

# The influence of socioeconomic deprivation on outcomes in patients with primary glomerulopathies

Emily McQuarrie<sup>1</sup>, Bruce Mackinnon<sup>1</sup>, Valerie McNeice<sup>2</sup>, Jonathan Fox<sup>1</sup>, Colin Geddes<sup>1</sup>

<sup>1</sup> Glasgow Renal & Transplant Unit, Western Infirmary, Glasgow, U.K.; <sup>2</sup> Glasgow Centre for Population Health



## Background and Aim

IgA nephropathy is more common in areas of multiple socioeconomic deprivation for reasons that are not clear. Whether deprivation status has an impact upon outcomes in patients with primary renal diseases is not known. We aimed to assess whether living in a deprived area impacted upon risk of death or requiring renal replacement therapy (RRT) in patients with primary glomerulopathies.

## Methods

We analysed all consecutive native renal biopsies performed between 2000-2010 in the Glasgow Renal and Transplant Unit, with a diagnosis of primary glomerulonephritis (GN) (n=683). We excluded patients with a diagnosis of minimal change disease (n=59).

From postcode, using the Scottish Index of Multiple Deprivation, we calculated healthboard specific quintiles of deprivation. Patients were divided by deprivation status: more deprived (quintiles 1 and 2) and less deprived (quintiles 3, 4, 5). We recorded baseline and follow-up renal function (eGFR), blood pressure (BP) and proteinuria and time to RRT or death. Groups were compared using Cox proportional hazards model for risk of requiring RRT or dying.

## Results

We included 624 patients. Membranous nephropathy (MGN) = 169; IgA nephropathy = 214; FSGS = 141; other = 100. Mean age at diagnosis was 55 years (SD 17), mean eGFR 51 ml/min/1.73m<sup>2</sup> (SD 30), median uPCR 322mg/mmol(140-650), mean baseline systolic BP 145mmHg (24) and diastolic BP 80mmHg (13). 140 patients (22.4%) required RRT, 174 died (27.9%) and 260 (41.7%) reached either end point. Median follow-up was 6.5y (interquartile range 4.1-9.7). Table 1.

	All cases (n=624)	MGN N=169 (27.1%)	IGA N=214 (34.3%)	FSGS N=141 (22.6%)	OTHER N=100 (16.0%)	Estimate of significance (p)
Male (n, %)	404 (65%)	103 (61%)	154 (72%)	80 (57%)	67 (67%)	0.02 <sup>^</sup>
Age	55 (17)	60 (16)	50 (16)	54 (17)	55 (17)	<0.001 <sup>*</sup>
eGFR (ml/min/1.73 m <sup>2</sup> )	51 (30)	63 (31)	45 (26)	54 (29)	40 (32)	<0.001 <sup>*</sup>
uPCR baseline	322 (140-650)	636 (363-1138)	196 (101-387)	324 (178-652)	290 (88-592)	<0.001 <sup>~</sup>
SBP (mmHg)	145 (24)	142 (26)	147 (21)	147 (23)	147 (24)	0.292 <sup>*</sup>
DBP (mmHg)	80 (13)	77 (12)	84 (12)	80 (12)	79 (16)	<0.001 <sup>*</sup>
RRT (n, %)	140 (22.4%)	23 (14%)	60 (28%)	25 (18%)	32 (32%)	<0.001 <sup>^</sup>
Time to RRT (days)	528 (79-1634)	1192 (314-1961)	658 (45-1576)	790 (280-2145)	85 (24-471)	<0.001
Dead (n, %)	174 (27.9%)	51 (30%)	51 (24%)	37 (26%)	35 (35%)	0.18
Time to death (days)	1136 (322-2241)	1881 (439-2563)	979 (398-2197)	1051 (354-2480)	650 (175-1465)	0.05 <sup>~</sup>
Death or RRT (n, %)	260 (41.7%)	65 (38.5%)	92 (43.0%)	52 (36.9%)	51 (51%)	0.12 <sup>^</sup>
Time to death or RRT (days)	2090 (1523)	2304 (1372)	2024 (1504)	2317 (1621)	1548 (1539)	<0.001 <sup>*</sup>
Follow up (days)	2372 (1511-3536)	2145 (1408-3353)	1865 (669-3066)	2372 (1226-3307)	1158 (176-2341)	<0.001 <sup>~</sup>

<sup>\*</sup> = One way ANOVA; <sup>~</sup> Kruskal-Wallis test; <sup>^</sup> = Chi square.  
uPCR = Urinary protein:creatinine ratio (mg/mmol) at baseline; SBP = systolic blood pressure; DBP = diastolic blood pressure; RRT = renal replacement therapy.

Table 1: Baseline demographics

At baseline, no significant differences were seen in demographics between the two deprivation groups in patients with IgA nephropathy and there was no difference in average blood pressure or median proteinuria over the first 2 years of follow up. The findings were the same in patients with MGN, FSGS and other primary GNs.

Using a Cox proportional hazards model, patients living in an area of multiple deprivation were significantly more likely to die or require RRT (p=0.007) during follow-up than in those who did not (Figure 1). There were differences between diseases, with patients who had IgAN being significantly more likely to die or require RRT if they lived in an area of multiple deprivation (HR 1.81; p=0.006), but no significant association was seen in patients with membranous nephropathy (HR 1.09; p=0.733) or FSGS (HR 1.61; p=0.08). (Figure 2)

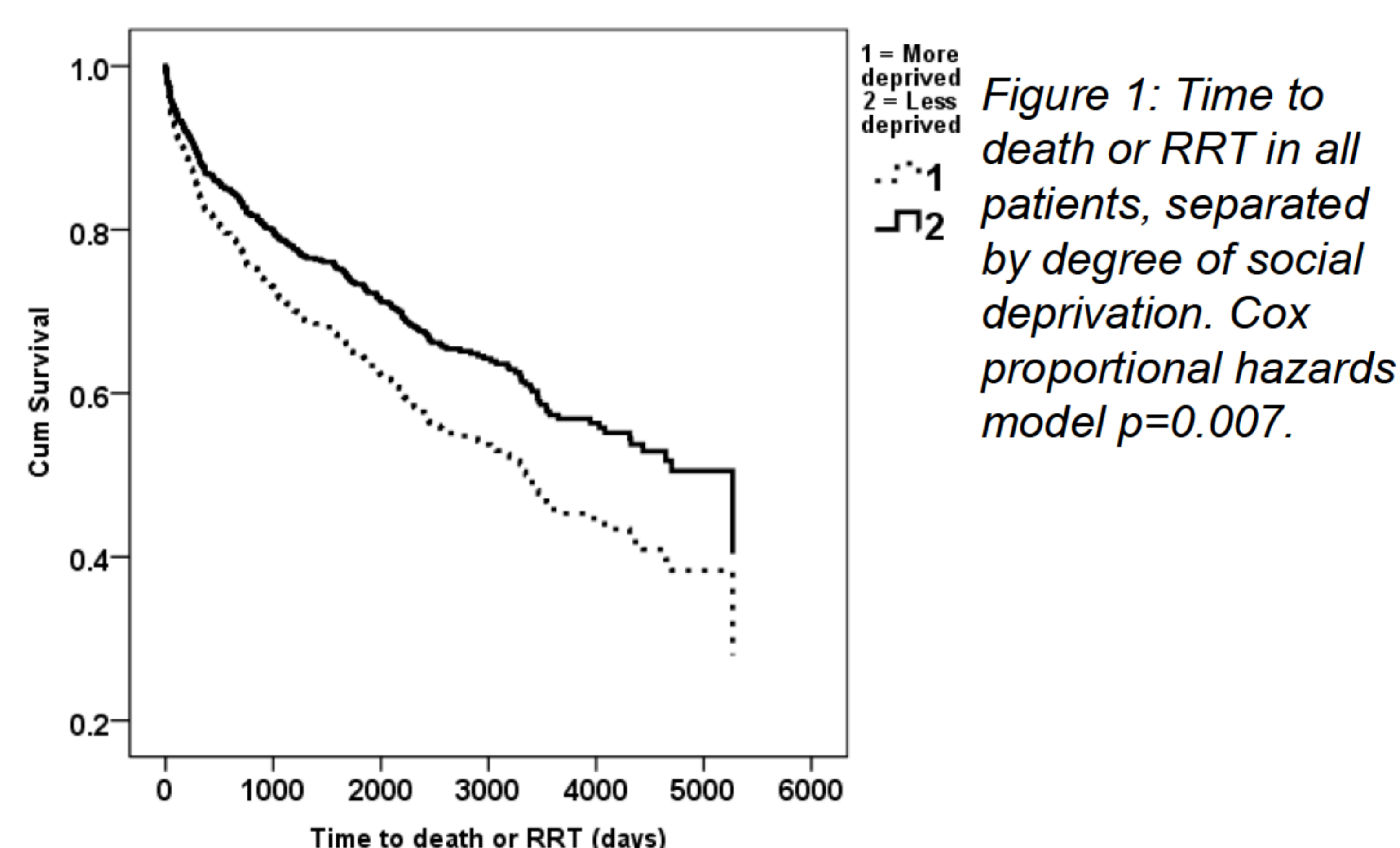


Figure 1: Time to death or RRT in all patients, separated by degree of social deprivation. Cox proportional hazards model p=0.007.

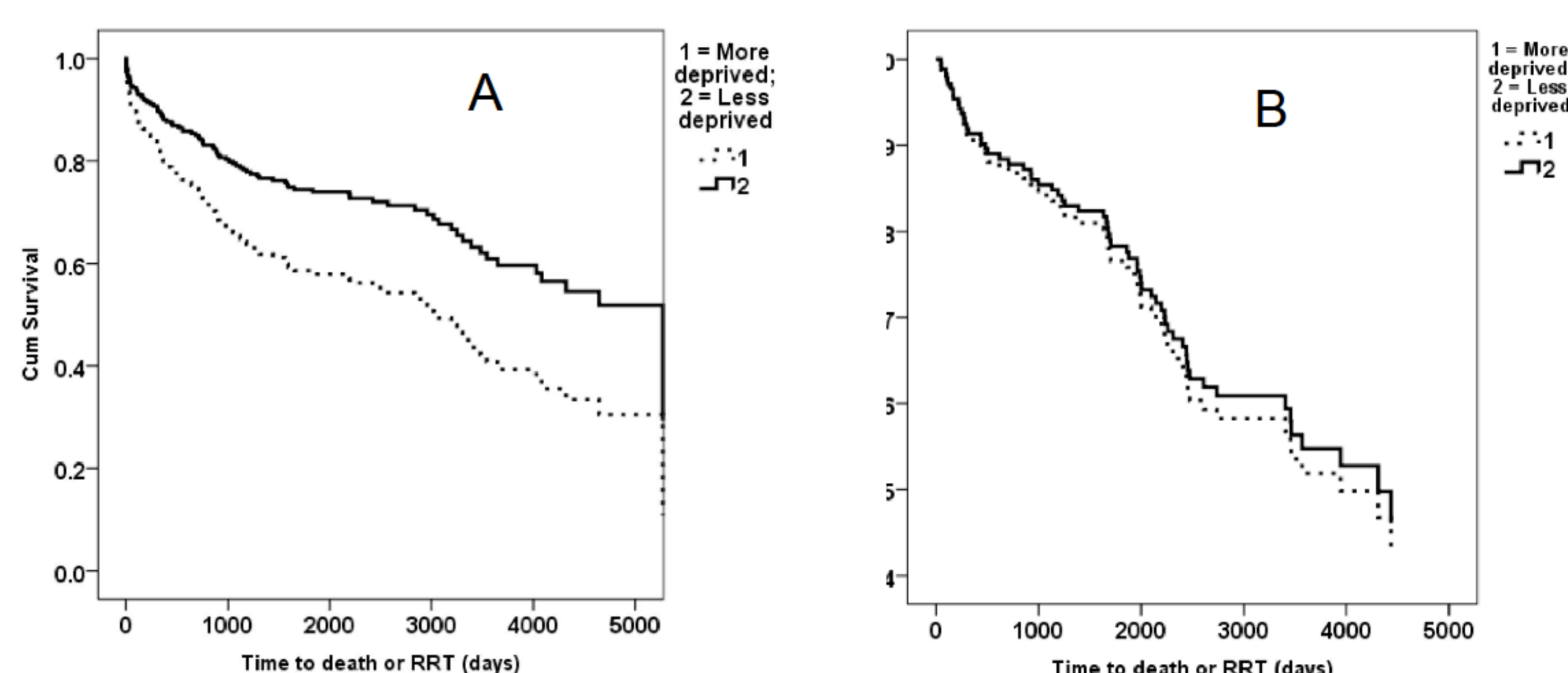


Figure 2: Time to death or RRT in IgA nephropathy (p=0.006) (A) or Membranous nephropathy (p=0.733) (B) by social deprivation category.

Cox multivariate proportional hazards model demonstrated that deprivation category was independently associated with the risk of dying or requiring RRT. (Table 2)

Factor	Univariate			Multivariate		
	ExpB	CI Exp B	P	ExpB	CI Exp B	p
Age	1.037	1.028-1.046	<0.001	1.019	1.01-1.028	<0.001
eGFR	0.959	0.953-0.965	<0.001	0.961	0.955-0.968	<0.001
SBP	1.012	1.006-1.018	<0.001			
SBP during follow-up	1.005	1.000-1.010	0.042			
SIMD group	1.404	1.095-1.800	0.007	1.294	1.009-1.661	0.042
uPCR baseline	1.001	1.000-1.001	<0.001			

Table 2: Cox multivariate model of risk of death or dying in all patients.

## Conclusion

Patients with IgA nephropathy living in areas of multiple deprivation are significantly more likely to die or require RRT than patients who live in relative affluence. This association was absent in patients with MGN or FSGS. It does not seem to be explained by differences in recognised baseline risk factors for adverse outcomes in IgAN and deserves further study.

