

## The pharmacoeconomics of treating renal patients

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The world of renal replacement therapy, be it through dialysis or transplantation, has changed immeasurably over the last 25 years. Now, many patients can successfully maintain a good quality of life for many years, and indeed, they will die with, rather than from renal failure. However, renal medicine is renowned for being a high-cost, low-volume commodity, and more recently the burning question has been "Who will pay for these drugs?"

Table 1. Approximate annual contract price tariff for different modalities of renal replacement therapy

	Cost (£)
Home Haemodialysis (1 <sup>st</sup> year)	28,000
Home Haemodialysis (subs years)	17,000
Home CAPD (1 <sup>st</sup> year)	23,500
Home CAPD (subs years)	21,000
Hospital Haemodialysis (1 <sup>st</sup> year)	22,500
Hospital Haemodialysis (subs years)	20,000
Transplant (1 <sup>st</sup> year)	25,000
Transplant (subs years)	1,500

As can be seen from Table 1, renal transplantation is at present the most economical, successful, and hence cost-effective treatment for patients with end stage renal failure (ESRF). The supply of donor organs is greatly outstripped by demand, hence they are an extremely valuable resource which must be used optimally.

Conventional maintenance immunosuppressive therapy for the last fifteen years has been the combination of cyclosporin, azathioprine and prednisolone. However, the last two years has seen the introduction of several new agents including tacrolimus and mycophenolate mofetil (MMF). Tacrolimus is another interleukin 2 (IL-2) inhibitor, and is used in place of cyclosporin, while MMF is a cytotoxic immunosuppressant similar to azathioprine, but reportedly with less bone-marrow toxicity. It may also have a role in the management of chronic rejection. In addition, there are two new anti-CD25 monoclonal antibodies, basiliximab and daclixumab, which block the expression of IL-2. These are to be marketed shortly, and have been developed for use as induction therapy to prevent acute rejection.

Table 2. Approximate annual costs per patient of standard immunosuppressive therapy.

	Cost (£)
Prednisolone	12
Azathioprine	70
Mycophenolate Mofetil	3500
Cyclosporin	4000
Tacrolimus	4500

As can be seen from Table 2, the newer immunosuppressant agents are very expensive, which has required the drawing up of treatment protocols in order to justify their use. In the interests of budget control it is essential that these protocols be adhered to.

For many patients, renal replacement therapy in the form of either haemodialysis or peritoneal dialysis remains the mainstay of treatment for end stage renal failure (ESRF). It has been the introduction of recombinant human erythropoietin (epoetin) that has revolutionised life for these patients.

The Renal Association has set guidelines for dialysis units which state that a target haemoglobin of not less than 10g/dl should be achieved in the great majority (> 85%) of patients within 3 months of commencing haemodialysis. Transfusions should be avoided wherever possible in patients likely to be transplanted to avoid sensitisation<sup>2</sup>. Hence epoetin is now the major feature in any renal unit's drug budget. It has been demonstrated to have a major impact on the quality of life of the patient, with increased exercise capacity, reversal of left ventricular hypertrophy, and improved sexual function. However, the treatment is expensive, costing approximately £3000–£3500 per patient per year, and many renal units are unable to fund this therapy for all patients unless the GP agrees to prescribe the drug. In addition, many patients on epoetin also require parenteral iron therapy, another expensive drug, in order to maintain their iron stores and thus optimise the effects of epoetin. Shared care protocols are now commonplace and should be encouraged.