Kidney Disease Key Facts and Figures

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Introduction

*Chronic kidney disease is common, harmful and treatable*

Kidney disease is an important public health issue. It is common and the prevalence increases with age, which means that the disease burden will increase with our aging population. Chronic kidney disease is an independent risk factor for other diseases, particularly cardiovascular disease. It often coexists with other cardiovascular conditions meaning that it needs to be managed alongside other diseases and risk factors such as diabetes and hypertension as well as the social needs that come with frailty and multiple conditions. In a minority of cases, chronic kidney disease progresses to end stage renal disease, which may require renal replacement therapy. This progression and the risks of other vascular events, such as stroke and heart failure can be reduced if chronic kidney disease is identified and managed, early diagnosis is therefore essential.

This document outlines some basic facts about kidney disease in England. Several areas of kidney disease are covered ranging from how common it is, what makes people at risk of developing kidney disease and what is the cost of kidney disease within England. The document should be read alongside the National Service Framework (NSF) for Renal Services¹, which sets standards for kidney care and identifies markers of good practice. Part one of the NSF was developed in 2004 and there have been subsequent reports on the progress towards the standards identified in the documents.

The target audiences for the document are primary care, commissioners of kidney services and those working with an interest in vascular risk assessment and management, although it will also be of interest to specialists in kidney care and those involved in other chronic conditions. Throughout the document links to the source of the kidney disease information are included to enable access to the most current information.
1 Kidney disease common definitions

1.1 Chronic kidney disease

Chronic kidney disease (CKD) describes abnormal kidney function and/or structure. It is common, frequently unrecognised and often exists together with other conditions (for example, cardiovascular disease and diabetes). CKD can progress to end stage renal disease in a small but significant percentage of people. CKD is usually asymptomatic until the late stages, but it is detectable usually by measurement of serum creatinine or urine testing for protein. In the UK clinical practice has been standardised using the 4 factor Modification of Diet in Renal Disease (MDRD) equation and albumin creatinine ratio, consistent with the National Institute for Health and Clinical Excellence (NICE) guidance. Other measurement methods exist for specific indications such as the CKD-EPI equation and the Cockroft-Gault in children. The CKD-EPI equation is more accurate than the MDRD especially in categorising CKD stages 3-5 and may be used in future CKD guidelines. There is evidence that treatment can prevent or delay the progression of CKD, reduce or prevent the development of complications and reduce the risk of cardiovascular disease.

The National Service Framework (NSF) for renal services used the US National Kidney Foundation kidney disease outcomes quality initiative (NKF-KDOQI) classification of CKD which divides CKD into five stages. Stages 3–5 may be defined by glomerular filtration rate (GFR) alone, whereas stages 1 and 2 also require the presence of persistent proteinuria, albuminuria or haematuria, or structural abnormalities. This classification has been refined by the NICE guidance on CKD management. Stage 3 CKD has been further subdivided into stages 3a and 3b (table 1.1).

<table>
<thead>
<tr>
<th>Stage</th>
<th>GFR (ml/min/1.73 m²)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≥ 90</td>
<td>Normal or increased GFR, with other evidence of kidney damage</td>
</tr>
<tr>
<td>2</td>
<td>60–89</td>
<td>Slight decrease in GFR, with other evidence of kidney damage</td>
</tr>
<tr>
<td>3A</td>
<td>45–59</td>
<td>Moderate decrease in GFR, with or without other evidence of kidney damage</td>
</tr>
<tr>
<td>3B</td>
<td>30–44</td>
<td>Moderate decrease in GFR, with or without other evidence of kidney damage</td>
</tr>
<tr>
<td>4</td>
<td>15–29</td>
<td>Severe decrease in GFR, with or without other evidence of kidney damage</td>
</tr>
<tr>
<td>5</td>
<td>&lt; 15</td>
<td>Established renal failure</td>
</tr>
</tbody>
</table>

*Use the suffix (p) to denote the presence of proteinuria when staging CKD.

Source: Taken from the NICE CKD guidelines.

1.2 Acute kidney injury

Acute kidney injury (AKI) is now the commonly accepted term for acute renal failure. It is a clinical syndrome characterised by a rapid reduction in renal excretory function due to several different causes, for example low blood volume or kidney damage due to glomerulonephritis. CKD is also a risk factor for the development of AKI.

AKI has been defined by the Acute Kidney Injury Network as ‘An abrupt (within 48 hours) reduction in kidney function currently defined as an absolute increase in serum creatinine of more than or equal to 0.3 mg/dl (≥ 26.4 μmol/l), a percentage increase in serum creatinine of
more than or equal to 50% (1.5-fold from baseline), or a reduction in urine output (documented oliguria of less than 0.5 ml/kg per hour for more than six hours)’.

1.3 End stage renal disease
A UK population study estimated that in people with CKD there was a 4% risk of progression to end stage renal disease (ESRD) over a 5.5 year follow-up period\(^6\). ESRD is a long-term irreversible decline in kidney function, for which renal replacement therapy (RRT) is required if the individual is to survive. RRT can take a number of forms; kidney transplantation, haemodialysis and peritoneal dialysis; dialysis can take place either in hospital or at home. The choice of care in ESRD is complex for those with severe comorbidity, in whom alternatives to RRT such as conservative treatment and palliative care may be more appropriate. A proportion of people with ESRD are managed outside the care of the renal services\(^1\).
2 How common is kidney disease in England?

About 9% of the English adult population are estimated to have CKD stages 3-5

2.1 Prevalence of chronic kidney disease

As chronic kidney disease (CKD) is a long-term condition, most measures quantifying CKD refer to the prevalence of disease. In England in 2008/09 there were 1,739,443 people aged 18 and over who were registered with CKD (stages 3-5). This represents an overall crude (not adjusted for age) proportion of 4.1% in the 18 and over age group. The QOF prevalence shown below only represents the people who have been detected and registered as having CKD, the actual prevalence will be higher.

Figure 2.1 CKD prevalence % recorded from GP Quality and Outcomes Framework (QOF) by PCT, England 2008/09

Source: QOF NHS Information Centre for Health and Social Care7.
The introduction of an internationally recognised classification system for CKD has led to the realisation that CKD rates vary little between countries: around 10% of the predominantly Europid populations of Iceland, Norway and the US have CKD\(^\text{6,9,10}\). While comparable data are not yet available for the UK, the rate is likely to be similar\(^\text{11}\).

Estimates of the prevalence of CKD from the literature vary due to the different methods of measuring CKD and the differing populations sampled. The most commonly quoted estimate of CKD prevalence in England is the ‘New Opportunities for Early Renal Intervention by Computerised Assessment’ (NEOERICA) dataset analysis\(^\text{12}\). This may be an overestimate of the prevalence of CKD for several reasons, as the estimates are based on one measurement of estimated glomerular filtration rate (eGFR) only and the testing is selective as testing tends to occur in patients who are unwell and may have acutely impaired renal function or acute kidney injury. The Association of Public Health Observatories CKD prevalence model\(^\text{13}\) applies the NEOERICA prevalence data to population estimates. The most recent estimate, applied to 2007 population figures, estimates a total of 3,547,654 people, or 8.8% of the population aged 18 and over in England, have CKD stages 3-5.

There are currently two other information sources which will be reporting CKD prevalence, the Health Survey for England 2009 and the Quality Improvement in CKD trial. These studies will provide further estimates of the prevalence of CKD and when available the APHO model will be updated to reflect these new findings.

### 2.2 Incidence of acute kidney injury\(^\text{14}\)

Acute kidney injury (AKI) is by definition\(^\text{5}\) a rapid onset condition which either recovers or becomes CKD. Its best measure is therefore an incidence (number of new cases). The population incidence from UK data ranges from 172 per million population (pmp) per year from early data\(^\text{15}\) up to 486-630 pmp/year from more recent series\(^\text{16,17,18}\) again depending on definition. The incidence of AKI requiring renal replacement therapy (RRT) ranged from 22 pmp/year\(^\text{15}\) up to 203 pmp/year\(^\text{16}\).

An estimated 5-20% of critically ill patients experience an episode of AKI during the course of their illness and AKI requiring RRT has been reported in 4-9% of all admissions to intensive-care units\(^\text{19}\). The reported prevalence of AKI from US data ranges from 1% (community-acquired) up to 7.1% (hospital-acquired) of all hospital admissions\(^\text{20,21}\).

### 2.3 Incidence and prevalence of renal replacement therapy

The number of people on renal replacement therapy (RRT) is often used as a proxy measure for end stage renal disease (ESRD), however this figure is an underestimate as it does not include people with ESRD who are being managed conservatively. The UK Renal Registry\(^\text{22}\) collects and analyses information relating to the incidence, clinical management and outcome of kidney disease. In 2008, the acceptance rate for RRT in England was 109 per million population (pmp).

There were 39,476 adult patients receiving RRT in England at the end of 2008, giving an England population prevalence of 767 pmp (split by modality; haemodialysis 337 pmp, peritoneal dialysis 69 pmp and transplant 361 pmp). Overall growth in the prevalent England RRT population from 2007 to 2008 was 4.5%.
2.4 Kidney Cancer

Kidney cancer information has not been summarised in this document. Information on the incidence, mortality, survival and risk factors for kidney cancer can be found at the Cancer Research UK website.
3 What are the health burdens and complications of kidney disease?

A large proportion of people with CKD also experience other conditions particularly cardiovascular disease

3.1 Morbidity and mortality associated with chronic kidney disease

A large proportion of people with chronic kidney disease (CKD) experience other long-term conditions, and this proportion increases with age\(^2\). The complications of CKD include\(^2\):

- Cardiovascular disease (CVD)
- Mineral and bone disorders (e.g. calcium and phosphate disorders)
- Anaemia
- Malnutrition
- Depression
- Increased risk of other non cardiovascular disease e.g. infection and cancer
- Increased risk of fracture

The relationship with CVD is strong and UK population studies have demonstrated that the risk of cardiovascular death in people with diagnosed CKD far outweighs the risk of progression of the kidney disease\(^2\). A UK study found that only 4% of individuals progressed to end stage renal disease (ESRD) over a 5.5 year follow-up period whilst 69% had died at the end of follow-up; the cause of death was cardiovascular in 46% of cases\(^6\). This high prevalence of CVD in people with CKD, and the relative lack of progression, has been confirmed in a number of other studies\(^11,25,26\). This is further illustrated by results from the NEOERICA\(^12\) project where 50% of those with a stage 4 and 5 CKD had coexistent CVD which increased in prevalence as GFR decreased. The impact of other co-existing conditions such as diabetes, hypertension and significant anaemia also increased with more advanced kidney dysfunction.

CKD has been shown to be related to an increased risk of hospitalisation, morbidity and death. A US study\(^27\) showed that a reduced eGFR (60 ml/min/1.73m\(^3\)) independent of other CVD risk factors was associated with an increased risk of hospitalisation, morbidity and death in a nearly three year follow up period. The adjusted hazard ratio for cardiovascular events increased as the eGFR decreased from 1.4 (45 to 59 ml/ min/1.73 m\(^3\)), to 3.4 (eGFR of less than 15 ml/ min/1.73 m\(^3\)). The adjusted risk of hospitalization with a reduced eGFR followed a similar pattern. The risk of death also increased as the GFR decreased below 60 ml/ min/1.73 m\(^2\); the adjusted hazard ratio for death was 1.2 with an eGFR of 45 to 59 ml/ min/1.73 m\(^2\) increasing to 5.9 with an eGFR of less than 15 ml/ min/1.73 m\(^2\).

Data from the CKD Prognosis Consortium suggests a similar association with mortality\(^28\) eGFR less than 60 mL/min/1·73 m\(^2\) and albumin:creatinine ratio (ACR) 1·1 mg/mmol (10 mg/g) or more are independent predictors of mortality risk in the general population. Compared with eGFR 95 mL/min/1·73 m\(^2\), adjusted hazard ratios for all-cause mortality were 1·18 for eGFR 60 mL/min/1·73 m\(^2\), 1·57 (for 45 mL/min/1·73 m\(^2\)), and 3·14 for 15 mL/min/1·73 m\(^2\). There were similar findings for CVD mortality.
Reduced kidney function is associated with poorer psychosocial functioning, higher anxiety, higher distress, decreased sense of well-being, higher depression, and negative health perception\textsuperscript{29}. Evidence is emerging that cognitive impairment, delirium and depression are very common in patients with kidney disease. All of these conditions are associated with prolonged hospitalization and an increased risk of mortality\textsuperscript{30}.

3.2 Acute kidney injury\textsuperscript{14}

AKI not requiring an intensive care unit (ICU) level of care, in which the kidney is usually the only failed organ, carries a mortality rate of up to 10\%\textsuperscript{31,32}. In contrast, ICU AKI is often associated with sepsis and with non-renal organ system failure\textsuperscript{33} with mortality rates of over 50\%. These rates rise to 80\% when renal replacement therapy (RRT) is required\textsuperscript{34}. Death rates increase with an increasing number of failing organ systems but over 65\% of survivors recover kidney function and discontinue RRT\textsuperscript{35}. AKI is not just a reflection of co-existent pathologies with the mortality reflecting the severity of the underlying cause e.g. severe trauma, but it contributes, directly, to mortality\textsuperscript{36,37,38} possibly associated with an increased risk of "non-renal" complications such as bleeding and sepsis\textsuperscript{32}.

Established AKI can result in serious, life-threatening complications. The National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) report\textsuperscript{39} found that 83\% of patients whose deaths were investigated in the report suffered one or more complication of AKI. The most commonly occurring complications were found to be acidosis, hyperkalaemia and sepsis.

3.3 Quality of life for people on renal replacement therapy

An Australian population study\textsuperscript{40} demonstrated that a lower eGFR was associated with a lower quality of life score as measured by the health related quality of life score (HRQoL). An economic evaluation that estimated quality of life scores on people on dialysis\textsuperscript{41} found that the valuations obtained for HRQoL and the EuroQol 5D Instrument (EQ-5D) were lower and consistently lower than age-related population norm. They also found that dialysis places a major limitation on a patient’s social life. About 80\% of the sample on dialysis felt that their life was affected, with 60\% reporting a burden on their carers.

A UK based study\textsuperscript{42} of two groups of older people (aged 70 and over) on dialysis (‘new patients’ on dialysis 90 days and ‘stock’ patients 5 or more months on dialysis) concluded that the mean score for physical quality of life in both groups was significantly lower than the general population over 70 years in the UK. The mental quality of life score was, however, not significantly different for those new patients on dialysis for 90 days compared to the general UK population.

3.4 Survival on renal replacement therapy\textsuperscript{22}

Compared to the general population, the relative risk of death on RRT decreased with age from 28.6 times that of the general population at age 30 to 34 to 2.7 at age 85+. There has been a decline in rates of death on RRT; over the last 10 years the age-standardised mortality ratios compared with the general population has fallen (7.7 in 2001, 6.9 in 2007).
3.5 Mortality from different types of kidney disease

A recent National End of Life Care Intelligence Briefing bulletin quantified the number of deaths from various types of kidney disease. The analysis looked at death records from 2001-2008 and quantified the number of deaths where the specific kidney disease was 'underlying' i.e. where the disease initiated the train of events directly linked to death or where kidney disease was 'mentioned' (where kidney disease is either the underlying cause of death, part of the causal sequence of events leading to death or the disease contributed to death but not part of the causal sequence).

There were 175,917 deaths for which one or more of the selected kidney diseases were mentioned on death certificates between 2001 and 2008. This represents approximately 5% of all deaths (3,865,264) recorded in England over the same period. Of the 175,917 people who died with a mention of one of the kidney diseases, 43,884 (25%) people had one of these diseases recorded as being the 'underlying cause'.

Tables 3.1 and 3.2 below show the numbers of deaths in England where the specified kidney diseases were classified as the underlying cause of death and where the diseases were 'mentioned' on the death certificate from 2001 to 2008. The study acknowledges that advanced kidney disease has been under-recorded in death certification, so that these mortality statistics may represent an underestimate of the total number of deaths.

Table 3.1 Underlying causes of death from selected kidney diseases, England, 2001 to 2008

<table>
<thead>
<tr>
<th>Disease</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal carcinoma</td>
<td>2,478</td>
<td>2,593</td>
<td>2,634</td>
<td>2,767</td>
<td>2,746</td>
<td>2,902</td>
<td>2,817</td>
<td>2,847</td>
<td>21,784</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>1,378</td>
<td>1,382</td>
<td>1,414</td>
<td>1,422</td>
<td>1,359</td>
<td>1,395</td>
<td>1,546</td>
<td>1,397</td>
<td>11,293</td>
</tr>
<tr>
<td>Hypertensive renal disease</td>
<td>643</td>
<td>633</td>
<td>697</td>
<td>651</td>
<td>679</td>
<td>751</td>
<td>857</td>
<td>835</td>
<td>5,746</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>360</td>
<td>446</td>
<td>429</td>
<td>445</td>
<td>510</td>
<td>508</td>
<td>528</td>
<td>559</td>
<td>3,785</td>
</tr>
<tr>
<td>Renal ischaemia and infarction</td>
<td>75</td>
<td>82</td>
<td>90</td>
<td>73</td>
<td>109</td>
<td>148</td>
<td>301</td>
<td>398</td>
<td>1,276</td>
</tr>
<tr>
<td>Total</td>
<td>4,934</td>
<td>5,136</td>
<td>5,264</td>
<td>5,358</td>
<td>5,403</td>
<td>5,704</td>
<td>6,049</td>
<td>6,036</td>
<td>43,884</td>
</tr>
</tbody>
</table>

Source: Office for National Statistics, annual mortality extracts. Taken from National End of Life Care Intelligence Briefing bulletin.

Table 3.2 Mentions of selected kidney diseases at death, England, 2001 to 2008

<table>
<thead>
<tr>
<th>Disease</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic renal failure</td>
<td>9,394</td>
<td>10,020</td>
<td>10,688</td>
<td>10,966</td>
<td>11,898</td>
<td>13,026</td>
<td>14,633</td>
<td>13,895</td>
<td>94,520</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>4,952</td>
<td>5,602</td>
<td>6,295</td>
<td>6,438</td>
<td>7,607</td>
<td>8,468</td>
<td>9,212</td>
<td>9,404</td>
<td>57,978</td>
</tr>
<tr>
<td>Hypertensive renal disease</td>
<td>891</td>
<td>856</td>
<td>943</td>
<td>910</td>
<td>951</td>
<td>1,002</td>
<td>1,109</td>
<td>1,098</td>
<td>7,760</td>
</tr>
<tr>
<td>Renal ischaemia and infarction</td>
<td>410</td>
<td>391</td>
<td>466</td>
<td>433</td>
<td>473</td>
<td>1,012</td>
<td>2,564</td>
<td>4,326</td>
<td>10,075</td>
</tr>
<tr>
<td>Total</td>
<td>18,562</td>
<td>19,970</td>
<td>21,500</td>
<td>22,013</td>
<td>24,157</td>
<td>26,983</td>
<td>30,901</td>
<td>32,124</td>
<td>196,210</td>
</tr>
</tbody>
</table>

Source: Office for National Statistics, annual mortality extracts. Taken from National End of Life Care Intelligence Briefing bulletin.
3.6 Mortality and years of life lost from chronic renal failure

In England the mortality rate where the underlying cause of death is chronic renal failure has remained relatively static since 1993 to present at about 1.3 to 1.8 per 100,000 people. In England this equated to 10,030 years of life lost prematurely in under 75 year olds in the combined years 2006/08.

As covered in section 3.1 there is a strong association between CKD and cardiovascular disease mortality, although data illustrating the number of CVD deaths which could be attributed to kidney disease could not be identified.
4 What is the cost of kidney disease?

The cost of treating end stage renal disease is 1-2% of the NHS budget, but comprises 0.05% of the population

4.1 Cost of healthcare
The NSF for renal services\(^1\) stated that treatment is resource intensive for the NHS. The current cost of treating people with end stage renal disease (ESRD) has been estimated at 1-2% of the total NHS budget, yet they comprise only 0.05% of the total population. A 1999 paper\(^5\) which compared the proportion of the total healthcare spend on dialysis in 6 European countries estimated a variability of between 0.7% (UK) and 1.8% (Belgium) of overall healthcare cost being spent on dialysis alone.

4.2 Programme budgeting information
More recent programme budgeting data\(^6\) from the Department of Health (DH) estimates that the total expenditure on ‘renal problems’ was £1.3bn in England in 2008/09. This represented 1.4% of NHS expenditure (includes PCT reported expenditure as well as estimated DH, SHA and Special Health Authority costs). 6% of this total spend was recorded as primary care expenditure and 94% secondary care.

4.3 NHS reference cost information
NHS reference costs outline the financial cost of an episode of care. The NHS reference costs 2008/09\(^7\) provides costs for renal replacement therapy (RRT) in people aged 19 years and over. For a single episode, depending on whether the procedure takes place as an inpatient or an outpatient the cost varies from £138 to £171 for a session of haemodialysis, and £32 to £51 for continuous ambulatory peritoneal dialysis. The cost of a kidney transplant in adults varies from £10,250 to £13,627 from deceased donors to £19,340 for a live donor (this cost does not include immunosuppressive drug therapy and follow up treatment). More recent advances in kidney transplantation where a donor and recipient have different blood groups, or a recipient is sensitised to aspects of the donor kidney require the recipient to have additional treatments and are therefore currently more expensive.

4.4 Healthcare expenditure on kidney disease
The Wanless report Securing our Future Health: Taking a Long-Term View\(^8\) estimate the current spending on kidney care to be £445 million per year. In addition it estimated that there would be additional costs by 2010/11 to fully implement the NSF as a result of several technological improvements in haemodialysis and developments in primary and palliative care.

4.5 Prescribing costs
Programme Budgeting data\(^6\) provided by the NHS Business Services Authority (BSA) give primary prescribing costs relating specifically to kidney problems as £43.5m in 2009/10 (0.5% of primary prescribing costs).

There are issues in the estimation of the cost of prescribing for kidney disease. Medicines can be categorised into medicines used exclusively for kidney conditions, medicines used for
other conditions but predominantly used for kidney conditions and medicines used for one or more other conditions (including kidney disease); this makes the total cost on medicines specifically used for kidney conditions difficult to derive. The NHS Information Centre is investigating further options for representing kidney prescribing costs.

4.6 Further sources of kidney disease cost information-NHS Comparators

NHS Comparators is a source of expenditure data. This information includes expenditure on admissions for kidney problems split by inpatient and outpatient, elective and non-elective and prescribing. The NHS Comparators website is available on this link:- NHS Comparators website.
5 What makes people at risk of developing kidney disease?

*Hypertension, diabetes, obesity, smoking and socio-economic status are all risk factors for kidney disease*

### 5.1 Age

The estimated prevalence of chronic kidney disease (CKD) stages 3-5 varies by age and gender (based on extrapolation of patients with CKD amongst those tested for kidney function in primary care\(^4\)). In the 18 to 25 age group the prevalence is less than 1%, this increases to more than 40% in the 85 and over age group (table 5.1).

#### Table 5.1 Prevalence estimates (%) of CKD stages 3 to 5 by gender and age group

<table>
<thead>
<tr>
<th>Age groups</th>
<th>18-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65-74</th>
<th>75-84</th>
<th>85+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td>0.01</td>
<td>0.17</td>
<td>0.71</td>
<td>3.08</td>
<td>6.89</td>
<td>17.65</td>
<td>33.16</td>
<td>44.75</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>0.18</td>
<td>0.79</td>
<td>2.69</td>
<td>2.79</td>
<td>13.09</td>
<td>27.86</td>
<td>41.68</td>
<td>48.61</td>
</tr>
</tbody>
</table>

Source: NEOERICA\(^{12}\).

CKD is more likely to be recognized in older people as they are more likely to have blood tests which include serum creatinine due to their higher rates of morbidity when presenting to health services.

### 5.2 Gender

The prevalence of CKD is higher in women compared to men in most population based studies\(^49\). This is illustrated in all age groups (excluding the 45 to 54 age group) in table 5.1 above where the overall age standardised prevalence of CKD stages 3-5 in people aged 18 and over in women was 10.6% and in men 5.8%\(^{12}\).

### 5.3 Inheritance of kidney disease

A recent paper developing a risk predictor for chronic kidney disease\(^50\) estimated that having a family history of kidney disease conferred an increased risk of developing moderate to severe CKD (stages 3b, 4 and 5). In women the risk was more than double, and in men, over three times the risk.

A number of inherited conditions are associated with kidney disease; these include polycystic kidney disease, medullary sponge kidney, vesico-ureteric reflux and Von Hippel Lindau disease. Kidney disease is also associated with congenital syndromes e.g. Alports Syndrome and Bartters syndrome. In 2008 7.5% of people accepted onto renal replacement therapy had a primary renal diagnosis of polycystic kidney disease\(^22\).

### 5.4 Ethnicity

Advanced CKD is more prevalent in South Asian individuals in the UK; compared with White Caucasians, South Asians had a 2.3-fold higher risk of advanced CKD\(^51\). However in the US the prevalence of CKD 3-5 is similar in both the Black and White population\(^10\). In the UK a similar prevalence of CKD was found in both Black and South Asian groups compared to the White population in a study from West London, though here there was some evidence that...
the prevalence of more advanced CKD and albuminuria are raised, especially in men\textsuperscript{52}. These data are supported by data from primary care in East London\textsuperscript{53}.

Data from the US suggest that much of the increased risk of advanced CKD in Black groups relates to more rapid progression of CKD\textsuperscript{54}. There is ongoing research to study progression rates and competing risks (e.g. cardiovascular mortality) by ethnic group in the UK. Within the sub-group of individuals with diabetes, CKD has been shown to progress more rapidly in Black and South Asian populations in the UK\textsuperscript{55}.

The explanation for such ethnic disparities, though not well understood, partly reflects co-existing medical conditions such as diabetes and hypertension, cultural factors, genetic differences, socioeconomic factors and inappropriate physiological adaptation to rapid transition to western lifestyle from traditional lifestyle; 40\% of the excess risk of CKD in Black groups was explained by such variables in one US study\textsuperscript{56}.

There is currently little data on the prevalence of CKD by ethnic group in the UK. New data will be available from the Health Survey for England 2009, available later in 2010.

5.5 Socio-economic status

Socially deprived people have a higher incidence and prevalence of CKD in developed countries, though the magnitude of the effect varies between countries\textsuperscript{57,58,59,60}. In one UK study individuals living in the most socially deprived areas had a 45\% increased risk of new diagnosis of CKD compared with those living in the most affluent areas\textsuperscript{57}.

Furthermore, CKD progresses more rapidly in socially deprived patients\textsuperscript{61,62}. The effects on both incidence and progression are mediated through many intermediate factors working at the individual-level, for example; low birth weight; smoking; obesity; diabetes and hypertension; and poor compliance with treatment, or area-level, for example; variation in quality of primary care services and poorer access to secondary care\textsuperscript{63,59}.

5.6 Obesity

Obesity has been shown to be an important population risk factor for development of CKD, acting partly through other established risk factors such as type 2 diabetes and hypertension\textsuperscript{64,65,66}.

The relationship between obesity and CKD was however not consistent when examined by the NICE team\textsuperscript{2}. The risk of developing CKD (stages 3-5) increased with increasing BMI. Compared to men who remained within 5\% of their baseline, men who had a >10\% increase in BMI had a significantly increased risk of CKD\textsuperscript{57}. However, the NHANES II follow-up study\textsuperscript{68} showed no significant risk for a CKD-related death or end stage renal disease (ESRD) at any level of BMI. Metabolic syndrome (a syndrome where three of the listed parameters are above certain thresholds; waist measurement, blood triglycerides, high-density lipoprotein (HDL), cholesterol, blood pressure or fasting glucose) was significantly associated with an increased risk of developing CKD. As the number of traits increased, there was a significant stepwise increase in risk of developing CKD\textsuperscript{59}. 
5.7 **Hypertension**  
Several studies have shown that hypertension is a risk factor for CKD\(^2,10,9,70,71\). More recently a UK based study\(^50\) indicated that the risk of developing moderate to severe CKD (stages 3b, 4 and 5) increase in those being treated for hypertension. In both females and males this was about two and a half times the risk.

5.8 **Diabetes mellitus**  
Several studies have indicated that diabetes is associated with a significantly increased risk for CKD\(^2,9,10,71,72\). More recently a UK based study\(^50\) indicated that diabetes increased the risk of developing moderate to severe CKD (stages 3b, 4 and 5). In women the risk was about eight times higher and in men over twelve times higher compared to those without diabetes.

Diabetic nephropathy is a renal complication of diabetes mellitus. Diabetes is the most common cause of ESRD requiring renal replacement therapy in the UK\(^22\).

5.9 **Smoking**  
Several studies showed that smokers had a significantly higher risk for CKD than non-smokers\(^2,71,73,74\). More recently a UK based study\(^50\) indicated that smoking increased the risk of developing moderate to severe CKD (stages 3b, 4 and 5). For light smokers the increase in risk for females was 1.3 and males 1.2 times more likely compared to non-smokers. Among heavy smokers, females were 1.4 times more at risk compared to non-smokers and males were 1.3 times more at risk.
6 Opportunities for prevention and treatment, what can be done?

To prevent the development of new chronic kidney disease, potentially modifiable causes of CKD should be targeted

6.1 Health Survey for England data
Public health surveillance of chronic kidney disease (CKD) is important to guide prevention, detection and treatment planning and evaluation. Current CKD prevalence estimates are based on studies using serum creatinine measures on general practice computer systems which are inevitably selective (e.g. by age, underlying conditions). Quality and Outcomes Framework (QOF) prevalence data provide population estimates only of tested and GP registered cases. A project is underway that has initially ensured that measurement of serum creatinine and urine albumin:creatinine ratio (ACR) is performed in both the 2009 and 2010 Health Surveys for England. The numbers tested will provide national prevalence data which can be used to estimate CKD prevalence at more local levels. The project will also measure kidney function in stored sera from the 2003-5 National Health Surveys for England (HSEs) thereby including larger numbers of people enhanced for key demographic groups (ethnic minorities, elderly) and with potential for follow-up. These estimates will be important in future work on health needs assessment and the development of kidney care services.

6.2 Addressing health inequalities
NHS Kidney Care considers inequalities in kidney disease in the development of its work programme. This will be guided by a research paper currently under development, which considers inequalities in CKD prevalence, risk factors for kidney disease and access to RRT and kidney transplant. The inequalities paper will be available on the NHS Kidney Care website.

6.3 Primary prevention of chronic kidney disease
To prevent the occurrence of new CKD, potentially modifiable causes of CKD should be targeted. These include Type 1 or 2 diabetes; primary hypertension; smoking; obesity /Metabolic syndrome; causes of urinary obstruction or reflux; and cardiovascular disease. There is a large overlap with the underlying causal conditions for vascular disease.

6.4 NICE guidelines and standards for chronic kidney disease
The National Institute for Health and Clinical Excellence (NICE) produced a guideline on chronic kidney disease in 2008. A key outcome was the recognition that CKD is a condition that should be largely managed in primary care with referral to nephrologists limited to those with more advanced CKD or progressive CKD.

NICE quality standards for CKD are currently in development, and will be available shortly for consultation on the NICE website.

6.5 General Practice Quality and Outcomes Framework
CKD indicators were introduced to the QOF national quality improvement scheme in 2006/7 and have enabled more systematic identification of and intervention in patients with CKD.
The key interventions following the NICE guidance above are blood pressure (BP) control and specific use of rennin angiotensin system (RAS) inhibitors in those with proteinuria.

There are incentives for General Practitioners to develop registers of patients with stage 3-5 disease and record indicators for BP and ACR measurement, BP control and use of angiotensin converting enzyme (ACE) and angiotensin receptor blockers (ARB). These indicators are being reviewed and updated annually.

Avoidance of acute kidney injury (AKI) in those with pre-existing CKD is not a feature of QOF, but is a significant issue cutting across all specialties. Better recognition of patients with CKD may avoid insults which precipitate AKI (e.g. avoiding nephrotoxic drugs).

6.6 **Indicators for quality improvement**

Indicators of health, performance, quality and efficiency can give valuable insight into how care is being delivered. The indicators for quality improvement are a resource of over 200 robust indicators to help local clinical teams select indicators for local quality improvement. There are several kidney related indicators in the list of indicators. These include several QOF indicators (CKD 1, 2, 3, 5, BP 5 and smoking 3) along with a measure of the renal specific MRSA rate. A full list of the indicators can be accessed at the NHS Information Centre website.

6.7 **GP e-learning**

The Royal College of General Practitioners (RCGP) and NHS Kidney Care are working to develop an e-learning resource aimed at GPs and other primary care professionals in support of the objectives of the NSF for renal services. The purpose of this project is to develop an e-learning course for general practitioners and other primary care professionals to improve professional standards relating to the diagnosis and management of chronic kidney disease (CKD), in order to support the objectives of the NSF for renal services. The resource will be available through the RCGP in April 2011.

6.8 **Anaemia management in chronic kidney disease**

Anaemia is a relatively common complication of CKD and it is estimated that nationally there are around 100,000 people with the combination of CKD and a low haemoglobin level\(^78\). The NICE clinical guideline on treating anaemia in people with CKD\(^78\) covers detecting and diagnosing anaemia of CKD, managing anaemia of CKD, and other health problems or treatments that may affect it. This guidance is under review and the update is due in February 2011.

6.9 **Management of end stage renal disease**

Management of end stage renal disease aims to provide the best outcome depending on the preference of the individual. A person with end stage renal disease (ESRD) has the choice of undergoing renal replacement therapy (RRT) or pursuing conservative management. Some evidence suggests that in high risk, highly dependent patients with ESRD the decision to dialyse or not has little impact on survival\(^79\).
6.10 End of life care for advanced kidney disease

The NSF for renal services was the first to tackle the issues of death and dying. Part two of the NSF sets a specific aim to support people with established kidney disease to live as full a life as possible and to die with dignity in a setting of their own choice. In 2009 the End of Life Care for Advanced Kidney Disease: Framework for Implementation was published and three test sites have been funded by NHS Kidney Care to develop and implement its recommendations. The outcomes of the project will be used to stimulate and inform the delivery of high quality end of life care for advanced kidney disease across England and will be available at the beginning of 2012.

6.11 Kidney transplant

If RRT is selected by the patient then the Renal Association guidelines suggest that kidney transplantation should be the RRT of choice for patients with CKD stage 5 who are considered fit for major surgery and for chronic immunosuppression. A living donor transplantation should be considered the treatment of choice for all patients suitable for kidney transplantation when there is an appropriate donor.

The demand for kidney transplantation has consistently and increasingly outstripped the number of available deceased donor organs. In 2006/7 over 3,000 patients in the UK received an organ transplant, but another 1,000 died whilst waiting or after being removed from the waiting list because they had become too ill. The active transplant waiting list (January 2008) stood at 7,235 and was rising by approximately 8% each year. This list does not reflect the true extent of need, as many clinicians are reluctant to list more patients than are realistically likely to receive organs. The true need is, at minimum, 50% more than currently available and is rising rapidly with changing demographics in the UK.

Spain has the highest organ donation rate in Europe at 35 donors per million of population (pmp). The UK has one of the lowest rates at just 13 pmp. Recently, lessons from the Spanish model have been implemented in several other countries. All experienced an immediate and rapid rise in organ donation. The UK and the Organ Donation Taskforce document ‘Organs for Transplants’ sets out some recommendations on how a similar rise in organ donation could be achieved in the UK.

6.12 Peritoneal dialysis

The Renal Association clinical practice guidelines, Peritoneal Dialysis in CKD states that there is evidence to indicate that peritoneal dialysis (PD) used in the context of an integrated dialysis programme is associated with good clinical outcomes, comparable to haemodialysis in the medium term. The randomised study (NECOSAD), comparing haemodialysis to peritoneal dialysis as a first treatment showed no differences in 2 year quality adjusted life years or 5 year mortality.

6.13 Haemodialysis

Haemodialysis at home is a good option for some people and it is recommended that all suitable patients should be offered the choice between home haemodialysis and haemodialysis in a hospital or satellite unit. In general, patients receiving home haemodialysis report better quality of life than those who have haemodialysis in hospital. There are fewer issues with travel, waiting in hospital for treatment and changing timings to
reduce the impact on a person’s life, although there may be issues with increased isolation and the impact on a carer’s way of life.

Definitive vascular access is required to undertake haemodialysis. There are three principle forms of vascular access available; arteriovenous fistulae, arteriovenous grafts and either tunnelled or non tunnelled catheters placed in a central vein. Evidence from multiple studies suggest that arteriovenous fistulae are superior in terms of longevity, need for maintenance and carry less risk of vascular and infective complications compared to other types of vascular access\textsuperscript{86}. 
7 What is cost effective?

*Early detection is cost effective for both financial and health outcomes*

7.1 Early detection and management of chronic kidney disease

As Chronic Kidney Disease (CKD) has historically been a significantly under-diagnosed condition, many patients now being diagnosed with CKD would have otherwise ended up needing emergency dialysis in years to come, without any previous diagnosis. Early detection is cost effective, in both financial and human terms.

The UK National Screening Committee conducted a literature review of the evidence for widespread screening of adults for CKD in 2008. The committee concluded that there was insufficient evidence to support population based screening for CKD. Targeted screening at ‘high risk’ groups using testing for both eGFR and proteinuria may be of benefit. This policy is due to be reviewed in 2011/12, or earlier if significant new evidence emerges.

7.2 NICE chronic kidney disease guidance

NICE produce estimates of the cost of implementing their guidelines. The estimated cost for fully implementing the NICE guidance, ‘Early identification and management of chronic kidney disease in England’ is £16.4 million per year. Although the cost benefits of implementing the guideline have not been calculated, the benefits listed below are expected:

- Prevention of cardiovascular disease may be improved because people found to have early CKD are also at increased risk of premature cardiovascular disease and so can be identified earlier.
- Reduction in hospitalisation through earlier diagnosis.
- Progression to end stage renal disease (ESRD) is delayed or prevented.
- A reduction in lost working lives for people for ESRD who are too ill to work, and the social care cost of supporting people with ESRD.

A UK study from 2007 used primary care data (prior to the introduction of the Quality and Outcomes Framework (QOF) CKD indicators) reporting the cost of implementing the Royal College of Physicians and Renal Association guidelines ‘CKD in adults: UK guidelines for identification, management and referral’. The study estimated that the cost to a typical 10,000 patient General Practice in identifying and investigating patients newly diagnosed with CKD as a result of implementing the guidelines, was between €17,133 and €29,790 (this excluded the cost to the Acute Trusts for the increase in renal referrals). Although it was still too early to model the costs saved by implementing the guidelines the authors suggested that this money could be recouped by delaying the onset of dialysis by one year in one patient in a typical 10,000 person practice who was identified and managed appropriately as a result of the guideline.
7.3 Timely referral for renal replacement therapy

The Renal Association guidelines suggest that patients should be referred at least a year before they might be anticipated to require renal replacement therapy (RRT). There is consistent evidence of the detrimental effects of late referral to nephrology services. These include lack of adequate intervention to delay the progression of kidney failure, higher morbidity and mortality, poorer quality of life on dialysis, missed opportunities to have pre-emptive kidney transplantation and, for some patients, inappropriate dialysis treatment where conservative care might have been chosen by an informed patient\textsuperscript{92}. Late presentation is defined as referral to kidney services less than 90 days prior to commencing RRT. The prevalence of late presentation for RRT (< 90 days) has declined from 28% in 2003 to 22% in 2008 of all people commencing RRT\textsuperscript{22}.

7.4 Transplantation in end stage renal disease\textsuperscript{1}

Transplantation costs about the same as haemodialysis in the first year (current estimated annual cost of haemodialysis is £29,800 per person\textsuperscript{89}), which includes surgery as well as immunosuppressive drugs, regular checks and treatment. However, the cost reduces considerably in subsequent years, and transplantation is the most cost-effective form of RRT\textsuperscript{93}.
8 What is being done?

Good management of patients with kidney disease can slow, halt or reverse chronic kidney disease progression

8.1 Primary prevention

Promoting healthy lifestyles is an important national priority. There is a national strategy for obesity in place (Healthy Weight, Healthy Lives: A Cross-Government Strategy for England\(^{94}\)) and the recent launch of the Change4life programme attempts to encourage healthy behaviours in children with respect to diet and exercise. In future years this may impact on obesity or incident type 2 diabetes rates and thereby reduce incident chronic kidney disease (CKD).

Other primary prevention measures for CKD are:

- Efforts to stop people from starting to smoke or to encourage quitting in those without pre existing CKD, with major DH initiatives on developing NHS quitting services and smoke free public places.
- Treatments to prevent the microvascular and macrovascular complications of both types of diabetes e.g. by glycaemic control, blood pressure control (there is NICE guidance on both type 1 and 2 diabetes). Early detection of type 2 diabetes by screening is part of the new National Vascular Risk Assessment Programme.
- Prevention, detection and effective control of hypertension (NICE guidelines on hypertension). Efforts to reduce salt consumption, enhance physical activity and prevent obesity will all help to reduce hypertension.

8.2 Vascular Risk Assessment Programme (NHS Health Check)

The Vascular Risk Assessment Programme\(^{95}\) is now being implemented in England. The aim is for all adults aged 40-74 to have a vascular risk assessment and stepped intervention according to their level of risk. It will include testing for CKD in those groups at higher risk such as patients with newly diagnosed hypertension. Interventions to stop smoking and reduce weight if obese/overweight are very important in CKD as they will reduce cardiovascular disease (CVD) risk and may contribute to reducing CKD progression.

8.3 Chronic kidney disease detection and management in primary care

QOF 2008/9 records show that virtually all practices have a register of chronic kidney disease and that 4.1% of the population (18 and over) had been identified with stage 3-5 disease. Furthermore, 98% of identified patients had had their blood pressure measured in the past 15 months; 73% of non-excepted patients had a blood pressure of 140/85 mm Hg or less and 87% of non-excepted patients with hypertension and proteinuria were treated with angiotensin converting enzyme or angiotensin receptor blocker drugs\(^{7}\) (table 8.1).

Since the QOF CKD indicators were introduced there has been an increase in the number of people on CKD registers from 1,279,246 (2006/07) to 1,739,443 (2008/09). Performance on indicator CKD 2 has remained relatively static in the three years since recording began, but the performance against CKD 3 has reduced from 86.9% (2006/07) to 73.3% in 2008/09.
A further CKD QOF indicator was introduced in 2009 (QOF CKD 6 - the percentage of patients on the CKD register whose notes have a record of an albumin:creatinine ratio (or protein:creatinine ratio) test in the previous 15 months). The data from the year 2009/10 is available from September 2010.

Table 8.1 Summary of QOF CKD indicators PCT level 2008/09

<table>
<thead>
<tr>
<th>QOF indicator* definitions below</th>
<th>England average</th>
<th>PCT range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CKD prevalence</td>
<td>4.1%</td>
<td>1.3% to 7.7%</td>
</tr>
<tr>
<td>CKD 2</td>
<td>97.5%</td>
<td>89.8% to 98.7%</td>
</tr>
<tr>
<td>CKD 3</td>
<td>73.3%</td>
<td>68.3% to 79.8%</td>
</tr>
<tr>
<td>CKD 5</td>
<td>87.3%</td>
<td>76.4% to 94.7%</td>
</tr>
</tbody>
</table>

*CKD prevalence the proportion of people aged 18 and over on the practice CKD register.

*CKD 2 The percentage of patients on the CKD register whose notes have a record of blood pressure in the previous 15 months.

*CKD 3 The percentage of patients on the CKD register in whom the last blood pressure reading, measured in the previous 15 months, is 140/85 or less.

*CKD 5 The percentage of patients on the CKD register with hypertension and proteinuria who are treated with an angiotensin converting enzyme inhibitor (ACE-I) or angiotensin receptor blocker (ARB) unless a contraindication or side effects are recorded.

The National Diabetes Audit collects information on diabetes registrations, care processes and complications. The measurement of urine albumin:creatinine ratio (ACR) in people with diabetes, which detects the earliest stage of kidney disease, has increased from 19% in type 1 diabetes and 21% in type 2 in 2003/04 to 51% in Type 1 diabetes and 68% in Type 2 diabetes in 2008/09.

The results of the QOF programme, with data reported at practice, PCT, SHA and England level can be accessed at the NHS Information Centre for Health and Social Care website.

8.4 Acceptance rates and prevalence of renal replacement therapy

In 2008, 5,585 new adult patients commenced renal replacement therapy (RRT) in England. The acceptance rate for renal replacement therapy (RRT) in England was 109 per million population (pmp), this has remained stable for the last three years. There is variability between the different areas within England, for crude acceptance rates and also for adjusted rates, adjusted for the differing PCTs age and gender profile (see table 8.2 below). The rates are not adjusted for ethnicity and deprivation, which will explain some of the variability.

Table 8.2 Crude and adjusted acceptance rates for RRT, UK and PCT range 2003/2008

<table>
<thead>
<tr>
<th></th>
<th>Crude rate per 1,000,000</th>
<th>Adjusted ratio *</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>107</td>
<td>1.0</td>
</tr>
<tr>
<td>PCT Range</td>
<td>54 to 194</td>
<td>0.42 to 2.49</td>
</tr>
</tbody>
</table>

*Adjusted ratio compares the observed number with an expected number (adjusted for age and gender), 1.0 represents expected UK rate. Numbers above and below 1 represent rates above and below the UK expected rate.

Source: UK Renal Registry, also available in the Kidney Disease PCT profiles.
8.5 Prevalence of renal replacement therapy

There were 39,476 adult patients receiving RRT in England at the end of 2008, giving an England population prevalence of 767 pmp (split by modality; haemodialysis 337 pmp, peritoneal dialysis 69 and transplant 361 pmp). Overall growth in the prevalent England RRT population from 2007 to 2008 was 4.5%.

In the UK as a whole over the period 2005-08 there have been changes in the prevalence of the different RRT modalities. Overall in this period the prevalence of RRT has been increasing on average by 3.7% per year. The different modalities have been changing at different rates. The prevalence of haemodialysis and transplants have been increasing by 5.3% and 4.7% per year respectively whereas the prevalence of peritoneal dialysis has been decreasing by 6.3% per year.

There was variability in RRT prevalence by PCT area by the different modalities (see table 8.3 below). As for the RRT acceptance rates, crude and adjusted rates are shown. The number of people receiving peritoneal dialysis is relatively small and there is a large variability in rates which may be due to these small numbers. Differing deprivation and ethnicity profiles will also affect variability in the acceptance rates between PCTs.

Table 8.3 Crude and adjusted prevalence of RRT by modality, UK and PCT range, 2008

<table>
<thead>
<tr>
<th>Modality</th>
<th>Crude rate per 1,000,000</th>
<th>UK</th>
<th>PCT range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total RRT</td>
<td></td>
<td>781</td>
<td>521 to 1492</td>
</tr>
<tr>
<td></td>
<td>Adjusted ratio*</td>
<td>1</td>
<td>0.58 to 2.49</td>
</tr>
<tr>
<td>Haemodialysis</td>
<td>Crude rate per 1,000,000</td>
<td>344</td>
<td>159 to 903</td>
</tr>
<tr>
<td></td>
<td>Adjusted ratio*</td>
<td>1</td>
<td>0.38 to 3.69</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>Crude rate per 1,000,000</td>
<td>70</td>
<td>6 to 207</td>
</tr>
<tr>
<td></td>
<td>Adjusted ratio*</td>
<td>1</td>
<td>0.09 to 3.63</td>
</tr>
<tr>
<td>Transplant</td>
<td>Crude rate per 1,000,000</td>
<td>367</td>
<td>209 to 684</td>
</tr>
<tr>
<td></td>
<td>Adjusted ratio*</td>
<td>1</td>
<td>0.55 to 1.84</td>
</tr>
</tbody>
</table>

*Adjusted ratio compares the observed number with an expected number (adjusted for age and gender), 1.0 represents expected UK rate. Numbers above and below 1 represent rates above and below the UK expected rate.

Source: UK Renal Registry, also available in the Kidney Disease PCT profiles.

The UK Renal Registry (UKRR) collects and analyses information on all people undergoing RRT, and all the units providing RRT in the UK. The UKRR produces yearly reports summarising this information, these reports are available at UKRR website.

NHS Kidney Care commissioned EMPHO to produce profiles of kidney disease in every PCT which incorporate routinely available information on the need for and delivery of kidney care within the PCT. These profiles are available at NHS Kidney Care Website.
9 How are kidney services arranged and commissioned?

Kidney services have been a priority for specialised services commissioning since 1998.

The majority of mild kidney disease is managed in primary care. There is an emphasis on the early detection and management of chronic kidney disease (CKD) and prevention of progression to end stage renal disease (ESRD). Kidney disease management is monitored in primary care through the Quality and Outcomes Framework system. The CKD element of this monitoring system has been in place since 2006/07. More severe CKD and ESRD tend to be managed in secondary care. This section outlines how these services are commissioned and delivered.

9.1 How services have been delivered

The NSF for renal services summarises the delivery of kidney care services. Kidney services have been a priority for specialised services commissioning since 1998.

Traditionally services for people with ESRD have been centred around hospital haemodialysis in a limited number of main renal units where renal consultants, inpatient and investigative facilities are based. In the 1970s and 1980s programmes of home haemodialysis and peritoneal dialysis were established. The 1990s saw the development of a ‘hub and spoke’ model with many main renal units supplemented by one or more satellite haemodialysis units closer to patients’ homes. In some cases the traditional hub and spoke model has evolved into a clinical network, providing the majority of kidney care as close to patients’ homes as possible.

Like dialysis services, kidney transplantation in England comes under the arrangements for specialised commissioning, with kidney/pancreas transplant operations funded through the National Specialised Commissioning programme. All patients require access to kidney transplant centres, which are an important element in any clinical network. The transplant service is at the forefront of high quality care. It operates a busy retrieval and live donor programme to maximise organ procurement, provides treatment regimens that capitalise on the success of a transplant, makes the best use of effective immunosuppressive agents to reduce the likelihood of rejection, and follows up patients for life to enhance the quality of their care.

Patients on haemodialysis have highlighted transport issues as the most important aspect of their care that needs to be improved. The Healthcare Quality Improvement Partnership (HQIP) commissioned the National Kidney Care Audit on Patient Transport. This is a two part audit; the first audit reported in 2008 and the second in October 2010. This audit is managed by the NHS Information Centre for Health and Social Care (NHS IC), working in partnership with the National Kidney Federation and the UK Renal Registry. NHS Kidney Care commissioned EMPHO to produce summaries of each of the 10 Specialised Commissioning Group (SCG) which describe the findings of the 2008 audit in England. These reports are available on the NHS Kidney Care website.
9.2 Kidney Care Networks

There are kidney care networks embedded or emerging in all 10 SHA areas across England. They aim to support the commissioning and planning of high quality kidney services. The map below (figure 9.1) outlines the geography of the kidney care networks.

Figure 9.1 Kidney Care Networks in England

Source: West Midlands Cancer Intelligence Unit on behalf of the Department of Health.

9.3 Hospital based kidney care

Advanced kidney disease is generally managed in secondary care. Management of severe CKD and preparation for renal replacement therapy (RRT) may be undertaken in general
hospital outpatient clinics, but there are fewer centres where dialysis and transplantation are available. Hospital based dialysis can take place in facilities which contain renal units, or in satellite centres which are run alongside these main units.

The provision of RRT through these centres is constantly being monitored and new centres are being added to ensure that the service is accessible to those who need it. It is recommended that dialysis services should be within a 30 minute drive time of all who need to access. A map of the current centres and the 30 minute drive time geographies to these centres is available on the NHS Kidney Care website.

9.4 Patient awareness
Renal PatientView\textsuperscript{97} (RPV) aims to provide online information about kidney patients’ diagnosis, treatment, and their latest test results from their hospital renal database. Patients can share this information with anyone they want (including their GP), and view it from anywhere in the world. Renal PatientView is available from most UK renal units, and for patients who have chosen to participate. The system has recently been enhanced so that patients can now upload their own blood pressure, weight and glucose measurements and enter a dated comment about their condition in a new blog feature.
10 Acknowledgements

This document uses a similar format of the Diabetes Key Facts document produced for NHS Diabetes by the Yorkshire and Humber Public Health Observatory (YHPHO). The Diabetes Key Facts document can be found on the YHPHO website.

The document has been developed by:
- NHS Kidney Care
- The East Midlands Public Health Observatory
- Members of the Kidney Quality Information Partnership
- Dr Donal O'Donoghue, National Clinical Director for Kidney Care
- Professor Paul Roderick, Professor of Public Health, Faculty of Medicine, University of Southampton

Some of the data reported here have been supplied by the UK Renal Registry of the Renal Association. The interpretation and reporting of these data are the responsibility of EMPHO and in no way should be seen as an official policy or interpretation of the UK Renal Registry or the Renal Association.

Some of the data reported here have been supplied by the NHS Information Centre. Copyright © 2009, re-used with the permission of the Health and Social Care Information Centre. All rights reserved.

Where quotations have been taken from secondary research these have been acknowledged in the text or references.
11 Glossary and abbreviations

ACEI  A drug that inhibits ACE (angiotensin-converting enzyme) which is important to the formation of angiotensin II. ACE inhibitors are used for blood pressure control and congestive heart failure.

ARB  Angiotensin receptor blocker

BMI  Body mass index

Albuminuria  The presence of albumin in the urine.

ACR  Albumin:creatinine ratio

Confidence interval (CI)  A range of values which contains the true value for the population with a stated ‘confidence’ (conventionally 95%). The interval is calculated from sample data, and generally straddles the sample estimate. The 95% confidence value means that if the study, and the method used to calculate the interval, is repeated many times, then 95% of the calculated intervals will actually contain the true value for the whole population.

CKD  Chronic kidney disease

(e)GFR  (Estimated) glomerular filtration rate

ESRD  End stage renal disease

Hazard ratio (HR)  A statistic to describe the relative risk of complications due to treatment, based on a comparison of event rates.

Hyperkalaemia  Abnormally high potassium concentration in the blood, most often due to defective renal excretion, as in kidney disease.

KDIGO  Kidney Disease Improving Global Outcomes

KDOQI  Kidney Disease Outcomes Quality Initiative

MDRD  Modification of Diet in Renal Disease

NEOERICA  New Opportunities for Early Renal Intervention by Computerised Assessment

NICE  National Institute for Health and Clinical Excellence

NHANES  National Health and Nutrition Examination Surveys

NSF  National Service Framework

pmp  Per million population

QOF  Quality and Outcomes Framework

Quality-adjusted life year (QALY)  A measure of health outcome which assigns to each period of time a weight, ranging from 0 to 1, corresponding to the health-related quality of life during that period, where a weight of 1 corresponds to optimal health, and a weight of 0 corresponds to a health state judged equivalent to death; these are then aggregated across time periods.

SCr  Serum creatinine
12 References


16 Taken from the Renal Association AKI guidelines. Stevens PE, Tamimi NA, Al Hasani MK, et al. Non-specialist management of acute renal failure. QJM 2001; 94: 533-540


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Details of Renal PatientView can be found on https://www.renalpatientview.org/
This report has been produced by the East Midlands Public Health Observatory (EMPHO) on behalf of NHS Kidney Care. It uses data provided by the Information Centre and the UK Renal Registry. EMPHO is a member of APHO.

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www.kidneycare.nhs.uk
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