COMPLETE METHODS:

Patient population:

Using the United States Renal Data System (USRDS, we identified all adult patients (≥18 years) with ESRD attributed to any of 6 selected GN subtypes (FSGS, IgAN, MN, MPGN, LN, or vasculitis), diabetic nephropathy (DN), or autosomal dominant polycystic kidney disease (ADPKD), who received a first kidney transplant in the U.S. between Jan 1st 1996 and December 31st 2011). Exclusion criteria included: age <18 years, second or subsequent kidney transplants, receipt of simultaneous kidney and pancreas transplants, and residence in U.S. territories.

Data sources:

The USRDS, incorporating data from the United Network for Organ Sharing (UNOS), was our primary data source for all exposure, outcome, and covariate data. The USRDS contains records for virtually all patients who receive a kidney transplant in the US. We obtained data regarding cause of ESRD, demographic characteristics, and comorbidities from the Patient and Medical Evidence files (*patient*, *medevid*), which are largely derived from Medical Evidence Reports (MERs) submitted by nephrologists within 45 days of a patient commencing a new ESRD treatment (dialysis or kidney transplantation). We obtained data regarding dialysis modality (if any) used prior to transplantation from the *rxhist60* file. We obtained data

regarding transplant-related variables from transplant files (*waitlist_ki , txunos_ki_ pre_jul04 , txunos_ki_post_jul04*, *txfuunos_ki*, *txirunos)*. Date and cause of allograft failure were obtained from the *txfuunos_ki* file and derived from data submitted by transplant centers to UNOS in Kidney Transplant Recipient Follow-up Forms. Data regarding early post-transplanted complications were obtained from *txunos_ki_ pre_jul04* and *txunos_ki_post_jul04* files and derived from data submitted by transplant centers to UNOS in Kidney Transplant Recipient Registration Forms. Date and cause of death were obtained from the *patient* file and derived from data submitted by nephrologists to the USRDS in Death Notification Forms (CMS-2746).

Primary Exposure:

GN subtype (FSGS, IgAN, MN, MPGN, LN, or vasculitis) was the primary exposure. Two non-GN-related causes of ESRD (DN and ADPKD) were examined as external comparator groups. Cause of ESRD was defined as that reported in a patient's first Medical Evidence Reports (MER). Nephrologists must submit this document, by federal mandate, within 90 days of a patient commencing a new ESRD treatment (dialysis or transplantation). The cause of ESRD selected does not need to be confirmed by kidney biopsy, although a category "GN not histologically examined" exists for cases lacking a biopsy. A prior validation study determined that selection of a specific GN subtype had a high positive predictive value (>90%), but low sensitivity (≤30%).[1]

GN subtypes were categorized as either *primary* (FSGS, IgAN, MN, or MPGN) or *secondary* (LN or vasculitis), based upon whether they are considered to be kidney-limited or part of a multi-systemic process, respectively.

Primary Outcomes:

Three primary outcomes were studied: 1) patient death; 2) all-cause allograft failure (including death as a cause); and 3) allograft failure excluding death as a cause. We defined all-cause allograft failure as death, return to dialysis, or re-transplantation. We defined allograft failure excluding death as a cause as return to dialysis or re-transplantation, with death modeled as a competing risk (primary analysis) or as a censoring event (sensitivity analysis). Administrative censoring for all patients without a prior event occurred on Jan 1st, 2012.

Secondary Outcomes:

We studied cause of death (as reported to the USRDS in Death Notification forms), cause of allograft failure (as reported to UNOS in transplant recipient follow-up forms), and a selection of early post-transplant complications [acute rejection prior to discharge from the hospital (=early acute rejection, as reported to UNOS in transplant recipient registration forms, without requirement for biopsy confirmation), urine output ≤40mls in the first 24 hours (=post-operative oliguria, as reported to

UNOS as a yes/no variable in transplant recipient registration forms), or need for dialysis within the first week (=delayed graft function, DGF, as reported to UNOS in transplant recipient registration forms)] as secondary study outcomes.

Covariates:

We considered previously reported risk factors for death or for allograft failure following kidney transplantation as potential confounders. Demographic variables included recipient age, sex, race (black, white, Asian, other), Hispanic ethnicity (yes/no), and geographic region (Northeast, Midwest, South, West, or other), as reported in MERs. Socioeconomic variables included insurance payer at time of transplantation (Medicare, Medicaid, Employer Group Plan, Veterans Affairs, or other), and attainment of college-level education by time of wait listing (yes/no). Comorbidities included diabetes, heart failure, coronary heart disease, cerebrovascular disease, hypertension, chronic obstructive pulmonary disease, current/recent smoking, cancer, peripheral vascular disease, and inability to ambulate, as reported in patients' first MERs, along with BMI and hepatitis C (HCV) status at time transplantation as reported in Kidney Transplant Recipient Registration Forms. If BMI at time of transplantation was unavailable but weight at time of transplantation was, then BMI was computed using height reported in the patient's first MER or at wait listing (when present). Dialysis variables included modality and duration of prior dialysis, if any. Transplant-related variables included donor characteristics (age, race, sex, type [living, standard deceased, expanded

criteria deceased]), immunological factors (ABO blood group, human leukocyte 6-antigen [HLA] mismatch, recipient peak panel reactive antibody [PPRA] %, prior blood transfusion), cold-ischemic time, and baseline immunosuppression (induction and maintenance immunosuppressive drugs prescribed during or at discharge from the patient's initial hospital admission for kidney transplantation).

Statistical Analyses:

We used cross tabulation and distribution plots to examine unadjusted differences in baseline characteristics among cause of ESRD groups. We summarized categorical variables as frequencies and percentages and continuous variables as means and standard deviations, or as medians and interquartile ranges, as appropriate.

We computed unadjusted rates of each primary outcome (death, all-cause allograft failure, and allograft-failure excluding death as a cause) for each of the 8 causes of ESRD, based on number of events and person-time, in years, observed. We created stacked cumulative incidence plots depicting the competing events of death and of allograft failure due to causes other than death, by cause of ESRD, using the cumulative incidence function modeled by flexible parametric models.[2]

We used stratified Cox proportional hazards regression to compute hazard ratios (HRs) with 95% confidence intervals (CIs) for each of the 3 primary outcomes, with IgAN as the reference group and year of transplant as the stratum. For the outcome of allograft failure excluding death as a cause, we adopted two approaches: for our primary analysis, death was treated as a competing risk. In order to use standard analysis methods for right-censored data, we needed to recover the missing censoring information for those patients with the competing event. To this end, we used the Kaplan-Meier multiple imputation method and obtained *sub-distribution* HRs.[3,4] These are computed from the sub-distribution hazard, defined as the probability of the event given that the patient had a functional graft (no return to dialysis or re-transplantation) up to time *t* or died prior to time *t*.[5] As a sensitivity analysis we instead modeled death as a censoring event and used Cox proportional hazards regression to obtain *cause-specific* HRs. Here, individuals with the competing event are removed from the risk set at the time of the competing event.

For secondary outcomes, we computed relative risks for DGF by GN subtype using modified Poisson models.[6,7] For this analysis, 560 individuals (0.5%) with missing outcome data were excluded from the cohort. Due to high outcome missingness (>10%), we did not subject the secondary outcomes of cause of death, cause of allograft failure, early acute rejection, or post-transplant oliguria to multivariate modeling, and report these simply as frequencies (%) by cause of ESRD.

In all analyses, we added covariates to regression models sequentially to account for confounding. Model 1 included cause of ESRD (and year of transplantation for Poisson models, which were not stratified by year). Model 2 additionally adjusted for socio-demographic characteristics: age, sex, race, Hispanic ethnicity, geographic region, insurance type, and college education. Model 3 additionally adjusted for comorbidities, dialysis modality (pre-emptive kidney transplantation, hemodialysis, or peritoneal dialysis), dialysis vintage, HCV serological status, and BMI. Model 4 additionally adjusted for transplant-related variables: donor age, donor race, donor sex, donor type (living, standard deceased donor, expanded criteria deceased donor), recipient PPRA, recipient ABO blood group, HLA mismatch (0, 1-3, or 4-6), cold-ischemic time, prior blood transfusion, and baseline immunosuppressive treatments (induction treatment with daclizumab, thymoglobulin, alemtuzumab, or basiliximab; maintenance treatment with steroids, tacrolimus, ciclosporin, mycophenolate mofetil, azathioprine, and/or sirolimus).

We used log(-log) survival curves and plots of Loess smoothed scaled Schoenfeld residuals to assess the adequacy of the Cox proportional hazards models.

Missing Data:

The frequency of missing covariate data ranged from <1% (e.g. race) to 28% (PPRA level), and 62.5% of patients had at least one missing variable. We assumed these data to be missing at random and used multiple imputation (MI) (using SAS proc mi) through the joint modeling approach to generate 10 imputed data sets.[8] The imputation model included, besides the event indicator and log(time), all the variables in the analysis model 4 plus post-transplant weight, height, BMI at listing and weight at listing as auxiliary variables. As a sensitivity analysis, we ran MI to generate 40 imputed datasets with no gain in efficiency.[9] The imputed datasets were then combined using SAS proc mianalyze to obtain estimates of the HR for each outcome and model adjustment. For the analysis of allograft failure with death as a competing risk, 5 extra data sets were generated using the *kmi* package to produce new censoring times for those individuals with the competing event. Thus, the final analysis incorporated results from 50 (10*5) imputed data sets.

For completeness, we also report the results of complete case analyses, for which only patients with complete data for all covariates (37.5%) were included.

Statistical analyses were performed using a combination of SAS, version 9.4 (SAS Institute, Inc., Cary, NC), Stata version 13.1 (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.) and R version 3.1.2. A Stanford University School of Medicine Internal Review Board approved the study.

Supplemental Table 1. Five-, 10-, and 15- year cumulative incidences of the competing risks of death and allograft failure excluding death as a cause, by cause of ESRD. All numbers represent %.

	5-year cumulative incidence			10-year cumulative incidence			15 year cumulative incidence		
	Death	**Allograft failure***	**All-cause allograft failure**	**Death**	**Allograft failure***	**All-cause allograft failure**	**Death**	**Allograft failure***	**All-cause allograft failure**
IgAN	3.3	10.5	13.8	6.9	23.1	29.9	10.1	31.7	41.7
FSGS	6.1	15.1	21.3	12.9	31.7	44.5	18.4	41.8	60.2
MN	7.0	16.3	23.3	15.8	29.9	45.7	23.4	38.1	61.5
MPGN	6.3	21.5	27.8	12.0	35.9	48.0	16.7	46.3	62.9
LN	5.5	18.4	24.0	10.6	32.2	42.8	15.9	42.1	58.0
Vasculitis	8.5	10.0	18.4	18.4	21.2	39.6	29.7	27.9	57.6
DN	16.8	13.6	30.4	32.8	24.3	57.1	44.0	31.9	75.9
ADPKD	6.3	8.5	14.8	15.5	16.3	31.8	26.0	24.4	50.3

GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease. *excluding death as a cause

Supplemental Table 2. Hazard ratios with 95% confidence intervals for the primary outcomes of death, all-cause allograft failure, and allograft failure excluding death as a cause, by cause of ESRD, for the complete case cohort, n=40,460.

	Primary GN Subtypes				Secondary GN Subtypes		Non-GN Comparators	
	FSGS n=5,233	IgAN n=2,857	MN n=833	MPGN n=652	LN n=2,263	Vasculitis n=567	DN n=20,708	ADPKD n=7,357
Death								
Model 1	1.74 (1.49-2.03)	Ref	2.23 (1.80-2.76)	2.10 (1.67-2.65)	1.64 (1.37-1.97)	2.17 (1.69-2.79)	4.89 (4.27-5.61)	1.58 (1.36-1.84)
Model 2	1.48 (1.27-1.73)	Ref	1.55 (1.25-1.91)	1.78 (1.41-2.24)	1.86 (1.54-2.23)	1.42 (1.11-1.83)	3.21 (2.80-3.69)	1.09 (0.93-1.26)
Model 3	1.35 (1.16-1.58)	Ref	1.42 (1.14-1.75)	1.61 (1.28-2.03)	1.56 (1.29-1.87)	1.26 (0.98-1.63)	2.33 (2.00-2.70)	1.07 (0.92-1.25)
Model 4	1.34 (1.15-1.57)	Ref	1.39 (1.12-1.72)	1.62 (1.28-2.03)	1.56 (1.29-1.88)	1.24 (0.96-1.60)	2.28 (1.96-2.65)	1.05 (0.91-1.23)
All-cause allograft failure								
Model 1	1.83 (1.63-2.04)	Ref	1.97 (1.68-2.32)	2.02 (1.70-2.40)	1.74 (1.52-1.98)	1.48 (1.20-1.83)	2.97 (2.69-3.28)	1.16 (1.04-1.30)
Model 2	1.65 (1.47-1.84)	Ref	1.65 (1.40-1.94)	1.82 (1.53-2.16)	1.74 (1.53-1.99)	1.21 (0.98-1.49)	2.42 (2.18-2.67)	1.04 (0.92-1.16)
Model 3	1.51 (1.35-1.69)	Ref	1.52 (1.29-1.79)	1.67 (1.41-1.99)	1.51 (1.32-1.72)	1.04 (0.85-1.29)	2.03 (1.81-2.27)	1.03 (0.92-1.16)
Model 4	1.50 (1.34-1.68)	Ref	1.51 (1.28-1.78)	1.68 (1.41-2.00)	1.52 (1.33-1.73)	1.04 (0.84-1.28)	1.95 (1.74-2.18)	1.01 (0.91-1.14)
Allograft failure with death as a competing risk								
Model 1	1.81 (1.58-2.07)	Ref	1.82 (1.49-2.22)	2.10 (1.72-2.58)	1.84 (1.58-2.15)	1.13 (0.85-1.49)	1.56 (1.38-1.77)	0.86 (0.75-0.99)
Model 2	1.44 (1.26-1.65)	Ref	1.66 (1.36-2.03)	1.84 (1.50-2.26)	1.30 (1.11-1.52)	1.09 (0.82-1.44)	1.43 (1.26-1.63)	0.95 (0.82-1.09)

Model 3	1.37	Ref	1.61	1.77	1.23	0.97	1.49	0.97
	(1.19-1.57)		(1.32-1.97)	(1.44-2.17)	(1.05-1.45)	(0.73-1.29)	(1.29-1.72)	(0.84-1.12)
Model 4	1.35	Ref	1.58	1.78	1.23	0.98	1.37	0.94
	(1.18-1.55)		(1.29-1.94)	(1.45-2.18)	(1.05-1.45)	(0.74-1.30)	(1.18-1.58)	(0.81-1.09)
Death-censored allograft failure								
Model 1	1.85	Ref	1.85	2.17	1.87	1.15	1.74	0.87
	(1.62-2.12)		(1.52-2.26)	(1.77-2.65)	(1.60-2.19)	(0.87-1.52)	(1.54-1.97)	(0.76-1.00)
Model 2	1.75	Ref	1.93	2.06	1.63	1.16	1.81	1.02
	(1.53-2.01)		(1.58-2.36)	(1.68-2.53)	(1.39-1.91)	(0.88-1.53)	(1.60-2.06)	(0.88-1.18)
Model 3	1.58	Ref	1.78	1.90	1.45	0.99	1.76	1.02
	(1.38-1.81)		(1.46-2.18)	(1.55-2.34)	(1.23-1.70)	(0.75-1.32)	(1.53-2.03)	(0.88-1.18)
Model 4	1.55	Ref	1.74	1.93	1.45	1.00	1.61	0.98
	(1.35-1.77)		(1.43-2.13)	(1.57-2.37)	(1.23-1.70)	(0.75-1.32)	(1.40-1.86)	(0.85-1.14)

Model 1, stratified by year of transplantation

Model 2, added socio-demographic variables: age, age*age, sex, race, ethnicity, geographic region, insurance type, college

Model 3, added dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status

Model 4, added transplant-related variables: ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.

Supplemental Table 3. Hazard ratios with 95% confidence intervals for the allograft failure excluding death as a cause, comparing the primary analysis (death modeled as a competing risk) to a sensitivity analysis (death modeled as a censoring event), by cause of ESRD (n=107,778).

	Primary GN Subtypes				Secondary GN Subtypes		Non-GN Comparators	
	FSGS n=13,272	IgAN n=7,379	MN n=2,249	MPGN n=1,980	LN n=5,884	Vasculitis n=1,367	DN n=51,790	ADPKD n=18,457
Allograft failure with death as competing risk								
Model 1	1.59	Ref	1.42	1.79	1.59	0.98	1.19	0.76
	(1.49-1.71)		(1.28-1.57)	(1.62-1.98)	(1.47-1.72)	(0.85-1.14)	(1.12-1.27)	(0.71-0.81)
Model 2	1.30	Ref	1.36	1.62	1.15	0.97	1.17	0.88
	(1.21-1.39)		(1.23-1.51)	(1.46-1.79)	(1.06-1.24)	(0.84-1.13)	(1.10-1.25)	(0.81-0.94)
Model 3	1.24	Ref	1.32	1.56	1.11	0.90	1.24	0.89
	(1.16-1.33)		(1.19-1.47)	(1.41-1.72)	(1.03-1.21)	(1.78-1.05)	(1.15-1.33)	(0.82-0.95)
Model 4	1.20	Ref	1.27	1.50	1.11	0.94	1.16	0.85
	(1.12-1.28)		(1.14-1.41)	(1.36-1.66)	(1.02-1.20)	(0.81-1.09)	(1.08-1.25)	(0.79-0.91)
Death-censored allograft failure								
Model 1	1.65	Ref	1.48	1.85	1.64	1.03	1.36	0.78
	(1.61-1.68)		(1.43-1.53)	(1.80-1.91)	(1.60-1.68)	(0.98-1.08)	(1.33-1.38)	(0.77-0.80)
Model 2	1.31	Ref	1.36	1.65	1.18	0.98	1.28	0.87
	(1.23-1.41)		(1.22-1.51)	(1.49-1.82)	(1.09-1.28)	(0.85-1.14)	(1.20-1.36)	(0.81-0.93)
Model 3	1.25	Ref	1.32	1.57	1.13	0.90	1.31	0.88
	(1.16-1.34)		(1.18-1.46)	(1.42-1.74)	(1.04-1.23)	(0.78-1.05)	(1.22-1.41)	(0.81-0.94)
Model 4	1.20	Ref	1.26	1.51	1.12	0.94	1.23	0.83
	1.12-1.29)		(1.13-1.40)	(1.36-1.67)	(1.03-1.22)	(0.80-1.09)	(1.14-1.32)	(0.77-0.90)

Model 1, stratified by year of transplantation
Model 2, added socio-demographic variables: age, age*age, sex, race, ethnicity, geographic region, insurance type, college
Model 3, added dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status
Model 4, added transplant-related variables: ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.

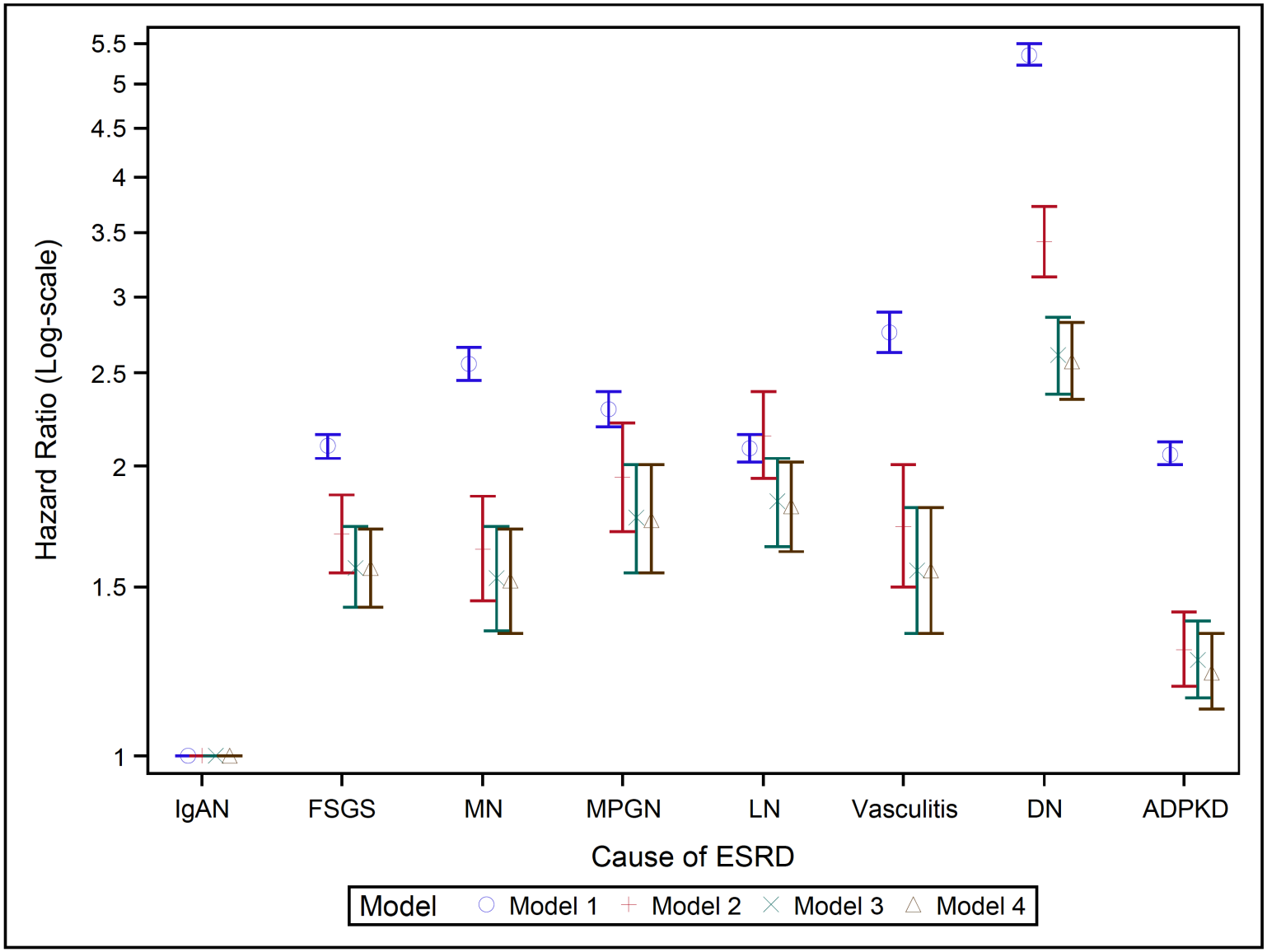
Supplemental Table 4. Risk ratios with 95% confidence intervals for the secondary outcome of delayed graft function (DGF), by cause of ESRD.

	Primary GN Subtypes				Secondary GN Subtypes		Non-GN Comparators	
	FSGS	**IgAN**	**MN**	**MPGN**	**LN**	**Vasculitis**	**DN**	**ADPKD**
Multiple imputation cohort, n=107,272								
Model 1	1.71	Ref	1.65	1.53	1.43	1.32	2.21	1.35
	(1.58-1.86)		(1.46-1.87)	(1.34-1.75)	(1.30-1.58)	(1.13-1.56)	(2.05-2.38)	(1.24-1.47)
Model 2	1.34	Ref	1.22	1.33	1.18	1.11	1.50	1.16
	(1.24-1.46)		(1.08-1.38)	(1.17-1.52)	(1.07-1.30)	(0.95-1.31)	(1.39-1.62)	(1.07-1.26)
Model 3	1.21	Ref	1.13	1.21	1.01	0.97	1.35	1.17
	(1.12-1.32)		(1.00-1.28)	(1.06-1.38)	(0.91-1.11)	(0.83-1.13)	(1.24-1.46)	(1.08-1.27)
Model 4	1.13	Ref	1.07	1.14	0.95	0.98	1.21	1.04
	(1.04-1.22)		(0.95-1.20)	(1.01-1.20)	(0.86-1.04)	(0.84-1.14)	(1.12-1.31)	(0.96-1.13)
Complete case cohort, n=40,460								
Model 1	1.63	Ref	1.58	1.47	1.28	1.22	2.32	1.27
	(1.43-1.85)		(1.30-1.92)	(1.18-1.83)	(1.09-1.49)	(0.95-1.57)	(2.07-2.60)	(1.12-1.44)
Model 2	1.34	Ref	1.24	1.30	1.10	1.06	1.64	1.14
	(1.18-1.52)		(1.02-1.50)	(1.05-1.62)	(0.94-1.29)	(0.83-1.36)	(1.46-1.85)	(1.01-1.30)
Model 3	1.22	Ref	1.16	1.26	0.98	0.94	1.42	1.19
	(1.08-1.39)		(0.96-1.40)	(1.02-1.56)	(0.84-1.15)	(0.74-1.21)	(1.25-1.62)	(1.05-1.35)
Model 4	1.13	Ref	1.09	1.20	0.92	0.96	1.28	1.07
	(1.00-1.27)		(0.91-1.31)	(0.98-1.48)	(0.79-1.07)	(0.75-1.21)	(1.13-1.45)	(0.95-1.21)

Model 1, stratified by year of transplant

Model 2, added demographic variables: age, age*age, sex, race, ethnicity, geographic region), insurance type, college
Model 3, added dialysis modality: dialysis vintage, comorbidities (can't ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, Current/recent smoker, PVD), BMI group, HCV status
Model 4, added transplant-related variables: abo group, CIT, donor age, donor sex, donor race, mismatch group, donor type (living/decreased/expanded criteria), PPRA, immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion.

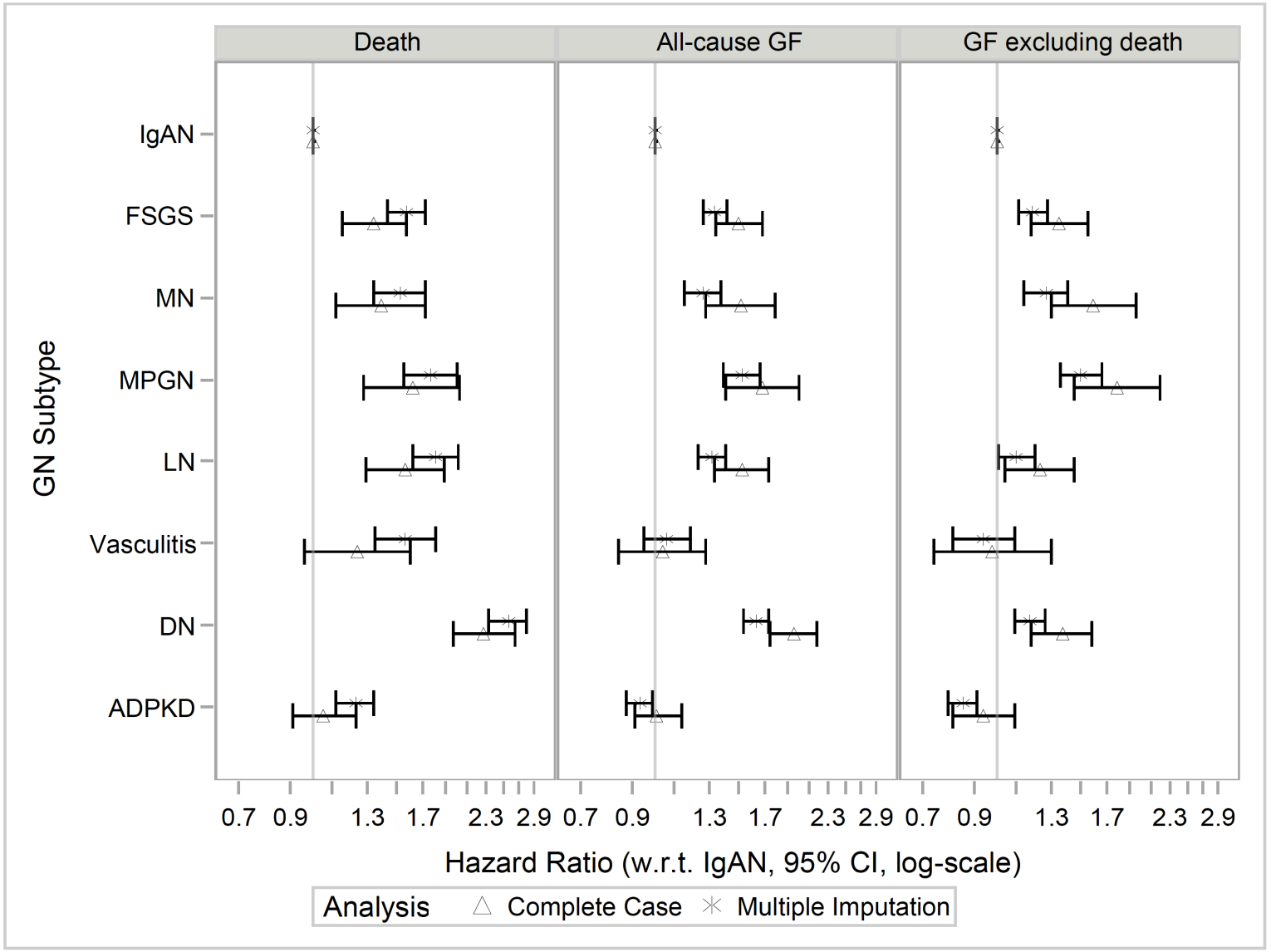
GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody.


Hazard Ratio (Log-scale)
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
IgAN
FSGS
MN
MPGN
LN
Vasculitis
DN
ADPKD
Cause of ESRD
Model
Model 1
Model 2
Model 3
Model 4

Supplemental Figure 1. Hazard ratios with 95% confidence intervals for the primary outcome of death, showing attenuation of effect estimates with sequential addition of covariates to multivariate models (n=107,778).

Model 1, stratified by year of transplantation
Model 2, added socio-demographic variables: age, age*age, sex, race, ethnicity, geographic region, insurance type, college
Model 3, added dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status
Model 4, added transplant-related variables: ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

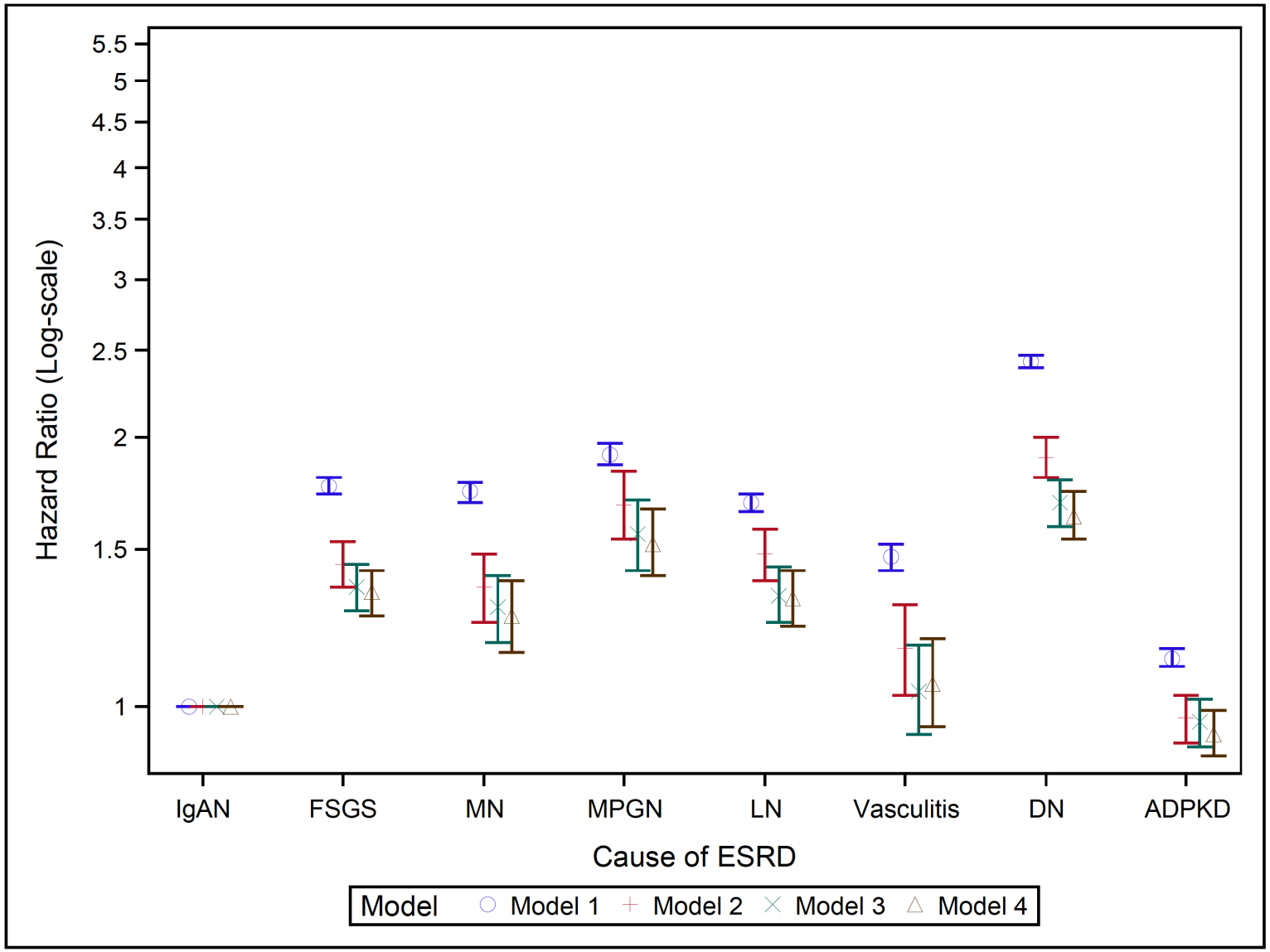
GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.


Death
All-cause GF
GF excluding death
GN Subtype
IgAN
FSGS
MN
MPGN
LN
Vasculitis
DN
ADPKD
0.7
0.9
1.3
1.7
2.3
2.9
Hazard Ratio (w.r.t. IgAN, 95% CI, log-scale)
Analysis
Complete Case
Multiple Imputation

Supplemental Figure 2. Model 4 hazard ratios with 95% confidence intervals for the primary outcomes of death, all-cause allograft failure, and allograft failure excluding death as a cause (competing risk model), comparing the primary multiple imputation analysis (107,778) to a sensitivity complete case analysis (n=40,460).

Model 4 stratified by year of transplantation and adjusted for age, age*age, sex, race, ethnicity, geographic region, insurance type, college education, dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status, ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

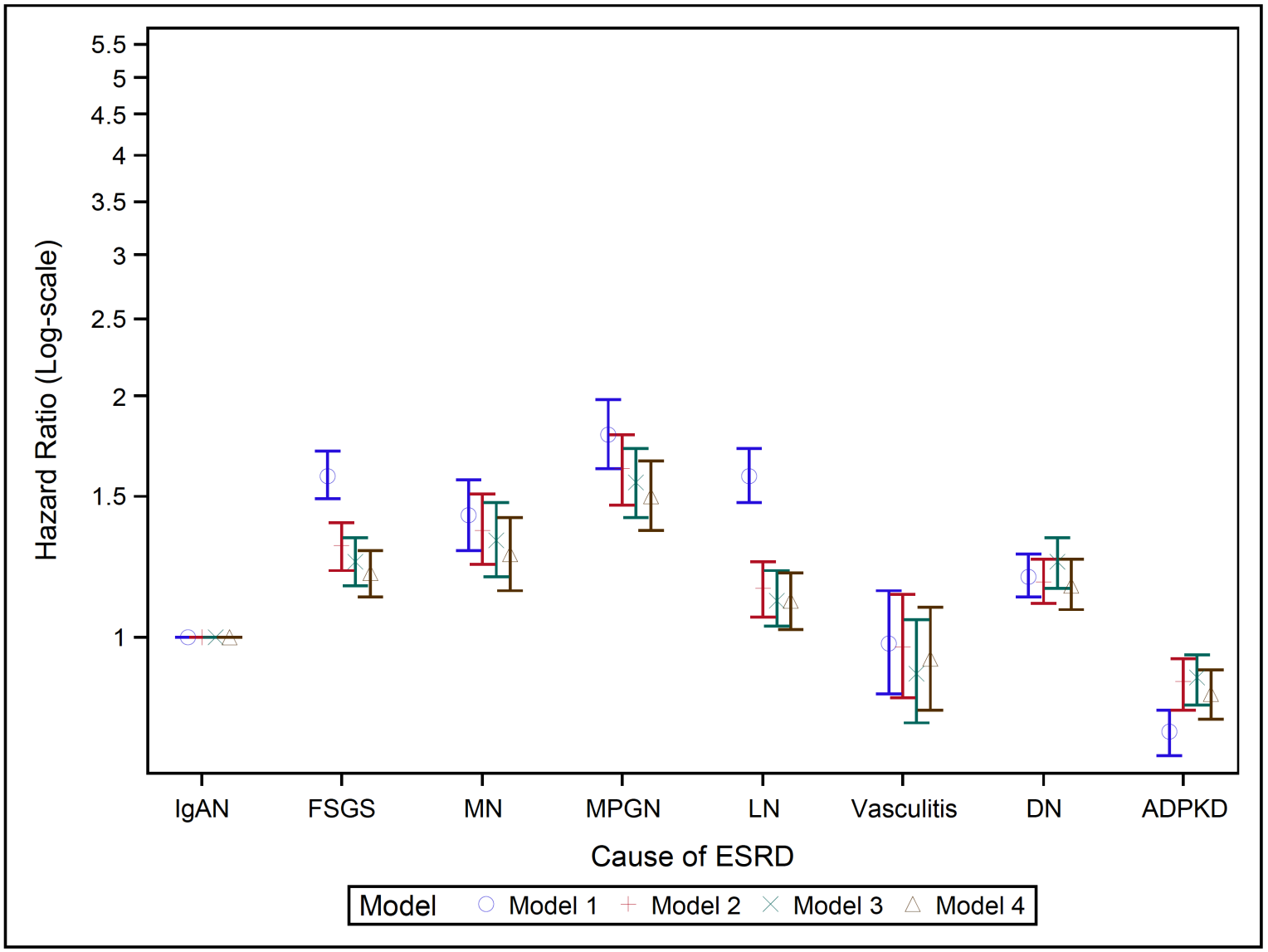
GF, allograft failure; GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.


Hazard Ratio (Log-scale)
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
IgAN
FSGS
MN
MPGN
LN
Vasculitis
DN
ADPKD
Cause of ESRD
Model
Model 1
Model 2
Model 3
Model 4

Supplemental Figure 3. Hazard ratios with 95% confidence intervals for the primary outcome of all-cause allograft failure, showing attenuation of effect estimates with sequential addition of covariates to multivariate models (n=107,778).

Model 1, stratified by year of transplantation
Model 2, added socio-demographic variables: age, age*age, sex, race, ethnicity, geographic region, insurance type, college
Model 3, added dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status
Model 4, added transplant-related variables: ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

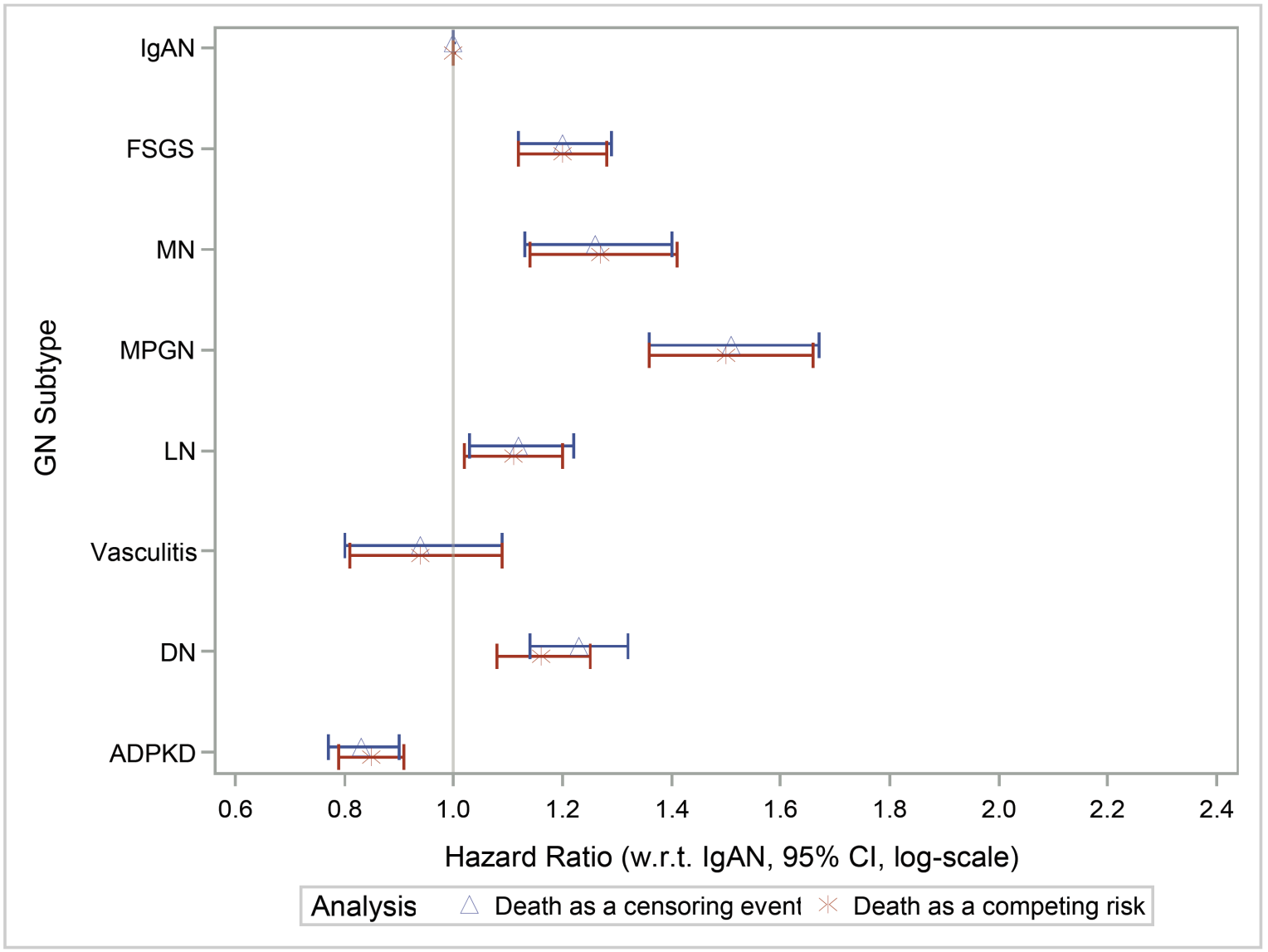
GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.


Hazard Ratio (Log-scale)
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
IgAN
FSGS
MN
MPGN
LN
Vasculitis
DN
ADPKD
Cause of ESRD
Model
Model 1
Model 2
Model 3
Model 4

Supplemental Figure 4. Hazard ratios with 95% confidence intervals for the primary outcome of allograft failure excluding death as a cause (competing risk model), showing attenuation of effect estimates with sequential addition of covariates to multivariate models (n=107,778).

Model 1, stratified by year of transplantation
Model 2, added socio-demographic variables: age, age*age, sex, race, ethnicity, geographic region, insurance type, college
Model 3, added dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status
Model 4, added transplant-related variables: ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.


IgAN
FSGS
MN
MPGN
LN
Vasculitis
DN
ADPKD
GN Subtype
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
Hazard Ratio (w.r.t. IgAN, 95% CI, log-scale)
Analysis
Death as a censoring event
Death as a competing risk

Supplemental Figure 5. Model 4 hazard ratios with 95% confidence intervals for the primary outcome of allograft failure excluding death as a cause, comparing the primary modeling approach (death as a competing risk) to a sensitivity approach (death as a censoring event).

Model 4 stratified by year of transplantation and adjusted for age, age*age, sex, race, ethnicity, geographic region, insurance type, college education, dialysis modality, dialysis vintage, comorbidities (unable to ambulate, coronary heart disease, cancer, congestive heart failure, COPD, CVA/TIA, diabetes, hypertension, current/recent smoker, PVD), BMI group, HCV status, ABO blood group, CIT, donor age, donor sex, donor race, HLA mismatch group, donor type (living/decreased/expanded criteria), PPRA, initial post-transplant immunosuppression (Alemtuzumab, Basiliximab, Daclizumab, or Thymoglobulin induction; Tacrolimus, Ciclosporin, Sirolimus, MMF, Azathioprine and/or steroid maintenance), previous blood transfusion, DGF.

GN, glomerulonephritis; FSGS, focal segmental glomerulosclerosis; IgAN, IgA nephropathy; MN, membranous nephropathy; MPGN, membranoproliferative GN; LN, lupus nephritis; DN, diabetic nephropathy; ADPKD, autosomal dominant polycystic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; TIA, transient ischemic attack; PVD, peripheral vascular disease; BMI, body mass index; HCV, hepatitis C virus; CIT, cold ischemia time; HLA, human leukocyte antigen; PPRA, peak panel reactive antibody; DGF, delayed graft function.

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