KIDNEY ALLOCATION SYSTEM (KAS)
"OUT-OF-THE-GATE" MONITORING REPORT

June 26, 2015

Purpose: Provide an early look at high-level metrics revealing performance of the system and any potential unintended consequences that may require changes to policy, programming, or clinical practice. A goal is also to have information on hand for responding to the media, general public, and transplant community in the early period following KAS implementation on December 4, 2014. This report will serve as a complement to the more extensive analyses that will be performed on behalf of the OPTN/UNOS Kidney Transplantation Committee at 6 months, 1 year, and 2 years post-implementation.

This monitoring plan is aimed at addressing these types of high-level questions:

Waiting list (page 4)
1. Is the kidney waiting list growing at approximately the same rate as before?
2. How many candidates have verified data for calculating their Estimated Post-Transplant Survival (EPTS) score?
3. How many CPRA 99+ candidates have both approver names entered for receiving additional priority?
4. How many blood type B candidates are eligible to receive A_2/A_2B kidneys?

Transplants (page 7)
1. Is the rate of deceased donor kidney transplants about the same as before?
2. What are the characteristics of transplant recipients now compared to before?
3. What is the geographic distribution of transplants (local/regional/national)?
4. Are there noticeable changes from before KAS (expected or unexpected) related to geographic distribution of transplants?
5. What proportion of transplants are going to EPTS 0-20% patients compared with patients with EPTS 21-100%?
6. Is there evidence of better kidney/recipient longevity-matching due to the new policy?

Kidney utilization (page 13)
1. Has the rate of recovered deceased kidney donors changed?
2. Are there any changes in the kidney discard rate, in particular for high KPDI kidneys?
3. Has there been a rise in the number of kidneys accepted for one candidate but ultimately either discarded or transplanted into a different candidate, in particular for kidneys allocated non-locally (outside of the recovery donor service area) and for very highly sensitized patients?

Executive Summary

In the first six months after implementation of KAS, four sharp changes are evident in the types of transplants being performed: an approximately 6-fold increase in transplants for CPRA 99-100 patients; an increase in non-local transplants from 21% to 33%; a drop in the proportion of longevity-mismatched transplants; and a significant increase in transplant to African-American recipients. These changes were expected based on core components of the new system such as the CPRA sliding scale, broader sharing for very highly sensitized patients, longevity-matching, and crediting of pre-listing time on dialysis.

After a post-KAS high of 17.7% of transplants to CPRA 99-100 recipients in December, this percentage has declined to 12.6% in May, suggesting a tapering off of transplants to these very highly sensitized patients due to a predicted "bolus" effect. (**Figure 4a, Table 2**)

As of March 13, 2015, African Americans represented 34.1% of the kidney waiting list. Prior to KAS, African American recipients accounted for 31.5% of transplants but have accounted for 38.0% of transplants post-KAS. It is likely that the increase is a result of the new system's awarding of waiting time points for time spent on dialysis prior to being registered on the waiting list. The percentage of transplants going to Caucasians has decreased, while the percentage to Asian recipients has not changed. Data are beginning to suggest a slight increase in transplants for Hispanics and females. (**Figure 4b**, **Table 2**)

The distribution of transplants by candidate age appears to have shifted moderately, with an increase observed for candidates ages 18-49 and a decrease for candidates over age 65. The proportion of transplants to pediatric (age<18) recipients has been slightly lower post-KAS (3.7%) compared to pre-KAS (4.3%), but this difference is not statistically significant. Additional months are data are needed to determine whether access to pediatrics has changed under the new system. Pediatrics represent approximately 1% of waitlisted kidney candidates. (**Figure 4b**, **Table 2**)

A statistically significant drop in zero-mismatch transplants, from approximately 8% to 4.5%, has been observed since implementation. (**Figure 4b**, **Table 2**) It is likely that this trend is at least in part due to the increased priority for very high CPRA patients.

New registrations on the kidney waiting list have tempered somewhat in the six months after implementation and the total size of the kidney waiting list has plateaued (**Figure 2**). These trends may be attributable to changes in listing and list management practices in light of the new system's awarding of waiting time points based on dialysis time prior to being added to the list.

The kidney discard rate – the proportion of kidneys recovered for the purpose of transplantation but not utilized – has been higher in each of the six months post-implementation compared to the one-year pre-KAS average. The discard rate of 20.3% post-KAS is statistically higher (p=0.001) than the pre-KAS rate of 18.5%. The greatest increase appears to be among the high KDPI kidneys. These data are being further analyzed to understand the causes of the change, whether it is likely to be sustained, and whether policy or practice changes may eventually be needed in response. (**Figure 5**)

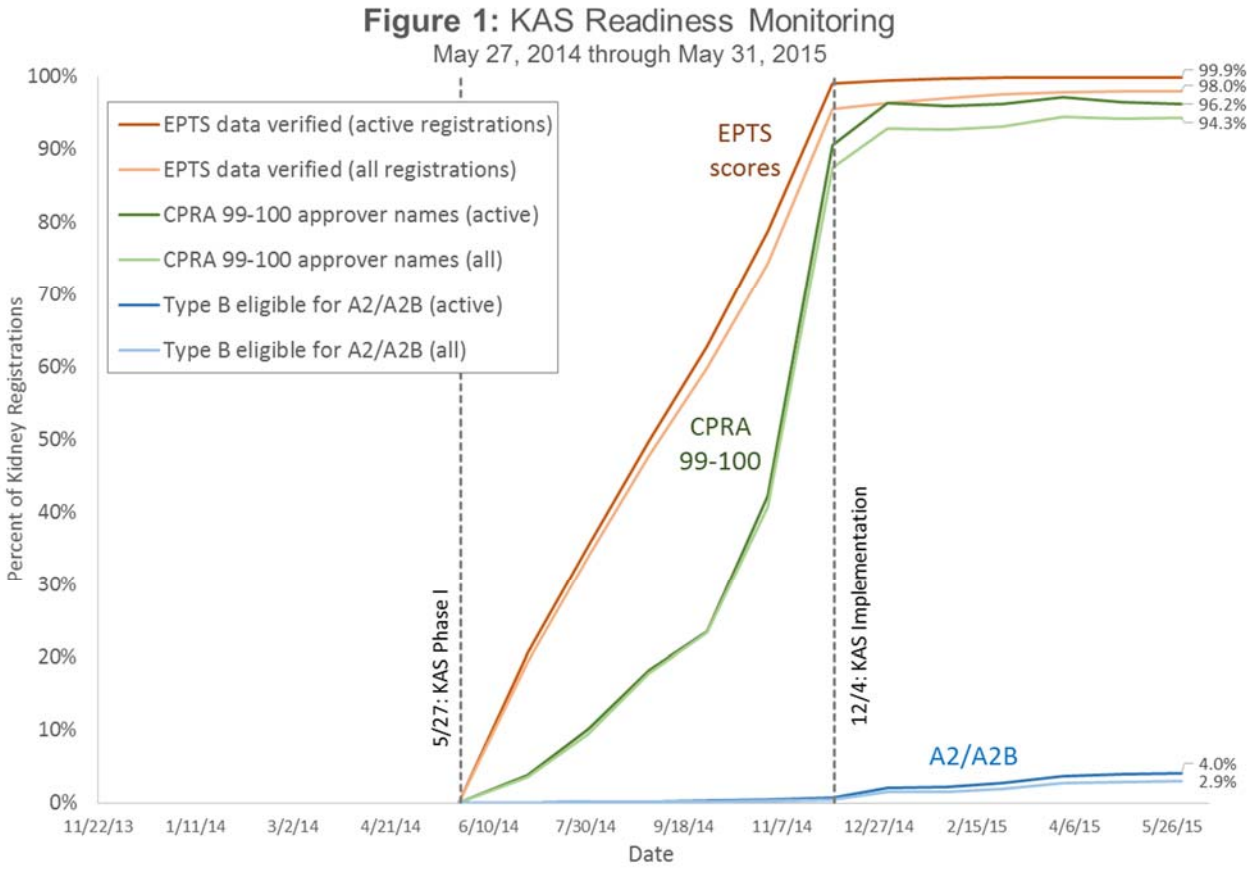
Despite this increase in discard rates, the monthly rate of deceased donor kidney transplants being performed has not decreased and has actually increased slightly (**Figure 3**). This is attributable to a modest increase in the number of deceased donor kidneys recovered for the purpose of transplantation (**Figure 5**).

Pre-KAS, 95 instances per month were identified in which a kidney was accepted for one candidate but then transplanted into a different candidate or discarded; in the five post-KAS months with available data, 113 instances per month have been identified (**Table 3**, row 20). These data suggest a slight post-KAS increase – from 9.5% to 10.9% of all accepted offers (p=0.008) – in the overall percentage of kidneys accepted but not transplanted into the accepting candidate.

These cases are occurring more often in a different subpopulation of patients, which may cause the perception that the rate has gone up dramatically. The number of offers accepted on behalf of non-local, high CPRA patients has increased dramatically (**Table 3**, row 29); historically, the proportion of acceptances for these patients that led to an organ discard or a transplant to a different patient has been higher than average. However, this proportion has *not* increased post-KAS. In fact, although these findings must be interpreted with caution due to data limitations, this proportion has actually *decreased* post-KAS (**Table 3**, row 31). **Figure 4a** affirms that many non-local and high CPRA patients are not merely receiving offers but are actually accepting them and being transplanted under the new system.

Lastly, though **Figure 1** highlights the success of the six-month, KAS Phase I period in guiding centers to update and verify candidate data in preparation for KAS, it also shows that relatively few blood type B registrations have been indicated as clinically eligible and willing to accept an A_2/A_2B-subtyped kidney. Though there has been a statistically significant increase in $A_2/A_2B \rightarrow B$ transplants (**Table 2**), this aspect of the system is not yet close to achieving its full potential. Participating in the A_2/A_2B aspect of KAS is strictly voluntary and is only an option for blood type B patients with low immune sensitivity to blood type A.

Waiting list

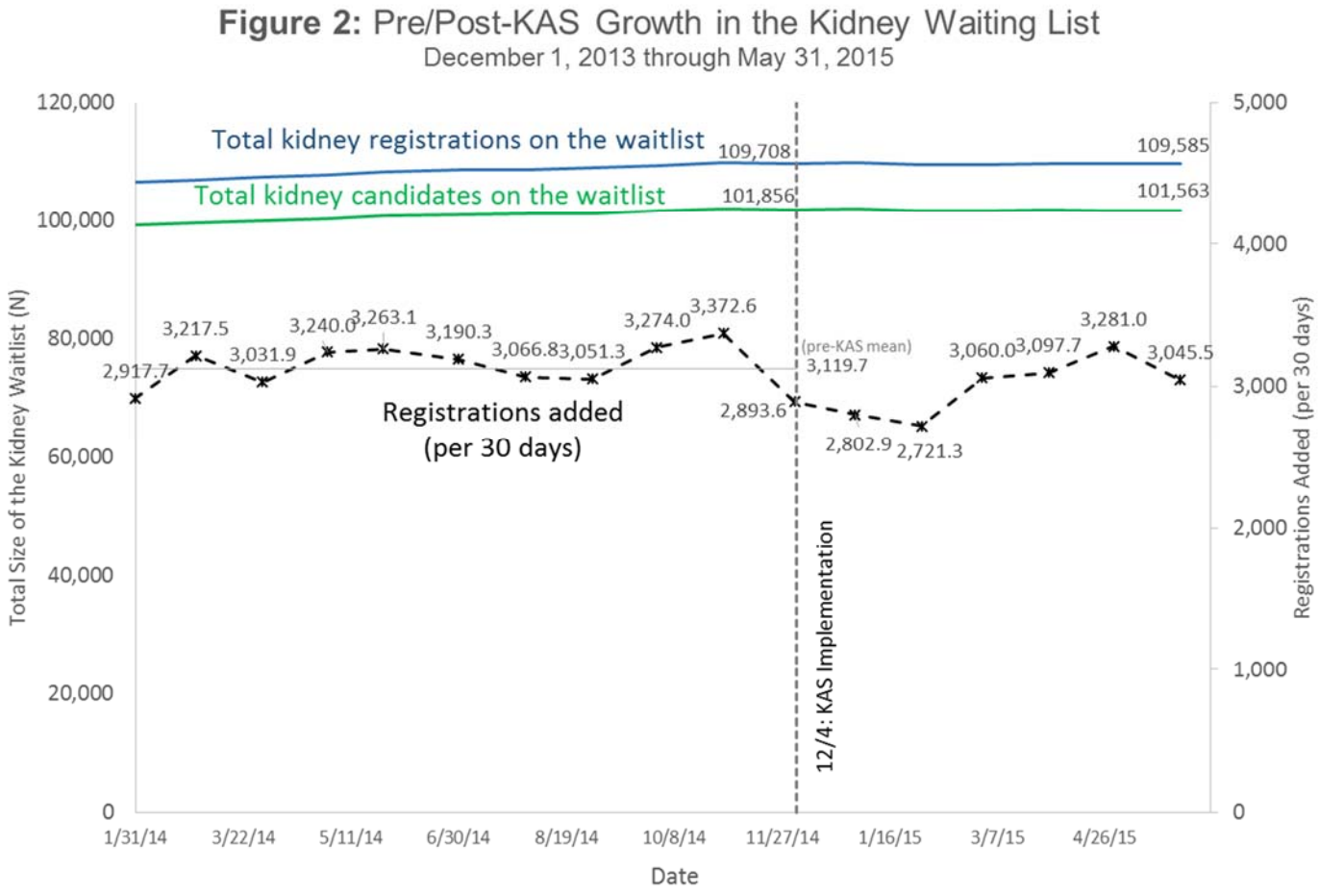


Interpretation

As of May 31, 2015, 99.9% of active kidney registrations and 98.0% of all kidney registrations had data elements needed to calculate their EPTS score verified by the transplant center. Approver names had been entered (after reviewing unacceptable antigens) for 96.2% of active and 94.3% of all kidney registrations with CPRA of 99 or 100%, allowing these difficult-to-match candidates to receive increased priority.

Very few (447 of 11,182, or 4.0%) active blood type B registrations were listed as eligible and willing to accept a subtype A_2 or A_2B kidney. Far more have been reported as ineligible (N=1,837; 16.4%), while the majority still have unknown status (N=8,851; 79.2%)[1]. Participation in the $A_2/A_2B \rightarrow B$ aspect of the new system is optional for both patients and transplant programs. Eligible candidates must have anti-A titers below the acceptable threshold determined by their transplant program in order to participate.

[1] Also, 47 active registrations had their eligibility – which must be reconfirmed every 90 days – expire as of May 31, 2015.



Interpretation

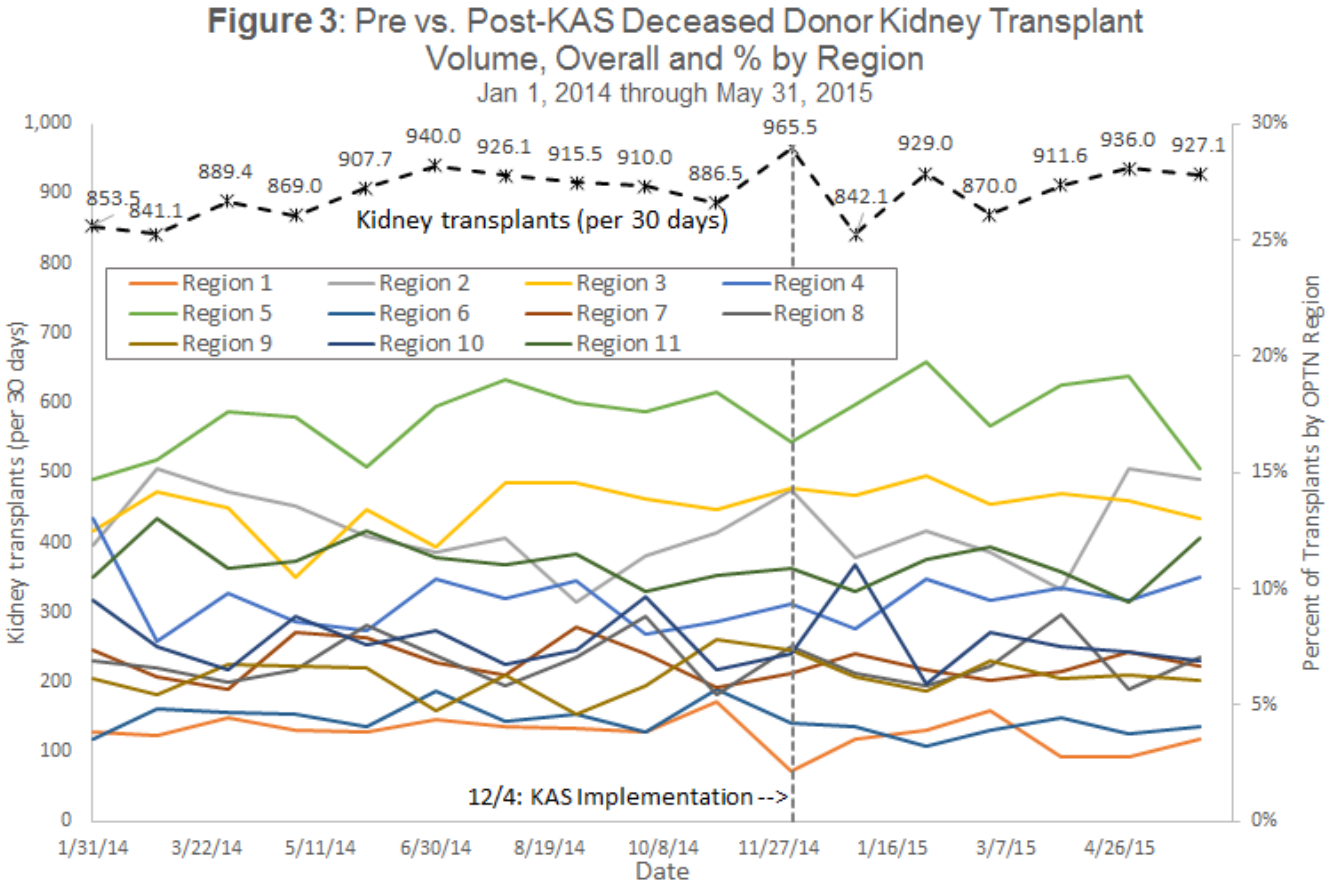
In the first two months after KAS implementation, the number of registrations added to the kidney waiting list (normalized per 30 days) declined marginally to 2,802.9 in December and 2,721.3 in January, compared to a rate of 3,119.7 in the year prior to KAS. The rate of new kidney registrations for February (3,060.0), March (3,097.7), April (3281.0), and May (3045.5) were more similar to recent historical averages. (**Figure 2**).

However, the rate of kidney registrations added to the waiting list has typically grown over time. This recent tempering in additions to the waiting list, coupled with removals from the list due transplantation and other reasons, has resulted in a flattening of the overall size of the kidney waiting since KAS implementation. On December 3, 2014, the waiting list had 109,708 kidney registrations, and on May 31, 2015, there were 123 fewer kidney registrations (109,585). The rare (but not unprecedented) flattening in the size of the list actually began just prior to KAS implementation (**Table 1**).

Table 1: Waiting list Growth and KAS Readiness Metrics
September 30, 2014 through May 31, 2015

#	Metric	30SEP14	31OCT14	03DEC14	31DEC14	31JAN15	28FEB15	31MAR15	30APR15	31MAY15
1	Total KI registrations on list	109,373	109,861	109,708	109,800	109,405	109,423	109,617	109,664	109,585
2	Total KI candidates on list	101,568	101,963	101,856	101,918	101,571	101,571	101,729	101,690	101,563
3	% w/active status	60.8%	60.7%	60.6%	60.2%	59.9%	59.9%	59.9%	60.9%	61.0%
4	KI Registrations added	3,274	3,485	3,183	2,616	2,812	2,856	3,201	3,281	3,147
5	KI regs added per 30 days	3,274.0	3,372.6	2,893.6	2,802 9	2,721.3	3,060.0	3,097.7	3,281 0	3,045.5
6	Number of adults with EPTS score	65,390	81,500	104,795	105,790	106,230	105,373	105,788	105,953	105,941
7	Number of adults without EPTS score	43,983	28,361	4,913	4,010	3,175	2,588	2,348	2,242	2,167
8	% adults with EPTS score	59.8%	74.2%	95.5%	96.3%	97.1%	97.6%	97.8%	97.9%	98.0%
9	% active adults with EPTS score	62.8%	78.7%	99.1%	99.4%	99.7%	99.8%	99.9%	99.9%	99.9%
10	Number CPRA 99-100 regs	9,305	9,222	9,147	8,987	8,846	8,755	8,654	8,509	8,443
11	%with approvers names	23.3%	40.7%	87.4%	92.8%	92.8%	93.1%	94.5%	94.2%	94.3%
12	# of blood type B registrations	18,002	18,067	18,086	18,110	18,013	18,038	18,069	18,118	18,104
13	% eligible for A2/A2B KI	0.2%	0.2%	0.4%	1.4%	1.5%	1.9%	2.6%	2.9%	2.9%

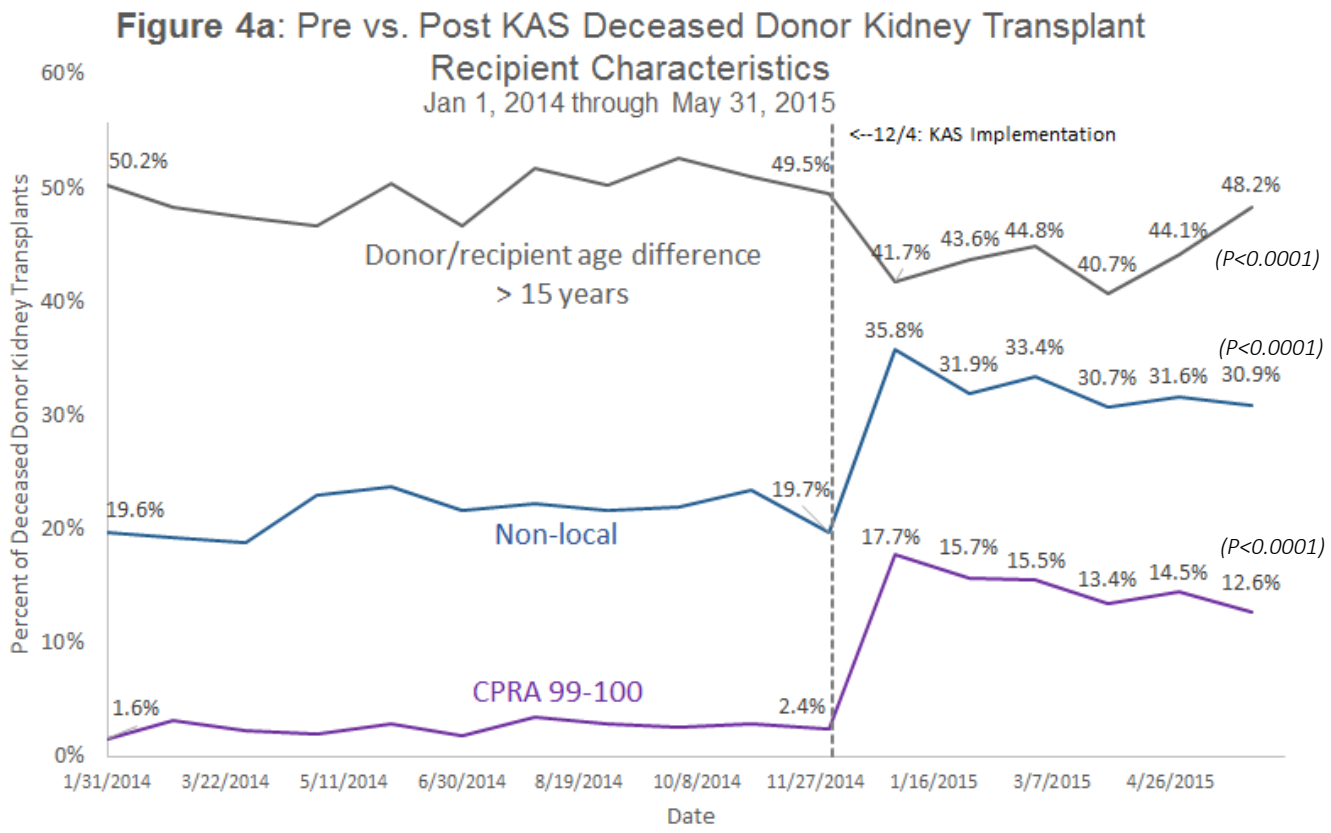
Transplants



Interpretation

In the first 28 days after KAS implementation (Dec 4 through Dec 31), 786 solitary, deceased donor kidney transplants were performed, a rate of 842.1 per 30 days (**Figure 3**). In January, the rate increased to 929.0, was 870.0 in February, 911.6 in March, 936.0 in April, and 927.1 in May. The overall post-KAS rate of deceased donor kidney transplants is about 1% higher but not statistically different (p=0.64) from the rate during the year prior to KAS.

Figure 3 also shows the percentage of transplants across the 11 OPTN regions. Though the proportion of transplants by Region has varied from month-to-month, none of the Regional pre vs. post-KAS differences are statistically significant. These early results suggest that access to transplantation by OPTN Region will not change substantially due to KAS.



Interpretation

The three marked changes in the types of kidney transplants being performed that were previously identified persisted into May (**Figure 4a**). All three (pre vs. post-KAS) changes are highly statistically significant ($p<0.0001$).

Firstly, and most dramatically, the percentage of transplants going to CPRA 99-100 patients jumped from about 2.5% to 17.7% in December and has remained much higher than pre-KAS levels. This rise was expected due to the CPRA sliding scale, coupled with regional and national priority for CPRA 99-100 patients. Simulations performed on behalf of the OPTN/UNOS Kidney Transplantation Committee predicted substantial increases in the number of kidney offers and transplants under the new system for these most highly sensitized patients.

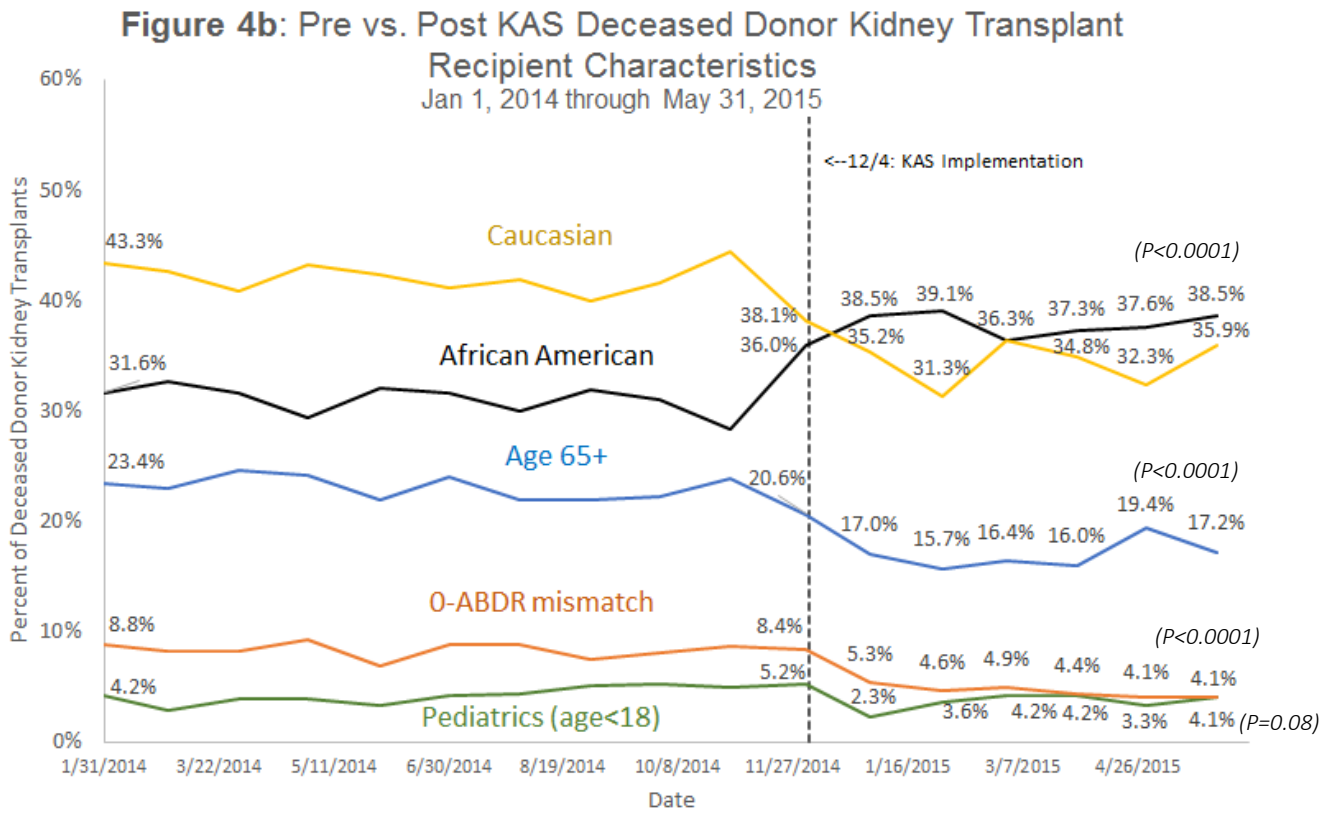
Simulations also suggested the possibility of a "bolus" effect: a large initial number of CPRA 99-100 transplant recipients that would gradually decrease as these patients, many of whom have been on the waiting list for many years, would comprise a smaller proportion of the waiting list over time. The declining trend in the percentage of transplants to CPRA 99-100 recipients – from 17.7% in December a post-KAS low of 12.6% in May – may be early evidence of bolus reduction. **Table 1** shows that the number of CPRA 99-100 registrations on the waiting list has dropped from over 9,100 to 8,443 in the six months after implementation. Reaching a state of equilibrium, where

the bolus effect has resolved and the percentage of transplants to very high CPRA patients has stabilized, may take additional time.

Secondly, the percentage of non-local kidney transplants – defined as those in which the recipient hospital was located outside of the recovering OPO's donor service area (DSA) – increased from 21% to about 33%, or from about one-fifth to one-third of kidney transplants. An increase in non-local transplants was expected due to regional and national priority for CPRA 99-100 patients as well as combined local/regional distribution of high KDPI kidneys. Early data suggest that both of these elements of the new policy are contributing to this increase in non-local transplants, as evidenced by the aforementioned 6-fold increase in CPRA 99-100 transplants, as well as a shift from 30% to about 50% of KDPI 86-100 transplants occurring outside of the donor hospital's DSA.

Thirdly, the percentage of *longevity-mismatched* transplants – defined here as those in which the donor and recipient age difference exceeded 15 years – fell from 50% to between 40 and 45% in the first five months post-KAS. More data will help ascertain whether the increase to 48.2% in May is merely an aberration. The percentage of transplants in which the recipient was age 65+ and the donor KDPI was less than 20% has decreased from 3% to 1%. The average donor-recipient age difference dropped from over 18 years to about 16 years. (**Table 2**) These trends were expected since the new system incorporates longevity-matching by prioritizing those kidneys expected to last the longest (low KDPI score) to those candidates most expected to need a long-lasting kidney (low EPTS score).

Several other pre vs. post-KAS changes are also being closely monitored (**Figure 4b**).



Interpretation:

The distribution of candidate race/ethnicity among kidney recipients appears to have changed due to KAS. African-American patients have received a higher proportion of kidney recipients in the post-KAS era (38%) compared to before KAS (32%). This change is statistically significant ($p<0.0001$). Some of this shift seems to have begun just prior to KAS implementation. A contributing factor to this change is likely the awarding of waiting time points based on time spent on dialysis prior to being registered on the waiting list. Candidates who previously experienced delayed referrals for transplantation may now be more likely to receive kidney offers due to this back-dating of waiting time.

The percentage of transplants going to Asian ($p=0.34$) patients has not changed in the pre vs. post-KAS era. Data are beginning to suggest a slight increase in transplants for Hispanic patients ($p=0.02$), as well as a possible slight increase in transplants for females ($p=0.03$).

The distribution of transplants by candidate age has shifted moderately, with increases observed for recipients ages 18-49 (**Table 2**) and decreases for recipients age 65+

(**Table 2**, **Figure 4b**). Pediatric transplants decreased from approximately 5.0% to 2.3% in the four weeks immediately post-KAS, but rebounded to 3.6% in January, 4.2% in February, 4.2% in March, 3.3% in April, and 4.1% in May, relieving initial concerns about a potentially large drop in pediatric access to transplants due to KAS. The overall percentage of transplants for pediatric patients in the six months post-KAS (3.7%) is modestly lower than the year prior to KAS (4.3%); this difference is not statistical significant ($p=0.08$). Still, the possibility of even a small change in access for pediatric recipients demands continued close monitoring. Pediatric candidates represent approximately 1% of the waiting list.

Fewer zero-ABDR mismatch transplants (about 4.5%) have been performed in the first six months post-KAS since the year prior to KAS (8.2%); this change is highly statistically significant ($p<0.0001$). It is likely that this decrease is related to the sharp increase in the proportion of transplants for very high CPRA patients, who appear at the very top of the allocation sequence regardless of donor KDPI and even if they do not have a zero-ABDR mismatch with the donor.

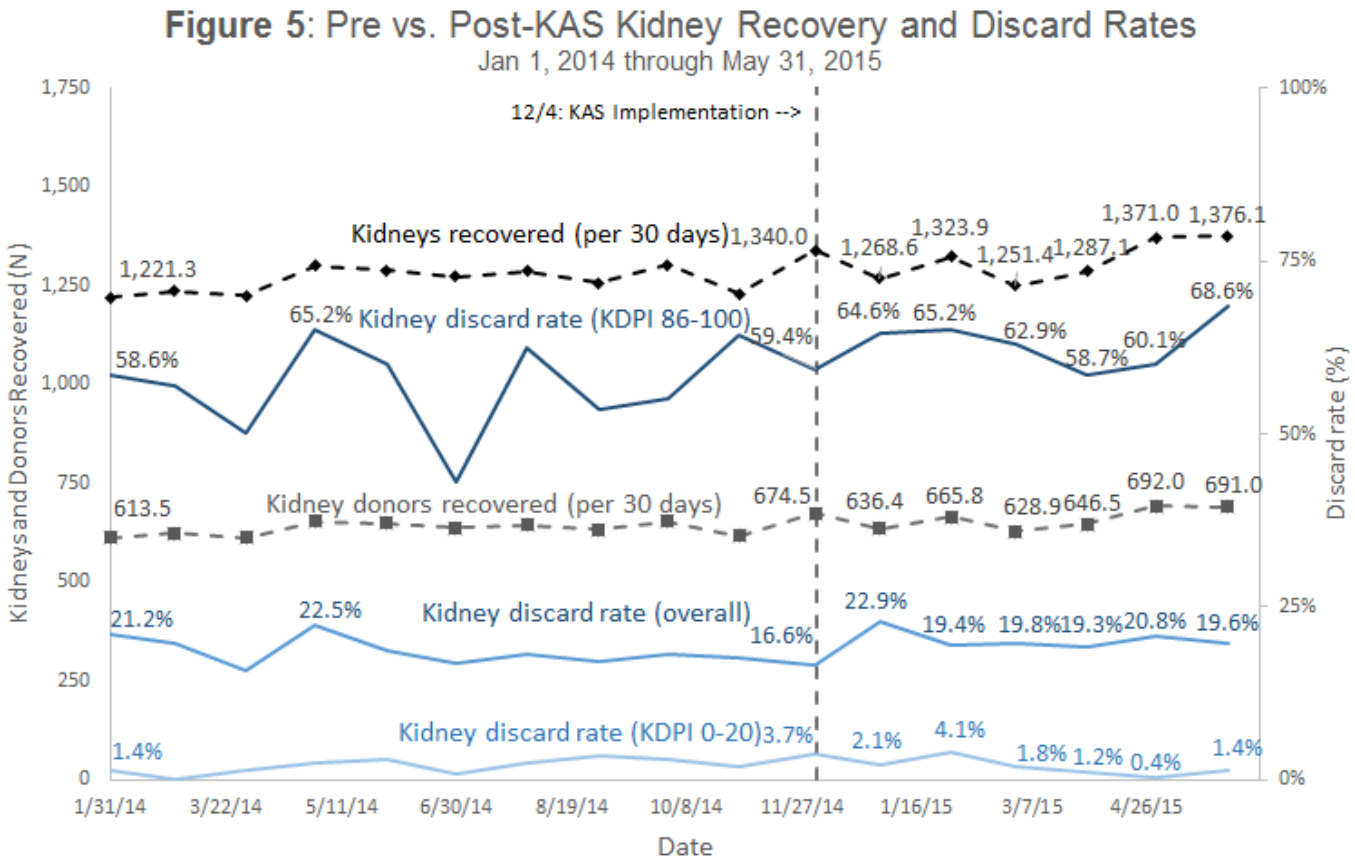
Despite the small percentage of blood group B candidates listed as eligible to receive a blood type A_2 or A_2B kidney (Figure 1, Table 1), row 43 of **Table 2** shows that 47 $A_2/A_2B \rightarrow B$ transplants have occurred during the six months after KAS implementation compared to just six during the six months prior to KAS. Though small in absolute numbers, this increase is highly statistically significant ($p<0.0001$) and suggests that this aspect of the policy has already started to make a difference in access to transplants for blood type B candidates.

Finally, Table 2 (rows 41, 42) shows that the number of kidneys being used in multi-organ transplants (e.g. simultaneous liver-kidney (SLK), kidney-pancreas (KP), heart-kidney) has not changed appreciably in the six months since KAS was implemented.

Table 2: Pre vs. Post-KAS Transplant Volume and Characteristics
September 1, 2014 through May 31, 2015

#	Metric	30SEP14	31OCT14	03DEC14	31DEC14	31JAN15	28FEB15	31MAR15	30APR15	31MAY15
1	Total # deceased KI-alone transplants	910	916	1,062	786	960	812	942	936	958
2	Total # deceased KI-alone transplants per 30 days	910.0	886.5	965.5	842.1	929.0	870.0	911.6	936.0	927.1
3	% Transplants: age 0-17	5.3%	4.9%	5.2%	2.3%	3.6%	4.2%	4.2%	3.3%	4.1%
4	% Transplants: age 18-34	9.6%	9.3%	8.6%	13.1%	14.2%	13.5%	15.8%	12.0%	12.3%
5	% Transplants: age 35-49	21.4%	23.9%	23.5%	28.9%	30.3%	28.3%	28.0%	28.2%	27.0%
6	% Transplants: age 50-64	41.5%	38.0%	42.1%	38.7%	36.1%	37.6%	35.9%	37.1%	39.4%
7	% Transplants: age 65+	22.2%	23.9%	20.6%	17.0%	15.7%	16.4%	16.0%	19.4%	17.2%
8	% Transplants: Ethnicity - Caucasian	41.5%	44.4%	38.1%	35.2%	31.3%	36.3%	34.8%	32.3%	35.9%
9	% Transplants: Ethnicity - African-American	31.0%	28.3%	36.0%	38.5%	39.1%	36.3%	37.3%	37.6%	38.5%
10	% Transplants: Ethnicity - Hispanic	17.1%	17.2%	16.9%	17.4%	18.0%	18.3%	18.5%	20.5%	17.7%
11	% Transplants: Ethnicity - Asian	8.0%	7.8%	6.9%	6.4%	7.8%	6.3%	7.0%	7.1%	6.1%
12	% Transplants: Ethnicity - Other	2.3%	2.3%	2.1%	2.4%	3.9%	2.7%	2.4%	2.6%	1.8%
13	% Transplants: Blood Type A	34.7%	37.1%	40.0%	36.1%	35.1%	34.6%	37.7%	34.9%	33.3%
14	% Transplants: Blood Type AB	4.5%	4.7%	5.6%	5.9%	7.1%	7.9%	6.5%	4.5%	7.0%
15	% Transplants: Blood Type B	13.1%	14.1%	12.2%	13.6%	12.8%	14.0%	12.3%	14.7%	12.6%
16	% Transplants: Blood Type O	47.7%	44.1%	42.1%	44.4%	45.0%	43.5%	43.5%	45.8%	47.1%
17	% Transplants: CPRA 0	63.1%	62.2%	60.6%	56.7%	54.5%	54.8%	57.6%	54.3%	53.7%
18	% Transplants: CPRA 1-79	22.7%	21.4%	24.3%	17.0%	21.8%	20.0%	20.5%	23.5%	24.0%
19	% Transplants: CPRA 80-94	8.9%	10.2%	10.1%	4.2%	4.8%	5.3%	4.2%	4.8%	5.7%
20	% Transplants: CPRA 95-98	2.7%	3.4%	2.6%	4.3%	3.2%	4.4%	4.2%	2.9%	4.0%
21	% Transplants: CPRA 99-100	2.5%	2.8%	2.4%	17.7%	15.7%	15.5%	13.4%	14.5%	12.6%
22	% Transplants - Adults: EPTS 0-20	.	.	.	23.7%	26.8%	24.8%	27.5%	22.3%	22.3%
23	% Transplants - Adults: EPTS 21-100	.	.	.	76.0%	73.0%	75.1%	72.5%	77.6%	77.7%
24	% Transplants - Adults: EPTS Missing	.	.	.	0.3%	0.2%	0.1%	.	0.1%	.
25	% Transplants: 0-ABDR mismatch	8.1%	8.6%	8.4%	5.3%	4.6%	4.9%	4.4%	4.1%	4.1%
26	% Transplants: 0-DR mismatch	17.8%	20.3%	18.6%	18.6%	14.8%	18.3%	15.1%	16.1%	18.0%
27	% Transplants: Placement- Non-Local	22.0%	23.4%	19.7%	35.8%	31.9%	33.4%	30.7%	31.6%	30.9%
28	% Transplants: recip age 65+ w/ donor KDPI < 35	6.6%	6.7%	6.5%	3.3%	2.6%	3.4%	3.1%	3.2%	3.4%
29	% Transplants: absolute age diff. donor/recip >15	52.6%	51.0%	49.5%	41.7%	43.6%	44.8%	40.7%	44.1%	48.2%
30	Mean absolute age diff. between recip/donor	19.1	18.6	18.4	15.5	16.4	16.8	15.7	16.8	17.3
31	% KDPI>85% Transplants: Local	76.3%	66.0%	64.1%	50.0%	47.5%	46.8%	53.8%	42.5%	48.2%
32	% KDPI>85% Transplants: Regional	10.2%	16.0%	9.0%	39.6%	40.7%	37.1%	35.0%	35.6%	30.4%
33	% KDPI>85% Transplants: National	13.6%	18.0%	26.9%	10.4%	11.9%	16.1%	11.3%	21.9%	21.4%
34	% Local Transplants: KDPI 0-20	24.2%	24.5%	24.2%	17.8%	26.5%	20.7%	22.7%	20.0%	20.8%
35	% Local Transplants: KDPI 21-34	20.3%	15.7%	17.6%	22.2%	15.1%	13.1%	14.5%	14.4%	18.4%
36	% Local Transplants: KDPI 35-85	49.2%	55.1%	52.4%	55.2%	54.1%	60.8%	55.9%	60.8%	56.3%
37	% Local Transplants: KDPI 86-100	6.3%	4.7%	5.9%	4.8%	4.3%	5.4%	6.6%	4.8%	4.1%
38	% CPRA 99-100% Transplants: Local	73.9%	65.4%	60.0%	9.4%	11.3%	12.7%	12.7%	13.2%	8.3%
39	% CPRA 99-100% Transplants: Regional	4.3%	.	.	32.4%	27.8%	28.6%	25.4%	32.4%	37.2%
40	% CPRA 99-100% Transplants: National	21.7%	34.6%	40.0%	58.3%	60.9%	58.7%	61.9%	54.4%	54.5%
41	# multi-organ kidney transplants	139	119	146	95	122	108	105	124	138
42	# multi-organ kidney transplants per 30 days	139.0	115.2	132.7	101.8	118.1	115.7	101.6	124.0	133.5
43	# A2/A2B kidney tx to blood type B recipients	0	0	3	7	7	6	10	8	9

Utilization



Interpretation

The rate of deceased donor kidneys recovered has increased slightly in the post-KAS period (**Figure 5**) (p=0.005). Most of this increase was observed in April and May.

The discard rate – the proportion of kidneys not transplanted among those recovered for the purpose of transplantation – increased modestly from a recent historical rate of 18.5% to 22.9% in December. However, this increase tempered in January through May, with observed rates of 19.4%, 19.8%, 19.4%, 20.8%, and 19.6% respectively.

Still, compared to the discard rate of 18.5% in the year prior to KAS, the six-month, post-KAS rate is higher at 20.3% (p=0.001). Among recovered kidneys with KDPI of 86-100%, the discard rate increased from 56% before KAS to 63% in the six months following implementation (p=0.003). Since these results suggest an increase in the discard rate, further analyses are underway to understand the cause of the increase and whether it is expected to be sustained.

An important, related concern identified in the wake of KAS implementation was the potential for an increase in the rate of kidneys being accepted for transplant on behalf of one candidate, and then transplanted into a different recipient or discarded due to the inability to find a suitable back-up recipient. This concern was linked in particular to the increased priority for very high CPRA candidates, who may have a higher likelihood of an unacceptably positive crossmatch, coupled with the increased rates of kidneys being sent outside of the local DSA for these and other candidates.

Table 3 indicates that the number and percentage of kidneys reported as having a "final acceptance" on a match run in DonorNet® but which were not transplanted into the accepting candidate has not changed dramatically in the first three months post implementation[2]; however, data are starting to suggest a moderate increase has occurred. Prior to KAS, 9.5% of accepted kidneys were transplanted into another recipient or discarded (95 cases per month), while between KAS implementation and March 31, 2015 this rate was 10.9% (113 cases per month); this difference is statistically significant (p=0.008). Of these cases, a higher percentage (38.2% vs. 33.4%) led to a discard. Though the absolute number of kidneys with a final acceptance for a non-local, CPRA 99-100% candidate increased dramatically post-KAS due to more offers for these patients, no increase was observed in the percentage of these acceptances that were not transplanted into the initially accepting patient (Table 3, rows 29-33).

Post-KAS, 93 different transplant hospitals accounted for at least one of the 557 kidneys that were reported as accepted but then not transplanted into the originally accepting candidate, indicating that these occurrences are not isolated among a very small number of programs. However, six transplant hospitals accounted for over half of these cases. These six programs also appear to have had a disproportionate number of such cases in the pre-KAS period as well.

These results suggest that although there has not been a large increase in the percentage of cases in which a kidney was accepted for one candidate but then transplanted into a different candidate or discarded, a small increase has occurred post-KAS. Table 3 shows that the rate of accepted kidneys not going to the intended recipient has historically been higher than average for non-local high CPRA patients, and still remains higher than average despite actually declining in the post-KAS period. Since more offers are being made to and accepted on behalf of these candidates under KAS, this appears to have led to the increase in the overall rate of acceptances that do not get transplanted into the intended recipient.

The statistics reported in the last fifteen rows of Table 3 are derived from reporting of final acceptances and refusals on match runs for potential transplant recipients (PTR)

[2] These cases are typically reported to be caused by candidate illness or a positive crossmatch. All allocations, including those in which the actual recipient differs from the initially accepting patient, are reviewed by the OPTN for potential policy violations.

and consequently contain inherent limitations[3] that must be acknowledged. Given these limitations, these data cannot be used to rule out the possibility of an increase in kidneys accepted for a non-local candidate but shipped back to the recovery DSA and either allocated to a different patient on the same match run or discarded.

[3] The primary purpose of data collected in DonorNet®, including PTR, is to facilitate organ allocation, not to provide data for research. Consequently, statistics derived from this data source must be interpreted cautiously. More specifically, these data will not include cases in which the allocating OPO does not enter a "final acceptance" for an initially accepting candidate. For example, if the recovering OPO places and ships a kidney to a non-local transplant hospital, but the kidney is subsequently refused (e.g., positive crossmatch) and shipped back to the recovering OPO's DSA, the case will not be captured in Table 3 if the recovering OPO continues allocating the kidney using the same match run; the reason the case is not included is because a final acceptance will generally not be reported for the initially accepting candidate. Also, an underlying assumption in drawing inference about potential impact of KAS is that OPOs' practices for entering final acceptance data into DonorNet have not changed over time.

Table 3: Pre vs. Post-KAS Kidney Recovery and Discard Rates
September 1, 2014 through May 31, 2015

#	Metric	09/30/14	10/31/14	12/03/14	12/31/14	01/31/15	02/28/15	03/31/15	04/30/15	05/31/15
1	Kidney donors recovered for transplantation	654	639	742	594	688	587	668	692	714
2	Kidney donors recovered for tx (per 30 days)	654.0	618.4	674.5	636.4	665.8	628.9	646.5	692.0	691.0
3	Kidneys recovered for transplantation	1,303	1,271	1,474	1,184	1,368	1,168	1,330	1,371	1,422
4	Kidneys recovered for tx (per 30 days)	1,303.0	1,230.0	1,340.0	1,268.6	1,323.9	1,251.4	1,287.1	1,371.0	1,376.1
5	Discarded kidneys	236	224	245	271	266	231	257	285	279
6	Kidney discard rate	18.1%	17.6%	16.6%	22.9%	19.4%	19.8%	19.3%	20.8%	19.6%
7	Kidneys recovered (KDPI 0-20) N	270	275	325	189	295	217	260	238	280
8	Kidneys recovered (KDPI 21-34) N	242	161	211	204	191	152	180	162	210
9	Kidneys recovered (KDPI 35-85) N	625	659	704	612	695	597	655	741	727
10	Kidneys recovered (KDPI 86-100) N	136	151	197	147	158	178	196	193	172
11	Kidneys recovered (KDPI 0-20) %	20.7%	21.8%	22.1%	16.0%	21.7%	18.7%	19.6%	17.4%	19.7%
12	Kidneys recovered (KDPI 21-34) %	18.6%	12.7%	14.4%	17.4%	14.0%	13.1%	13.6%	11.8%	14.8%
13	Kidneys recovered (KDPI 35-85) %	49.4%	52.8%	49.6%	53.5%	52.2%	52.4%	51.2%	55.9%	52.6%
14	Kidneys recovered (KDPI 86-100) %	11.2%	12.7%	13.9%	13.1%	12.2%	15.8%	15.6%	15.0%	12.9%
15	Kidney discard rate (KDPI 0-20)	3.0%	1.8%	3.7%	2.1%	4.1%	1.8%	1.2%	0.4%	1.4%
16	Kidney discard rate (KDPI 21-34)	6.2%	3.7%	5.2%	8.8%	6.3%	5.9%	7.8%	5.6%	8.1%
17	Kidney discard rate (KDPI 35-85)	20.6%	16.5%	13.5%	23.7%	18.7%	16.9%	18.2%	20.5%	18.6%
18	Kidney discard rate (KDPI 86-100)	55.1%	64.2%	59.4%	64.6%	65.2%	62.9%	58.7%	60.1%	68.6%
19	Overall: Number of kidneys with "final acceptance"	1,050	1,038	1,185	927	1,109	925	1,071	1,091	*
20	Overall: # accepted kidneys not transplanted to accepting candidate	113	105	93	104	119	90	117	127	*
21	Overall: % accepted kidneys not transplanted to accepting candidate	10.8%	10.1%	7.9%	11.2%	10.7%	9.7%	10.9%	11.6%	*
22	Overall: % accepted kidneys transplanted to a different candidate	7.5%	6.8%	5.5%	7.9%	5.8%	6.2%	6.8%	7.1%	*
23	Overall: % accepted kidneys discarded	3.2%	3.3%	2.4%	3.3%	5.0%	3.6%	4.1%	4.6%	*
24	Non-local: Number of kidneys with "final acceptance"	306	321	315	399	431	370	391	428	*
25	Non-local: # accepted kidneys not transplanted to accepting candidate	109	103	89	101	117	87	114	125	*
26	Non-local: % accepted kidneys not transplanted to accepting candidate	35.6%	32.1%	28.3%	25.3%	27.2%	23.5%	29.2%	29.2%	*
27	Non-local: % accepted kidneys transplanted to a different candidate	24.5%	21.5%	20.0%	17.8%	14.4%	14.9%	17.9%	18.0%	*
28	Non-local: % accepted kidneys discarded	11.1%	10.6%	8.3%	7.5%	12.8%	8.7%	11.3%	11.2%	*
29	Non-local 99-100 CPRA: Number of kidneys with "final acceptance"	9	13	13	160	163	134	142	136	*
30	Non-local 99-100 CPRA: # accepted kidneys not txed to accepting cand.	2	3	4	30	25	21	34	18	*
31	Non-local 99-100 CPRA: % accepted kidneys not txed to accepting cand.	22.2%	23.1%	30.8%	18.8%	15.3%	15.7%	23.9%	13.2%	*
32	Non-local 99-100 CPRA: % accepted kidneys txed to a different cand.	22.2%	23.1%	23.1%	15.6%	14.7%	13.4%	19.0%	12.5%	*
33	Non-local 99-100 CPRA: % accepted kidneys discarded	0.0%	0.0%	7.7%	3.1%	0.6%	2.2%	4.9%	0.7%	*

** Results not yet available due to usual lags associated with the reporting of offer acceptance data in DonorNet®.*