

INTRODUCTION

- Public insurance coverage at the time of kidney transplant (KTx), or changing from private to public insurance coverage after transplant, are associated with decreased graft survival.¹⁻³
- KTx recipients, unlike recipients of other solid organ transplants, have historically been eligible for coverage of immunosuppressant medications for 36 months following transplant under Medicare Part B.⁴
- Using data from the United Network for Organ Sharing (UNOS), we tested the hypothesis that return to employment after KTx moderates the association between early Medicare exit and graft failure or mortality.

MATERIALS & METHODS

The study was deemed not human subjects research by the local IRB. Data were obtained from the UNOS registry, including follow-up through November 2020. KTx recipients aged 18 years or older from January 2005 through November 2017 were included to allow for at least 3 years of follow-up data.

The primary outcome was a composite of mortality or graft failure, conditional on 3 years of post-transplant survival with a functioning graft.

Patients were categorized into four groups:

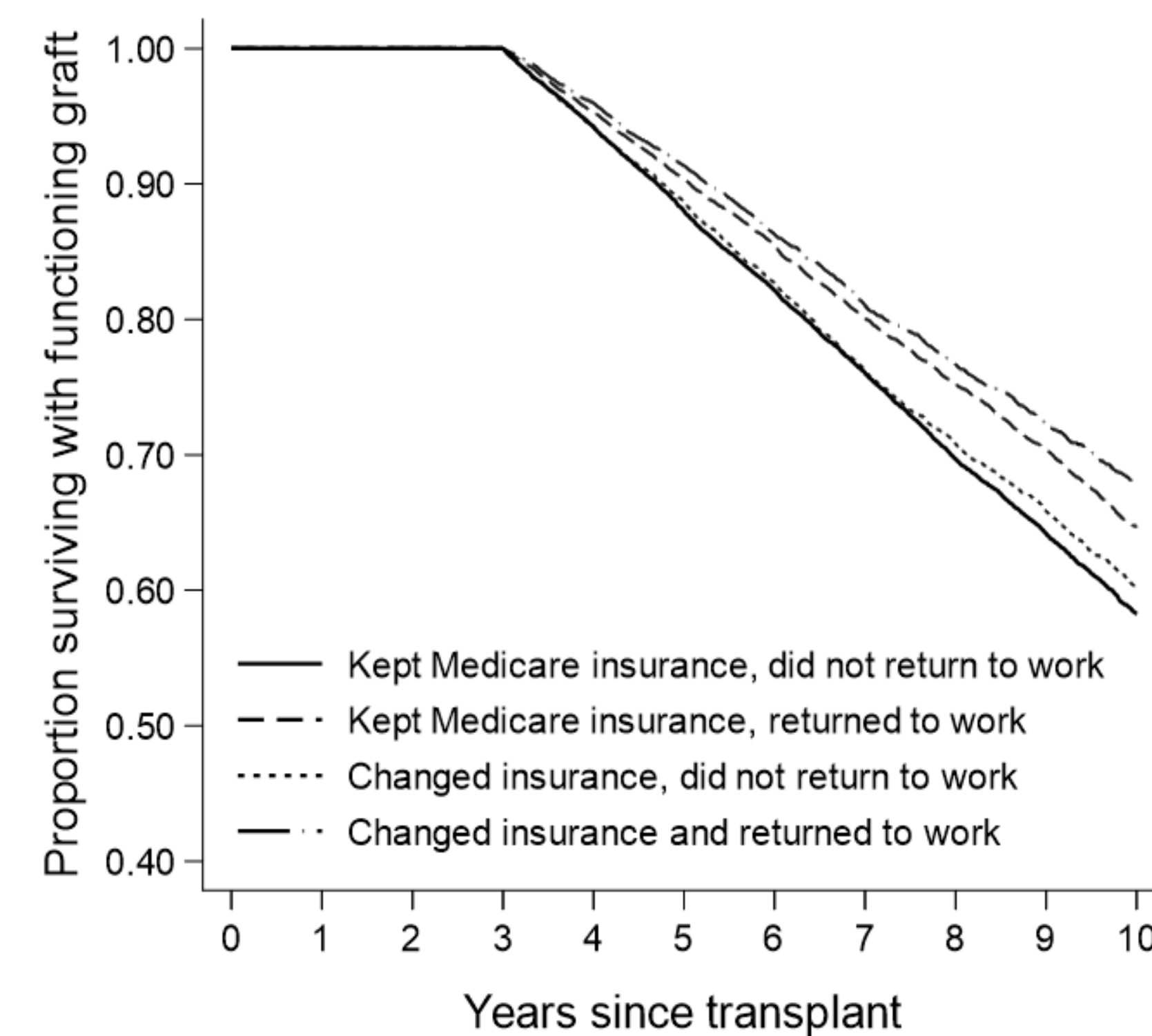
Retain Medicare No Work	Retain Medicare Return to Work	Exit Medicare No Work	Exit Medicare Return to Work
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Survival analysis used Kaplan-Meier curves with a log-rank test, and multivariable Cox proportional hazards models.

In the primary analysis, the insurance coverage covariate (exited Medicare coverage vs. retained coverage) was interacted with employment status to test the hypothesis that return to employment would moderate the association between Medicare exit and post-transplant outcomes.

RESULTS

The sample included 45,289 patients with a median follow-up time of 7 years. Of this sample, 12,797 patients (28%) experienced death or graft failure during follow-up and 12,777 (28%) changed insurance coverage from Medicare. During the first 3 years post-transplant, 16,673 patients participated in paid work (37%), and 23,489 achieved a functional status score of 100% (51%).



	0	1	2	3	4	5	6	7	8	9	10
Kept Medicare, no work	22586	22586	22586	22586	18661	15325	12393	9699	7341	5498	3912
Kept Medicare, resumed work	10466	10466	10466	10466	8633	7126	5707	4487	3483	2619	1839
Changed insurance, no work	6480	6480	6480	6480	5425	4520	3642	2860	2235	1711	1224
Changed insurance, resumed work	6297	6297	6297	6297	5291	4426	3593	2896	2298	1810	1383

Figure 1 compares survival outcomes by insurance coverage and work status. The log-rank tests confirmed statistically significant differences in survival across the four groups ($p < 0.001$).

- Factors associated with increased hazard included prolonged hospital stay, acute rejection within the first year, and comorbidities of diabetes mellitus or peripheral vascular disease.
- Patients of non-Hispanic Black race faced increased hazard of mortality and graft failure compared to patients of other racial/ethnic groups.
- Donor characteristics associated with increased hazard to graft outcomes included increased donor age and non-Hispanic Black race/ethnicity.
- Factors associated with reduced hazard included pretransplant employment and an indication other than glomerular disease or tubulointerstitial disease.
- Women and patients of Hispanic/Latino ethnicity had decreased hazard to graft survival as well as receiving the kidney from a living donor.

Table 1

Variable	HR	95% CI	P
Changed insurance coverage*	0.98	0.93, 1.03	0.484
Returned to work*	0.91	0.87, 0.96	<0.001
Changed insurance X returned to work*	0.95	0.87, 1.03	0.178
Recipient age (years)	1.00	1.00, 1.00	0.379
Recipient sex			
Male	Ref.		
Female	0.92	0.89, 0.95	<0.001
Recipient race/ethnicity			
Non-Hispanic White	Ref.		
Non-Hispanic Black	1.13	1.08, 1.18	<0.001
Hispanic/Latino	0.78	0.72, 0.82	<0.001
Other	0.81	0.74, 0.87	<0.001
Indication for transplant			
Glomerular disease	Ref.		
Tubulointerstitial disease	1.05	0.94, 1.16	0.322
Other	0.79	0.74, 0.83	<0.001
BMI (kg/m ²)	1.01	1.00, 1.01	0.001
Cold ischemia time (hr)	1.00	1.00, 1.00	0.346
Hospital LOS (d)	1.002	1.001, 1.003	<0.001
Acute rejection within 1 yr	1.43	1.34, 1.51	<0.001
Pretransplant diabetes	1.47	1.41, 1.53	<0.001
Pretransplant PVD	1.26	1.17, 1.35	<0.001
Pretransplant % KPS	1.00	1.00, 1.00	0.023
Educational attainment			
High school or less	Ref.		
Some college	0.99	0.94, 1.03	0.560
College degree	0.93	0.88, 0.98	0.004
Pretransplant employment	0.91	0.86, 0.95	<0.001
Donor age (years)	1.01	1.01, 1.01	<0.001
Donor sex			
Male	Ref.		
Female	1.01	0.98, 1.05	0.489
Donor race/ethnicity			
Non-Hispanic White	Ref.		
Non-Hispanic Black	1.12	1.06, 1.17	<0.001
Hispanic/Latino	0.97	0.92, 1.03	0.359
Other	1.04	0.94, 1.14	0.396
Living donor	0.81	0.76, 0.85	<0.001
Transplant year	1.00	0.99, 1.00	0.262

Among patients who returned to work, a change in insurance coverage from Medicare was associated with a 7% reduction in hazard of the composite outcome of graft failure or patient mortality (HR: 0.93; 95% CI: 0.87, 0.99; $p=0.024$). Particularly, a change to private insurance was associated with reduced hazard of graft failure or patient mortality among those returning to work (HR: 0.89; 95% CI: 0.83, 0.96; $p=0.001$).

Table 2

Model	Variable	HR	95% CI	P
Primary model	(a) Change in insurance among patients not working	0.98	0.93, 1.03	0.484
	(b) Change in insurance among patients returning to work	0.93	0.87, 0.99	0.024
	Difference between (b) and (a)	0.95	0.87, 1.03	0.178
Detailed change in insurance	(c) Change to private insurance among patients not working	0.97	0.91, 1.03	0.322
	(d) Change to other insurance among patients not working	1.00	0.93, 1.07	0.994
	(e) Change to private insurance among patients returning to work	0.89	0.83, 0.96	0.001
	(f) Change to other insurance among patients returning to work	1.09	0.97, 1.22	0.155
Primary model, stratified by KPS	Difference between (e) and (c)	0.92	0.84, 1.01	0.091
	Difference between (f) and (d)	1.09	0.95, 1.25	0.225
	(g) Change in insurance among patients attaining <100% KPS	0.94	0.89, 0.988	0.042
Detailed change in insurance, stratified by KPS	(h) Change in insurance among patients attaining 100% KPS	0.97	0.92, 1.02	0.289
	Difference between (h) and (g)	1.03	0.95, 1.12	0.423
	(i) Change to private insurance among patients attaining <100% KPS	0.91	0.85, 0.98	0.011
	(j) Change to other insurance among patients attaining <100% KPS	1.00	0.91, 1.09	0.933
Detailed change in insurance, stratified by KPS	(k) Change to private insurance among patients attaining 100% KPS	0.93	0.87, 0.99	0.021
	(l) Change to other insurance among patients attaining 100% KPS	1.06	0.98, 1.15	0.166
	Difference between (k) and (l)	1.02	0.93, 1.11	0.730
	Difference between (i) and (j)	1.06	0.94, 1.20	0.334

DISCUSSION

- Early exit from Medicare was favorably associated or not associated with patient and graft survival greater than 3 years after transplant, depending on whether patients returned to work.
- Patients who return to work regardless of insurance coverage type tend to have better graft survival.
- Among those returning to work, a change in insurance from Medicare is associated with reduced hazard of graft failure or mortality.
- This potentially demonstrates that patients able to return to employment and either gain coverage through their employer or purchase coverage individually through the marketplace have better long-term graft survival compared to patients who return to work but stay insured by Medicare.
- Multiple studies indicate that patients who were employed prior to transplantation are most likely to return to work after KTx.^{5,6}
- About half of patients who consider themselves able to work after KTx are employed.

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ACKNOWLEDGEMENTS

This project was made possible by the Summer Scholars Research Program at the Brody School of Medicine. The project was completed by Jacob Ford under guidance from Dr. Dmitry Tumin, Dr. Hostensia Beng and Dr. Liliana Gomez Mendez.