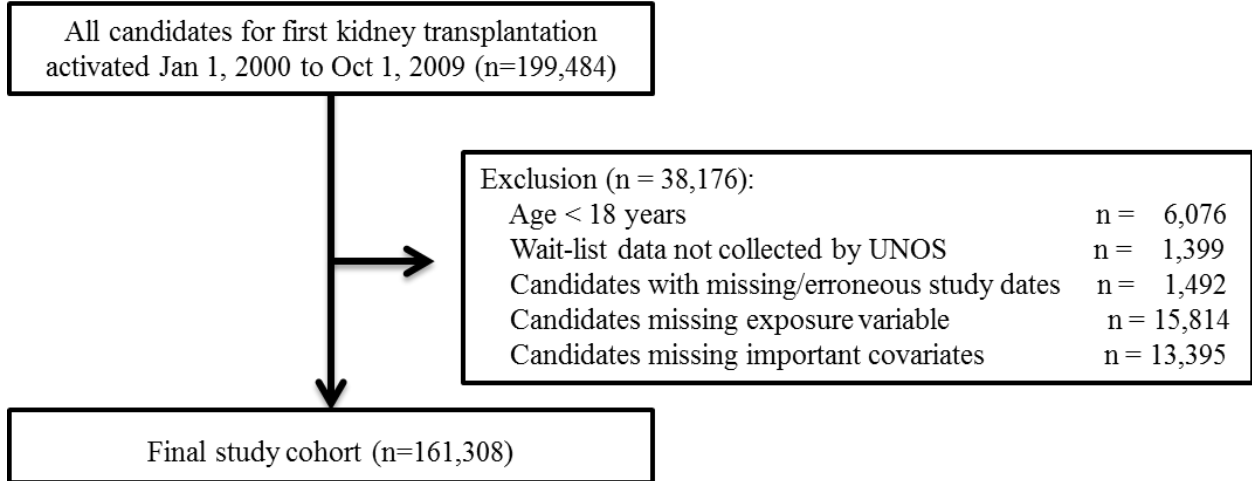


SUPPLEMENTAL MATERIAL 1: Study Flow Diagram



SUPPLEMENTAL MATERIAL 2: Distribution of the Number of PRA Measurements among Study Participants and Changes in PRA from Activation to Landmark Follow-Up Time points

PRA Category at Activation	Number of patients	Median Number of PRA Measurements (IQR)	Incidence Rate Ratio of PRA Measurements (95% CI)
0%	120,888	1 (1, 2)	1
1-19%	22,112	2 (1, 4)	1.94 (1.92, 1.97)
20-79%	13,000	3 (2, 6)	2.25 (2.22, 2.29)
80-100%	5,308	3 (2, 6)	2.02 (1.97, 2.07)
Total	161,308	2 (1, 3)	

Abbreviations: CI, confidence interval; IQR, interquartile range

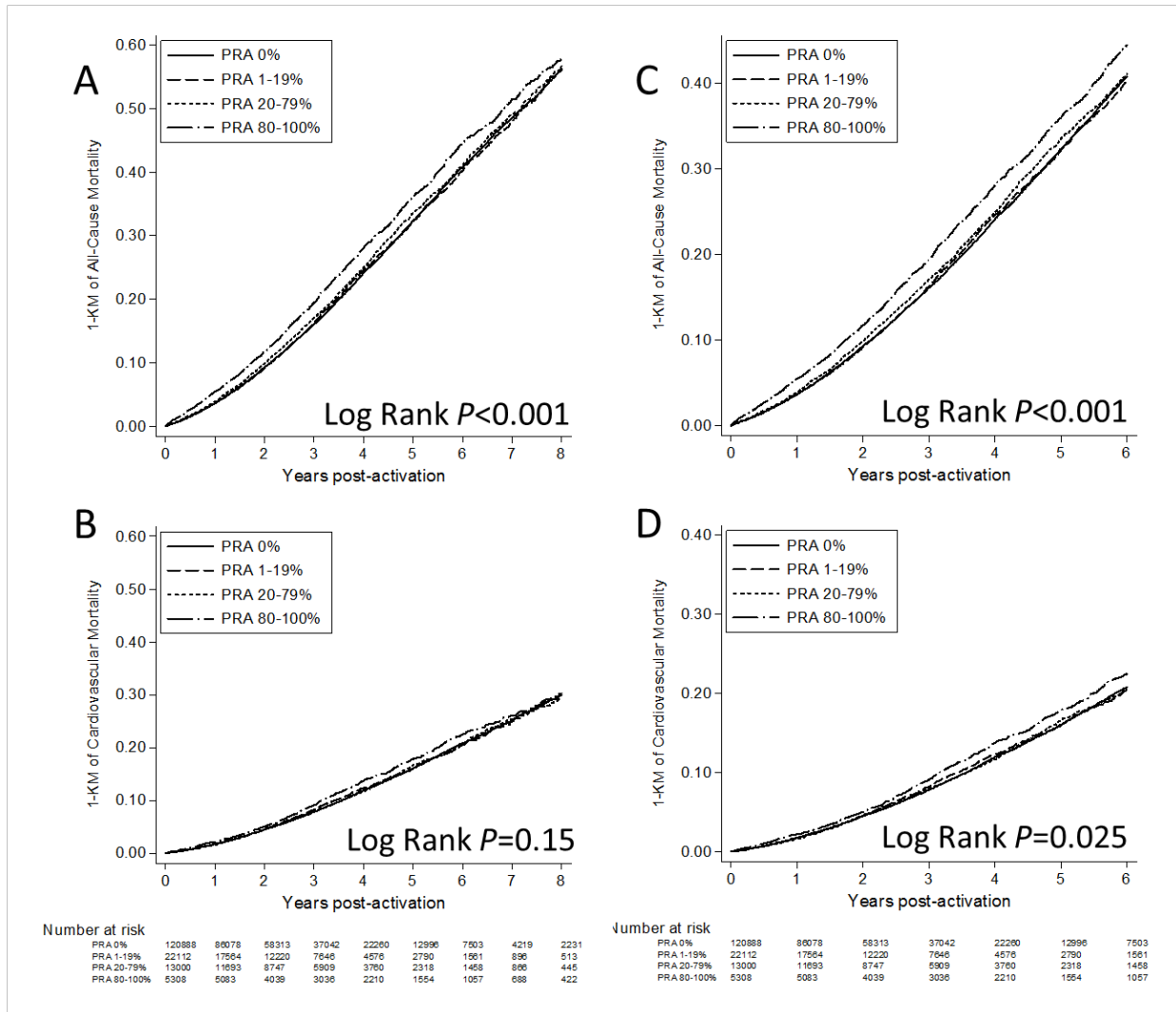
PRA Category at Activation	Number of patients*	Median (IQR) of delta PRA^o 3 months post-activation	Number of patients*	Median (IQR) of delta PRA^o 6 months post-activation	Number of patients*	Median (IQR) of delta PRA^o 12 months post-activation
0%	4,169	0 (0, 4)	2,499	2 (0, 11)	1,509	3 (0, 17)
1-19%	2,032	0 (-3, 3)	1,575	0 (-3, 6)	919	0 (-3, 6)
20-79%	1,588	0 (-14, 8)	1,210	0 (-16, 10)	736	-1 (-17, 12)
80-100%	526	0 (-12, 1)	415	-2 (-18, 1)	264	-4 (-23, 1)
Total	8,315	0 (0, 4)	5,699	0 (-1, 8)	3,428	1 (-1, 11)

*Number of patients in the subcohort of patients who were activated after 2007 who had PRA measurements at landmark time points (3, 6, 12 months) following activation

^oDelta PRA is the difference in PRA measured at landmark time points vs. activation

Abbreviations: CI, confidence interval; IQR, interquartile range

SUPPLEMENTAL MATERIAL 3: Extended Kaplan-Meier Failure Curves of All-Cause Mortality and Cardiovascular Mortality among Waitlisted Kidney Transplant Candidates over Entire Follow-Up and Up To 6-Years* following Activation



*Follow up truncated at 6 years following activation to account for loss of information at the extremes of follow-up time, or differences in data collection/ascertainment as a function of time from wait-listing (e.g., as a consequence of removal from the waiting list)

SUPPLEMENTAL MATERIAL 4: Association between Time-Varying PRA Category and All-Cause Mortality by Patient Subgroups

Subgroups of covariates		Number of patients in subgroups	PRA 0%	PRA 1-19% HR (95% CI)	PRA 20-79% HR (95% CI)	PRA 80-100% HR (95% CI)	P value for interaction between PRA and covariates
Transplant candidate's age (years)	18-34.9	20,458	referent	1.13 [0.98, 1.32]	1.28 [1.08, 1.51]	1.37 [1.12, 1.67]	0.20
	35-44.9	26,927	referent	1.01 [0.91, 1.12]	1.14 [1.02, 1.27]	1.33 [1.17, 1.51]	
	45-49.9	19,812	referent	1.11 [1.00, 1.23]	1.27 [1.14, 1.42]	1.29 [1.13, 1.48]	
	50-54.9	23,460	referent	0.98 [0.90, 1.07]	1.12 [1.01, 1.23]	1.15 [1.02, 1.30]	
	55-59.9	24,699	referent	1.05 [0.97, 1.14]	1.11 [1.01, 1.21]	1.18 [1.05, 1.32]	
	60-64.9	21,590	referent	1.01 [0.94, 1.10]	1.04 [0.95, 1.14]	1.20 [1.07, 1.34]	
	≥65	20,458	referent	0.97 [0.91, 1.04]	1.05 [0.97, 1.14]	1.13 [1.01, 1.26]	
Candidate's sex	Male	96,428	referent	1.04 [0.99, 1.09]	1.20 [1.13, 1.29]	1.43 [1.28, 1.59]	<0.001
	Female	64,880	referent	0.99 [0.93, 1.04]	1.06 [1.01, 1.11]	1.15 [1.09, 1.21]	
Candidate's Race	White	75,140	referent	1.03 [0.97, 1.08]	1.10 [1.04, 1.17]	1.17 [1.08, 1.26]	0.64
	Black	48,076	referent	1.01 [0.95, 1.07]	1.11 [1.01, 1.22]	1.22 [1.13, 1.32]	
	Hispanic	25,589	referent	1.02 [0.94, 1.11]	1.03 [0.85, 1.23]	1.30 [1.15, 1.46]	
	Asian	9,255	referent	0.97 [0.84, 1.13]	1.28 [1.00, 1.63]	1.23 [0.97, 1.56]	
	Other	3,248	referent	1.28 [1.02, 1.61]	1.22 [1.13, 1.32]	1.08 [0.80, 1.45]	
Cause of End Stage Renal Disease	GN	30,624	referent	1.09 [0.98, 1.21]	1.18 [1.06, 1.32]	1.28 [1.12, 1.46]	0.33
	DM	53,133	referent	1.02 [0.97, 1.07]	1.11 [1.05, 1.18]	1.14 [1.06, 1.22]	
	PKD	12,951	referent	0.93 [0.77, 1.13]	1.11 [0.91, 1.36]	1.40 [1.09, 1.81]	
	HTN	38,585	referent	1.01 [0.94, 1.08]	1.11 [1.02, 1.20]	1.18 [1.07, 1.31]	
	Other	26,015	referent	1.02 [0.93, 1.12]	1.08 [0.98, 1.19]	1.38 [1.22, 1.55]	
Dialysis prior to activation	HD	96,907	referent	1.03 [0.99, 1.07]	1.12 [1.07, 1.18]	1.19 [1.12, 1.26]	0.01
	PD	16,910	referent	0.99 [0.90, 1.10]	1.02 [0.91, 1.14]	1.03 [0.89, 1.19]	
	No dialysis	39,104	referent	0.96 [0.87, 1.05]	1.13 [1.01, 1.26]	1.46 [1.27, 1.68]	
	Modality unknown	8,387	referent	1.17 [1.00, 1.38]	1.17 [0.98, 1.40]	1.49 [1.17, 1.89]	
Time from dialysis initiation to activation	Preemptive	43,650	referent	0.96 [0.88, 1.04]	1.20 [1.10, 1.32]	1.41 [1.26, 1.59]	0.02
	<12 months	54,999	referent	1.00 [0.94, 1.07]	1.12 [1.05, 1.20]	1.15 [1.05, 1.25]	
	1 to 2 years	32,037	referent	1.09 [1.02, 1.17]	1.06 [0.98, 1.14]	1.26 [1.15, 1.39]	
	2 to 3 years	13,646	referent	1.03 [0.94, 1.14]	1.12 [1.00, 1.24]	1.13 [0.98, 1.29]	

	>3 years	16,976	referent	1.00 [0.92, 1.09]	1.09 [0.99, 1.20]	1.14 [1.02, 1.27]	
Activation era	2000-2003	54,486	referent	1.03 [0.98, 1.08]	1.20 [1.13, 1.26]	1.17 [1.09, 1.26]	0.003
	2004-2006	52,238	referent	1.00 [0.94, 1.06]	1.04 [0.98, 1.11]	1.18 [1.08, 1.28]	
	2007-2009	54,584	referent	1.05 [0.98, 1.14]	1.07 [0.98, 1.17]	1.37 [1.23, 1.53]	
Diabetes Mellitus at activation	No	95,292	referent	1.01 [0.95, 1.06]	1.11 [1.05, 1.18]	1.30 [1.21, 1.39]	0.05
	Yes	66,016	referent	1.03 [0.99, 1.08]	1.11 [1.06, 1.17]	1.14 [1.07, 1.22]	
Peripheral vascular disease at Activation	No	152,909	referent	1.03 [1.00, 1.07]	1.11 [1.07, 1.17]	1.22 [1.16, 1.29]	0.14
	Yes	8,399	referent	0.93 [0.83, 1.04]	1.10 [0.98, 1.25]	1.05 [0.89, 1.24]	

Abbreviations: HR, hazard ratio; CI, confidence interval; PVD, peripheral vascular disease; GN, glomerulonephritis; DM, diabetes mellitus, PKD, polycystic kidney disease, HTN, hypertensive nephropathy; HD, hemodialysis; PD, peritoneal dialysis

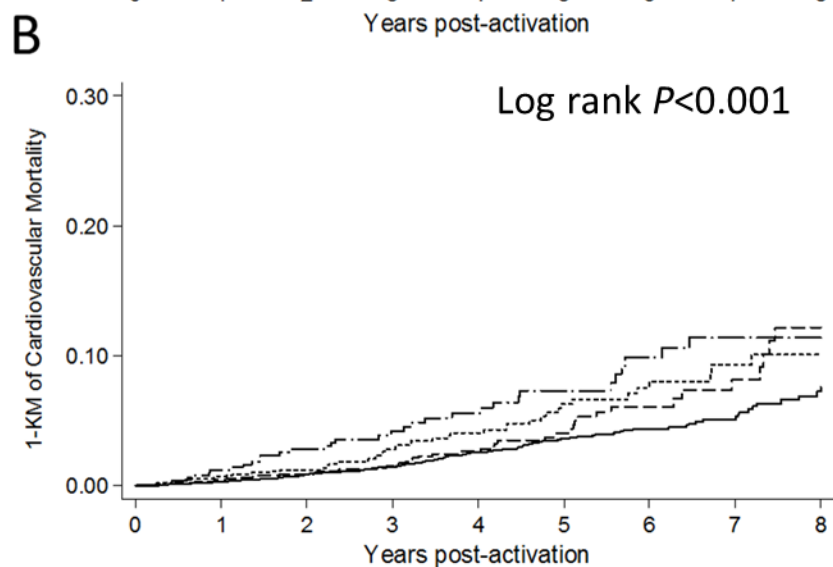
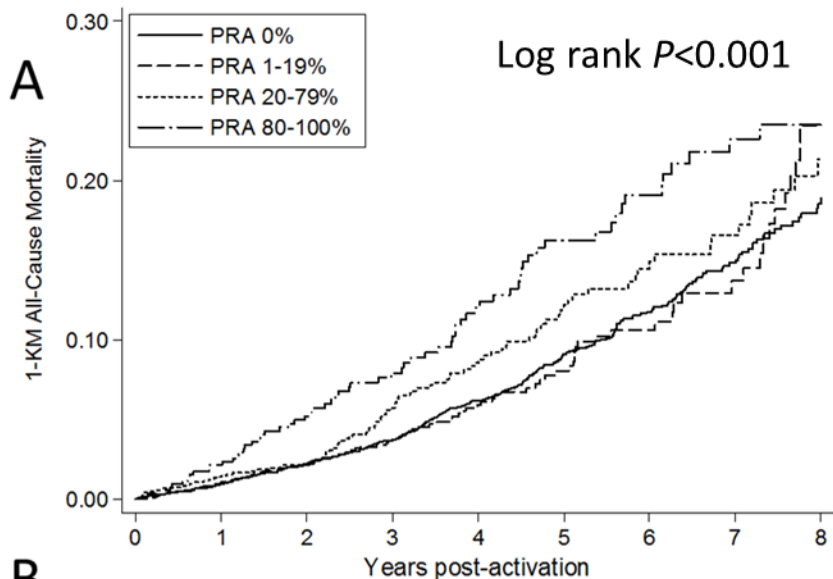
SUPPLEMENTAL MATERIAL 5: Association between Time-Varying PRA Category and Cardiovascular Mortality by Patient Subgroups

Subgroups of covariates		Number of patients in subgroups	PRA 0%	PRA 1-19%	PRA 20-79%	PRA 80-100%	P value for interaction between PRA and covariates
				HR (95% CI)	HR (95% CI)	HR (95% CI)	
Transplant candidate's age (years)	18-34-9	20,458	referent	1.15 [0.91, 1.45]	1.34 [1.03, 1.73]	1.45 [1.07, 1.98]	0.06
	35-44-9	26,927	referent	1.25 [1.08, 1.45]	1.17 [0.99, 1.38]	1.49 [1.24, 1.80]	
	45-49-9	19,812	referent	1.09 [0.94, 1.28]	1.35 [1.15, 1.58]	1.26 [1.02, 1.55]	
	50-54-9	23,460	referent	1.03 [0.90, 1.17]	1.15 [1.00, 1.33]	1.13 [0.93, 1.37]	
	55-59-9	24,699	referent	1.06 [0.94, 1.19]	1.12 [0.98, 1.28]	1.17 [0.98, 1.40]	
	60-64-9	21,590	referent	1.01 [0.89, 1.13]	1.05 [0.92, 1.21]	1.16 [0.97, 1.38]	
	≥65	20,458	referent	0.96 [0.86, 1.07]	0.94 [0.82, 1.07]	1.11 [0.94, 1.31]	
Candidate's sex	Male	96,428	referent	1.06 [1.00, 1.13]	1.17 [1.06, 1.29]	1.45 [1.23, 1.71]	0.06
	Female	64,880	referent	1.02 [0.94, 1.11]	1.07 [0.99, 1.15]	1.15 [1.06, 1.25]	
Candidate's Race	White	75,140	referent	1.06 [0.99, 1.15]	1.08 [0.98, 1.19]	1.14 [1.01, 1.28]	0.38
	Black	48,076	referent	1.06 [0.97, 1.16]	1.15 [1.05, 1.26]	1.33 [1.19, 1.49]	
	Hispanic	25,589	referent	0.97 [0.86, 1.09]	1.09 [0.95, 1.26]	1.18 [0.98, 1.42]	
	Asian	9,255	referent	0.99 [0.80, 1.23]	0.97 [0.73, 1.28]	0.93 [0.62, 1.40]	
	Other	3,248	referent	1.38 [0.99, 1.91]	1.44 [1.02, 2.04]	1.24 [0.81, 1.90]	
Cause of End Stage Renal Disease	GN	30,624	referent	1.17 [0.99, 1.38]	1.31 [1.10, 1.55]	1.44 [1.17, 1.77]	0.51
	DM	53,133	referent	1.01 [0.94, 1.08]	1.09 [1.00, 1.18]	1.14 [1.02, 1.27]	
	PKD	12,951	referent	0.99 [0.74, 1.33]	1.08 [0.78, 1.49]	1.20 [0.78, 1.86]	
	HTN	38,585	referent	1.04 [0.93, 1.15]	1.10 [0.97, 1.24]	1.24 [1.07, 1.44]	
	Other	26,015	referent	1.17 [1.02, 1.35]	1.10 [0.93, 1.30]	1.29 [1.05, 1.58]	
Dialysis prior to activation	HD	96,907	referent	1.04 [0.98, 1.11]	1.10 [1.03, 1.18]	1.20 [1.10, 1.30]	0.10
	PD	16,910	referent	1.10 [0.95, 1.28]	1.14 [0.97, 1.35]	1.03 [0.82, 1.30]	
	No dialysis	39,104	referent	0.92 [0.77, 1.08]	1.12 [0.93, 1.34]	1.54 [1.23, 1.94]	
	Modality unknown	8,387	referent	1.37 [1.07, 1.75]	1.16 [0.87, 1.54]	1.39 [0.93, 2.08]	
Time from dialysis initiation to activation	Preemptive	43,650	referent	1.03 [0.91, 1.18]	1.19 [1.02, 1.38]	1.64 [1.37, 1.97]	0.06
	<12 months	54,999	referent	1.03 [0.94, 1.13]	1.15 [1.04, 1.28]	1.15 [1.07, 1.43]	
	1 to 2 years	32,037	referent	1.04 [0.94, 1.15]	1.07 [0.95, 1.20]	1.24 [1.07, 1.43]	
	2 to 3 years	13,646	referent	1.04 [0.90, 1.19]	1.02 [0.86, 1.20]	0.93 [0.74, 1.17]	
	>3 years	16,976	referent	1.11 [0.98, 1.26]	1.11 [0.96, 1.27]	1.19 [1.01, 1.41]	
Activation era	2000-2003	54,486	referent	1.06 [0.98, 1.13]	1.22 [1.12, 1.32]	1.22 [1.10, 1.36]	0.018

	2004-2006	52,238	referent	0.98 [0.90, 1.07]	0.97 [0.88, 1.08]	1.19 [1.04, 1.35]	
	2007-2009	54,584	referent	1.16 [1.03, 1.30]	1.11 [0.97, 1.27]	1.23 [1.02, 1.48]	
Diabetes Mellitus at activation	No	95,292	referent	1.08 [0.99, 1.17]	1.13 [1.03, 1.24]	1.31 [1.17, 1.47]	0.29
	Yes	66,016	referent	1.03 [0.97, 1.10]	1.10 [1.02, 1.19]	1.15 [1.04, 1.26]	
Peripheral vascular disease at Activation	No	152,909	referent	1.05 [1.00, 1.11]	1.11 [1.05, 1.19]	1.23 [1.14, 1.33]	0.59
	Yes	8,399	referent	1.03 [0.87, 1.20]	1.08 [0.90, 1.29]	1.03[0.81, 1.32]	

Abbreviations: HR, hazard ratio; CI, confidence interval; PVD, peripheral vascular disease; GN, glomerulonephritis; DM, diabetes mellitus, PKD, polycystic kidney disease, HTN, hypertensive nephropathy; HD, hemodialysis; PD, peritoneal dialysis

SUPPLEMENTAL MATERIAL 6: Extended Kaplan-Meier Failure Curves of All-Cause Mortality (A) and Cardiovascular Mortality (B) among Waitlisted Kidney Transplant Candidates in a Subcohort with a Low Comorbidity Risk



Number at risk

	0	1	2	3	4	5	6	7	8
PRA 0%	14130	8933	5976	3978	2479	1476	876	500	265
PRA 1-19%	2581	1865	1271	805	503	311	164	111	67
PRA 20-79%	1385	1121	894	642	421	280	191	129	72
PRA 80-100%	549	480	385	301	234	168	127	93	67

SUPPLEMENTAL MATERIAL 7: All-Cause and Cardiovascular Mortality for every 10% increase in Delta PRA by 3-, 6-, and 12-months following Activation by Landmark Analyses

ALL-CAUSE MORTALITY						
Model	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 3-months post-activation	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 6-months post-activation	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 12-months post-activation
3	8,315 / 890	1.05 [1.02, 1.09]	5,699 / 579	1.02 [0.99, 1.06]	3,428 / 347	1.05 [1.01, 1.10]
CARDIOVASCULAR MORTALITY						
Model	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 3-months post-activation	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 6-months post-activation	Number of patients* / events	HR (95% CI) per 10% increase in delta PRA [◊] by 12-months post-activation
3	8,315 / 369	1.05 [0.99, 1.10]	5,699 / 257	1.01 [0.95, 1.07]	3,428 / 143	1.06 [0.99, 1.13]

Model 3: PRA category, age, sex, race, body mass index, cause of end-stage renal disease, dialysis modality, time from dialysis initiation to activation, activation era, multi-listing, Hepatitis C

◊Delta PRA is the difference in PRA measured at landmark time points vs. activation

*Number of patients in the subcohort of patients who were activated after 2007 who had PRA measurements at landmark time points (3, 6, 12 months) following activation

SUPPLEMENTAL MATERIAL 8: Frequency of Candidates' Cause of Death in the Study Cohort by Scientific Registry of Transplant Recipients (SRTR) and Centers for Medicare & Medicaid Services (CMS) Data

CANDIDATE'S CAUSE OF DEATH	SRTR AUGMENTED BY CMS DATA		SRTR DATA		CMS DATA	
	NUMBER OF EVENTS	PERCENT	NUMBER OF EVENTS	PERCENT	NUMBER OF EVENTS	PERCENT
Cardiovascular	12,792	44.9%	4,170	14.6%	12,741	44.7%
Infection/sepsis	3,280	11.5%	1,099	3.9%	3,262	11.4%
Malignancy	806	2.8%	273	1.0%	762	2.7%
Hemorrhage	515	1.8%	200	0.7%	487	1.7%
Trauma	110	0.4%	110	0.4%	0	0.0%
Miscellaneous	2,724	9.6%	797	2.8%	2,789	9.8%
Other	2,790	9.8%	1,945	6.8%	1,239	4.3%
Unknown/Missing	5,496	19.3%	19,919	69.9%	7,233	25.4%

SUPPLEMENTAL MATERIAL 9: Association between Time-Varying PRA Category and Cardiovascular Mortality using the Scientific Registry of Transplant Recipients (SRTR) and Centers for Medicare & Medicaid Services (CMS) data

CARDIOVASCULAR MORTALITY (SRTR)				
Models	PRA 0%	PRA 1-19%	PRA 20-79%	PRA 80-100%
		HR (95% CI)	HR (95% CI)	HR (95% CI)
1	Referent	1.01 [0.93, 1.11]	1.17 [1.07, 1.29]	1.36 [1.20, 1.53]
2	Referent	1.06 [0.97, 1.15]	1.32 [1.20, 1.46]	1.59 [1.40, 1.81]
3	Referent	1.04 [0.95, 1.13]	1.23 [1.12, 1.36]	1.45 [1.28, 1.65]
CARDIOVASCULAR MORTALITY (CMS)				
Models	PRA 0%	PRA 1-19%	PRA 20-79%	PRA 80-100%
		HR (95% CI)	HR (95% CI)	HR (95% CI)
1	Referent	1.01 [0.96, 1.07]	1.00 [0.95, 1.06]	1.07 [0.99, 1.15]
2	Referent	1.06 [1.01, 1.11]	1.12 [1.05, 1.18]	1.22 [1.13, 1.32]
3	Referent	1.05 [1.00, 1.10]	1.11 [1.04, 1.18]	1.18 [1.10, 1.28]

Model 1: PRA category

Model 2: PRA category, age, sex, race, body mass index, cause of end-stage renal disease

Model 3: PRA category, age, sex, race, body mass index, cause of end-stage renal disease, dialysis modality, time from dialysis initiation to activation, activation era, multi-listing, Hepatitis C

Abbreviations: HR, Hazard ratio; CI, confidence interval