The Electronic Frailty Index (eFI) Indicates Mortality Risk in End Stage Kidney Disease (ESKD) Patients on Dialysis

Dr Sam Relton[2], Dr Usha Appalsawmy[3], Ms Kuldeep Sohal[4], Dr John Stoves[5], Mr John Birkinshaw[4], Dr Andy Clegg[6], Professor Robert West[2], Professor Jenny Hewison[2], **Dr Andrew Mooney[1]**
[1]Renal Unit, Leeds, United Kingdom, [2]University of Leeds, Leeds, United Kingdom, [3]Improvement Academy, Bradford, United Kingdom, [4]Connected Cities, Bradford, United Kingdom, [5]Renal Unit, Bradford, United Kingdom, [6]Bradford Institute for Health Research, Bradford, United Kingdom

Background: ESKD patients have high mortality rates and in certain groups it is uncertain whether initiating dialysis confers a survival advantage (ERBP guideline development group. Nephrol Dial Transplant. 2016 Nov;31(suppl 2):ii1-ii66). The eFI has recently been developed (Clegg A, et al; Age and Ageing, 2018, 47(2), 319), based upon the cumulative deficit model of frailty (Rockwood K, J Gerontol, 2007; 738-743) using >2000 read codes routinely collected by GPs. These are used to construct 36 deficits comprising of symptoms, diagnoses, and co-morbidities. The eFI predicts mortality and nursing home admission in community-dwelling older people aged 65+, and is now freely available to all general practices in England and Wales. However, it has not yet been evaluated in other clinical areas.

Methods: We used the "'Connected Health Cities - Connected Bradford" dataset initiative to obtain linked datasets from all patients undergoing dialysis since 1998 in a single large renal unit in the North of England. The Connected Bradford dataset unites local health data from various sources across primary and secondary care and other organisations using advanced technology to improve health services for patients across the North of England. We analysed survival time using both univariate Kaplan-Meier and multivariate Cox models (with and without the eFI) to assess its efficacy in survival modelling for the ESKD population.

Results: Of 571 dialysis patients identified in the initial dataset, 79 were lost to analysis, leaving 492 patients (male 57.5%; median age 59 [IQR 46-72]) with a longest follow up duration of 6615 days. There were 267 deaths during the follow up period. Median survival of the cohort after dialysis start was 5.8 years. Multivariate analysis with eFI excluded confirmed hazard ratios of known predictors of survival among the cohort (eg diabetes HR 1.80 [1.34-2.39 95%CI]) etc. Inclusion of the eFI in the multivariate analysis was dominant, with an overall hazard ratio of 65.59 (9.5-450.5 95%CI) for a full score of 36 deficits compared to no deficits at all, or a HR of 1.8 for each deficit in the score. Median deficit score of the cohort was 7/36.

Conclusion: We conclude that the eFI is likely to have prognostic utility in end stage kidney disease patients undergoing dialysis, and it merits further investigation. Longitudinal studies of frailty evolution (measured by eFI) are underway, as are validation studies in larger datasets.