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Life Insurance for Living Kidney Donors: A Canadian Undercover Investigation

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Some living kidney donors encounter difficulties obtaining life insurance, despite previous surveys of insurance companies reporting otherwise. To better understand the effect of donation on insurability, we contacted offices of life insurance companies in five major cities in Canada to obtain $100 000 of life insurance (20-year term) for 40 fictitious living kidney donors and 40 paired controls. These profiles were matched on age, gender, family history of kidney disease and presence of hypertension. The companies were blinded to data collection. The study protocol was reviewed by the Office of Research Ethics. The main study outcomes were the annual premium quoted and total time spent on the phone with the insurance agent. All donor and control profiles received a quote, with no significant difference in the premium quoted (medians $190 vs. $209, p = 0.89). More time was spent on the phone for donor compared to control profiles, but the absolute difference was small (medians 9.5 vs. 7.0 min, p = 0.046). Age, gender, family history of kidney disease and new-onset hypertension had no further effect on donor insurability in regression analysis. We found no evidence that kidney donors were disadvantaged in the first step of applying for life insurance. The effect donation has on subsequent phases of insurance underwriting remains to be studied.

Key words: Insurability; insurance, life; kidney transplantation; living donors; premium; undercover

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Introduction

Kidney transplantation from a living donor is the treatment of choice for many patients with kidney failure. Living organ donation is a complex issue and is practiced with the expectation that any negative outcomes for the donor are outweighed by psychological benefits of altruism and improved health for the recipient. While the biological and psychological effects of living kidney donation have been frequently studied (1–4), the financial implications for donors, particularly the future ability to obtain insurance, are less clear.

We recently completed a systematic review on insurability of living organ donors (5). We summarized 23 studies published from 1972 to 2006, with data on 2067 donors, 385 potential donors and 239 responses from insurance companies. Five studies surveyed insurance companies, of which almost all (97–100%) would provide life insurance to living kidney donors (6–10). Most also stated they would not charge higher premiums. In contrast, in six donor follow-up studies, up to 11% of the 1161 donors reported difficulties with insurance (11–16).

Reasons for the discrepancy in response between companies and donors were unclear. Inherent limitations of survey responses and the lack of suitable controls may have played a role. It is also possible that donor insurability was influenced by postdonation complications, such as new-onset hypertension, or donor characteristics, such as age, gender and family history of kidney disease.

A better understanding of insurability would improve informed consent, address donor concerns and facilitate efforts to minimize this potential barrier to donation. We set out to measure living kidney donor insurability directly using an experimental design, with concurrent controls and blinding of insurance companies during data collection.

Methods

Study overview

We telephoned the offices of five industry-leading life insurance companies in five major cities across Canada to obtain 20-year term life insurance of $100 000 coverage for fictitious donor and control profiles.

Profiles

We first generated 16 unique donor profiles by combining four prespecified characteristics in a in a factorial manner: age (28–32 vs. 58–62 years old), gender, family history of kidney disease and new-onset hypertension. Each was then paired with a matching control (nondonor) profile, and assigned randomly, with blocking, to two to three different insurance offices/agents. In total, we presented 40 donor profiles and 40 matching control profiles to obtain life insurance quotes.

For the purpose of our study, all donors donated the left kidney about 3 years ago, to either a sibling (if the profile was positive for family history of kidney disease) or a spouse (if negative for family history). Profiles with new-onset hypertension developed mild hypertension (145/95 mmHg) approximately 6 months ago, with blood pressure well controlled on a single agent, amlodipine 5 mg daily, for the past 3 months.

Insurance companies

We chose the inclusion and exclusion criteria to ensure a representative sample from the Canadian life insurance industry. An insurance company was eligible for contact if (a) it provided term life insurance to individual Canadians, (b) it was among the top 20 life insurers according to recent industry reports; and (c) it had offices and/or agents who could be contacted directly by telephone to provide premium quotes. An insurance company was excluded if it required additional questionnaires, nursing visits, laboratory tests, or physical examination before a premium quote was issued.

Using recent industry reports, we selected five major life insurance companies with Canada-wide presence, including the three largest companies which encompass over 70% of the Canadian life insurance market (17).

Data collection

We contacted company offices in five major Canadian cities (Vancouver, Calgary, Winnipeg, Toronto and Halifax) from October 2007 to January 2008, after a pilot phase (August to September 2007) to test feasibility. We used company offices in the London and Hamilton areas for the pilot phase to minimize premature exposure of the target company offices to the study process.

Six investigators (RCY, DL, AY, AKJ, IFPN and AD) participated in the calling process. Using cellular phones registered to each of the study cities, and special calling cards which displayed a local number on the receiving end, the callers telephoned insurance company offices, provided relevant information associated with the assigned profile and obtained a premium quote for that profile.

Ethics

The Director of the Office of Research Ethics at the University of Western Ontario reviewed the study protocol prior to study initiation. The study was exempted from review by the Research Ethics Board (REB) for three main reasons. No human subjects were to be involved. No individual was to be identified through the data collected; the insurance agents providing the quotes were not to be asked personal information, and the telephone conversations were not to be taped. The study had no foreseeable influence on the life, well being or health of the insurance agents.

Nevertheless, we recognized that to generate the quotes, the insurance companies/agents would have to spend a certain amount of resources, which in this case would not lead to the sale of insurance policies. However, providing a quote to a potential customer without a guarantee of a policy purchase at the end is considered a common practice in the insurance industry, and the amount of company resources spent for each individual premium quote was deemed very small.

Study outcomes

The primary outcome was the annual premium quoted, in dollars. The secondary outcome was total time spent on the phone, in minutes, with the insurance agent until a quote was given.

Sample size

The sample size of 40 pairs was mainly limited by the necessity to maintain blinding of the companies to data collection. Since living kidney donors represent a very small fraction of potential life insurance purchasers, blinding might become compromised if more than one or two donor profiles were presented to an office over the study duration. Therefore, we limited each regional office to two donor profiles for the larger companies (2×5 offices $\times$ 3 companies $= 30$ donor profiles), and only one donor profile for the smaller companies (1×5 offices $\times$ 2 companies $= 10$ donor profiles).

Statistical analysis

We assessed normality of the outcomes using Q–Q plots, and presented nonnormally distributed data as the median and interquartile range (IQR). We used the Wilcoxon signed-rank test to compare donors and controls on the primary and secondary outcomes. We used Hodges–Lehmann estimates to calculate 95% confidence intervals around group median differences (18).

In additional analyses, we sequentially compared premium quotes between profiles matched on four prespecified factors using the Wilcoxon signed-rank test. The four factors were age (older vs. younger), gender, family history of kidney disease and presence of new-onset hypertension. We used the Kruskal–Wallis test to compare premium quotes between insurance companies, between cities and between callers. We assessed the effect of the caller on the premium quoted, adjusted for the four prespecified factors, using Type I (hierarchical decomposition) sum of squares.

Then, using multiple linear regression, we examined if the four prespecified factors influenced donor insurability—i.e. whether they modified the relationship between donation status and the primary outcome. First, we created an additive model (where the null hypothesis assumed no difference between each donor and its paired control). We entered the difference in premium within each donor–control pair as the dependent variable, and the four prespecified factors as predictor variables. Signed square-root transformation was required because the residuals were not normally distributed. Next, we used a multiplicative model (where the null hypothesis assumed that the ratio between the donor and its paired control was 1). We needed to log-transform the data to achieve normality in the residuals. We used Levene's test to test for equality of error variances (19).

We performed the analyses using SPSS 16.0.0 for Windows (SPSS Inc., Chicago, IL) and StatXact 8.0.0 (Cytel Inc., Cambridge, MA). All p-values were two tailed and considered statistically significant when less than 0.05. For nonparametric tests, we used the Exact and Monte Carlo methods over the asymptotic approach whenever possible. Boxes in boxplots represent the interquartile range, for which the top, middle and bottom lines are 75th percentile, median, and 25th percentile, respectively. Top and bottom whiskers enclose data points within 1.5 times the interquartile range.

Results

No company was excluded, as we were able to obtain premium quotes by phone from all companies contacted.

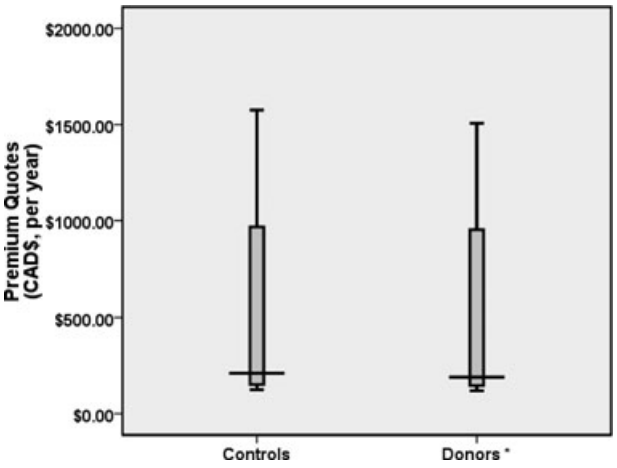

Figure 1: Premium quoted for a 20-year term life insurance of $100 000 coverage. CAD$, Canadian dollars. *An outlier of $3149 in the donor group is not presented in this graph, but was included in the analysis.

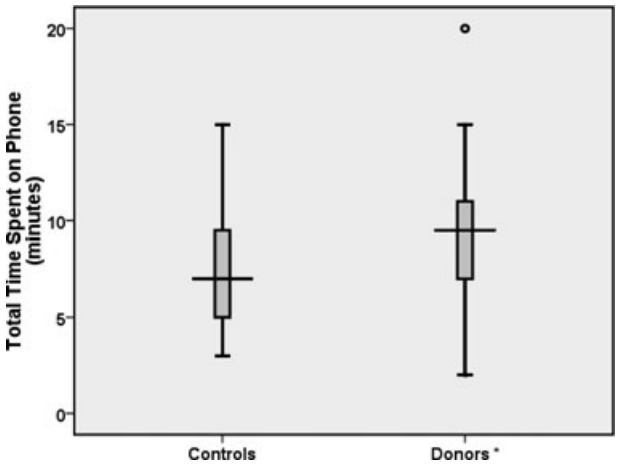

Figure 2: Total time spent on phone with insurance agent before a quote was obtained. *An outlier of 26 min in the donor group is not presented in this graph but was included in the analysis.

Premium quotes

All donor and control profiles received a quote. The median quoted premium for donors was $190 (interquartile range $145, $962), and for controls $209 (interquartile range $151, $984) (Figure 1). While there were significant differences attributable to age, gender, family history of kidney disease and new-onset hypertension (see below), there was no statistically significant difference in quotes between donors and controls ($Z = -0.144$, $p = 0.89$) (Table 1). We ruled out a difference of $15 or more between donors and controls (Hodges–Lehmann's 95% confidence interval [CI] –$7.40, $14.70).

Total time on the phone

The median time spent on the phone was 9.5 min for donors (interquartile range 7.0, 11.0), and 7.0 min for controls (interquartile range 5.0, 9.8) (Figure 2). Although the medians only differed by 2.5 min, the difference between groups was statistically significant ($Z = -1.992$, $p = 0.046$) (Table 1).

Table 1: Primary and secondary outcomes

Outcome	Controls (n = 40)	Donors (n = 40)	Significance[1]
Premium quotes for a 20-year term life insurance of $100 000			
Median	$209	$191	p = 0.89
Interquartile range	$151, $984	$145, $962	
Total time spent on phone with agent (min)			
Median	7.0 min	9.5 min	p = 0.046
Interquartile range	5.0, 9.8 min	7.0, 11.0 min	

[1]Wilcoxon's signed-rank test (two-tailed, exact method).

Factors affecting premium quoted

Premium quotes for older profiles were significantly greater than for younger profiles ($Z = -5.373$, $p < 0.001$; median difference: $850, 95% CI $772, $1015) as were male compared to female profiles ($Z = -3.560$, $p < 0.001$; median difference: $213, 95% CI $36, $320). Similarly, profiles with a family history of kidney disease received higher quotes that those without such a history ($Z = -1.994$, $p = 0.046$; median difference: $40, 95% CI $1, $348), as did profiles with new-onset hypertension compared to those without such a history ($Z = -2.107$, $p = 0.034$; median difference: $15, 95% CI $1, $77).

There was no difference in premium quotes between the five cities ($p = 0.21$) or between companies ($p = 0.10$). While there was a significant difference between callers (Kruskal–Wallis test, $p < 0.001$), the difference was no longer present after adjusting for the profile mix assigned to each caller ($p = 0.368$).

Factors influencing donor insurability

The differences in premium quotes between matched donor–control pairs ranged from –$244 to $1642, with a median of $0.50 (IQR $9.20). Using the additive model, none of the four prespecified factors (age, gender, family history of kidney disease and presence of new-onset hypertension) had a significant effect on donor insurability in multiple linear regression analysis (p-value ranged from 0.20 to 0.99) (Table 2). The multiplicative model was superior to the additive model ($R^2 = 0.21$ vs. 0.09). Again, none of the four prespecified factors were significant (p-value ranged from 0.07 to 0.58).

Table 2: Multiple linear regression analysis of factors modifying donor insurability (premium quotes)

Factor	Regression coefficient (β)	95% Confidence interval	Significance (p-Value)
Constant	−0.953	−7.144, 5.239	0.76
Age (older vs. younger)	1.522	−1.869, 4.912	0.37
Gender (male vs. female)	−0.757	−4.147, 2.634	0.65
Family history of kidney disease	2.180	−1.211, 5.570	0.20
New-onset hypertension	0.009	−3.382, 3.399	1.00

Dependent variable: difference in premium quotes between the donor and the matching control, after square-root transformation.

Discussion

Currently, there is a discrepancy among previous self-reported surveys; some living kidney donors reported difficulty with insurance while reassuring answers were provided by insurance companies (6–16). To our knowledge, this is the first study to directly assess living kidney donor insurability using an experimental design, concurrent controls and blinded data collection. We found no evidence that living kidney donors were disadvantaged in the first step or pre-underwriting phase of applying for life insurance in Canada.

Possible reasons for our findings

Fundamentally, life insurance functions on the basis of risk identification and risk pooling. Companies identify and quantify risks of premature mortality in applicants through the use of questionnaires, physical examination and various laboratory tests, and then pool risks across a large number of individuals with similar or lower risks (20,21).

To become a living kidney donor, an individual undergoes extensive medical and psychological evaluation; donation is allowed to proceed only after major illnesses and diseases have been ruled out. Thus, living kidney donors represent a highly selected group of individuals with lower risks than what insurance companies can ascertain through the usual risk identification process at the time of application.

Indeed, living kidney donors have been shown to have better life expectancy (22,23) and lower risks of long-term disability (24) compared to the general population. There really is no reason for companies to charge individuals higher life insurance premiums simply because of a past history of kidney donation.

Strengths and limitations of this study

Compared to previous studies in this area, our methodology is more robust, due to the use of an experimental design, concurrent controls and blinded data collection. The experimental design maximized our ability to detect how each factor influenced donor insurability. Had we designed the profiles with real-life prevalence of these factors in the donor population, there would not have been enough profiles with hypertension to allow a meaningful analysis.

A smaller study by Nissing and Hayashi used a similar design to assess life insurability after right hepatic lobe donation (25). Their results are not generalizable to kidney donors, given the much higher risks of morbidity (26–28) and mortality (27,29) associated with living liver donation. Unlike our study, Nissing and Hayashi also did not consider female donors, older donors or donors with complications. Our profiles included living-related and unrelated donors of both genders and different ages, so our main results should be generalizable to the majority of the living kidney donor population.

By including five major life insurance companies with a Canada-wide presence (including the three largest which encompass over 70% of the Canadian life insurance market) and collecting data from five major Canadian cities, our results are generalizable to the Canadian life insurance industry as a whole.

Our study is not without limitations. For one, the amount applied for ($100 000) may have been too small to elicit a difference between donors and controls. Through the course of this investigation, many insurance agents (n = 11) commented that the lower 'preferred' rates only existed for policies with over $200 000 or $250 000 of coverage. However, such an application would usually require in-person visits, laboratory tests and physical examination, none of which were possible within our framework. Furthermore, we believe $100 000 represents a reasonable amount of coverage in real life. This value is so commonly chosen that most companies sell it at a discount in terms of premium per $1000 of coverage. Also consider an insurance product specifically designed for living kidney donors. It is underwritten by AIG Insurance, and administered by the South-Eastern Organ Procurement Foundation (SEOPF) in the United States (30). In addition to life insurance, the total benefit amount of $250 000 also covers medical expenses and disability income related to living kidney donation (31). Therefore, $100 000 for life insurance alone is in keeping with real-life practice in North America.

Some may also be concerned with our use of fictitious profiles, leading to quotes obtained without completion of the underwriting process. However, we have reasons to believe that our findings are reflective of what living kidney donors experience in real life. Age, gender, family history of kidney disease and hypertension are all known to have an effect on life insurance premiums (20). Our results showed similar relationships between premium and these four factors, lending support to the robustness of our design. Moreover, several insurance agents in our study (n = 9) did review the provided medical information with

underwriters in their central offices, and invariably the response was that donation would not result in increased premiums as long as the remaining kidney was normal in function.

Although we believe our results reflect real-life experience, confirmation that donation status does not influence insurability in subsequent phases of insurance underwriting is still needed. Much work is also needed in other areas of insurance, including disability insurance and health insurance, particularly in countries without universal health insurance coverage.

Clinical and policy implications

Uncertainty about future insurability is a source of concern for donors from diverse backgrounds (11,32–35), and may be underrecognized, even by those close to the donor (11). Concerns about insurability may also affect the decision to donate. In a large survey of 536 living kidney donors, it was found that donors whose insurance premiums increased after donation were less likely to reaffirm their decision to donate (16). Clearly, a better understanding of insurability is needed to allow informed consent, address donor concerns and prevent it from becoming a barrier to donation. Even if donors are willing to accept risks of being denied insurance and/or higher insurance premiums, transplant professionals still have the ethical obligation to ensure that donors are not unnecessarily penalized.

In this investigation, we found no difference in premium quotes between donors and matching controls. Although donors did spend longer on the phone, the difference of 2.5 minutes would not cause significant hardship nor deter someone from becoming a living kidney donor. These results should be reassuring for potential donors, recipients and transplant professionals alike.

It was also reassuring to see that donors who developed hypertension were treated no differently than nondonors who developed hypertension. Still, the presence of hypertension was associated with a higher premium. This may mean that if a donor were to develop complications such as hypertension, proteinuria or impaired kidney function at a greater frequency than otherwise expected, his/her insurability would be impacted. A potential donor should be aware of this possibility prior to the transplant surgery.

Finally, only life insurability was considered in this study. It is our position that transplant professionals should counsel all potential donors on the benefit of having life, disability and health insurance policies in place before they proceed with the evaluation process. This will provide financial protection against the small risk of mortality associated with donor nephrectomy and complications arising afterward (24). It will also provide protection for previously unknown conditions and diseases which may be uncovered during the evaluation process.

Many experts have also advocated provision of insurance to living organ donors (36–38). Living kidney donation has been shown to be cost saving for society (39), in addition to the numerous benefits for the recipients (40–42). In return for their selfless gift, policymakers may wish to consider offering all living kidney donors a comprehensive insurance coverage, similar to that offered by the SEOPF registry program in the United States.

Until then, we hope that our findings will help inform potential donors, address their concerns about insurability and allow them to make an informed decision to donate.

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Conflict of Interest Statement

None declared.

References

1. Johnson EM, Remucal MJ, Gillingham KJ, Dahms RA, Najarian JS, Matas AJ. Complications and risks of living donor nephrectomy. Transplantation 1997; 64: 1124–1128.
2. Boudville N, Prasad GV, Knoll G et al. Meta-analysis: Risk for hypertension in living kidney donors. Ann Intern Med 2006; 145: 185–196.
3. Garg AX, Muirhead N, Knoll G et al. Proteinuria and reduced kidney function in living kidney donors: A systematic review, meta-analysis, and meta-regression. Kidney Int 2006; 70: 1801–1810.
4. Clemens KK, Thiessen-Philbrook H, Parikh CR et al. Psychosocial health of living kidney donors: A systematic review. Am J Transplant 2006; 6: 2965–2977.
5. Yang RC, Thiessen-Philbrook H, Klarenbach S, Vlaicu S, Garg AX. Insurability of living organ donors: A systematic review. Am J Transplant 2007; 7: 1542–1551.
6. Clarke S, Lumsdaine JA, Wigmore SJ, Akyol M, Forsythe JL. Insurance issues in living kidney donation. Transplantation 2003; 76: 1008–1009.

7. Santiago EA, Simmons RL, Kjellstrand CM, Buselmeier TJ, Najarian JS. Life insurance perspectives for the living kidney donor. Transplantation 1972; 14: 131–133.
8. Spital A. Life insurance for kidney donors–an update. Transplantation 1988; 45: 819–820.
9. Spital A. More on life insurance for kidney donors. Transplantation 1990; 49: 664.
10. Spital A, Jacobs C. Life insurance for kidney donors: Another update. Transplantation 2002; 74: 972–973.
11. Burroughs TE, Waterman AD, Hong BA. One organ donation, three perspectives: Experiences of donors, recipients, and third parties with living kidney donation. Prog Transplant 2003; 13: 142–150.
12. Fisher PA, Kropp DJ, Fleming EA. Impact on living kidney donors: Quality of life, self-image and family dynamics. Nephrol Nurs J 2005; 32: 489–500.
13. Higgerson AB, Bulechek GM. A descriptive study concerning the psychosocial dimensions of living related kidney donation. J Am Assoc Nephrol Nurses Tech1982; 9: 27–31.
14. Jackobs S, Becker T, Luck R et al. Quality of life following living donor nephrectomy comparing classical flank incision and anterior vertical mini-incision. World J Urol 2005; 23: 1–6.
15. Schover LR, Streem SB, Boparai N, Duriak K, Novick AC. The psychosocial impact of donating a kidney: Long-term follow-up from a urology based center. J Urol 1997; 157: 1596–1601.
16. Smith MD, Kappell DF, Province MA et al. Living-related kidney donors: A multicenter study of donor education, socioeconomic adjustment, and rehabilitation. Am J Kidney Dis 1986; 8: 223–233.
17. Best's Insurance Reports. Life/Health–United States & Canada. Oldwick, NJ: A. M. Best, 2006.
18. Sprent P, Smeeton NC. Section 2.2: Inferences about medians based on ranks. Applied nonparametric statistical methods, 3rd Ed. Boca Raton, FL: Chapman & Hall/CRC, 2000.
19. Brown MB, Forsythe AB. Robust tests for the equality of variances. J Am Stat Assoc 1974; 69: 364–367.
20. Brackenridge RDC, Croxson RS, Mackenzie R, eds. Brackenridge's medical selection of life risks, 5th Ed. New York: Palgrave, 2006.
21. Jerry RH. Life, health, and disability insurance: Understanding the relationships. J Law Med Ethics 2007; 35(Suppl): 80–89.
22. Fehrman-Ekholm I, Elinder CG, Stenbeck M, Tyden G, Groth CG. Kidney donors live longer. Transplantation 1997; 64: 976–978.
23. Holdaas H, Hartmann A, Leivestad T et al. Mortality of living kidney donors during 32 years of observation. J Am Soc Nephrol 1997; 8: 685A.
24. Hartmann A, Fauchald P, Westlie L, Brekke IB, Holdaas H. The risk of living kidney donation. Nephrol Dial Transplant 2003; 18: 871–873.
25. Nissing MH, Hayashi PH. Right hepatic lobe donation adversely affects donor life insurability up to one year after donation. Liver Transpl 2005; 11: 843–847.
26. Beavers KL, Sandler RS, Fair JH, Johnson MW, Shrestha R. The living donor experience: Donor health assessment and outcomes after living donor liver transplantation. Liver Transpl 2001; 7: 943–947.
27. Brown RS, Jr., Russo MW, Lai M et al. A survey of liver transplantation from living adult donors in the United States. N Engl J Med 2003; 348: 818–825.
28. Trotter JF, Talamantes M, McClure M et al. Right hepatic lobe donation for living donor liver transplantation: Impact on donor quality of life. Liver Transpl 2001; 7: 485–493.
29. Surman OS. The ethics of partial-liver donation. N Engl J Med 2002; 346: 1038.
30. Living Organ Donor Network (LODN). http://www.seopf.org/lodn_info.htm (Accessed May 31, 2008)
31. McCune TR, Armata T, Mendez-Picon G et al. The living organ donor network: A model registry for living kidney donors. Clin Transplant Suppl 2004; 18: 33–38.
32. Vlaovic PD, Devins GM, Abbey S, Wright E, Robinette MA. Psychosocial impact of renal donation. Can J Urol 1999; 6: 859–864.
33. Johnson EM, Anderson JK, Jacobs C et al. Long-term follow-up of living kidney donors: Quality of life after donation. Transplantation 1999; 67: 717–721.
34. Isotani S, Fujisawa M, Ichikawa Y et al. Quality of life of living kidney donors: The short-form 36-item health questionnaire survey. Urology 2002; 60: 588–592.
35. Giessing M, Reuter S, Schonberger B et al. Quality of life of living kidney donors in Germany: A survey with the Validated Short Form-36 and Giessen Subjective Complaints List-24 questionnaires. Transplantation 2004; 78: 864–872.
36. Matas AJ, Schnitzler M. Payment for living donor (vendor) kidneys: A cost-effectiveness analysis. Am J Transplant 2004; 4: 216–221.
37. Delmonico FL, Arnold R, Scheper-Hughes N, Siminoff LA, Kahn J, Youngner SJ. Ethical incentives–not payment–for organ donation. N Engl J Med 2002; 346: 2002–2005.
38. Israni AK, Halpern SD, Zink S, Sidhwani SA, Caplan A. Incentive models to increase living kidney donation: Encouraging without coercing. Am J Transplant 2005; 5: 15–20.
39. Smith CR, Woodward RS, Cohen DS et al. Cadaveric versus living donor kidney transplantation: A Medicare payment analysis. Transplantation 2000; 69: 311–314.
40. Terasaki PI, Cecka JM, Gjertson DW, Takemoto S. High survival rates of kidney transplants from spousal and living unrelated donors. N Engl J Med 1995; 333: 333–336.
41. Evans RW, Manninen DL, Garrison LP Jr. The quality of life of patients with end-stage renal disease. N Engl J Med 1985; 312: 553–559.
42. Matas AJ, Lawson W, McHugh L et al. Employment patterns after successful kidney transplantation. Transplantation 1996; 61: 729–733.

Appendix: Donor Nephrectomy Outcome Research (DONOR) Network Investigators

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