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OPTN/SRTR 2015 Annual Data Report: Kidney

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Abstract

The first full year of data after implementation of the new kidney allocation system reveals an increase in deceased donor kidney transplants among black candidates and those with calculated panel-reactive antibodies 98%–100%, but a decrease among candidates aged 65 years or older. Data from 2015 also demonstrate ongoing positive trends in graft and patient survival for both deceased and living donor kidney transplants, but the challenges of a limited supply of kidneys in the setting of increasing demand remain evident. While the total number of patients on the waiting list decreased for the first time in a decade, this was due to a combination of a decrease in the number of candidates added to the list and an increase in the number of candidates removed from the list due to deteriorating medical condition, as well as an increase in total transplants. Deaths on the waiting list remained at, but this was likely because of an increasing trend toward removing inactive candidates too sick to undergo transplant.

1 Introduction

This 2015 Annual Data Report is the first since the new kidney allocation system (KAS) was implemented in December 2014, providing an early opportunity to look for resulting changes in trends. While many previous 5- and 10-year trends continued unchanged, signals of the effect of the new allocation system were seen even at this early stage. A more detailed review of the pre- and post-KAS effects is provided in a separate chapter. While some effects of the new KAS are evident now, the transplant community will have to wait several more years to assess other potential effects, such as the potential long-term benefits of matching the lowest kidney donor profile index (KDPI) kidneys to recipients with the greatest likelihood of long-term benefit.

The 2015 data also show ongoing positive trends in unadjusted graft and patient survival for both deceased and living donor kidney transplants over the past decade. Unfortunately, these data continue to highlight the most fundamental challenge in managing the kidney transplant waiting list: an insufficient supply of kidneys in the setting of increasing demand. While the total number of patients on the list decreased for the first time in a decade, this decrease is due to a combination of a decrease in the number of new listings and an increase in the number of candidates removed due to deteriorating medical condition or other reasons, in addition to an increase in the number of transplants. The number of active candidates on the list continued to grow, along with waiting times and time on dialysis, a frustrating trend given the known survival, cost, and quality of life detriment of longer time on dialysis. Instead of a corresponding increase in the number of living donor kidney transplants given the growing waiting list, they actually declined over the past decade. A small increase in the number of living donor transplants did occur in 2015, but whether this represents a new positive trend remains to be seen.

2 Adult Kidney Transplant

2.1 Waiting List

For the first time in more than 10 years, the total number of patients on the waiting list decreased in 2015 from 99,120 at the start of 2015 to 97,680 at the end (Table KI 3); however, this was likely driven by a combination of a decrease in the number of new listings, a decrease in the number of inactive candidates, and an increase in the number of candidates removed due to deteriorating medical condition, in addition to an increase in the number of transplants. This decline was anticipated, since under the new KAS patients are given waiting time credit for time on dialysis, negating any benefit to maintaining inactive end-stage kidney disease patients on the list while the issue rendering them ineligible for transplant is addressed (Figure KI 1, Figure KI 2, Table KI 3). However, the increase in the number of active patients on the list continued, from less than 47,000 in 2005 to 61,234 in 2015. Despite the policy change giving waiting time credit for time on dialysis, the most common reason for inactive status at the time of listing remained incomplete candidate workup; only 6% were inactive at listing due to poor health status, essentially unchanged from previous years (Table KI 1). Of the 31,672 patients removed from the list in 2015, 17,611 underwent transplant, and nearly 5000 died. While the number of patients who died on the list was fairly stable over the past 3 years, despite increasing numbers on the list, an additional 4154 patients were removed from the list due to deteriorating medical condition (13.1% of removals), a nearly 3-fold increase over 5 years, from 1533 in 2010 (6% of removals) (Table KI 4; 2010 data obtained from the 2012 Annual Data Report). This increase may reflect an effort to remove patients deemed unlikely to ever be well enough for transplant before death is imminent; these patients can be relisted if clinical improvement is noted, with waiting time credit for time on dialysis. This possibility is supported by a decrease in 6-month mortality in patients removed from the list (Figure KI 23); however, this trend should be monitored to ensure that overly aggressive removals from the list do not adversely affect patients who may yet benefit from transplant.

The-10 year trend toward an increasing proportion of waitlisted patients aged 65 to 74 years continued; the proportion aged 65 years or older rose from 14.5% in 2005 to 22.0% in 2015 (Table KI 2). If the rate of change over the past 5 years continues, patients aged 65 years or older will outnumber those aged 35 to 49 years in 2020 (Figure KI 3). The racial distribution of the list remained relatively stable, with an ongoing slow increase in the proportion of Hispanic candidates (Figure KI 4). The proportion of candidates with kidney disease due to diabetes has steadily increased (Figure KI 5). Waiting time and time on dialysis for candidates at the time of the snapshot continued to increase. The proportion of candidates waiting more than 5 years rose from 11.4% in 2005 to 15.7% in 2015, while the proportion waiting less than 1 year continued to fall (Table KI 2, Figure KI 6). Nearly half of patients listed had been on dialysis for at least 4 years, 12.8% for at least 11 years (Figure KI 8). Interestingly, the only marked reversal of previous trends was in willingness to accept an expanded criteria donor (ECD) or KDPI-above-85% kidney. In 2004, 42.8% reported willingness to accept an ECD kidney, and this proportion steadily increased until 2014 when, for the first time, more patients were willing than unwilling to accept an ECD or KDPI-above-85% kidney. However, in 2015 this proportion dropped to 47.8% (Figure KI 9). Candidates aged 65 years or older, whose rates of willingness were previously increasing, reported lower rates of willingness to accept these kidneys, at 64.9% in 2015, down from 67.3% in 2012; other age groups remained relatively stable (Figure KI 18). This trend is surprising in light of concern and early evidence that the new KAS will decrease rates of deceased donor transplant in older patients.

The 3-year outcomes for adults listed for transplant in 2012 show that only 20.1% had undergone deceased donor transplant; an additional 15.3% had undergone living donor transplant, 18.5% died or were removed from the list, and 45.9% were still waiting (Figure KI 15). Reflecting the worsening supply-demand ratio for allografts nationally, the percentages of adults who underwent deceased donor transplant within any given period have generally continued to decrease, with the notable exception of an increase over the past year in the proportion of patients undergoing transplant within 1 year of listing (Figure KI 16). This increase may reflect the bolus effect of the new KAS, discussed further in the pre- and post-KAS chapter. Great geographic variation remained in the percentages of candidates who underwent deceased donor transplant within a given period of time; the percentage who did so within 5 years varied from 7.8% to 82.7% across donation service areas (DSAs) (Figure KI 17).

Examining rates of deceased donor transplant among waitlisted candidates by candidate characteristics shows several marked changes in the setting of the new KAS: The deceased donor transplant rate among candidates aged 18 to 34 years jumped from 16.9 per 100 waitlist years in 2014 to 25.0 in 2015. Rates also increased, although less dramatically, for candidates aged 35 to 49 years. Correspondingly, the rate of transplants per 100 waitlist years decreased among candidates aged 65 years or older, from 19.9 to 16.8 per 100 waitlist years (Figure KI 11). Similarly, the rate for candidates with panel-reactive antibodies/ calculated panel-reactive antibodies (CPRA) above 98% increased from 7.2 to 27.3 per 100 waitlist years, and rates decreased for those with CPRA 80% to 97%, from 34.4 to 23.0 per 100 waitlist years (Figure KI 13). The rate among patients with kidney failure due to

diabetes has continued to fall, despite these candidates representing an increasing proportion of the waiting list.

Given increased waiting times and longer time on dialysis, one would expect waitlist mortality to increase correspondingly. However, overall pretransplant mortality rates decreased steadily until 2012 and remained relatively stable since then across age, race, and pretransplant diagnosis, with higher rates among older candidates and candidates with diabetes (Figure KI 19, Figure KI 20, Figure KI 21). Pretransplant mortality rates continued to show substantial geographic variation, mirroring the variation in waiting times; rates in some DSAs were more than twice the rates in others (Figure KI 22).

2.2 Deceased Donation

Overall, the demographic characteristics of deceased donors have remained relatively stable over 10 years (Figure KI 24, Figure KI 25). Deceased donation per 100 deaths remained variable by state, from 7.4 to 29.3 per 100 deaths (Figure KI 26). Kidneys recovered from donors aged 50 to 64 and 65 years or older continued to be discarded at a high rate (32.9% and 62.3%, respectively), as were those from donors with diabetes (45.1%), hypertension (36.6%) and terminal creatinine above 1.5 mg/dL (36.3%), and donors who died of cerebrovascular accident (29.6%) (Figure KI 27, Figure KI 28, Figure KI 29, Figure KI 30, Figure KI 32). The discard rate for biopsied kidneys remained high at 31.4% compared with 6.8% for non-biopsied kidneys, despite lack of evidence that biopsy findings predict outcomes beyond the kidney donor risk index (KDRI)1,2 (Figure KI 31). Given varied practice regarding whether a kidney biopsy is performed (e.g., routine, patient characteristics, cause of death), more prospective research is needed to determine whether information from kidney biopsies increases the predictive ability of the KDRI, or causes unnecessary discards. Discard rates remained similar fordonation after brain death (DBD) and donation after circulatory death (DCD) (Figure KI 33), but were markedly higher for KDPI-above-85% kidneys than for kidneys with KDPI 85% or below (59.1% vs. 2.3%–17.8%, Figure KI 34). In addition, the discard rate for KDPI-above-85% kidneys was trending up, from 54.4% in 2012 to 59.1% in 2015. Presumably, some kidneys previously transplanted when labeled as standard criteria donor are now more commonly discarded given their higher KDPI score. If this trend continues, it will warrant closer examination.

Regarding specific components of the KDRI, an increasing proportion of donors weighed more than 80 kg, 45.3% in 2015 from 39.5% in 2005; the proportion of DCD kidneys increased from 7.3% in 2005 to 17.7% in 2015; and deaths from cerebrovascular accident decreased from 38.2% to 24.9% over 10 years (Figure KI 35). Average KDRI has been fairly stable over the past 10 years, between 1.20 and 1.24 (Figure KI 36). Anoxia as a cause of death has continued its marked increase, overtaking head trauma as the most common cause at 37.4% of donors (Figure KI 37).

2.3 Living Donation

In 2015, 5626 living donor transplants were performed, slightly up from 5539 in 2014 but well below the peak of 6647 in 2004. This decline appears to be due to a decrease in related kidney donations, as unrelated donation counts have generally been stable. The number of

paired donations has increased, possibly accounting for some of the decrease in related donations as family members donate to an unrelated match; however, this increase has not been enough to offset the overall decline in related donations (Figure KI 38). In addition, with an ever growing waiting list, one would hope that the total number of living donor kidney transplants would increase proportionally, rather than the opposite. The proportion of kidney donors aged 50 to 64 years has been increasing over 10 years, from 20.3% in 2005 to 29.5% in 2015, for the first time outnumbering donors aged 18 to 34 years, 27.5%. Women made up an increasing majority of living donors at 63.5%, up from 59.2% in 2005 (Figure KI 40). The proportion of black donors has continued to decline over 10 years from 13.4% to 9.6%. The laparoscopic approach is increasingly the most common procedure type, more than 97% of procedures, assisted and unassisted in 2015. The data for rehospitalizations after living donation continued to show low rates of 2.5%, 3.9%, and 5.2% at 6 weeks, 6 months, and 12 months; however, these numbers were exceeded by the number of living donors for whom rehospitalization data were unknown, at 2.5%, 10.9%, and 21.0% at 6 weeks, 6 months and 12 months, respectively, highlighting a need for improved monitoring of living kidney donor outcomes (Figure KI 43). The number of living donors who reported a complication was slightly higher, 5.3%, 7.2%, and 8.8% at 6 weeks, 6 months, and 12 months, again with a relatively high unknown rate (Figure KI 44). The distribution of BMI remained relatively stable over 10 years, with a slight decrease in the proportion of donors with BMI 35 kg/m^2 or higher, from 4.6% to 2.6%, and an increase in the proportion with BMI 30 to less than 35 kg/m^2, from 16.1% to 19.5% (Figure KI 45). Collection of BMI data also improved, from 9.8% to 0.5% missing, which could partly explain the changing distribution. From 2011 to 2015, 17 deaths within 1 year of donation were reported to OPTN. The most common causes of death were medical (including donation-related) in seven and accident/homicide in five living donors.

2.4 Transplant

In total, 18,597 adult and pediatric kidney transplants, including multi-organ transplants, were performed in the US in 2015 (Figure KI 46), up from 17,388 in 2005; 30.3% of these were living donor transplants. As mentioned, the increase is attributable to an increase in deceased donation, as the number of living donor kidney transplants fell. After increasing over 10 years, the number of transplants among adults aged 65 years or older fell in 2015 compared with 2014 (Figure KI 47), a decrease entirely attributable to fewer deceased donor transplants; living donor transplants in this age group increased from 753 in 2014 (2014 Annual Data Report, Kidney Chapter) to 824 in 2015 (Table KI 6). Transplants remained more common in men than in women (Figure KI 48). Numbers of black and Hispanic recipients, having increased slowly over the previous 10 years, increased more noticeably in 2015 (Figure KI 49), and the number of transplants in recipients with hypertension also increased more in 2015 than in previous years (Figure KI 50). Perhaps mirroring the higher rate of discarded kidneys with KDPI above 85%, the proportion of deceased donor transplants using KDPI-above-85% kidneys fell slightly, a trend that should be monitored in future years.

Previous trends in medication use at discharge continued in 2015. T-cell depleting agents were increasingly the induction agent of choice (Figure KI 52), tacrolimus and

mycophenylate use continued to rise and exceeded 93% of all transplants (Figure KI 53, Figure KI 54), and mTor inhibitor use continued to decline to less than 5% (Figure KI 55). Despite interest in steroid-sparing regimens, a majority (70%) of transplant recipients remain on steroids at 1 year posttransplant (Figure KI 56).

The proportion of transplants among deceased donor kidney recipients with CPRA 98% to 100% jumped from 4.8% in 2014 to 14.6% in 2015, nearly double the proportion of recipients with CPRA 80% to 97% (Figure KI 57). In 2011–2015, 4, 5, and 6 HLA mismatches were more common in deceased donor transplants, while 1, 2, and 3 HLA mismatches were more common in living donor transplants (Figure KI 59, Table KI 6).

2.5 Outcomes

The number of kidney transplant recipients alive with a functioning graft exceeded 200,000 in June 2015 (Figure KI 74), more than doubling since 2000 (Figure KI 6.8, 2012 Annual Data Report). While graft function and survival remained better for living than for deceased donor transplants, long-term outcomes continued to improve for both. All-cause and death-censored graft failure at 1, 3, 5, and 10 years continued to decline for both living and deceased donor transplants. For deceased donor transplants, 10-year graft failure for transplants in 2005 was 52.8%, down from 59.2% 10 years prior (Figure KI 60, Figure KI 61). Similarly, 10-year graft failure for living donor transplants in 2005 was 37.3%, down from 44.8% 10 years prior (Figure KI 63, Figure KI 64). Death with a functioning graft remained fairly constant for both living and deceased donor transplants (Figure KI 62, Figure KI 65). Five-year deceased donor graft survival was lowest for patients with diabetes or hypertension as a cause of kidney failure, at 70.4% and 71.8% (Figure KI 66), and with higher KDPI (57.6%, KDPI > 85%; 73.3%, KDPI 35–85%) (Figure KI 67). Five-year graft survival was essentially identical for DCD and DBD kidneys (Figure KI 68). Among living donor recipients, 5-year graft survival was lowest for those aged 65 years or older (Figure KI 69). Five-year graft survival was nearly 10% lower for black recipients than for Asian recipients (81.1% vs. 90.2%, Figure KI 70).

Proportions of recipients with estimated glomerular filtration rate (eGFR) below 30 mL/min/1.73m^2 at the time of discharge increased over the past 10 years (Figure KI 72); however, eGFR at 6 months was stable or improved; only 5% had an eGFR below 30 mL/min/1.73m^2 (Figure KI 73), suggesting that recipients were discharged sooner or that higher-risk kidneys with delayed graft function were transplanted without a resulting decline in later eGFR. The incidence of acute rejection within the first year also decreased for both living and deceased donor transplant recipients (Figure KI 75), from 10% in 2009–2010 recipients to 7.9% in 2013–2014 recipients. The reported incidence of posttransplant lymphoproliferative disorder remained low, 0.6% at 5 years, but 3 times higher for candidates who were Epstein Barr virus-negative at transplant, but incidence may be underreported. Five-year patient survival for recipients of a deceased donor kidney in 2010 was 86.8%, but decreased with increasing age (75.2% for ages ≥ 65 years), and was lower for recipients with diabetes as cause of kidney failure (82.1%) and recipients of a KDPI above 85% kidney (78.5%) (Figure KI 79, Figure KI 80, Figure KI 81). Five-year survival among recipients of a living donor kidney in 2010 was 93.5%; while lower among older recipients and those with diabetes as cause of

kidney failure, it remained 83.9% for recipients aged 65 years or older and 88.3% for recipients with diabetes as the cause of kidney disease (Figure KI 82, Figure KI 83, Figure KI 84).

3 Pediatric Kidney Transplant

3.1 Waiting List

In 2015, 928 pediatric candidates were added to the kidney transplant waiting list, 525 as inactive (Figure KI 85). The number of prevalent pediatric candidates (on the list on December 31 of the given year) has been steadily increasing and reached a peak of 1509 on December 31, 2015. The most common reason for inactive status among newly listed candidates in 2015 was incomplete work-up (47.3%), followed by living donor candidate status (16.8%), and too well to need transplant (11.4%) (Table KI 9). Over the past decade, the age of waitlisted pediatric candidates has shifted, with an increase in those aged 1 to 5 years (13.8% to 23.2%) and a decrease in those aged 11 to 17 years (69.9% to 57.0%) (Table KI 10). Proportions of candidates with congenital anomalies of the kidney and urinary tract (CAKUT) as primary cause of disease increased from 27.7% in 2005 to 38.9% in 2015, and proportions with glomerulonephritis decreased from 13.5% to 7.4%. Regarding sensitization, most candidates (64.8%) had a CPRA at the time of listing of 0%. Multi-organ listing was uncommon; only 2.4% of pediatric candidates were awaiting multi-organ transplant in 2015. The leading cause of end-stage kidney disease changed with age; CAKUT was most common in children aged younger than 6 years, while focal segmental glomerulosclerosis and glomerulonephritis were more common in older children (Figure KI 92).

Of pediatric candidates removed from the waiting list in 2015, 62.0% received a deceased donor kidney, 27.6% received a living donor kidney, 2.1% died, 1.3% were considered too sick to undergo transplant, and 0.8% were removed from the list because their condition improved (Table KI 12). Among patients newly listed in 2012, 55.2% underwent deceased donor transplant within 3 years, 24.2% underwent living donor transplant, 16.3% were still waiting, 2.5% were removed from the list for other reasons, and 1.8% died (Figure KI 93). The rate of deceased donor transplant in 2015 among pediatric waitlisted candidates was 98.3 per 100 active waitlist years (Figure KI 94), compared with 18.8 for adult candidates (Figure KI 11). The intent of the new KAS is to maintain this high level of access to transplant for pediatric patients. Transplant rates varied by age. In 2015, transplant rates were highest for candidates aged 6 to 10 years (117.2 per 100 active waitlist years), followed by candidates ages 11 to 17 years (106.5). For the first time in several years, transplant rates among pediatric candidates were lowest for children aged younger than 6 years (93.4 per 100 active waitlist years). Rates also varied by CPRA and demonstrate the effects of new priority for highly sensitized candidates under the KAS. For pediatric candidates with CPRA greater than 98%, the transplant rate increased from 6.9 per 100 active waitlist years in 2014 to 20.3 in 2015. Transplant rates for pediatric candidates with a CPRA of 80% to 97% declined from 63.7 to 18.2. In contrast to mortality among candidates waiting for other organs, pretransplant mortality among pediatric candidates waiting for kidney transplant was low: 1.3 per 100 waitlist years in 2014–2015 (Figure KI 96).

3.2 Transplant

The number of pediatric kidney transplants decreased from a peak of 899 in 2005 to 718 in 2015 (Figure KI 97). The decline in the proportion of living donor kidney transplants in pediatric recipients is of concern. In 2015, only 33.7% of pediatric transplants were from living donors, compared with 50.1% in 2004. Regarding the source of the living donor, the number of related donors has decreased dramatically. Children aged younger than 6 years were most likely to receive a living donor kidney (47.3%) (Figure KI 99). In 2015, 37 centers were performing only pediatric kidney transplants, compared with 133 performing only adult transplants and 54 performing transplants in both adults and children (Figure KI 100). Regarding donor source and age at transplant, a higher proportion of living donor transplants were in recipients aged 1 to 5 years; this group accounted for 30.8% of pediatric living donor transplants and 19.2% of pediatric deceased donor transplants, compared with 20.0% and 18.9%, respectively, for recipients aged 6 to 10 years. While the majority of pediatric transplants were in recipients aged 11 to 17 years, deceased donor transplants were more common than living donor transplants (61.7% vs. 48.8%). (Table KI 13). The racial distribution differed among deceased and living donor transplant recipients. A higher proportion of living donor recipients were white (70.5% vs. 39.7%) and a higher proportion of deceased donor recipients were black (25.4% vs. 9.1%) and Hispanic (27.4% vs. 15.0%). Private insurance was more common among living donor recipients and Medicare/Medicaid was more common among deceased donor recipients. Most deceased donor recipients (65.4%) underwent transplant with a kidney from a donor with KPDI less than 20%. No ABO incompatible transplants occurred in pediatric kidney recipients in 2015. The number of HLA mismatches was higher among deceased donor recipients than among living donor recipients; 83.5% of deceased donor recipients and 24.1iving donor recipients had more than three HLA mismatches in 2013–2015.

The combination of a donor who was positive for cytomegalovirus and a pediatric recipient who was negative occurred in 29.4% of deceased donor transplants and in 25.1% of living donor transplants (Table KI 14 and Table KI 15). The combination of a donor who was positive for Epstein-Barr virus (EBV) and a recipient who was negative occurred in 36.5% of deceased donor transplants and in 44.7% of living donor transplants.

3.3 Immunosuppressive Medication Use

Trends in immunosuppressive medications used in children and adolescents were similar to trends for adults. In 2015, the use of T-cell depleting agents continued to increase, reaching 61.6%; interleukin-2 receptor antagonist (IL-2-RA) therapy use remained steady at 33.3%. The percentage of recipients receiving no induction therapy continued to decline, reaching a low of 9.1% in 2015 (Figure KI 101). In 2015, tacrolimus was used as part of the initial maintenance immunosuppressive medication regimen in 96.3% of pediatric transplant recipients and mycophenolate in 93.2%. Mammalian target of rapamycin inhibitors were used in 7.7% of 2014 pediatric recipients at 1 year posttransplant. Corticosteroids were used in 59.9% of 2015 pediatric recipients at the time of transplant and in 64.1% of 2014 recipients at 1 year posttransplant. Regarding induction use by CPRA, T-cell depleting agents were more common with increasing CPRA and IL-2-RA use more common with decreasing CPRA (Figure KI 106).

3.4 Outcomes

All-cause graft failure after deceased donor transplant in pediatric recipients was 2.8% at 6 months and 3.7% at 1 year for transplants in 2014–2015, 10.4% at 3 years for transplants in 2012–2013, 18.0% at 5 years for transplants in 2010–2011, and 51.9% at 10 years for transplants in 2004–2005 (Figure KI 110). Corresponding graft failure after living donor transplant was 2.7% at 6 months and 3.5% at 1 year for transplants in 2014–2015, 4.7% at 3 years for transplants in 2012–2013, 11.1% at 5 years for transplants in 2010–2011, and 34.8% at 10 years for transplants in 2004–2005 (Figure KI 113). For a cohort of recipients who underwent transplant in 2006–2010, graft survival was highest for living donor recipients aged younger than 11 years (89.1% at 5 years) and lowest for deceased donor recipients aged 11 to 17 years (72.0% at 5 years) (Figure KI 116). By age, incidence of reported acute rejection in the first posttransplant year was highest for recipients aged 11 to 17 years, at 12.4% for patients who underwent transplant in 2013–2014, compared with 10.3% among recipients aged younger than 6 years and 8.7% among recipients aged 6 to 10 years (Figure KI 117). Short-term renal function, measured by eGFR, improved substantially over the past decade. The proportion of recipients with an eGFR of 90 mL/min/1.73 m^2 or higher at discharge increased from 20.7% in 2005 to 32.2% in 2015, and at 1 year posttransplant, from 13.0% to 28.5% (Figure KI 108). Of recipients in the 2014 cohort, 72.5% had chronic kidney disease stage 1–2 at 1 year posttransplant, with an eGFR of 60 mL/min/1.73m^2 or higher. The incidence of posttransplant lymphoproliferative disorder among EBV-negative recipients was 3.2% at 5 years posttransplant, compared with 0.7% among EBV-positive recipients (Figure KI 118). Overall 5-year patient survival among pediatric kidney transplant recipients in 2006–2010 was 97.7%.

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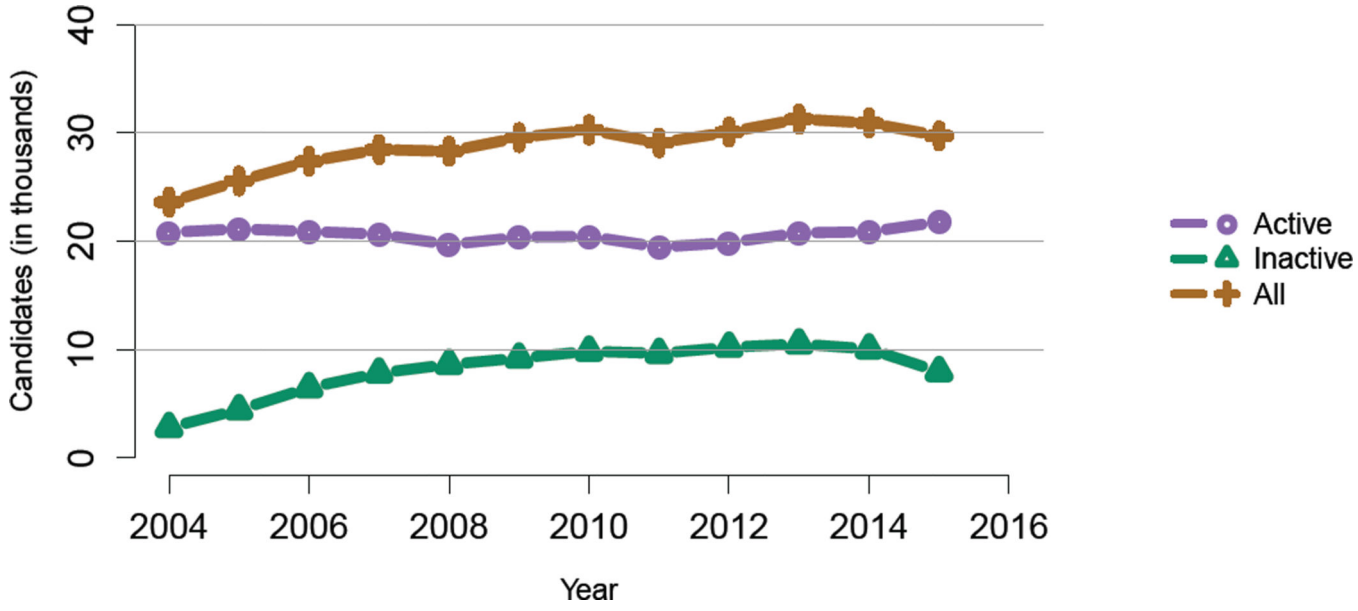

Figure KI 1. New adult candidates added to the kidney transplant waiting list

A new candidate is one who first joined the list during the given year, without having been listed in a previous year. Previously listed candidates who underwent transplant and subsequently relisted are considered new. Candidates concurrently listed at multiple centers are counted once. Active and inactive patients are included; active status is determined on day 7 after first listing. Includes kidney and kidney-pancreas listings.

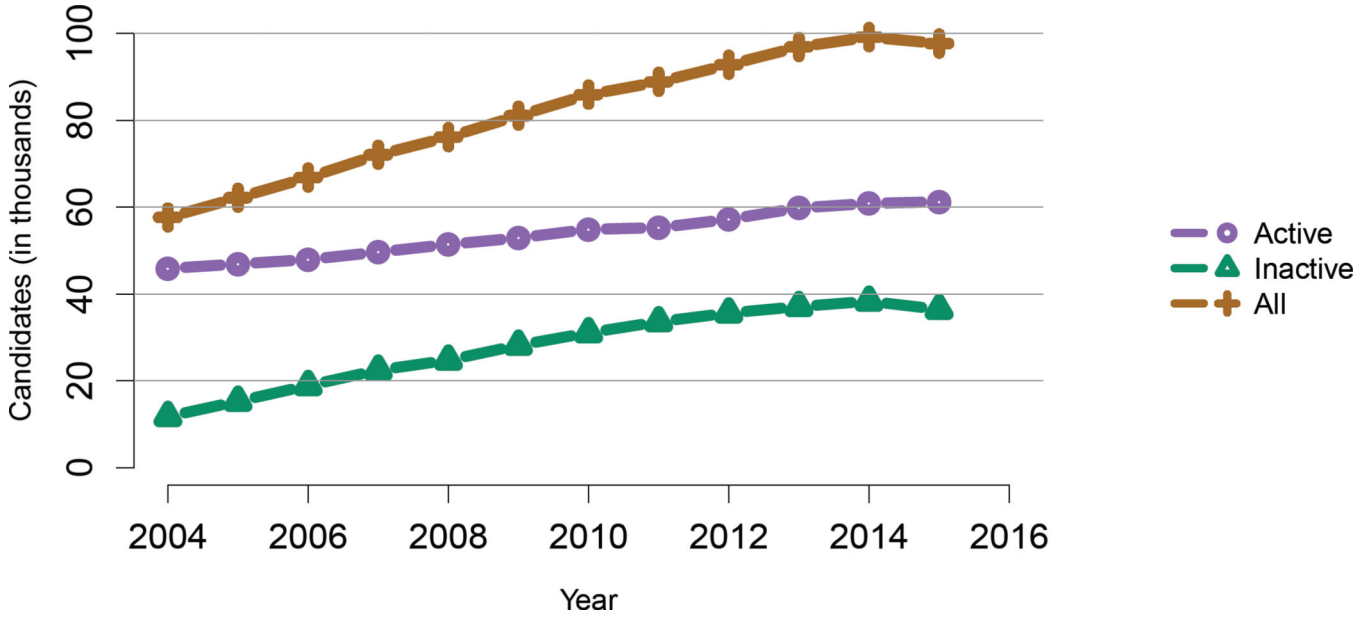

Figure KI 2. Adults listed for kidney transplant on December 31 each year

Candidates concurrently listed at multiple centers are counted once. Those with concurrent listings and active at any program are considered active. Includes kidney and kidney-pancreas listings.

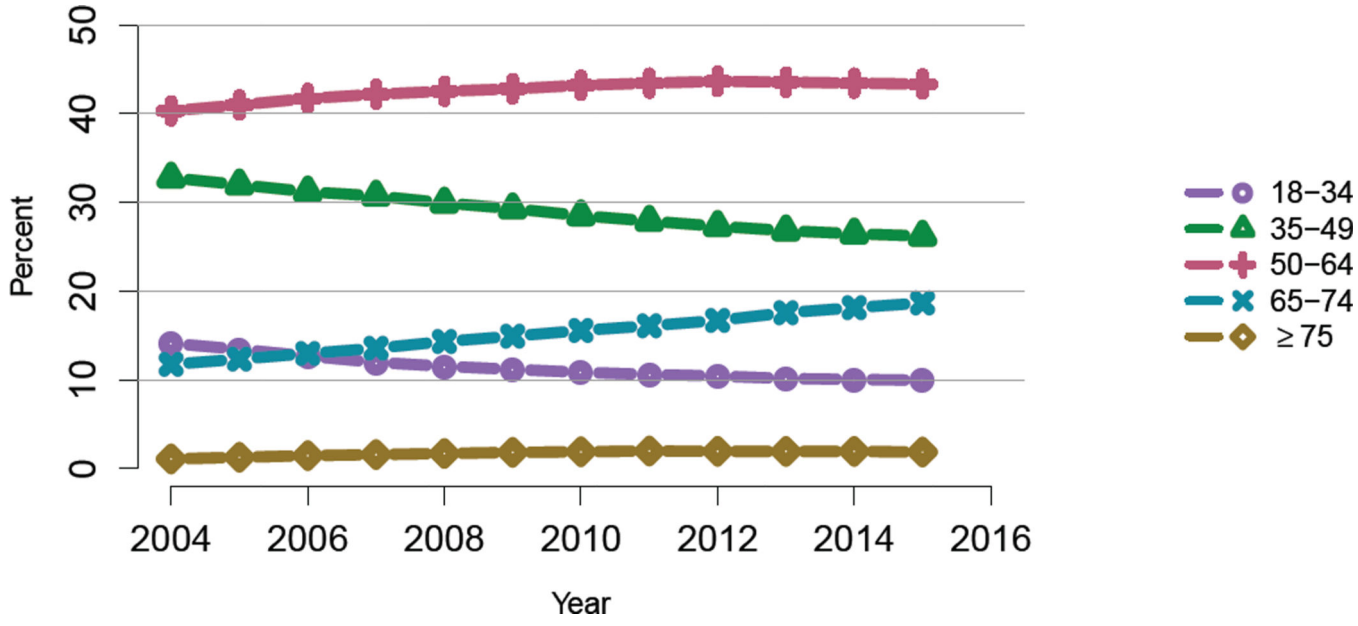

Figure KI 3. Distribution of adults waiting for kidney transplant by age

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Age is determined at the later of listing date or January 1 of the given year. Active and inactive candidates are included.

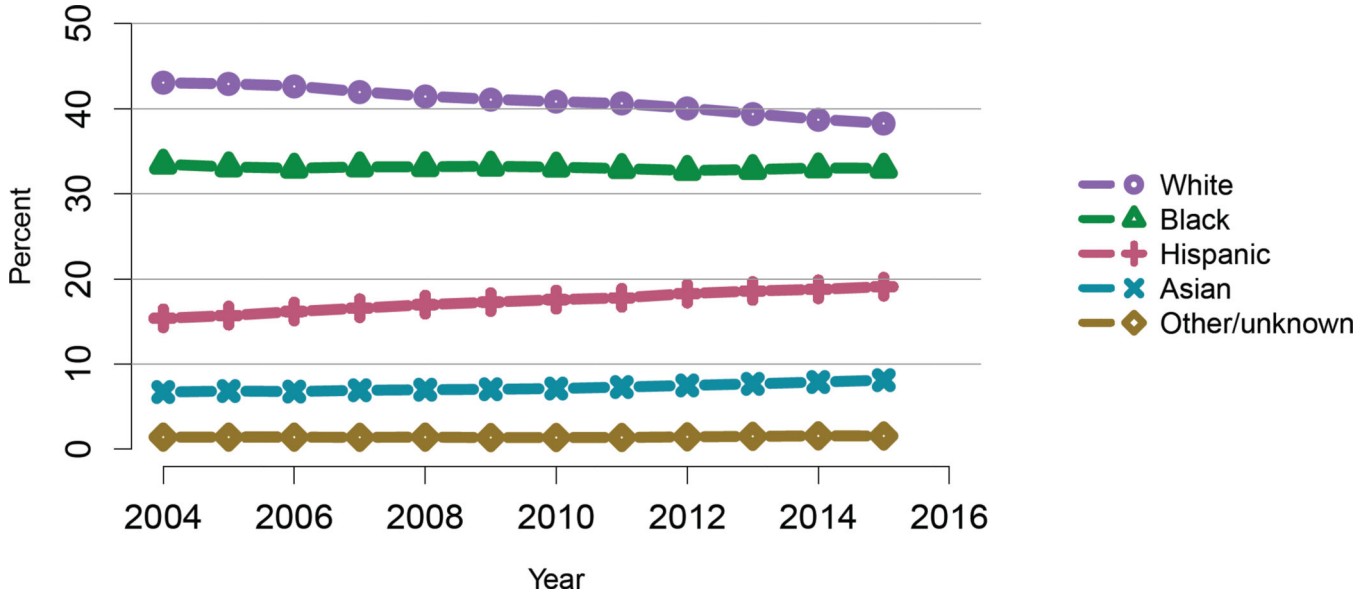

Figure KI 4. Distribution of adults waiting for kidney transplant by race

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Active and inactive candidates are included.

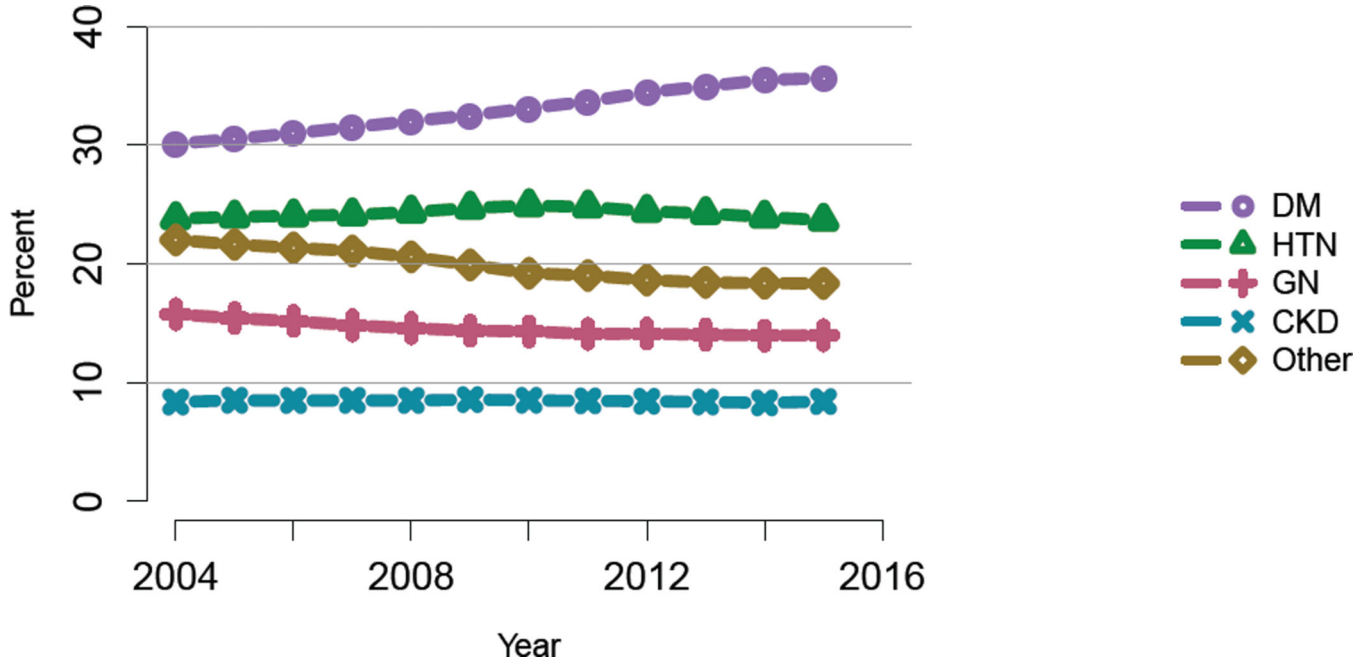

Figure KI 5. Distribution of adults waiting for kidney transplant by diagnosis

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Active and inactive candidates are included. CKD, cystic kidney disease; DM, diabetes. HTN, hypertension. GN, glomerulonephritis.

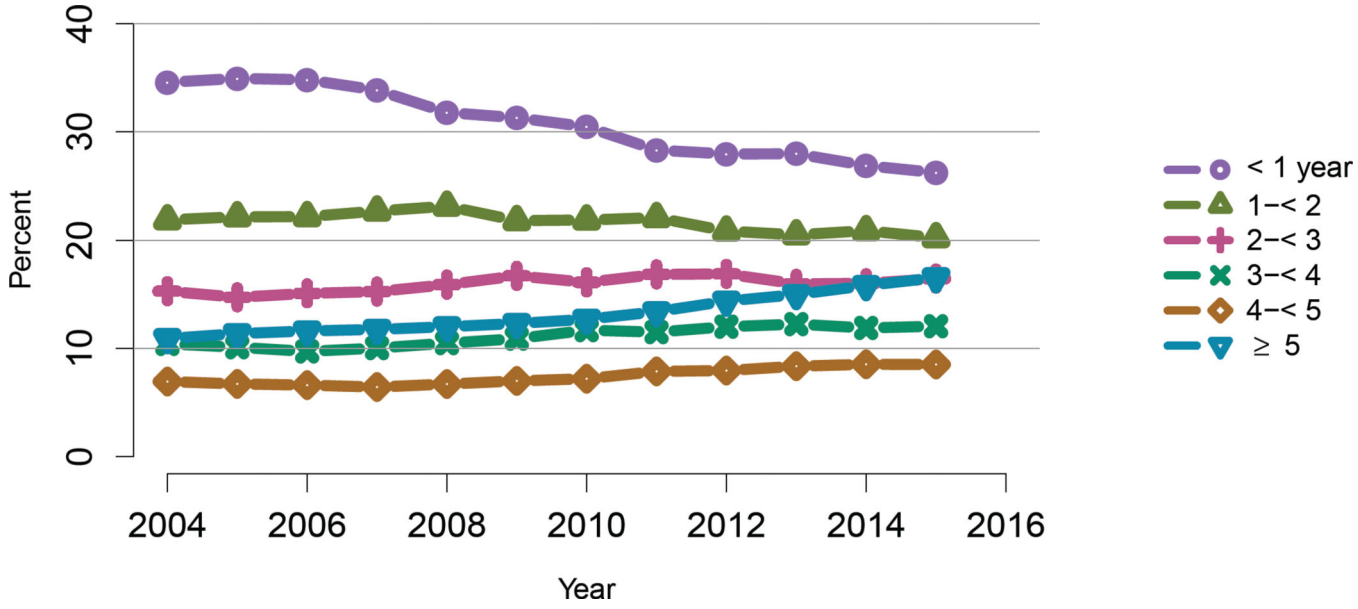

Figure KI 6. Distribution of adults waiting for kidney transplant by waiting time

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Time on the waiting list is determined at the earlier of December 31 or removal from the waiting list. Active and inactive candidates are included.

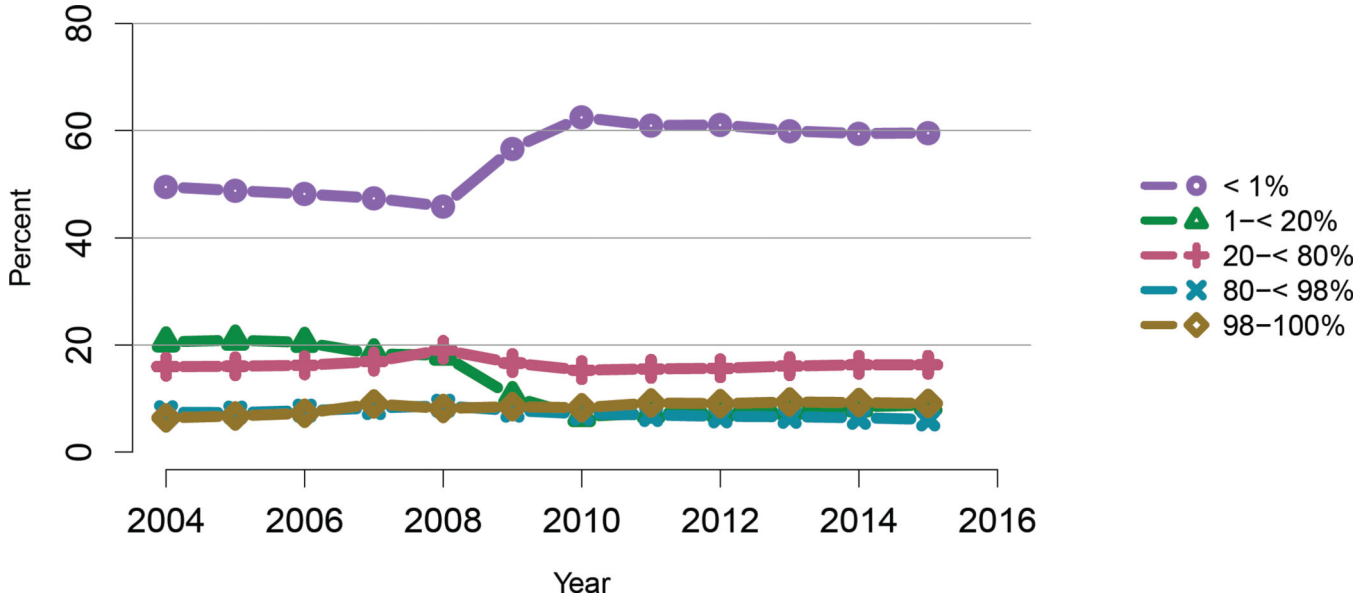

Figure KI 7. Distribution of adults waiting for kidney transplant by C/PRA

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. From December 5, 2007, through September 30, 2009, CPRA was used if greater than 0; otherwise, the maximum pretransplant PRA was used. Before December 5, 2007, the maximum pretransplant PRA was used unconditionally. CPRA is used after September 30, 2009. C/PRA is the highest value during the year. Active and inactive candidates are included.

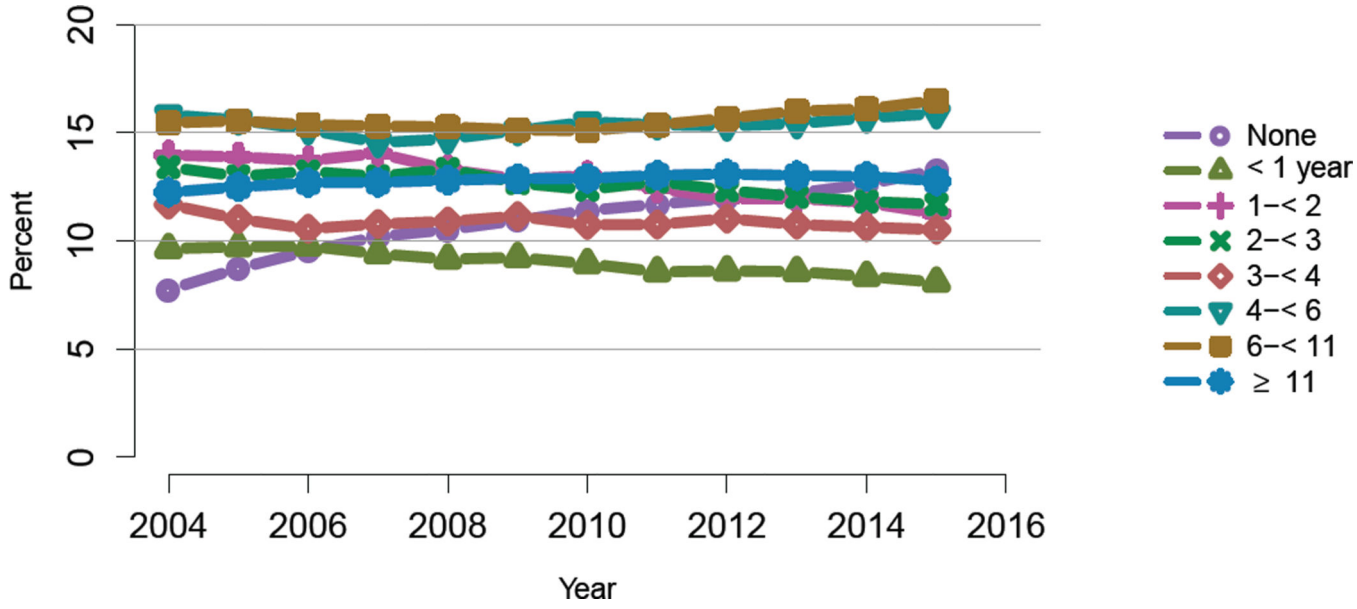

Figure KI 8. Distribution of adults waiting for kidney transplant by time on dialysis

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Time on dialysis is determined at the earlier of December 31 or removal from the waiting list. Active and inactive candidates are included.

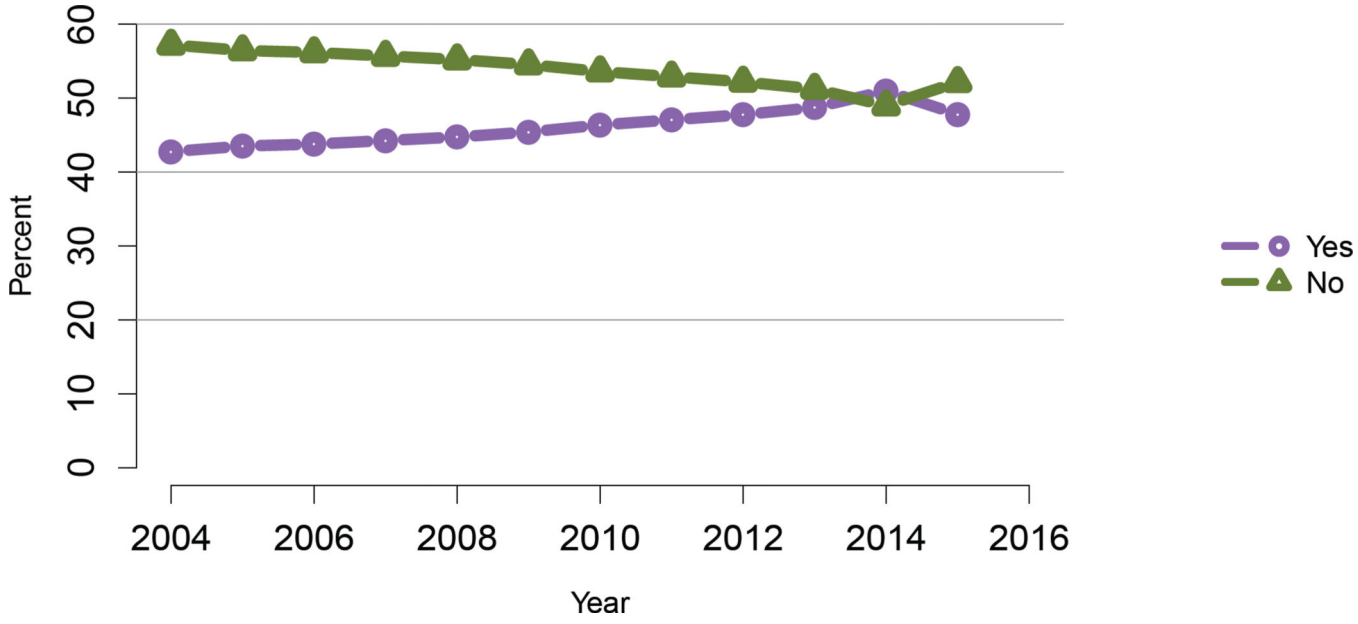

Figure KI 9. Distribution of adults waiting for kidney transplant by willingness to accept ECD or KDPI > 85% kidney

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Active and inactive candidates are included. Willingness to accept a local non-zero HLA mismatch KDPI >85% kidney is for at least one day during the year, beginning in 2014. ECD, expanded criteria donor.

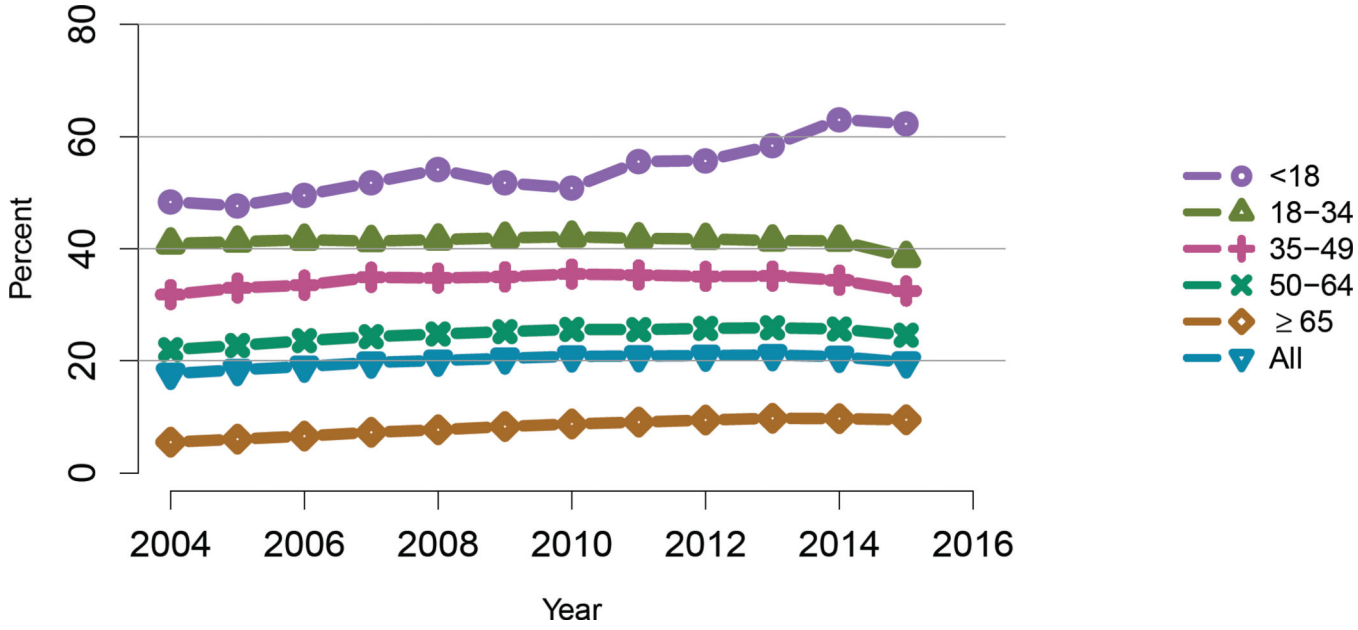

Figure KI 10. Prevalent dialysis patients waitlisted for kidney transplant by age

Estimated percentage of prevalent dialysis patients waitlisted for kidney or kidney-pancreas transplant. Percentage calculated as the sum of point prevalent waitlist candidates divided by the sum of point prevalent dialysis patients on December 31 of each year. Dialysis data from the Consolidated Renal Operations in a Web-enabled Network (CROWN) dataset. Age calculated on December 31 of given year.

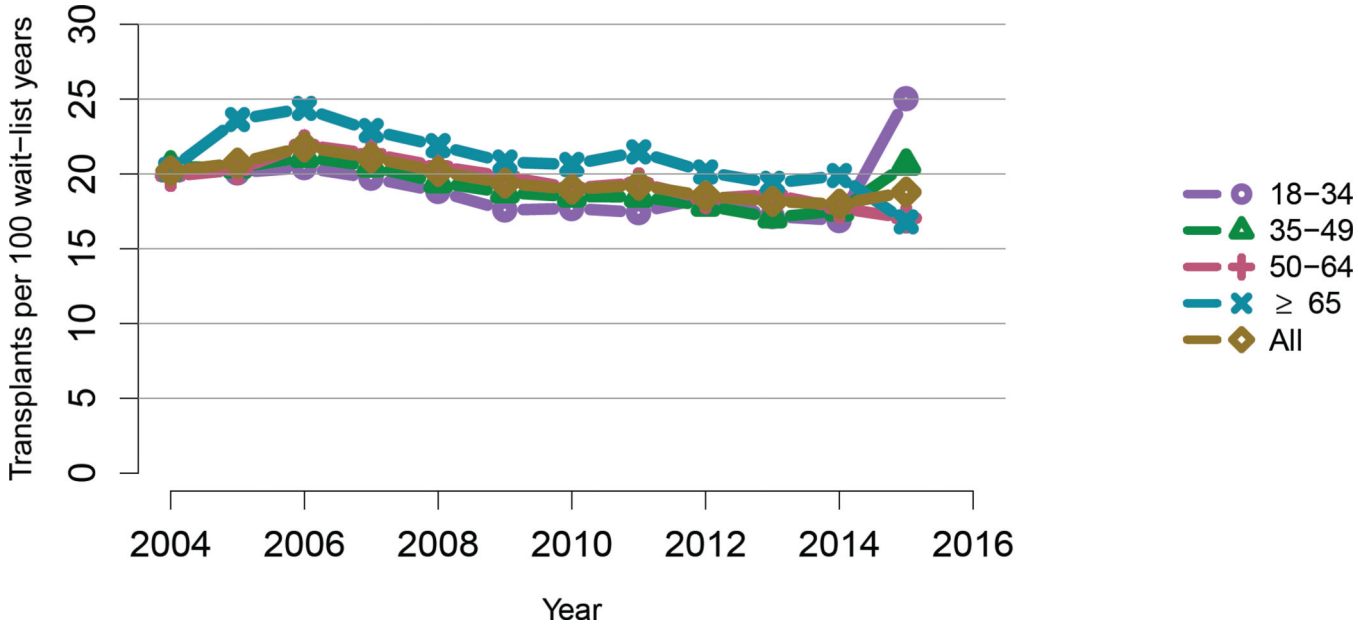

Figure KI 11. Deceased donor kidney transplant rates among active adult waitlist candidates by age

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active wait time in a given year. Individual listings are counted separately. Age is determined at the later of listing date or January 1 of the given year. Rates with less than 10 patient-years of exposure are not shown.

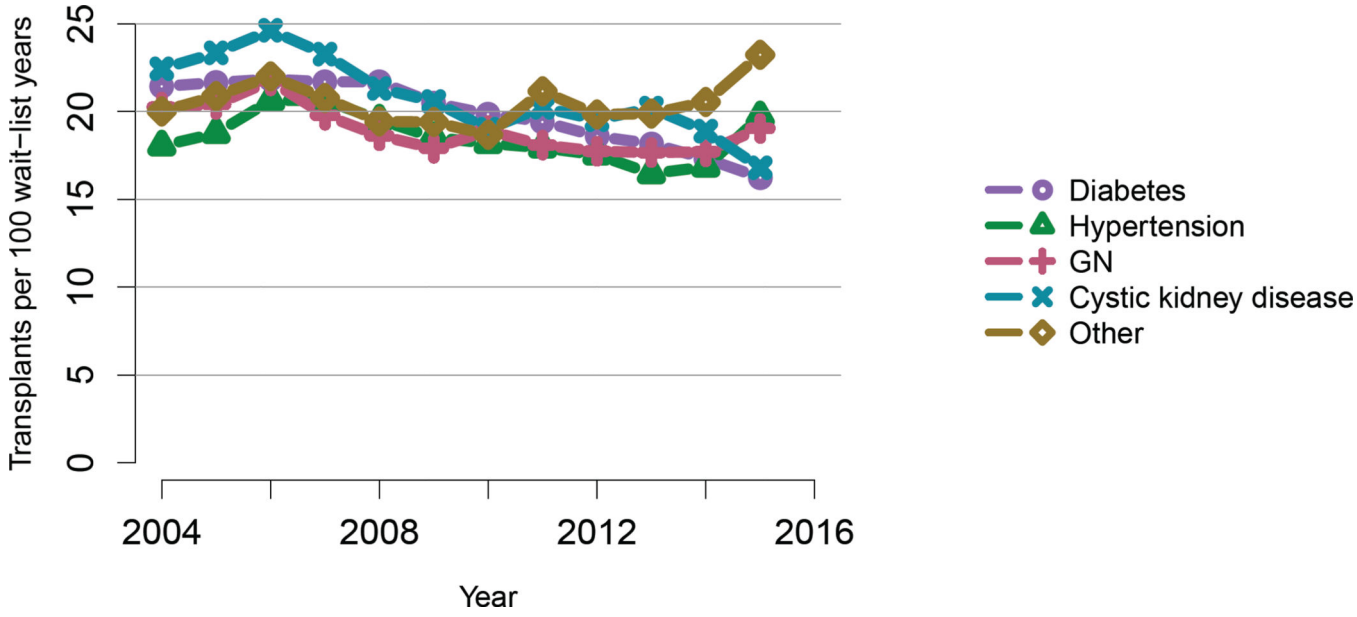

Figure KI 12. Deceased donor kidney transplant rates among active adult waitlist candidates by diagnosis

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active wait time in a given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown. GN, glomerulonephritis.

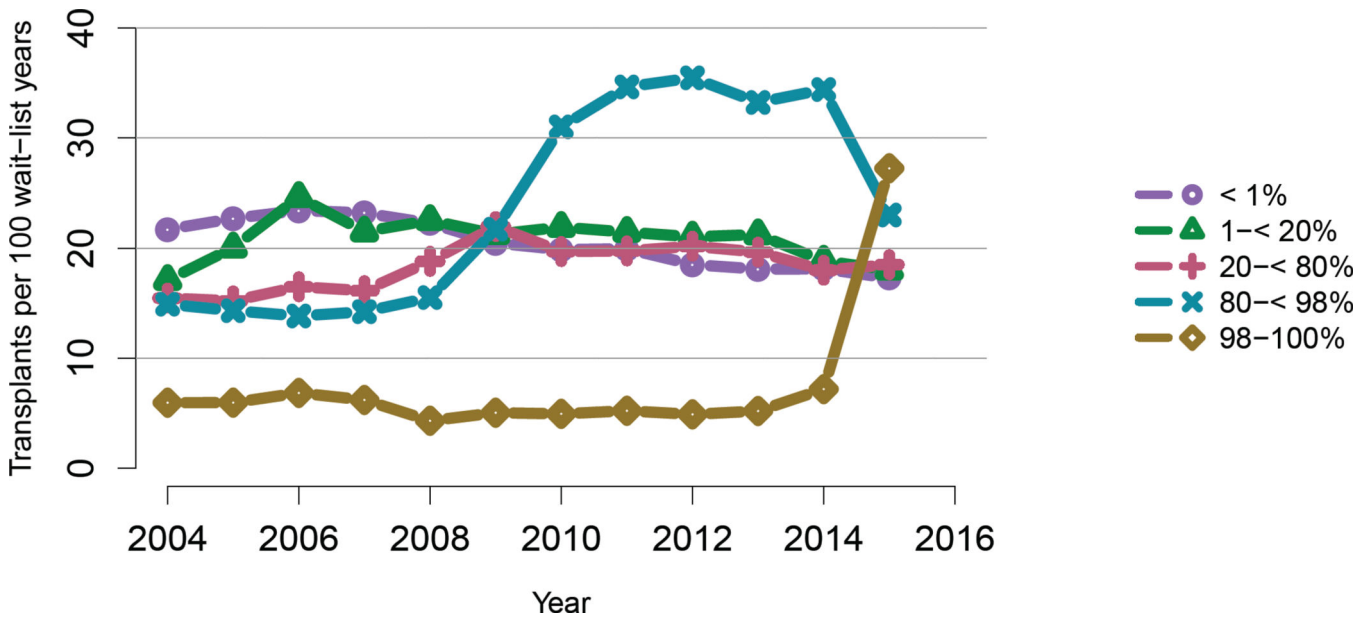

Figure KI 13. Deceased donor kidney transplant rates among active adult waitlist candidates by C/PRA

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active wait time in a given year. Individual listings are counted separately. From December 5, 2007, through September 30, 2009, CPRA was used if greater than 0; otherwise, the maximum pretransplant PRA was used. Before December 5, 2007, the maximum pretransplant PRA was used unconditionally. CPRA is used after September 30, 2009. Rates with less than 10 patient-years of exposure are not shown.

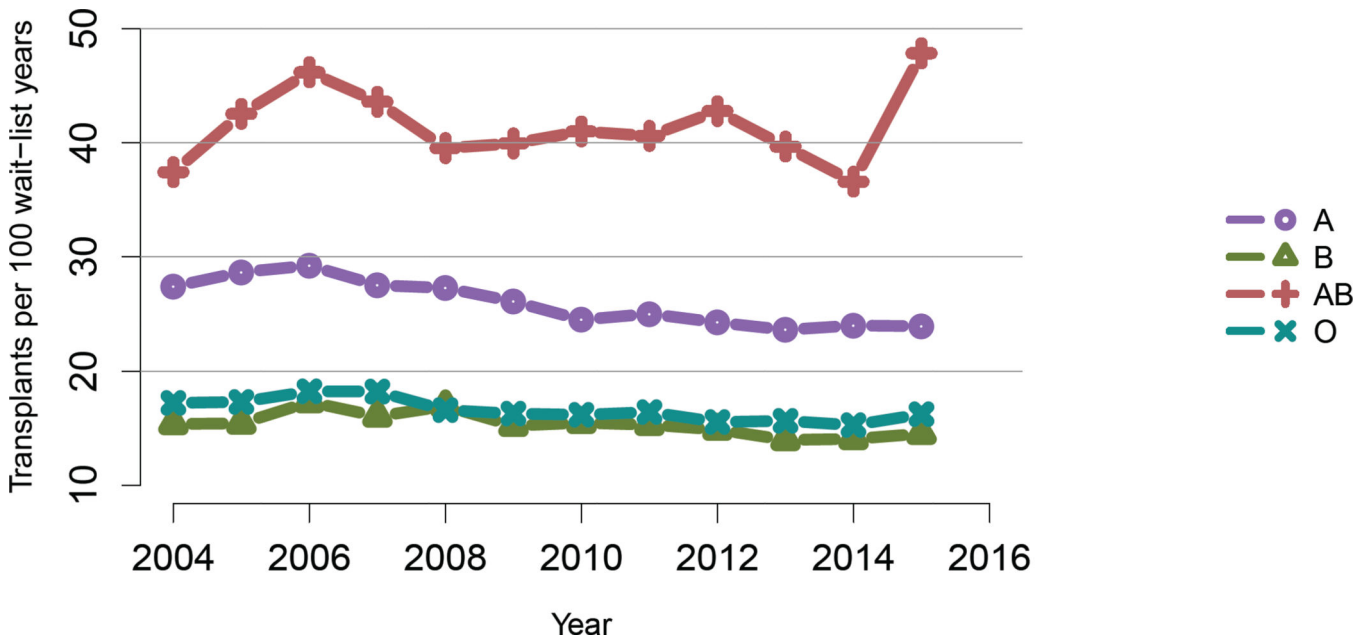

Figure KI 14. Deceased donor kidney transplant rates among active adult waitlist candidates by blood type

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active wait time in a given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown.

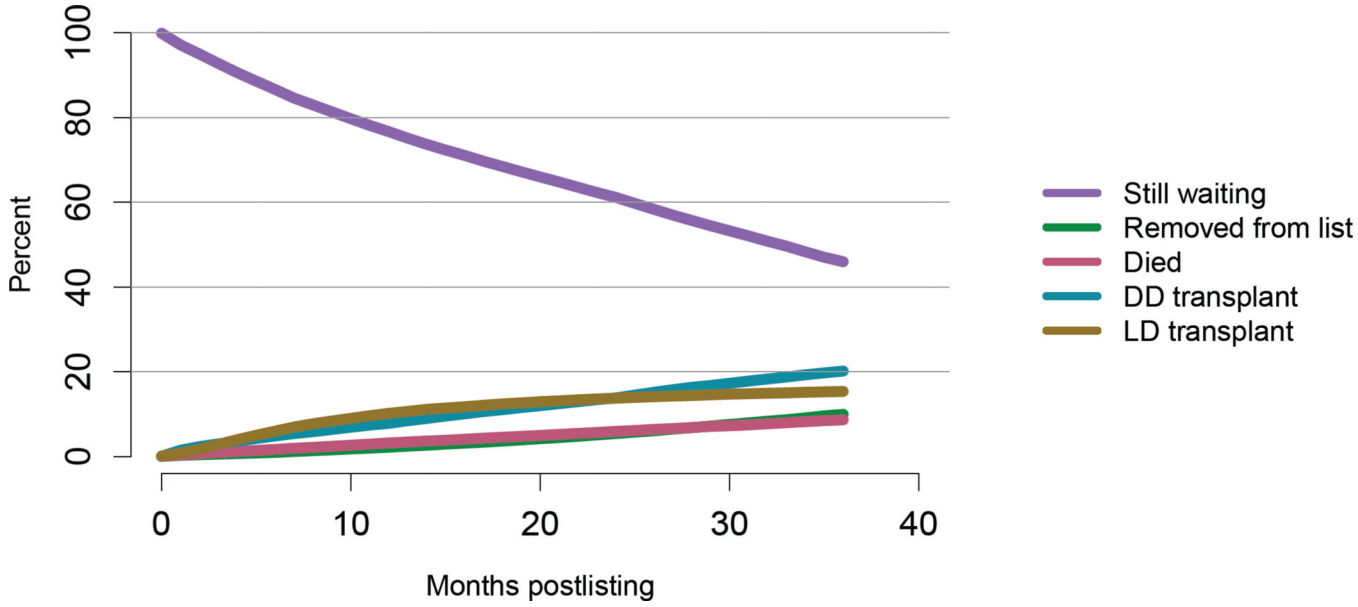

Figure KI 15. Three-year outcomes for adults waiting for kidney transplant, new listings in 2012

Adults waiting for any kidney transplant and first listed in 2012. Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal. Removed from list includes all reasons except transplant and death. DD, deceased donor; LD, living donor.

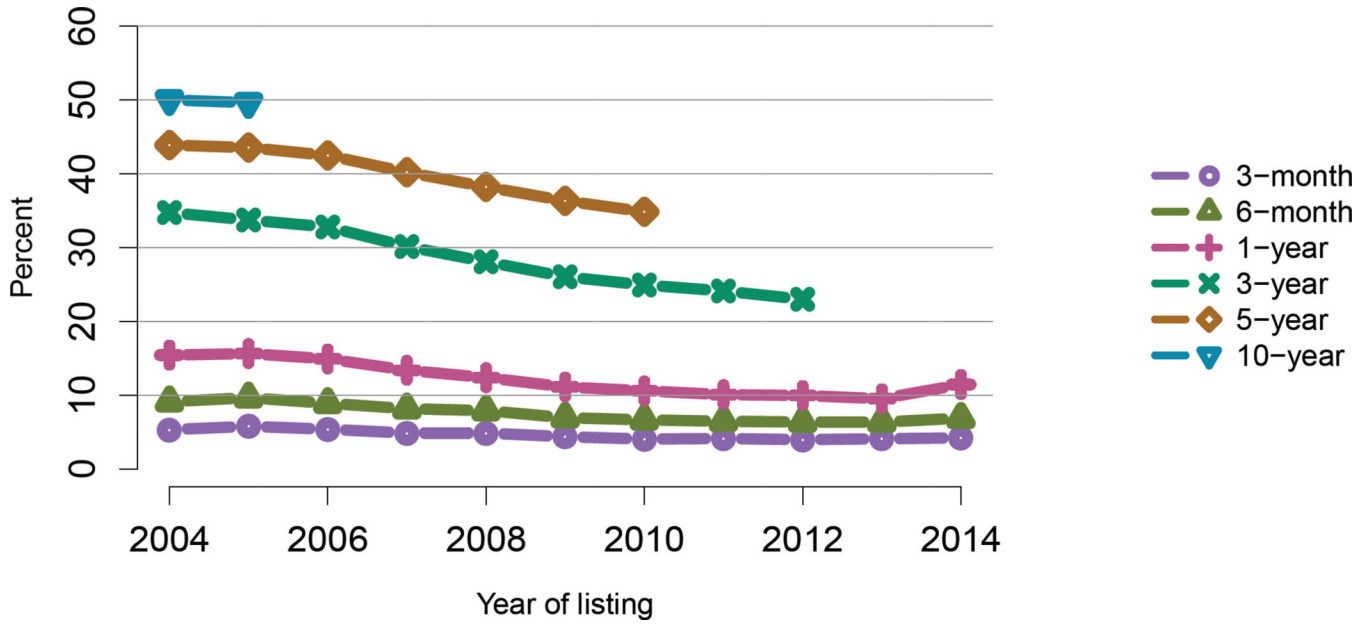

Figure KI 16. Percentage of adults who underwent deceased donor kidney transplant within a given time period of listing

Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal.

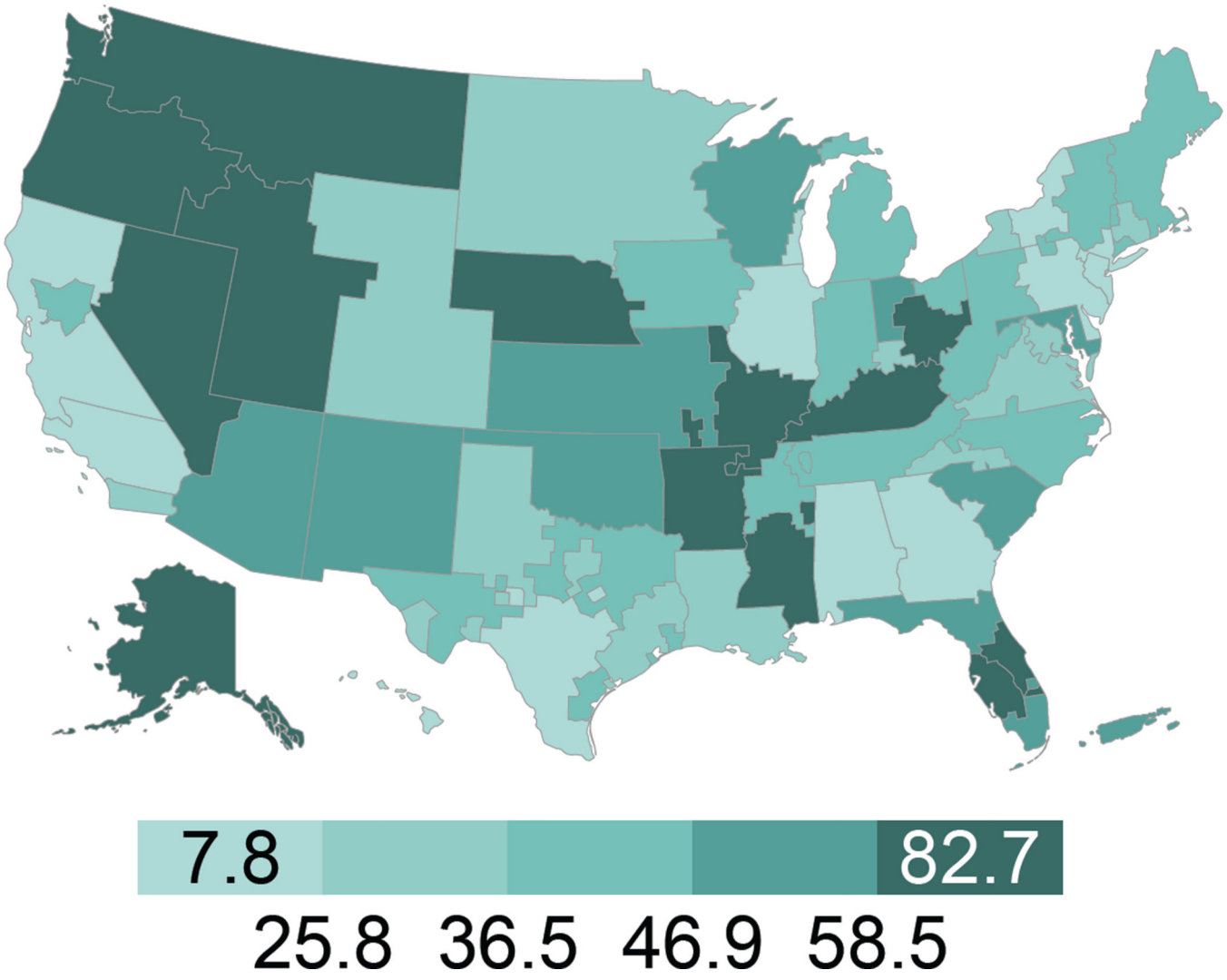

Figure KI 17. Percentage of adults who underwent deceased donor kidney transplant within 5 years of listing in 2010 by DSA

Candidates listed concurrently in a single DSA are counted once in that DSA, from the time of earliest listing to the time of latest removal; candidates listed in multiple DSAs are counted separately per DSA.

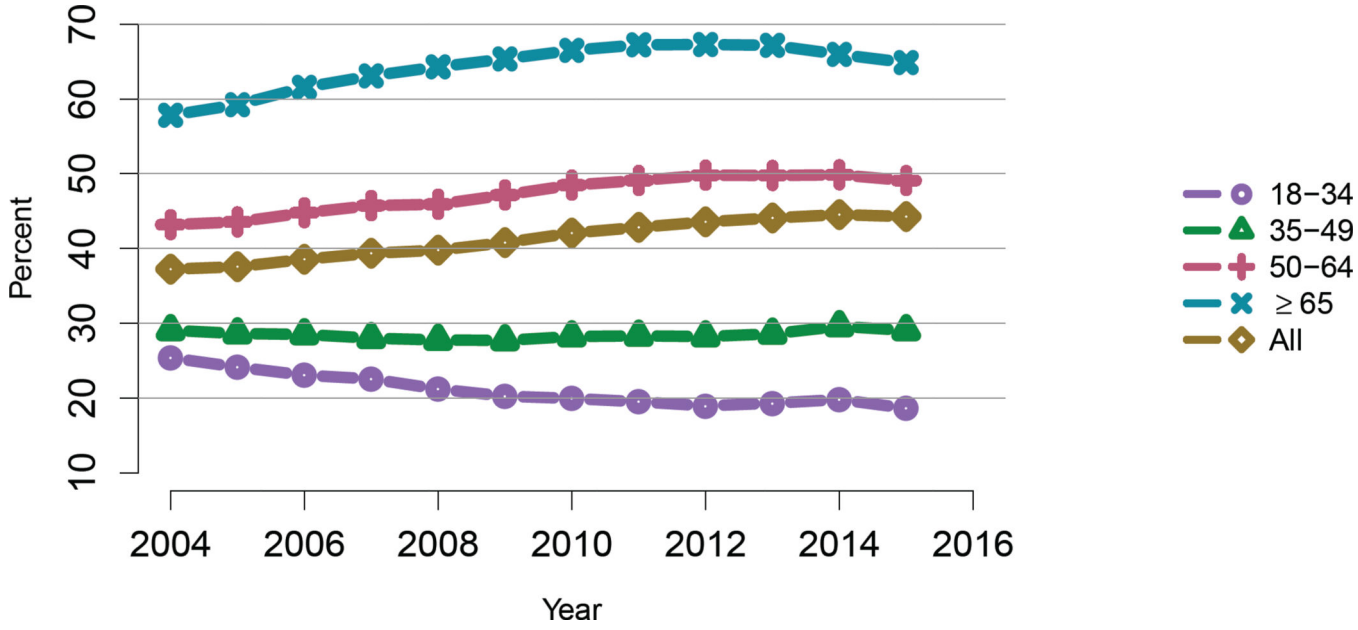

Figure KI 18. Adults willing to accept a kidney designated ECD or KDPI > 85% by age

Adults waiting for kidney transplant on December 31 of the given year. Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal. Willingness to accept a KDPI >85% kidney is for at least one day during the year, beginning in 2014. ECD, expanded criteria donor.

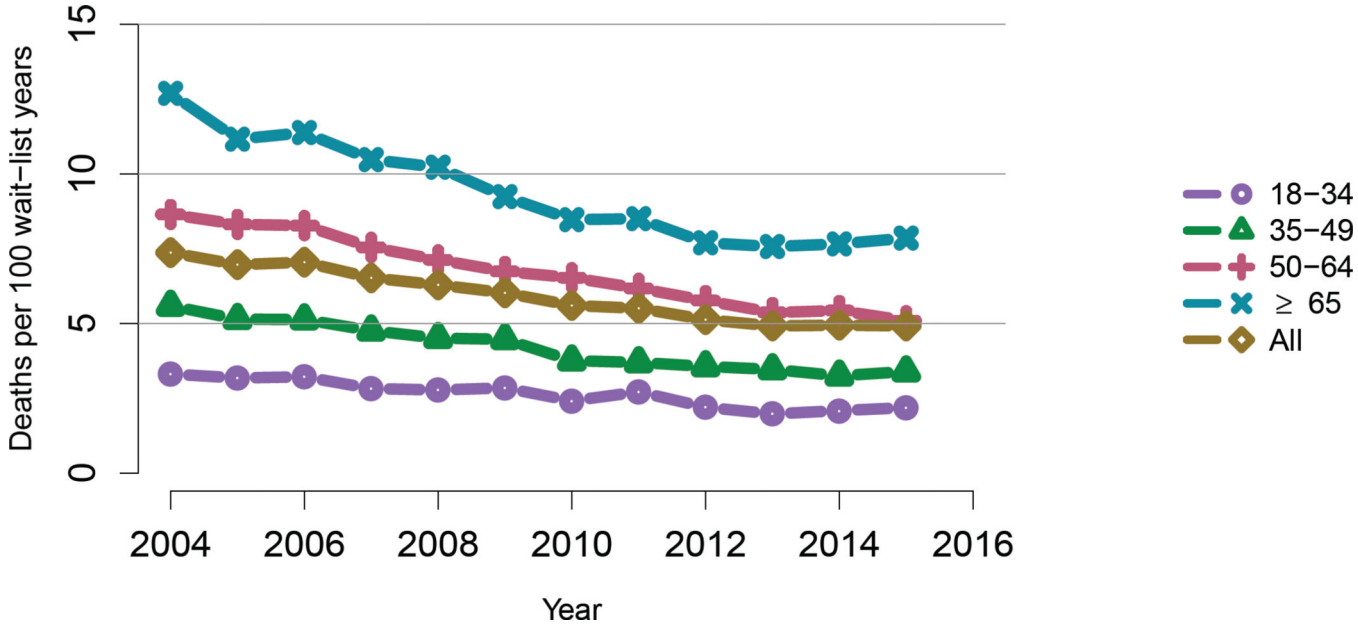

Figure KI 19. Pretransplant mortality rates among adults waitlisted for kidney transplant by age

Mortality rates are computed as the number of deaths per 100 patient-years of waiting in the given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown. Age is determined at the later of listing date or January 1 of the given year.

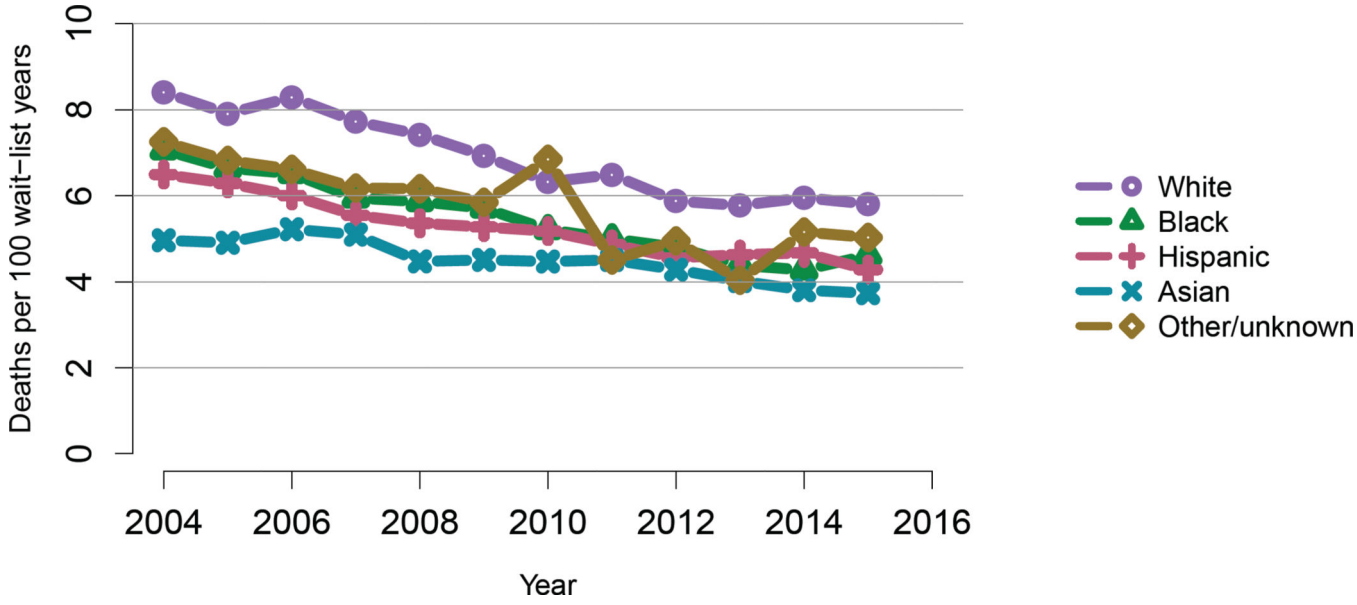

Figure KI 20. Pretransplant mortality rates among adults waitlisted for kidney transplant by race

Mortality rates are computed as the number of deaths per 100 patient-years of waiting in the given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown.

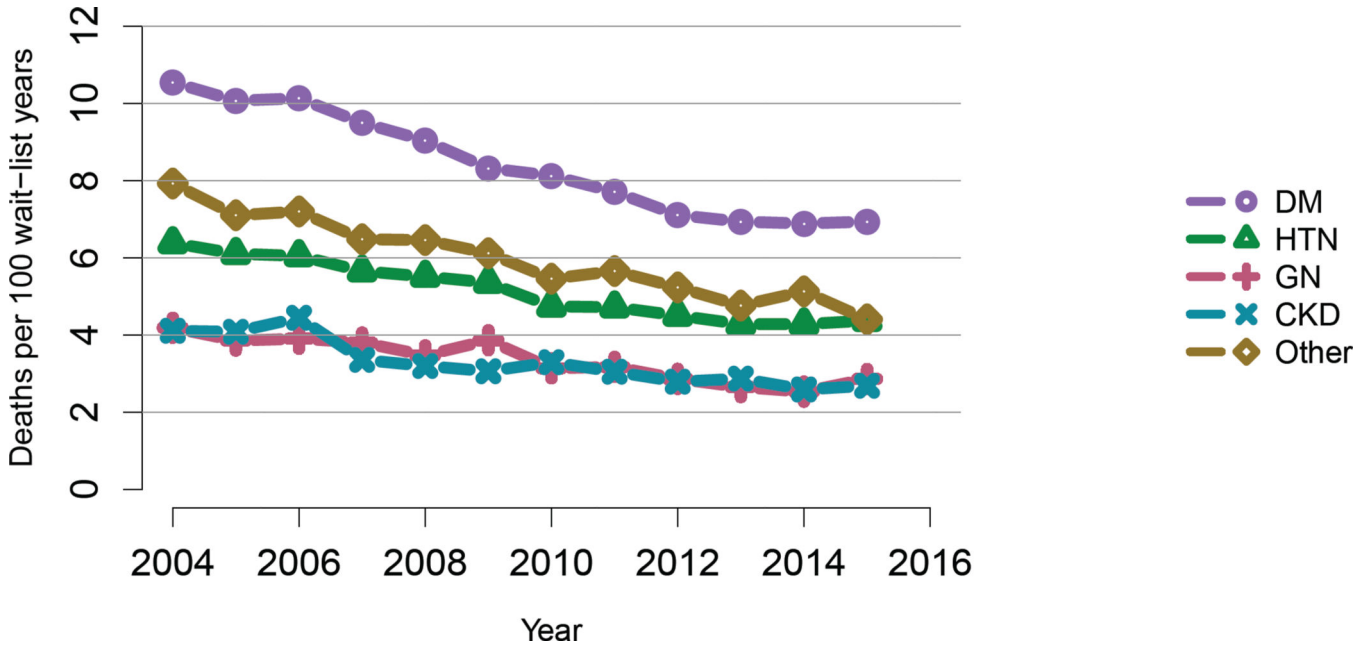

Figure KI 21. Pretransplant mortality rates among adults waitlisted for kidney transplant by diagnosis

Mortality rates are computed as the number of deaths per 100 patient-years of waiting in the given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown. CKD, cystic kidney disease; DM, diabetes. HTN, hypertension. GN, glomerulonephritis.

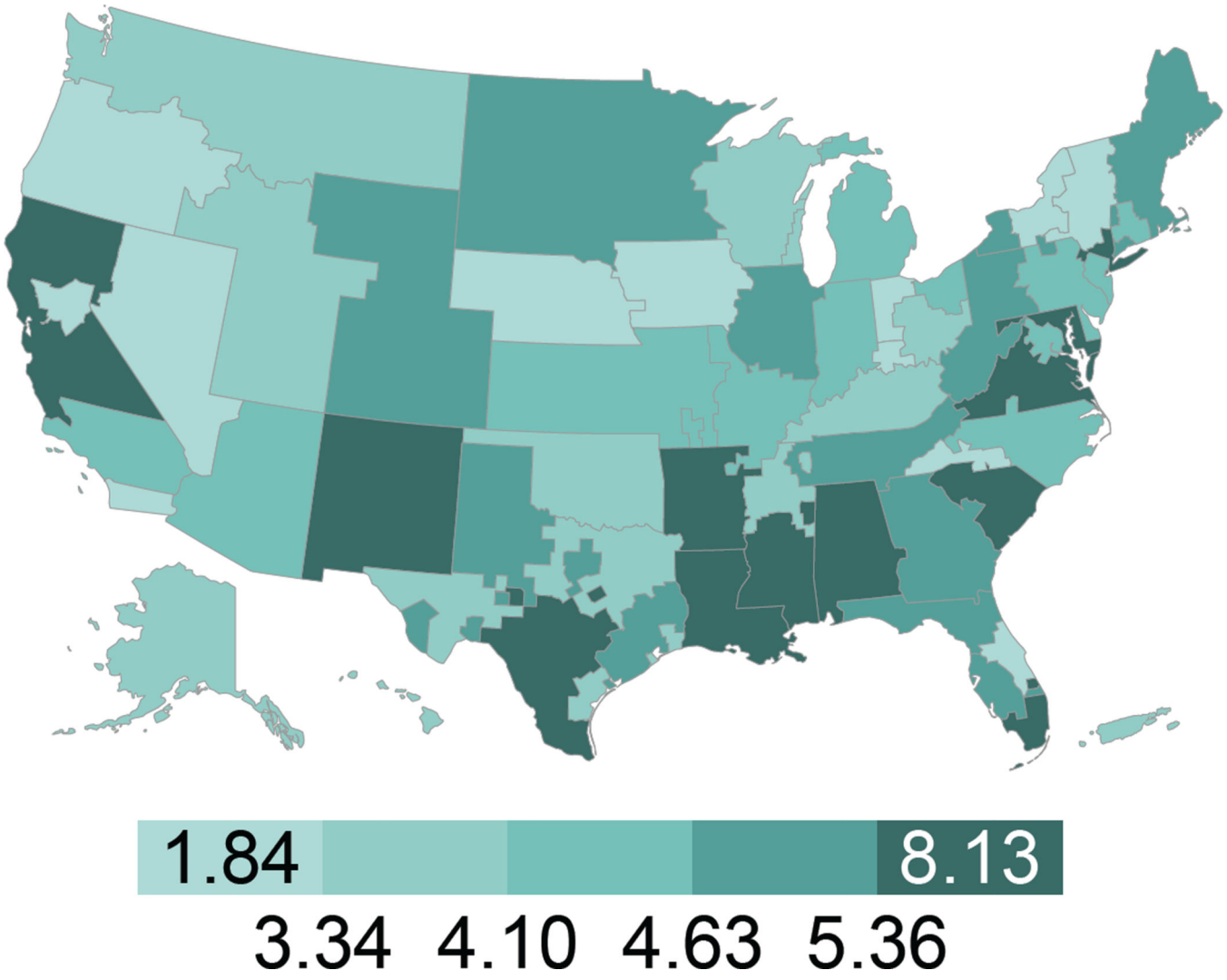

Figure KI 22. Pretransplant mortality rates among adults waitlisted for kidney transplant in 2015, by DSA

Mortality rates are computed as the number of deaths per 100 patient-years of waiting in the given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown.

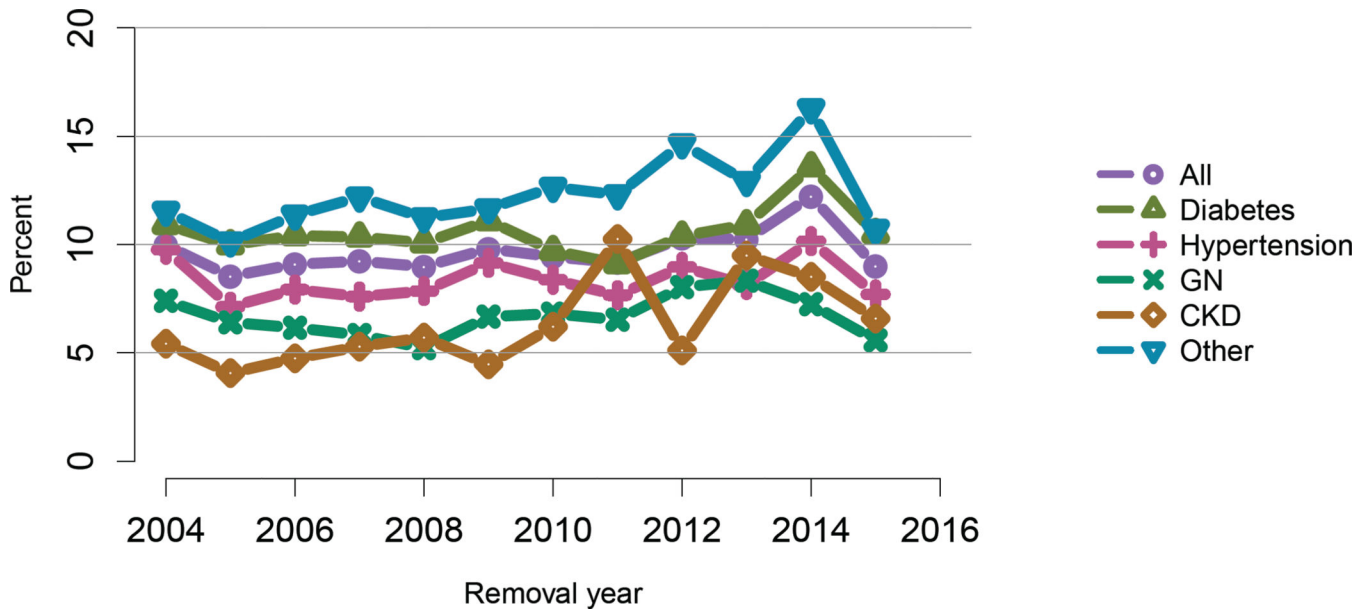

Figure KI 23. Deaths within six months after removal among adult kidney walitlist candidates
Denominator includes only candidates removed from the waiting list for reasons other than transplant or death while on the list.

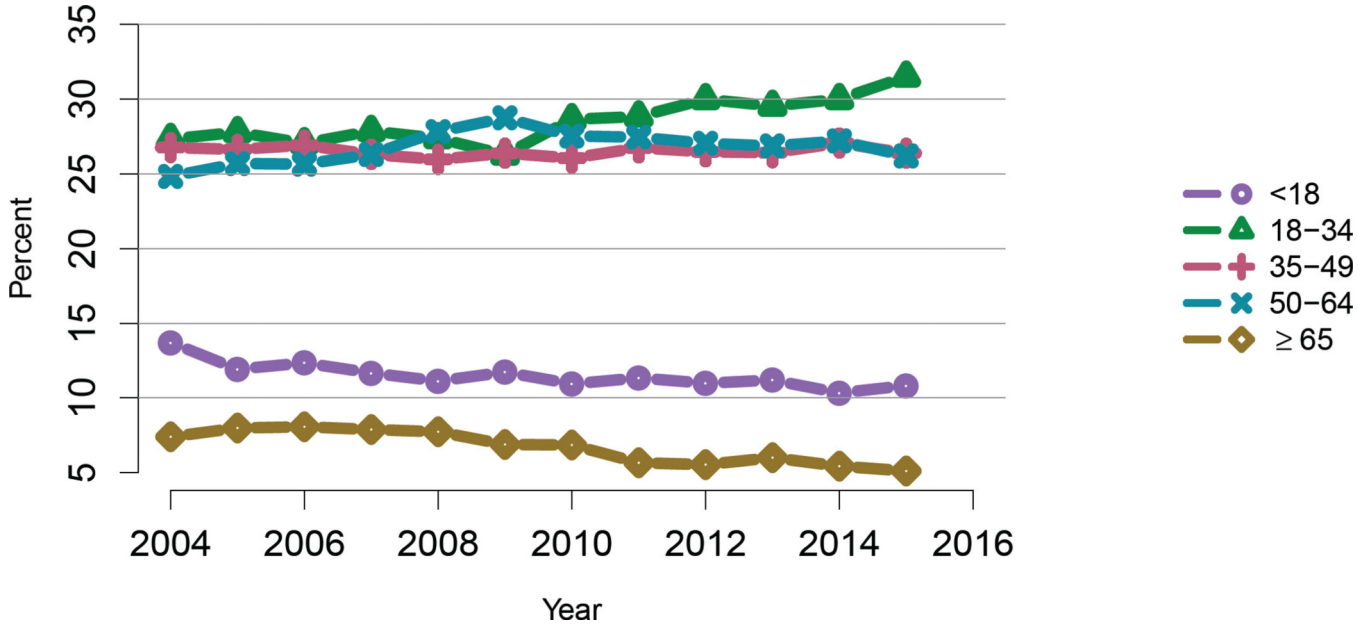

Figure KI 24. Deceased kidney donors by age

Deceased donors with at least one kidney recovered for transplant. Donors whose kidneys were recovered en-bloc are counted once, and donors whose kidneys were recovered separately are counted twice.

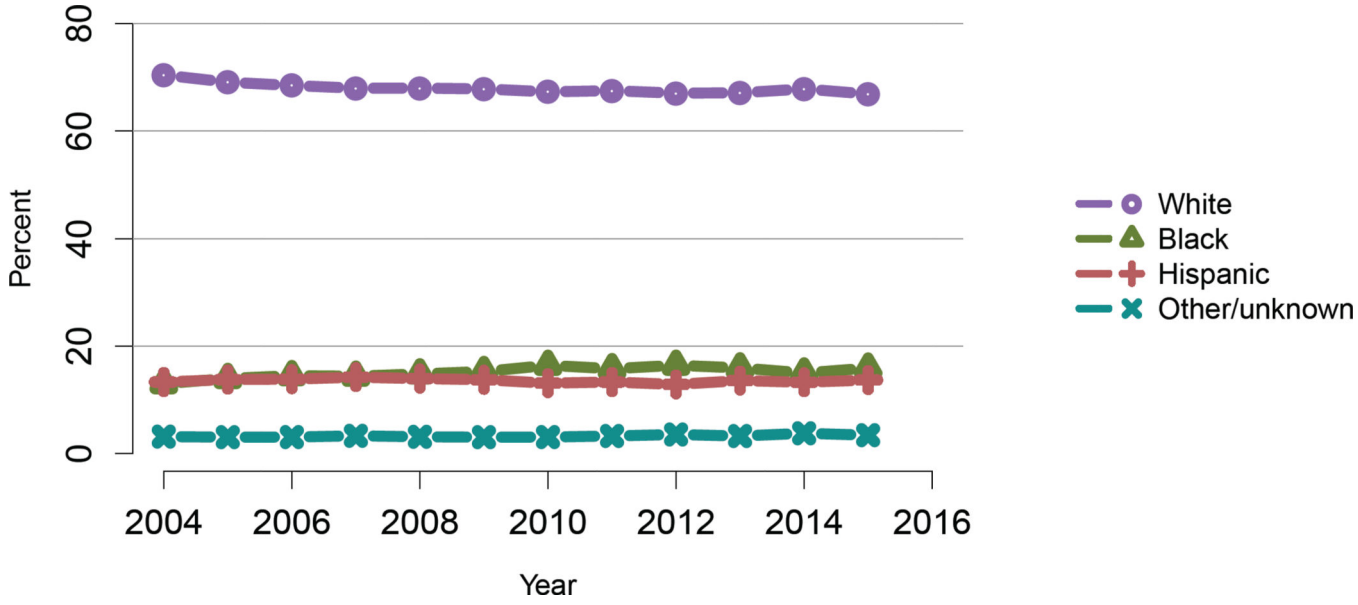

Figure KI 25. Deceased kidney donors by race

Deceased donors with at least one kidney recovered for transplant. Donors whose kidneys were recovered en-bloc are counted once, and donors whose kidneys were recovered separately are counted twice.

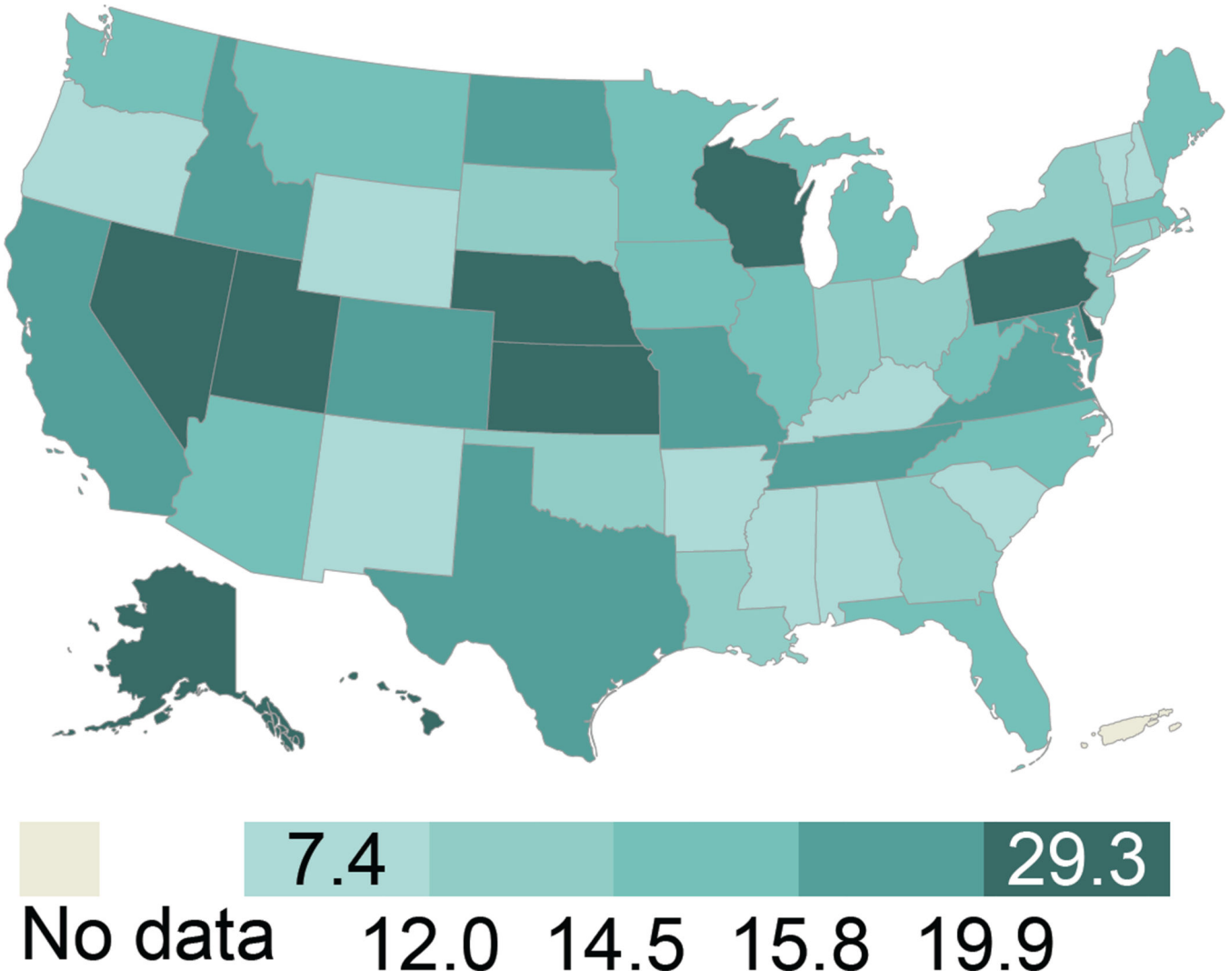

Figure KI 26. Deceased donor kidney donation rates (per 1000 deaths) by state, 2012–2014

Numerator: Deceased donors aged < 70 years, by state of death, whose kidneys were recovered for transplant from 2012 through 2014. Denominator: US deaths aged < 70 years, by state of death, from 2012 through 2014. State death data by age obtained through agreement with NAPHSIS (http://www.naphsis.org/programs/vital-statistics-data-research-request-process). Donors whose kidneys were recovered en-bloc are counted once, and donors whose kidneys were recovered separately are counted twice.

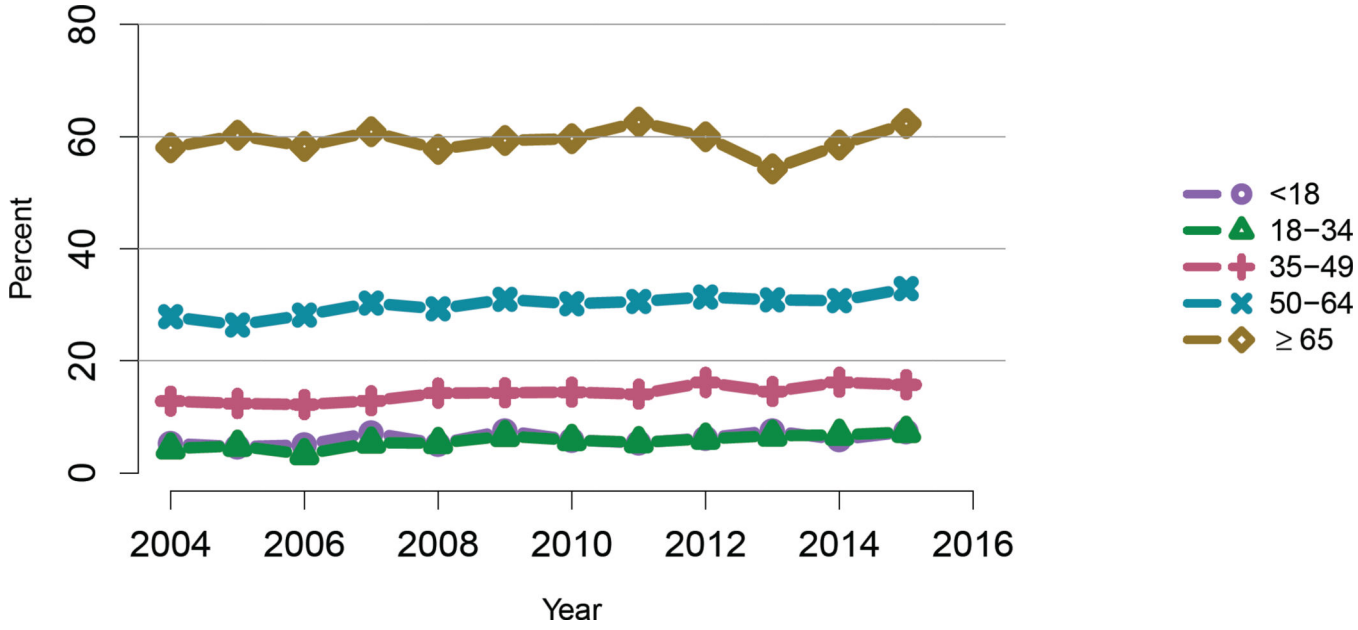

Figure KI 27. Rates of kidneys recovered for transplant and not transplanted by age

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice.

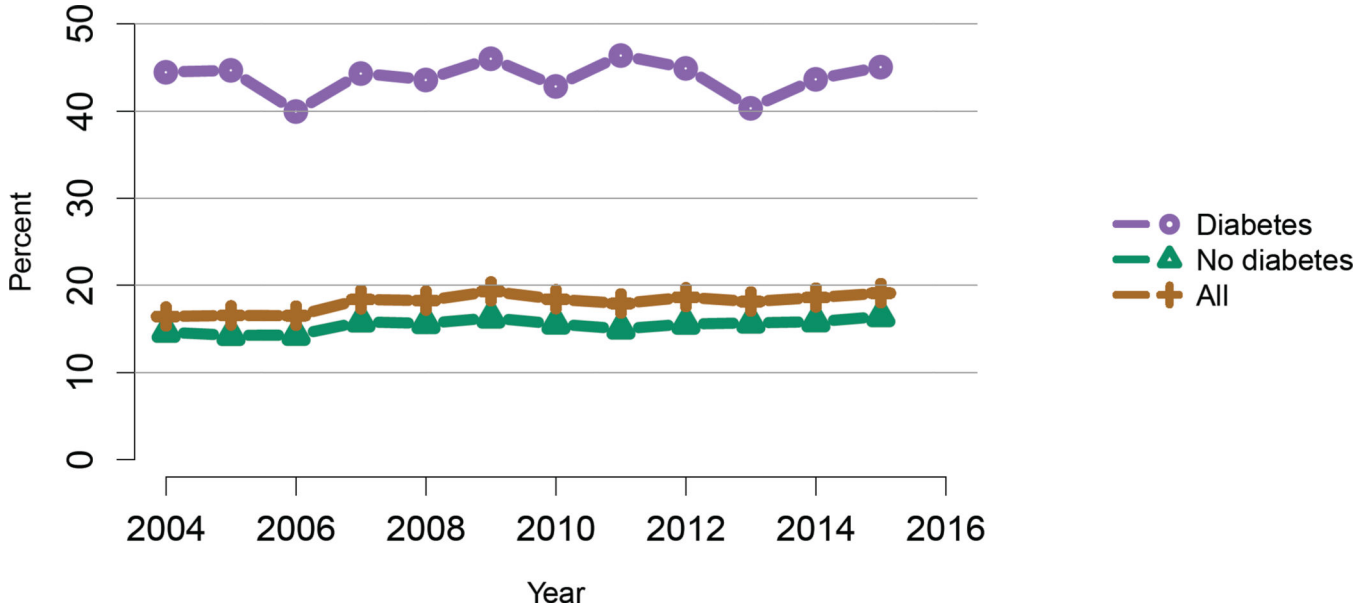

Figure KI 28. Rates of kidneys recovered for transplant and not transplanted by diabetes status

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice.

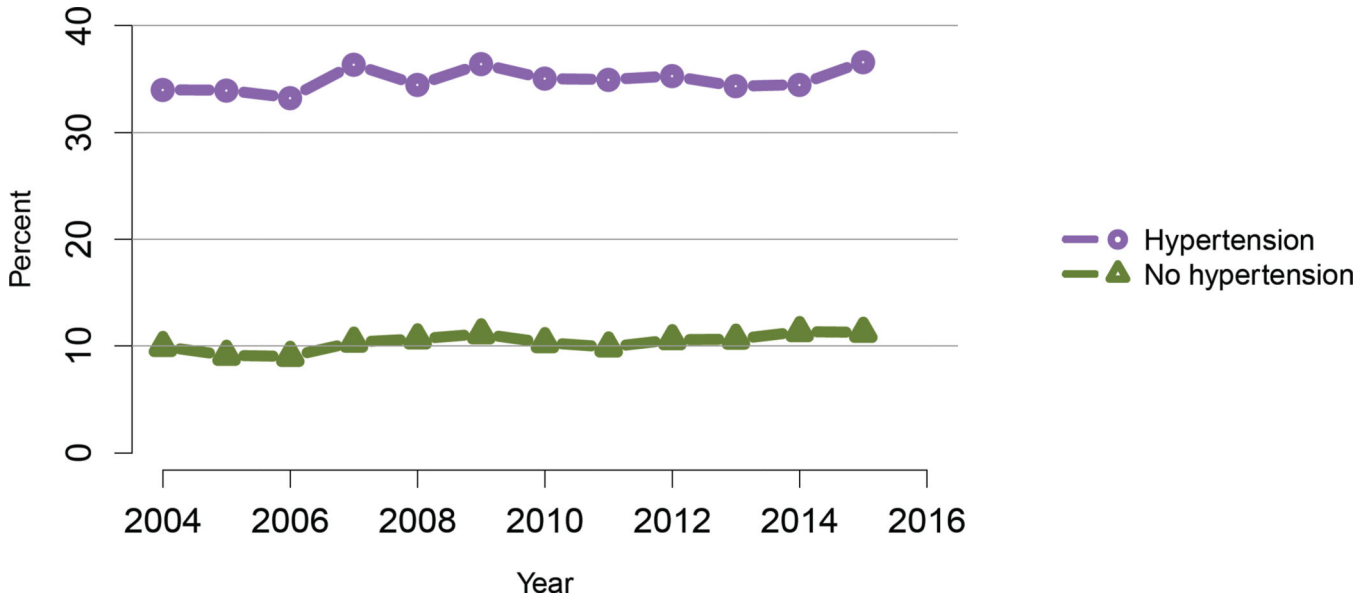

Figure KI 29. Rates of kidneys recovered for transplant and not transplanted by hypertension status

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice.

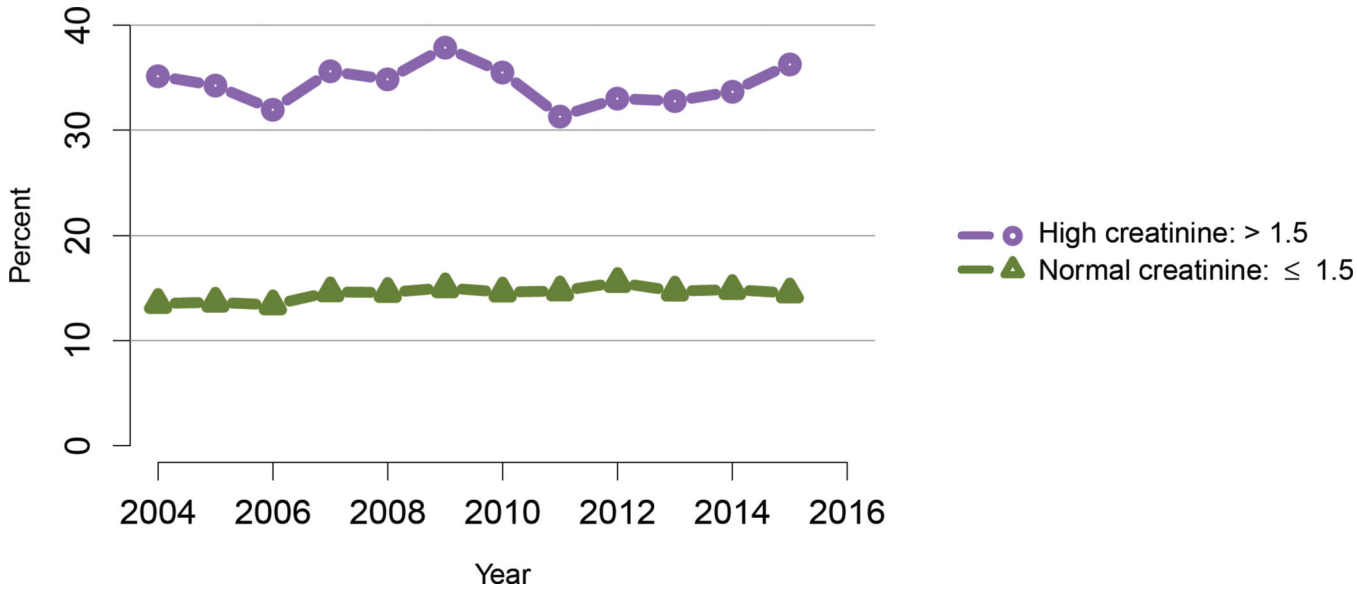

Figure KI 30. Rates of kidneys recovered for transplant and not transplanted by terminal creatinine

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice.

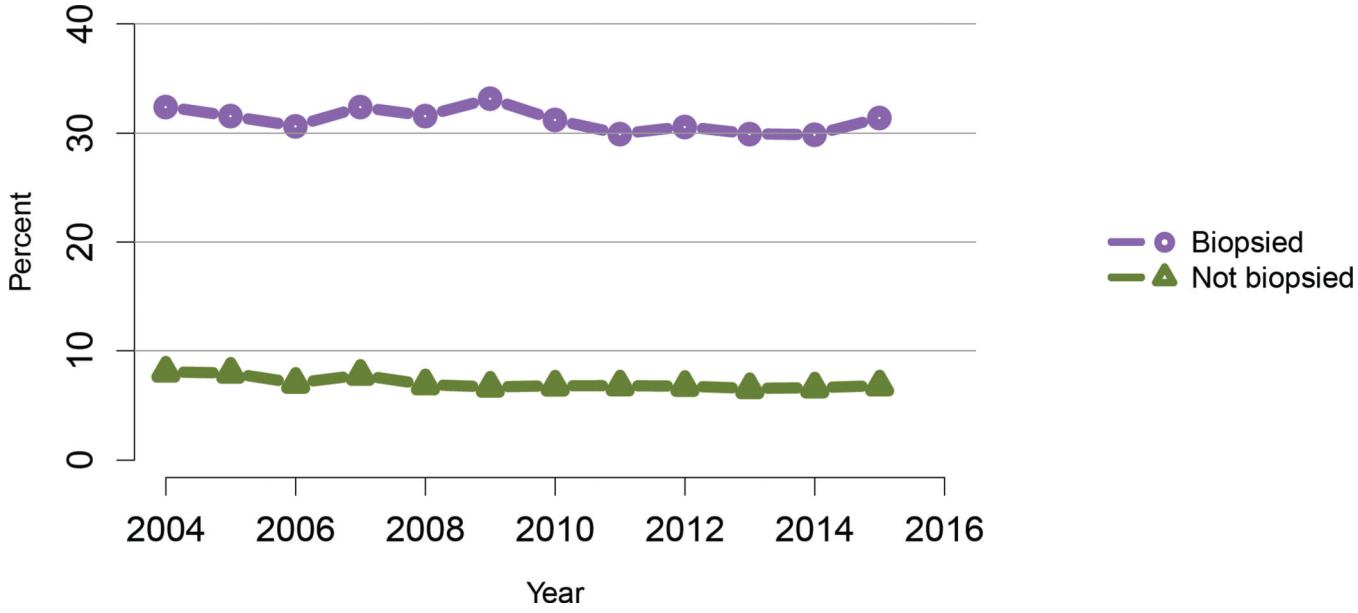

Figure KI 31. Rates of kidneys recovered for transplant and not transplanted by biopsy status

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice.

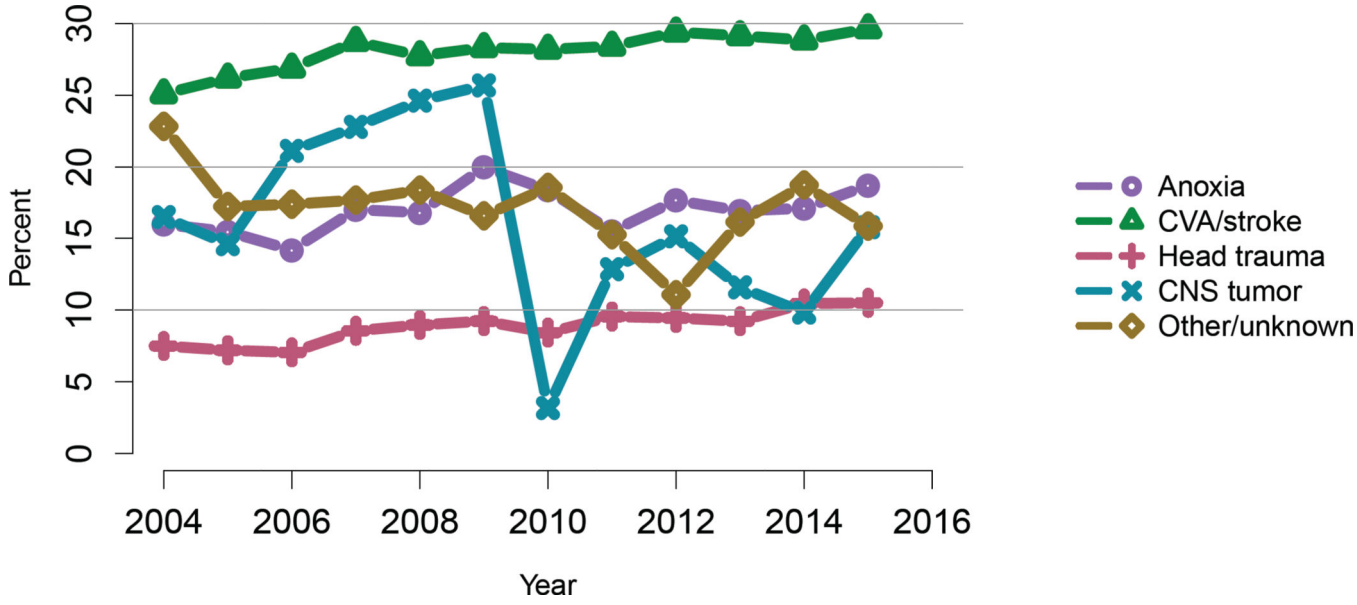

Figure KI 32. Rates of kidneys recovered for transplant and not transplanted by cause of death

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice. CNS, central nervous system; CVA, cerebrovascular accident.

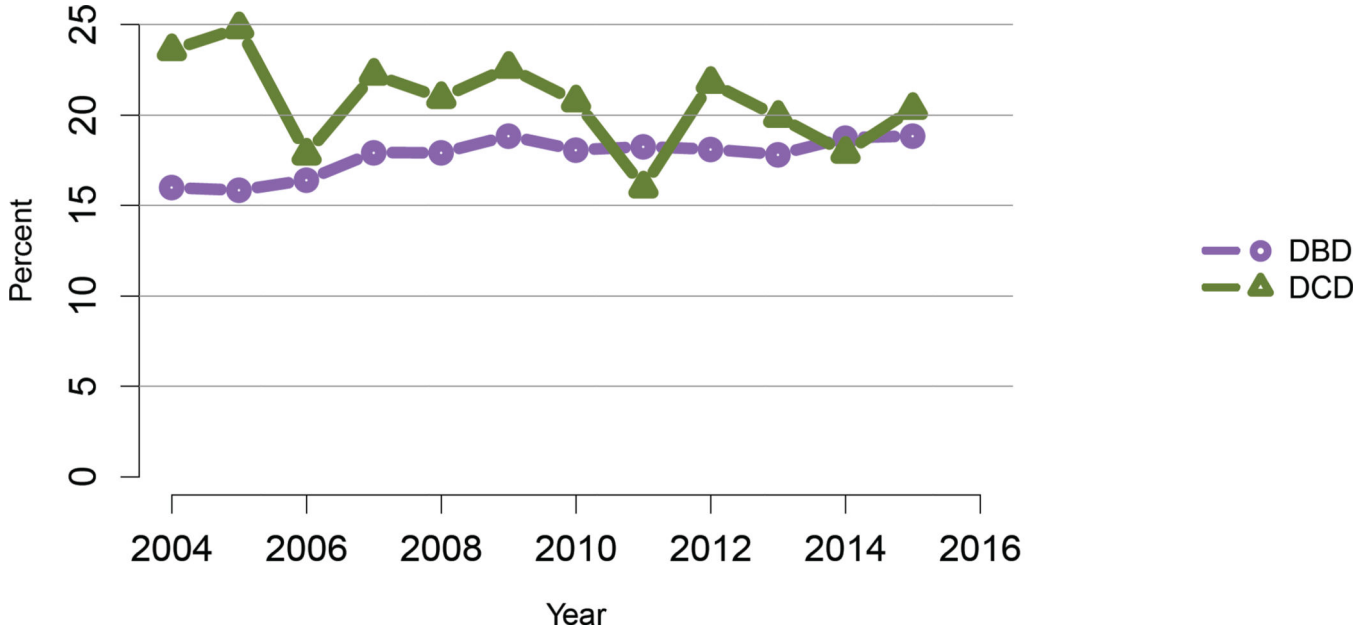

Figure KI 33. Rates of kidneys recovered for transplant and not transplanted by DCD status

Percentages of kidneys not transplanted out of all kidneys recovered for transplant. Kidneys recovered en-bloc are counted once, and kidneys recovered separately are counted twice. DBD, donation after brain death; DCD, donation after circulatory death.

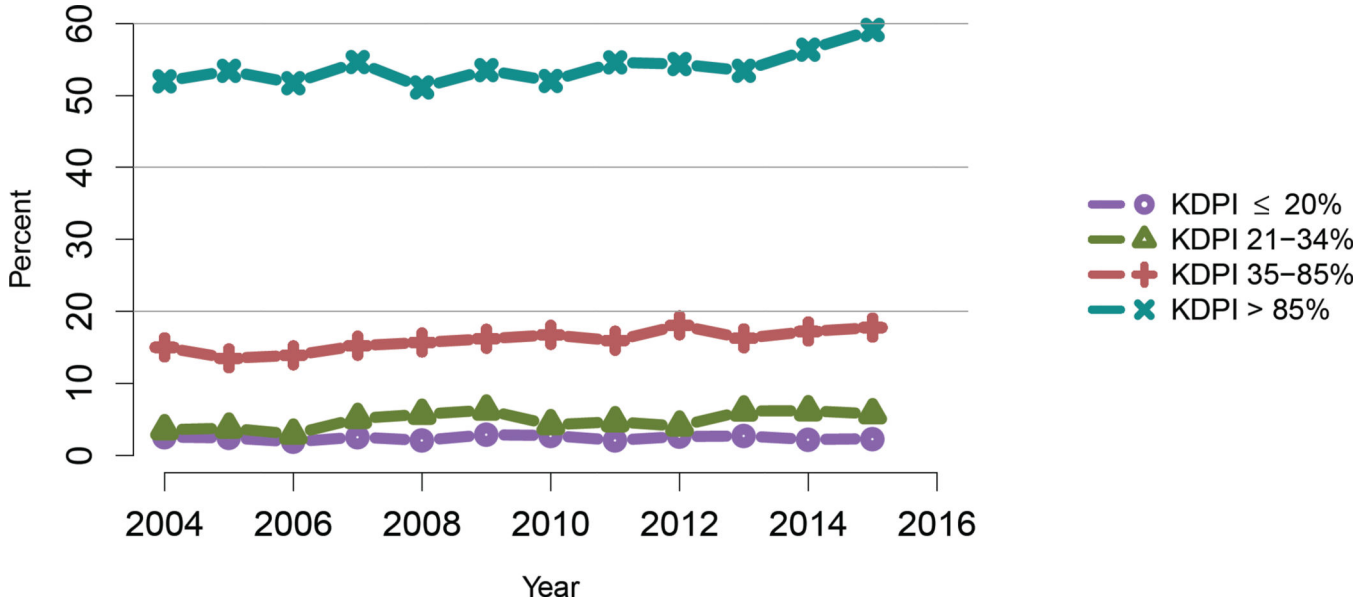

Figure KI 34. Rates of kidneys recovered for transplant and not transplanted by KDPI

Percentages of kidneys not transplanted out of all kidneys recovered for transplant, by KDPI classification. The reference population for the KDRI to KDPI conversion is all deceased donor kidneys recovered for transplant in the US in 2015. Kidneys recovered en-bloc are counted once. KDPI, kidney donor profile index; KDRI, kidney donor risk index.

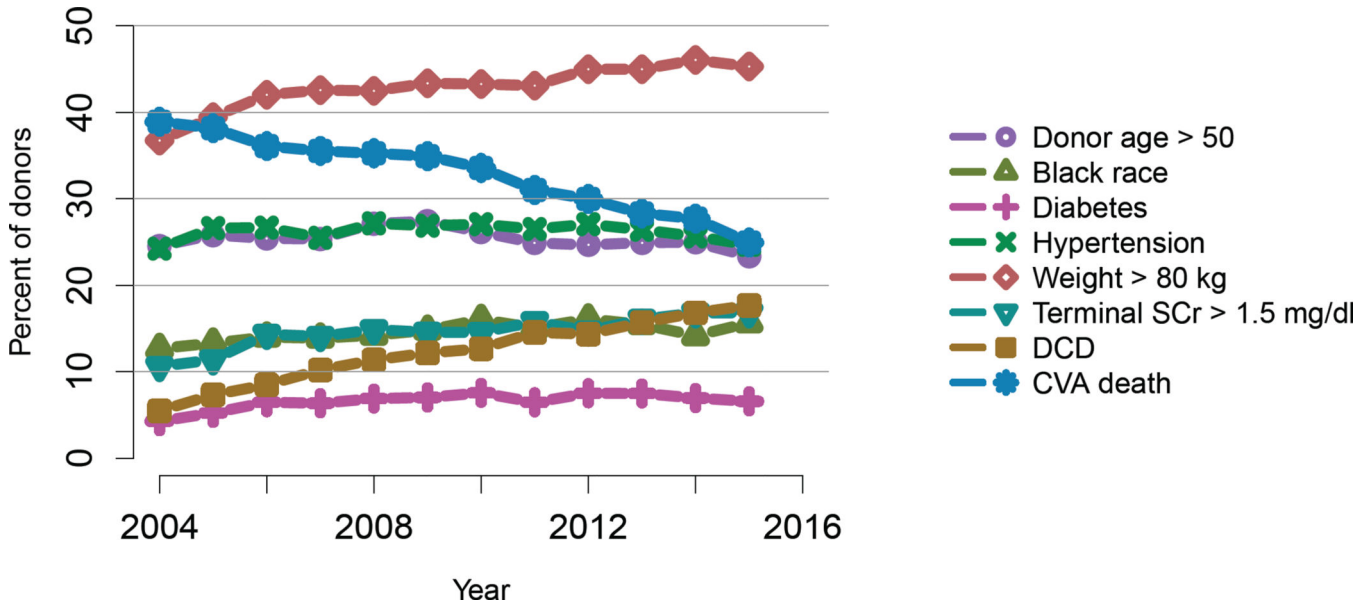

Figure KI 35. Donor-specific components of the kidney donor risk index

Donors with at least one transplanted kidney. The donor-specific components of the kidney donor risk index are shown, except for donor height and hepatitis C virus status. CVA, cerebrovascular accident; DCD, donation after circulatory death; SCr, serum creatinine.

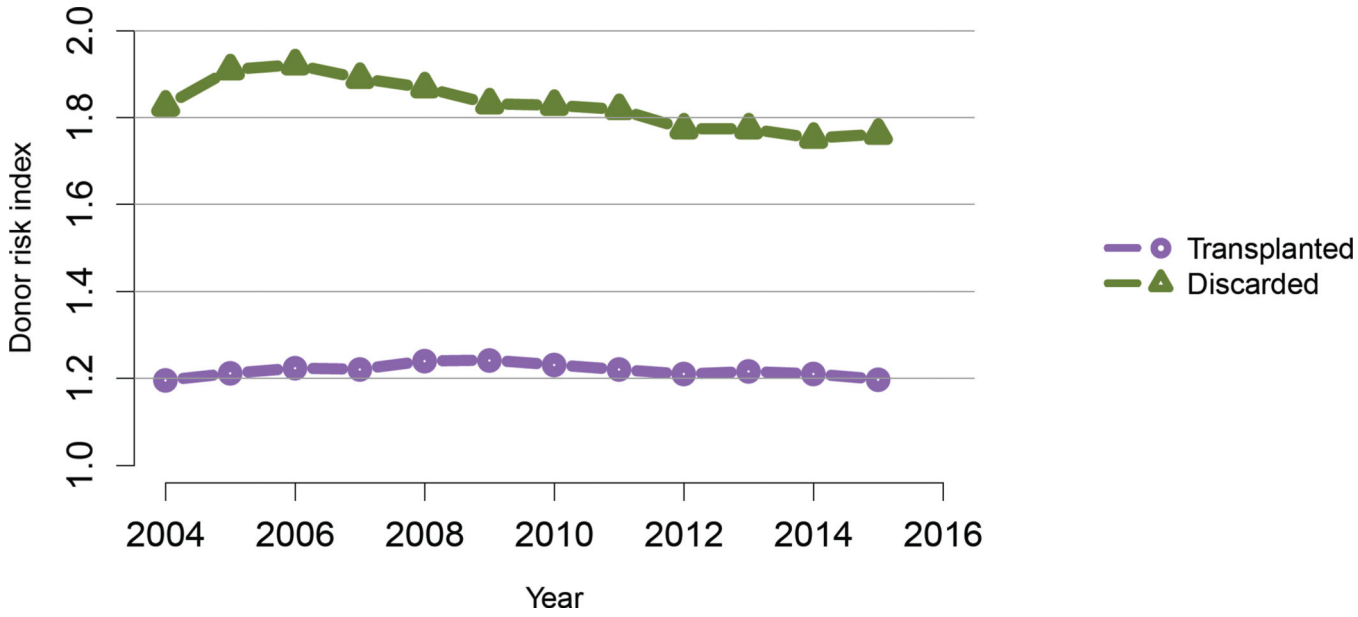

Figure KI 36. Average kidney donor risk index

Kidneys recovered for transplant. Kidney donor risk index is computed using only donor-specific components.

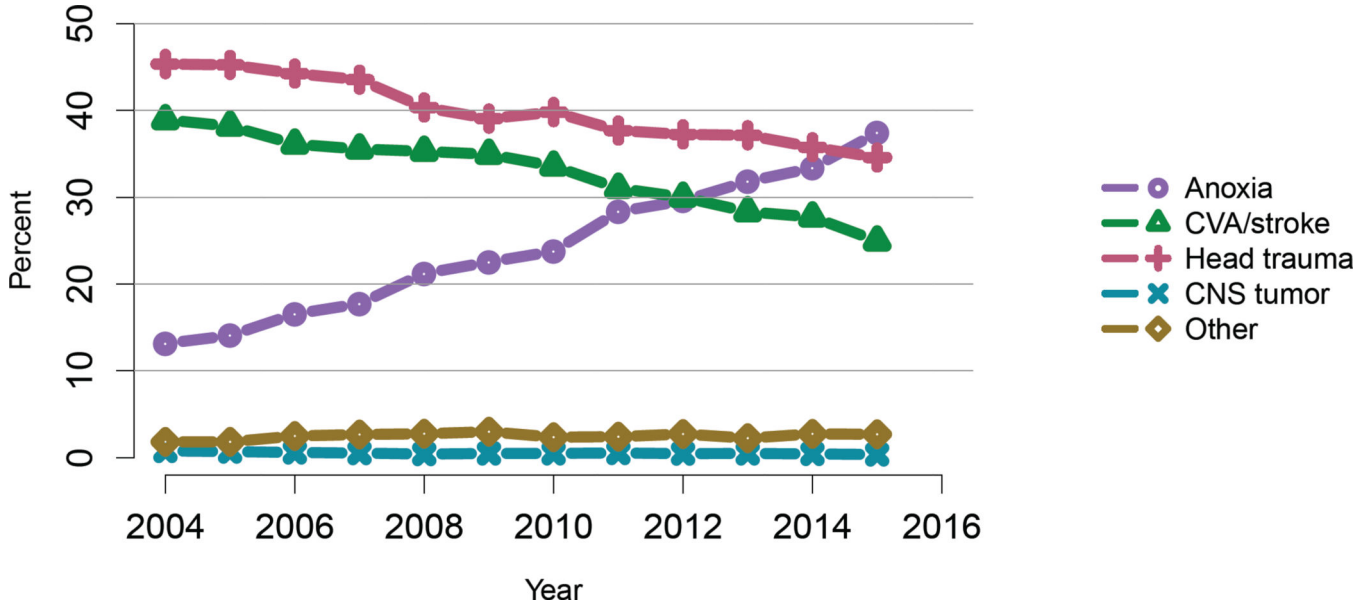

Figure KI 37. Cause of death among deceased kidney donors

Deceased donors whose kidneys were transplanted. Each donor is counted once. CNS, central nervous system; CVA, cerebrovascular accident.

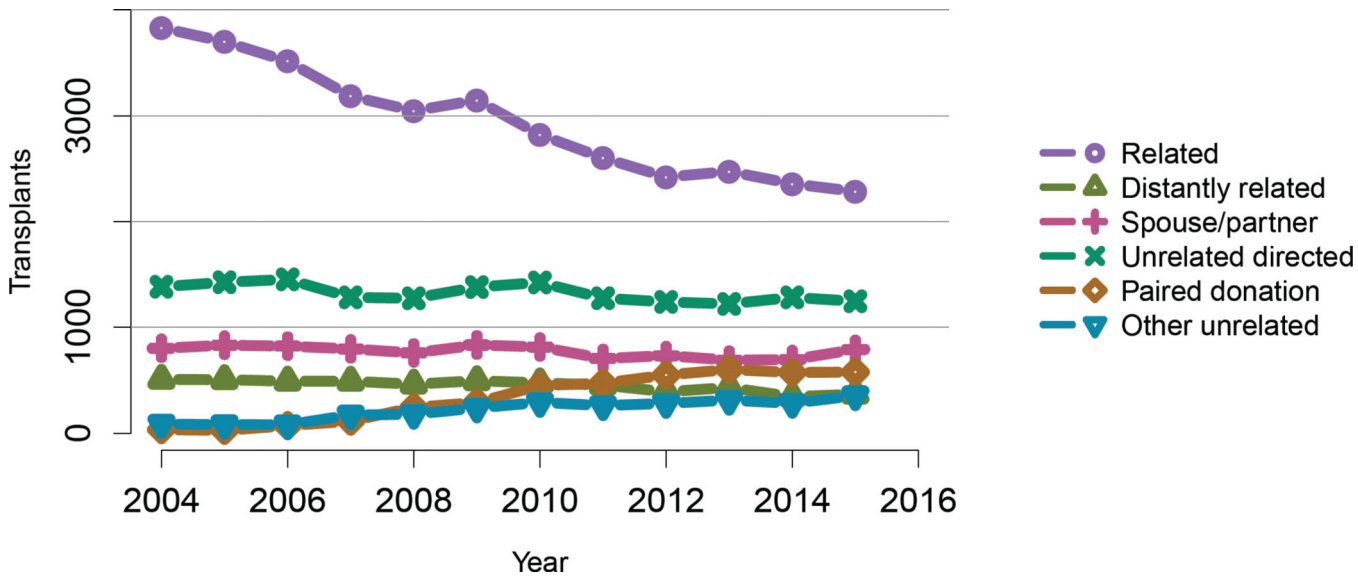

Figure KI 38. Kidney transplants from living donors by donor relation
As reported on the OPTN Living Donor Registration Form.

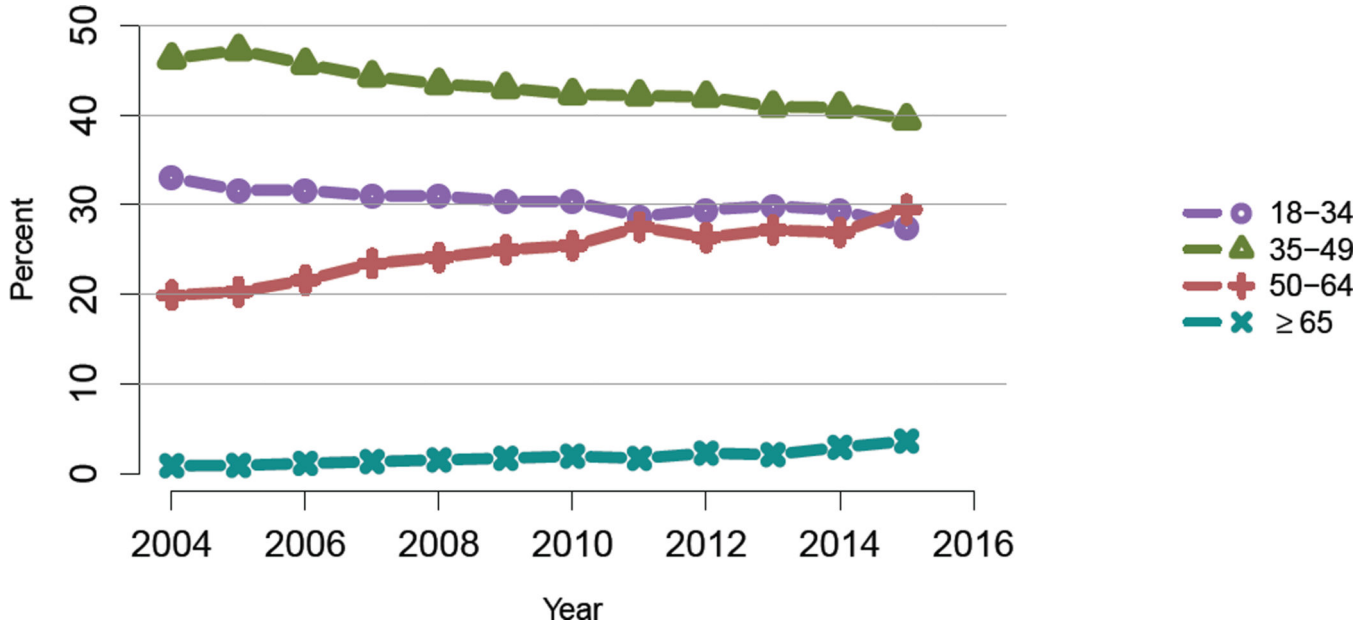

Figure KI 39. Living kidney donors by age

As reported on the OPTN Living Donor Registration Form.

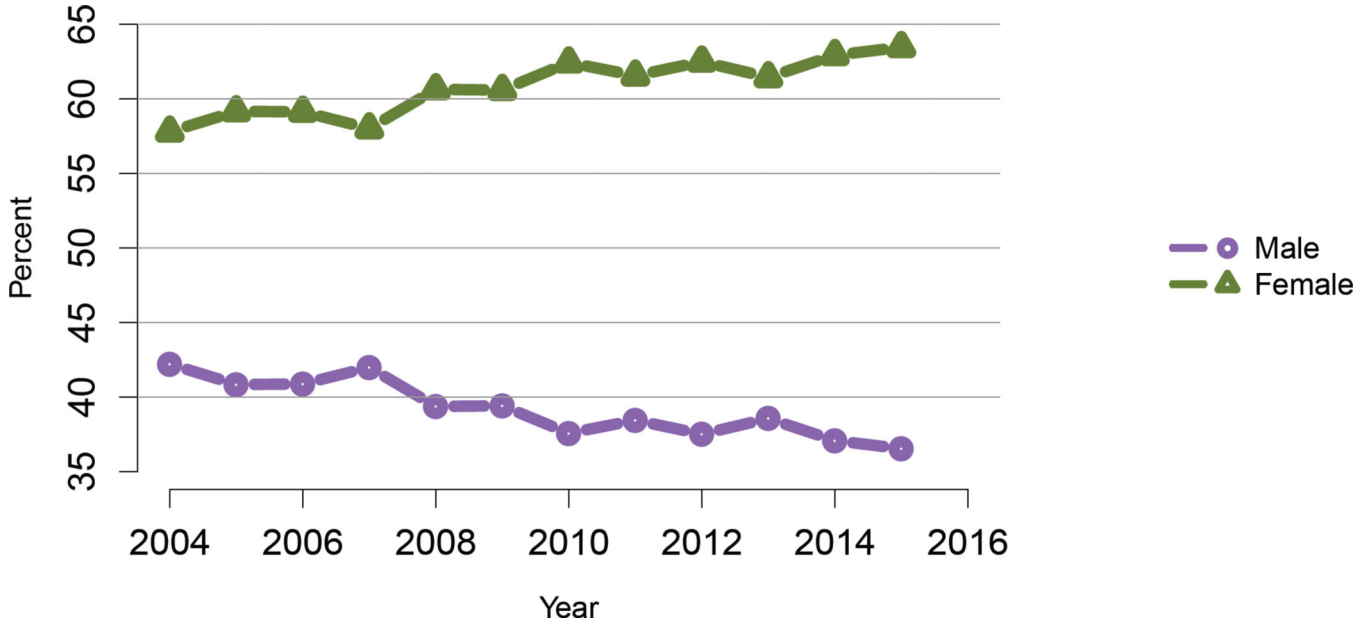

Figure KI 40. Living kidney donors by sex

As reported on the OPTN Living Donor Registration Form.

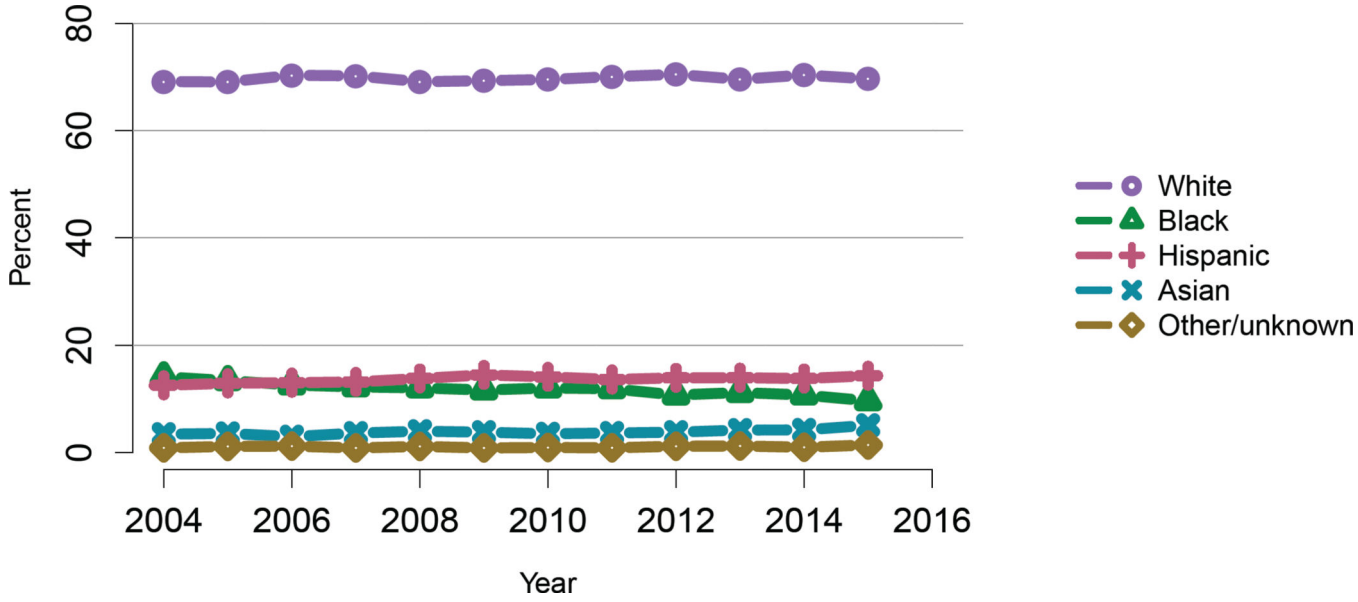

Figure KI 41. Living kidney donors by race

As reported on the OPTN Living Donor Registration Form.

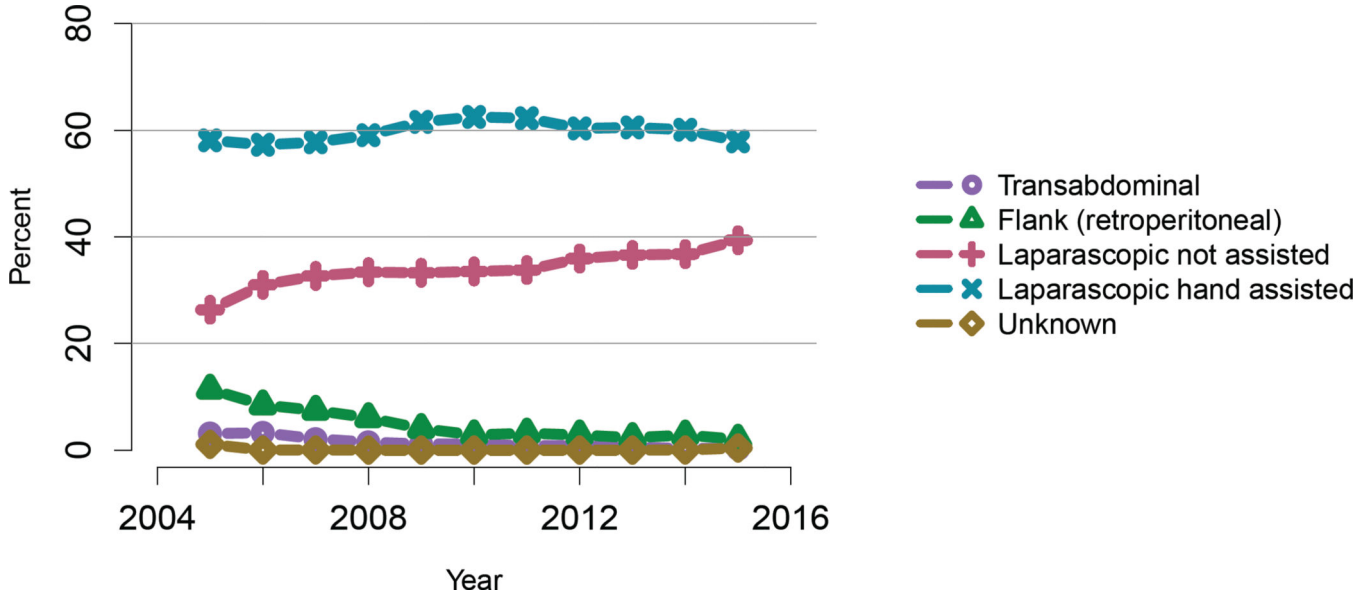

Figure KI 42. Intended living kidney donor procedure type

As reported on the OPTN Living Donor Registration Form.

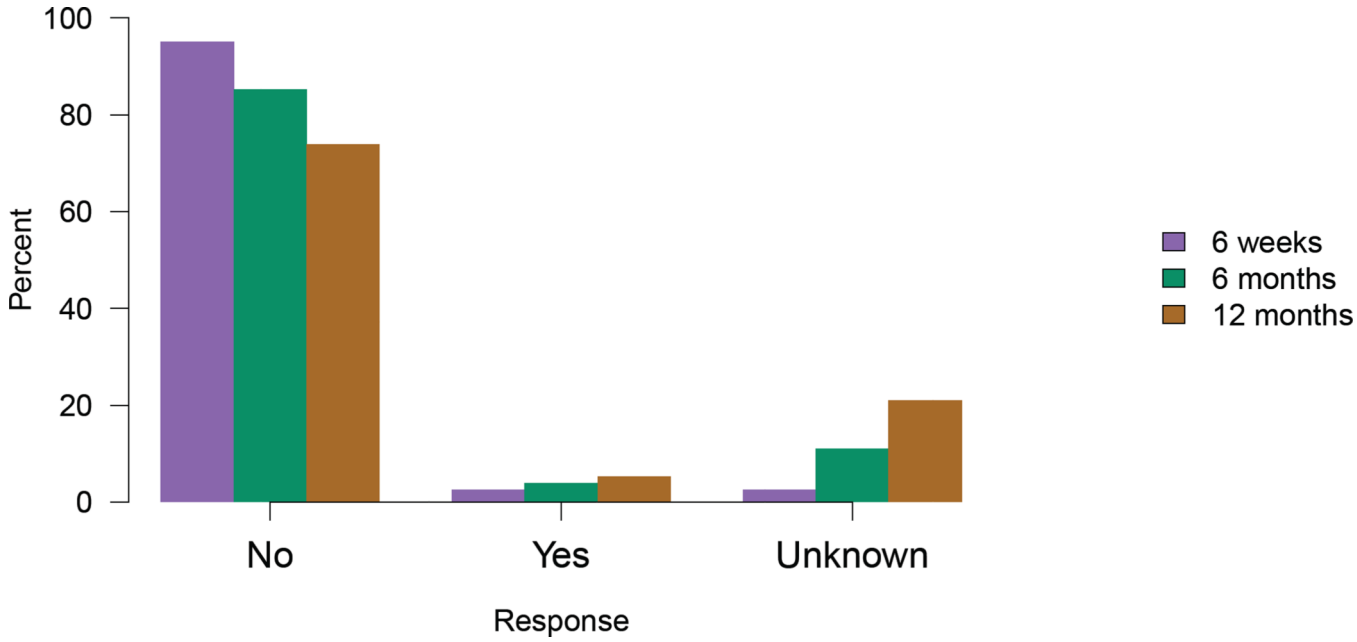

Figure KI 43. Rehospitalization in the first 6 weeks, 6 months, and 1 year among living kidney donors, 2010–2014

Cumulative hospital readmission. The 6-week time point is recorded at the earliest of discharge or 6 weeks after donation.

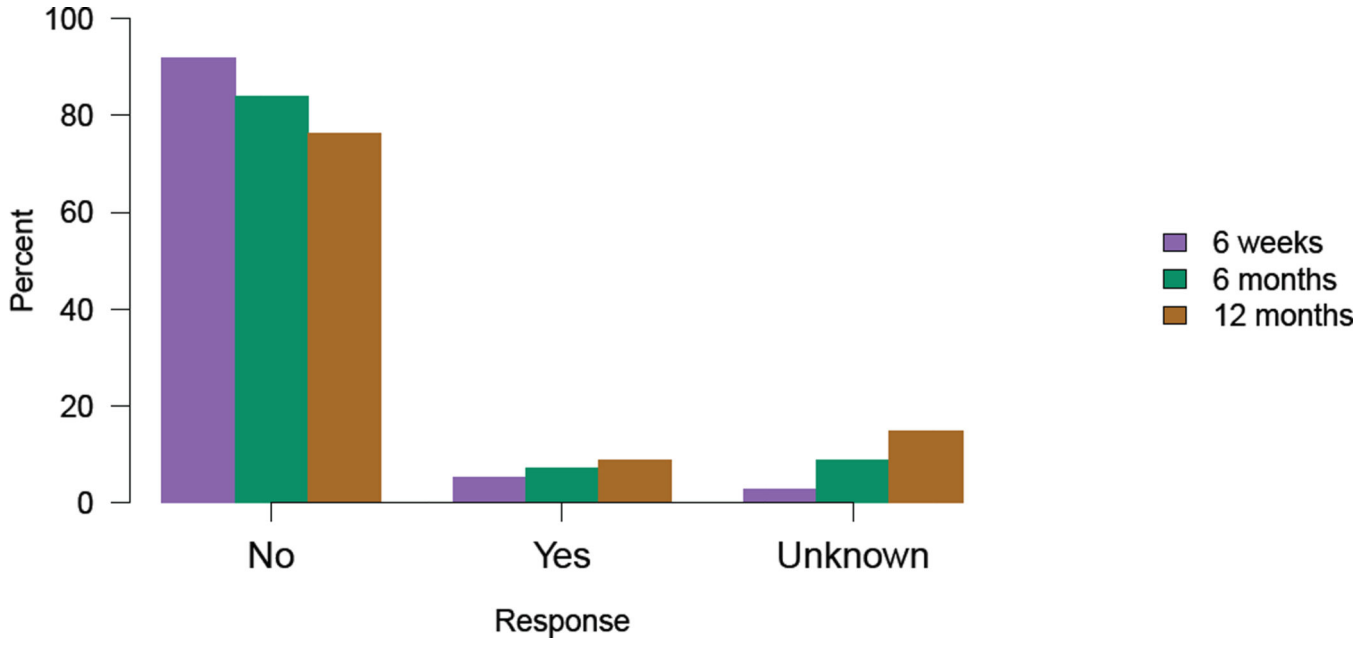

Figure KI 44. Kidney complications among living kidney donors, 2010–2014

Complications reported on the OPTN Living Donor Registration and Living Donor Follow-up Forms at each time point. Complications include readmission, reoperation, vascular complications, and other complications requiring intervention. Multiple complications may be reported at any time point.

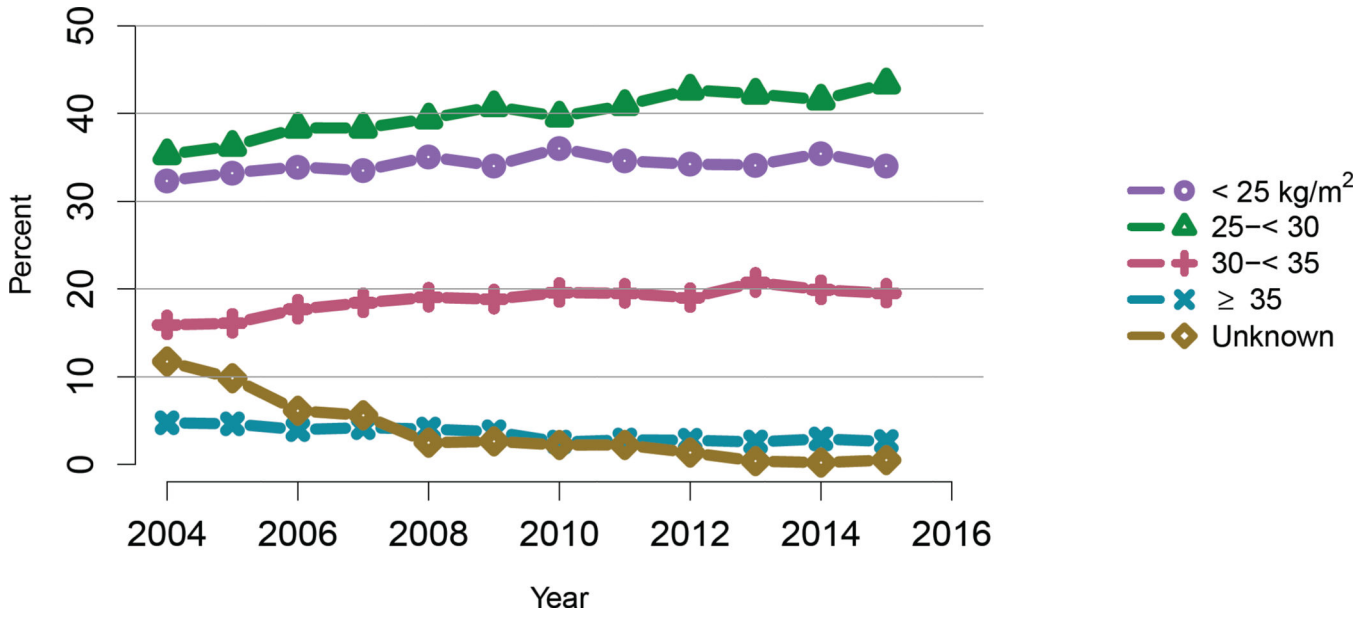

Figure KI 45. BMI among living kidney donors

Donor height and weight reported on the OPTN Living Donor Registration Form.

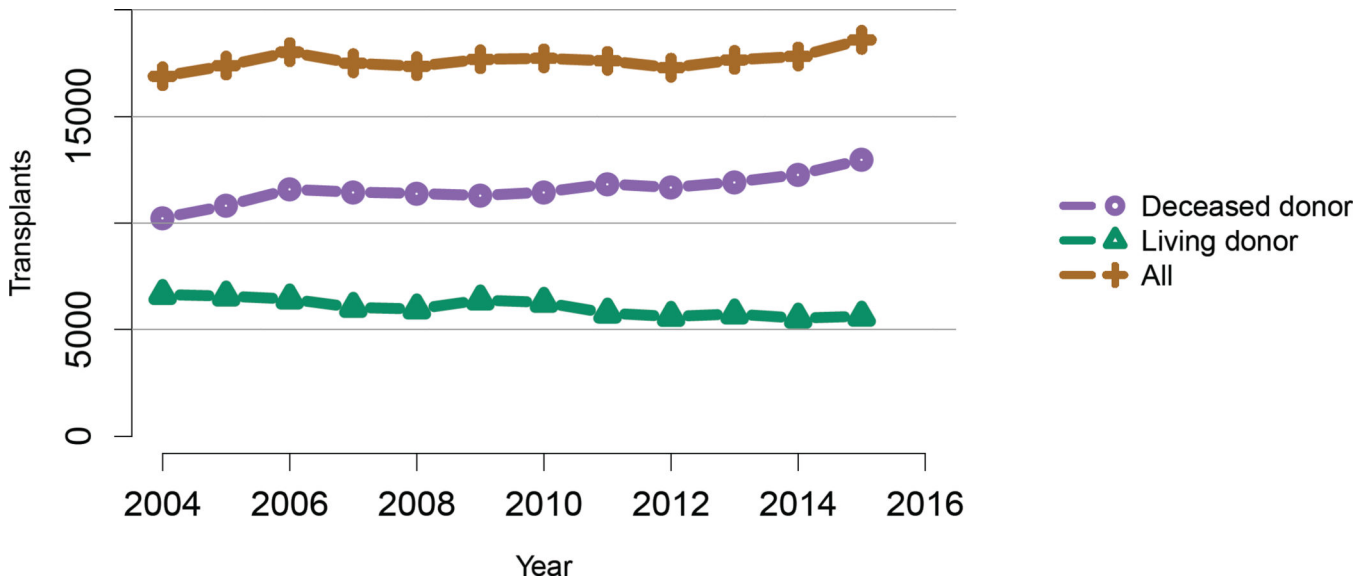

Figure KI 46. Total kidney transplants

All kidney transplant recipients, including adult and pediatric, retransplant, and multi-organ recipients.

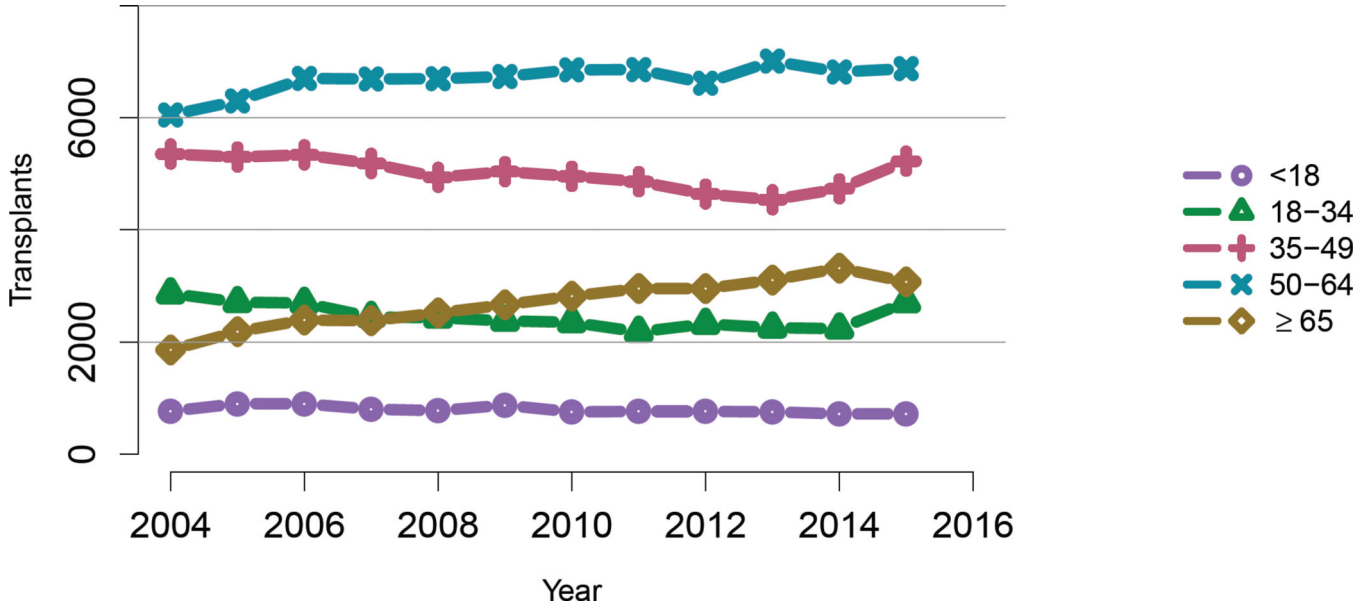

Figure KI 47. Total kidney transplants by age

All kidney transplant recipients, including adult and pediatric, retransplant, and multi-organ recipients.

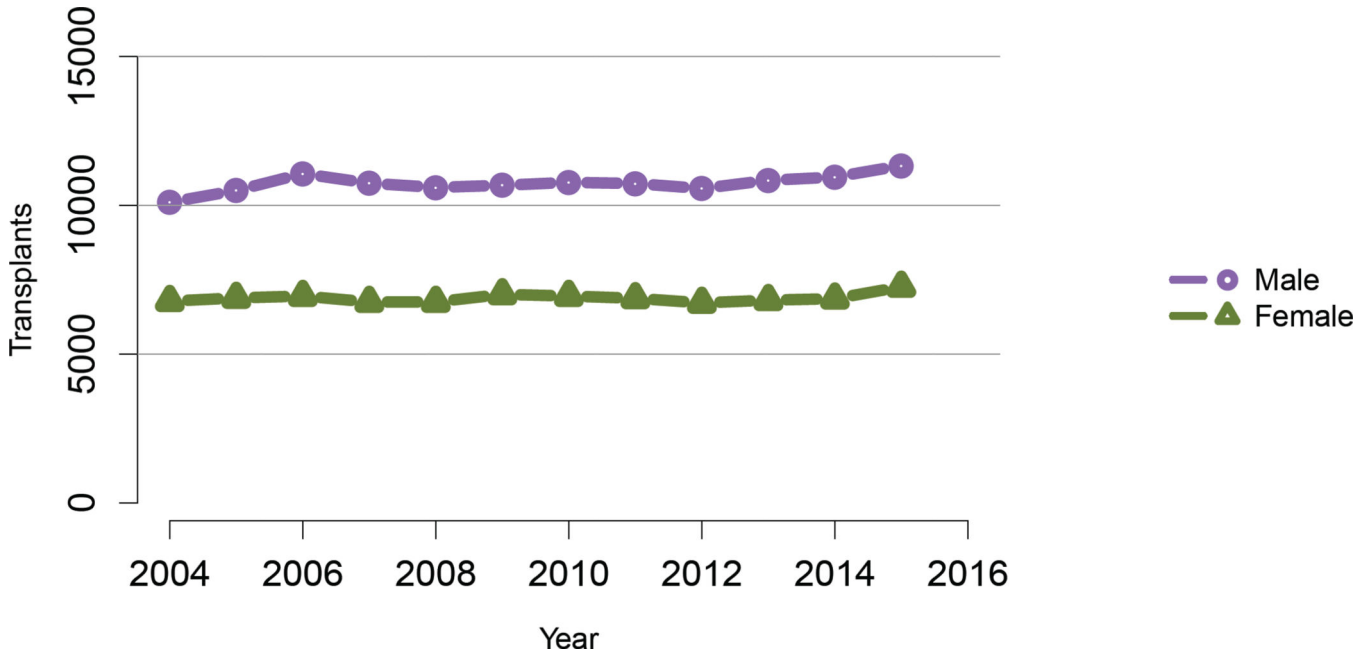

Figure KI 48. Total kidney transplants by sex

All kidney transplant recipients, including adult and pediatric, retransplant, and multi-organ recipients.

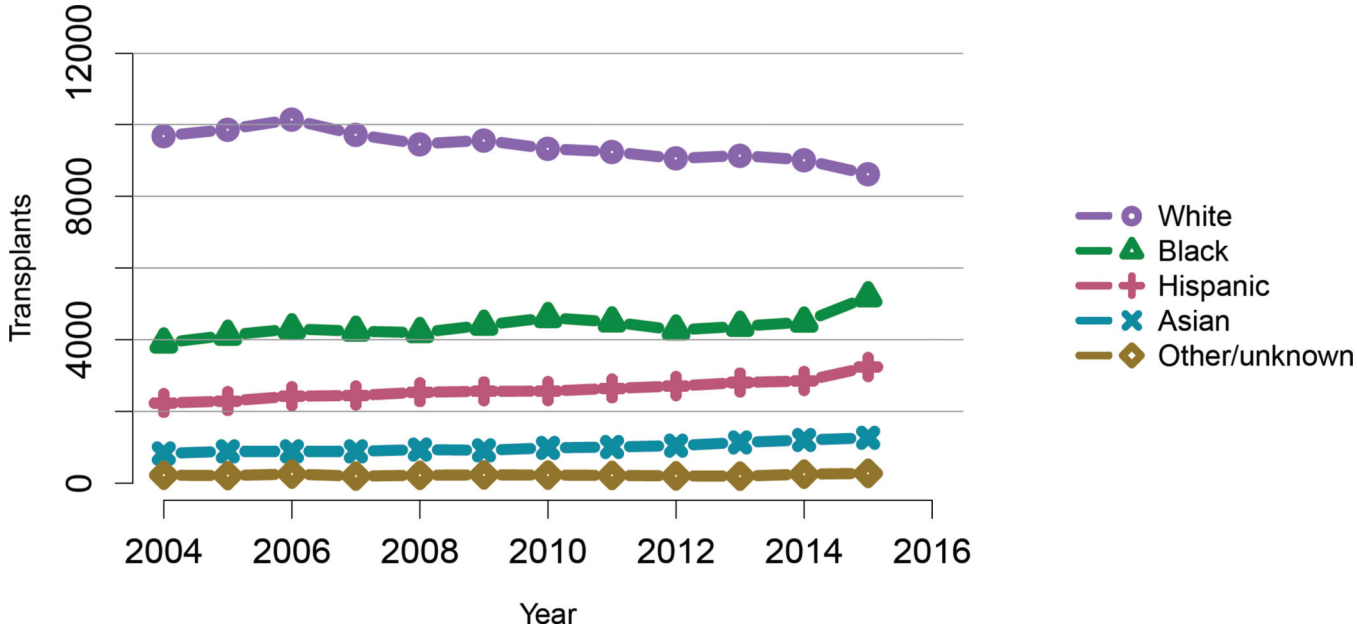

Figure KI 49. Total kidney transplants by race

All kidney transplant recipients, including adult and pediatric, retransplant, and multi-organ recipients.

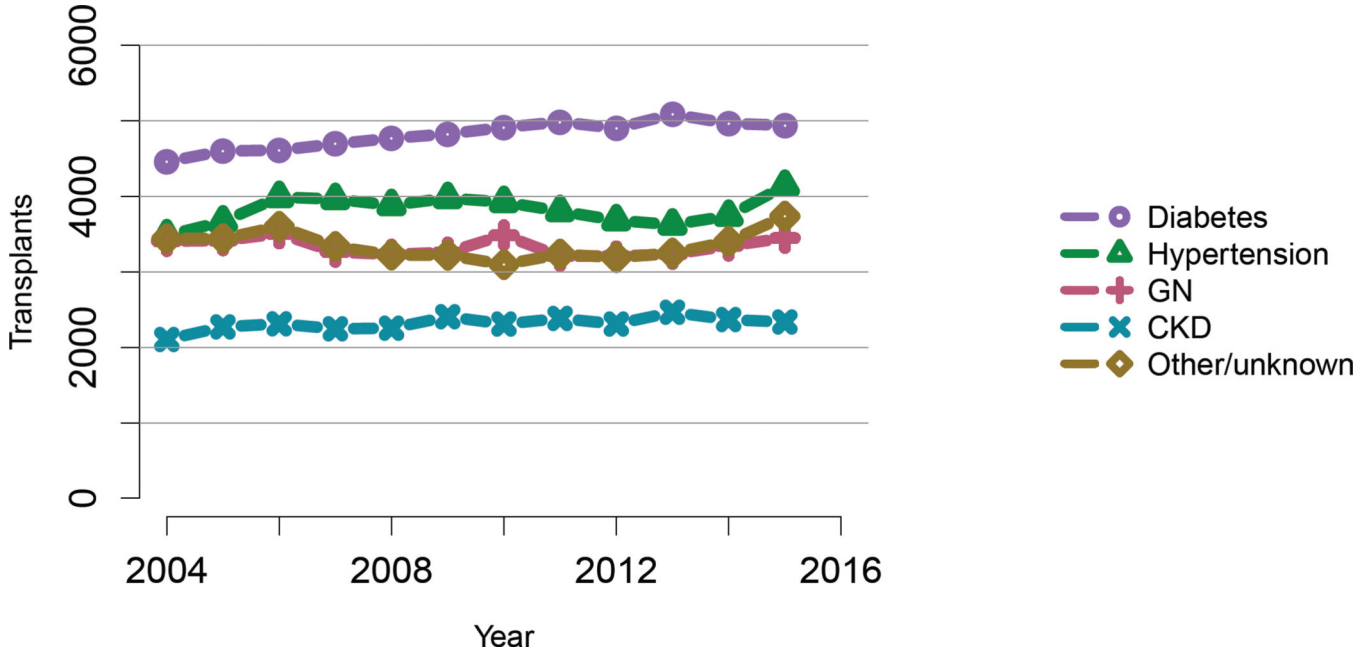

Figure KI 50. Total kidney transplants by diagnosis

All kidney transplant recipients, including adult and pediatric, retransplant, and multi-organ recipients. GN, glomerulonephritis; CKD, cystic kidney disease.

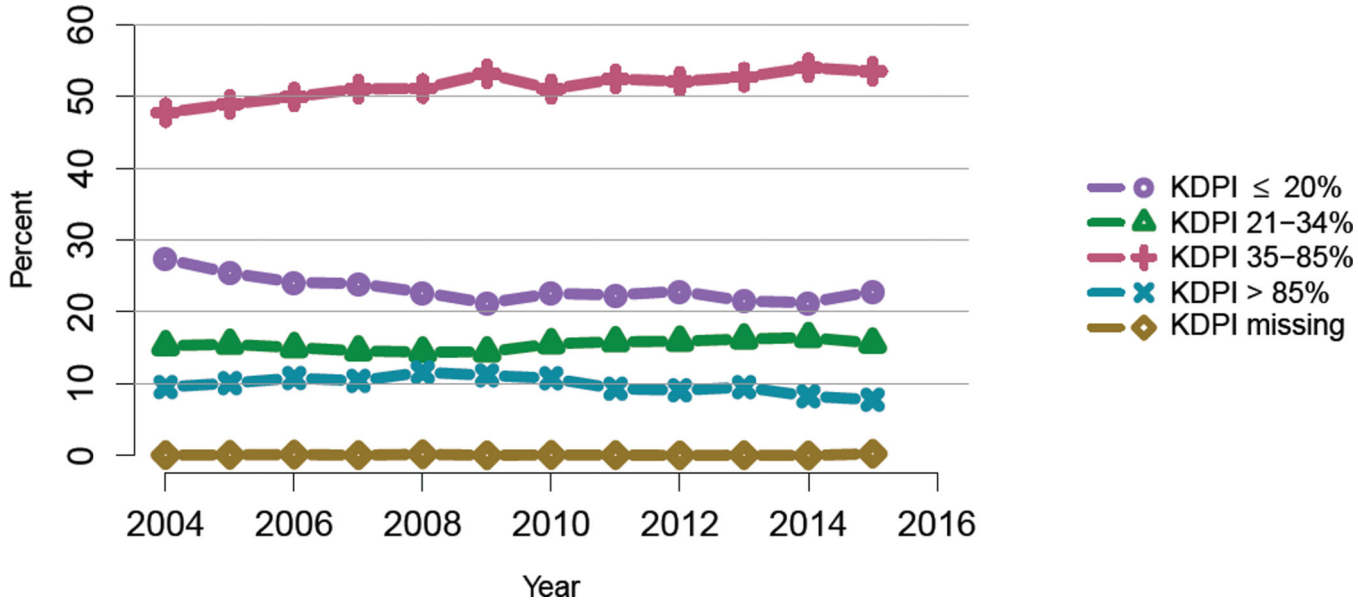

Figure KI 51. Kidney transplants by kidney donor profile index (KDPI)

All adult recipients of deceased donor kidneys, including multi-organ transplants. The reference population for the KDRI to KDPI conversion is all deceased donor kidneys recovered for transplant in the US in 2015. Kidneys recovered en-bloc are counted once. KDPI, kidney donor profile index; KDRI, kidney donor risk index.

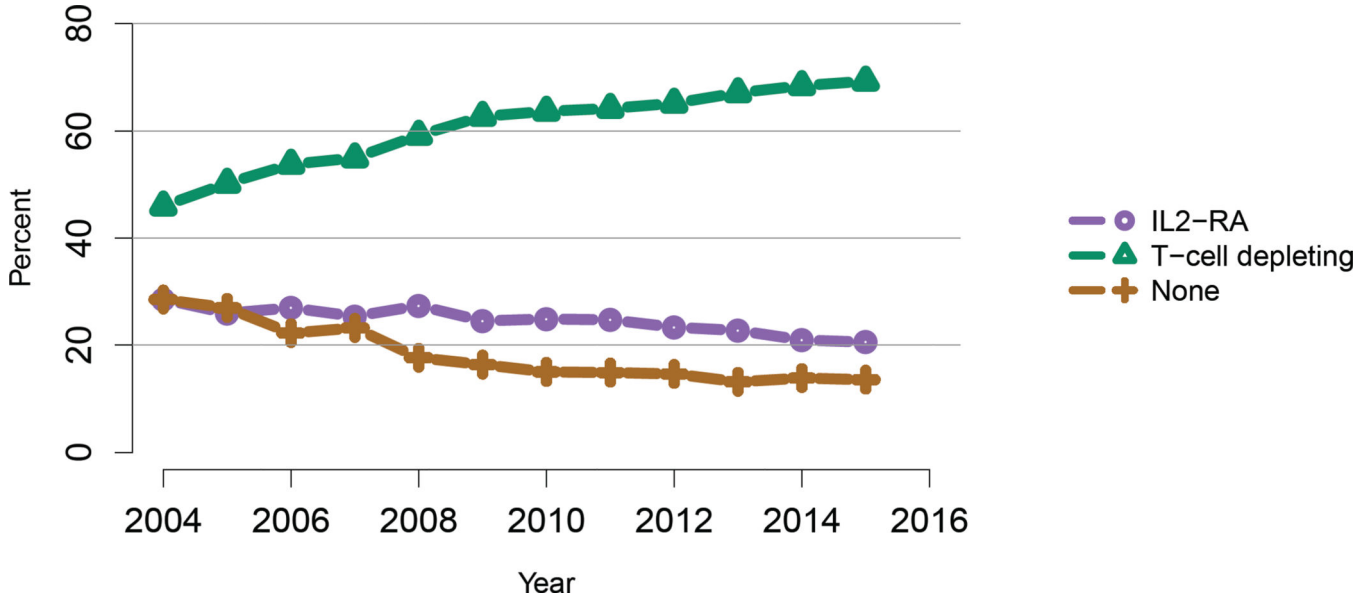

Figure KI 52. Induction agent use in adult kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. IL2-RA, interleukin-2 receptor antagonist.

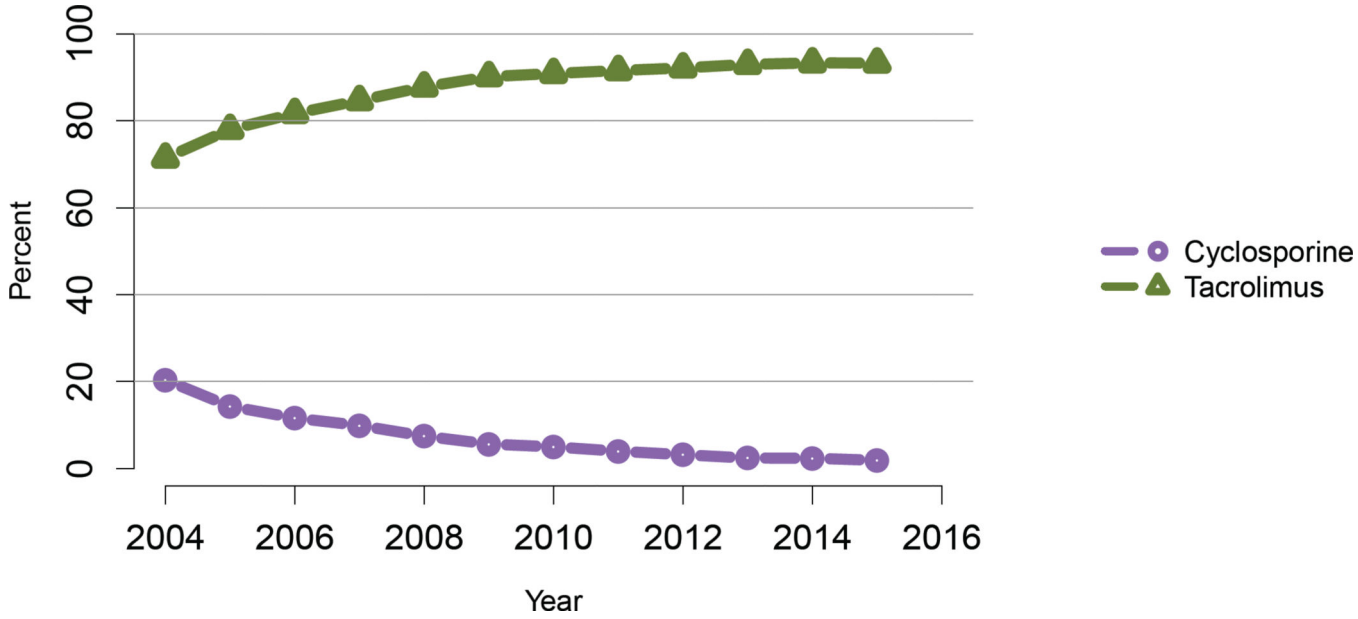

Figure KI 53. Calcineurin inhibitor use in adult kidney transplant recipients
Immunosuppression at transplant reported to the OPTN.

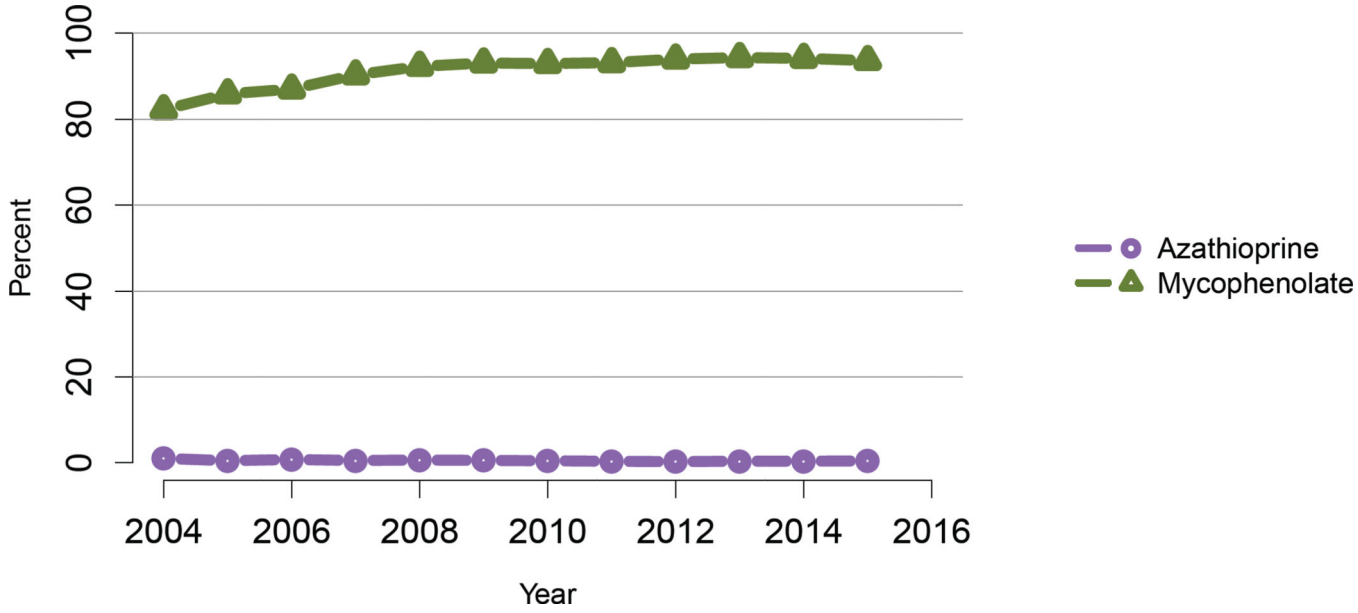

Figure KI 54. Anti-metabolite use in adult kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. Mycophenolate includes mycophenolate mofetil and mycophenolate sodium.

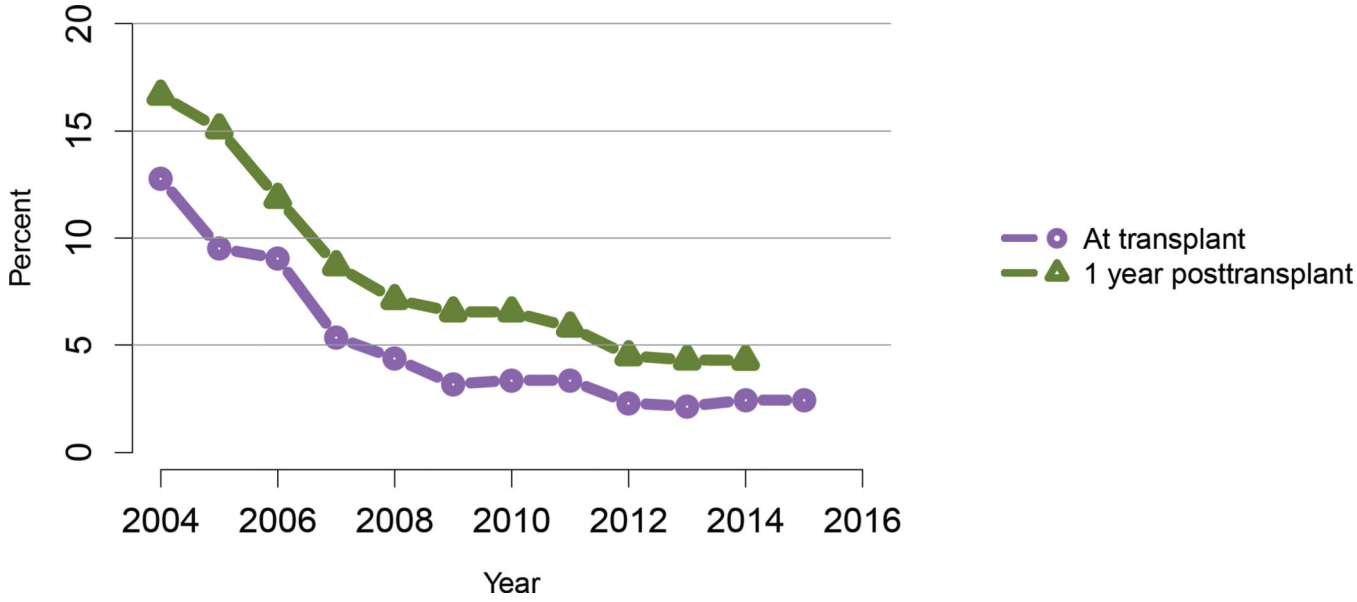

Figure KI 55. mTOR inhibitor use in adult kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. One-year posttransplant data are limited to patients alive with graft function at 1 year posttransplant. mTOR, mammalian target of rapamycin.

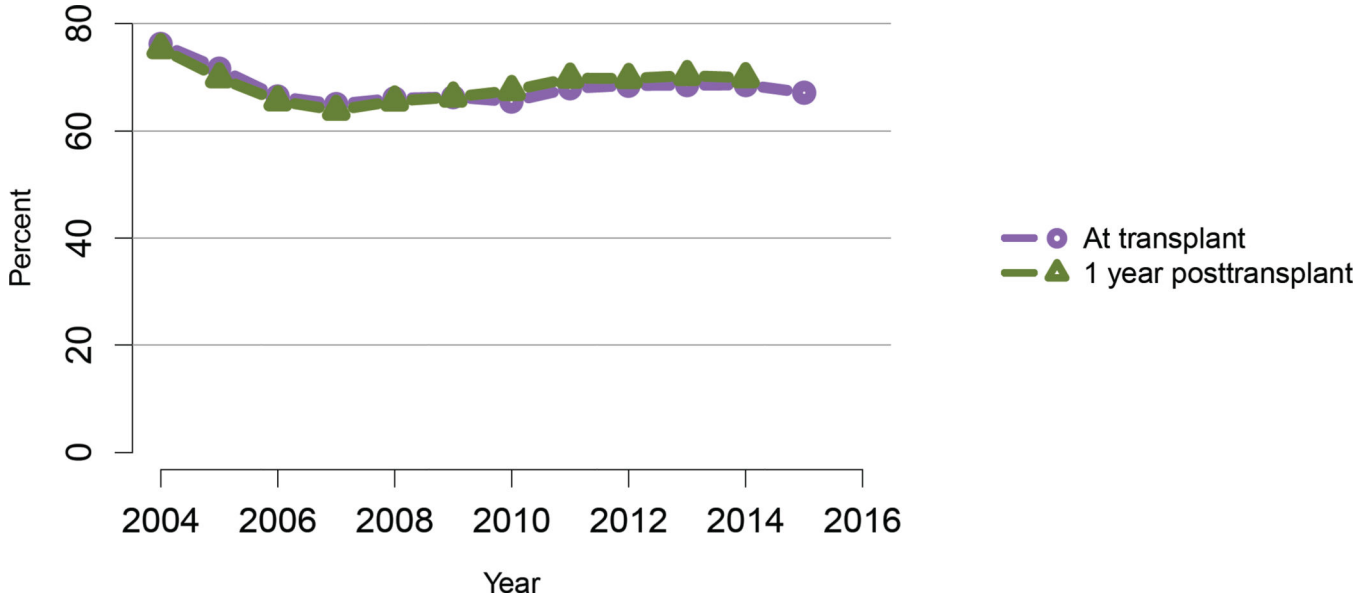

Figure KI 56. Steroid use in adult kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. One-year posttransplant data are limited to patients alive with graft function at 1 year posttransplant.

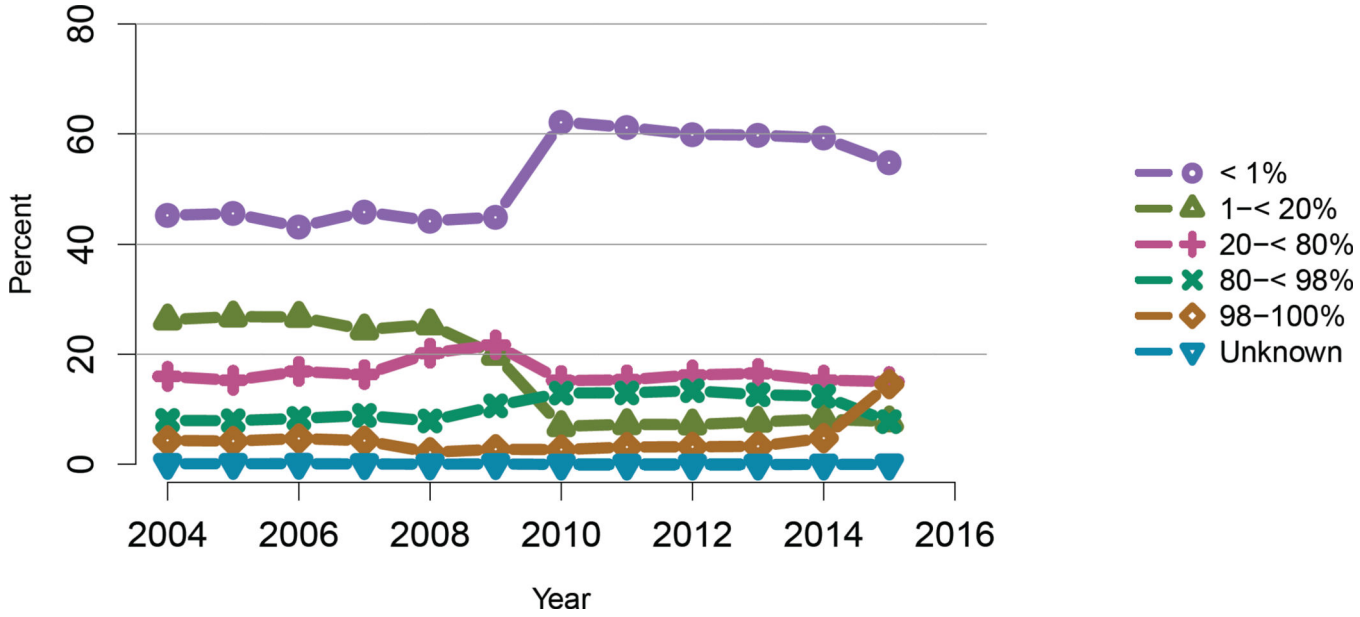

Figure KI 57. C/PRA at time of kidney transplant in adult deceased donor recipients

From December 5, 2007, through September 30, 2009, CPRA was used if greater than 0; otherwise, the maximum pretransplant PRA was used. Before December 5, 2007, the maximum pretransplant PRA was used unconditionally. CPRA is used after September 30, 2009, unless it is missing; if it is missing, the maximum pretransplant PRA is used. Kidney-alone transplants only.

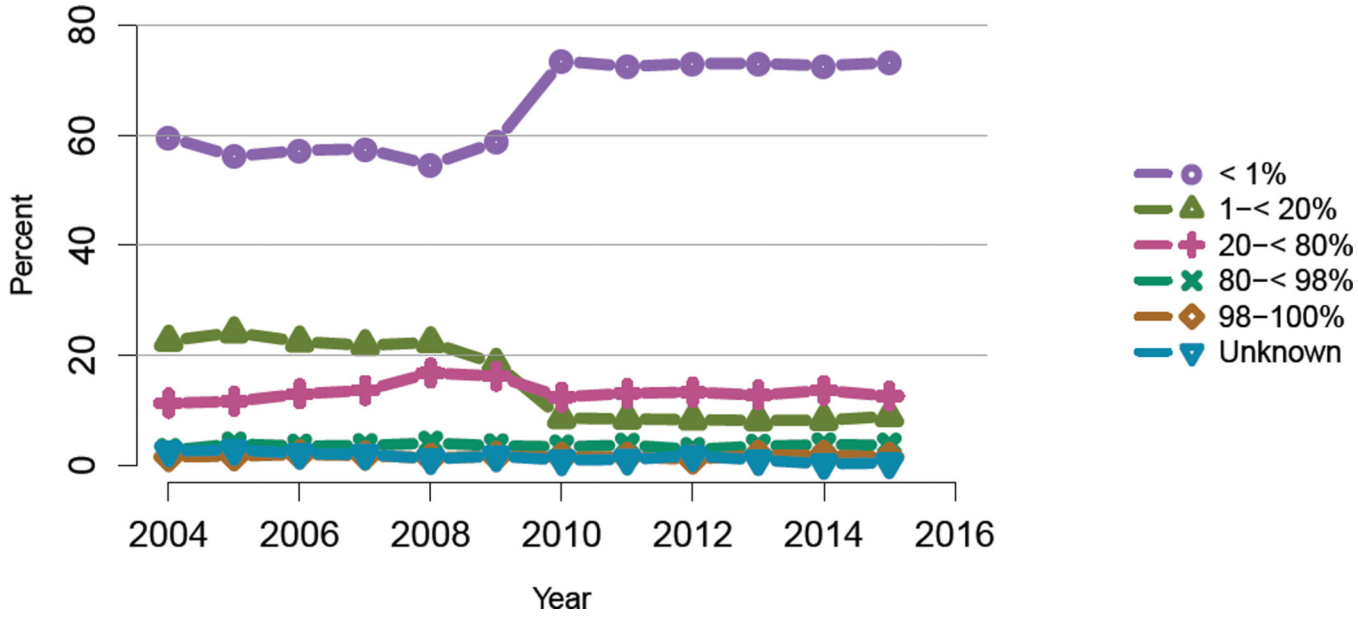

Figure KI 58. C/PRA at time of kidney transplant in adult living donor recipients

From December 5, 2007, through September 30, 2009, CPRA was used if greater than 0; otherwise, the maximum pretransplant PRA was used. Before December 5, 2007, the maximum pretransplant PRA was used unconditionally. CPRA is used after September 30, 2009, unless it is missing; if it is missing, the maximum pretransplant PRA is used. Kidney-alone transplants only.

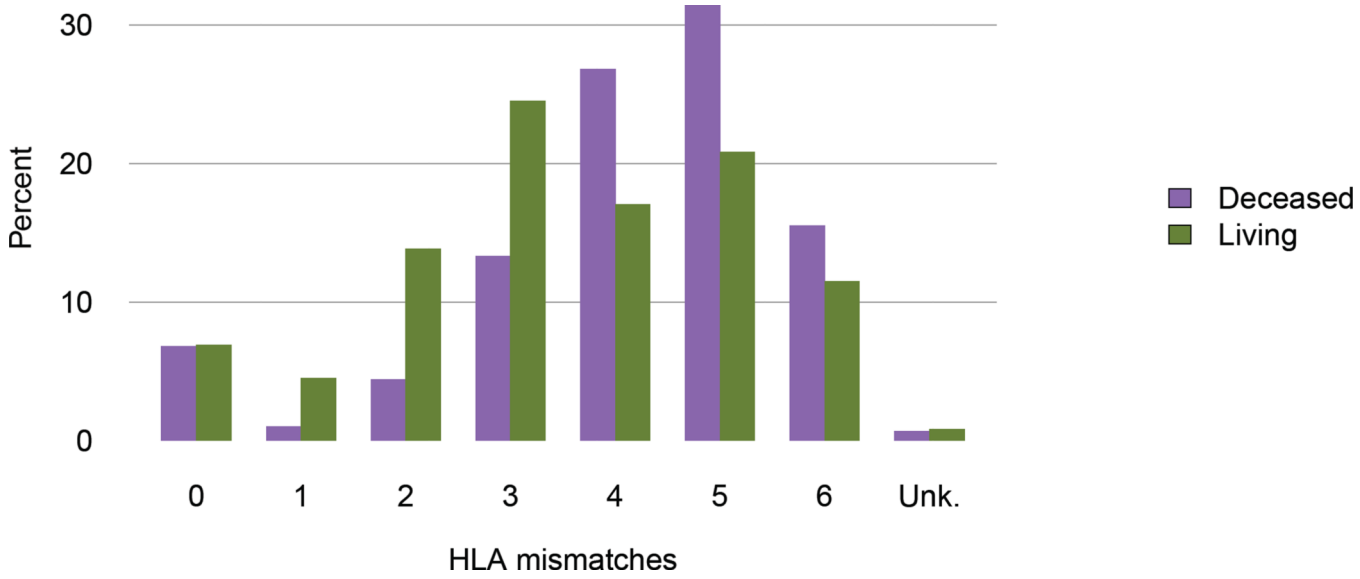

Figure KI 59. Total HLA A, B, and DR mismatches among adult kidney transplant recipients, 2011–2015

Donor and recipient antigen matching is based on OPTN antigen values and split equivalences policy as of 2015.

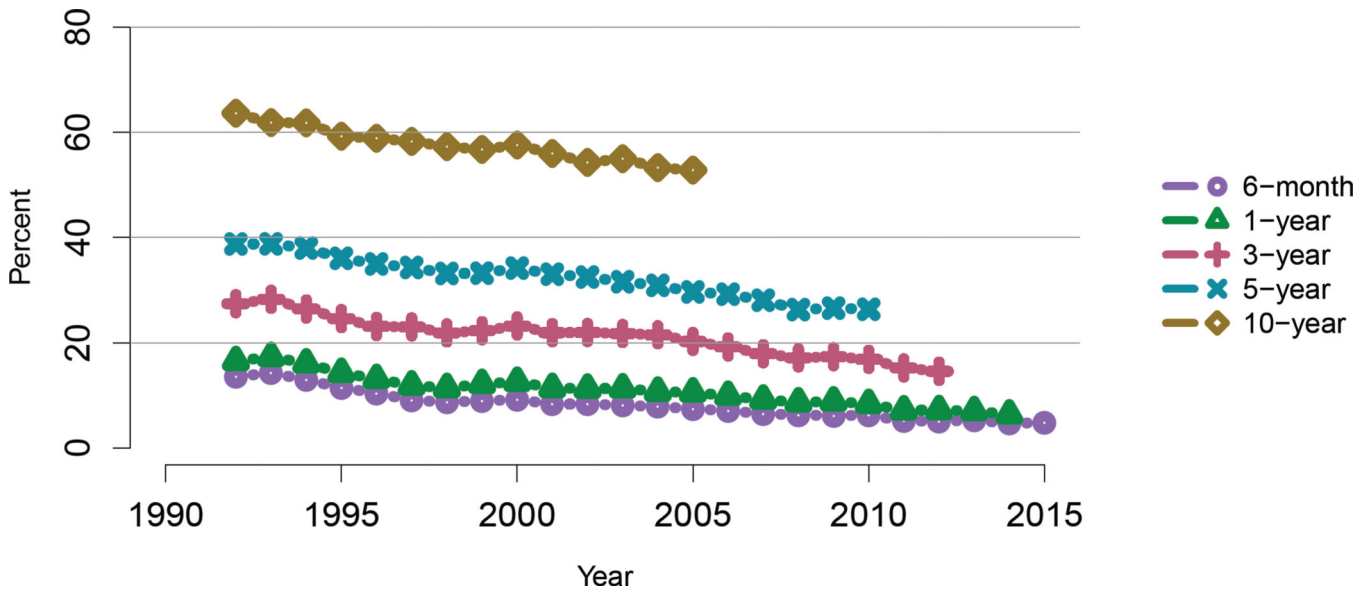

Figure KI 60. Graft failure among adult deceased donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. All-cause graft failure (GF) is defined as any of the prior outcomes prior to 6 months, 1, 3, 5, or 10 years, respectively.

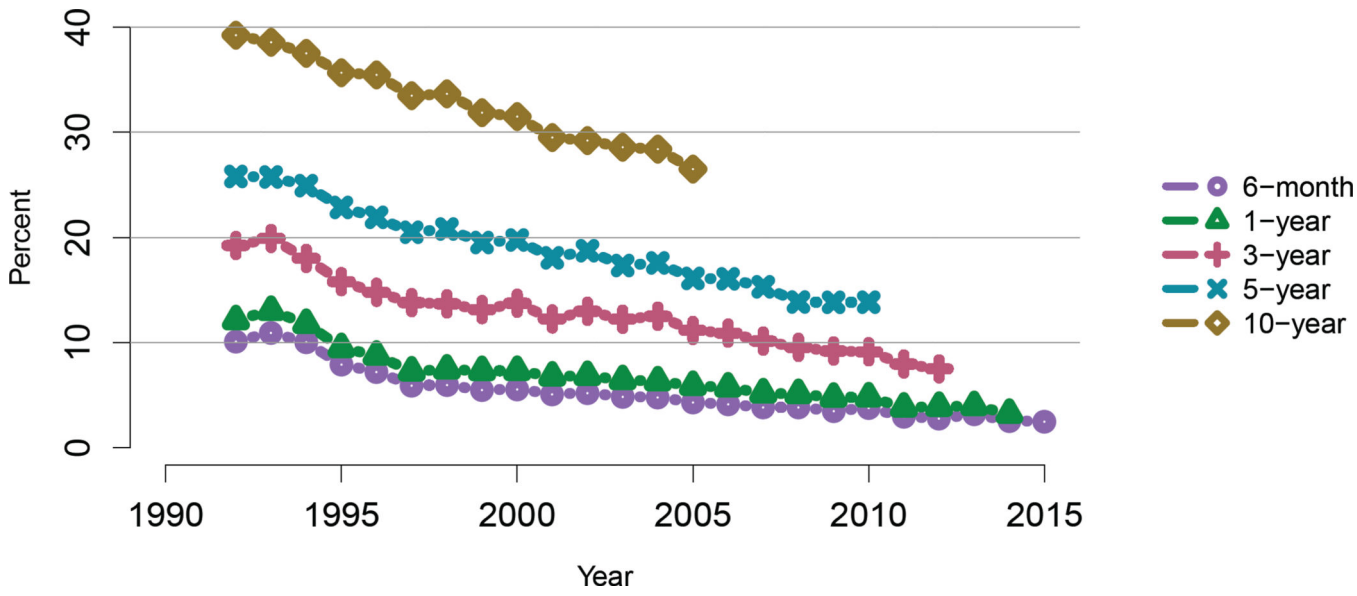

Figure KI 61. Death-censored graft failure among adult deceased donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death-censored graft failure (DCGF) is defined as a return to dialysis, reported graft failure, or kidney retransplant.

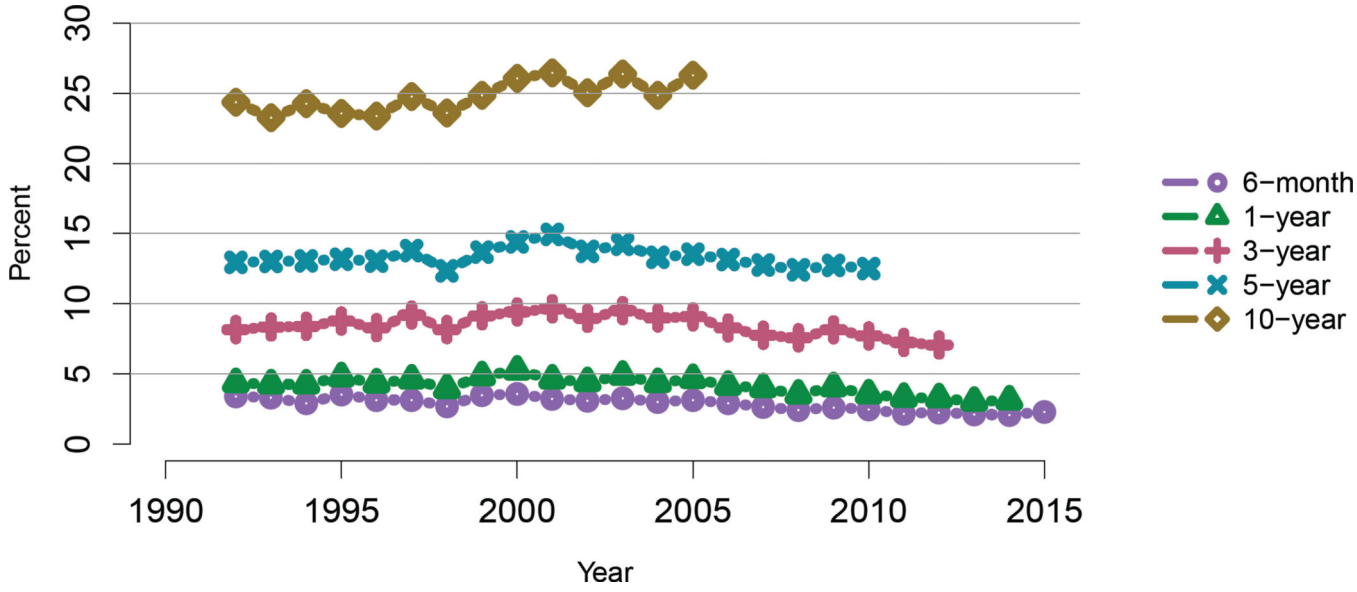

Figure KI 62. Death with function among adult deceased donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death with function (DWF) is defined as death without prior graft failure, return to dialysis, or retransplant.

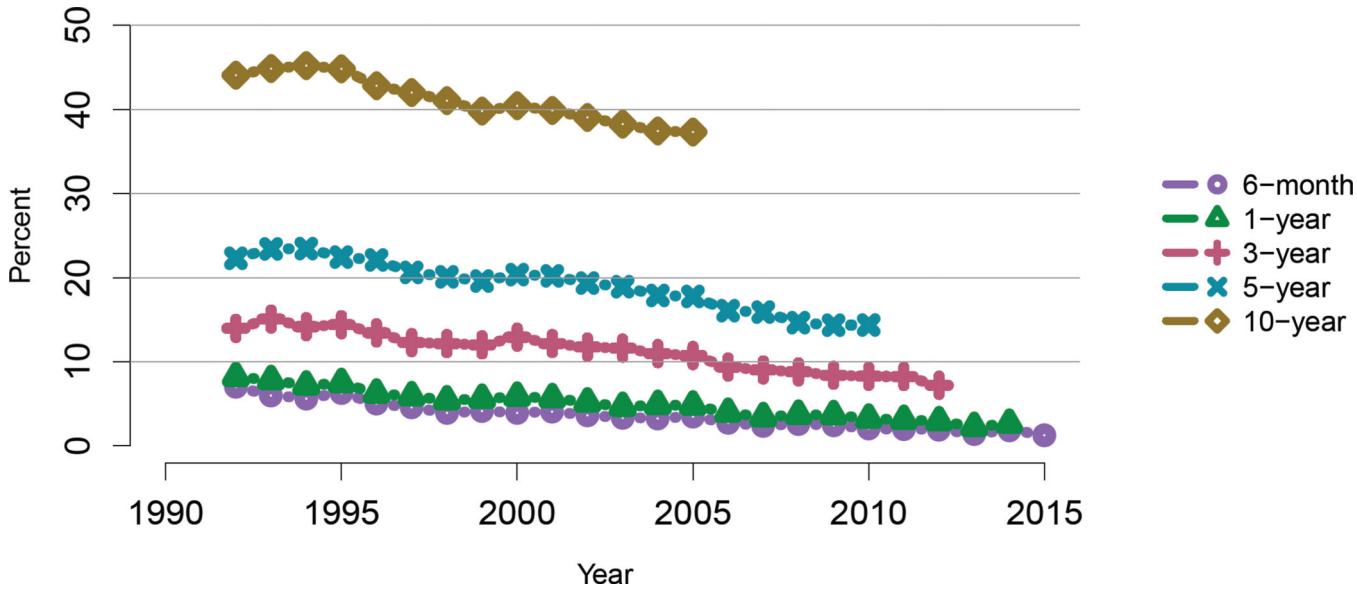

Figure KI 63. Graft failure among adult living donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. All-cause graft failure (GF) is defined as any of the prior outcomes prior to 6 months, 1, 3, 5, or 10 years, respectively.

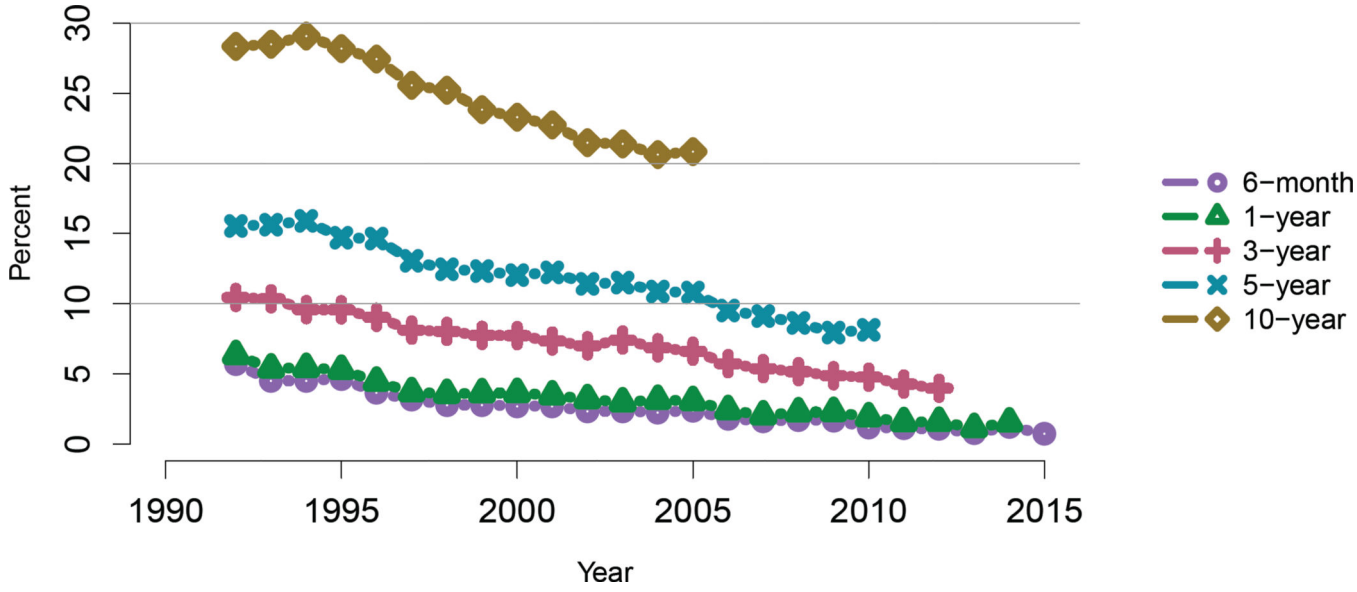

Figure KI 64. Death-censored graft failure among adult living donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death-censored graft failure (DCGF) is defined as a return to dialysis, reported graft failure, or kidney retransplant.

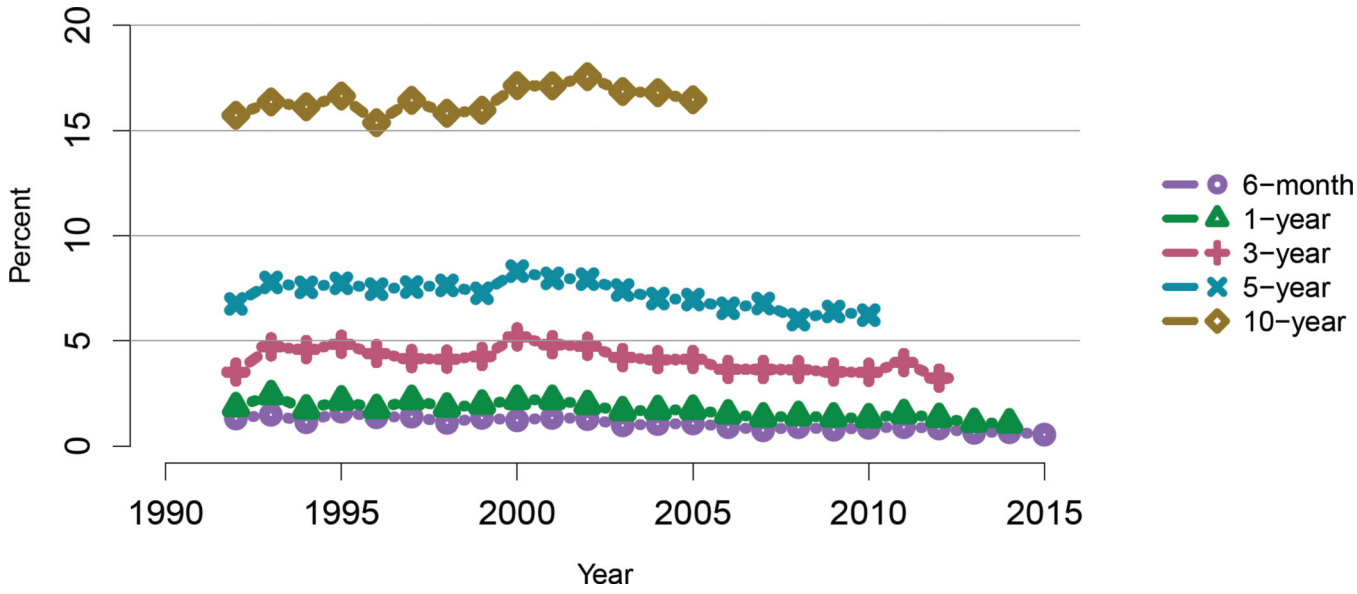

Figure KI 65. Death with function among adult living donor kidney transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death with function (DWF) is defined as death without prior graft failure, return to dialysis, or retransplant.

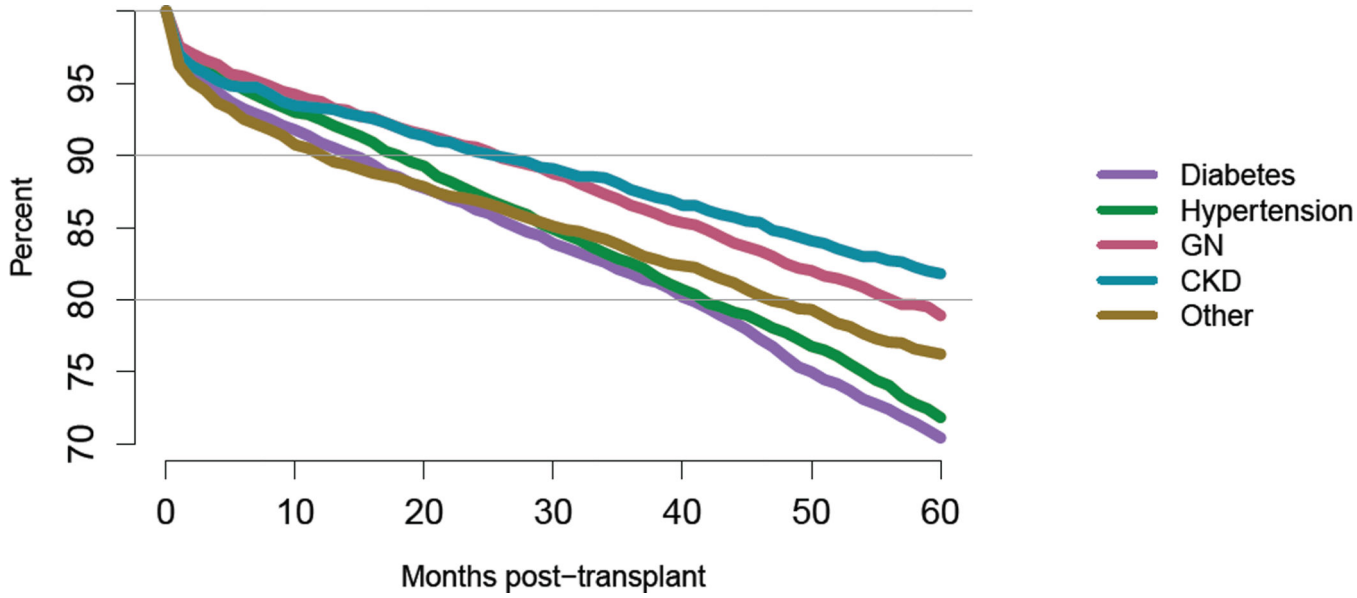

Figure KI 66. Graft survival among adult deceased donor kidney transplant recipients, 2010, by diagnosis

Graft survival estimated using unadjusted Kaplan-Meier methods. CKD, cystic kidney disease; GN, glomerulonephritis.

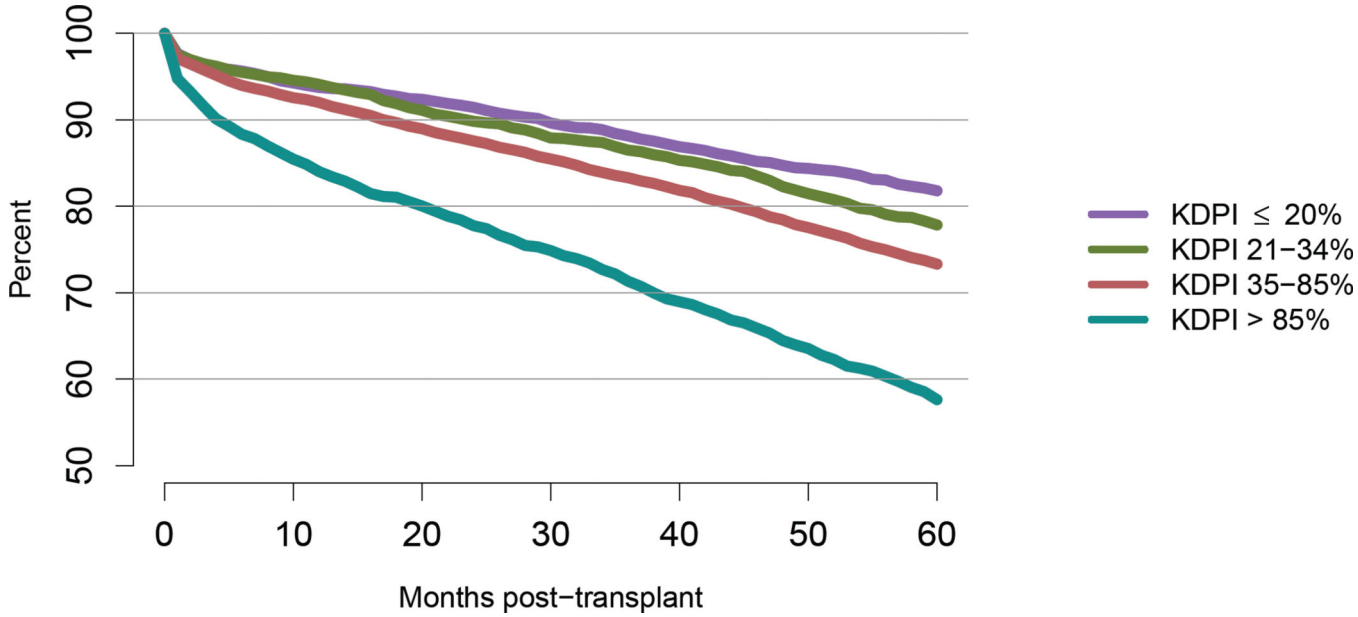

Figure KI 67. Graft survival among adult deceased donor kidney transplant recipients, 2010, by KDPI

Graft survival estimated using unadjusted Kaplan-Meier methods. The reference population for the KDRI to KDPI conversion is all deceased donor kidneys recovered for transplant in the US in 2015. KDPI, kidney donor profile index.

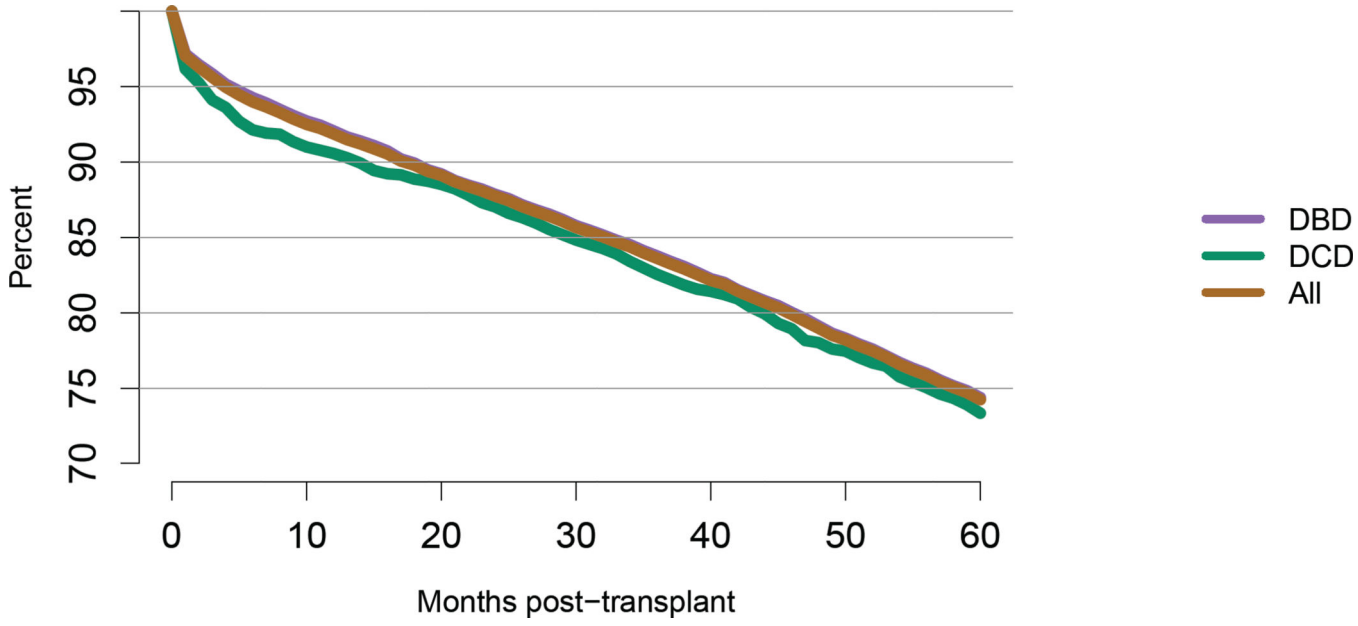

Figure KI 68. Graft survival among adult deceased donor kidney transplant recipients, 2010, by DCD status

Graft survival estimated using unadjusted Kaplan-Meier methods. DCD, donation after circulatory death; DBD, donation after brain death.

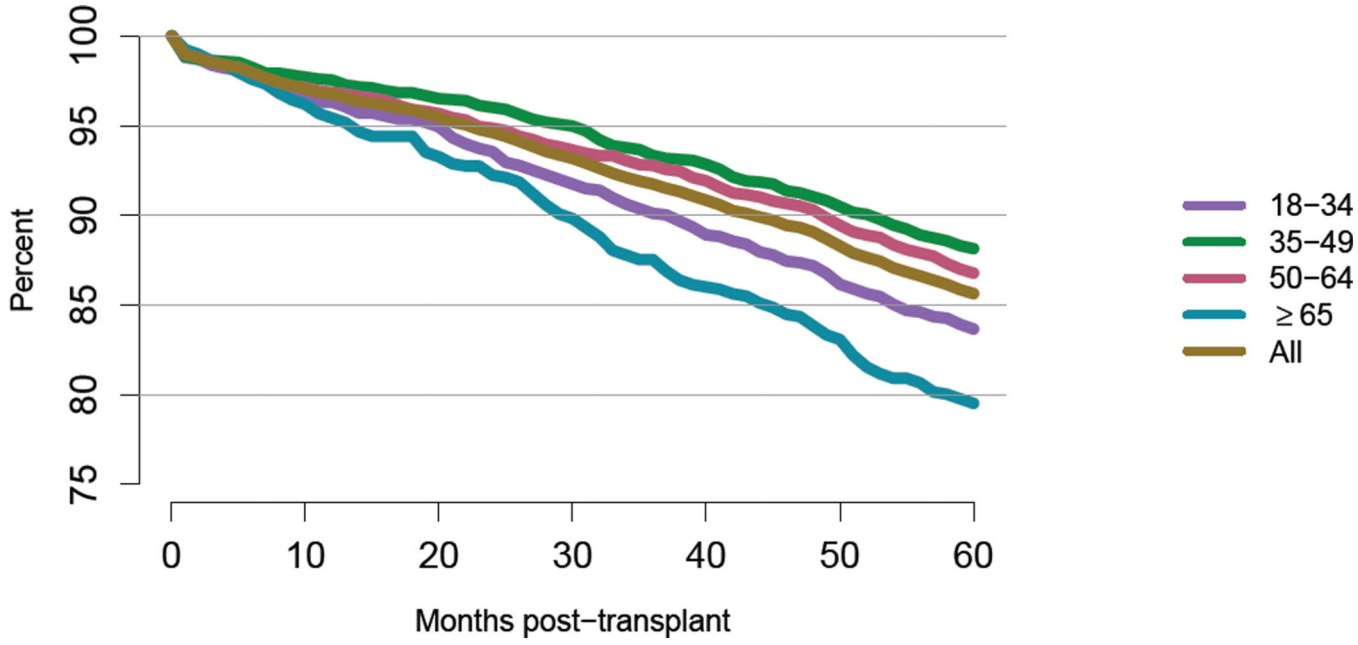

Figure KI 69. Graft survival among adult living donor kidney transplant recipients, 2010, by age
Graft survival estimated using unadjusted Kaplan-Meier methods.

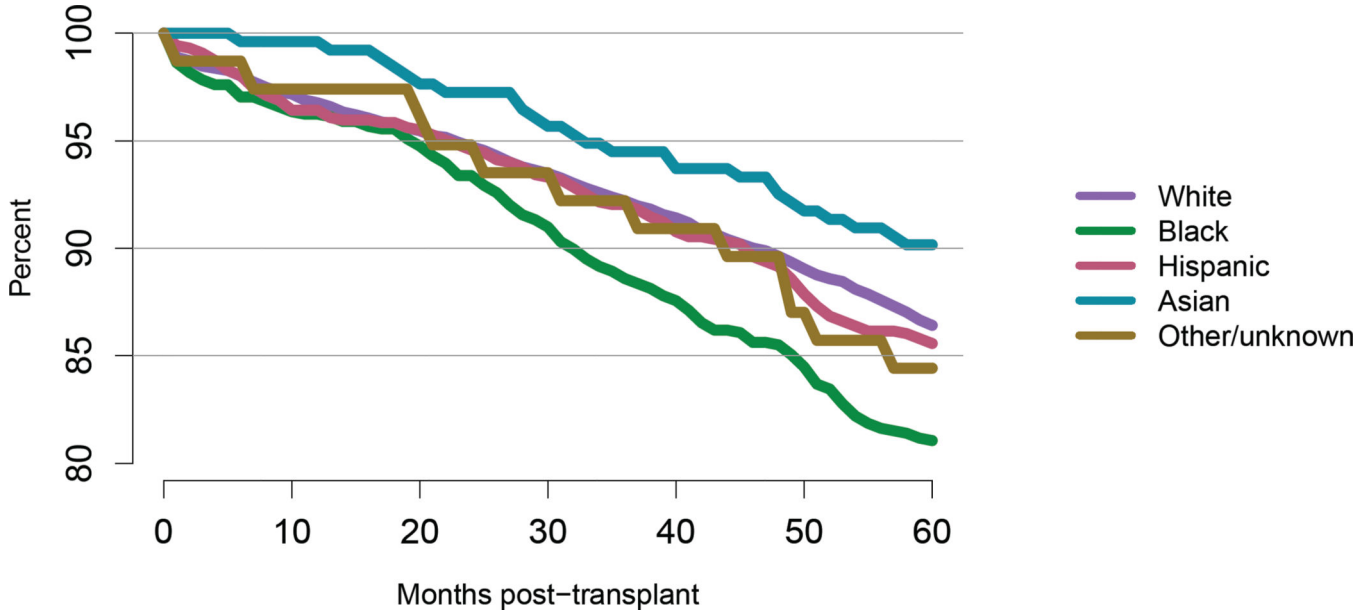

Figure KI 70. Graft survival among adult living donor kidney transplant recipients, 2010, by race

Graft survival estimated using unadjusted Kaplan-Meier methods.

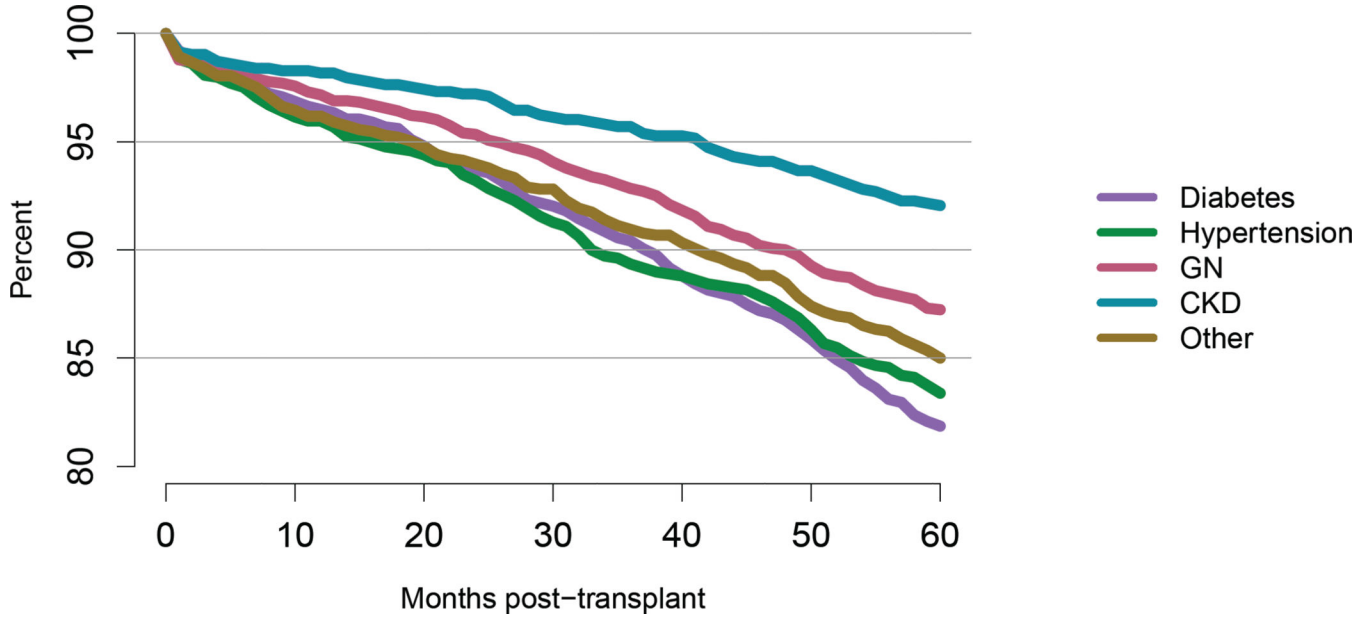

Figure KI 71. Graft survival among adult living donor kidney transplant recipients, 2010, by diagnosis

Graft survival estimated using unadjusted Kaplan-Meier methods. CKD, cystic kidney disease; GN, glomerulonephritis.

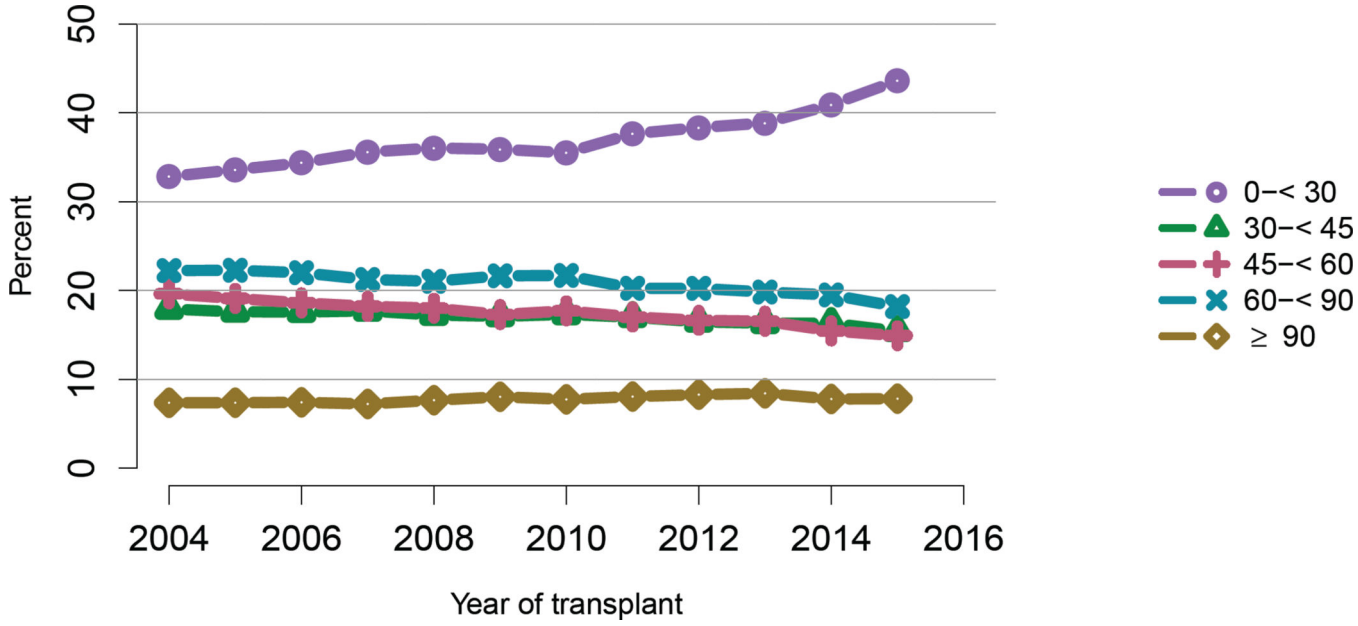

Figure KI 72. Distribution of eGFR at discharge among adult kidney transplant recipients

GFR (mL/min/1.73 m^2) estimated using the Chronic Kidney Disease Epidemiology Collaboration equation, and computed for patients alive with graft function at discharge.

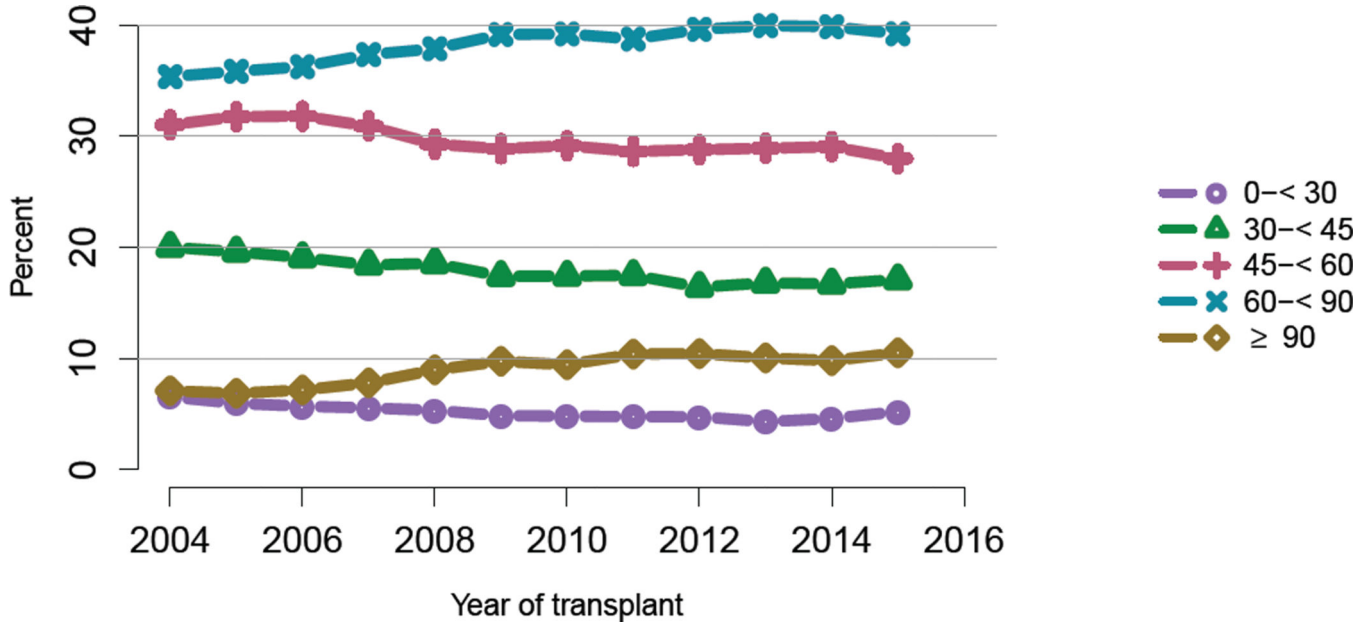

Figure KI 73. Distribution of eGFR at 6 months posttransplant among adult kidney transplant recipients

GFR (mL/min/1.73 m^2) estimated using the Chronic Kidney Disease Epidemioogy Collaboration equation, and computed for patients alive with graft function at 6 months posttransplant.

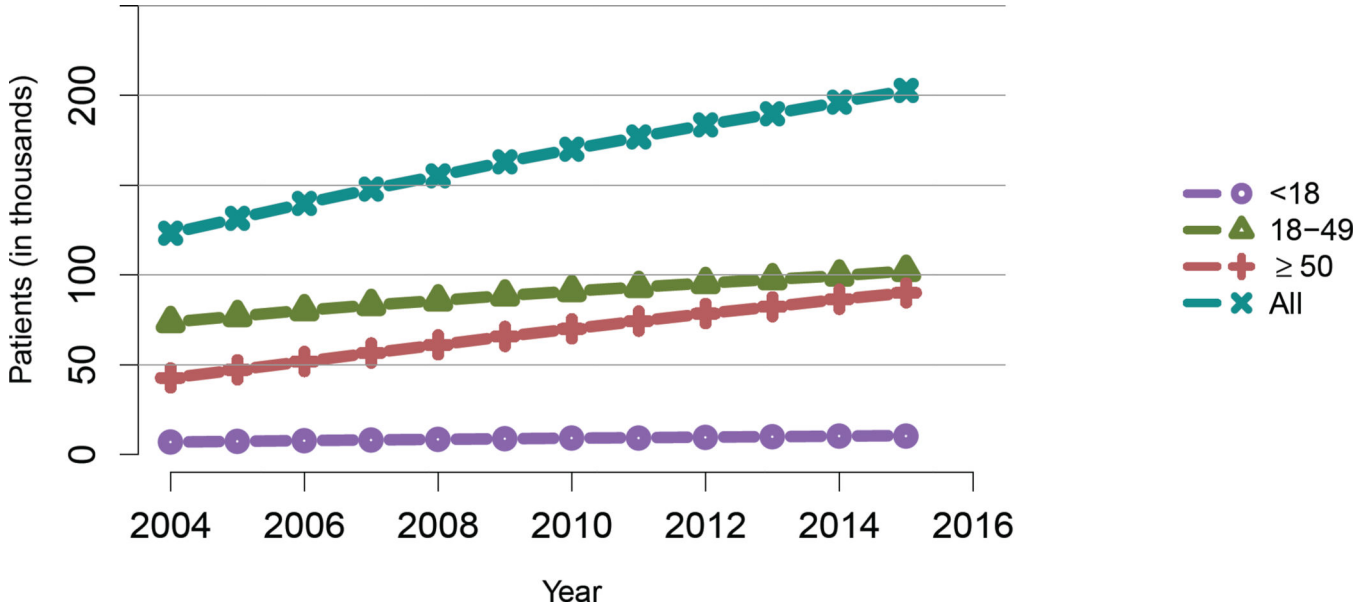

Figure KI 74. Recipients alive with a functioning kidney graft on June 30 of the year, by age at transplant

Recipients are assumed to be alive with function unless a death or graft failure is recorded. A recipient may experience a graft failure and be removed from the cohort, undergo retransplant, and re-enter the cohort.

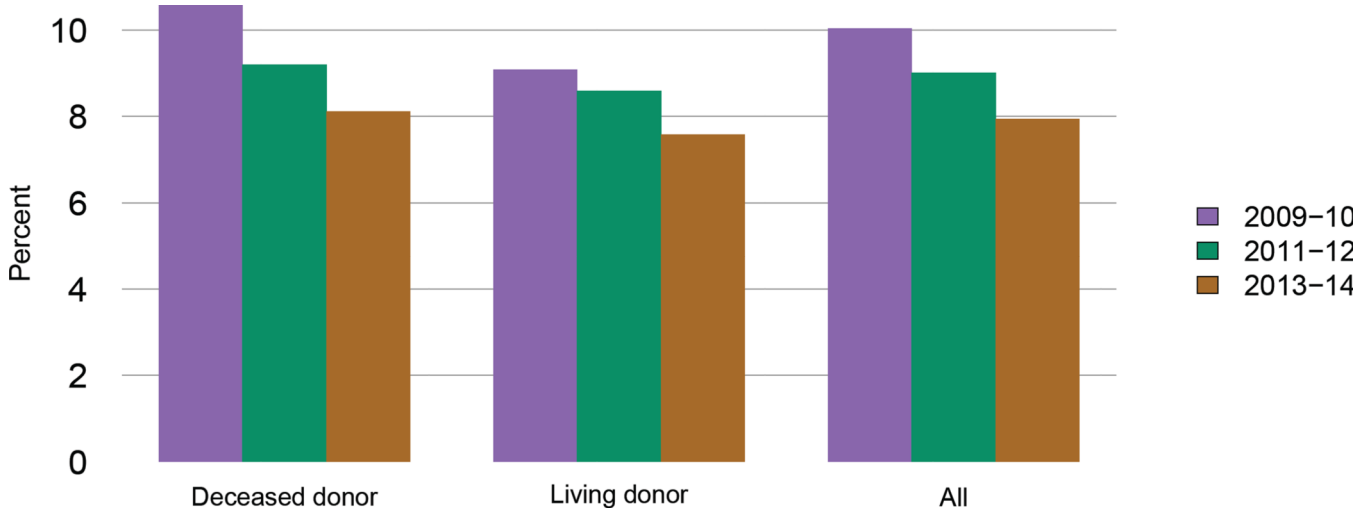

Figure KI 75. Incidence of acute rejection by 1 year posttransplant among adult kidney transplant recipients by donor type

Acute rejection is defined as a record of acute or hyperacute rejection, as reported on the OPTN Transplant Recipient Registration or Transplant Recipient Follow-up Form. Only the first rejection event is counted. Cumulative incidence is estimated using the Kaplan-Meier competing risk method.

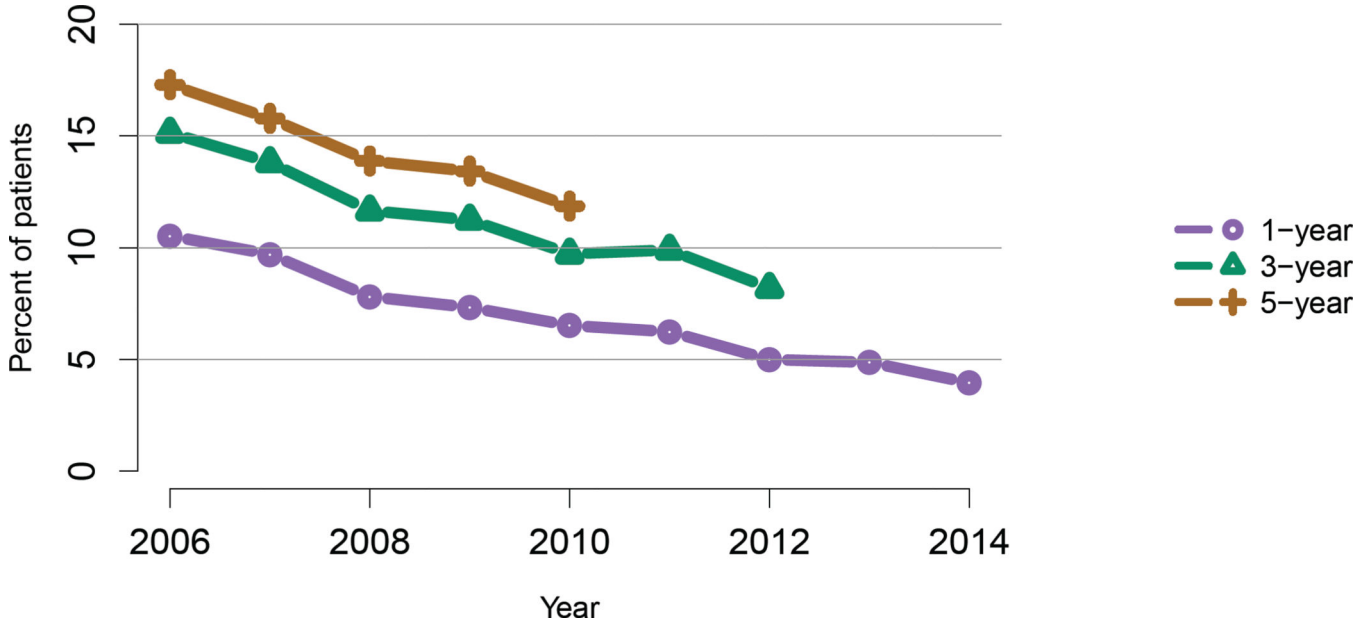

Figure KI 76. Posttransplant diabetes among adult kidney transplant recipients

Percentage of adult deceased donor kidney recipients who were nondiabetic at transplant and developed diabetes posttransplant. Posttransplant diabetes is reported on the Transplant Recipient Follow-up Form. Death and graft failure are treated as competing events.

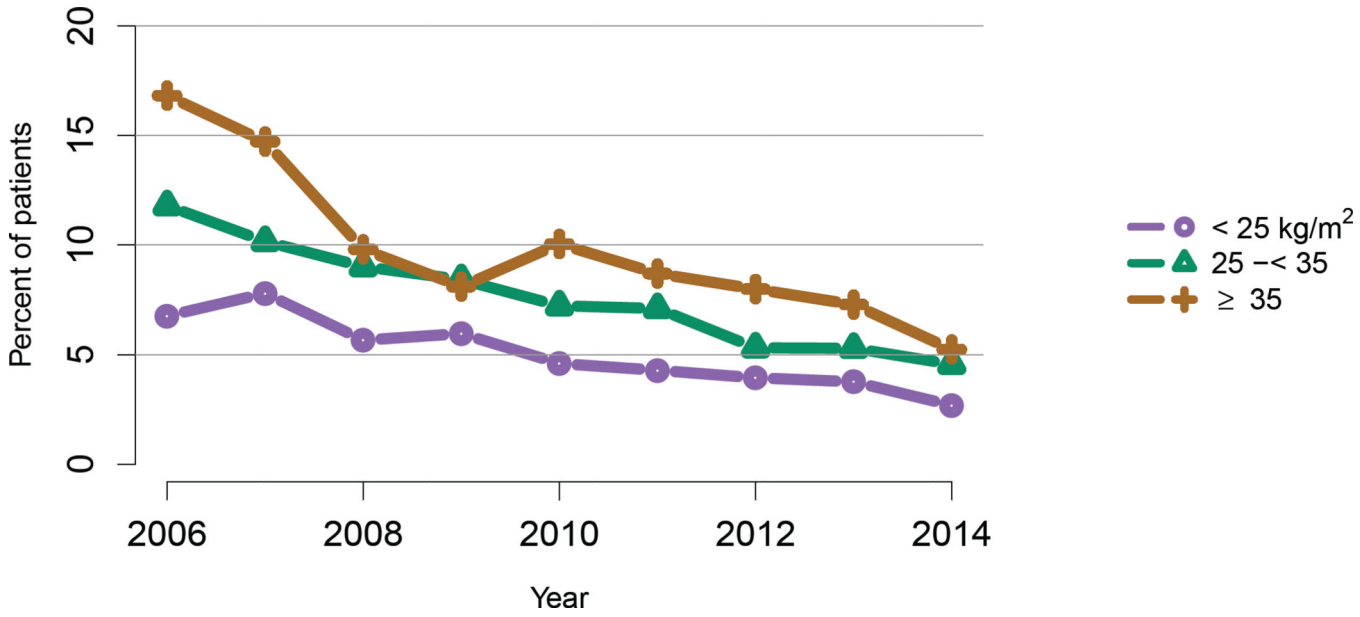

Figure KI 77. Posttransplant diabetes within 1 year among adult kidney transplant recipients by BMI at transplant

Percentage of adult deceased donor kidney recipients who were nondiabetic at transplant and developed diabetes posttransplant. Posttransplant diabetes is reported on the Transplant Recipient Follow-up Form. Death and graft failure are treated as competing events.

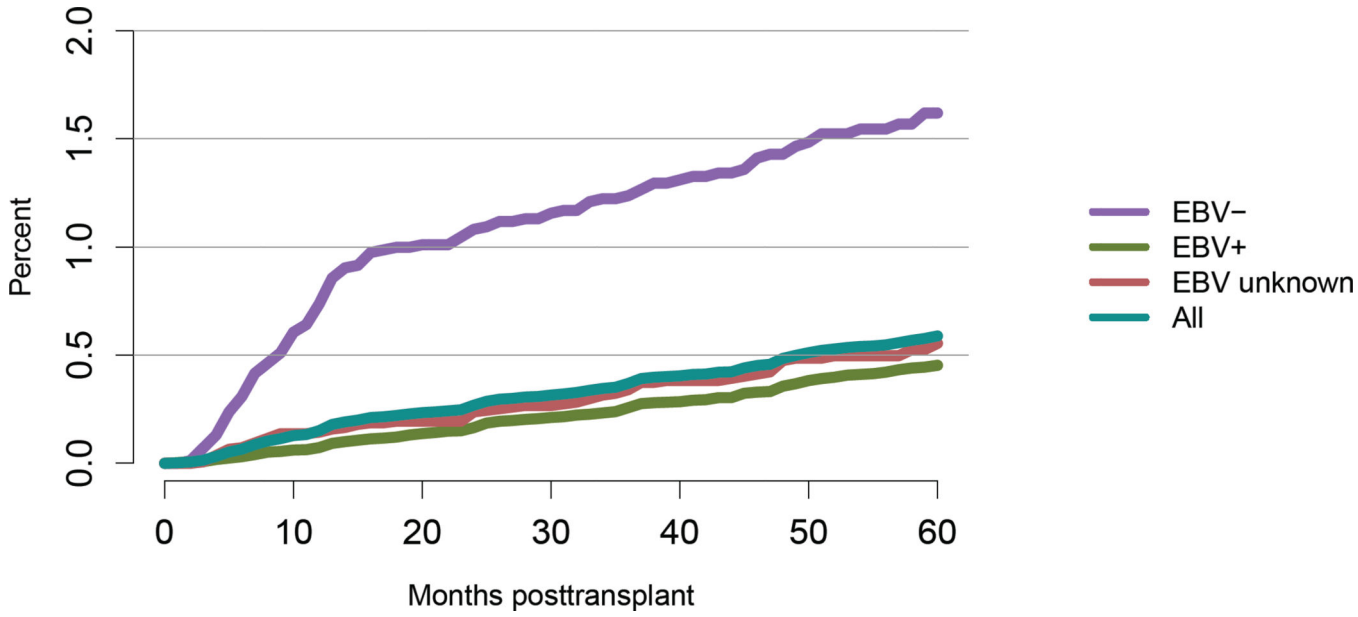

Figure KI 78. Incidence of PTLD among adult kidney transplant recipients by recipient EBV status at transplant, 2009–2013

Cumulative incidence is estimated using the Kaplan-Meier competing risk method. PTLD is identified as a reported complication or cause of death on the OPTN Transplant Recipient Follow-up Form or the Posttransplant Malignancy Form as polymorphic PTLD, monomorphic PTLD, or Hodgkin disease. Only the earliest date of PTLD diagnosis is considered. EBV, Epstein-Barr virus; PTLD, posttransplant lymphoproliferative disorder.

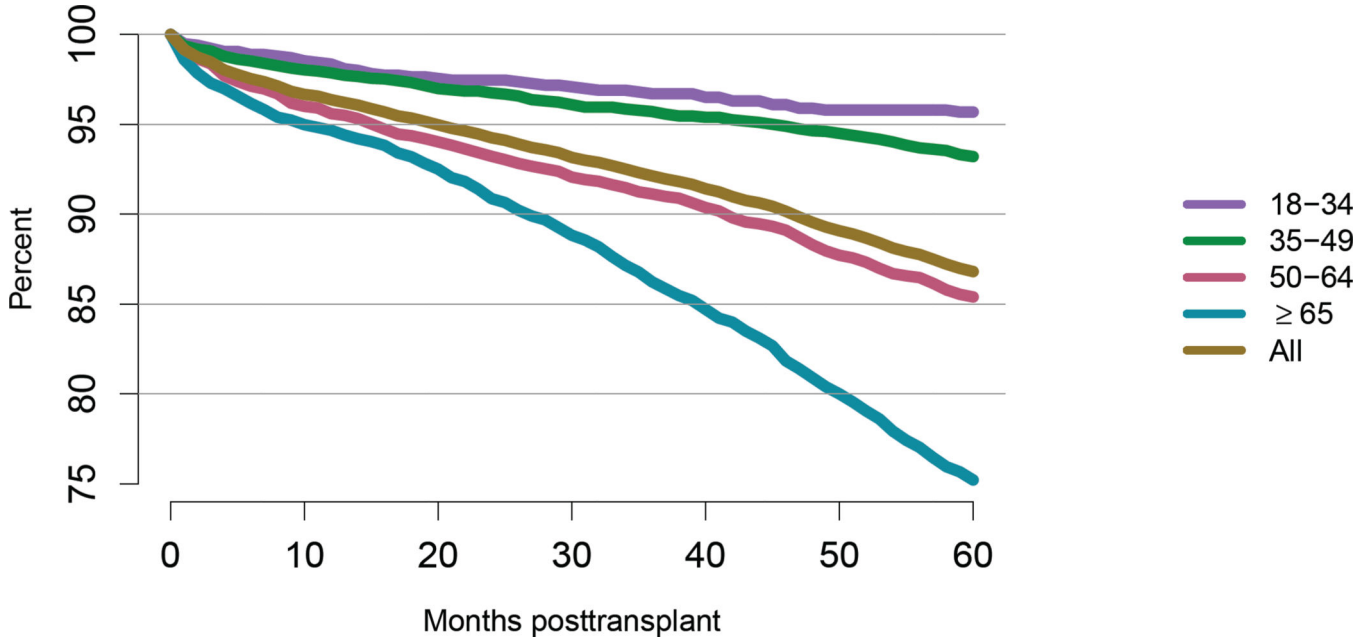

Figure KI 79. Patient survival among adult deceased donor kidney transplant recipients, 2010, by age

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered.

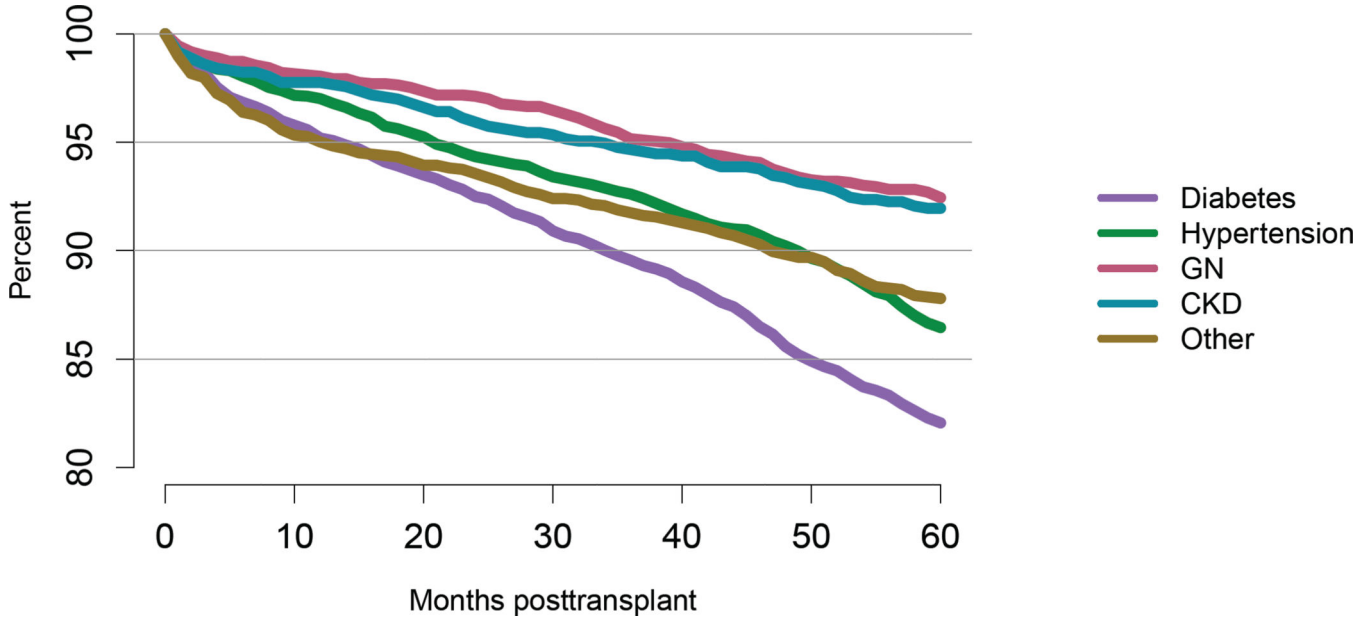

Figure KI 80. Patient survival among adult deceased donor kidney transplant recipients, 2010, by diagnosis

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered. CKD, cystic kidney disease; GN, glomerulonephritis.

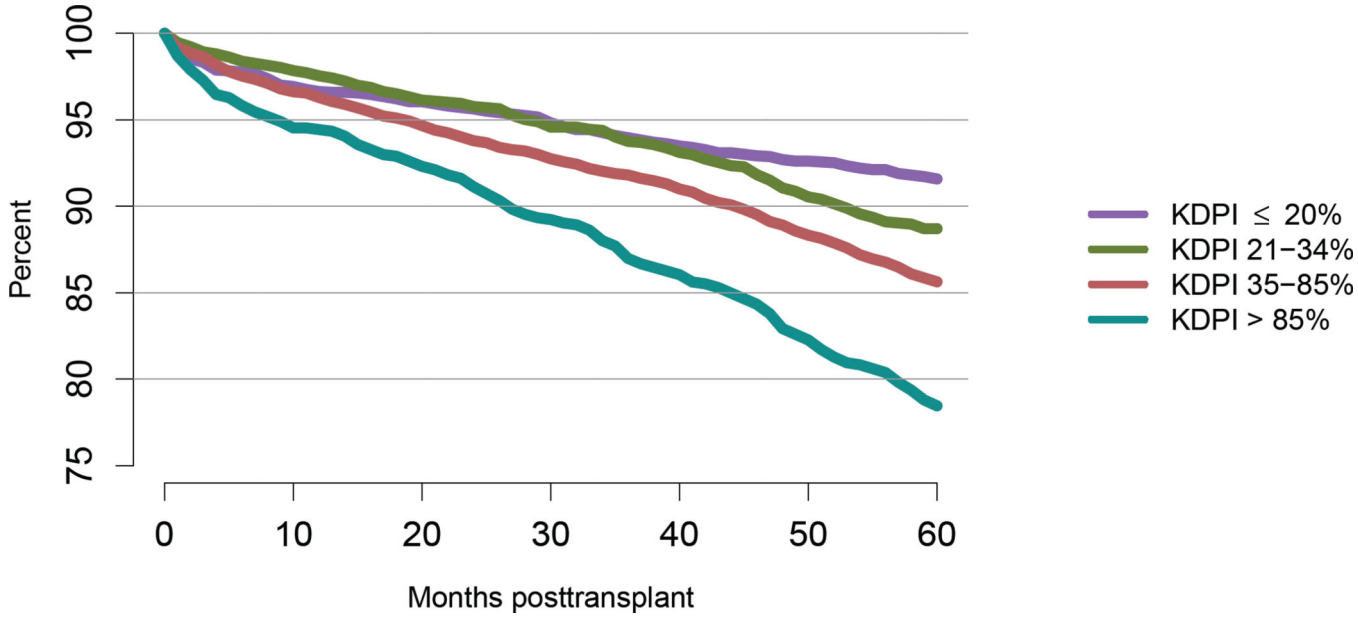

Figure KI 81. Patient survival among adult deceased donor kidney transplant recipients, 2010, by KDPI

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered. The reference population for the KDRI to KDPI conversion is all deceased donor kidneys recovered for transplant in the US in 2015. KDPI, kidney donor profile index.

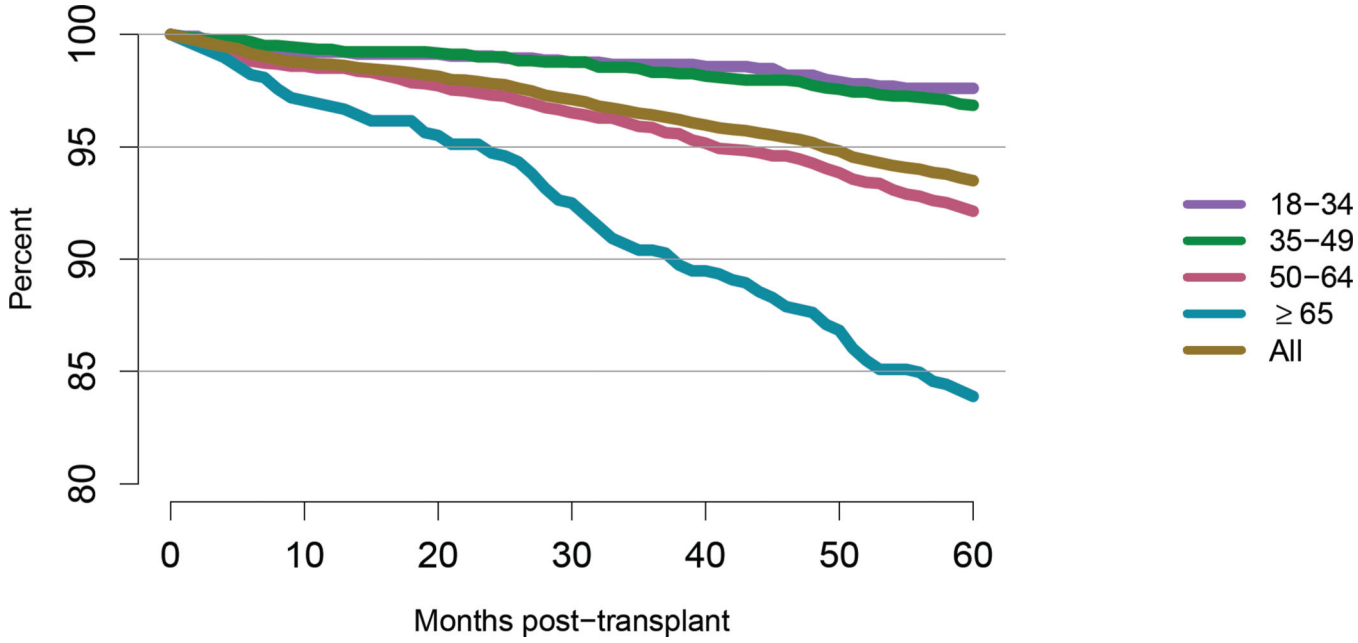

Figure KI 82. Patient survival among adult living donor kidney transplant recipients, 2010, by age

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered.

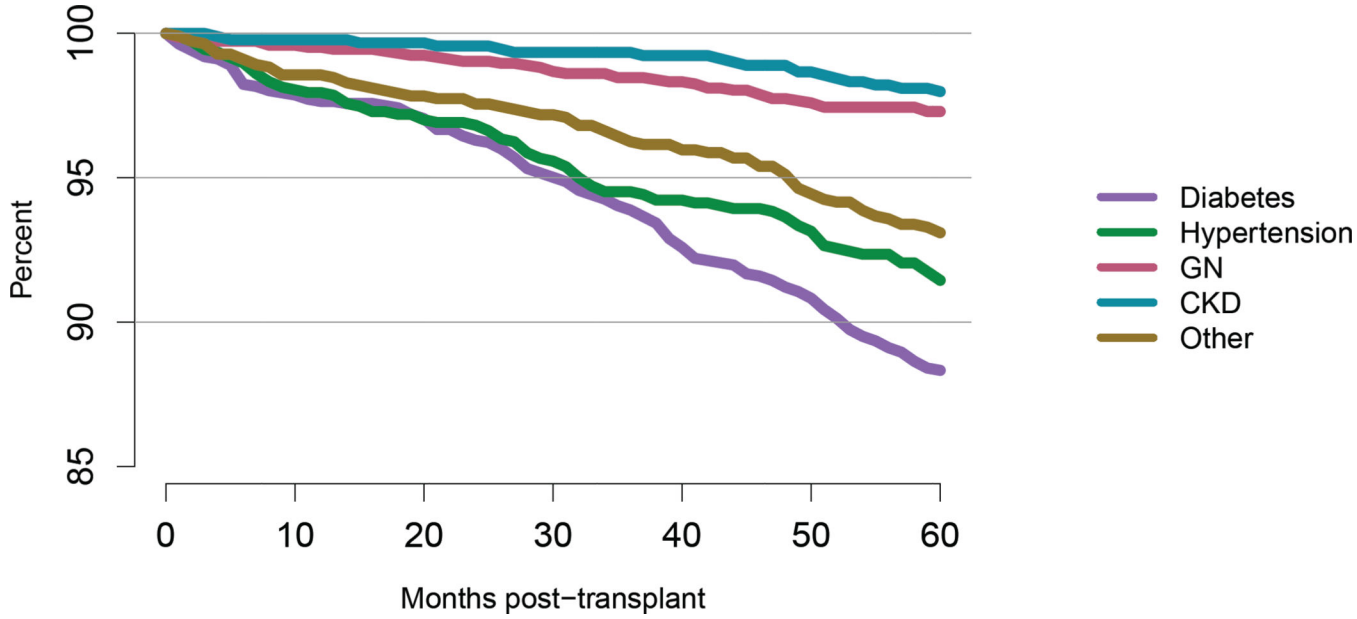

Figure KI 83. Patient survival among adult living donor kidney transplant recipients, 2010, by diagnosis

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered. CKD, cystic kidney disease; GN, glomerulonephritis.

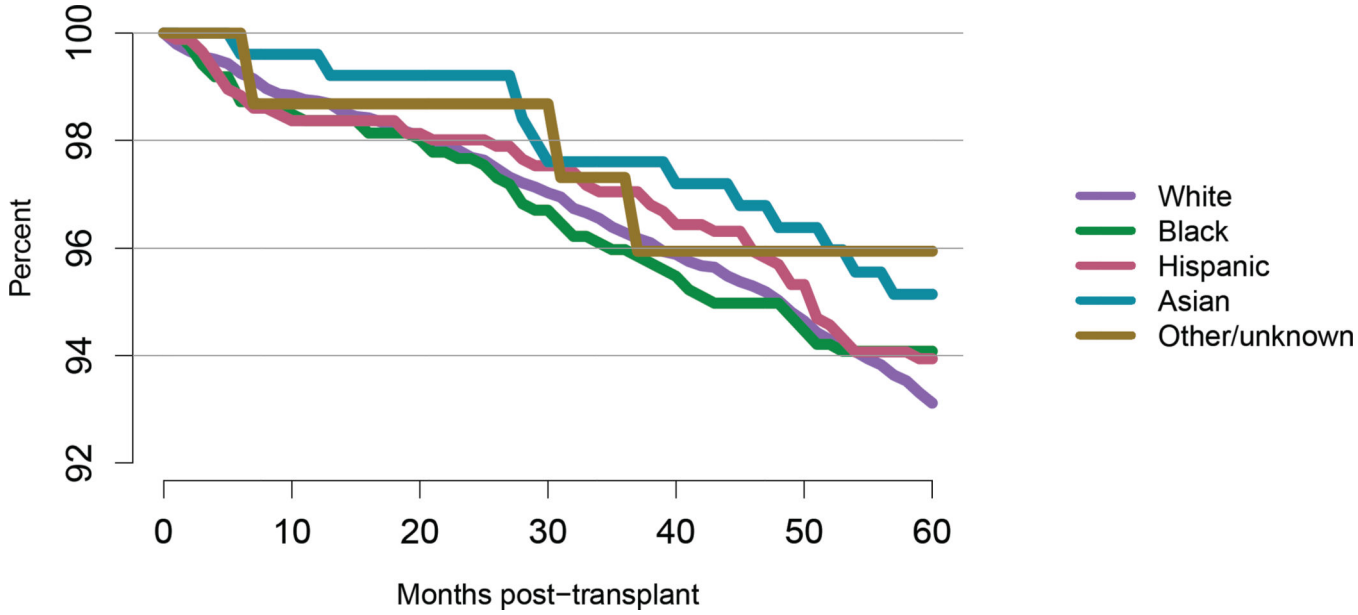

Figure KI 84. Patient survival among adult living donor kidney transplant recipients, 2010, by race

Patient survival estimated using unadjusted Kaplan-Meier methods. For recipients of more than one transplant during the period, only the first is considered.

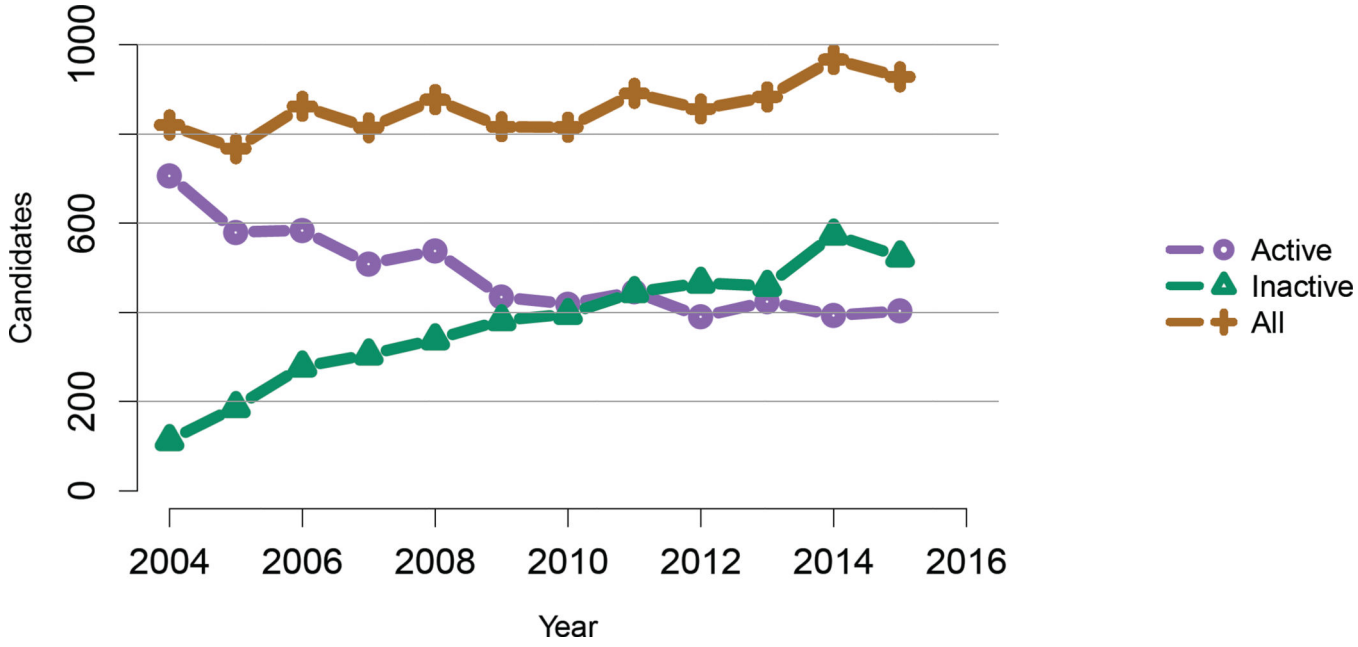

Figure KI 85. New pediatric candidates added to the kidney transplant waiting list

A new candidate is one who first joined the list during the given year, without having been listed in a previous year. Previously listed candidates who underwent transplant and subsequently relisted are considered new. Candidates concurrently listed at multiple centers are counted once. Active and inactive patients are included. Age determined at listing.

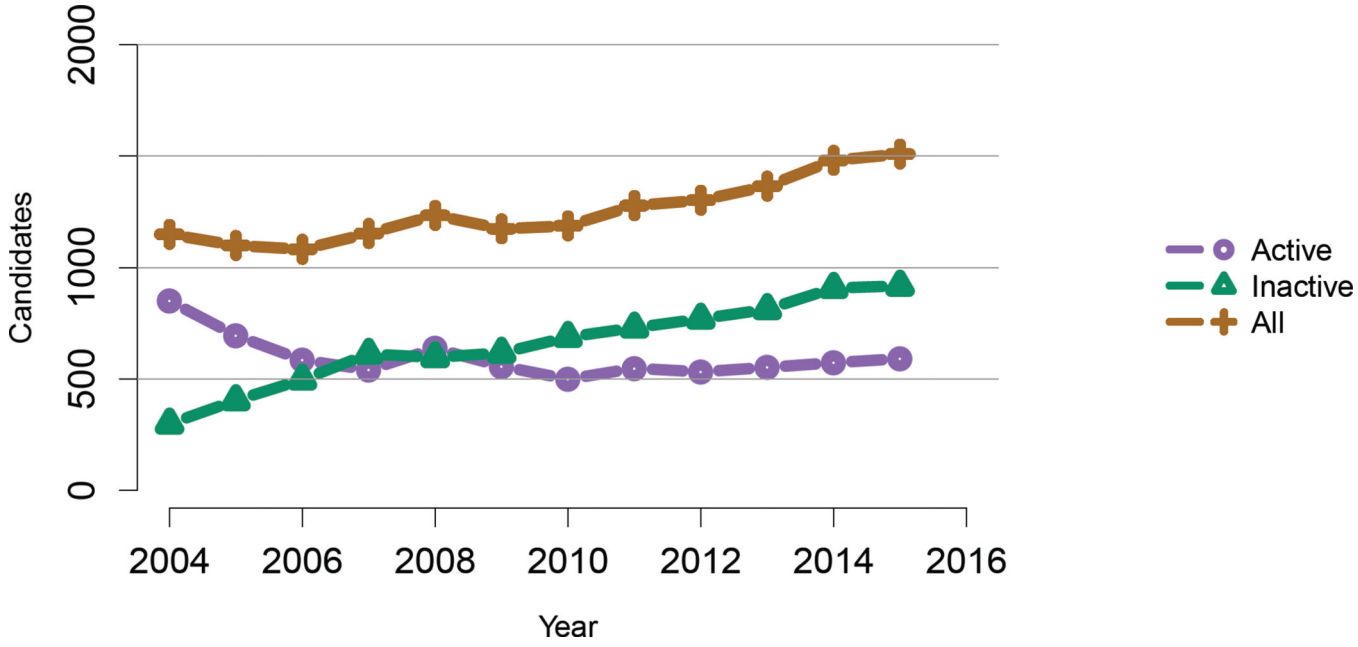

Figure KI 86. Pediatric candidates listed for kidney transplant on December 31 each year

Candidates concurrently listed at multiple centers are counted once. Those with concurrent listings and active at any program are considered active. Active status is determined on day 7 after first listing; age determined at first listing.

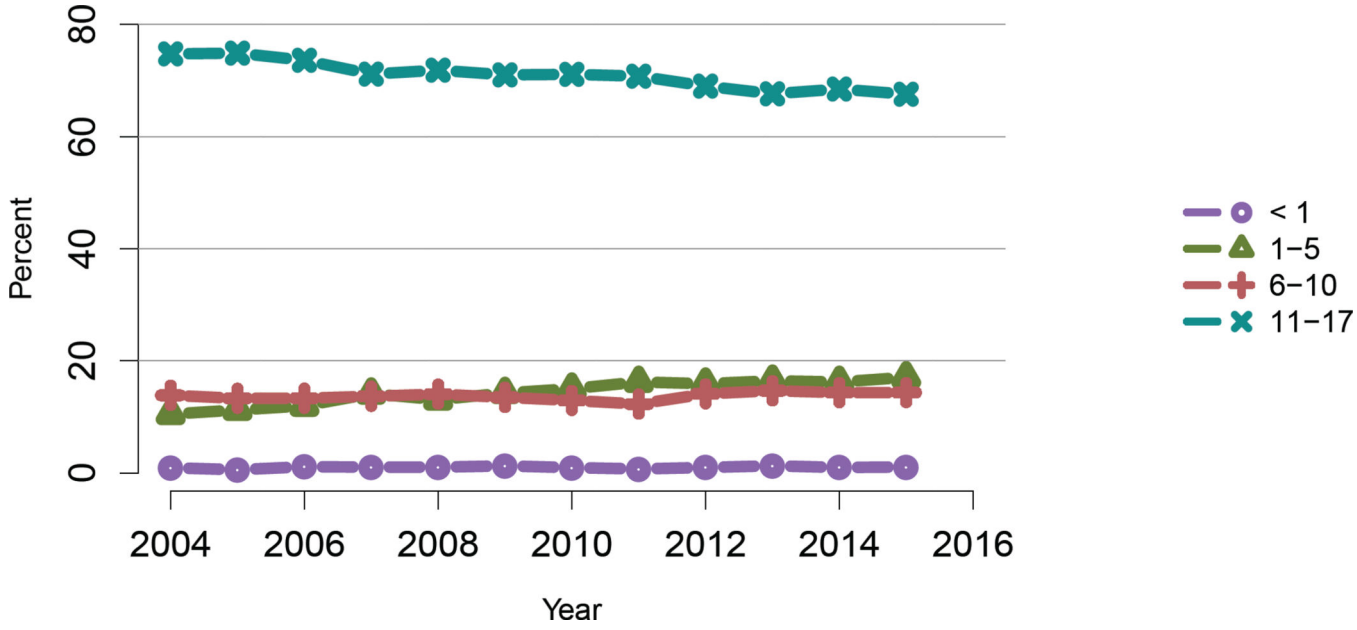

Figure KI 87. Distribution of pediatric candidates waiting for kidney transplant by age

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. Age is determined at the later of listing date or January 1 of the given year. Active and inactive candidates are included.

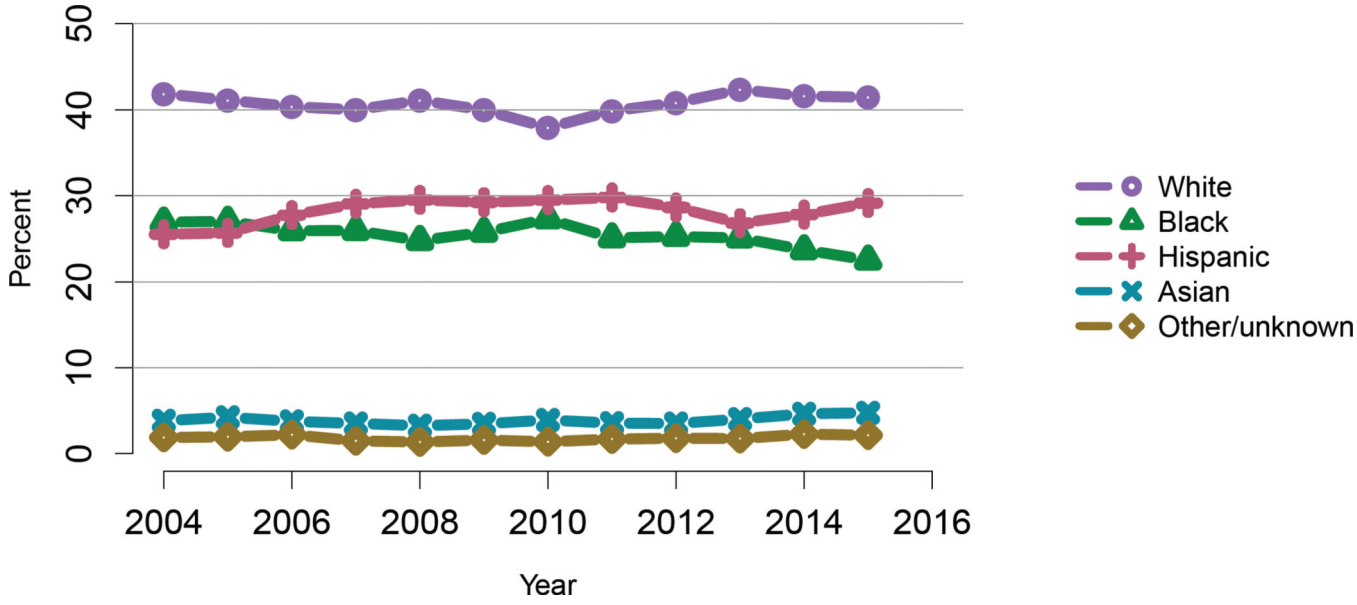

Figure KI 88. Distribution of pediatric candidates waiting for kidney transplant by race

Candidates waiting for transplant any time in the given year. Candidates listed concurrently at multiple centers are counted once. Active and inactive candidates are included.

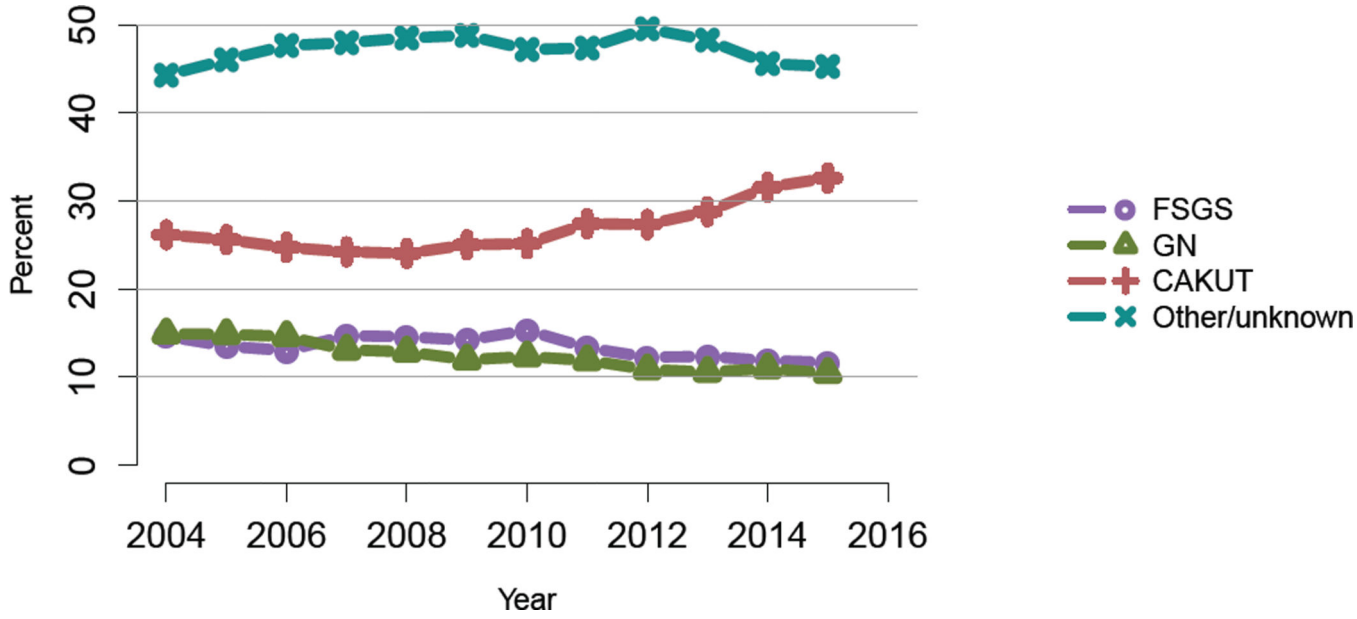

Figure KI 89. Distribution of pediatric candidates waiting for kidney transplant by diagnosis

Candidates waiting for transplant any time in the given year. Candidates listed concurrently at multiple centers are counted once. Diagnosis categories follow North American Pediatric Renal Trials and Collaborative Studies recommendations. Active and inactive candidates are included. FSGS, focal segmental glomerulosclerosis; GN, glomerulonephritis; CAKUT, congenital anomalies of the kidney and urinary tract.

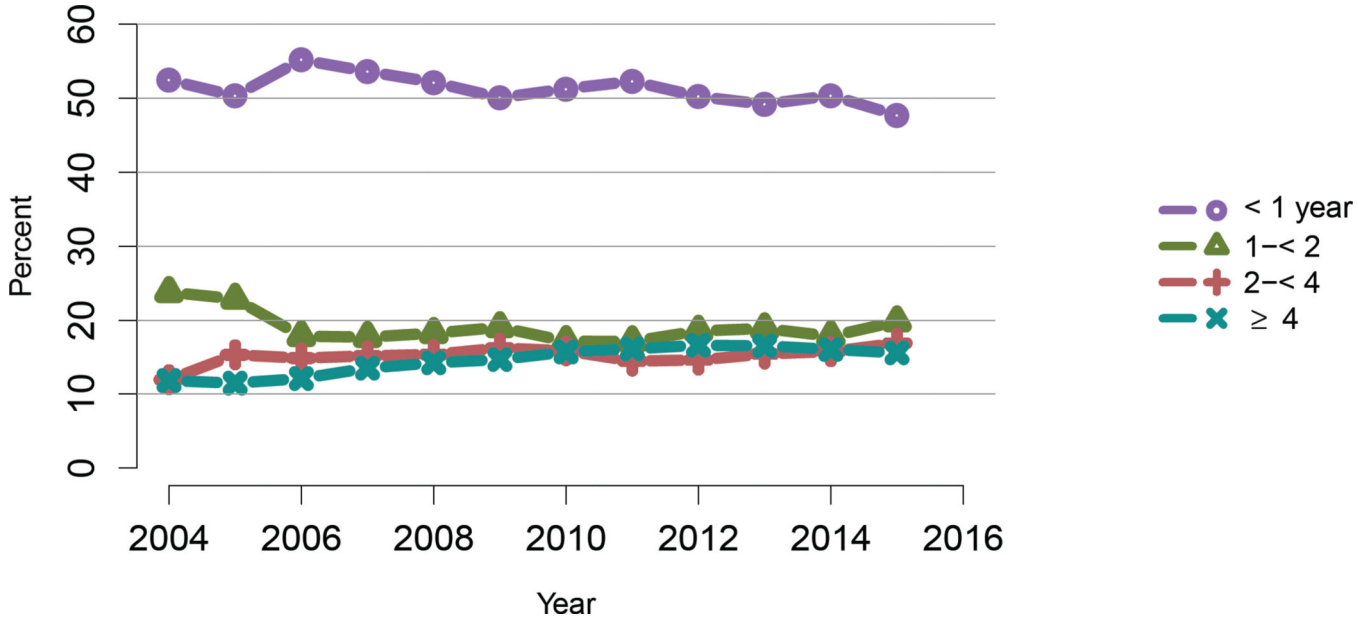

Figure KI 90. Distribution of pediatric candidates waiting for kidney transplant by waiting time

Candidates waiting for transplant any time in the given year. Candidates listed concurrently at multiple centers are counted once. Time on the waiting list is determined at the earlier of December 31 or removal from the waiting list. Active and inactive candidates are included.

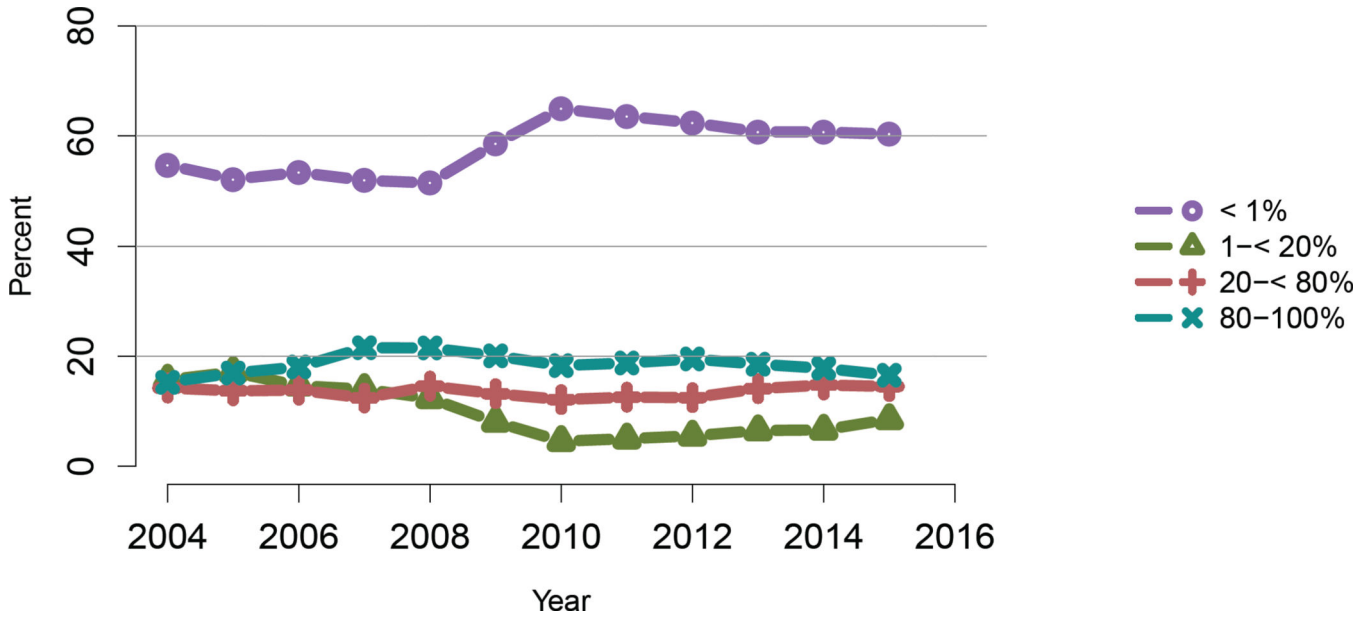

Figure KI 91. Distribution of pediatric candidates waiting for kidney transplant by PRA

Candidates waiting for transplant at any time in the given year. Candidates listed concurrently at multiple centers are counted once. From December 5, 2007, through September 30, 2009, CPRA was used if greater than 0; otherwise, the maximum pretransplant PRA was used. Before December 5, 2007, the maximum pretransplant PRA was used unconditionally. CPRA is used after September 30, 2009. C/PRA is the highest value during the year. Active and inactive candidates are included.

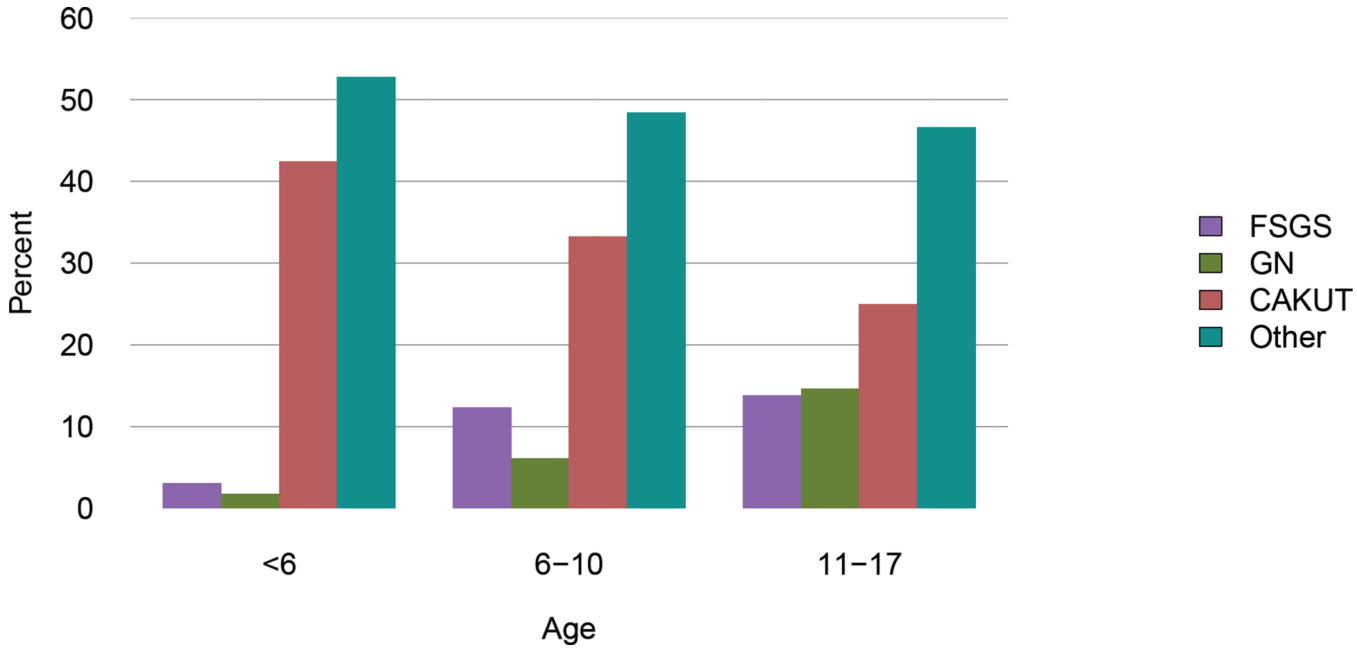

Figure KI 92. Primary cause of ESRD in pediatric candidates waiting for kidney transplant by age, 2011–2015

Candidates who joined the list 2011–2015. Candidates concurrently listed at more than one center are counted once. Patients who were listed, underwent transplant, and were relisted during the time period are counted more than once. Age is computed at earliest listing date. FSGS, focal segmental glomerulosclerosis; GN, glomerulonephritis; CAKUT, congenital anomalies of the kidney and urinary tract.

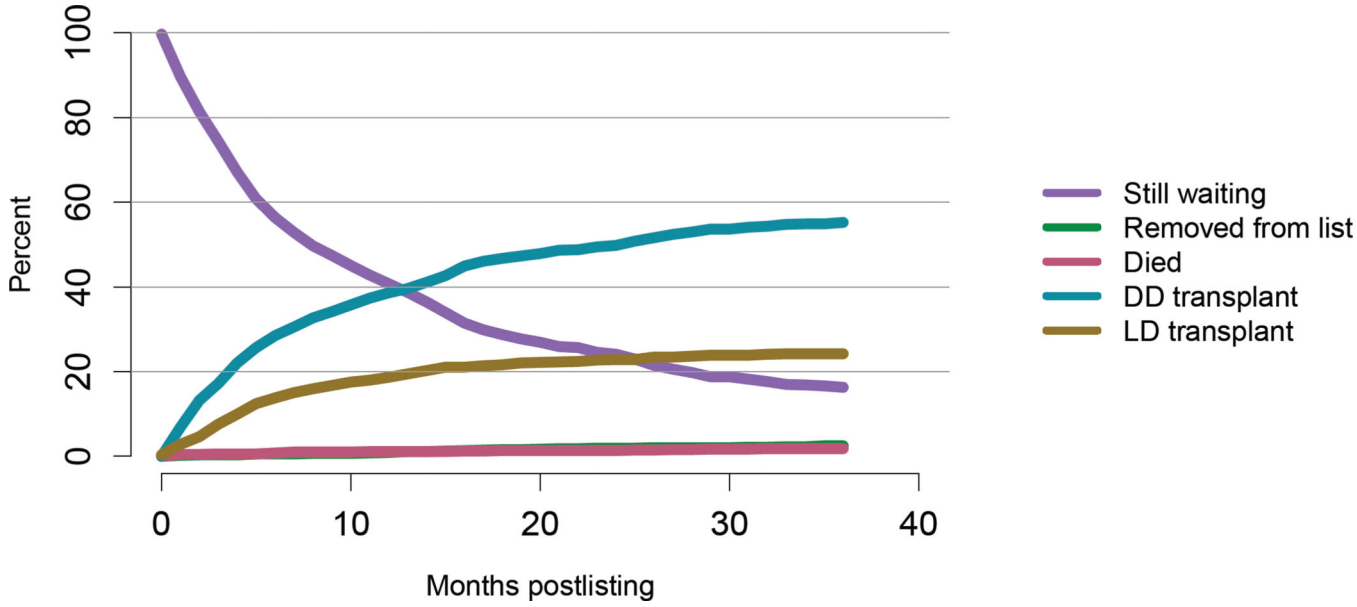

Figure KI 93. Three-year outcomes for newly listed pediatric candidates waiting for kidney transplant, 2012

Pediatric candidates who joined the kidney or kidney-pancreas waitlist in 2012. Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal. DD, deceased donor; LD, living donor.

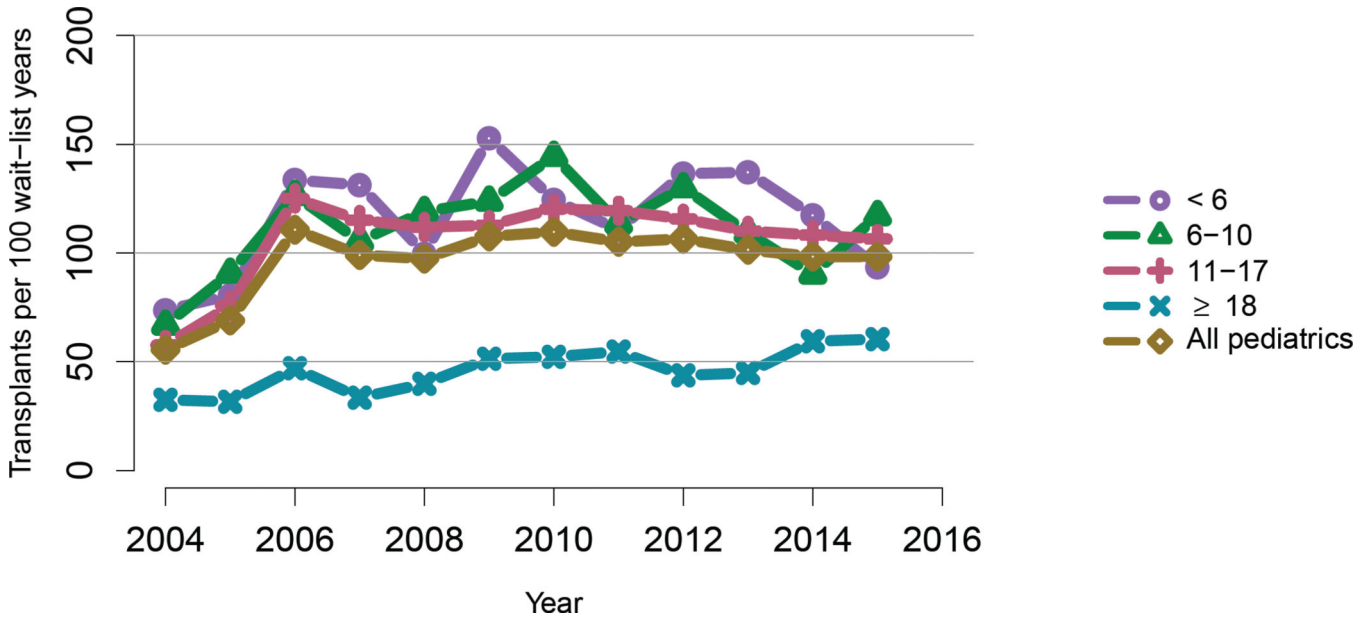

Figure KI 94. Deceased donor kidney transplant rates among active pediatric waitlist candidates by age

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active waiting in a given year. Individual listings are counted separately. Age is determined at the later of listing date or January 1 of the given year. Rates with less than 10 patient-years of exposure are not shown. The age category 18 years or older includes candidates listed when pediatrics but still on the list in the given year.

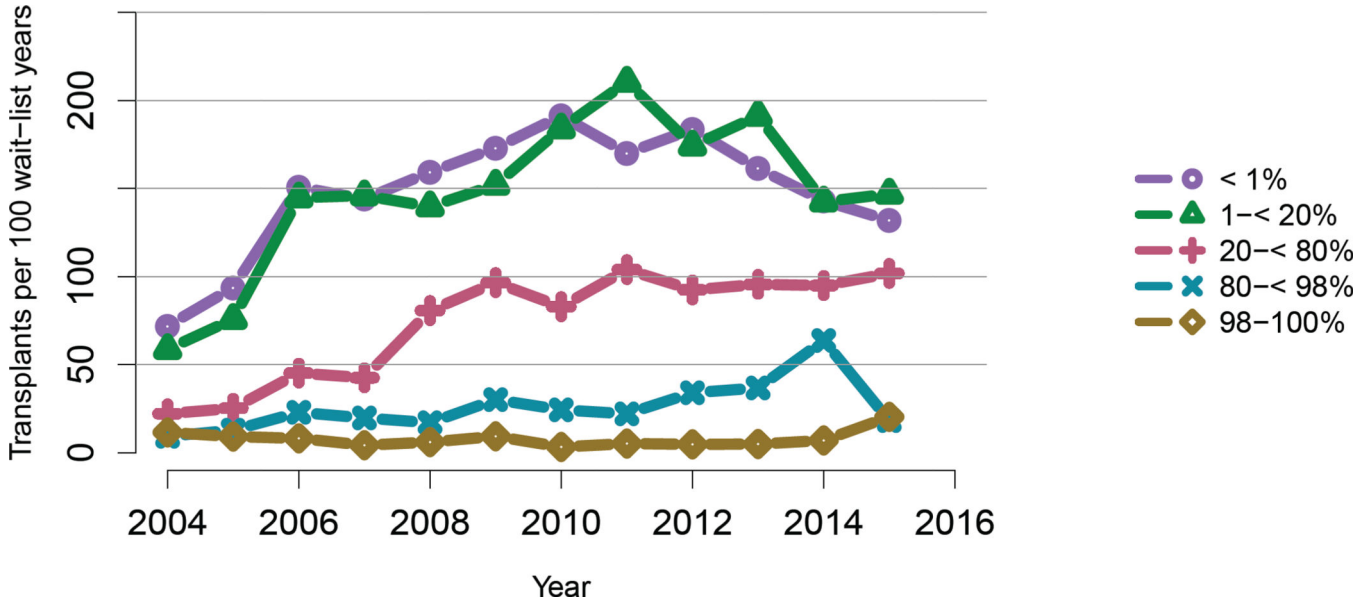

Figure KI 95. Deceased donor kidney transplant rates among active pediatric waitlist candidates by C/PRA

Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of active waiting in a given year. Individual listings are counted separately. Rates with less than 10 patient-years of exposure are not shown.

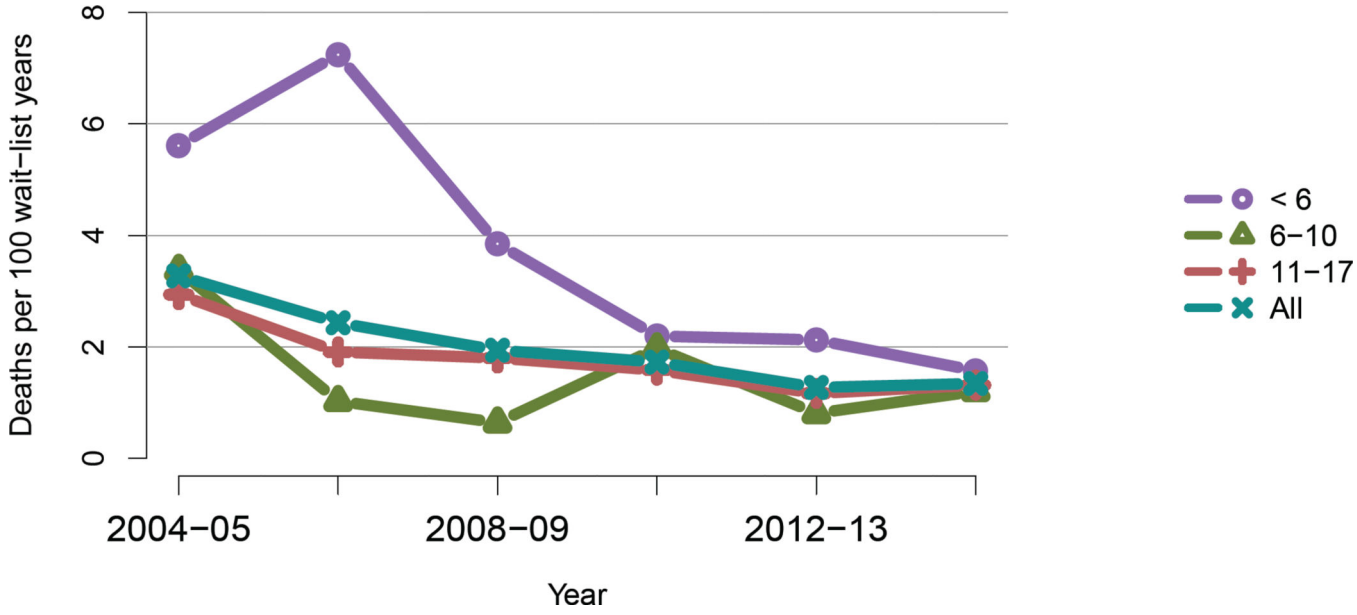

Figure KI 96. Pretransplant mortality rates among pediatrics waitlisted for kidney transplant by age

Mortality rates are computed as the number of deaths per 100 patient-years of waiting in the given year. Individual listings are counted separately. Age is determined at the later of listing date or January 1 of the given year. Rates with less than 10 patient-years of exposure are not shown.

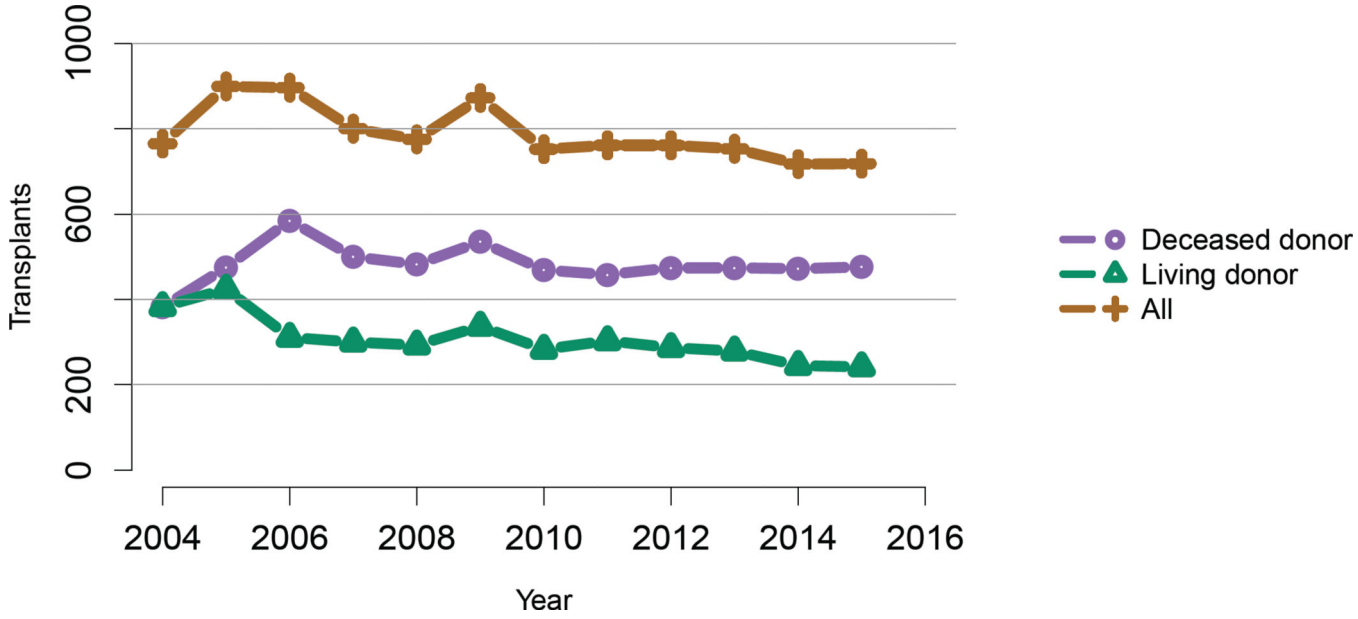

Figure KI 97. Pediatric kidney transplants by donor type

All pediatric kidney transplant recipients, including retransplant, and multi-organ recipients.

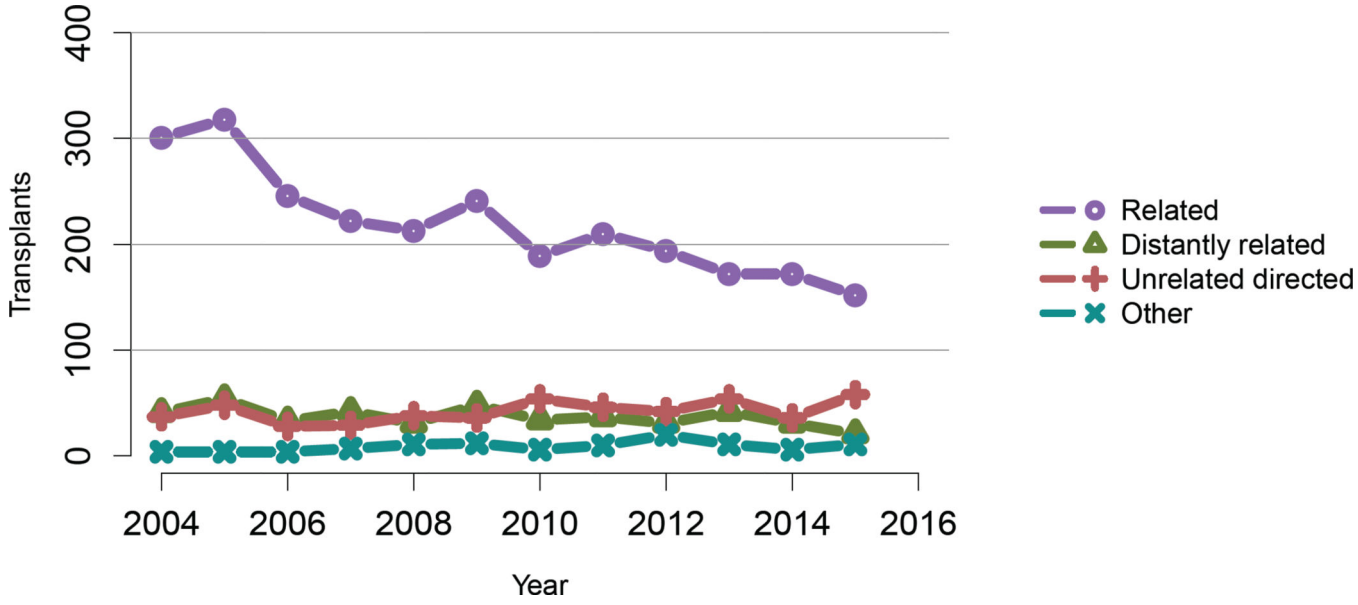

Figure KI 98. Pediatric kidney transplants from living donors by relation

Relationship of living donor to recipient is as indicated on the OPTN Living Donor Registration Form.

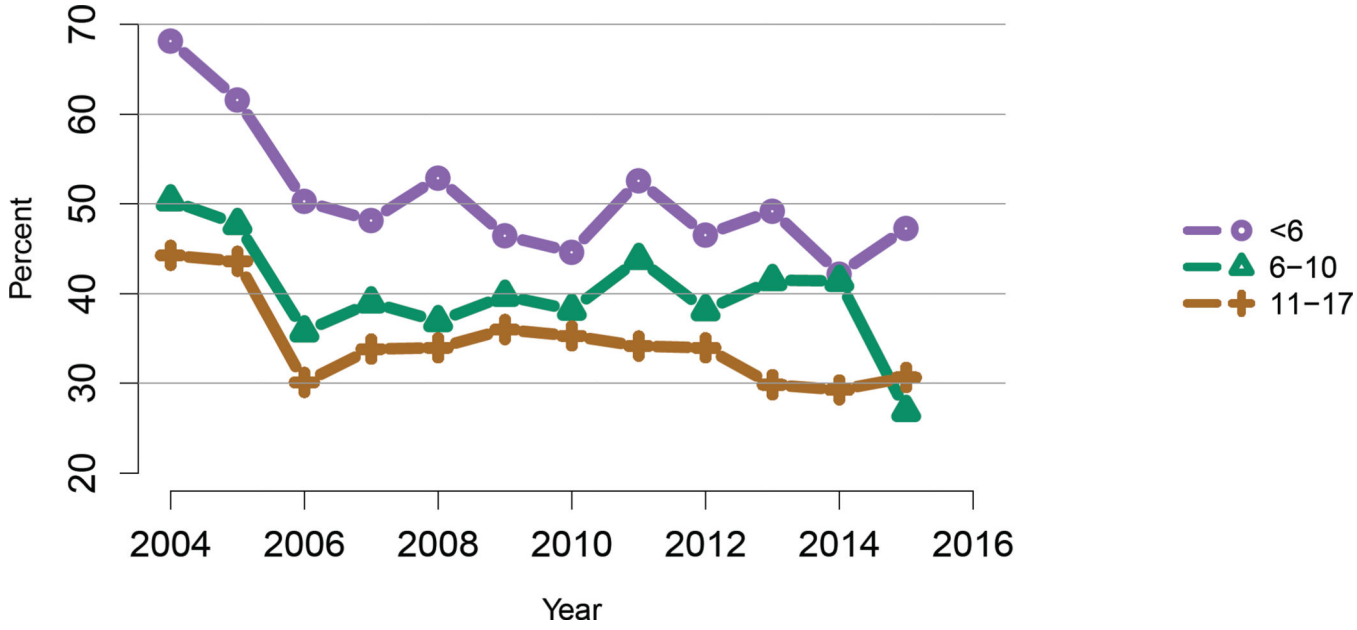

Figure KI 99. Percent of pediatric kidney transplants from living donors by recipient age
All pediatric living kidney transplant recipients, including retransplant, and multi-organ recipients.

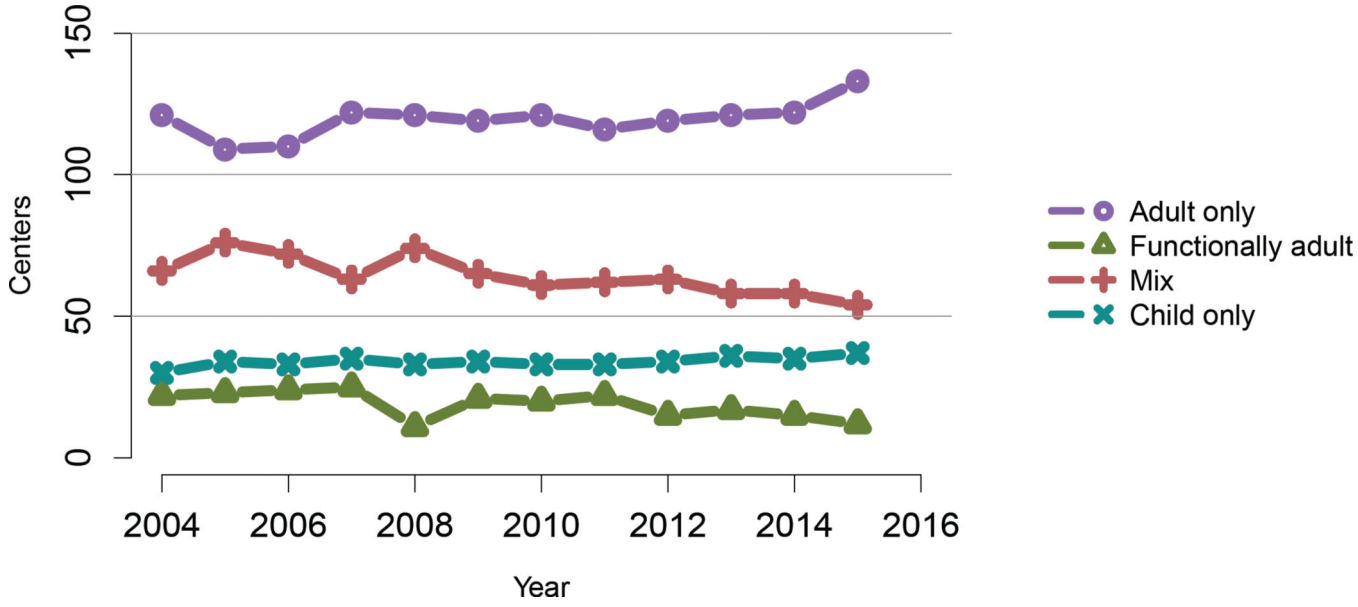

Figure KI 100. Number of centers performing pediatric and adult kidney transplants by center's age mix

Adult centers transplanted only recipients aged 18 years or older. Functionally adult centers transplant 80% adults or more, and the remainder were children aged 15–17 years. Mixed included adults and children of any age groups. Child only centers transplanted recipeints aged 0–17 years, and small number of adults up to age 21 years.

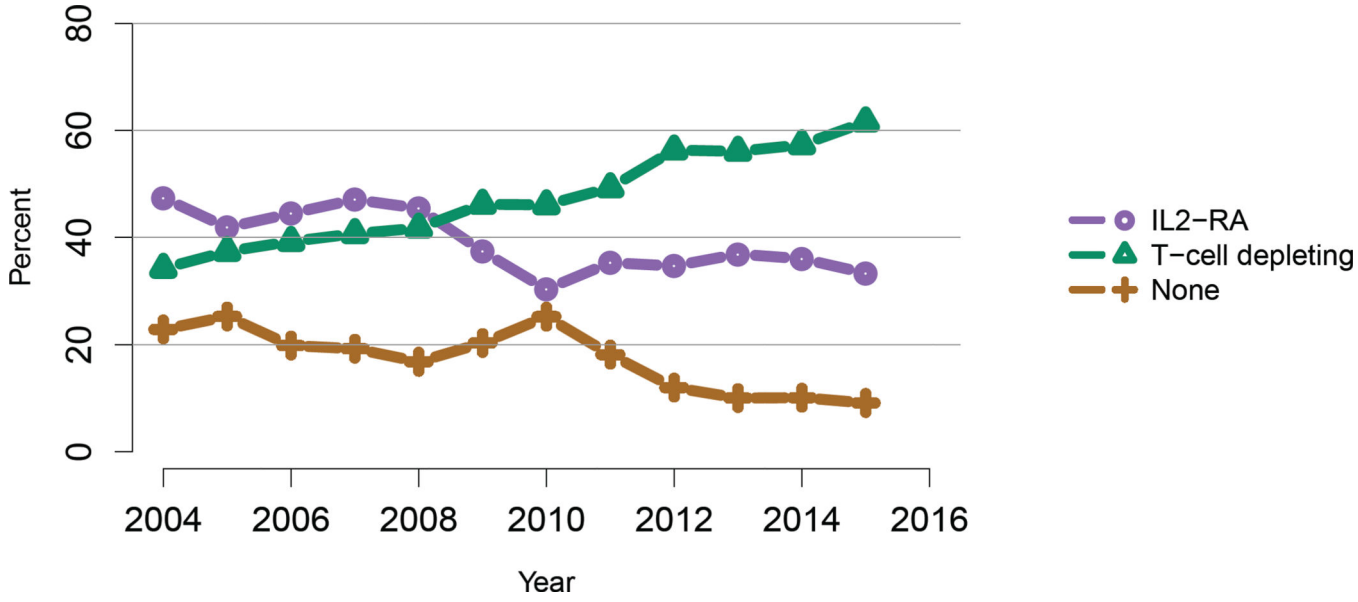

Figure KI 101. Induction agent use in pediatric kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. IL2-RA, interleukin-2 receptor antagonist.

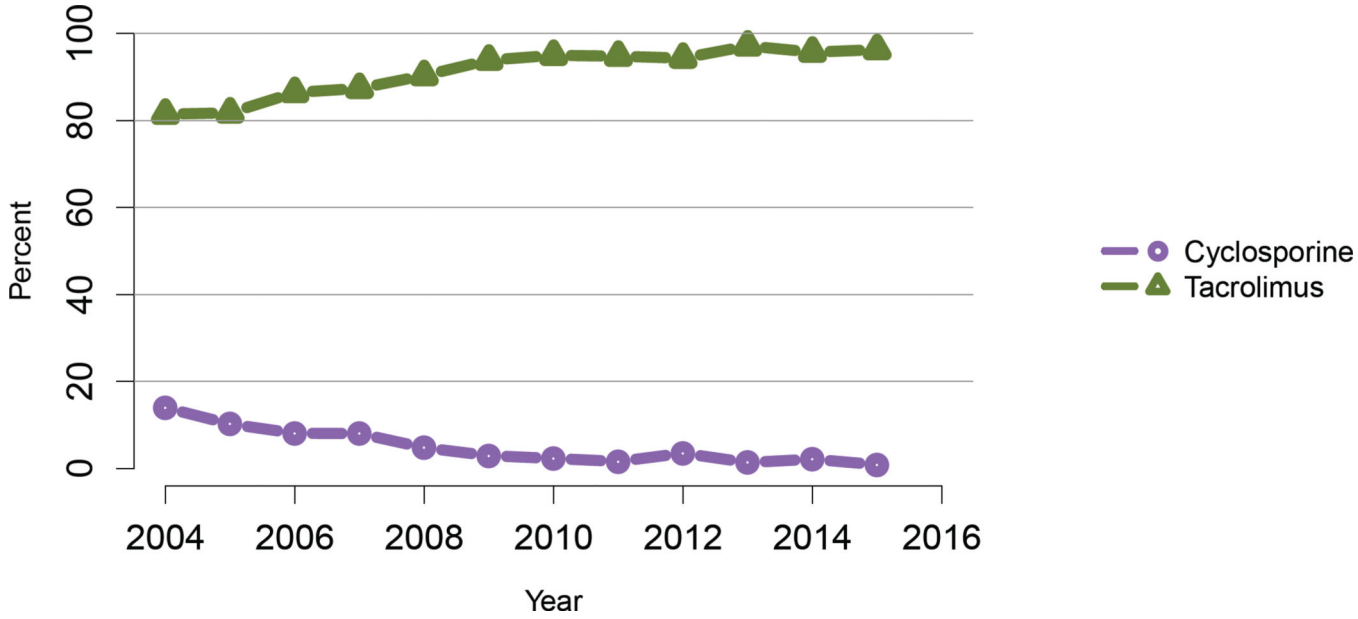

Figure KI 102. Calcineurin inhibitor use in pediatric kidney transplant recipients
Immunosuppression at transplant reported to the OPTN.

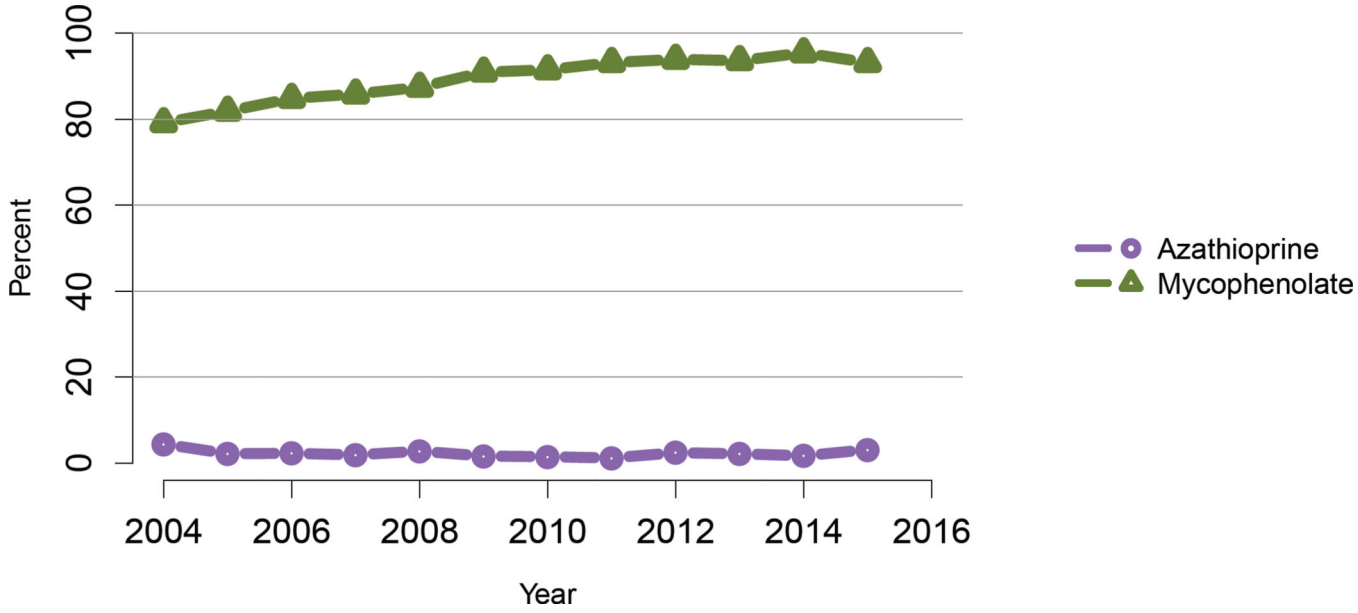

Figure KI 103. Anti-metabolite use in pedatric kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. Mycophenolate includes mycophenolate mofetil and mycophenolate sodium.

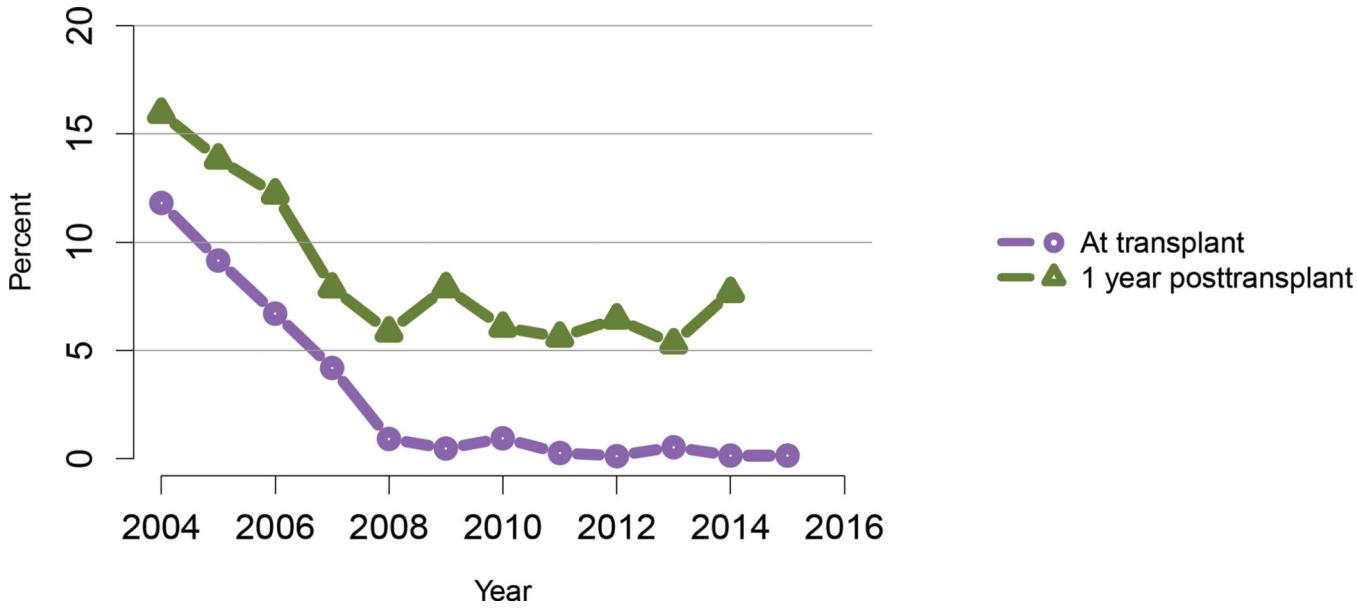

Figure KI 104. mTOR inhibitor use in pediatric kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. One-year posttransplant data are limited to patients alive with graft function at 1 year posttransplant. mTOR, mammalian target of rapamycin.

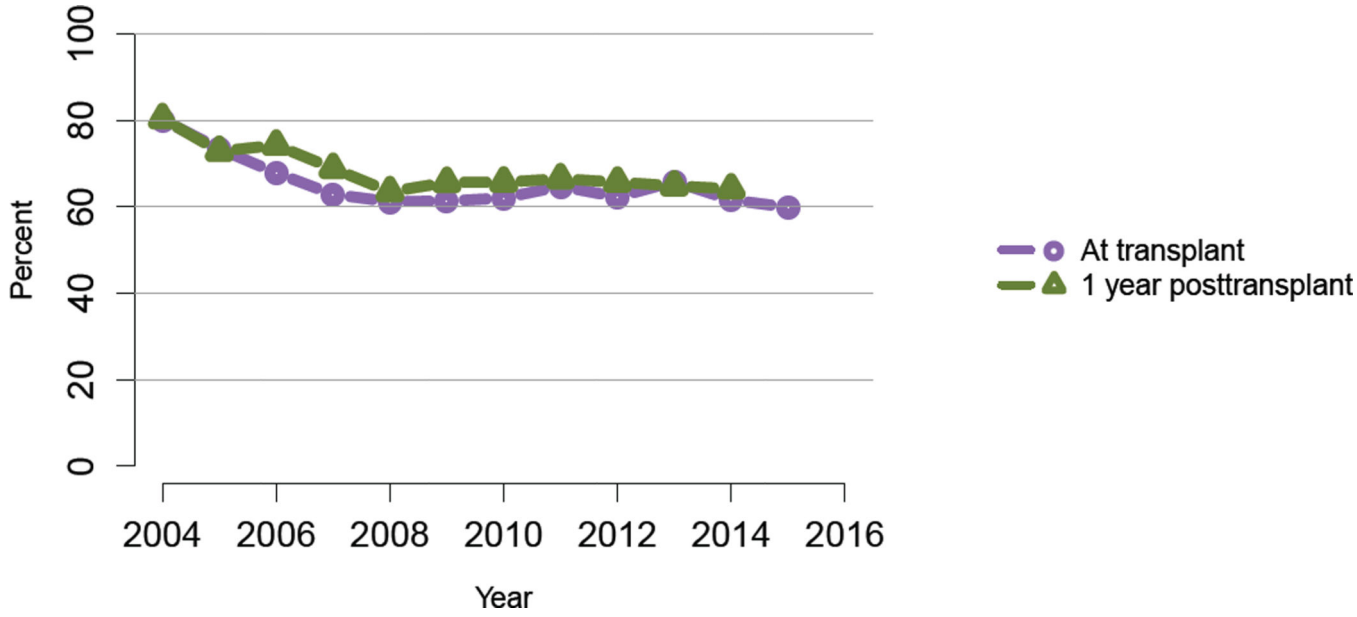

Figure KI 105. Steroid use in pedatric kidney transplant recipients

Immunosuppression at transplant reported to the OPTN. One-year posttransplant data are limited to patients alive with graft function at 1 year posttransplant.

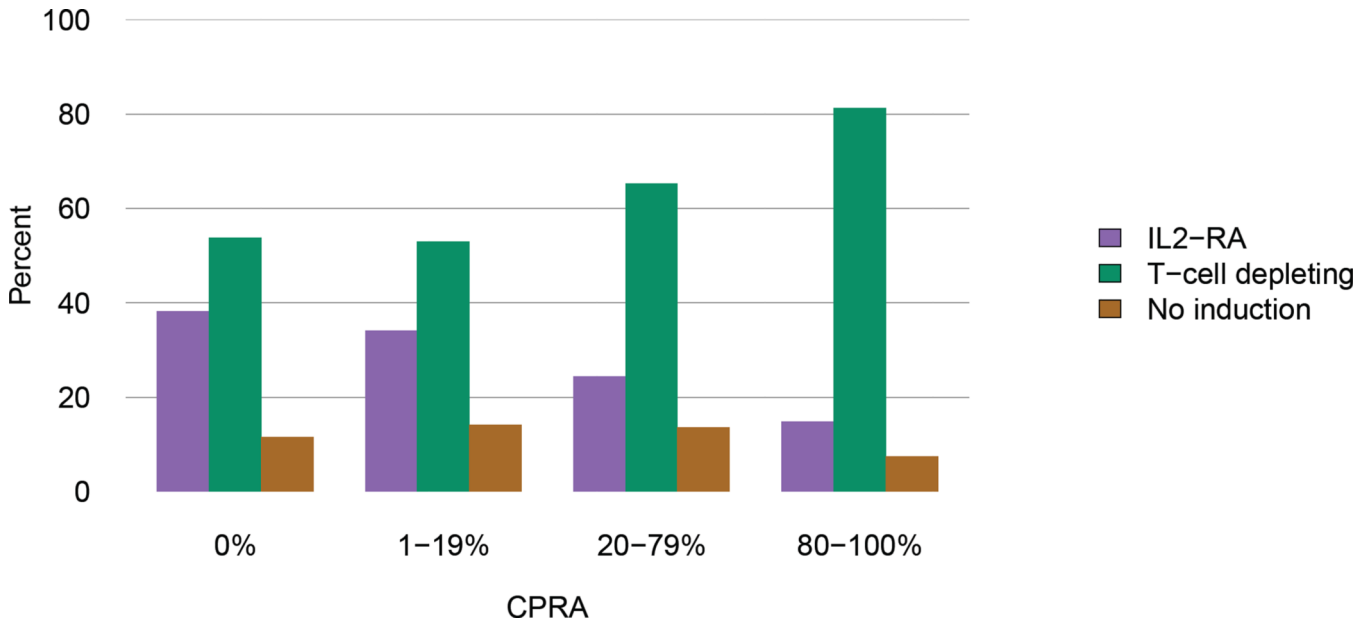

Figure KI 106. Induction use by CPRA among pediatric kidney transplant recipients, 2011–2015
IL2-RA, interleukin-2 receptor antagonist.

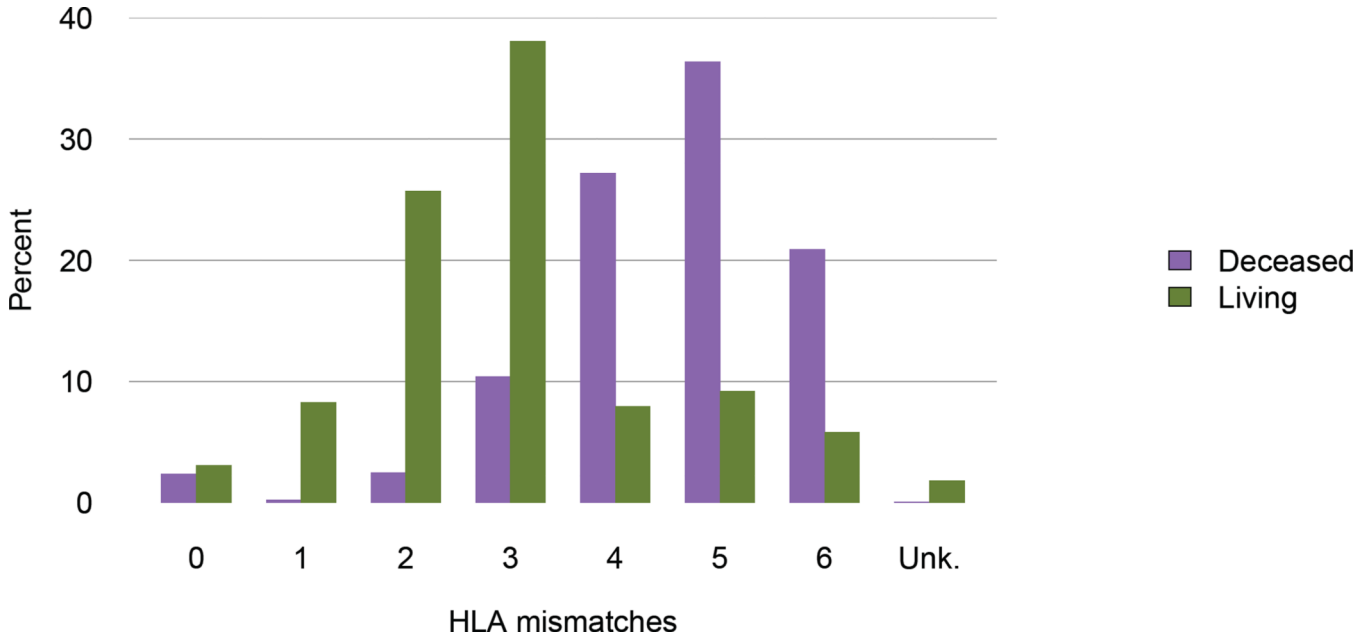

Figure KI 107. Total HLA A, B, and DR mismatches among pediatric kidney transplant recipients, 2011–2015

Donor and recipient antigen matching is based on OPTN antigen values and split equivalences policy as of 2015.

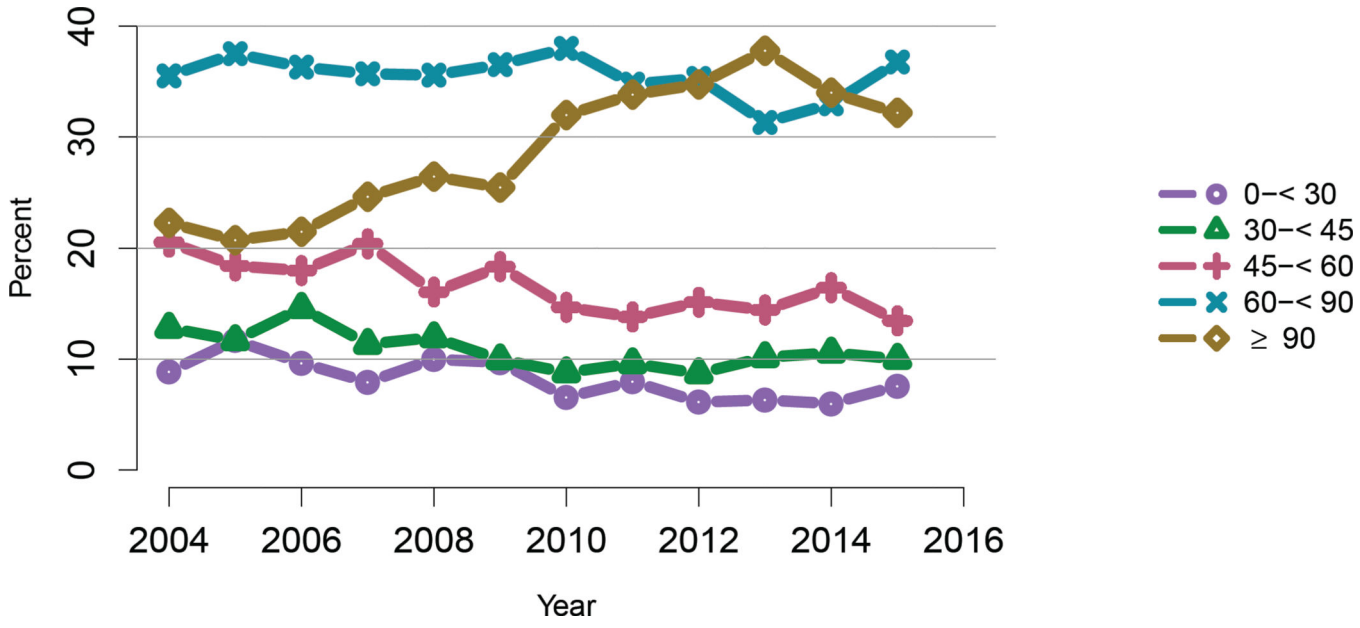

Figure KI 108. Distribution of eGFR at discharge among pediatric kidney-alone transplant recipients

GFR (mL/min/1.73 m^2) estimated using the bedside Schwartz equation, and computed for patients alive with graft function at discharge. Equation: eGFR = 0.413*Height(cm)/ Creatinine (mg/dL).

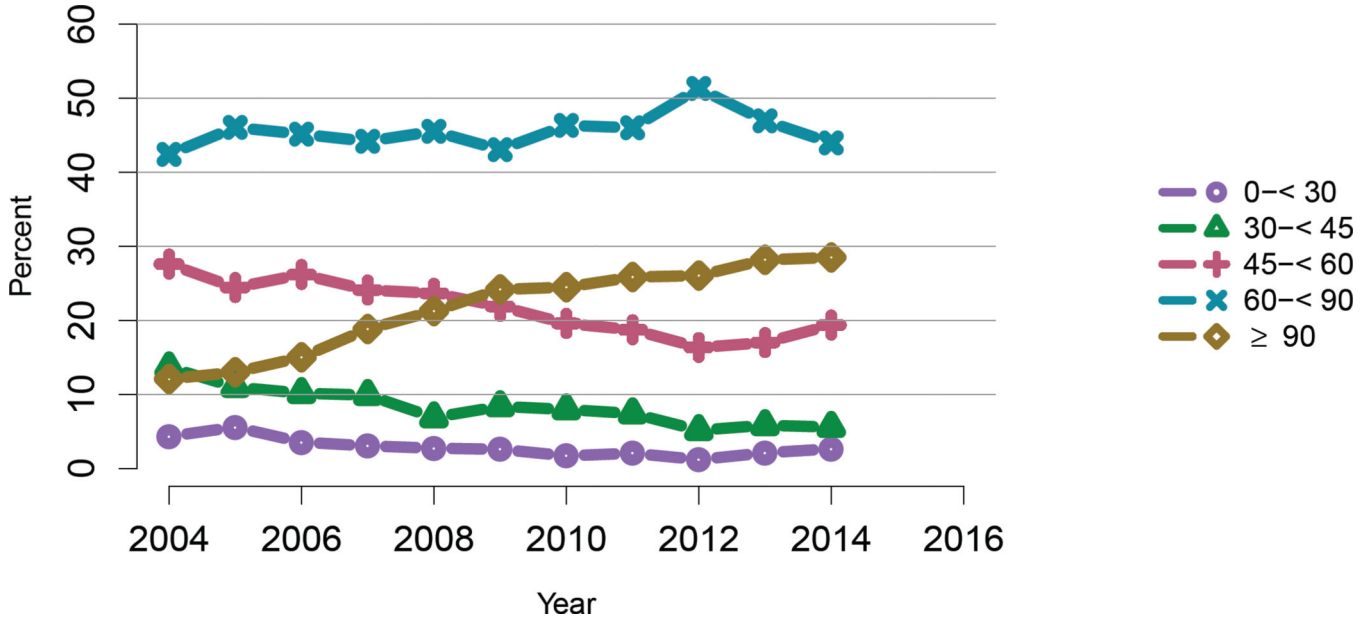

Figure KI 109. Distribution of eGFR at 12 months posttransplant among pediatric kidney-alone transplant recipients

GFR (mL/min/1.73 m^2) estimated using the bedside Schwartz equation, and computed for patients alive with graft function at 12 months posttransplant. Equation: eGFR = 0.413*Height(cm)/Creatinine (mg/dL).

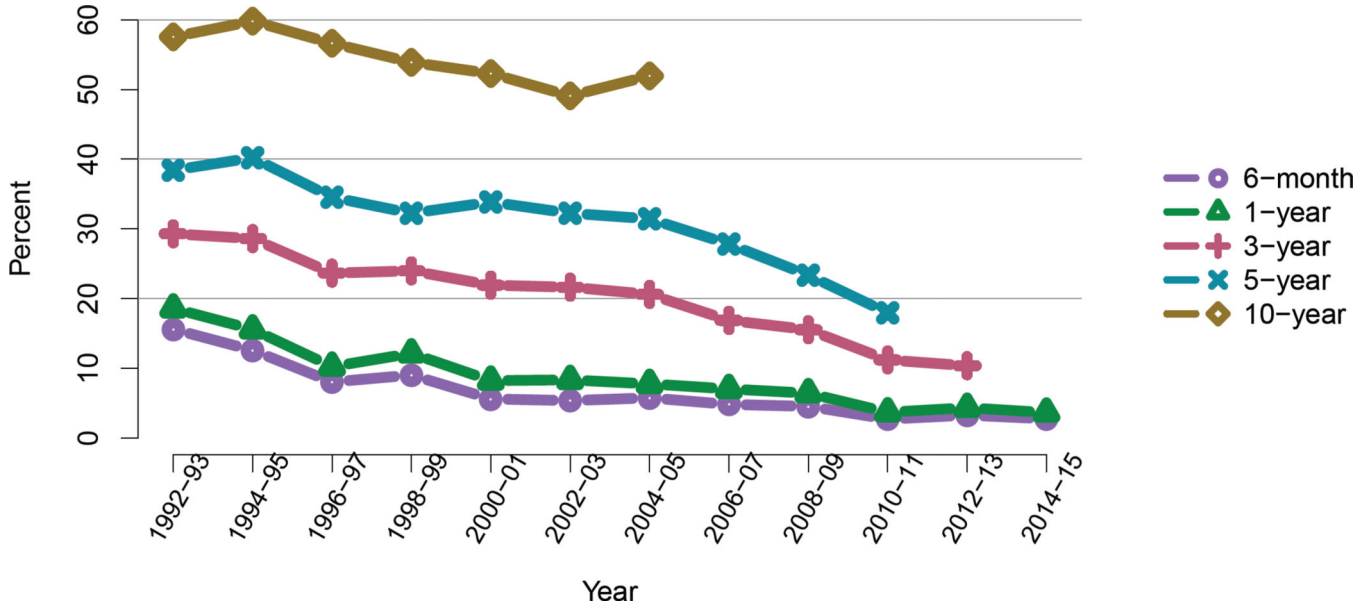

Figure KI 110. Graft failure among pediatric kidney-alone deceased donor transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. All-cause graft failure (GF) is defined as any of the prior outcomes prior to 6 months, 1, 3, 5, or 10 years, respectively.

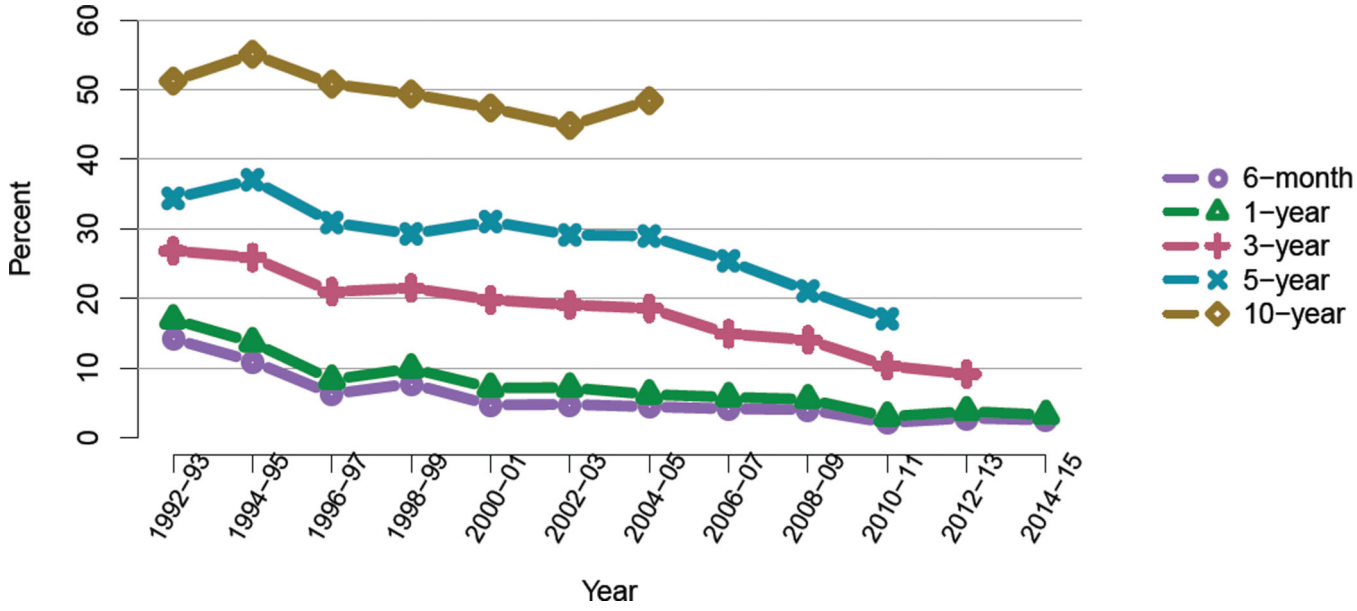

Figure KI 111. Death-censored graft failure among pediatric deceased donor kidney-alone transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death-censored graft failure (DCGF) is defined as a return to dialysis, reported graft failure, or kidney retransplant.

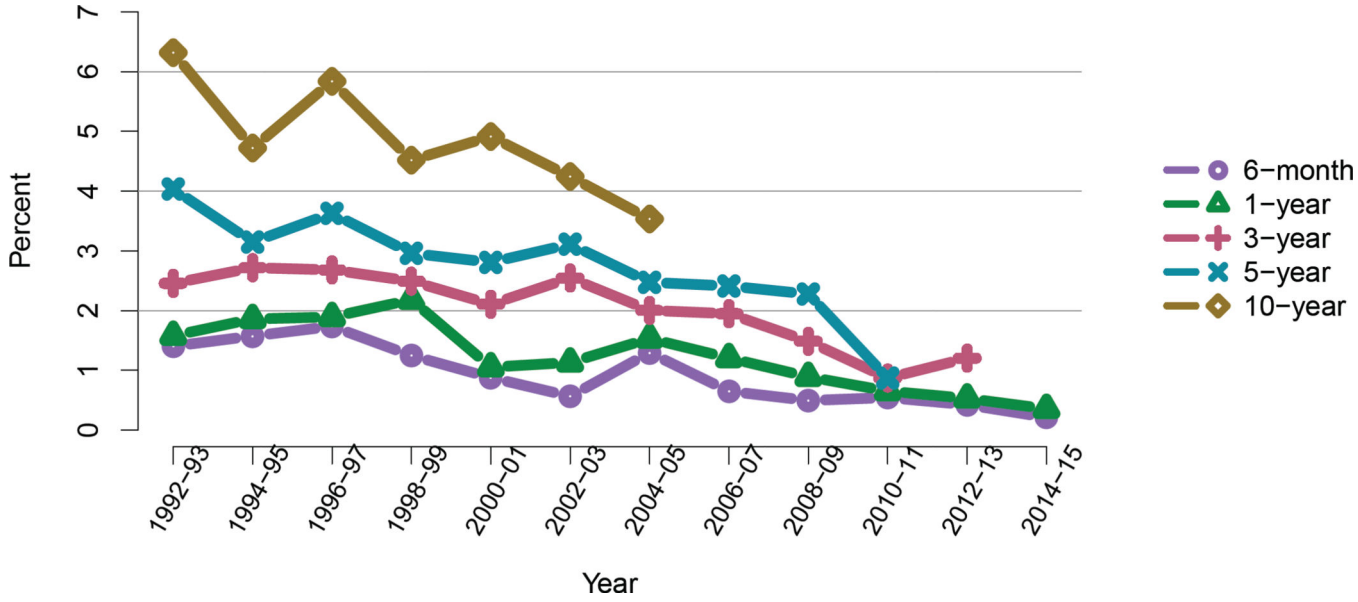

Figure KI 112. Death with function among pediatric deceased donor kidney-alone transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death with function (DWF) is defined as death without prior graft failure, return to dialysis, or retransplant.

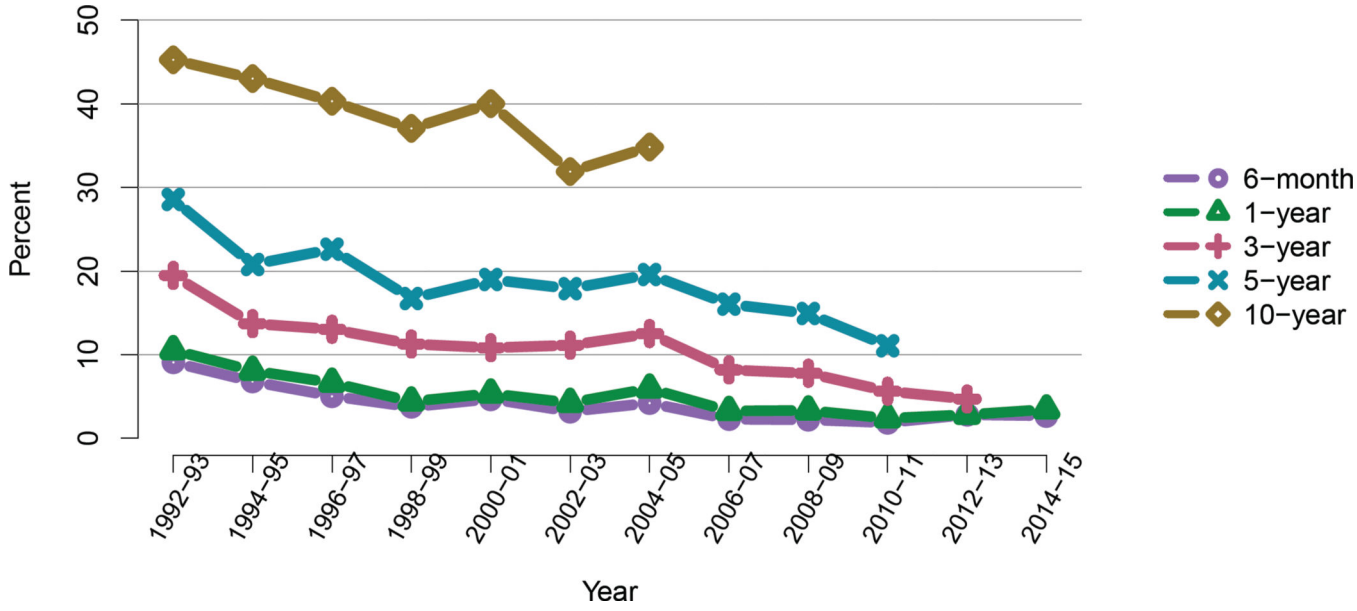

Figure KI 113. Graft failure among pediatric living donor kidney-alone transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. All-cause graft failure (GF) is defined as any of the prior outcomes prior to 6 months, 1, 3, 5, or 10 years, respectively.

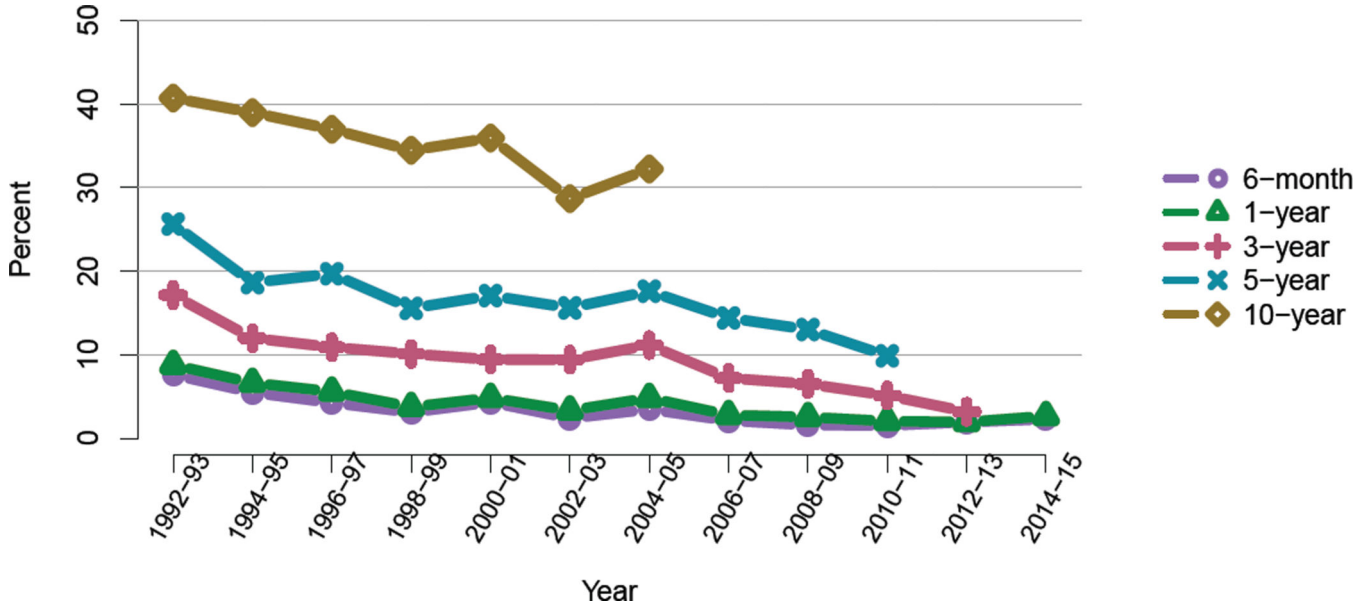

Figure KI 114. Death-censored graft failure among pediatric living donor kidney-alone transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death-censored graft failure (DCGF) is defined as a return to dialysis, reported graft failure, or kidney retransplant.

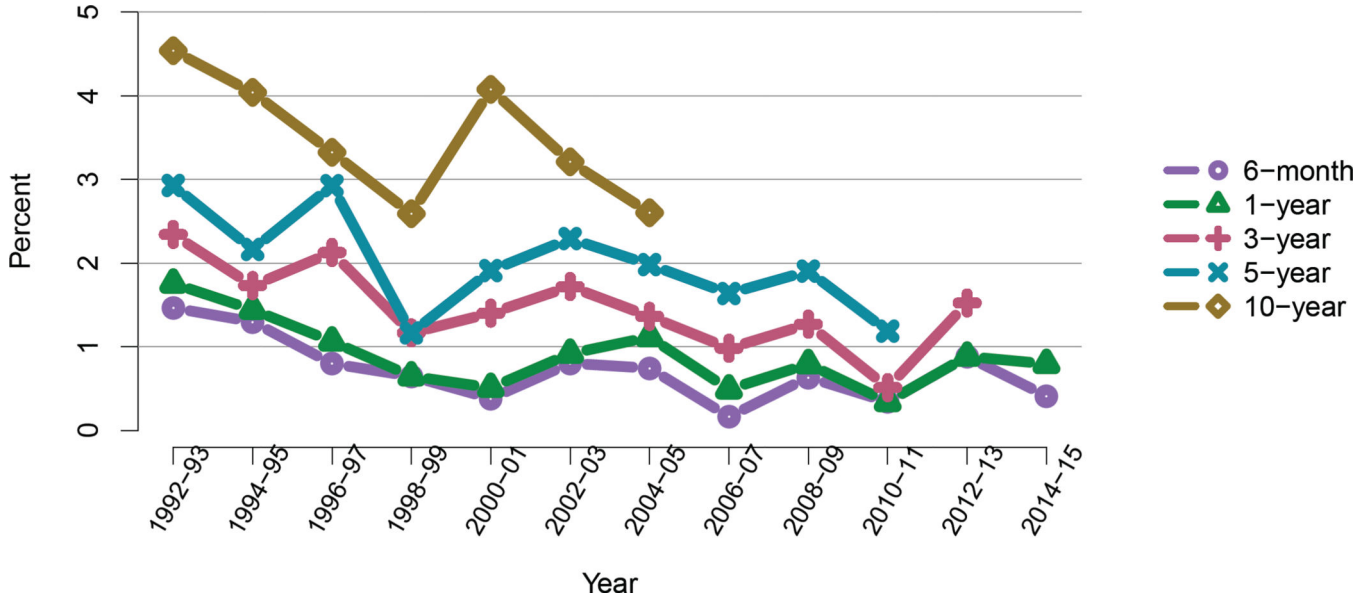

Figure KI 115. Death with function among pediatric living donor kidney-alone transplant recipients

Estimates are unadjusted, computed using Kaplan-Meier competing risk methods. Recipients are followed to the earliest of kidney graft failure; kidney retransplant; return to dialysis; death; or 6 months, 1, 3, 5, or 10 years posttransplant. Death with function (DWF) is defined as death without prior graft failure, return to dialysis, or retransplant.

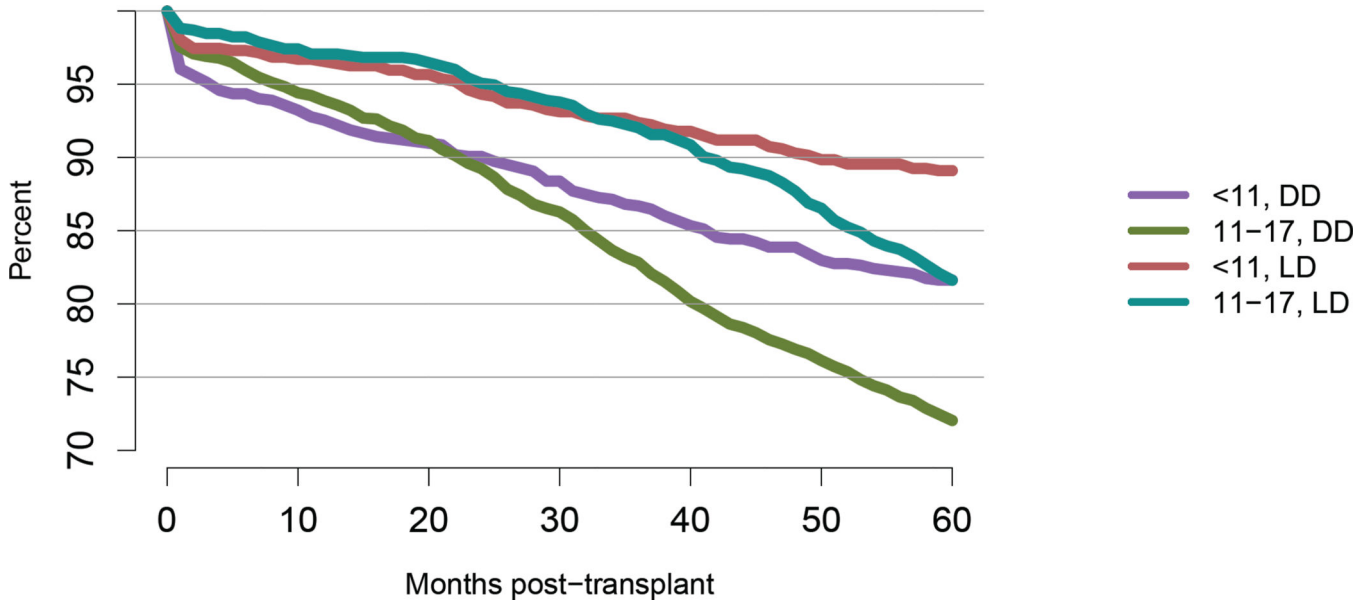

Figure KI 116. Graft survival among pediatric kidney transplant recipients by age and donor type, 2006–2010

Graft survival estimated using unadjusted Kaplan-Meier methods. DD, deceased donor; LD, living donor.

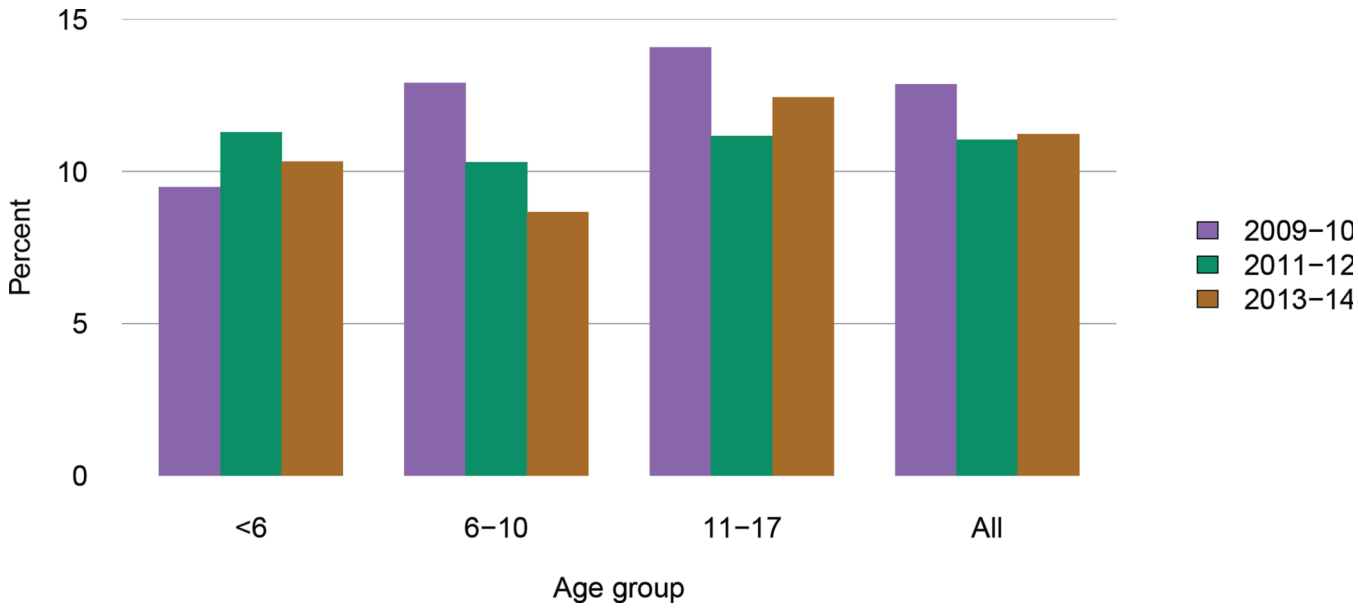

Figure KI 117. Incidence of acute rejection by 1 year posttransplant among pediatric kidney transplant recipients by age

Acute rejection is defined as a record of acute or hyperacute rejection, as reported on the OPTN Transplant Recipient Registration Form or Transplant Recipient Follow-up Form. Only the first rejection event is counted. Cumulative incidence is estimated using the Kaplan-Meier competing risk method.

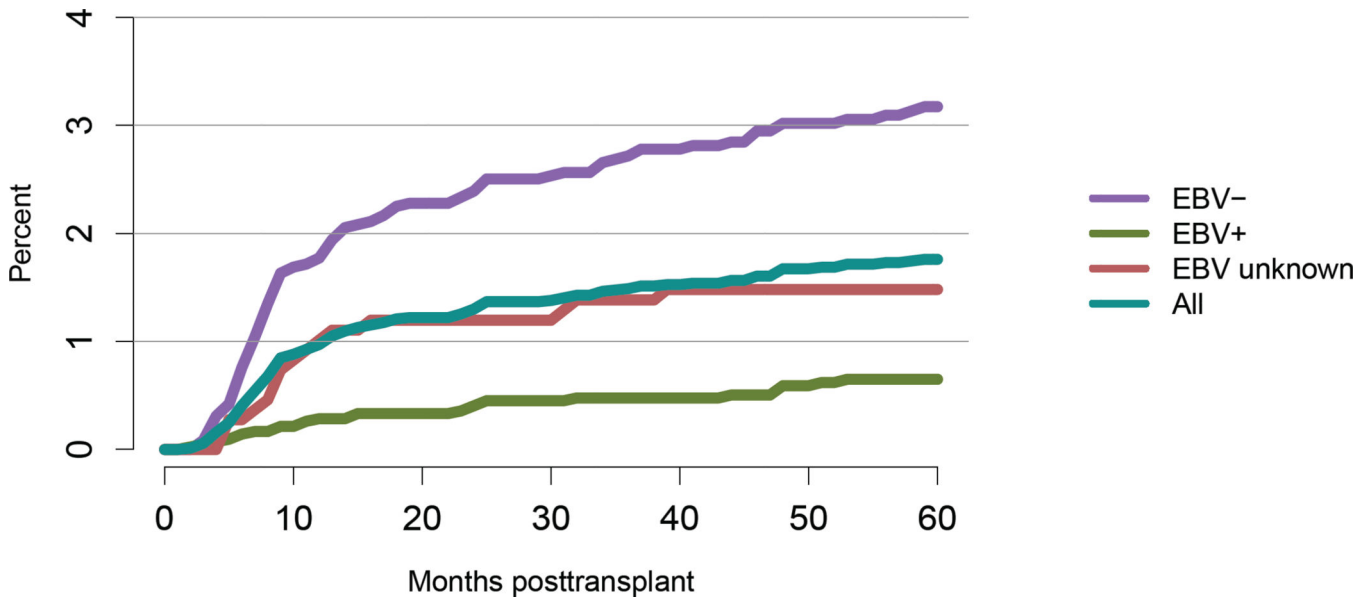

Figure KI 118. Incidence of PTLD among pediatric kidney transplant recipients by recipient EBV status at transplant, 2003–2013

Cumulative incidence is estimated using the Kaplan-Meier competing risk method. Posttransplant lymphoproliferative disorder (PTLD) is identified as a reported complication or cause of death on the OPTN Transplant Recipient Follow-up Form or on the Posttransplant Malignancy Form as polymorphic PTLD, monomorphic PTLD, or Hodgkin disease. Only the earliest date of PTLD diagnosis is considered. EBV, Epstein-Barr virus.

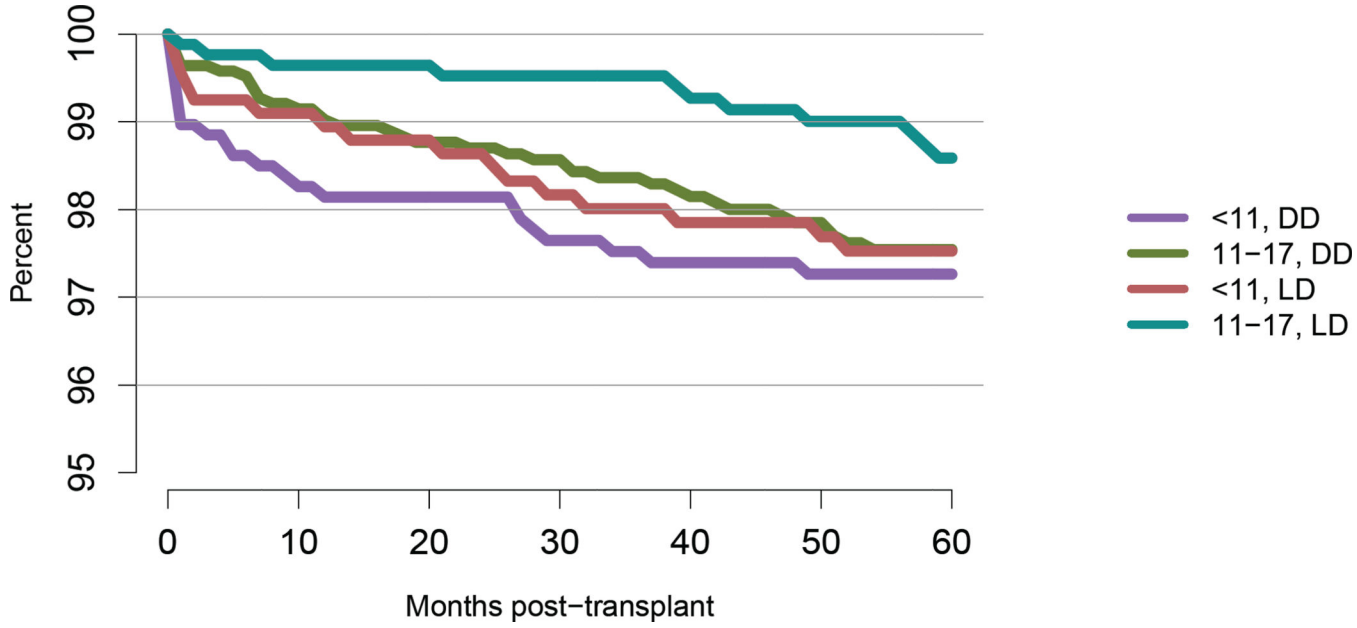

Figure KI 119. Patient survival among pediatric kidney transplant recipients, 2006–2010, by age and donor type

Recipient survival estimated using unadjusted Kaplan-Meier methods. DD, deceased donor; LD, living donor.

Table KI 1

Reasons for inactive status among new adult kidney transplant listings, 2015

Candidates first listed as inactive. Each listing is counted separately.

Reasons for inactive status	N	Percent
Candidate work-up incomplete	6461	70.8%
Insurance issues	862	9.4%
Too sick	556	6.1%
Too well	416	4.6%
Weight inappropriate	343	3.8%
Candidate choice	180	2.0%
Candidate for LD transplant only	155	1.7%
Transplant pending	70	0.8%
Unknown	36	0.4%
Medical non-compliance	25	0.3%
Inappropriate substance abuse	13	0.1%
Candidate could not be contacted	6	0.1%
Physician/surgeon unavailable	1	0.0%

LD, living donor.

Table KI 2

Characteristics of adults on the kidney transplant waiting list on December 31, 2005 and December 31, 2015

Candidates waiting for transplant on December 31, 2005, and December 31, 2015, regardless of first listing date; active/inactive status is on this date, and multiple listings are not counted.

Characteristic	2005		2015	
	N	Percent	N	Percent
Age				
18–34 years	7619	12.3%	8490	8.7%
35–49 years	19,676	31.7%	24,782	25.4%
50–64 years	25,859	41.6%	42,949	44.0%
≥65 years	9012	14.5%	21,459	22.0%
Sex				
Female	26,048	41.9%	38,649	39.6%
Male	36,118	58.1%	59,031	60.4%
Race/ethnicity				
White	24,726	39.8%	35,649	36.5%
Black	21,806	35.1%	32,971	33.8%
Hispanic	10,254	16.5%	19,188	19.6%
Asian	4473	7.2%	8352	8.6%
Other/unknown	907	1.5%	1520	1.6%
Diagnosis				
Diabetes	18,785	30.2%	35,069	35.9%
Hypertension	15,523	25.0%	23,360	23.9%
GN	9523	15.3%	13,567	13.9%
CKD	5112	8.2%	8187	8.4%
Other	13,223	21.3%	17,497	17.9%
Diabetes (any source)	23,737	38.2%	44,602	45.7%
Transplant history				
First	51,706	83.2%	84,897	86.9%
Retransplant	10,460	16.8%	12,783	13.1%
Blood type				
A	17,453	28.1%	27,892	28.6%
B	10,250	16.5%	15,920	16.3%
AB	1744	2.8%	2688	2.8%
O	32,719	52.6%	51,180	52.4%
CPRA				
< 1%	30,060	48.4%	60,099	61.5%
1–< 20%	12,436	20.0%	8646	8.9%
20–< 80%	9243	14.9%	14,835	15.2%
80–< 98%	4633	7.5%	5803	5.9%
98–100%	4524	7.3%	7816	8.0%

Characteristic	2005		2015	
	N	Percent	N	Percent
unknown	1270	2.0%	481	0.5%
Wait time				
< 1 year	21,401	34.4%	25,207	25.8%
1–< 2 years	14,130	22.7%	20,464	21.0%
2–< 3 years	9186	14.8%	16,613	17.0%
3–< 4 years	6296	10.1%	11,852	12.1%
4–< 5 years	4074	6.6%	8189	8.4%
≥ 5 years	7079	11.4%	15,355	15.7%
Will accept ECD or KDPI>85%	26,791	43.1%	47,931	49.1%
Tx type				
Kidney alone	59,409	95.6%	94,650	96.9%
Kidney-pancreas	2395	3.9%	1911	2.0%
Kidney-liver	306	0.5%	925	0.9%
Kidney-heart	47	0.1%	179	0.2%
Other	9	0.0%	15	0.0%
All candidates	62,166	100.0%	97,680	100.0%

CKD, cystic kidney disease; GN, glomerulonephritis; KDPI, kidney donor profile index.

Table KI 3
Kidney transplant waitlist activity among adults

Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal. Candidates who are listed, undergo transplant, and are relisted are counted more than once. Candidates are not considered to be on the list on the day they are removed; counts on January 1 may differ from counts on December 31 of the prior year. Candidates listed for multi-organ transplants are included.

Waiting list state	2013	2014	2015
Patients at start of year	92,761	96,848	99,120
Patients added during year	31,595	31,275	30,232
Patients removed during year	27,454	28,951	31,672
Patients at end of year	96,902	99,172	97,680

Table KI 4
Removal reason among adult kidney transplant candidates

Removal reason as reported to the OPTN. Candidates with death dates that precede removal dates are assumed to have died waiting.

Removal reason	2013	2014	2015
Deceased donor transplant	11,278	11,590	12,280
Living donor transplant	5100	5084	5331
Transplant outside US	44	47	50
Patient died	4749	4958	4981
Patient refused transplant	452	477	527
Improved, transplant not needed	194	196	211
Too sick for transplant	2868	3342	4154
Other	2769	3257	4138

Table KI 5
Living kidney donor deaths, 2011–2015, by number of days after donation

Living kidney donors. Numbers of deaths reported to OPTN or the Social Security Administration. Donation-related deaths are included in the Medical category.

Cause	0–30 days	31–90 days	91–365 days
Suicide	1	0	1
Accident/homicide	0	0	5
Overdose	0	0	1
Medical	5	1	1
Cancer	0	0	0
Unknown	0	1	1
TOTAL	6	2	9

Table KI 6

Characteristics of adult kidney transplant recipients, 2015

Adult kidney transplant recipients, including retransplants.

Characteristic	Deceased		Living		All	
	N	Percent	N	Percent	N	Percent
Age						
18–34 years	1694	13.6%	1013	18.8%	2707	15.1%
35–49 years	3702	29.6%	1523	28.3%	5225	29.2%
50–64 years	4849	38.8%	2026	37.6%	6875	38.5%
≥65 years	2248	18.0%	824	15.3%	3072	17.2%
Sex						
Female	4977	39.8%	1995	37.0%	6972	39.0%
Male	7516	60.2%	3391	63.0%	10,907	61.0%
Race/ethnicity						
White	4724	37.8%	3541	65.7%	8265	46.2%
Black	4426	35.4%	633	11.8%	5059	28.3%
Hispanic	2265	18.1%	806	15.0%	3071	17.2%
Asian	874	7.0%	353	6.6%	1227	6.9%
Other/unknown	204	1.6%	53	1.0%	257	1.4%
Diagnosis						
Diabetes	3704	29.6%	1235	22.9%	4939	27.6%
Hypertension	3247	26.0%	883	16.4%	4130	23.1%
GN	2039	16.3%	1281	23.8%	3320	18.6%
CKD	1102	8.8%	932	17.3%	2034	11.4%
Other	2401	19.2%	1055	19.6%	3456	19.3%
Blood type						
A	4360	34.9%	2130	39.5%	6490	36.3%
B	1617	12.9%	723	13.4%	2340	13.1%
AB	741	5.9%	218	4.0%	959	5.4%
O	5775	46.2%	2315	43.0%	8090	45.2%
CPRA						
< 1%	7204	57.7%	3940	73.2%	11,144	62.3%

Characteristic	Deceased		Living		All	
	N	Percent	N	Percent	N	Percent
1–< 20%	985	7.9%	476	8.8%	1461	8.2%
20–< 80%	1789	14.3%	675	12.5%	2464	13.8%
80–< 98%	888	7.1%	196	3.6%	1084	6.1%
98–100%	1624	13.0%	78	1.4%	1702	9.5%
unknown	3	0.0%	21	0.4%	24	0.1%
Wait time						
< 1 year	100	0.8%	164	3.0%	264	1.5%
< 3 years	4603	36.8%	3322	61.7%	7925	44.3%
< 5 years	4089	32.7%	1480	27.5%	5569	31.1%
≥ 5 years	2135	17.1%	318	5.9%	2453	13.7%
Unknowns	1566	12.5%	102	1.9%	1668	9.3%
Dialysis time						
None	1165	9.3%	1669	31.0%	2834	15.9%
< 1 year	780	6.2%	1292	24.0%	2072	11.6%
< 3 years	2086	16.7%	1280	23.8%	3366	18.8%
< 5 years	2131	17.1%	437	8.1%	2568	14.4%
≥ 5 years	6331	50.7%	708	13.1%	7039	39.4%
Insurance						
Private	2552	20.4%	3044	56.5%	5596	31.3%
Medicare	8757	70.1%	1978	36.7%	10,735	60.0%
Medicaid	834	6.7%	226	4.2%	1060	5.9%
Other government	211	1.7%	45	0.8%	256	1.4%
Unknown	139	1.1%	93	1.7%	232	1.3%
HLA mismatches						
0	528	4.2%	361	6.7%	889	5.0%
1	197	1.6%	217	4.0%	414	2.3%
2	644	5.2%	705	13.1%	1349	7.5%
3	1829	14.6%	1266	23.5%	3095	17.3%
4	3353	26.8%	930	17.3%	4283	24.0%
5	3856	30.9%	1170	21.7%	5026	28.1%

Characteristic	Deceased		Living		All	
	N	Percent	N	Percent	N	Percent
6	2004	16.0%	679	12.6%	2683	15.0%
Unknown	82	0.7%	58	1.1%	140	0.8%
Transplant history						
First	10,671	85.4%	4854	90.1%	15,525	86.8%
Retransplant	1822	14.6%	532	9.9%	2354	13.2%
DCD status						
DBD	10,236	81.9%				
DCD	2257	18.1%				
KDPI						
≤ 20%	2848	22.8%				
21–34%	1952	15.6%				
35–85%	6661	53.3%				
> 85%	969	7.8%				
Unknown	63	0.5%				
All recipients	12,493	100.0%	5386	100.0%	17,879	100.0%

CKD, cystic kidney disease; DBD, donation after brain death; DCD, donation after circulatory death; GN, glomerulonephritis; KDPI, kidney donor profile index. DCD status and KDPI scores apply to deceased donor transplants only.

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Table KI 7

Adult deceased donor kidney donor-recipient serology matching, 2011–2015

Donor serology is reported on the OPTN Donor Registration Form and recipient serology on the OPTN Transplant Recipient Registration Form. There may be multiple fields per serology. Any evidence for a positive serology is treated as positive for that serology. If all fields are unknown, incomplete, or pending, the person is categorized as unknown for that serology; otherwise, serology is assumed negative.

Donor	Recipient	CMV	EBV	HB core	HB surf. ant.	HCV	HIV
D−	R−	10.3%	0.7%	79.2%	96.2%	91.4%	91.1%
D−	R+	20.3%	5.2%	8.1%	2.2%	4.1%	0.9%
D−	R unk	7.8%	0.9%	9.2%	1.5%	1.9%	7.3%
D+	R−	14.8%	8.4%	2.7%	0.0%	0.2%	0.0%
D+	R+	34.5%	73.1%	0.6%	0.0%	2.2%	0.0%
D+	R unk	11.9%	11.6%	0.2%	0.0%	0.0%	0.0%
D unk	R−	0.1%	0.0%	0.0%	0.1%	0.0%	0.7%
D unk	R+	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%
D unk	R unk	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%

CMV, cytomegalovirus; EBV, Epstein-Barr virus; HB, hepatitis B; HCV, hepatitis C virus; HIV, human immunodeficiency virus.

Table KI 8

Adult living donor kidney donor-recipient serology matching, 2011–2015

Donor serology is reported on the OPTN Donor Registration Form and recipient serology on the OPTN Transplant Recipient Registration Form. There may be multiple fields per serology. Any evidence for a positive serology is treated as positive for that serology. If all fields are unknown, incomplete, or pending, the person is categorized as unknown for that serology; otherwise, serology is assumed negative.

Donor	Recipient	CMV	EBV	HB core	HB surf. ant.	HCV	HIV
D−	R−	19.9%	2.0%	78.2%	91.7%	92.9%	72.5%
D−	R+	17.1%	6.1%	3.6%	1.3%	2.0%	0.3%
D−	R unk	8.3%	0.6%	7.8%	1.6%	1.7%	2.8%
D+	R−	13.5%	7.0%	1.4%	0.3%	0.3%	0.0%
D+	R+	28.7%	67.9%	0.4%	0.0%	0.0%	0.0%
D+	R unk	9.4%	5.1%	0.1%	0.0%	0.0%	0.0%
D unk	R−	0.9%	1.0%	4.7%	4.8%	2.7%	20.6%
D unk	R+	1.4%	4.1%	0.3%	0.1%	0.1%	0.1%
D unk	R unk	0.8%	6.1%	3.6%	0.2%	0.4%	3.7%

CMV, cytomegalovirus; EBV, Epstein-Barr virus; HB, hepatitis B; HCV, hepatitis C virus; HIV, human immunodeficiency virus.

Table KI 9

Reasons for inactive status among new pediatric kidney transplant listings, 2015

Candidates first listed as inactive. Each listing is counted separately.

Reasons for inactive status	N	Percent
Candidate work-up incomplete	265	47.3%
Candidate for LD transplant only	94	16.8%
Too well	64	11.4%
Candidate choice	40	7.1%
Too sick	39	7.0%
Insurance issues	18	3.2%
Weight inappropriate	18	3.2%
Medical non-compliance	12	2.1%
Transplant pending	9	1.6%
Inappropriate substance abuse	1	0.2%

LD, living donor.

Table KI 10

Characteristics of pediatric candidates on the kidney transplant waiting list on December 31, 2005 and December 31, 2015

Candidates aged younger than 18 years waiting for transplant on December 31, 2005, and December 31, 2015, regardless of first listing date; multiple listings are not counted. Age calculated at snapshot.

Characteristic	2005		2015	
	N	Percent	N	Percent
Age				
< 1 year	2	0.3%	7	0.7%
1–5 years	105	13.8%	233	23.2%
6–10 years	123	16.1%	192	19.1%
11–17 years	533	69.9%	572	57.0%
Sex				
Female	313	41.0%	416	41.4%
Male	450	59.0%	588	58.6%
Race/ethnicity				
White	298	39.1%	406	40.4%
Black	185	24.2%	201	20.0%
Hispanic	230	30.1%	322	32.1%
Asian	33	4.3%	56	5.6%
Other/unknown	17	2.2%	19	1.9%
Diagnosis				
FSGS	86	11.3%	100	10.0%
GN	103	13.5%	74	7.4%
CAKUT	211	27.7%	391	38.9%
Other	363	47.6%	439	43.7%
Transplant history				
First	575	75.4%	834	83.1%
Retransplant	188	24.6%	170	16.9%
Blood type				
A	225	29.5%	299	29.8%
B	113	14.8%	157	15.6%
AB	20	2.6%	32	3.2%
O	405	53.1%	516	51.4%
CPRA				
< 1%	425	55.7%	651	64.8%
1–< 20%	124	16.3%	100	10.0%
20–< 80%	84	11.0%	125	12.5%
80–< 98%	51	6.7%	45	4.5%
98–100%	46	6.0%	79	7.9%
unknown	33	4.3%	4	0.4%
Wait time				

Characteristic	2005		2015	
	N	Percent	N	Percent
< 1 year	464	60.8%	528	52.6%
1–< 2 years	162	21.2%	228	22.7%
2–< 3 years	80	10.5%	116	11.6%
3–< 4 years	31	4.1%	62	6.2%
4–< 5 years	11	1.4%	22	2.2%
≥ 5 years	15	2.0%	48	4.8%
Tx type				
Kidney alone	748	98.0%	980	97.6%
Kidney-liver	12	1.6%	20	2.0%
Kidney-heart	1	0.1%	3	0.3%
Other	2	0.3%	1	0.1%
All candidates	763	100.0%	1004	100.0%

FSGS, focal segmental glomerulosclerosis; GN, glomerulonephritis; CAKUT, congenital anomalies of the kidney and urinary tract.

Table KI 11
Kidney transplant waitlist activity among pediatric candidates

Candidates concurrently listed at more than one center are counted once, from the time of earliest listing to the time of latest removal. Candidates who are listed, undergo transplant, and are relisted are counted more than once. Candidates are not considered to be on the list on the day they are removed; counts on January 1 may differ from counts on December 31 of the prior year. Candidates listed for multi-organ transplants are included.

Waiting list state	2013	2014	2015
Patients at start of year	1302	1362	1478
Patients added during year	907	1002	976
Patients removed during year	844	883	945
Patients at end of year	1365	1481	1509

Table KI 12
Removal reason among pediatric kidney transplant candidates

Removal reason as reported to the OPTN. Candidates with death dates that precede removal dates are assumed to have died waiting.

Removal reason	2013	2014	2015
Deceased donor transplant	557	575	586
Living donor transplant	217	238	261
Transplant outside US	0	0	1
Patient died	15	22	20
Patient refused transplant	0	2	2
Improved, transplant not needed	4	2	8
Too sick for transplant	8	8	12
Other	43	36	55

Table KI 13

Characteristics of pediatric kidney transplant recipients, 2013–2015

Kidney transplant recipients, including retransplants. Diagnosis categories follow North American Pediatric Renal Trials and Collaborative Studies recommendations.

Characteristic	Dceased		Living		All	
	N	Percent	N	Percent	N	Percent
Age						
< 1 year	2	0.1%	3	0.4%	5	0.2%
1–5 years	273	19.2%	236	30.8%	509	23.3%
6–10 years	269	18.9%	153	20.0%	422	19.3%
11–17 years	878	61.7%	374	48.8%	1252	57.2%
Sex						
Female	586	41.2%	300	39.2%	886	40.5%
Male	836	58.8%	466	60.8%	1302	59.5%
Race/ethnicity						
White	564	39.7%	540	70.5%	1104	50.5%
Black	361	25.4%	70	9.1%	431	19.7%
Hispanic	390	27.4%	115	15.0%	505	23.1%
Asian	70	4.9%	26	3.4%	96	4.4%
Other/unknown	37	2.6%	15	2.0%	52	2.4%
Diagnosis						
FSGS	167	11.7%	76	9.9%	243	11.1%
GN	173	12.2%	67	8.7%	240	11.0%
CAKUT	481	33.8%	283	36.9%	764	34.9%
Other	601	42.3%	340	44.4%	941	43.0%
Blood type						
A	458	32.2%	291	38.0%	749	34.2%
B	184	12.9%	108	14.1%	292	13.3%
AB	55	3.9%	34	4.4%	89	4.1%
O	725	51.0%	333	43.5%	1058	48.4%
CPRA						
< 1%	1039	73.1%	570	74.4%	1609	73.5%

Characteristic	Dceased		Living		All	
	N	Percent	N	Percent	N	Percent
1–< 20%	132	9.3%	64	8.4%	196	9.0%
20–< 80%	185	13.0%	86	11.2%	271	12.4%
80–< 98%	49	3.4%	17	2.2%	66	3.0%
98–100%	17	1.2%	11	1.4%	28	1.3%
unknown	0	0.0%	18	2.3%	18	0.8%
Wait time						
< 1 year	5	0.4%	156	20.4%	161	7.4%
< 3 years	1013	71.2%	496	64.8%	1509	69.0%
< 5 years	348	24.5%	100	13.1%	448	20.5%
≥ 5 years	36	2.5%	9	1.2%	45	2.1%
Unknowns	20	1.4%	5	0.7%	25	1.1%
Dialysis time						
None	368	25.9%	299	39.0%	667	30.5%
< 1 year	315	22.2%	214	27.9%	529	24.2%
< 3 years	464	32.6%	162	21.1%	626	28.6%
< 5 years	129	9.1%	26	3.4%	155	7.1%
≥ 5 years	146	10.3%	65	8.5%	211	9.6%
Insurance						
Private	401	28.2%	455	59.4%	856	39.1%
Medicare	475	33.4%	152	19.8%	627	28.7%
Medicaid	442	31.1%	124	16.2%	566	25.9%
Other government	88	6.2%	20	2.6%	108	4.9%
Unknown	16	1.1%	15	2.0%	31	1.4%
HLA mismatches						
0	38	2.7%	24	3.1%	62	2.8%
1	4	0.3%	56	7.3%	60	2.7%
2	34	2.4%	180	23.5%	214	9.8%
3	157	11.0%	303	39.6%	460	21.0%
4	381	26.8%	57	7.4%	438	20.0%
5	514	36.1%	81	10.6%	595	27.2%

Characteristic	Dceased		Living		All	
	N	Percent	N	Percent	N	Percent
6	293	20.6%	47	6.1%	340	15.5%
Unknown	1	0.1%	18	2.3%	19	0.9%
Transplant history						
First	1294	91.0%	708	92.4%	2002	91.5%
Retransplant	128	9.0%	58	7.6%	186	8.5%
DCD status						
DBD	1350	94.9%				
DCD	72	5.1%				
KDPI						
≤ 20%	930	65.4%				
21–34%	312	21.9%				
35–85%	173	12.2%				
> 85%	3	0.2%				
Unknown	4	0.3%				
DGF						
None	1316	92.5%	742	96.9%	2058	94.1%
Yes	106	7.5%	24	3.1%	130	5.9%
ABO						
Compatible/identical	1422	100.0%	762	99.5%	2184	99.8%
Incompatible	0	0.0%	4	0.5%	4	0.2%
All recipients	1422	100.0%	766	100.0%	2188	100.0%

FSGS, focal segmental glomerulosclerosis; GN, glomerulonephritis; CAKUT, congenital anomalies of the kidney and urinary tract; DBD, donation after brain death; DCD, donation after circulatory death; DGF, delayed graft function; KDPI, kidney donor profile index. DCD status and KDPI scores apply to deceased donor transplants only.

Table KI 14
Pediatric deceased donor kidney donor-recipient serology matching, 2011–2015

Donor serology is reported on the OPTN Donor Registration Form and recipient serology on the OPTN Transplant Recipient Registration Form. There may be multiple fields per serology. Any evidence for a positive serology is treated as positive for that serology. If all fields are unknown, incomplete, or pending, the person is categorized as unknown for that serology; otherwise, serology is assumed negative.

Donor	Recipient	CMV	EBV
D−	R−	20.7%	4.8%
D−	R+	13.5%	6.7%
D−	R unk	6.8%	0.6%
D+	R−	29.4%	36.5%
D+	R+	17.8%	47.3%
D+	R unk	11.2%	3.9%
D unk	R−	0.4%	0.1%
D unk	R+	0.3%	0.1%

CMV, cytomegalovirus; EBV, Epstein-Barr virus.

Table KI 15
Pediatric living donor kidney donor-recipient serology matching, 2011–2015

Donor serology is reported on the OPTN Donor Registration Form and recipient serology on the OPTN Transplant Recipient Registration Form. There may be multiple fields per serology. Any evidence for a positive serology is treated as positive for that serology. If all fields are unknown, incomplete, or pending, the person is categorized as unknown for that serology; otherwise, serology is assumed negative.

Donor	Recipient	CMV	EBV
D−	R−	28.2%	7.2%
D−	R+	6.1%	2.9%
D−	R unk	9.0%	0.5%
D+	R−	25.1%	44.7%
D+	R+	17.8%	33.7%
D+	R unk	9.4%	4.0%
D unk	R−	3.0%	3.9%
D unk	R+	0.8%	2.3%
D unk	R unk	0.4%	0.8%

CMV, cytomegalovirus; EBV, Epstein-Barr virus.