Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The aim was to estimate the cost-effectiveness threshold that was implied by the current practice in dialysis for end-stage renal disease and to extrapolate from it an estimate for the value of life. The threshold of $129,090 could be considered to be an implied value of a statistical life. The economic evaluation methods appear to have been comprehensive, but the costing methods were not transparent. The authors’ conclusions are appropriate for the analysis undertaken.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The aim was to find the cost-effectiveness threshold implied by current practice in dialysis for end-stage renal disease and to extrapolate from this an estimate for the value of life. The study population was a hypothetical cohort of 1,000,000 patients with a profile based on the incident patient population of the US Renal Data System.

Interventions
Five dialysis strategies were compared: current practice; no dialysis; dialysis with a slight delay; dialysis with a moderate delay; and dialysis with a significant delay. The initiation of dialysis depended on the estimated glomerular filtration rate (eGFR) and an eGFR below 9mL per min per 1.73m$^2$ was the current practice or no delay. For the three delayed strategies, patients started on dialysis when their eGFR fell a further 1.5mL per min per 1.73m$^2$, plus an additional 0.1 (slight); 0.4 (moderate); or 0.7 (significant) mL per min per 1.73m$^2$, for each point of Charlson morbidity score below 10.

Location/setting
USA/in-patient care.

Methods
Analytical approach:
A simulation model was used (Lee, et al. 2006, see ‘Other Publications of Related Interest’ below for bibliographic details) and the model parameters were derived from secondary datasets and relevant published literature. The authors’ did not state the study perspective.

Effectiveness data:
The clinical outcome data were primarily from the US Renal Data System and Kaiser Permanente, Northern California. The primary clinical outcomes were transplant rates, graft failures, eGFR decline rates, and mortality.

Monetary benefit and utility valuations:
The health-state utilities were derived from the published literature. The utility scores were collected from patients requiring dialysis, using direct time trade-off interviews and the Health Utilities Index 3 (HUI-3).

Measure of benefit:
The measures of benefit were life-years saved (LYS) and quality-adjusted life-years gained (QALYs). These were discounted at 3%.
Cost data:
The included direct medical resources were hospitalisations, transplantations, transplantation follow-ups, graft failure, and dialysis. Resource quantities were from patient-level data on over 650,000 patients in the US Renal Data System. The costs were from Medicare and published data. They were discounted at 3% per annum and were reported in US dollars ($) for 2003.

Analysis of uncertainty:
One-way and probabilistic sensitivity analyses were used to estimate the uncertainty in the base-case incremental cost-effectiveness ratios. Sensitivity analysis tested variations in the key estimates, such as transplant rates, time to hospitalisation, costs, and discount rates. The results were illustrated in a cost-effectiveness efficiency frontier.

Results
The mean discounted costs ranged from $135,076 for no dialysis to $281,640 for current practice over the lifetime. The mean QALYs ranged from 28.68 for no dialysis to 44.55 for current practice. The mean months of survival ranged from 47.88 for no dialysis to 81.99 for current practice. The incremental cost per QALY for current practice versus dialysis with a slight delay was $129,090 and the incremental cost per LYS was $61,294.

The incremental cost per QALY was sensitive to the costs of dialysis (changing results by 35% to 39%), the ability of dialysis to attenuate hospitalisation (changing by 21% to 31%) and mortality (changing by 27%). With an interquartile range of $71,890, the incremental cost per QALY was widely distributed across different patient profiles and subgroups.

Authors' conclusions
The threshold of $129,090 could be considered to be the implied value of a statistical life; assuming that dialysis was a desired benefit for patients with end-stage renal disease.

CRD commentary
Interventions:
The strategies included actual practice and strategies that mimicked clinically plausible ranges of delays within resource constraints. A full and in depth discussion of the rationale behind the analysis was provided, along with specific details of each strategy. Readers should decide if the current practice, as defined here, is a feasible option in their own setting.

Effectiveness/benefits:
The effectiveness data were from a large dataset with over 650,000 patient records collected between 1996 and 2003. The simulation model publication (Lee, et al. 2006) had further information on the patient profiles, clinical outcomes, disease progression, any statistical approaches undertaken, and data quality issues. The measurement of the utility values involved valid methods combining the direct time trade-off technique with an acceptable multi-attribute utility instrument.

Costs:
There was very brief reporting of the costing methods, including the types of costs, plus a summary of the main unit costs and their sources. Further details were available in the simulation model publication (Lee, et al. 2006).

Analysis and results:
Much of the detail of the analysis was provided in the earlier publication. The primary aim of this paper was to establish an estimate for the value of life. The authors presented sufficient details on the major aspects of the analysis and the results and sensitivity analysis were fully presented. An extensive discussion and justification of the rationale and objectives of the analysis was clearly presented. The reporting of most aspects of the analysis was good, but the brief cost report might limit transferability.

Concluding remarks:
- The economic evaluation methods appear to have been comprehensive, but the costing methods were not transparent.
- The authors' conclusions reflect the analysis undertaken.
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