Modernising Services for Renal Patients
Redesigning the workforce and re-engineering elective dialysis access surgery
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Redesigning the workforce and re-engineering elective dialysis access surgery

The report of a project at two sites, commissioned by the Department of Health and managed by the Changing Workforce Programme of the NHS Modernisation Agency
**Document Purpose**
For information

**ROCR Ref:**

**Gateway Ref:** 4268

**Title**
Modernising Services for Renal Patients

**Author**
DH Renal

**Publication Date**
July 2005

**Target Audience**
PCT CEs, NHS Trust CEs, SHA CEs, Care Trust CEs, Foundation Trust CEs, Medical Directors, Directors of PH, Directors of Nursing, PCT PEC Chairs, Directors of HR, Allied Health Professionals, Communications Leads

**Circulation List**
n/a

**Description**
Report on year long pilot looking at new and different ways of working to improve care to patients with chronic kidney disease. Focusing on roles within renal team, improving access to vascular access surgery and reducing delays and waste in patient journey.

**Cross Ref**
n/a

**Superseded Docs**
n/a

**Action Required**

**Timing**

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First Published July 2005
Produced by COI for the Department of Health
CHLORINE FREE PAPER

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The NHS Improvement Plan made clear the importance of new ways of working to meet patients’ needs. In this spirit the Department of Health commissioned the Modernisation Agency to work with NHS front-line staff at two sites to develop and test workforce changes. Modernising Services for Renal Patients shares the outcome of their work, both the tools and techniques they found of value, and the spirit of innovation and creativity they brought to workforce redesign and the re-engineering of elective dialysis access surgery.

The work undertaken at the Royal Devon and Exeter Hospital NHS Foundation Trust and University Hospital Birmingham NHS Foundation Trust has encompassed the whole patient pathway. Each site has developed methodology and tools, drawn on improvement science techniques and prioritised their key areas for action to improve the quality of care delivered. The approach to problem solving and the resources developed in Birmingham and Exeter can be adapted by other renal services to suit their own local circumstances.

Vascular access is the ‘Achilles’ heel’ of renal replacement therapy. Poor vascular access is associated with infections, unnecessary hospitalisation and avoidable morbidity and mortality. We know there are large variations in quality and timing of vascular access creation. This is unacceptable for a service that can be readily quantified and planned from the case mix and case loads. Both sites, from different perspectives, examined their access delivery and placed vascular access, the dialysis patient’s lifeline, at the centre of integrated care planning for patients who chose to have haemodialysis. They have made high impact changes that have now been embedded into their service. The tools, techniques and products they have used are detailed in this report and are available to the whole renal community.

Team work, across the artificial barriers that can fragment care, emerged as a core theme early in the project. Patients’ needs have been the basis for the workforce redesign and several new roles, such as Vascular Access Co-ordinator, have been developed. The modelling tools have quantified the critical resources and skills required more precisely than ever before. The challenge of matching workforce to patients’ needs can be approached using these tools.
The project teams and steering group identified three essential factors for success:

- dedicated project resource
- support of a board level champion
- integration of change using the balanced score card to ensure sustainability.

The project teams have achieved lasting improvements in their services using existing resources. The analysis undertaken has also made it possible to build a convincing business case to secure additional resources for future development.

I am grateful to Angela Pedder, the Chief Executive of Royal Devon and Exeter NHS Foundation Trust, and Mark Britnell, the Chief Executive of University Hospital Birmingham NHS Foundation Trust, for supporting these projects: also to the project teams and colleagues at the NHS Modernisation Agency, who have worked tirelessly; to the steering group, who have given valuable advice; and to the patients who have given up their time to support the work.

Dr Donal O’Donoghue
Chair, Modernising Renal Services National Steering Group
This report shows how two renal sites set about redesigning their local workforce, and adjusting their clinical processes to match increasing demand against existing capacity. The background to their local changes will resonate with the experiences of the renal community. The report makes available details of the processes and resources the project teams used, and describes how they worked with staff, patients and major stakeholders. It is, above all, a practical guide to help other renal teams develop and evaluate solutions that are appropriate to their own patients and workforce.

Before embarking on any modernisation activity it is essential to gain support from those in a position to assist the implementation of agreed changes. Both teams secured explicit support from named champions on their executive boards, and harnessed strong managerial leadership at strategic and operational level where it was essential to embed change and develop a culture of improvement. People with chronic kidney disease and carers were actively involved throughout the project, acting on local and national steering groups and reporting at sharing workshops. A sound and well thought out communication strategy ensured that improvement activity was shared with all those in the wider local health economy who could contribute to, or might be affected by, the changes.

Gaining a detailed understanding of the problems was key to delivering the improvements required, and meant effort was not wasted developing solutions to symptoms. The project teams examined how they delivered care historically along the length of the renal patient pathway. Using modernisation tools and techniques they identified points on their respective clinical pathways where changes could secure improvements to patient care and, with colleagues from Information Technology, defined precisely what they needed to measure in order to demonstrate the impact of their changes. The range of measures was developed to reflect processes along the patient pathway that will be familiar to most renal units. Improvements were made to correct acknowledged deficiencies in the existing local data collection systems, and are presented here.

With clear understanding of the clinical processes they wanted to improve and mechanisms for measuring in place, both sites began to analyse tasks undertaken by their team members. Using a skills escalator approach, the teams were able to safely adjust the traditional allocation of tasks and so make best use of the talents already available. The teams themselves agreed changes to how functions could be delivered differently, and a number of new roles were created. Specific role redesign tools ensured new ways of working that would also improve staff experience and offer enhanced career possibilities.
It is important to understand that most improvements have been, and will continue to be secured by the multi-skilled renal teams working ‘smarter’, using existing resources differently; a principle fundamental to the success of the NHS Plan.

The skill mix profile at the project sites has been plotted in draft form against the new NHS Career Framework. It is important to acknowledge that some of the roles developed are already in existence elsewhere. The strength of this piece of work is in sharing the learning, the tools and the skills that will support other renal teams who are about to start on this journey. All of the new ways of working discussed here can be replicated or developed further by renal teams nationally.

The project teams reported all outcomes against four key co-dependent areas of improvement identified in the NHS Plan: patient experience, clinical outcomes, staff experience and service delivery. The use of the ‘balanced score card’ and the collection of robust data have made it possible to prepare and articulate business cases and present them in a format that major stakeholders appreciate.

Improvement science often works around small ‘tests of change’, which yield changes in outcome indicators, sometimes in a matter of days. This is just one of the standard techniques used to secure improvements in clinical care without disrupting scheduled service delivery. As a routine step in the modernisation processes, protocols are developed to minimise risk as working practices are changed. Central involvement of governance teams at both sites, undertaking regular audit of change cycles, allowed the quality of care to be monitored and assured.

Whilst the modernisation tools and techniques are well proven, the solutions created cannot be prescriptive. The report seeks to balance this against the growing body of evidence that suggests a number of specific changes, identified as the 10 High Impact Changes, can deliver the greatest impact across all NHS specialties. Focusing activity on these 10 High Impact Changes ensured the teams’ efforts secured the most productive outcomes.

One size never fits all; the changes tested by the project teams demonstrate how the workforce model needs to be flexible in order to solve problems and deliver improved care for people with renal disease. The shared learning in this document will support other teams in identifying their key priorities for improvement, seeking appropriate tools for modernisation and testing possible solutions.
The National Service Framework for Renal Services

Summary of standards and quality requirements

These standards and quality requirements apply to all patients. In some cases, for example children and young people and some older people, they will also apply in varying degrees to families, guardians or carers.

Part One: Dialysis and Transplantation

STANDARD ONE: All children, young people and adults with chronic kidney disease are to have access to information that enables them with their carers to make informed decisions and encourages partnership in decision-making, with an agreed care plan that supports them in managing their condition to achieve the best possible quality of life.

Note: this standard applies across the whole of this NSF

STANDARD TWO: All children, young people and adults approaching established renal failure are to receive timely preparation for renal replacement therapy so the complications and progression of their disease are minimised, and their choice of clinically appropriate treatment options is maximised.

STANDARD THREE: All children, young people and adults with established renal failure are to have timely and appropriate surgery for permanent vascular or peritoneal dialysis access, which is monitored and maintained to achieve its maximum longevity.

STANDARD FOUR: Renal services are to ensure the delivery of high quality clinically appropriate forms of dialysis which are designed around individual needs and preferences and are available to patients of all ages throughout their lives.

STANDARD FIVE: All children, young people and adults likely to benefit from a kidney transplant are to receive a high quality service which supports them in managing their transplant and enables them to achieve the best possible quality of life.

Part Two: Chronic Kidney Disease, Acute Renal Failure and End of Life Care

Part two follows 'Standards for Better Health', which promises the NHS fewer national targets and sets out a new framework of core and developmental standards. Part two identifies quality requirements which are drawn from these, and which support the NHS to interpret them for renal services and deliver them locally.

QUALITY REQUIREMENT ONE: People at increased risk of developing or having undiagnosed chronic kidney disease, especially people with diabetes or hypertension, are identified, assessed and their condition managed to preserve their kidney function.

QUALITY REQUIREMENT TWO: People with a diagnosis of chronic kidney disease receive timely, appropriate and effective investigation, treatment and follow-up to reduce the risk of progression and complications.

QUALITY REQUIREMENT THREE: People at risk of, or suffering from, acute renal failure are identified promptly, with hospital services delivering high quality, clinically appropriate care in partnership with specialised renal teams.

QUALITY REQUIREMENT FOUR: People with established renal failure receive timely evaluation of their prognosis, information about the choices available to them, and for those near the end of life a jointly agreed palliative care plan, built around their individual needs and preferences.
References

1 Standards for Better Health is published as part of National Standards, Local Action: Health and Social Care Standards and Planning Framework 2005/06-2007/08, and is available at www.dh.gov.uk
Introduction

1. In January 2004 the National Service Framework (NSF) for Renal Services, Part One: Dialysis and Transplantation was published to deliver fairer, faster and better services and to give people more treatment choices.

2. Integral to this was a patient centred approach to developing services. As anticipated, the NSF found an arteriovenous fistula (AVF) to be the best form of long-term vascular access for haemodialysis, and identified the need to deliver faster, more effective elective vascular access surgery for kidney patients choosing haemodialysis. It also highlighted the need to undertake some wider workforce modelling to cover the complete patient pathway in preparation for Part Two of the NSF.

3. The Department of Health commissioned the NHS Modernisation Agency’s Changing Workforce Programme to establish a project that would search out and test new ways of working along the patient pathway. The emphasis of this report is primarily on the workforce and service issues identified in the NSF for Renal Services. In spring 2004 the Changing Workforce Programme announced its intention to work with two sites. As required in the original specification for the project, one of the sites was to be attached to its transplant unit and one was not. Expressions of interest were then sought from all renal services in England.

4. The aims of the project were to:
   - process map the patient pathway from referral to the renal team by primary care or other routes including emergency care
   - review the model of service to improve provision of vascular access surgery for renal patients by testing new models and ways of working
   - use task analysis of the patient pathway to enable effective workforce planning.

5. After considering 22 high calibre submissions, two sites were selected to take this work forward:
   - Royal Devon and Exeter Hospital NHS Foundation Trust (RD&E)
   - University Hospital Birmingham NHS Foundation Trust (UHB).
6. A national steering group was established to support the pilot sites (see Appendix One for membership) and a launch event was held. Each site identified an executive board member champion, developed their local steering group/board and appointed a project manager and team. Scoping and diagnostic work then commenced as the two successful sites began to develop their project plans.

7. The pilot sites began from different starting points, prioritised different issues to address and are testing different models. Whilst both sites have patients at the centre of their service, it is clear that one workforce model will not be the answer for all renal services. The workforce model needs to be flexible to deliver change and improvement; other renal services can use the learning shared here to support them in identifying their own priorities and developing and testing their own solutions.

The Project Sites – Background

Royal Devon and Exeter Hospital NHS Foundation Trust (RD&E)

8. The renal unit at RD&E is a non-transplant unit. It is one of four renal units in the South West of England, the others being situated in Bristol, Plymouth and Truro. The RD&E Renal Unit currently cares for 540 patients with established renal failure in addition to offering a comprehensive investigational renal service.

9. Haemodialysis is undertaken at RD&E as well as the satellite units at South Molton (North Devon Satellite Renal Unit), Newton Abbot (Torbay Satellite Renal Unit), Taunton and Yeovil. The latter two units are co-operative public-private partnerships providing regular haemodialysis.

10. Transplantation surgery was undertaken at the RD&E centre between 1968 and 1998, when transplantation services were reconfigured and surgery consolidated. For those 30 years, the on-site transplant surgeons had provided vascular access surgery. This service redesign subsequently required the development of an effective local vascular access service.

11. RD&E has built a multidisciplinary team which aims to provide seamless care for patients in two strategic health authorities, three surrounding district general hospitals and ten primary care trusts.
Baseline measures – RD&E

**Figure 1:** Total number of dialysis and transplant patients at RD&E 1995 to 2004

Why RD&E wanted to be a modernising renal service pilot site

12. RD&E was committed to the project as an opportunity to:

- provide a vehicle to deliver significant improvements in healthcare for people with chronic kidney disease, their relatives and carers
- support the shared aspirations of the North and East Devon Health and Social Care community, that include: no needless waste, no needless pain, no needless death, no needless waiting and no needless feelings of helplessness
- improve the working lives of staff through the development of new ways of working
- provide key people with the time and expertise to consider the whole patient pathway, and using data analysis to identify bottlenecks and delays so that the pathway can be redesigned with the patient at the centre.

University Hospital Birmingham NHS Foundation Trust (UHB)

13. The regional renal unit at UHB offers comprehensive investigational renal services, dialysis and renal transplantation services to a community with a rich ethnic minority mix. Outpatient activity is around 17,000 attendances per year, by patients with chronic kidney disease as well as those on renal replacement therapy. The unit cares for over 820 dialysis patients. Two thirds of patients receiving haemodialysis do so at the six UHB-supervised satellite haemodialysis units: Hereford, Aston, Tipton, City Hospital, Kidderminster and Priory.
14. UHB provides a renal transplantation service for a population of 4.5 million (UHB patients and those from surrounding renal units). The unit has performed well over 2,500 renal transplants since 1980 and is currently performing around 110 grafts annually. There is an expanding live donor kidney program projected to transplant 35-40 kidneys in 2005, and a newly implemented ‘non-heart beating’ transplant donor service. The assessment and management of patients pre- and post-renal transplant is performed jointly by physicians and surgeons.

15. Haemodialysis access surgery is predominantly provided by the renal transplant surgeons working with the rest of the multidisciplinary team and supported by vascular surgical colleagues.

**Baseline measures – UHB**

**Figure 2:** Total number of dialysis and transplant patients at UHB 1995 to 2004

The number of prevalent renal transplant patients under the direct care of UHB reflects the local follow-up arrangements for patients managed at other centres. Patients return to their referring base renal unit around three months post transplant surgery.

**Why UHB wanted to be a modernising renal service pilot site**

16. UHB was committed to the project as an opportunity to:

- reduce temporary vascular access use and its associated high rates of infection (see Appendix Four), and emergency re-admission
meet Renal Association best practice standards on vascular access
improve patient experience through the involvement of patient user groups and user surveys
initiate innovative practices and role redesign/development to best utilise current staff resources and meet future service needs (eg the development of radiology assistants).

**Figure 3:** Renal activity at RD&E and UHB

<table>
<thead>
<tr>
<th></th>
<th>RD&amp;E</th>
<th>UHB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transplant unit patients, 2003-04</td>
<td>210</td>
<td>665</td>
</tr>
<tr>
<td>Hospital and satellite haemodialysis</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Home haemodialysis</td>
<td>87</td>
<td>140</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>241</td>
<td>640</td>
</tr>
<tr>
<td>Annual acceptance for renal replacement therapy</td>
<td>N/A</td>
<td>220-240</td>
</tr>
<tr>
<td>Annual growth in dialysis</td>
<td>N/A</td>
<td>9%</td>
</tr>
</tbody>
</table>

**References**

Chapter Two: Processes

Modernisation involves working through a recognised process which includes project management, identifying baseline measures, agreeing definitions and robust data capture to demonstrate improvement or the impact of change. Identified, dedicated champions at executive board level are essential if renal services are to be improved. The project sites worked through the following recognised process structure.

**Project Management**

18. Each site appointed a project manager to:
   - develop an understanding of the renal culture and facilitate the project
   - analyse the current situation and the change drivers
   - increase awareness and develop the understanding of the project objectives across the renal communities and key stakeholders such as finance, human resources, information technology and workforce development
   - ensure patient and carer involvement
   - implement a communication strategy
   - develop national networking, and partnership working between the two project sites.

19. The project managers work closely with their management teams and operational service development managers. Using this process structure encourages staff and patients to lead the changes.

**Modernisation Training**

20. Modernisation training can support the development of changes that help reduce waiting times, reduce length of stay, improve the patient experience and improve efficiency. Developing a business case supported by easily understood measures can be a powerful mechanism for gaining support from finance or human resource departments.

21. Modernisation training to support new ways of thinking and basic training in improvement methodology enable staff to run small tests of change safely, and to identify at which points along the patient pathway changes can be focused to secure greatest impact:
   - process mapping, analysis and redesign
• measurement for improvement
• matching capacity and demand
• involving patients and carers
• managing the human dimensions of change
• sustainability and spread
• setting up collaborative programmes.

22. Training is usually provided by local Service Improvement or Modernisation teams and by Workforce Development Directorates. A series of step-by-step guides are available at www.wise.nhs.uk.

Stakeholder Event

23. Each site used a stakeholder event as their central guide for the project. The aims of the event were to:

• promote open debate around issues within renal services
• identify areas of good practice to be shared throughout the healthcare community
• identify areas where improvements within the service are required
• discuss how effective changes can be made to improve the patient experience and the working lives of healthcare workers
• produce clear action plans, agreed by the multidisciplinary teams throughout the local healthcare organisations, to ensure ownership and therefore the support of change.

24. The complexity of the renal patient pathway is challenging, but provides opportunities to develop meaningful and practical solutions.

25. In RD&E a design team, involving patients, and the use of the Problem Analysis tool (see Chapter Six) produced aims and objectives for the event. In Birmingham the approach was different with a ‘drop in’ event (see www.wise.nhs.uk/renal) rather than a full day meeting.

26. Both sites used the events to develop process maps showing how their services were delivered for the entire patient pathway (available on www.wise.nhs.uk/renal). These process maps have been used to identify delays and duplication and to develop action plans to redesign the service. A named person was assigned to each action, to ensure work was taken forward and owned.
27. Feedback/suggestions from the events were organised around main themes: integrated care pathways, primary and secondary care interface, patient experience and vascular access. Research undertaken by the NHS Modernisation Agency suggests ten changes which have the highest impact in delivering improvement to patient care. The sites have presented some of the areas they identified and prioritised for improvement within the 10 High Impact Changes in Chapter Three.

28. Patients' and carers' views have been sought throughout the project. Patients are represented on national and local steering groups, where they actively participate in decision making, advising on the patient perspective and the focus of the project. RD&E used a problems analysis tool to collect patient opinions. This informed the design of the stakeholder event. A patient and carer satisfaction survey will be used to inform future publications and a local sharing event in RD&E later this year. UHB co-opted a patient representative (Chairman of the local Kidney Patient Association) onto the project board and conveyed progress of the project via various forms of communication: patient newsletters, Trust’s patient councils, News Focus (the Trust newsletter) and via the local kidney patients associations.

**Measures**

29. The patient pathway was developed by the local project teams at the stakeholder events. This highlighted the baseline measures, and the national steering group together with the local project teams set the definitions to be used for the project. Core measures were collected by both sites, and additional measures were collected by UHB, to demonstrate the impact of their changes. Baseline data were collected for six months prior to changes being implemented (see [www.wise.nhs.uk/renal](http://www.wise.nhs.uk/renal)).

**Communication Strategy**

30. Local communication strategies for both project sites include monthly Trust newsletters for all staff and stakeholders in addition to updates at quarterly meetings with each site’s Renal Network. Feedback from all stakeholders is encouraged throughout the project.

31. Midpoint in the project a sharing event was held to allow both pilot sites to share learning, promote national discussion, align progress and involve patients. At the end of the project year a national sharing and dissemination event for wider healthcare organisations and the renal community was held.
Figure 4: UHB vascular access patient pathway, from stakeholder event

1. Identified bottlenecks and waits (non-monitored) in the vascular access pathway
   - Wait for outpatient vascular access clinic (secondary referral)
     - Current waiting time = 2–4 weeks (ideally, maximum 1 week)
   - Wait for radiological investigation
     - Current waiting time = 6 weeks (ideally, maximum 2 weeks)
   - Wait for radiological intervention – lack of day case beds for radiological intervention
     - Current waiting time = 3 weeks after radiological intervention (ideally ‘one stop’ radiological investigation and intervention service)
   - Wait for day case surgery
     - Current waiting time = 3–4 months
   - Wait for inpatient surgery
     - Current waiting time = maximum 6 months

2. New Roles
   - Vascular Access Co-ordinator
   - Radiology Assistant

3. Processes
   - HAEMODIALYSIS Modality choice
     - Nephrologist refers
       - Low clearance clinic appointment
     - Failing transplant
     - Failing peritoneal dialysis
     - Dialysis catheter insertion

4. Vascular Access Assessment Clinic
   - Ultrasound vascular mapping & surgical plan identified (day case criteria met or IP (23h or complex))
   - Radiological investigation (contrast vascular study) and/or intervention
   - VA co-ordinator prioritises (surgeon and VA nurse co-ordinator)
   - Direct patient booking
   - Access formation (LA day case/inpatient)
   - Access maturation (VA co-ordinator)
   - VA monitoring protocol
   - Radiological investigation +/- intervention
   - MDT radiology meeting review
   - Mechanical thrombolysis
   - Surgery
     - Renal Assessment Centre
       - Medical/surgical review
         - Acute fistula failure
   - Pre-clerking clinic applt.
   - Surgery
     - Yes
     - First and subsequent haemodialysis
       - ‘Normal’
       - VA monitoring protocol
       - Radiological investigation +/- intervention
         - Abnormal
         - VA co-ordinator (protocol)
     - No
   - Low clearance clinic
     - Vascular access co-ordinator
       - Appt booked at.

5. Identified bottlenecks and waits (monitored) in the vascular access pathway
   - Wait for outpatient vascular access clinic
   - Wait for radiological investigation
   - Wait for radiological intervention
   - Wait for day case surgery
   - Wait for inpatient surgery

6. Current waiting time
   - Current waiting time = 2–3 weeks (ideally, maximum 1 week)
   - Current waiting time = 6 weeks (ideally, maximum 2 weeks)
   - Current waiting time = 3 weeks after radiological intervention (ideally ‘one stop’ radiological investigation and intervention service)
   - Current waiting time = 3–4 months
   - Current waiting time = maximum 6 months
   - Current waiting time = 6 weeks (ideally, maximum 2 weeks)
   - Current waiting time = 3 weeks after radiological intervention (ideally ‘one stop’ radiological investigation and intervention service)
   - Current waiting time = maximum 6 months
Support Structures

32. Clinical leads were appointed for each action plan, to ensure ownership and active engagement for the change process; they reported back to the local steering group and to Trust executives. RD&E employed a governance support facilitator, and UHB drew upon the skills of the project manager and the renal and clinical management teams.

33. At each site the operational management groups were regularly updated on progress. Monthly reports using a Pursuing Perfection framework (see Chapter Six) were used to inform the local and national steering groups of progress and highlight challenges.

34. The Changing Workforce Programme project manager provided support to both project sites, ensuring communication and focus on objectives. The national steering group retained oversight of the project and provided national support and guidance.

Products and Tools

35. The products and tools used by the projects are detailed in Chapter Six and are available from the website (www.wise.nhs.uk/renal).
Chapter Three: Improvement Work Mapped to the 10 High Impact Changes

36. Through its work with thousands of NHS clinical teams, the NHS Modernisation Agency has identified 10 High Impact Changes which have been demonstrated to make significant, measurable improvements in the delivery of healthcare. They are underpinned by new ways of thinking about performance improvement to deliver and sustain national and local performance goals. They can make a significant contribution to local achievement of The NHS Improvement Plan and also support National Standards, Local Action: Health and Social Care Standards and Planning Framework. For more information about the 10 High Impact Changes, see www.wise.nhs.uk.

37. This document helps the renal service to use the modernisation vocabulary to discuss and implement change. Each project had a different starting point and prioritised different areas for testing possible solutions. For this reason progress against the 10 High Impact Changes will vary. The order reflects the numbering in the original NHS Modernisation Agency publication, and they are colour coded here to indicate which site is reporting on each change. The progress of the projects has been illustrated by application of the 10 High Impact Changes framework utilising a balanced scorecard approach.

38. A balanced set of measures provides feedback to clinical teams, the wider NHS and key stakeholders. This feedback shows when working differently is having the desired effect.

39. To be successful change needs to be balanced across all sectors. That is why the balanced score card has been used to demonstrate the impact on all quadrants, though it is recognised that the number of items listed under each may differ. It demonstrates the range of impacts that can be brought about by modernisation initiatives.
The 10 High Impact Changes are:

Change No 1  Treat day surgery (rather than inpatient surgery) as the norm for elective surgery

Change No 2  Improve patient flow across the whole NHS system by improving access to key diagnostic tests

Change No 3  Manage variation in patient discharge, thereby reducing length of stay

Change No 4  Manage variation in the patient admission process

Change No 5  Avoid unnecessary follow-ups for patients and provide necessary follow-ups in the right care setting

Change No 6  Increase the reliability of performing therapeutic interventions through a Care Bundle approach

Change No 7  Apply a systematic approach to care for people with long-term conditions
Change No 8  Improve patient access by reducing the number of queues

Change No 9  Optimise patient flow through service bottlenecks using process templates

Change No 10  Redesign and extend roles in line with efficient patient pathways to attract and retain an effective workforce
High Impact Change No 1: Treat day surgery (rather than inpatient surgery) as the norm for elective vascular access surgery

41. This High Impact Change supports Standard Three of the NSF for Renal Services, where the aim is to improve the outcomes of permanent vascular or peritoneal dialysis access surgery, minimise complications and maximise the longevity of the access. Some units such as UHB use a combination of day case and inpatient elective surgery for establishing permanent vascular access, whereas others like RD&E use only inpatient surgery.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
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<tbody>
<tr>
<td>Developing and implementing a vascular access day case pathway via an agreed business case. Including:</td>
<td>• Reduction in length of stay</td>
</tr>
<tr>
<td>• Appointing a vascular access nurse co-ordinator</td>
<td>• Reduction in hospital acquired infection</td>
</tr>
<tr>
<td>• ‘Streaming’ appropriate patients to day case facilities using set criteria</td>
<td>• Patient preference (via discussion with pre-dialysis education nursing team)</td>
</tr>
<tr>
<td>• Anaesthetic support</td>
<td>• Timely preparation for dialysis treatment</td>
</tr>
<tr>
<td>• Radiology including one stop vascular venous mapping</td>
<td>• Reduction in infection rates associated with temporary access lines</td>
</tr>
<tr>
<td>• Matching and optimising day case surgery</td>
<td>• Reduction in cancellation of elective surgery</td>
</tr>
<tr>
<td>• Audit and quality control, including multidisciplinary team audit meeting and development of vascular access database, to enable monitoring of success and provide regular reports</td>
<td>• Reduction in waiting time for vascular access procedure</td>
</tr>
<tr>
<td>• Software model developed enabling demand planning</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 1

Matching capacity and demand

Process mapping

Stakeholder event

Role Redesign Leaders Guide.

Experience at UHB

42. Experience at UHB is that appropriately selected patients can successfully and appropriately undergo day case access surgery and, importantly, that day case surgery is preferred by the patients. The benefits demonstrated so far for patients, for staff and for the service can be identified as follows.

Operating theatre resource

43. The supply and demand model developed and used during the project identified the need for day case, and increased inpatient, theatre capacity. The process facilitated the development of the business case for intelligent use of greater resource for the management executive.

Improved service planning/reduced cancellation rates

44. With the welcome expansion of live donor transplantation, theatre availability for vascular access surgery has reduced. Planning of elective inpatient vascular access surgery is limited by the unpredictability of cadaveric transplantation. In contrast, day case surgery is rarely cancelled in the absence of clinical reasons.

Maintaining patient safety and fistula function

45. In a highly co-morbid population it is preferable to avoid general anaesthesia. The experience of over 200 cases of day case AVF formation under local anaesthetic
(infiltration or regional block) has been audited locally. There is no evidence from this experience that adopting a day case approach, undertaken by an experienced vascular access surgeon, compromises fistula function or patient safety.

**Regional anaesthesia**

46. A recurrent theme identified is the need for experienced anaesthetic support to be available to achieve reliable regional anaesthesia for certain vascular access procedures. This would enable more day case access formation to be done, and avoid the risks of general anaesthesia in this patient population. Anaesthetists experienced in the techniques of regional blocks cannot at present cover all renal access theatre lists. There appears to be scope to focus greater anaesthetic training in this area.

**Requirement for day case patient criteria**

47. The lack of agreed criteria for day case access surgery appeared to be a block to expanding this service, so protocols/guidelines have been developed (see [www.wise.nhs.uk/renal](http://www.wise.nhs.uk/renal)).

**Pre-admission clinics for patients undergoing vascular access procedures**

48. Nurse-led, protocol-driven pre-admission clinics are an important element in maximising existing surgical capacity for day case (and inpatient) AVF formation. The pre-admission protocol and role description are being developed.

**Post-operative day case and 23 hour stay discharge by vascular access nurse**

49. A nurse-led protocol for pre-discharge assessment by a vascular access co-ordinator has improved the discharge assessment and follow-up plan for patients at the end of day case stay (see [www.wise.nhs.uk/renal](http://www.wise.nhs.uk/renal)).

**Patient information**

50. A review of all patient information regarding vascular access was undertaken. Information translated into major South Asian languages, as well as visual material on CD for those unable to read, is currently being developed. A web site is also being developed to make patient information more accessible.
High Impact Change No 2: Improve patient flow across the whole NHS system by improving access to key diagnostic tests

51. This High Impact Change supports Standard Two of the NSF for Renal Services, where the aim is to provide co-ordinated care to patients approaching established renal failure which is responsive to their individual needs and personal preferences, delivered by staff with an appropriate range of skills. This High Impact Change matches the needs of patients with capacity. In RD&E, the focus was placed on the key diagnostic stages in establishing and maintaining vascular access for haemodialysis.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Agreed protocol for the categorisation of chronic kidney disease, and early identification of patients at risk of disease progression</td>
<td>• Reduction in waiting times for pre-assessment scans and vascular access surgery</td>
</tr>
<tr>
<td>• Change in pre-assessment for vascular access surgery, from venogram in the radiology department to colour duplex scan in clinical measure department</td>
<td>• Early detection of a failing or under-developing fistula following vascular surgery</td>
</tr>
<tr>
<td>• Improved and agreed communication and referral process between nephrology, vascular access surgery and radiology teams for at risk/failed fistulae</td>
<td>• Early warning of fistula failure</td>
</tr>
<tr>
<td>• Implementation of dialysis access specialist nurse-led clinic to ensure all vascular access patients are followed up 28 days post surgery</td>
<td></td>
</tr>
<tr>
<td>• Development of algorithm for quarterly surveillance of fistulae and grafts</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 2

Sonic blood flow monitoring chart
Vascular access surveillance algorithm.

Experience at RD&E

Categorisation of renal failure

52. The RD&E renal team adopted an algorithm\(^1\) to manage an adult with a GFR < 90 ml/min/1.73m\(^2\) and a raised serum creatinine concentration, which has now been circulated to all GPs, and the RD&E laboratory has included signpost warnings on their system.

Colour duplex scans

53. The RD&E stakeholder event highlighted the issue of waits for colour duplex scans for pre-vascular access surgery assessment. The radiology department did not have the capacity to meet the needs of the service. As a result the clinical measures department have now taken on this role, resulting in a more responsive service to reduce waits.

Vascular surveillance programme

54. The dialysis access specialist nurse has started a vascular surveillance programme under which all fistulae will be scanned quarterly, to meet the Renal NSF guideline of regular monitoring by appropriately trained staff. Training has been provided to relevant staff at all five of the haemodialysis units. Data from this programme are currently being gathered to assess their value.

### Clinical Outcomes/Measures
- Percentage of patients starting haemodialysis using an AV fistula
- Percentage of patients included in vascular surveillance program

### Staff Experience
- Improved communication across departments, promoting team working
- Better understanding of the whole patient pathway
- Improved availability of diagnostic appointments
28 day post surgery nurse-led follow-up clinic

During the project it was found that post-surgical assessment of vascular access was currently ad hoc. Therefore the dialysis access specialist nurse instigated a 28 day follow-up clinic to assess maturation of the access of all patients who had undergone vascular access surgery. This clinic started in November 2004.

Reference

High Impact Change No 3: Manage variation in patient discharge thereby reducing length of stay

This High Impact Change looks at the variation and mismatch between demand and capacity that creates the queues and bottlenecks in the system. RD&E found that as discharge and planned elective admissions were within their control, they were able to improve their care planning as part of implementation of Standard One of the NSF for Renal Services, and reduce the variation between demand and capacity.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Appointment of renal discharge co-ordinator</td>
<td>• Reduced waits</td>
</tr>
<tr>
<td>• Appointment of haemodialysis flow co-ordinator</td>
<td>• Reduced length of stay</td>
</tr>
<tr>
<td>• Vascular access surgery planning tool developed</td>
<td>• Improved navigation along the pathway</td>
</tr>
<tr>
<td>• Dialysis access specialist nurse to discharge surgical patients home, as per agreed discharge criteria</td>
<td>• Reduced exposure to hospital acquired infections</td>
</tr>
<tr>
<td>• Improved accuracy and timeliness of discharge summaries</td>
<td></td>
</tr>
<tr>
<td>• Analysing length of stay trends to identify patterns</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Outcomes/Measures</th>
<th>Staff Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Length of stay</td>
<td>• Improved co-ordination of patient care</td>
</tr>
<tr>
<td>• Infection rates</td>
<td>• Experiencing seamless discharge as part of the whole patient care pathway</td>
</tr>
<tr>
<td>• Discharge procedures instigated appropriately</td>
<td>• Improved communication and team working</td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 3

Discharge planner tool
Discharge audit tool
Discharge summary process map
Discharge criteria.

Experience at RD&E

Three month pilot appointment of a discharge co-ordinator

57. Following a task analysis of doctors’ roles it was found that some of their workload could be more appropriately allocated to other staff groups. As a result a pilot role of a discharge co-ordinator was funded from project funds. Initially the role was based on the main renal ward, following similar models used elsewhere in the hospital. However the role developed to meet the needs of the service, developing specific tools to facilitate clinical input and proactive management of the discharge process from a patient’s admission. The resulting job description and person specification are available on the website www.wise.nhs.uk/renal.

Improving the accuracy and timeliness of discharge summaries

58. One important lesson was a method to improve communication across primary and secondary care and to ensure that accurate discharge letters were received by the patient’s GP within 48 hours of their discharge from hospital. To reduce the workload on staff the renal database was utilised to generate the discharge letter. Since this change in practice, ongoing spot audits indicate that all letters are sent out within the agreed 48 hour timeframe.

Facilitating discharge on the day of renal surgery

59. Improving communication across the team was a constant theme of this project. At RD&E the dialysis access specialist nurse was provided with a bleep to make it easier to contact her when vascular access surgery had been completed. This avoids delays in patient discharge and, along with other changes, has reduced the average length of stay, and improved the service to renal patients.
High Impact Change No 4: Manage variation in the patient admission process

60. High Impact Changes No 3 and No 4 are inexorably linked, and can form the basis of an organisation’s strategy for reducing variation. The discharge process should start at the point of admission if not earlier, as in the case of planned admissions. High Impact Changes No 3 and No 4 clearly refer to improving admissions and discharges. Whilst considering these issues it is important not to forget the choice agenda highlighted in Standard Two of the NSF for Renal Services, which aims to provide co-ordinated care to patients approaching established renal failure which is responsive to their individual needs and personal preferences, delivered by staff with an appropriate range of skills.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Renal pathway process map used to identify points of entry for emergency patient admission and create central co-ordinating facility in nurse-led protocol-driven setting: renal assessment centre</td>
<td>- Greater access to patient information, support and guidance from community/pre-dialysis nurse team and vascular access nurse specialists</td>
</tr>
<tr>
<td>- Introduction of the Renal Assessment Centre facility for rapid assessment, triage and management of all renal patients requiring urgent medical assessment and/or admission</td>
<td>- Patient choice of treatment modality for renal replacement therapy</td>
</tr>
<tr>
<td>- Appointment of vascular access co-ordinator</td>
<td>- Direct booking system allows appointments to be arranged which suit the patient</td>
</tr>
<tr>
<td>- Implementation of access co-ordinator role to reduce the variation in the patient admission process by linking referral, assessment, discharge and follow-up of patients, using day case criteria</td>
<td>- Co-ordinated admission process and reduced waits for investigations</td>
</tr>
<tr>
<td>- Use of direct booking protocols for both inpatient and day case surgery</td>
<td></td>
</tr>
<tr>
<td>- Acute fistula failure pathway being developed jointly with radiologists and surgeons</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 4

Stakeholder process mapping

Role Redesign Leaders Guide

Demand and capacity modelling for future renal services.

Experience at UHB

Renal Assessment Centre

61. Introduction of the Renal Assessment Centre has provided a mechanism by which all potential admissions can be reviewed at a central point. Patients are assessed by specialist renal nurses and appropriate treatment is delivered in a timely fashion in a protocol-driven pathway.

62. This results in reduced waiting times, enhanced continuity of care and improved patient satisfaction with the care they receive. In addition, nurse-led assessment avoids unnecessary admissions.

Direct booking protocols

63. A patient centred approach to appointment booking provides flexibility for patients and has reduced the number of missed appointments.

Vascular access co-ordinator role

64. This role co-ordinates the vascular access referral and review pathway. Surgery is prioritised on the basis of clinical need, rather than date of referral. Development and maintenance of a vascular access database ensures the multidisciplinary team has current information regarding a patient’s access status. This enables clinicians to plan patient care

Clinical Outcomes/Measures

- Vascular access demand prediction modelling
- Number of emergency patients changing their treatment modality when offered the choice
- Audit of Renal Assessment Centre attendances with vascular access problems

Staff Experience

- Experiencing continuity of care for patients
- Planned management of resources
- Understanding of the role of the multidisciplinary team
and service development based on projected demand. Some data entry fields are available at www.wise.nhs.uk/renal.

**Radiology assistant role**

65. This role is being developed in conjunction with the radiology department, and is expected to lead to shorter waiting times for diagnostic and interventional-related radiology, and vascular access surgery. This will hopefully lead to lower fistula failure rates. The job description, competencies and person specification are available at www.wise.nhs.uk/renal.

**Acute vascular access failure service**

66. It is clear from audit that vascular access surgical or radiological ‘rescue’ in the event of acute fistula/graft failure is inadequate due to:

- the need for a clear protocol detailing the pathway for intervention
- patients not urgently identifying concerns regarding their vascular access to their nurse/medical attendants
- competition for operating theatre space
- lack of access to interventional radiology support.

67. A protocol for acute access failure is being developed, and a clinical working group is examining solutions to this problem.

68. Descriptions of job roles and the Renal Assessment Centre can be found at www.wise.nhs.uk/renal.
High Impact Change No 5: Avoid unnecessary follow-ups for patients and provide necessary follow-ups in the right care setting

This High Impact Change is designed to streamline the patient pathway to create a ‘one stop’ approach where all relevant tests are planned, scheduled and booked to occur in one visit. It also advocates that follow-up appointments after treatment should take place in the right healthcare setting, and be delivered by the appropriate healthcare professional. This clearly supports Standard Three of the NSF for Renal Services, which seeks to ensure early referral for assessment and investigation for the best means of access for dialysis, timely surgery, monitoring and early intervention to minimise complications.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One stop dedicated vascular access clinic to discuss access options with surgeon and have mapping of potential veins/arteries using on-site ultrasound</td>
<td>• Receiving appropriate care in the right place at the right time, preventing unnecessary invasive surgery</td>
</tr>
<tr>
<td>• Nurse-led pre-operative screening/assessment to ensure patients are still suitable for surgery</td>
<td>• Follow-up in the patient’s home or at the dialysis unit, reducing need for hospital attendance</td>
</tr>
<tr>
<td>• Two weeks post-surgery follow-up of pre-dialysis patients, allowing early detection of maturation problems</td>
<td>• Nurse-led clinics offer patients more time and information</td>
</tr>
<tr>
<td>• Haemodialysis patients followed up at two weeks by satellite dialysis unit nurses or by access co-ordinator, at home or in clinic</td>
<td>• Comprehensive discharge package to avoid unnecessary follow-ups</td>
</tr>
<tr>
<td>• Access co-ordinator provides central support role for patients regarding advice and monitoring</td>
<td>• Reduced hospital admission with line-associated infection associated with access failure (and hence improved dialysis dose delivery)</td>
</tr>
<tr>
<td>• Monthly vascular access update on each patient at the haemodialysis review meeting</td>
<td>• Prompt removal of dialysis catheter as soon as the fistula is functioning for dialysis</td>
</tr>
<tr>
<td>• Development of weekly access radiology multidisciplinary meeting</td>
<td>• Need for clinic attendance reduced by review discussions</td>
</tr>
</tbody>
</table>
- Introduction of patient clinic review in satellite haemodialysis units
- Evidence-based infection control procedures for catheter insertion and connection for dialysis
- Vascular access nurse co-ordination of management of dialysis catheter insertion and removal, using evidence-based protocols for strict catheter infection control procedures, a central booking system of renal procedure room, and electronic protocol-based antibiotic prescribing

<table>
<thead>
<tr>
<th>Clinical Outcomes/Measures</th>
<th>Staff Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timely and accurate discharge summary</td>
<td>Enhanced nurse role in outpatient setting</td>
</tr>
<tr>
<td>Access failure rates</td>
<td>Training opportunities</td>
</tr>
<tr>
<td>Catheter-related infection admissions</td>
<td>Reduced stress due to better managed clinics</td>
</tr>
<tr>
<td>MRSA and MSSA infection rates</td>
<td>Reduced duplication and non-added value time</td>
</tr>
<tr>
<td>Proportion of patients reaching Renal Association standards for dialysis adequacy</td>
<td>Enhances timely decision making</td>
</tr>
<tr>
<td>Effective use of haemodialysis resources and continuity of haemodialysis</td>
<td></td>
</tr>
<tr>
<td>Hospital admission and emergency re-admission rates</td>
<td></td>
</tr>
</tbody>
</table>

**Tools used to implement High Impact Change No 5**

Stakeholder process mapping
Role Redesign Leaders Guide.
Experience at UHB

Care by patients, and needling management by haemodialysis staff and patients, of functioning AV fistulae/grafts

70. Patients receive advice on how to care for their AV fistulae and grafts, and the haemodialysis nurses regularly consider access care in continual professional development. However, the patients reported that the information they receive could be improved. An exercise to re-focus nurse training in this area has therefore been initiated.

Vascular access monitoring

71. A need for implementation of protocol-driven vascular access (AV fistulae and grafts) monitoring for all haemodialysis patients was identified. The key aims are:

- to reduce AV fistula failure rates (monitored through renal measures, data collected on a dedicated renal database (MARS II), some data entry fields of which are available at www.wise.nhs.uk/renal.)
- to identify access that is failing in order to institute appropriate pre-emptive investigation and radiological intervention where possible
- to improve quality of dialysis.

72. The protocol includes the:

- inspection and assessment of access at each dialysis session
- a monthly review of dialysis dose delivered at quality assurance meetings attended by a vascular access co-ordinator, with investigation planned where appropriate
- three-monthly assessment of:
  - access flow by ultrasound dilution technique
  - recirculation measured by ultrasound dilution technique and compared with urea recirculation estimate as per K/DOQI guidelines1.

Reference

1 Details of The USA National Kidney Foundation’s Kidney Disease Outcomes Quality Initiative (K/DOQI) are published at www.kidney.org/professionals/kdoqi/guidelines.cfm
High Impact Change No 6: Increase the reliability of performing therapeutic interventions through a Care Bundle approach

73. This High Impact Change is about making sure that clinical processes deliver to patients what they should be delivering. The Care Bundle approach can be used for any complex therapeutic intervention, such as preparation for renal replacement therapy, creation of dialysis access or transplantation. It is based on measuring the intervention according to standards underpinned by evidence and tailored by clinicians to the local situation. A Care Bundle approach requires compliance with a whole group of items, and promotes a systematic approach to the delivery of high quality services. For example Standard Three of the NSF for Renal Services means that it is important to include all the processes required to ensure that people with established renal failure have timely and appropriate surgery for permanent vascular or peritoneal dialysis access, which is monitored and maintained to achieve maximum longevity. This will include items such as planning and mapping the pre-fistula formation, pre-operative assessments, the access procedure, and monitoring and early interventions to minimise complications of the access.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Multidisciplinary approach to vascular access, co-ordinated by a vascular access co-ordinator</td>
<td></td>
</tr>
<tr>
<td>– Introduction of universal pre-operative vascular access clinics, with vascular mapping for all patients</td>
<td></td>
</tr>
<tr>
<td>– Development of weekly access radiology multidisciplinary team meeting</td>
<td></td>
</tr>
<tr>
<td>– Introduction of vascular access clinics (surgeon/vascular access co-ordinator outpatient assessment clinic – see UHB patient pathway in Chapter Two)</td>
<td>• Greater fistula success rates</td>
</tr>
<tr>
<td></td>
<td>• Option of day case surgery if appropriate</td>
</tr>
<tr>
<td></td>
<td>• Reduced hospital admissions</td>
</tr>
<tr>
<td></td>
<td>• Fewer complications</td>
</tr>
<tr>
<td></td>
<td>• Continuity of care</td>
</tr>
<tr>
<td></td>
<td>• Reduction in unnecessary length of stay and other risks of hospitalisation</td>
</tr>
</tbody>
</table>
Quality monitored through monthly multidisciplinary renal audit/governance meetings, which have been enhanced at all base and satellite dialysis units, and where patient outcomes are compared with Renal Association and British Transplant Society standards

- Central booking of procedure room used for catheter insertions and removal

- Development of the Renal Assessment Centre providing nurse-led protocol-driven investigation

- Renal Assessment Centre as central point of all renal patient admissions

- Development of vascular access database currently available on all renal unit computers via hospital network (MARS II)

- NHS.net is now operational in one satellite unit, with work in progress to connect others, to enable access to vascular access database, drugs and clinic letters

<table>
<thead>
<tr>
<th>Clinical Outcomes/Measures</th>
<th>Staff Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Percentage of patients undergoing vascular access surgery six months prior to starting haemodialysis</td>
<td>- Systematic approach to improve the delivery of healthcare is encouraged</td>
</tr>
<tr>
<td>- Percentage of patients undergoing haemodialysis with a temporary line</td>
<td>- Creative discussion between staff leads to new insights into care processes</td>
</tr>
<tr>
<td>- Treatment based on agreed, evidence-based guidelines</td>
<td>- Improved relationships between staff by stimulating dialogue</td>
</tr>
<tr>
<td>- Attention drawn to the link between outcomes and processes</td>
<td></td>
</tr>
<tr>
<td>- Decrease in emergency referrals for haemodialysis</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 6

Stakeholder process mapping
Role Redesign Leaders Guide
Vascular access database.

Experience at UHB

*Multidisciplinary approach*

74. The vascular access co-ordinator role provides a direct point of reference for both patients and members of the multidisciplinary team. This post is pivotal for the delivery of the Care Bundle approach. Monthly quality assurance meetings provide an up-to-date report of each patient’s vascular access status.

75. Multidisciplinary meetings/clinics have improved communication across the service. The opportunity to make holistic decisions about patient care is enhanced. This reduces patient waiting times for appointments to see individual members of the team, and patient flow along the pathway is improved.

76. Central data storage makes up-to-date information available for patient review at any computer point within the renal service.

77. The development of pre-operative assessment clinics has streamlined admission for access surgery and improved fistula success rates (surgical). Length of stay is reduced as patients can be appropriately selected for day case surgery.

78. A dedicated procedure room achieving theatre-standard sterility reduces radiological waiting times, as most dialysis catheters can be inserted by nephrologists.

79. The development of a Renal Assessment Centre has reduced length of stay and improved continuity of care, as the patient is seen by specialist renal healthcare professionals.
High Impact Change No 7: Apply a systematic approach to care for people with chronic disease

80. The *NHS Improvement Plan* together with *Supporting People with Long-term Conditions* set out the Government’s priority to improve the care for people with long-term conditions by moving away from reactive care based in acute systems, towards a systematic, patient centred approach. This High Impact Change helps implementation of this model of care, which will change the way that people with long-term conditions such as chronic kidney disease are supported by the NHS, whilst improving the quality of care, reducing fear and anxiety and ending needless travel to hospital. The NSF for Renal Services demonstrates how this approach can improve the care of people with kidney disease by putting patients at the centre of their care.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Developing integrated care pathways for the renal patient pathway through the Trust working group</td>
<td>• Access to an expert patient programme with the aim of improving confidence and well-being</td>
</tr>
<tr>
<td>• Process mapping to understand the entire patient pathway</td>
<td>• Increased satisfaction and confidence in protocol-based care</td>
</tr>
<tr>
<td>• Reviewed and improved patient information</td>
<td>• Better understanding of their condition and therefore self-management</td>
</tr>
<tr>
<td>• Developing the use of a renal specific information database</td>
<td>• Improved patient information</td>
</tr>
<tr>
<td>• Developing protocols for team-based care</td>
<td></td>
</tr>
<tr>
<td>• Expert patient programme encouraged</td>
<td></td>
</tr>
<tr>
<td>• Promoting closer working and understanding between primary and secondary care</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Outcomes/Measures</th>
<th>Staff Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Developing shared protocols across primary and secondary care</td>
<td>• Better integration between primary and secondary care</td>
</tr>
<tr>
<td>• Patient and carer feedback on hand-held notes</td>
<td>• Improved understanding of the patient pathway</td>
</tr>
<tr>
<td>• Promoting education and information leaflets for renal patients</td>
<td>• Promotes team working and discussion around clinical practice</td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 7

Process map of patient pathways – six sections (see Appendix Three)

Patient information leaflets.

Experience at RD&E

Developing integrated care pathways for renal patients

81. Following the renal stakeholder day there was a lot of support for the development of integrated care pathways for renal patients, promoting closer working between primary and secondary care. The benefits of such an approach can be significant, but require time and resources, and high level support, to be realised. The RD&E Trust has an integrated care pathway forum to support the development process, and has set up a working group with clinicians from the renal unit, managers and primary care representatives, including GPs, to agree communication and management protocols, and work towards a systematic patient centred approach to renal care.

Patient hand-held records

82. Work is currently under way to develop and trial the use of hand-held patient records, which have worked well in other clinical groups, empowering patients to manage and understand their condition.
High Impact Change No 8: Improve patient access by reducing the number of queues

The principles of this High Impact Change are relevant to any group of staff or service which requires patients or staff to be scheduled into slots of time. It is closely linked to High Impact Changes No 3, No 4, No 5 and No 9 as these support improving patient access to care, and the movement between different types of care and services.

Standard Two of the NSF for Renal Services aims to provide co-ordinated care to patients approaching established renal failure, which is responsive to their individual needs and personal preferences, delivered by staff with an appropriate range of skills. UHB used this High Impact Change to improve the delivery of vascular access surgery.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identified need to develop radiology skill mix to support vascular access</td>
<td>• Shorter waits for clinical interventions</td>
</tr>
<tr>
<td>• Agreed criteria for day surgery will reduce number of queues and waiting times</td>
<td>• Better care without delay through a pathway of care that involves the whole multidisciplinary team</td>
</tr>
<tr>
<td>• Access co-ordinator established as single point of co-ordination</td>
<td>• Reduced anxiety</td>
</tr>
<tr>
<td>• Development of nurse-led ultrasound vascular mapping increases assessment clinic resource, thus reducing overall waiting times for surgery</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Clinical Outcomes/Measures</th>
<th>Staff Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bed occupancy figures</td>
<td>• Less frustration arranging and waiting for tests for patients</td>
</tr>
<tr>
<td>• Waiting times for diagnostic scanning</td>
<td>• Satisfaction at reducing queues for patients and providing timely care</td>
</tr>
<tr>
<td>• Number of surgical cancellations</td>
<td>• Understanding and redesigning the patient pathway</td>
</tr>
</tbody>
</table>


Tools used to implement High Impact Change No 8

The skill mix modelling tool
Demand and capacity modelling for future renal services
Role Redesign Leaders Guide.

Experience at UHB

Development of new roles

84. Investigating skill mix with a competence-based view enables the development/extension of roles that ensure a task is carried out by the most appropriate person. The vascular access co-ordinator role and the radiology assistant role are designed to extend competencies so that surgeons and radiologists are available to perform more complex procedures, reducing patient waiting times. These new ways of working use a skills escalator approach to make best use of the talents available within the existing renal team.
**High Impact Change No 9: Optimise patient flow through service bottlenecks using process templates**

Process mapping and ‘time and motion’ studies can be used to build up a representation of the time and resources required by a patient during their process of care. This High Impact Change can help to identify bottlenecks in the system, plan to relieve those bottlenecks, calculate the benefits, improve patient experience and allow scenario planning for issues such as the impact of holidays. The NSF for Renal Services supports preparation and choice. For Standard Two this includes timely referral to appropriately skilled teams before the start of dialysis. Patients who present late need to have an accelerated process of care to ensure that they still benefit from the clinical and psychological preparation that a planned dialysis start provides. Optimising the patient flow through these services and identifying the bottlenecks using process templates will support implementation of this standard.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Understanding the flow of patients throughout the whole renal system through process mapping</td>
<td>● Efficient and timely interventions, and reduced delays</td>
</tr>
<tr>
<td>● Delays, bottlenecks, duplication and spare capacity identified</td>
<td>– Timely delivery of care</td>
</tr>
<tr>
<td>● Task analysis tool used to analyse clinical roles</td>
<td>– Reduced length of stay</td>
</tr>
<tr>
<td>● Modified roles developed to support patient flow: haemodialysis flow co-ordinator and discharge co-ordinator</td>
<td>– Minimising of unnecessary waits due to fragmented use of resources</td>
</tr>
<tr>
<td>● Development of new protocols and procedures to support patient flow</td>
<td>● Improved patient information</td>
</tr>
<tr>
<td>● Dedicated renal surgical team</td>
<td></td>
</tr>
<tr>
<td>● Tool being designed to monitor haemodialysis unit demand and capacity</td>
<td></td>
</tr>
<tr>
<td>● Investigating the use of prediction tools</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 9

Task analysis tool

Process map of patient pathways – six sections. (See Appendix Three)

Experience at RD&E

Understanding service bottlenecks and flow

86. The stakeholder day identified the current renal process by following a patient pathway through the system. It then attempted to redesign the pathway to improve flow and reduce patient handoffs\(^i\). This work has been used throughout the project to understand current limitations in the system, and support redesign work. Examples of changes include:

- using the clinical measures department to provide colour duplex scans rather than the traditional radiology department
- managing surgery slots to maximise their use, which has now resulted in direct booking for patients to further reduce cancellations
- piloting a discharge co-ordinator to pull\(^ii\) patients through their inpatient stay.

Maximising capacity in haemodialysis units

87. RD&E has an average year-on-year increase in haemodialysis patients of 9%. To meet the increase in demand, work is under way to understand and maximise the capacity currently available. A new role of haemodialysis co-ordinator has been developed (the job description and person specification can be found at [www.wise.nhs.uk/renal](http://www.wise.nhs.uk/renal)).

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\(^i\) Handoff: when a patient is passed on from one healthcare professional to another.

\(^ii\) Pull: ‘pull’ in a health system means that work is only done at a particular step in the process if the next step is demanding the work.
This role co-ordinates access to and availability of haemodialysis therapy across the five units, thereby maximising their use and maintaining good communication. A demand and capacity tool is also under development, to facilitate the ongoing prediction of demand over the next five years.
High Impact Change No 10: Redesign and extend roles in line with efficient patient pathways to retain and attract an effective workforce

88. This High Impact Change means that redesigning roles and matching them against skills and competencies can improve patient care, reduce waste, improve working lives and reduce errors and mistakes. The benefits, when implemented, can reduce delays and waits for procedures, and improve staff retention and recruitment rates. Skills for Health have developed a Renal Competence Framework. This framework can help renal units identify staff with the right skills in the right place at the right time to improve the care of their patients. This work supports the NSF for Renal Services by providing a renal service which is more responsive to the individual needs and personal preferences of patients.

<table>
<thead>
<tr>
<th>Changes In Service Delivery/Practice</th>
<th>Patient Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Developing workforce modelling ideas using skill mix modelling tool</td>
<td>● Fewer handoffs</td>
</tr>
<tr>
<td>● Using task analysis tool for clinical role redesign</td>
<td>● Improved communication and reduced delays in sharing information across the multidisciplinary team</td>
</tr>
<tr>
<td>● Modified roles developed include:</td>
<td>● Continuity of care</td>
</tr>
<tr>
<td>– governance support facilitator</td>
<td>● Care given at right time and place by the most appropriate team member</td>
</tr>
<tr>
<td>– discharge co-ordinator</td>
<td></td>
</tr>
<tr>
<td>– haemodialysis flow co-ordinator</td>
<td></td>
</tr>
<tr>
<td>– renal manager</td>
<td></td>
</tr>
<tr>
<td>– dialysis access specialist nurse</td>
<td></td>
</tr>
<tr>
<td>● Role redesign impact on the working time directive, recruitment and retention, hospital at night and the consultant contract</td>
<td></td>
</tr>
</tbody>
</table>
Tools used to implement High Impact Change No 10

- Task analysis tool
- Skill mix modelling tool
- NHS Career Framework
- Role Redesign Changing Workforce Programme
- Role Redesign Leaders Guide

All job descriptions and person specifications are available on the website (www.wise.nhs.uk/renal).

**Clinical Outcomes/Measures**

- Redesign of workforce to match the re-engineering of the service
- Reduction in length of stay and delays in hospital

**Staff Experience**

- Promotes leadership
- Better use of staff expertise
- Career development and progression
- Education and training
- Improves recruitment and retention
- Reduces stress by ensuring the best person provides the patients’ care

**Experience at RD&E**

*Developing workforce modelling ideas*

89. The skill mix modelling tool has facilitated the analysis of the current staffing structure, and consideration of future requirements for the service. It also supports problem solving around limitations of traditionally skilled staff and grades, facilitating thoughts towards new and modified roles.
Chapter Four: Workforce Modelling

90. This chapter draws together the national tools and initiatives the pilot sites used to put the High Impact Changes into effect. It provides the context of current workforce modernisation policy within which the pilot sites have been working.

Background

91. Understanding the current renal workforce, and the skills and competencies it has available, is the first step to any remodelling activity. Making better use of the existing workforce is a central theme of Human Resources in the NHS Plan, which identifies the need for a modern workforce that ‘works smarter and not harder’.\(^1\) Consideration must also be given to the increasing part new technology plays in the care given to patients.

92. The NHS workforce is growing substantially but so is the population it treats. By 2010 the number of school leavers available for work is predicted to decline at exactly the same time as there is expected to be a sharp rise in the number of people reaching retirement.\(^2\)

93. The number of people receiving treatment for established renal failure in England is expected to increase, particularly among black and minority ethnic groups and older people, by at least 50% over the next decade. Data on the level of chronic kidney disease are less clear, as so many people remain undiagnosed in the early stages, but a recent survey of blood samples in South East England found the prevalence to be 5,554 per million population.\(^3\)

94. Workforce projects are developing staff to meet this demand. The new and amended roles developed during this project will help local renal teams improve the care given to patients now, and also help them build the workforce needed for the future.

95. New or amended roles can also assist the individual’s career aspirations and so aid retention and recruitment. From process mapping activities within this project it has become clear that improvements to the patient pathway can be secured by certain aspects of care delivery being transferred between members of the multidisciplinary renal team.

96. The development of flexible and transferable skills sets within the renal multidisciplinary team can help to deliver quality care at the right time in the right place, often reducing waiting times for patients. Skills and competencies are beginning to determine how roles can be designed or developed to make the most efficient use of the combined skills of any clinical team. With protocol-driven care agreed and in place, new ways of working...
can be safely implemented, and maintain a consistently high quality of care now often not achieved by more traditional models.

**Agenda for Change and NHS Knowledge and Skills Framework**

97. The NHS Knowledge and Skills Framework is the development tool that underpins Agenda for Change. It is used to determine the broad areas and competence levels needed for each post. It is intended that all learning requirements should be linked with the NHS Knowledge and Skills Framework.

98. Within the project, modified job descriptions have been produced in line with Agenda for Change, and will be developed following the NHS Knowledge and Skills Framework.

**Skills for Health**

99. Skills for Health is the licensed Sector Skills Council for the entire health sector across the UK, and is the lead organisation charged with developing National Workforce Competence Frameworks. A renal framework has been developed using the NSF for Renal Services as its starting point, and competencies are mapped to the NHS Knowledge and Skills Framework as part of Agenda for Change. Phase one was developed to follow the patient pathway within dialysis, and phase two development will cover the patient pathway in renal transplantation. Neither framework is aimed at a particular profession or staff group, and therefore can be used by all staff across a range of functions, for example renal physicians, nurses and care assistants. Not only are competence frameworks useful for personal professional development, they can be successfully used by teams and services when identifying new competencies required for redesigned or new roles. More information about Skills for Health and the renal competence frameworks can be found at [www.skillsforhealth.org.uk](http://www.skillsforhealth.org.uk).

**The Changing Workforce Programme**

100. The Changing Workforce Programme is one of the NHS Modernisation Agency’s New Ways of Working teams, which work across health and social care to deliver service improvements that benefit both staff and patients, focusing on the key workforce priorities outlined in Human Resources in the NHS Plan.

101. The teams support the development of new ways of working to make the best use of staff’s skills, knowledge and expertise. They do this through implementation of the new pay system and consultant contract, and by initiatives to help with staff retention and recruitment, and to meet the requirements of the Working Time Directive.
The Changing Workforce Programme is a national workforce modernisation programme that is supporting the NHS and other health and social care organisations to develop, evaluate and implement new ways of working through role redesign. Its aims are to pioneer and mainstream role redesign, an integral part of service redesign. Innovative new and amended roles have brought clear benefits across health and social care, resulting in improved services for patients and more rewarding careers for staff. It is in this capacity that it has been supporting the work at the two renal pilot sites.

Skill Mix Modelling Tool

A skill mix modelling tool (also known as a skill mix tracker tool) has been developed to measure the impact of the new roles in terms of reduced waiting time, clinical hours saved, quality of care, and staff experience. It is readily available on www.wise.nhs.uk.

The NHS Career Framework

The Career Framework aims to provide a guide for NHS and partner organisations on the implementation of a flexible career and skills escalator concept. This enables an individual with transferable, competence-based skills to progress in a direction that meets their own career needs as well as those of the developing workforce and service.
105. The framework builds on the role redesign work already undertaken within the NHS and supported by Workforce Development Directorates and the Changing Workforce Programme. It has nine levels, starting at level one with traditional entry level roles. It illustrates how an individual could progress up through the levels as they acquire the new skills and competences to support the move. It provides examples of career frameworks in several care areas, and it includes those non-clinical roles that also contribute to the delivery of care. Development of the framework will continue.

**Locally developed initiatives and tools**

*An illustrative NHS renal career framework*

106. The RD&E and UHB sites have begun to plot their workforce against the NHS Career Framework.
Many of the roles in figures 7 and 8 are included to illustrate how the renal career framework might appear, and have not yet been assessed under Agenda for Change.

**Figure 7:** RD&E renal roles mapped on to the NHS Career Framework
As the workforce is developing to meet future demands it is clear there is a need for a set of commonly understood definitions for different job roles. Professionals and patients will become clearer about the new roles if job titles are used consistently. Stating the level on the framework at which a particular job is placed would improve transferability between organisations and establish a national currency.

**Task analysis tool**

RD&E developed a task analysis tool to analyse their renal medical roles. Snapshot results indicated that a skilled senior nurse might appropriately carry out some of the tasks previously carried out by medical staff. The exercise initially led to the development of a discharge co-ordinator role. One of the benefits of the role was to support the Trust in meeting the Working Time Directive. This task analysis tool used to analyse the renal medical roles is being rolled out to other renal disciplines within the Trust, including home
care nurses and the haemodialysis unit. The task analysis tool is available at www.wise.nhs.uk/renal.

**Modified roles developed by RD&E and UHB**

109. The projects considered many new roles, and the job descriptions and person specifications for those implemented are available on the website www.wise.nhs.uk/renal.

110. New roles at RD&E:
- Governance Support Facilitator
- Discharge Co-ordinator
- Haemodialysis Flow Co-ordinator
- Renal Manager
- Dialysis Access Specialist Nurse
- Volunteer in haemodialysis unit.

111. New roles at UHB:
- Vascular Access Co-ordinator
- Audit and Quality Improvement Project Leader
- Radiological Assistant.

**References**

4 The NHS Knowledge and Skills Framework (NHS KSF) and Development Review Process (October 2004) are published at www.dh.gov.uk
5 Agenda for Change is published at www.dh.gov.uk
Local sustainability

112. At RD&E ongoing meetings of the local Renal Steering Group with continued executive and service development support will facilitate the mainstreaming of project outcomes. Responsibility for maintaining new ways of working, improved outcomes and longer-term project work will be integrated within the new roles of Renal Service Manager and Lead Nurse for Renal. Continued strong clinical leadership will ensure that the progress of the project remains aligned to organisational objectives, and that project objectives will be reflected in the staff development and review process. In terms of training and development needs, all staff have access to training in improvement science and modernisation tools and techniques. Trust-wide service development work is co-ordinated by the Continuous Service Development Board, which has representation from service users and key stakeholders such as commissioners and the Strategic Health Authority. The board meets on a monthly basis and learning from projects is shared across the local healthcare community.

113. At UHB responsibility for maintaining new ways of working, improved outcomes and longer-term project work will be integrated within the role of Audit and Quality Improvement Project Leader. Progress reports delivered at a weekly business meeting will enable appropriate and timely support for the facilitation and sustainability of project outcomes. Dedicated clinical leadership will enable an evolving patient centred service at UHB, and build on partnerships forged during the running of the project both to improve the service delivery and to develop the staff responsible for providing it.

National initiatives

114. Action Learning Sets established by the Department of Health to support the NSF for Renal Services include two on the extension of palliative care to renal services, and two on the prevention of chronic kidney disease in primary care, the results of which will have implications for new or amended workforce roles. Two further Action Learning Sets on improving transport arrangements for haemodialysis patients may have consequences which will affect working practices in dialysis units.

115. To increase the level of transplantation activity, UK Transplant is funding hospital-based initiatives including living donor co-ordinators and additional transplant co-ordinators.
116. The NSF for Renal Services recommends the use of an estimated Glomerular Filtration Rate in assessing kidney function. Work will be piloted to establish what needs to be done to change current practice in calculating, reporting and interpreting test results, including the training and workforce implications.

Website

117. Tools and techniques described in this document can be found on the website (www.wise.nhs.uk/renal), together with the baseline measures and definitions used by the two sites to track the impact of those changes the individual teams decided to test. In addition, there is a comprehensive list of the modified roles designed to enhance the care provided to renal patients at each of the project sites.
Chapter Six: Resources

Reference sources, texts and relevant websites

Agenda for Change: modernising the NHS pay system [1999]. Department of Health 1999
www.dh.gov.uk

www.britishrenal.org

www.wise.nhs.uk

Department of Health
www.dh.gov.uk

www.dh.gov.uk

Kidney Alliance,
www.kidneyalliance.org.uk

National Institute for Health and Clinical Excellence
www.nice.org.uk

National Kidney Federation
www.kidney.org.uk

National Service Framework for Renal Services, Part One and Part Two
www.dh.gov.uk/publications

National Service Framework for Renal Services, Part One: Implementation Toolkit for Commissioners based on best practice
www.dh.gov.uk

NatPACT Referral wizard
www.natpact.nhs.uk

NHS Knowledge and Skills Framework, Department of Health 2004
www.dh.gov.uk/publications
Tools, techniques and products developed or used for the project

118. These are included here simply as suggestions that might help renal teams embarking upon change processes. The list includes both generic and renal specific tools. They can be found, along with other tools, at www.wise.nhs.uk/renal.

- Audit tool for infection rates with central venous catheters
- Central venous catheter insertion and connection protocol for dialysis patients
- Clinical algorithms
- Competence framework for insertion and removal of central venous dialysis catheters
- Demand and capacity modelling for future renal services
- Designing a stakeholder event
- Dialysis access nurse specialist referral form
- Discharge audit tool
- Discharge planning tools
- Discharge summary process map
- Generic steering group terms of reference
- Inpatient haemodialysis progress report
- Malfunctioning access flow chart
- Measures definitions
- Modified roles: job descriptions and person specifications on website
- Patient information leaflets
- Process maps of patient pathway – six sections
- Problem analysis tool
- Pursuing Perfection monthly reporting template
- Skill mix modelling tool
- Sonic blood flow monitoring chart
- Task analysis tool
- Various tables and forms designed to collect/analyse information.
Appendix One: Project Team Membership

RD&E Project Team
Frances Lowery, Project Manager
Jo Renton, Project Manager
Juan Batley, Senior Analyst
Maria Bello, Associate Specialist
Maria Bracey, Dialysis Access Nurse Specialist
Andrew Cowan, Clinical Lead
Diana Crump, Service Development Lead
Bernadette George, Lead Nurse Medicine
Elaine Hobson, Director of Operations (board level champion)
Christine Howard, Patient Representative
Joan Lythgoe, Governance Support Facilitator
Gail Marsden, Assistant Directorate Manager
Jenny McNeill, Service Improvement Manager
Anthony Nicholls, Clinical Lead
Diane Ody, Managerial Lead
Peter Shearman, Patient Representative
Andy Smith, GP
Sue Trew, Kidney Unit Manager
Polly Woodhams, Matron, Renal Services

Contacts for further enquiries: Jo.Renton@rdehc-tr.swest.nhs.uk or Frances.Lowery@rdehc-tr.swest.nhs
UHB Project Team

Mercia Spare, Project Manager
Graham W Lipkin, Clinical Project Lead

Simon Ball, Consultant Nephrologist
Yma Choudhury, Group Manager
Trisha Curran, Director of Operations, Division 2 (board level champion)
Hilary Fanning, Deputy Head of Nursing
Nick Flint, Patient Representative
Peter Jeffries, Clinical Service Development
Carol Knowles, Senior Nurse (Inpatients)
Ian McCafferty, Consultant Radiologist
Steve Mellor, Renal Surgeon
Simon Mroczkowski, Renal Programme Analyst
Mohie Omar, Renal Surgeon
Clair Phillips, Audit and QA Improvement Project Leader
Emma Skinner, Senior Nurse (Dialysis)
Karen Tullet, Access Co-ordinator

Contacts for further enquiries: Mercia.Spare@uhb.nhs.uk or Yma.Choudhury@uhb.nhs.uk

Modernising Renal Services National Steering Group

Chair
Donal O’Donoghue, Consultant Renal Physician, and Clinical Director of Renal Services, Hope Hospital

Members
Ali Bakran, Transplant and Vascular Surgeon, The Royal Liverpool University Hospital
Peter Brown, Consultant Radiologist, Northern General Hospital (representing the Royal College of Radiologists)
Alison Cornall, Renal Access Clinical Nurse Specialist, Oxford Radcliffe Hospitals
Chris Darby, Consultant Surgeon, The Churchill Hospital, Oxford (representing the Royal College of Surgeons)
Cathy Devonport, Associate Workforce Designer, NHS Modernisation Agency Changing Workforce Programme
Anne Eaton, Programme Director, Skills for Health
Jennifer Fenelon, National Programme Director, Action on Urology
Roger Greenwood, Consultant Nephrologist, Lister Hospital
Andrew Harvey, Business Manager, Skills for Health
Mark Heining, Consultant Anaesthetist, Nottingham City Hospital (representing the Royal College of Anaesthetists)
Jane Macdonald, Business Manager, Renal Long Term Conditions Care Group Workforce Team
David Mitchell, Consultant Surgeon, Richard Bright Renal Unit, Southmead Hospital
Robert Price, Treasurer of The 6 Counties Kidney Patients Association, Patient Representative
Elizabeth Scott, Implementation Director, Consultant Contract Implementation Team
Jane Verity, Renal NSF Team Leader, Department of Health
John D Woods, Consultant Nephrologist, Belfast City Hospital (representing the Royal College of Physicians)
Jackie Younger, Lead Workforce Designer, NHS Modernisation Agency Changing Workforce Programme
## Appendix Two: Baseline Measures and Definitions

<table>
<thead>
<tr>
<th>Renal Measure</th>
<th>Definition of data set to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General measures:</strong></td>
<td></td>
</tr>
<tr>
<td>Number of new patients referred to multidisciplinary/low clearance clinic per month</td>
<td>Number of patients previously unknown to UHB/RD&amp;E renal service who are referred to a multidisciplinary team member from another hospital speciality or outside agency</td>
</tr>
<tr>
<td>Number of new patients starting renal replacement therapy by treatment modality per month</td>
<td>Number of patients previously unknown to UHB/RD&amp;E renal service who commence haemodialysis (hospital/home/satellite) or CAPD for the first time</td>
</tr>
<tr>
<td>Prevalent population on renal replacement therapy by treatment modality per month</td>
<td>Number of chronic patients known to UHB/RD&amp;E renal service who are on haemodialysis (hospital/home/satellite) or CAPD</td>
</tr>
</tbody>
</table>

### Specific measures:

1. Total number of primary operations per month | Number of patients who have first AVF/Graft formation |

2. % general anaesthesia given | Count |
   2b Reason for general anaesthesia | Code |

3. % day cases and % ordinary admissions | % patients discharged on same day as admission for procedure |

3b Reason not day case | Count all and code by reason |

4. Average length of stay (of ordinary cases) | Number of days patient remains in hospital following formation of AVF/Graft (for both) complex and simple cases |
<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>% new patients having AVF surgery six months prior to starting haemodialysis</th>
<th>All AVF surgery</th>
<th>Date of surgery to date of first dialysis session</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>Number of complex patients’ access that cannot be carried out in lower arm</td>
<td>Number of patients who are not suitable for brachiocephalic fistulae or number of patients who have upper arm/leg fistulae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Number of patients not suitable for AVF</td>
<td>% patients counselled/who have vascular mapping to establish unsuitable for AVF or AVF/Graft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>From initial referral into multidisciplinary team/nephrologist</td>
<td>Date of paper referral, date referral received, date first appointment with multidisciplinary team/nephrologists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>From multidisciplinary team/nephrologist to surgical team</td>
<td>Date of first appointment to see vascular surgeon/transplant surgeon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9b</td>
<td>Date added to list</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>For surgery</td>
<td>Date of operation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Extent of waiting list for vascular access surgery (not cancelled operations)</td>
<td>Number of patients on surgery waiting list code by 1st, 2nd 3rd time for the procedure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Number of operations cancelled and reason</td>
<td>For baseline, a retrospective audit of cancelled operations (3/12) Count all cancellations Code by reason Code by 1st, 2nd, 3rd time cancellation Should identify major problem areas including any in pre-op assessment, patient deferral, change of choice, emergency given priority etc. Less waste of theatre time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>% new patients starting haemodialysis with functioning AVF, against NSF standard</td>
<td>% patients previously unknown to UHB/RD&amp;E renal services who commence haemodialysis with a primary fistula that can be needled, has thrill(^i) and exhibits adequate blood flows (300 mls/min)</td>
<td></td>
</tr>
</tbody>
</table>

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\(^i\) Thrill: a palpable vibration of the skin above a fistula, caused by the blood flow through it. Used by patients and staff as an indicator of blood flow.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>% new patients starting haemodialysis using temporary lines, against NSF standard</td>
<td>% patients previously unknown to UHB/RD&amp;E renal services who commence haemodialysis with a polyurethane non-tunnelled or tunnelled catheter</td>
</tr>
<tr>
<td>14b</td>
<td>Temporary line</td>
<td>Number of non-tunnelled lines in situ &gt; 21 days</td>
</tr>
<tr>
<td>15</td>
<td>% of all haemodialysis patients with functioning fistulae</td>
<td>% patients who have a fistula that is able to be needled, has thrill and exhibits adequate blood flows (300 mls /min)</td>
</tr>
<tr>
<td>16</td>
<td>% primary fistulae failure</td>
<td>Failure before initial needling, and check primary potency at six months</td>
</tr>
<tr>
<td>17</td>
<td>% fistulae revisions</td>
<td>Number of primary fistulae that require further surgical intervention</td>
</tr>
<tr>
<td>18</td>
<td>Wait for salvage</td>
<td>Date detected, date referred for salvage procedure to a. radiologists b. surgeons, date of salvage procedure</td>
</tr>
<tr>
<td>20</td>
<td>Reason done by surgeon</td>
<td>Reason – code, count and sort</td>
</tr>
<tr>
<td>21</td>
<td>% post op care in renal</td>
<td>Is patient cared for on a dedicated renal ward? YES/NO If no, where? – then code</td>
</tr>
<tr>
<td>22</td>
<td>% new patients referred to multidisciplinary team /low clearance clinic who have care plan</td>
<td>A paper document that is shared with patient. This document outlines the intended pathway agreed by patient and multidisciplinary team. It is audited and evaluated regularly</td>
</tr>
<tr>
<td>23</td>
<td>% patients assessed for inclusion on National Transplant List, six months before starting dialysis.</td>
<td>Percentage of patients who have physical work up (bloods/tests etc) 1. Date patient and multidisciplinary team agree that transplantation is a treatment option 2. Date pre-dialysis at which issue of transplant discussed 3. Time taken for screening investigations 4. Time to see transplant surgeon from waiting list 5. Time for tissue type analysis and lab tests etc. 6. Date added to the transplant list 7. Date result of tissue type</td>
</tr>
<tr>
<td>24</td>
<td>% chosen modality</td>
<td>Haemodialysis. Peritoneal dialysis. Conservative</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Code and sort</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>25</td>
<td>% place dialysis delivered</td>
<td>Home, Centre, Satellite</td>
</tr>
<tr>
<td>26</td>
<td>% preferred choice</td>
<td>YES/NO</td>
</tr>
<tr>
<td>27</td>
<td>If NO then reason</td>
<td>Code and sort</td>
</tr>
<tr>
<td>28</td>
<td>% of haemodialysis patients using transport services</td>
<td>% of haemodialysis patients unable to make their own way to the dialysis centre and require ambulance assistance (C1/C2/C3) Does patient use own transport? YES/NO</td>
</tr>
<tr>
<td>29</td>
<td>% Patients using transport services arriving late (more than 30 min) for haemodialysis</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>% Patients using transport services collected late (more than 30 min) from haemodialysis</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Graft survival at five years</td>
<td>Number of transplant patients who remain off dialysis for five years post operation. Identify from UK Transplant data</td>
</tr>
</tbody>
</table>
Group 1: the patient pathway from feeling unwell to commencing dialysis treatment

- **OPPORTUNISTIC TESTING**
- **PATIENT FEELS UNWELL**
  - **PATIENT REFERRED TO GP**
  - **INVESTIGATIONS/TESTS ORDERED**
  - **RESULTS TO GP**
  - **PATIENT INFORMED OF RENAL PROBLEM/RENAL-SPECIFIC DIAGNOSIS MADE**
  - **REFERRAL LETTER TO NEPHROLOGIST**
  - **PRIORITISATION BY NEPHROLOGIST RE URGENCY OF APPOINTMENT**
  - **APPOINTMENT WITH NEPHROLOGIST**
  - **INVESTIGATIONS/TEST CHOICE OF RRT DISCUSSED**
  - **PRE-DIALYSIS CLINIC**
  - **REGULAR CLINIC APPOINTMENTS**
  - **INTRODUCTION TO HOMECARE NURSE**
  - **CHANGES TO MEDICATION**
  - **DIALYSIS NEEDED**
Group 2: emergency route to renal replacement therapy

1. **PATIENT PRESENTS WITH COMPLAINT TO GP**
   - **GP REQUESTS BLOOD TESTS**
   - **REFERRED BY GP TO NEPHROLOGIST IN OUTPATIENT CLINIC – URGENT SLOT**

2. **PATIENT PRESENTS TO A&E / EMERGENCY MEDICAL UNIT**
   - **ADMIT TO EMERGENCY MEDICAL UNIT – NURSE TAKES CASE HISTORY, REFERS TO SHO, DISCUSS WITH MORE SENIOR MEDICAL STAFF**

3. **DIAGNOSTIC WORKUP**
   - ANGIOGRAM, BIOPSY, BLOOD TESTS, ULTRASOUND
   - **WARD CLERK ENTERS DETAILS ON PAS AND REQUESTS NOTES**

4. **IF URGENT DIALYSIS REQUIRED ADMITTED TO RENAL WARD, LINE INSERTED IN PROCEDURES ROOM ON THE WARD**

5. **TEMPORARY LINE INSERTED IN PROCEDURES ROOM ON WARD**

Modernising Services for Renal Patients
Group 3: elective route to vascular access

1. **URGENT**
   - Grade 4&5 patients seen within 2 weeks
   - Letter to OPD to be changed from ungraded to graded
   - Clerk back to medical secretary who changes clinic template for urgent slot
   - Patient phones up and books to specific urgent slot

2. **ROUTINE**
   - Grade 3 patients to be seen within 17 weeks
   - Letter to patient saying they will be contacted within 17 weeks to make appointment
   - Once appointment date agreed, letter to patient

3. **Investigations pre-clinic appointment**
   - Ultrasound
   - 24 hour urine

4. **At OPD appointment, medic discusses choices for dialysis, forms a monitoring plan and makes onward referral to other MDT member(s)**

5. **Consultant dictates onto tape**

6. **Patient choice**
   - Haemodialysis
   - Peritoneal dialysis

7. **Referral to surgeon to create access**

**MDT:**
- Other Consultants
- Anaemia Nurse
- Dietitian
- Home Care Nurses team – assess needs and implications, numerous visits, patient can be introduced to other patients + self help groups
- Psychologist – referrals from Home Care Nurses
- Palliative care if conservative
Anticipate dialysis in 6–12 months

If dialysis dependent with temporary neck line, refer for Ask-split line

Ash-split line inserted

If non-functioning, ASN orders duplex scan & refers to ASSrg.

Commence HD x 3 per week

Suture removal by dialysis nurse at 10 days

Dialysis nurse records circulatory observations.

Dialysis nurse makes decision that fistula is fit for use

Patient admitted the day before surgery, subject to bed availability

If dialysis dependent, haemodialysis at 1/7 day post-op – HD x 3 per week

Patient discharged 1 day post-op by 10am by SHO or ASN

Appointment made by ASN for suture removal at 10 days by HCN/dialysis nurse/practice nurse

Consider visit by HCN

ASN – Access Specialist Nurse
ASSrg – Associate Specialist Surgeon
HCN – Home Care Nurse
**Group 5: Dysfunctional Fistula**

**CHRONIC**  
Pathway from 1–3 months duration

**ACUTE**  
Maximum time for pathway 5–7 Days

- Acutely blocked fistula/graft diagnosed as below
- 28 days post-surgery a functioning fistula becoming dysfunctional
- Problem identified by HCN, patient, haemo unit, other staff
- Letter/fax/phone
- Dialysis unit—seen by Nurse or Doctor
- Assessed—clinical, rising pressure or reduced flow, treatment
- Interpret results—Doctor or Specialist Nurse
- Imaging service—fistulagram or colour duplex
- Diagnose problem
- Need bed available for intervention
- Intervention fistuloplasty.
- May be discharged same day or need bed
- HD on unit before discharge
- Discharge home. Need clinic follow up to check fistula patency

- If radiology unable to intervene, patient to Surgeon
- Secure CEPOD list slot
- If no theatre space available, await next day, when patient assessed by radiology or re-referred to surgery as clinically appropriate
- Hemo unit for dialysis—see chronic pathway

- Referral to surgeon or radiologist
- Results normal—no further intervention

- If fails, insert temporary line

- Haemo unit for dialysis—see chronic pathway
Group 6: haemodialysis patient treatment, day pathway

- Patient collected by transport
- Possibly stop to collect other patients
- Patient arrives at unit
- Patient sits in waiting room
- Observations: temperature, blood pressure and weight
- Patient needed
- Dialysis
- Patient activity, TV, music, lap top etc
- Machine alarms
- End of Treatment
- ‘Wash back’
- Disconnect from machine
- Apply pressure
- Observations
- Patient to waiting room
- Transport home
Appendix Four: Reducing Rates of Infection at UHB

Background

1. The arteriovenous fistula is the type of vascular access for haemodialysis associated with the lowest rates of infection. However, 25 - 30% of renal patients at UHB did not have functioning fistulae and therefore relied on central venous lines. As a consequence, they were more likely to acquire nosocomial blood stream infections (BSI), including MRSA.

Figure 1: MRSA line infection rates before (2002) and after introduction of infection control measures

Accumulative number of new cases of positive MRSA blood cultures over a three year period

2. A proportion of BSIs become deep seated resulting in endocarditis, septic arthritis and osteomyelitis. These patients require prolonged hospital stay (up to three months) which often involves cardiac or neurosurgical intervention. Reliance on temporary lines for haemodialysis results in an increased incidence of sepsis, prolonged periods of hospitalisation and other complications that result in unacceptable levels of infection and re-admission rates. The solution is to reduce the number of temporary lines, by increasing the number of patients with functioning arteriovenous fistulae.
3. Recent audit analysis within the UHB renal unit has shown that as the number of patients dialysing via temporary lines is reduced there is a reduction in infection rates. This supports the need for prompt surgical creation and salvage of fistulae in all suitable patients.

**Action taken to combat factors contributing to the spread of infection**

4. Analysis by the project team showed a range of factors contributed to the problem. These were addressed by a combination of immediate and longer-term actions. A dedicated multidisciplinary Renal Infection Control Action Group was established, responsible for auditing infection, investigating the cause, identifying a solution and implementing change.

**Environmental factors**

5. These were felt to be particularly relevant given the complex nature of renal patient movement across many areas of the hospital. Immediate action included:

- Cleaning schedules: improved cleaning rotas were defined in combination with domestic services, and resource allocated, for renal inpatient wards, dialysis units and toilets/commodes
- Procedure Room: cleaning schedules were upgraded to operating theatre level. The wall covering and ceiling tiles were replaced with more easily washed materials, and the equipment storage system replaced to reduce dust collection. The positive pressure airflow system was re-commissioned, bacterial air filters replaced, and air conditioning installed to remove the need for windows to be opened
- Equipment: cleaning policies for medical equipment were developed, including dialysis machines, and stethoscopes, blood pressure monitors etc for patients known to be of infective risk were specifically identified
- Drainage: a problem with inadequate waste drainage was identified and resource identified to rectify it
- Audit: regular environmental audit was performed by G grade sisters (initially weekly) in liaison with Infection Control nurse specialists. Regular audit was introduced with review at MDT governance meetings.

**Development of local infection-control ward groups**

- Group Members included Modern Matron, Ward Manager, Domestic Supervisor and Infection Control Sister
- Education programmes were initiated for nursing and medical staff
Strict hand washing policies after contact with infected patients were developed and alcohol hand rub used after any patient contact.

Regular audit is ongoing.

**Screening of all staff**

- Policies created with Occupational Health for screening practices, treatment regimes etc
- Medical, UHB nursing and satellite dialysis unit nursing staff screened for nasal carriage of MRSA.

**Introduction of protocol prescribing**

- Development of the PICS system (Prescribing, Information and Communication System). A renal unit-developed protocol-based investigation and wireless electronic prescribing system

**Review of unit antibiotic treatment policies**

- This led to elimination of the use of defined antibiotics, by use of the PICS system (making privileges to prescribe consultant only)
- It was thought third generation cephalosporin antibiotics included in antibiotic protocols before the review might predispose patients to acquired *Clostridium difficile* infection.

**Development and implementation of evidence-based line insertion protocol**

- Universally adopted by Trust for central venous catheter insertion.
- Competency-based training of new Renal Unit Junior Medical Staff for dialysis central venous catheter insertion procedure.

**Development and implementation of evidence-based line connection protocol**

- Disseminated and taught by the Renal Unit Nursing Clinical Practice manager through UHB renal units and, after review, with satellite dialysis units (including nursing staff employed by independent healthcare providers).

**Change in Nursing Practice**

- Development and roll-out of isolation room nursing (or cohort nursing when isolation not possible) of patients infected with antibiotic resistant organisms.
Increase in Vascular Access Surgery

- Appointment of vascular access nurse co-ordinator to improve flows of patients and reduce cancellations as well as prioritise
- Greater focus on day case surgery for patients undergoing fistula creation
- Initiation of radiology initiative lists for patients awaiting rate limiting pre-operative venography
- Initiative surgery lists making use of private sector facilities
- Increased focus on pre-dialysis patients to facilitate the formation of vascular access prior to starting dialysis.

Ongoing Audit of Practice and Review

The various initiatives have been associated with a marked reduction in MRSA septicaemia. The number of positive MRSA blood cultures almost halved between 2002 and 2004 (see figure 1). Rates of *Clostridium difficile*-related diarrhoea have reduced less, and this will continue to be an important area of focus.

Figure 2: Coagulase-negative Staphylococcus positive blood cultures before and after introduction of an evidence-based blood culture sampling protocol in July 2003 and training of junior doctors, phlebotomists and haemodialysis nurses
Appendix Five: Glossary

**Agenda for Change** – Agenda for Change provides NHS employees with an opportunity to be part of the decision-making process. It offers a new way of looking at job roles in the organisation. It will ensure fair pay, the development of staff and the delivery of the services we need in the future NHS.

**Arteriovenous fistula (AVF)** – created by joining a vein to an artery, usually in the forearm, to increase the blood flow directly into the vein: this causes enlargement of the vein, into which a needle can be repeatedly inserted to allow regular access to the bloodstream for haemodialysis.

**Algorithm** – a procedure or formula for solving a problem.

**Balanced score card** – a balanced set of measures that provides feedback to clinical teams, the wider NHS and key stakeholders. This feedback shows that working differently is having the desired effect.

**Bottlenecks** – part of the system where patient flow is obstructed, causing waits and delays.

**Brachiocephalic fistula** – an arteriovenous fistula created in the anterior aspect of the elbow by joining the brachial artery at the level of the elbow to the cephalic vein.

**CAPD** – Continuous Ambulatory Peritoneal Dialysis (see Peritoneal dialysis).

**Care Bundle approach** – a Care Bundle approach systematically appraises clinical processes. It is based on measuring the actual provision of therapeutic interventions according to standards, informed by evidence, which local clinicians set themselves. A Care Bundle approach requires measurement of compliance with a whole group of items, not just individual items.

**Central venous catheter** – a hollow tube inserted into a central vein such as the jugular vein in the neck, to transport fluids to and from the body.

**CEPOD list** – daily dedicated daytime emergency list.
Clinical governance – a framework through which NHS organisations are accountable for continually improving the quality of their services, and safeguarding high standards of care, by creating an environment in which excellence in clinical care will flourish.

Clostridium difficile – a bacterium found in the gut. It may cause no problem for healthy people, but can cause diarrhoea and inflammation in more vulnerable people such as hospital patients, usually when the ‘normal’ balance of bacteria in the gut is disturbed following antibiotic therapy.

Colour duplex scan – a special ultrasound scan which can both assess the structure of veins and also give information about blood flow, which can indicate areas of venous narrowing.

Day surgery – admitting a patient electively during the course of the day with the intention of providing treatment, which does not require the use of a hospital bed overnight, and following which the patient returns home as planned.

Diagnostic scanning – imaging for the purposes of achieving a diagnosis.

Dialysis – a process in which waste products and excess water are filtered out of a patient’s blood artificially. It is used when the patient’s kidneys no longer function sufficiently to maintain life.

Dialysis access – the mechanism allowing access to the body for dialysis to take place; vascular access for haemodialysis or peritoneal access for peritoneal dialysis.

Dialysis access specialist nurse – see job description.

Discharge co-ordinator – see job description.

Discharge planning tools – a collection of flow charts and proformas to guide the discharge process.

Expert patient programme – a self-management course for people with long-term health conditions.

Fistula – see arteriovenous fistula.

General anaesthesia – a state of reversible loss of consciousness and lack of response to painful stimuli, induced by chemical agents. To be distinguished from sedation, in which verbal contact with the patient is maintained.
**Governance Support Facilitator** – see job description

**Graft** – something implanted or transplanted, so: 1) a tube of synthetic material connected to blood vessels as an alternative to an AVF (see entry), to provide vascular access for haemodialysis; or 2) a transplanted kidney (or other organ)

**Haemodialysis** – a form of dialysis in which the patient’s blood is circulated through a machine that filters out waste products and excess water; typically done for around four hours, three times weekly, usually in a hospital or satellite unit

**Haemodialysis Flow Co-ordinator** – see job description

**Handoffs** – when the patient is passed on from one healthcare professional to another

**Infiltration anaesthesia** – loss of painful sensation around the surgical area, produced by infiltration of local anaesthetic into that area. Often regarded as synonymous with ‘local anaesthesia’ but this term may be confusing

**Integrated Care Pathways (ICP)** – an ICP amalgamates all the anticipated elements of care and treatment of all members of the multidisciplinary team, for a patient or client of a particular case-type or grouping within an agreed time frame, for the achievement of agreed outcomes. Any deviation from the plan is documented as a ‘variance’; the analysis of which provides information for the review of current practice

**Intravenous catheter** – a catheter inserted into a vein

**K/DOQI** – the Kidney Disease Outcomes Quality Initiative of the USA National Kidney Foundation

**MDT** – multidisciplinary team

**Measures** – a tool used to confirm if a change has made an improvement

**Measures definitions** – measurement charts are used to show the performance of processes over time. They are used for basic experimentation to find out when and how problems arise and how problems can be rectified. They are simple but effective. They can help identify improvement opportunities as well as providing evidence that improvements have been successful. Measurement charts are also known as run charts
**National Service Framework (NSF)** – a ten year programme of improvement for a service or group of patients, which identifies quality requirements and markers of good practice to be applied in a particular service area

**NHS Career Framework** – the NHS Career Framework aims to provide a guide for NHS and partner organisations on the implementation of a flexible career and skills escalator concept, enabling an individual with transferable, competence-based skills to progress in a direction which meets workforce, service and individual needs

**NHS Knowledge and Skills Framework (NHS KSF)** – a development tool that underpins Agenda for Change and will be used to determine the broad areas and level of competencies required for each post through the use of NHS KSF outlines

**OPD** – outpatient department

**PAS** – Patient Administration System

**Patient and Public Involvement in Health strategy** – involving our patients and public in any redesign or decisions around patient care

**Patient flow** – how a patient moves through a hospital system or process of treatment

**Pathway of care** – a description of the stages of a patient’s care for a particular condition or treatment

**PDSA cycles** – Plan-Do-Study-Act. A tool for continuous quality improvement

**Peritoneal dialysis** – a process in which waste products and excess water are removed from the blood into dialysis fluid carried in the peritoneal cavity in the abdomen, using its lining membrane (the peritoneum) as a filter

**Problem Analysis Tool** – an analysis tool that provides a systematic way of looking at a problem or issue identified. It can be used to identify areas for data collection and to study why a process is not performing properly or producing the desired results

**Process map** – a visual presentation of a series of connected steps or actions to achieve an outcome
**Process templates** – process templates can be used to build up a representation of the time and resources required for a patient during their process of care. They can be used to identify bottlenecks and reduce the effect of variation in demand and capacity at the bottlenecks to improve scheduling of patient care.

**Pull** – creating a pull in a health system means that work is only done at a particular step in the process if the next step is demanding the work. Pull systems are created by being able to anticipate demand. To do this, demand first has to be measured over time.

**Pursuing Perfection** – a patient centred improvement programme.

**Radiology** – a branch of medicine involved with diagnostic imaging. This may involve the use of radiation (eg X rays), ultrasound or magnetic fields (MRI).

**Renal replacement therapy (RRT)** – treatment to augment or replace the function of failing kidneys, by dialysis (peritoneal dialysis or haemodialysis) or transplantation.

**Regional anaesthesia** (may also be called regional analgesia) – loss of painful sensation in an area of the body, produced by injection of local anaesthetic around a group of nerves. Subdivided into ‘central neural blockade’ (spinal or epidural block) and ‘peripheral regional blockade’ (plexus blockade or individual nerve blocks).

**RRT** – see renal replacement therapy.

**Satellite unit** – a unit providing haemodialysis and sometimes other services, linked to a main unit which provides a full range of services. Usually it provides treatment for more stable patients, closer to where they live than the main unit.

**Strategic Health Authority (SHA)** – SHAs are responsible for developing strategies for local health services and ensuring high quality performance. They manage the NHS locally and are a key link between the Department of Health and the NHS. They also ensure that national priorities are converted into local plans.

**Skill mix modelling tool** – a pilot computer tool designed to calculate the impact of altering staffing establishments when new or modified roles are proposed. A development tool, it has also been known as the skill mix tracker tool, or the skills escalator tool.
Small test of change – testing changes is an iterative process: the completion of each Plan-Do-Study-Act (PDSA) cycle leads directly into the start of the next cycle. People are far more willing to test a change when they know that changes can and will be modified as needed. Linking small tests of change helps overcome an organisation’s natural resistance to change, gains clinicians’ support and prevents costly changes that do not work.

Sonic blood flow monitor – a machine that uses the principles of ultrasound dilution to calculate blood flow measurements, and therefore can be utilised for surveillance of vascular access.

Stakeholder – a person who has an interest or stake in an undertaking or business. In the context of renal services, all those involved in commissioning, delivering or using the service.

Stakeholder event – an opportunity for a wider group to find out what a service is doing, and to help shape the next phase of its work.

Succession planning – a process by which one or more successors are identified for key posts (or groups of similar key posts), and career moves and/or development activities are planned for these successors. Successors may be fairly ready to do the job (short-term successors) or seen as having longer-term potential (long-term successors).

Task analysis tool – a tool to collect raw data to determine which tasks a staff group currently performs. These data are then analysed to understand core tasks which need to be done by that staff group, and other tasks more suited to other roles or staff groups. This can help modify roles or support skill-mixing.

Vascular surveillance programme – routine monitoring of the state of a graft or fistula using a device utilising the ultrasound dilution method.

Vascular access – a fistula, catheter or graft allowing access to the bloodstream for haemodialysis.

Venogram – contrast enhanced radiological imaging of veins.

Workforce modelling – workforce modelling assists the Human Resources planning process by showing the results of different ‘what if?’ scenarios. Much of the value of workforce modelling lies in the process of putting together the model.