal contact until start of haemodialysis (all patients) percentage distribution

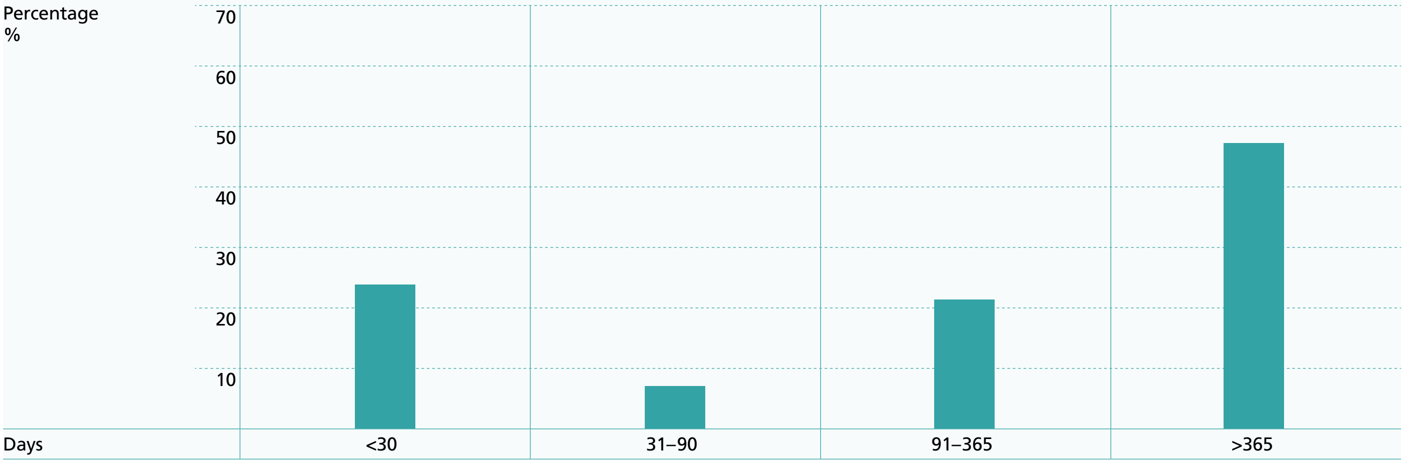
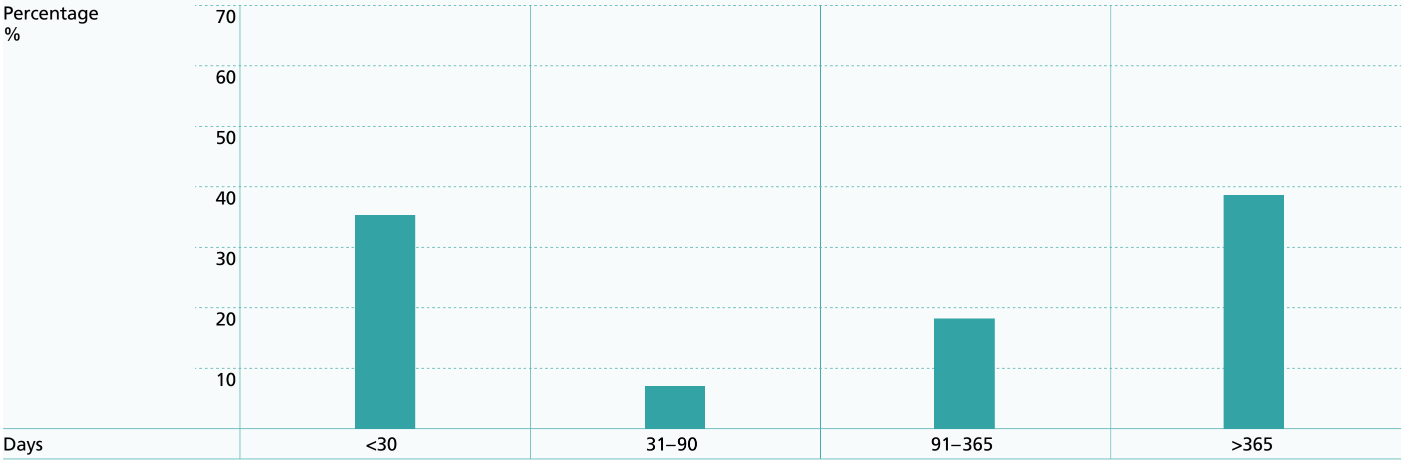


Figure 14
Days from first renal contact until start of haemodialysis (venous catheter group) percentage distribution



Conclusion

The early adopters have demonstrated that several units can collect data relevant to vascular access in their current systems. Data completeness is yet to be tested and several data items represent a challenge for the audit. Looking forward, the cycle of data entry, data extraction and then data analysis should be able to inform the debate about vascular access for the UK population.

Figure 15
Days from first renal contact until start of haemodialysis (arteriovenous fistula and graft group) percentage distribution

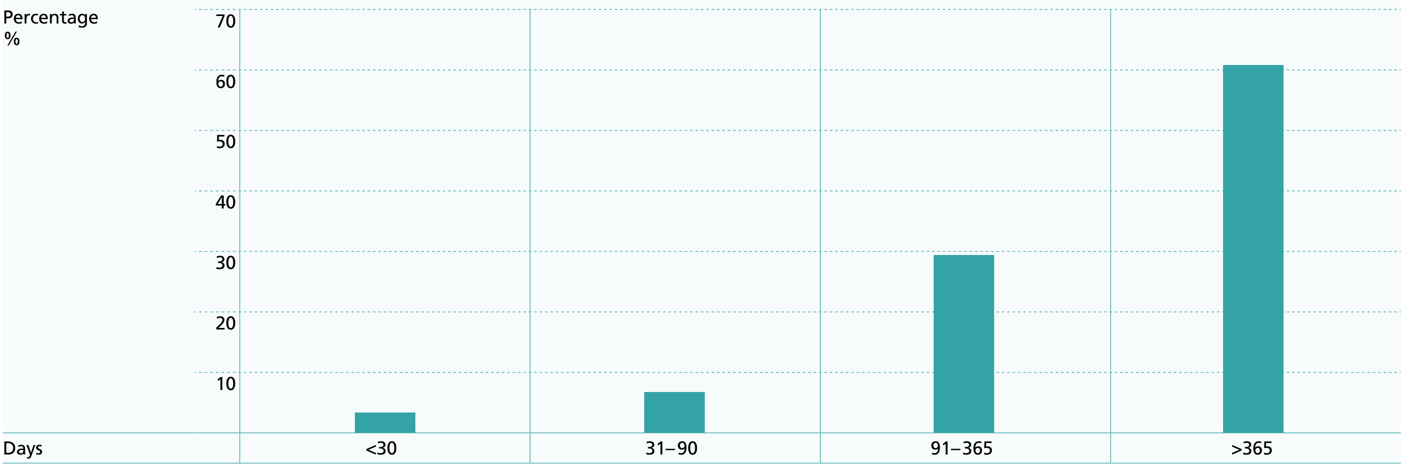
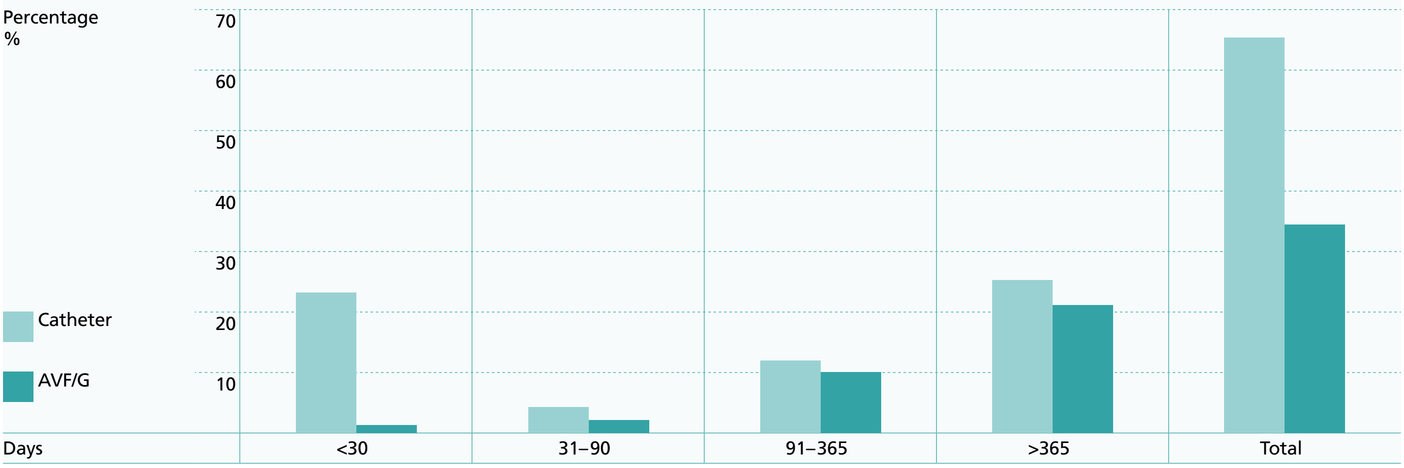


Figure 16
Comparison of the interval between being known to the service and starting renal replacement therapy for patients starting with catheters and patients starting with an arteriovenous fistula or graft



Case study – Identifying variation in rates of vascular access at the Royal Free

Joining the national vascular access audit has been a big but rewarding job for the Royal Free Hampstead NHS Trust. Having a bespoke in-house IT system has been no barrier to collecting the data and unveiling some interesting insights into how haemodialysis equipment is attached to a patient's bloodstream.

When renal unit staff David Wright and Shella Sandoval first heard about the audit, which is run by The NHS Information Centre on behalf of the Healthcare Quality Improvement Partnership, they knew they wanted to take part. The first job was to look at what data they needed to collect.

"We have our own in-house IT system and we looked at what existing data we collected, both electronically and by the renal nurses on paper," says David, Renal Systems and Clinical Data Manager. "Although we were collecting a lot of it already, we had to add in a few extra fields to meet the specification."

Once the IT system was up and running, the next job was to engage the people who would be inputting the figures. "We met with the nurses in the low clearance team who deal with the patients before they start dialysis. We explained what we were trying to do and how it could be beneficial to them," David says.

David has worked closely with Shella who is a Clinical Nurse Specialist. She is adamant it helped to have clinical backing from all levels. "Our medical director is very keen on taking part in the audit," she says. "Because we have had support right from the top it's really helped implement the audit and embed it into the work of the team."

When bringing in the IT aspects of the audit, David also found it vital to have input from a clinical perspective. "It was very important to work with Shella," he says. "She understood the implications of the data and could give reasons why it was important to collect it from a clinical point of view. By going into the system, she can now turn the information into graphs and present the data at meetings."

This ability to analyse vascular access data has given Shella a new perspective on how her Trust is performing. "We have identified that one of our satellite units is using more catheter lines than the others," she says. "That unit is now looking into the reasons and seeing if they can increase the number of patients that receive fistulas."

This insight means that the Royal Free's patients are already seeing benefits from the audit. "I think the audit will improve services to patients," Shella says. "Joining the audit has encouraged us to focus how important it is for patients to have good vascular access, and helped us look at how we can improve our rates of access."

Shella is looking forward to reading the national results. "It's great that the audit is being carried out at national level as it will definitely be useful to see how we compare to other hospitals. I will also look at our own results and see how we are performing. We hope to uncover the gaps in our service and try and improve them, and identify where we're doing well and try and build on that."

Lessons and Next Steps

Lessons

The last 12 months of establishing the Vascular Access audit have provided several important learning points.
Two units have provided case studies covering aspects of the audit and most particularly the data entry into local information systems (see pages 10 and 16). It is clear that the audit is complex with multiple interactions between agencies and with complex needs for data entry.

From the point of patient contact to the entry of data items, there needs to be a robust information system in place. There also needs to be clarity as to the responsibilities within the renal units as to who is responsible for which data items. Moreover, it is clear that we need to provide units with a greater degree of certainty about the data items that are required for the purpose of this audit. All of the current data items are part of the National Renal Dataset and therefore collection of these items is already mandated. However, it would be useful to provide additional guidance to units as to the data items required.

By providing such clarity, it would be hoped to improve the completeness of data entry. Whist the initial early adopter sites provided over 600 patient records and events, data completeness was low. For each individual unit, it needs to be understood whether this is a deficiency in the data base structure, a problem with actual data entry or some problem with the retrieval of data from the unit to the Renal Registry and then from the Renal Registry to The NHS IC.

Next Steps

There are several areas that need to be developed as part of the ongoing audit project, in order to achieve a high return rate and good data quality.

Table 2 in the appendix on page 19 provides a list of all the units that have expressed interest in the National Kidney Care Audit and their current status.

To assist with roll out and particularly to work with a unit in understanding the needs around the audit, the Clinical Lead can offer assistance with a visit to the unit or by providing early adopter sites to mentor units in their roll out.

As part of that, the dataset items that are required as part of the National Kidney Care Audit need to be clarified, and further guidance on this aspect will be included in a revised welcome pack. There will need to be enhanced dialogue between system suppliers, renal units themselves and the Renal Registry. This should include a review of data completeness. This may mean that IT systems will need to be upgraded but that should already be under consideration by individual renal units in England particularly as this is part of the National Renal Dataset.

Once the systems, agreed data items and processes are in place, it is planned to collect data on all incident patients commencing haemodialysis in units taking part in the audit. This will allow the database to build with a planned quarterly extract providing more timely data returns.

The next major plank of the agreed project is then to complete the permissions for the sharing of data between the Renal Registry, The NHS IC, the Health Protection Agency, and the hospital episode organisations in each home country. This would enable triangulation of incident patients as provided by the Registry and unit with bacteraemia data and hospital episode statistics. This will allow analysis of the impact of vascular access upon direct and indirect co-morbidities and adverse events. It is also proposed that as part of the dataset extension that the audit then moves into prevalent patient populations, this simply requires knowledge of vascular access use of each dialysis session, which will be extracted by the Registry and then similarly linked with hospital episodes and HPA data.

This will culminate in a report planned for 2011.

Conclusion

Peer lessons have been learnt in respect of this complex and difficult project as to data collection, data extraction and data analysis. Continued support to units commencing the audit will be needed to share the lessons from the early adopter sites and to improve data collection.

Ultimately, this should give us important and ongoing information about the impact of vascular access upon patient outcomes and provide us with prize clinicians, patients and commissioners with tools to improve safety, quality and value for money.

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References

1. Albers, F. J. (1996). "Clinical considerations in hemodialysis access infection." Adv Ren Replace Ther 3(3): 208-217.
2. Ansell, D., P. Roderick, et al. (2009). "UK Renal Registry 11th Annual Report (December 2008): Chapter 7 Survival and causes of death of UK adult patients on renal replacement therapy in 2007: national and centre-specific analyses." Nephron Clin Pract 111 Suppl 1: c113-139.
3. Baker, L. D., Jr., J. M. Johnson, et al. (1976). "Expanded polytetrafluoroethylene (PTFE) subcutaneous arteriovenous conduit: an improved vascular access for chronic hemodialysis." Trans Am Soc Artif Intern Organs 22: 382-387.
4. Berman, S. J., E. W. Johnson, et al. (2004). "Burden of infection in patients with end-stage renal disease requiring long-term dialysis." Clin Infect Dis 39(12): 1747-1753.
5. Butterly, D. W. and S. J. Schwab (2000). "Dialysis access infections." Curr Opin Nephrol Hypertens 9(6): 631-635.
6. Farrington, K., U. Udayaraj, et al. (2009). "UK Renal Registry 11th Annual Report (December 2008): Chapter 3 ESRD incident rates in 2007 in the UK: national and centre-specific analyses." Nephron Clin Pract 111 Suppl 1: c13-41.
7. Fluck, R., R. Rao, et al. (2007). "The UK Vascular Access Survey--follow-up data and repeat survey (chapter 5)." Nephrol Dial Transplant 22 Suppl 7: vii51-57.
8. Fluck, R., J. Wilson, et al. (2009). "UK Renal Registry 11th Annual Report (December 2008): Chapter 12 Epidemiology of Methicillin Resistant Staphylococcus aureus bacteraemia amongst patients receiving Renal Replacement Therapy in England in 2007." Nephron Clin Pract 111 Suppl 1: c247-256.
9. Ishani, A., A. J. Collins, et al. (2005). "Septicemia, access and cardiovascular disease in dialysis patients: the USRDS Wave 2 study." Kidney Int 68(1): 311-318.
10. Lawton, R. L. and H. P. Gulesserian (1969). "Venous arterialization (fistula) for vascular access (hemodialysis)." Arch Surg 99(3): 410-412.
11. Polkinghorne, K. R., S. P. McDonald, et al. (2004). "Vascular access and all-cause mortality: a propensity score analysis." J Am Soc Nephrol 15(2): 477-486.
12. Rehman, R., R. J. Schmidt, et al. (2009). "Ethical and legal obligation to avoid long-term tunneled catheter access." Clin J Am Soc Nephrol 4(2): 456-460.

Appendix

The following table is presented in alphabetical order by unit name and country. Paediatric units are presented at the end of the table. It is noted that paediatric units do not currently have appropriate clinical systems to return electronic data to the UKRR. A pilot study to do so is under way.

Table 2
Unit involvement

Unit Name	Country	Status	System	Estimated participation date
Basildon	England	Registered	eMed	Jan–10
Birmingham – Heartlands Hospital	England	Submitting data	Proton	Sep–09
Birmingham – Queen Elizabeth Hospital	England	Not Registered	In-house	TBD
Bradford – St Luke's Hospital	England	Registered	Proton	Aug–10
Brighton – Royal Sussex County Hospital	England	Registered	Clinical Vision	Apr–10
Bristol – Southmead Hospital	England	Submitting data	Proton	Sep–09
Cambridge – Addenbrooke's Hospital	England	Registered	In–house	TBD
Carlisle – Cumberland Infirmary	England	Not Registered	Proton	TBD
Chelmsford – Broomfield Hospital	England	Registered	eMed	Jan–10
Colchester General Hospital	England	Registered	Fresenius	TBD
Coventry – Walsgrave Hospital	England	Registered	Proton	Apr–10
Derby City General Hospital	England	Submitting data	VitalData	Sep–09
Doncaster Royal Infirmary	England	Registered	eMed	Mar–10
Dorchester – Dorset County Hospital	England	Registered	eMed	Jan–10
Dudley – Russells Hall Hospital	England	Registered	eMed	Jan–10
Exeter – Royal Devon and Exeter Hospital	England	Not Registered	Proton	TBD
Gloucester Royal Hospital	England	Registered	Proton	May–10
Hull Royal Infirmary	England	Registered	Proton	Mar–10
Ipswich Hospital	England	Registered	Baxter	TBD
Kent & Canterbury Hospital	England	Registered	RenalPlus	Mar–10
Leeds – St James's University Hospital	England	Submitting data	Proton	Jan–10
Leicester General Hospital	England	Submitting data	Proton	Oct–09
Liverpool – Aintree University Hospital	England	Registered	Proton	Apr–10
Liverpool – Royal Liverpool University Hospital	England	Registered	Proton	May–10
London – Guy's and St Thomas's	England	Registered	In-house	Jan–10
London – King's College Hospital	England	Registered	In-house	Mar–10
London – Royal Free	England	Submitting data	In-house	Jan–10
London – St Barts Hospital	England	Registered	In-house	Mar–10
London – St George's Hospital	England	Registered	Clinical Vision	Apr–10
London – St Helier Hospital, Carshalton – South West Thames Renal & Transplantation Unit	England	Registered	Proton	Dec–10
London – West London Renal and Transplant Centres	England	Registered	Proton	TBD
Manchester Royal Infirmary	England	Registered	Clinical Vision	May–10
Middlesbrough – The James Cook University Hospital	England	Submitting data	Proton	Sep–09
Newcastle – Freeman Hospital	England	Registered	Clinical Vision	Jun–10
Norfolk & Norwich University Hospital	England	Registered	eMed	Oct–09
Nottingham City Hospital Renal and Transplant Unit	England	Registered	Proton	Jun–10
Oxford John Radcliffe Hospital	England	Registered	Proton	May–10
Plymouth – Derriford Hospital	England	Submitting data	Proton	Jan–10
Portsmouth – Queen Alexandra Hospital	England	Registered	Proton	Jul–10
Preston – Royal Preston Hospital	England	Registered	Proton	Oct–10
Reading – Royal Berkshire Hospital	England	Registered	Proton	Sep–10
Salford – Hope Hospital	England	Registered	In-house	TBD
Sheffield – Northern General Hospital	England	Registered	Proton	Nov–10
Shrewsbury – Royal Shrewsbury Hospital	England	Registered	RenalPlus	TBD
Southend Hospital	England	Registered	Proton	Jul–10
Stevenage – The Lister Hospital	England	Registered	RenalPlus	Mar–10
Stoke – University Hospital of North Staffordshire	England	Registered	CyberREN	Jun–10
Sunderland Royal Hospital	England	Registered	Proton	Jun–10
Truro – Royal Cornwall Hospital (Treliske)	England	Submitting data	Proton	Sep–09
Wirral – Arrowe Park Hospital	England	Registered	CyberREN	Mar–10

Table 2 continued
Unit involvement

Unit Name	Country	Status	System	Estimated participation date
Wolverhampton – New Cross Hospital	England	Registered	Proton	Jul–10
York District General Hospital	England	Registered	Proton	Aug–10
Antrim Area Hospital	Northern Ireland	Registered	eMed	TBD
Belfast – Ulster Hospital	Northern Ireland	Registered	eMed	TBD
Belfast City Hospital	Northern Ireland	Registered	eMed	TBD
Derry/Londonderry – Altnagelvin Hospital	Northern Ireland	Registered	eMed	TBD
Newry – Daisy Hill Hospital	Northern Ireland	Registered	eMed	TBD
Omagh – Tyrone County Hospital	Northern Ireland	Registered	eMed	TBD
Bangor – Gwynedd Hospital	Wales	Registered	Baxter	TBD
Cardiff – University Hospital of Wales	Wales	Registered	Proton	Apr–10
Rhyl – Glan Clwyd Hospital	Wales	Registered	Fresenius	TBD
Swansea – Morriston Hospital	Wales	Submitting data	VitalData	Sep–09
Wrexham – Maelor Hospital	Wales	Registered	RenalPlus	Apr–10
Birmingham Children’s Hospital	England	Registered		TBD
Bristol Royal Hospital for Children	England	Not Registered		TBD
Leeds – St James’s University Hospital – Paediatric Unit	England	Registered		TBD
Liverpool – Royal Liverpool Children’s Hospital (Alder Hey)	England	Not Registered		TBD
London – Evelina Children’s Hospital	England	Not Registered		TBD
London – Great Ormond Street	England	Registered	Proton	TBD
Manchester – Royal Manchester Children’s Hospital	England	Not Registered		TBD
Newcastle – Royal Victoria Infirmary – Paediatric	England	Not Registered		TBD
Nottingham Queens Medical Centre – Paediatric	England	Not Registered		TBD
Southampton General Hospital – Paediatric	England	Not Registered		TBD
Belfast – Royal Belfast Hospital for Sick Children	Northern Ireland	Not Registered		TBD
Cardiff – University Hospital of Wales – Children’s Kidney Centre	Wales	Registered		TBD

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