EE588

Poster session: 4

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Modelling Framework for Assessing Cost-effectiveness of New Treatments in Chronic Kidney Disease (CKD)

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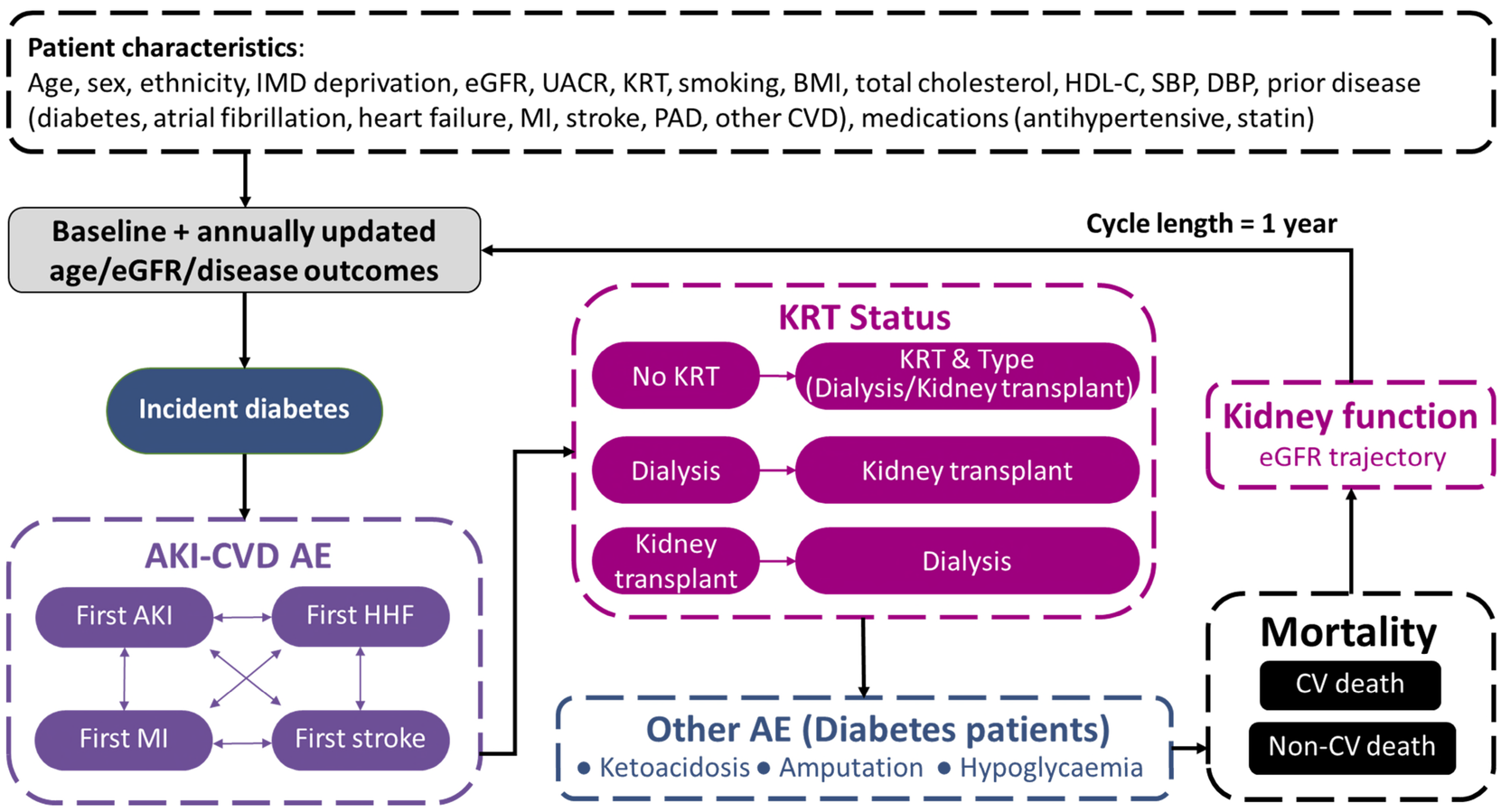
OBJECTIVES

- To develop a new model for cost-effectiveness assessments of new treatments reducing kidney disease progression in CKD patients.

METHODS

- We derived an open 2005-2020 CKD cohort from Clinical Practice Research Datalink (CPRD) and linked hospital and mortality data.
- Data split into estimation (east/central England 67%) and validation (west England: 33%).
- We conceptualized a microsimulation model reflecting the relationships between outcomes (Figure 1). Cox proportional hazards risk equations with time-updated outcomes were estimated and validated.

Figure 1. Chronic Kidney Disease model structure



RESULTS

Table 1. Participant baseline characteristics

Baseline characteristics	Estimation (n = 1 010 008)	Validation (n = 505 493)
Age, years (SD)	70.9 (15.5)	71.0 (15.3)
Male (%)	73 573 (43.7)	194 979 (43.9)
GFR stage (%)		
G1: eGFR >90	104 498 (10.3)	49 379 (9.8)
G2: eGFR 60-90	302 215 (29.9)	162 126 (32.1)
G3a: eGFR 45-60	297 642 (29.5)	151 602 (30.0)
G3b: eGFR 30-45	54 791 (5.4)	25 948 (5.1)
G4: eGFR 15-30	11 614 (1.1)	5 601 (1.1)
G5: eGFR <15	1 184 (0.1)	513 (0.1)
Missing but not KRT	227 917 (22.6)	106 405 (21.0)
Dialysis	5 370 (0.5)	2 117 (0.4)
Transplant	4 777 (0.5)	1 802 (0.4)
Diabetes at entry (%)	341 436 (33.8)	155 583 (30.8)

Table 2. Number of events during follow-up (FU) (%)

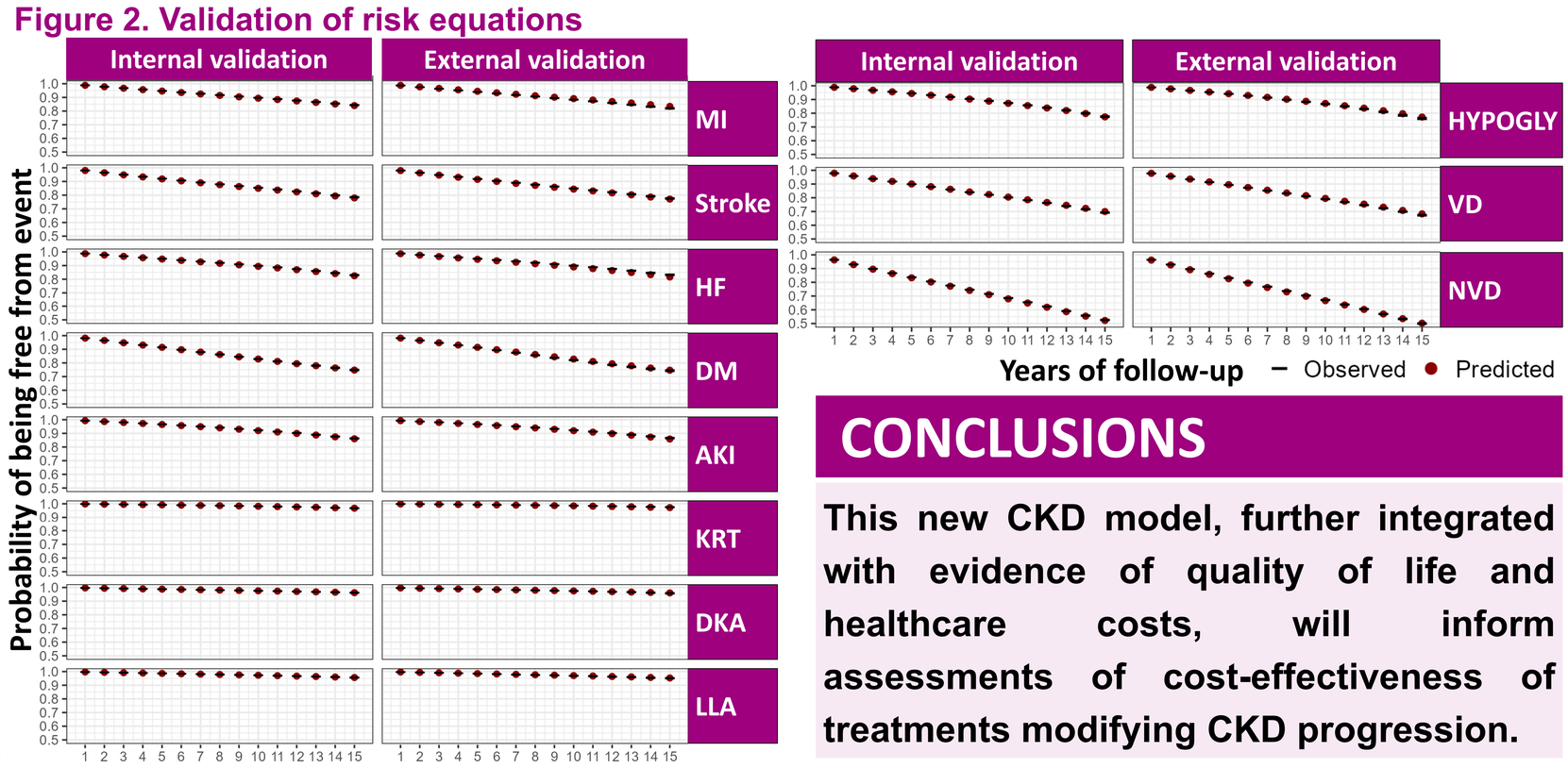
Event	Estimation (FU years = 5.8)	Validation (FU years = 6.1)
All participants	**1 010 008**	**505 493**
MI	58 179 (5.8)	34 640 (6.9)
Stroke	85 874 (8.5)	45 914 (9.1)
HHF	58 469 (5.8)	29 917 (5.9)
VD	121 037 (12.0)	66 905 (13.2)
NVD	206 555 (20.5)	112 641 (22.3)
No baseline KRT	**999 861**	**501 574**
KRT	9 510 (1.0)	3 895 (0.8)
No baseline dialysis	**1 004 638**	**503 376**
AKI	41 574 (4.1)	21 484 (4.3)
No baseline DM	**668 572**	**349 910**
DM	62 700 (9.4)	35 042 (10.0)
Incident DM	**62 700**	**35 042**
DKA	250 (0.4)	142 (0.4)
LLA	298 (0.5)	190 (0.5)
HYPOGLY	1 106 (1.8)	718 (2.0)
Baseline DM	**341 436**	**155 583**
DKA	4 974 (1.5)	2 569 (1.7)
LLA	5 509 (1.6)	3 024 (1.9)
HYPOGLY	26 079 (7.6)	13 523 (8.7)

AKI: acute kidney injury; DKA: diabetic ketoacidosis; DM: diabetes mellitus; HHF: Hospitalized for heart failure; HYPOGLY: severe hypoglycaemia; KRT: kidney replacement therapy; LLA: lower limb amputation; MI: myocardial infarction; NVD: non-vascular death; VD: vascular death;

Table 3. Estimated hazard ratio of time-updated GFR stage vs. G3a on key outcomes of interest

Ref: G3a	MI	Stroke	DM	HHF	AKI	KRT	DKA	LLA	HYPOGLY	VD	NVD
Not on KRT											
G1	0.92	1.00	1.10	0.69	0.29	0.11	0.82	0.75	0.62	1.21	1.56
G2	0.90	0.97	1.01	0.84	0.57	0.34	0.85	0.88	0.78	0.95	1.10
G3b	1.20	1.10	0.98	1.48	2.06	4.32	1.17	1.28	1.34	1.28	1.24
G4	1.53	1.25	0.88	2.12	4.26	45.5	1.42	1.25	1.77	1.76	1.72
G5	2.27	1.66	0.85	2.34	7.45	339	1.29	1.18	2.37	2.96	3.77
Missing	0.96	1.03	0.81	0.74	0.74	1.66	1.04	0.94	0.77	1.30	1.30
On dialysis											
Same year KRT	-	-	-	-	-	-	2.41	3.48	3.40	0.60	0.84
1-10 years KRT	3.27	2.62	1.09	1.76	-	-	1.36	3.85	2.65	3.07	4.01
≥10 year KRT	3.71	2.39	1.08	1.31	-	-	0.84	3.27	2.39	3.47	4.79
On transplant											
Same year KRT	-	-	-	-	4.32	-	0.48	2.16	1.90	1.31	1.75
1-10 years KRT	1.50	1.43	1.55	0.95	4.89	-	0.92	1.59	1.08	1.72	2.32
≥10 year KRT	1.73	1.69	1.22	1.32	4.10	-	0.70	1.43	1.35	2.02	2.76

Figure 2. Validation of risk equations



CONCLUSIONS

This new CKD model, further integrated with evidence of quality of life and healthcare costs, will inform assessments of cost-effectiveness of treatments modifying CKD progression.