HEALTH ECONOMICS ANALYSIS PLAN (HEAP)

TRIAL FULL TITLE	Does oral sodium bicarbonate therapy improve function and quality of life in older patients with chronic kidney disease and low-grade acidosis?
HTA PROJECT NUMBER	NIHR HTA 10/71/01
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TRIAL CHIEF INVESTIGATOR	Miles Witham
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Signatures

By signing this document I am confirming that I have read and approve the Health Economics Analysis Plan (HEAP) for the trial.

Miles Witham
Chief Investigator — Signature — Date 6/8/18.

Paul McNamee
Health Economist — Signature — Date 1/8/18

Aim of the health economics analysis

To assess the cost effectiveness of the addition of bicarbonate therapy in the management of patients aged 65 years or older with CKD stages 4 or 5 not on dialysis.

Methods

A cost-utility analysis will be performed to assess the health care costs, and quality of life effects, associated with provision of bicarbonate therapy, relative to usual care (i.e. usual health care management without the addition of bicarbonate therapy). Health care costs were collected retrospectively from participants at baseline, as well as 3, 6, 12 and 24 months after randomisation using structured questionnaires. These recorded the type and duration of hospital admissions, frequency of visits to hospital for outpatient attendances, and other visits to/from relevant health professionals (e.g. general practitioners, nurse practitioners, physiotherapists). National sources of unit cost data will be applied to value resource use (ISD Costs Book; Curtis & Netten 2017). Health-related quality of life data were collected from participants at baseline, and all follow-up time points, using the EQ-5D-3L instrument. The York MVH published UK tariff will be used to convert these data to quality of life weights.

Data Analysis

The primary economic analysis will be conducted on an intention-to-treat basis and will be performed for participants with complete data on resource use and EQ-5D values at baseline, and 3, 6, 12 and 24 months of follow-up from the NHS cost perspective. Patient who die during follow-up will be included in the primary (base-case) analysis. Generalised linear regression analyses will be used to estimate the differences (and associated 95% CIs) in mean total costs and differences in mean total QALYs comparing the treatment group with the usual care group, while adjusting for baseline differences in cost, EQ-5D and other patient characteristics (e.g. age, gender). Appropriate adjustment for skewed data will be undertaken (e.g. for skewed cost data, a γ family distribution and a log link function, and for QALYs, a Gaussian family distribution and an identity link function). In addition, non-parametric bootstrap methods (Briggs et al 1997) will be used for calculating confidence intervals around cost and QALY differences. Cost effectiveness acceptability curves will be employed to show the probability that bicarbonate therapy is cost effective for different values of willingness to pay per additional QALY (van Hout et al 1994). Sensitivity analysis will be undertaken for uncertain parameters, such as alternative hospital costs per bed day and alternative quality of life weights. The proposed analyses are shown in the list of figures and tables on pp.3-5.

References

Curtis L & Burns A. Unit costs of health and social care (2017). Personal Social Services Research Unit, University of Kent, 2017.

Briggs AH, Wonderling DE, Mooney CZ. Pulling cost-effectiveness analysis up by its bootstraps: a non-parametric approach to confidence interval estimation. *Health Econ* 1997;6: 327-40.

van Hout BA, Al MJ, Gordon GS, Rutten FF. Costs, effects and the C/E ratios alongside a clinical trial. *Health Econ* 1994;3: 309-19.

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