

Paired Exchange Results

Quarterly Report

As of September 30, 2018

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Message from the Founder and CEO

We are pleased to report that we have facilitated 473 transplants as of the end of 3rd quarter. This is 11 more transplants than what was facilitated for all of 2017. We currently have enough transplants scheduled to pass the 3,000 transplant milestone by the end of the year and expect 2018 NKR facilitated transplant volume to be over 30% higher than 2017.

Our Medical Board recently approved the Family Voucher program which removes the restriction that a voucher recipient must have some form of kidney impairment, and allows all immediate family members to receive vouchers. We will be piloting this program at eight NKR centers over the next 3-6 months and hope to roll-out the Family Voucher program to all NKR centers in 2019.

Our confirmatory enhanced resolution tissue typing initiative is more successful than we expected. We have proactively caught 14 HLA errors in the past 8 months and have over 70% of all NKR donors typed using confirmatory enhanced resolution typing. As a direct result of the confirmatory typing initiative, many of our highest volume centers have adopted virtual screening cross matching which streamlines the process and saves \$1,000 - \$4,000 per transplant.

We have updated our graft and patient survival numbers with the latest data available from the SRTR. In spite of transplanting much more difficult cases, the NKR death censored graft failure rate is 34% below the U.S. living donor transplant failure rate. The NKR patient mortality rate is 31% below the U.S. living donor transplant mortality rate. These outcome advantages appear to increase the longer the patient has the transplant. We are conducting research to better understand the reasons for these NKR outcome advantages.

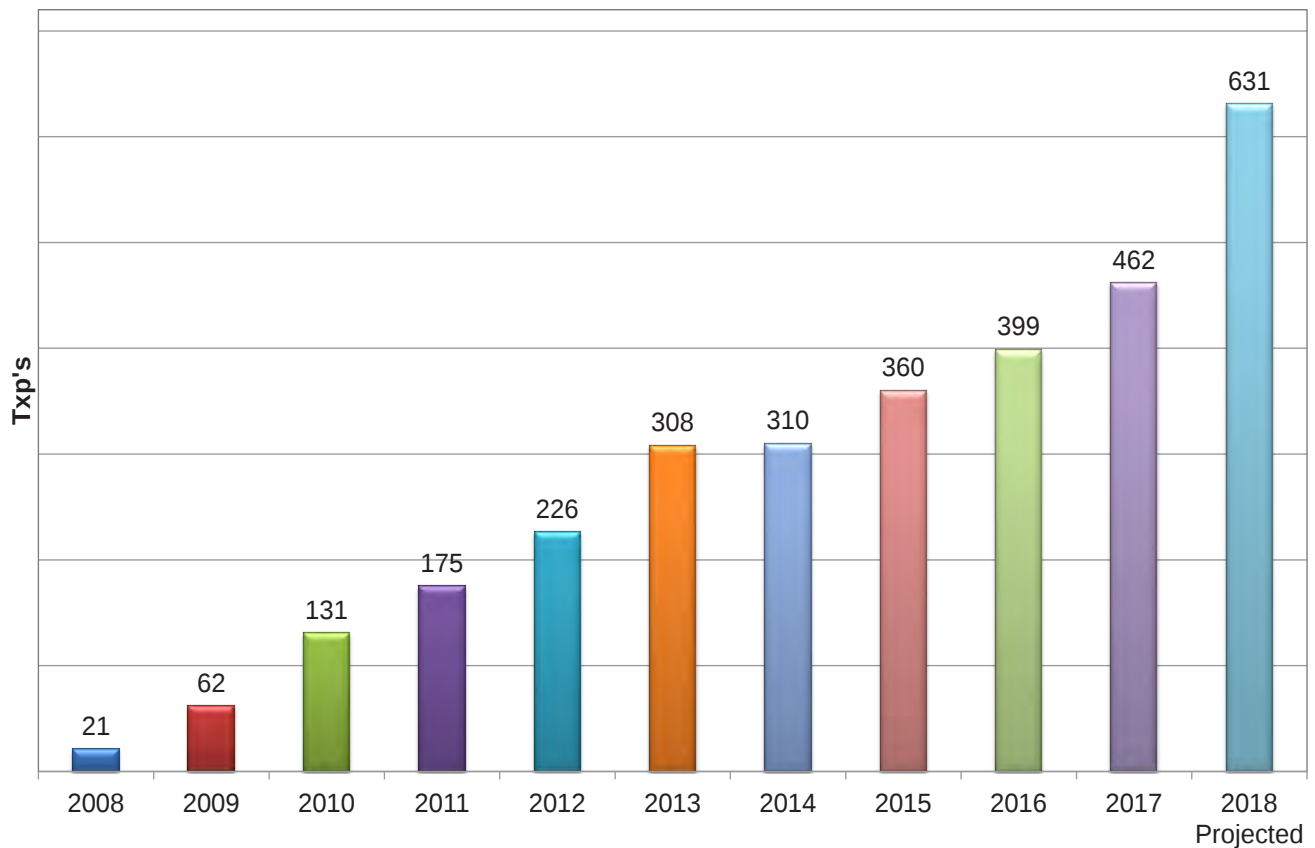
It is the ongoing dedication and effort of our Member Centers that enable us to continue breaking records and achieving new milestones. Thank you for your support and keep up the great work.

Sincerely,

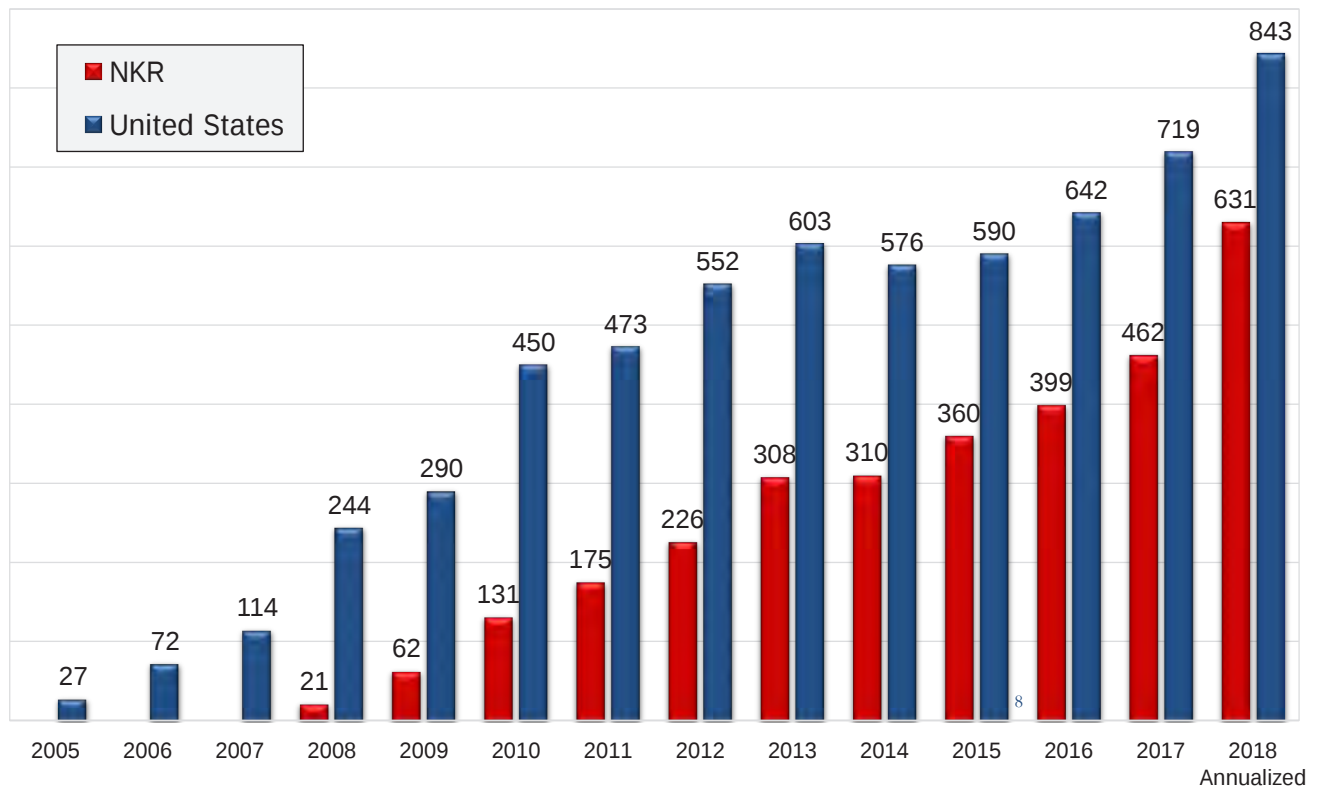
A handwritten signature in blue ink, appearing to read 'G Hil', with a long, sweeping horizontal line extending to the right.

Garet Hil
Founder & CEO
National Kidney Registry

Transplants Facilitated

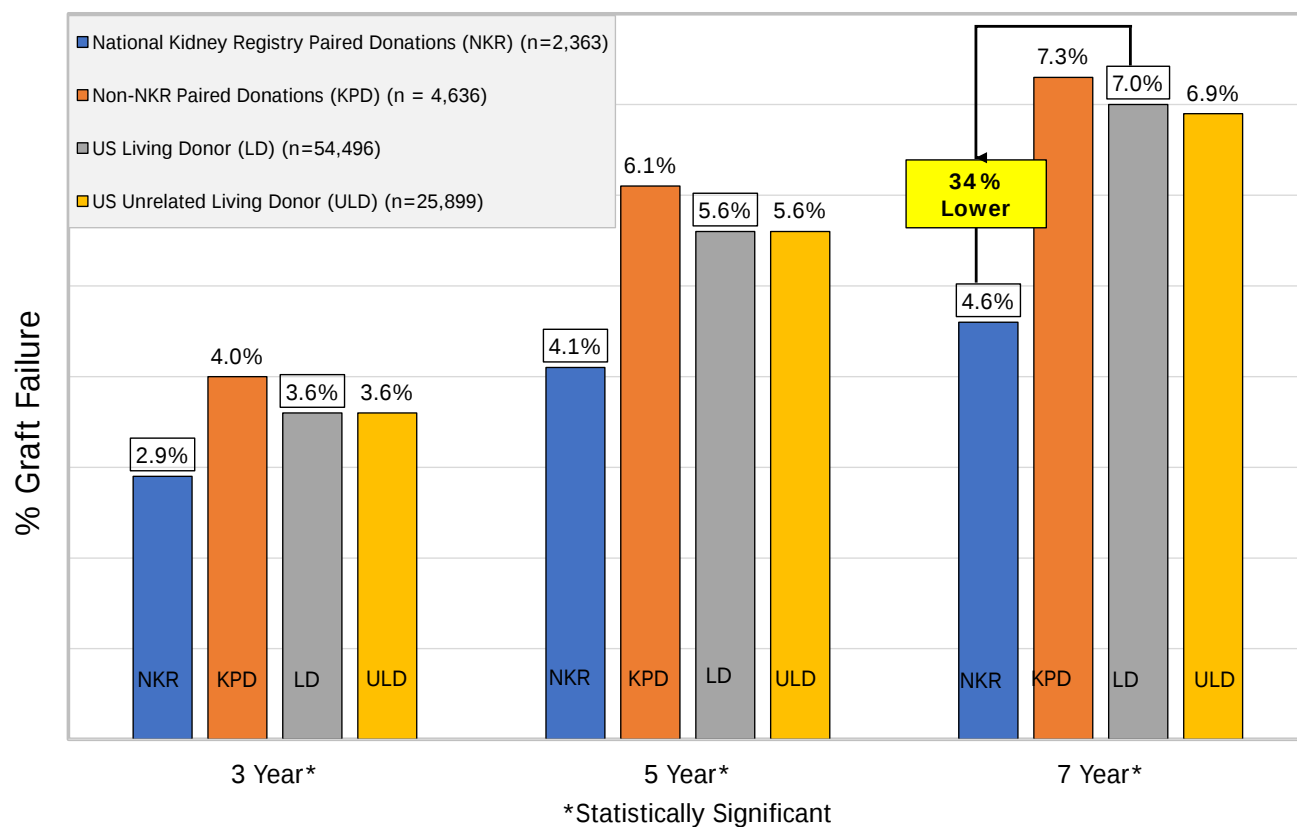


NKR Leading U.S. KPD Growth



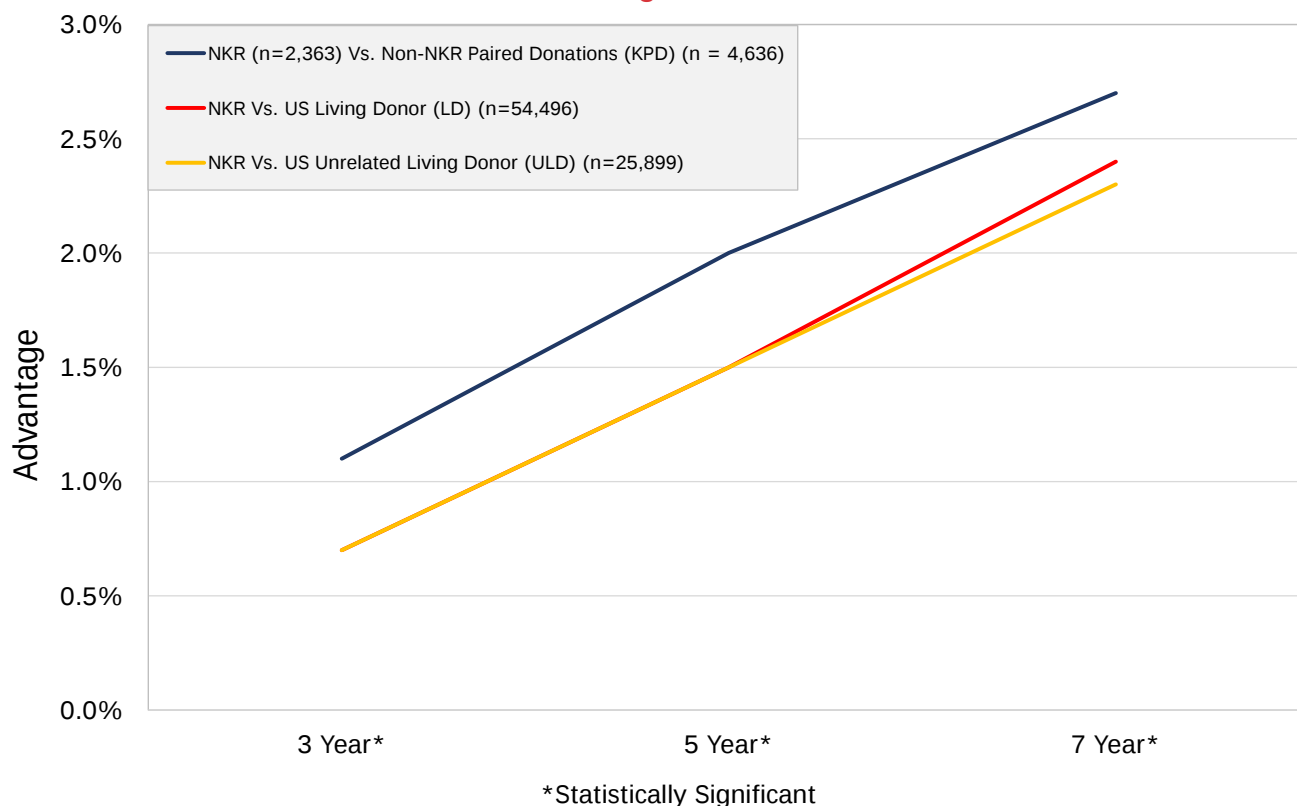
*Organ Procurement and Transplantation Network. <https://optn.transplant.hrsa.gov/> Accessed 10/31/18

34% Lower Transplanted Kidney Failure Rate



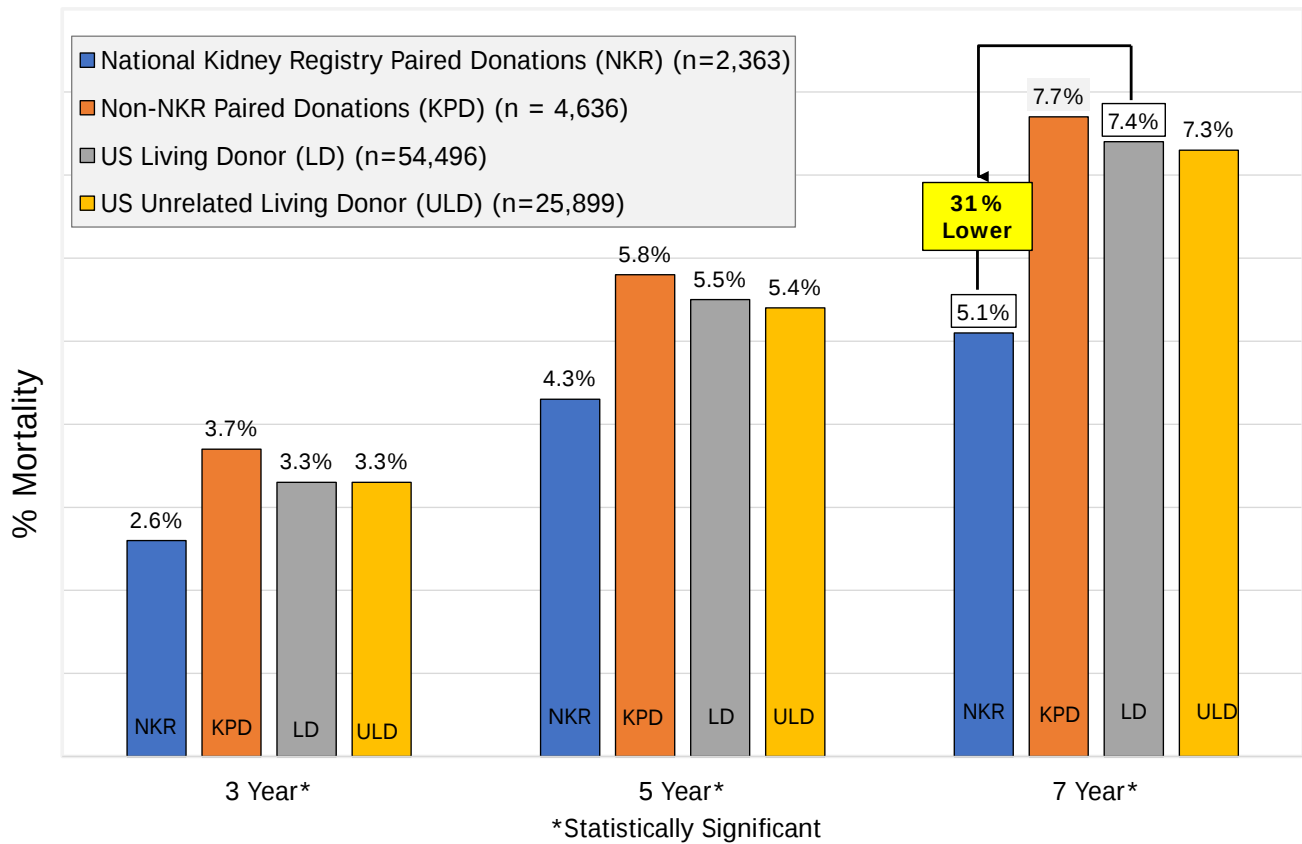
Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

NKR Death Censored Graft Survival Advantage Increasing Over Time



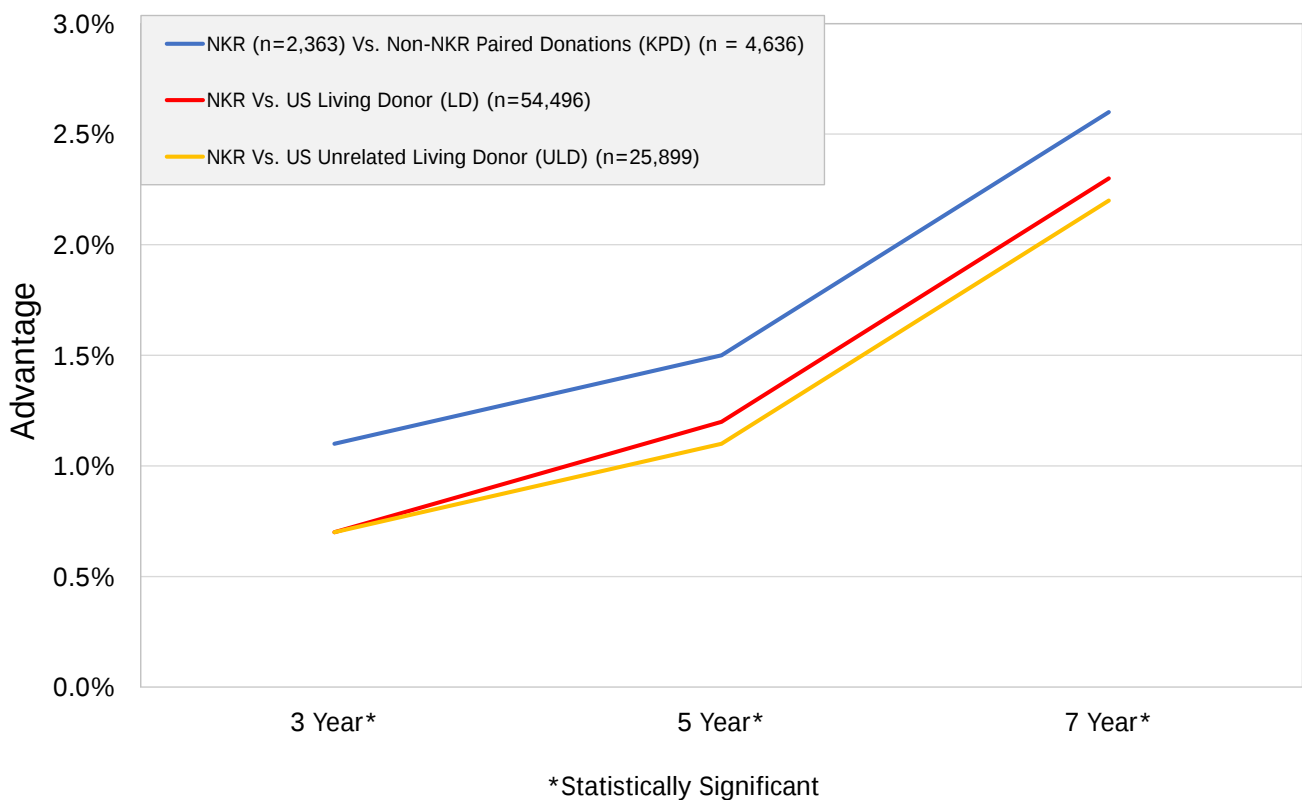
Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

31% Lower Patient Mortality Rate



Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

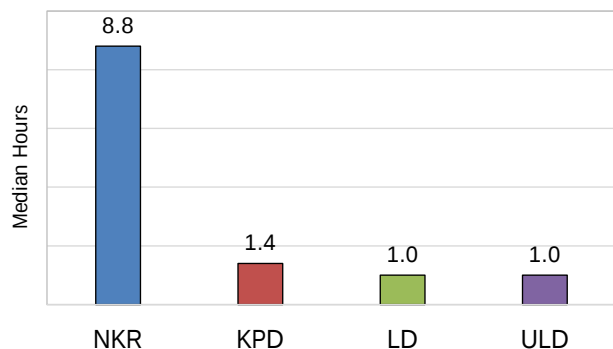
NKR Patient Mortality Rate Advantage Increasing Over Time



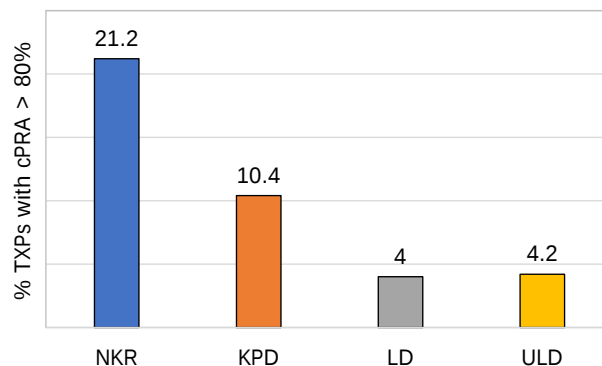
Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

NKR is Achieving Superior Outcomes While Transplanting Tougher Cases

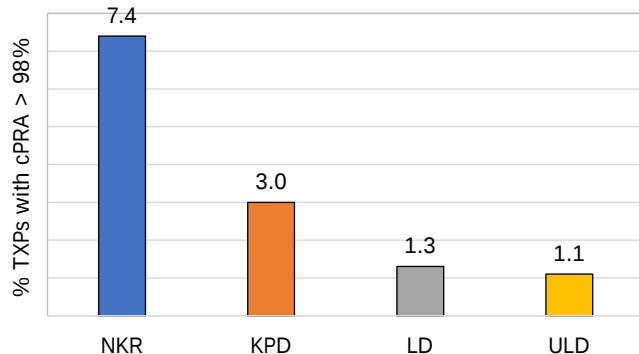
More Cold Ischemic Time



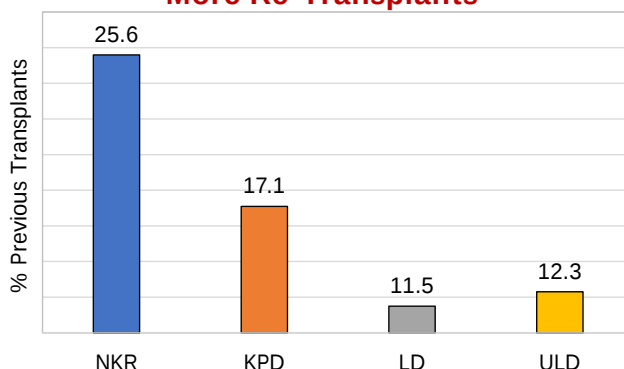
More Highly Sensitized Patients



More Hyper Sensitized Patients

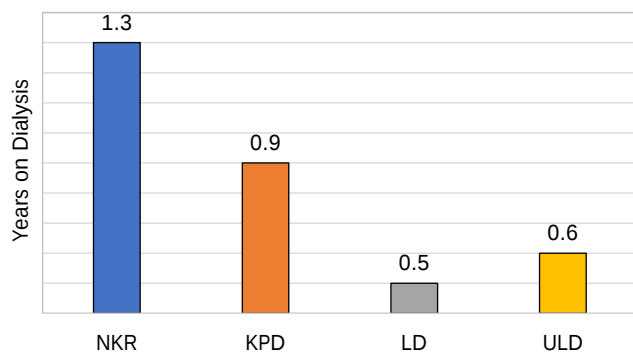


More Re-Transplants

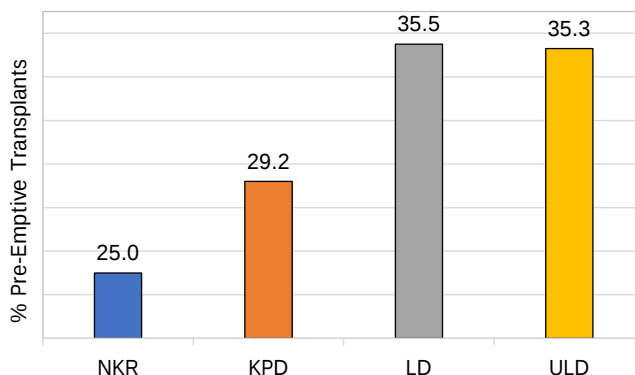


Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

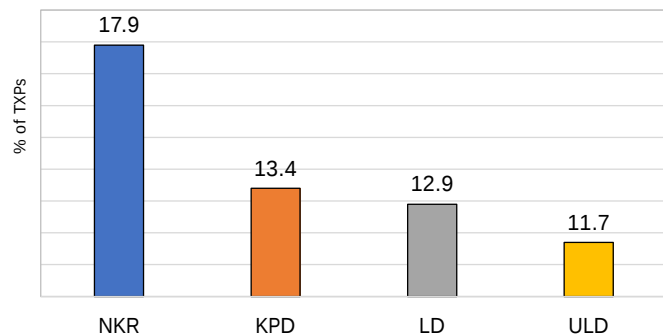
More Time on Dialysis



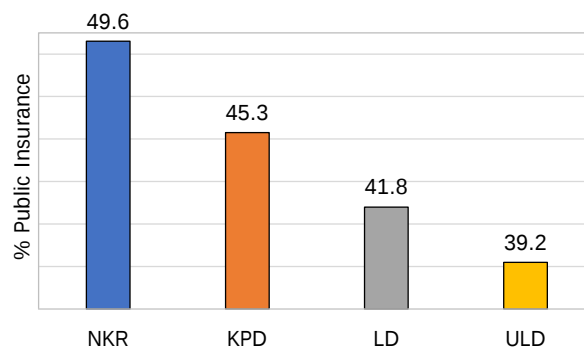
Fewer Pre-Emptive Transplants



More African American Patients

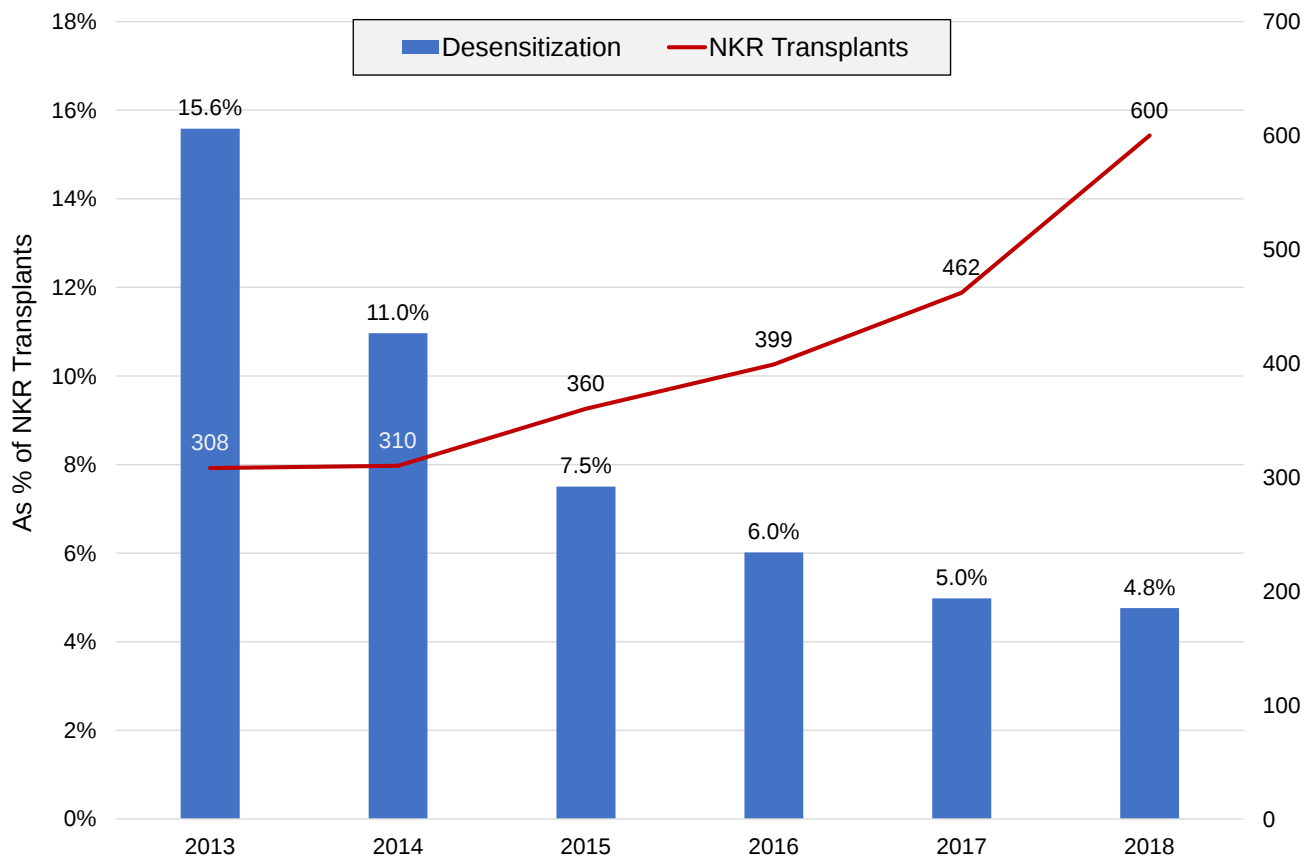


More Patients with Public Insurance



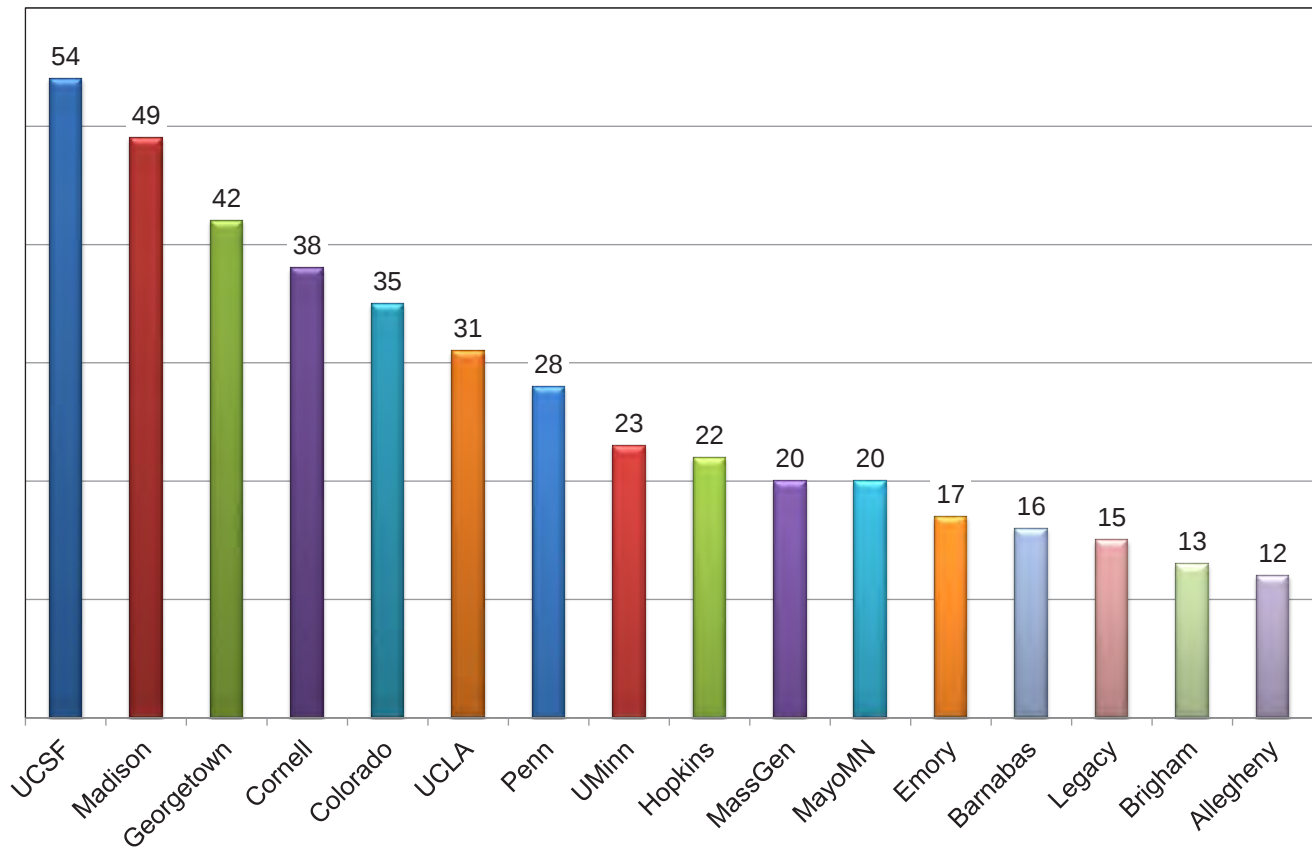
Provided courtesy of Johns Hopkins University School of Medicine, Department of Surgery *Not including CHIP patients;
Kaplan-Meier GS Rates for Transplants Performed: 02/2008-06/2017 with follow-up through 12/31/2017 <https://www.srtr.org/> SRTR data as of June, 2018

Desensitization is Trending Down



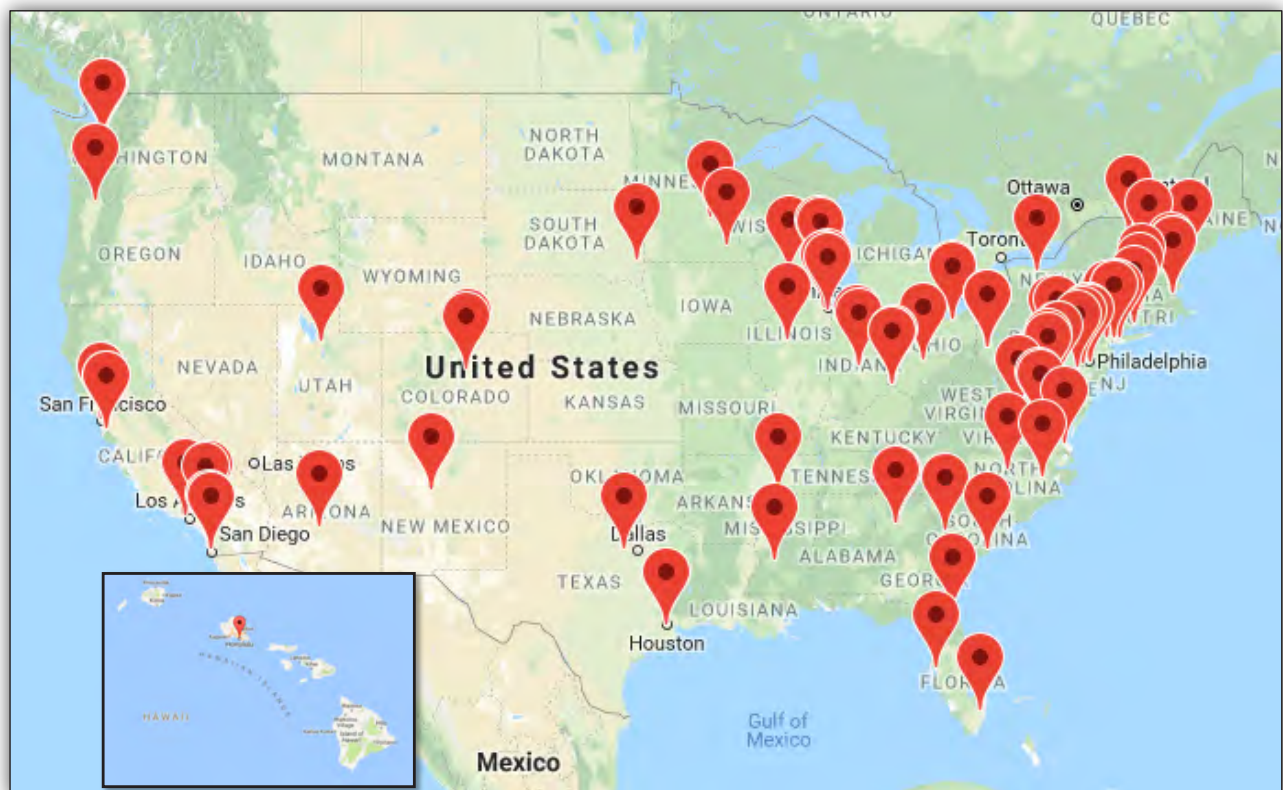
Top Centers

Transplants Last 12 Months

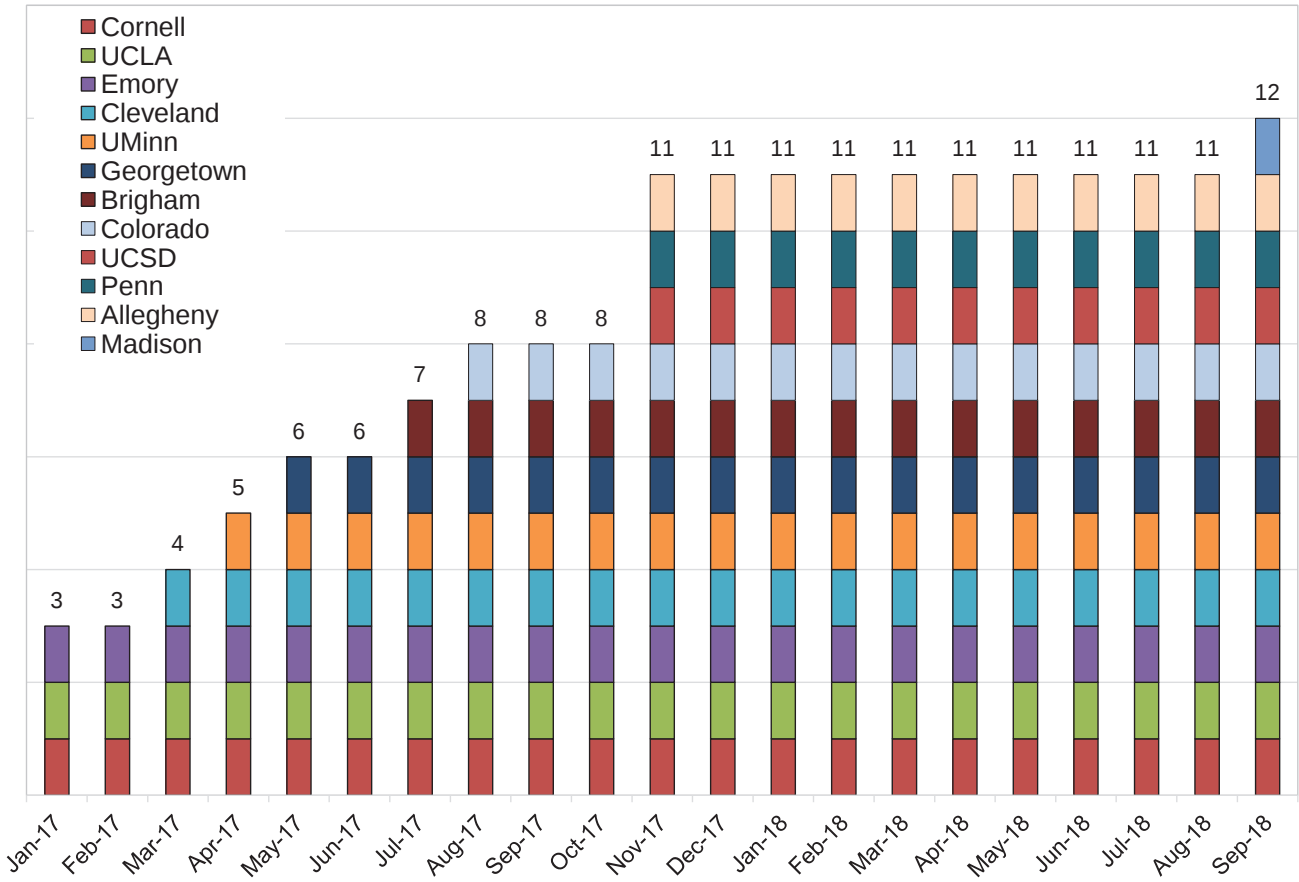


NKR Member Centers

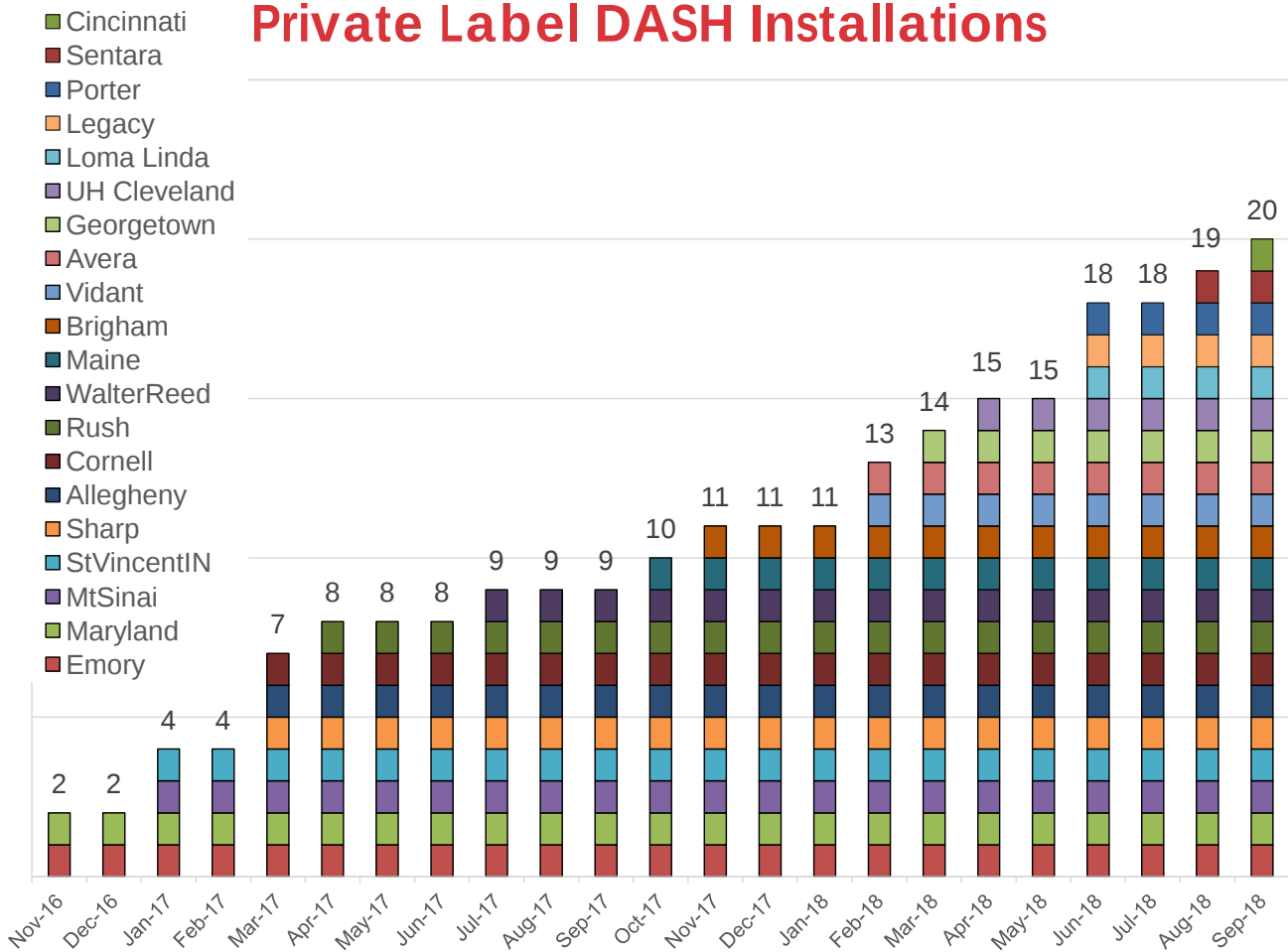
As of 9/30/2018



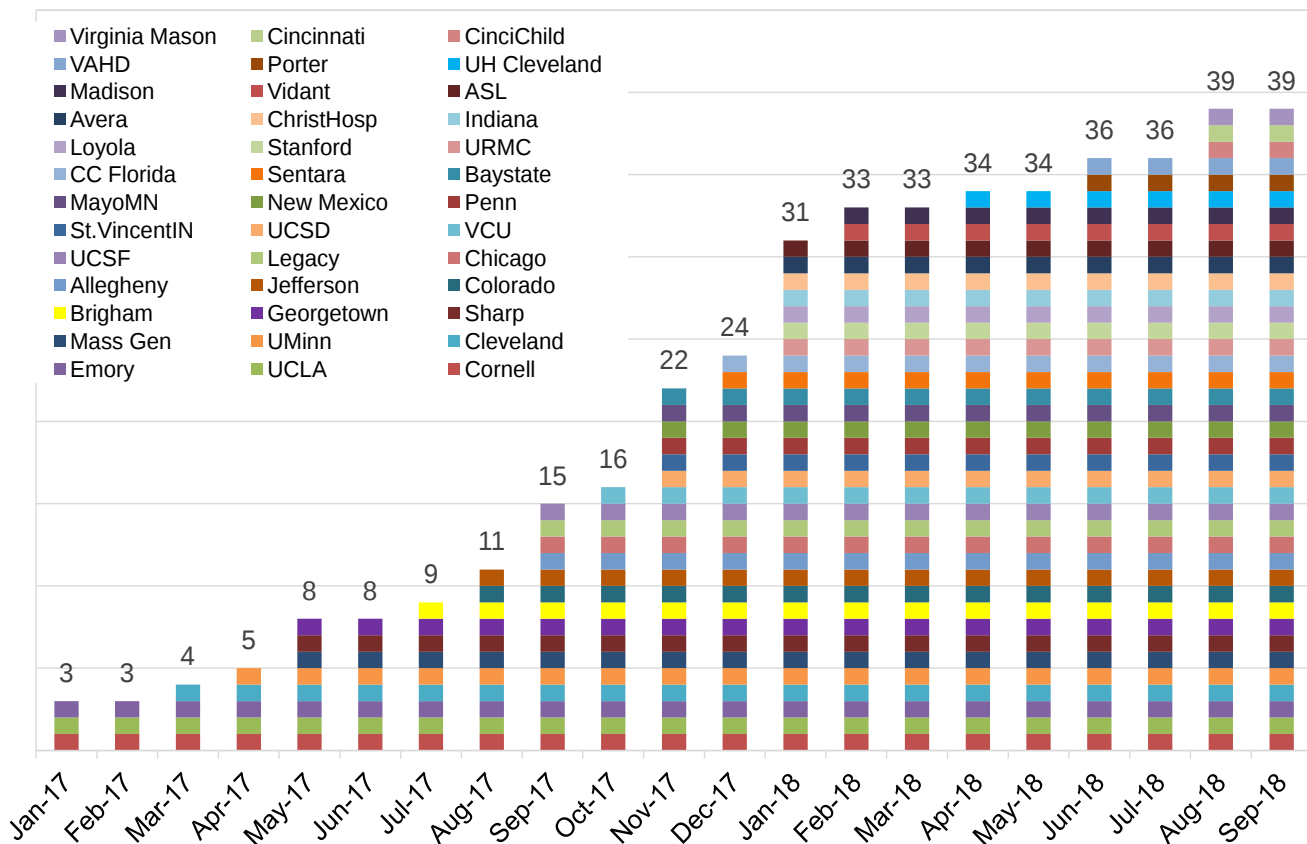
Donor Care Network® Centers of Excellence



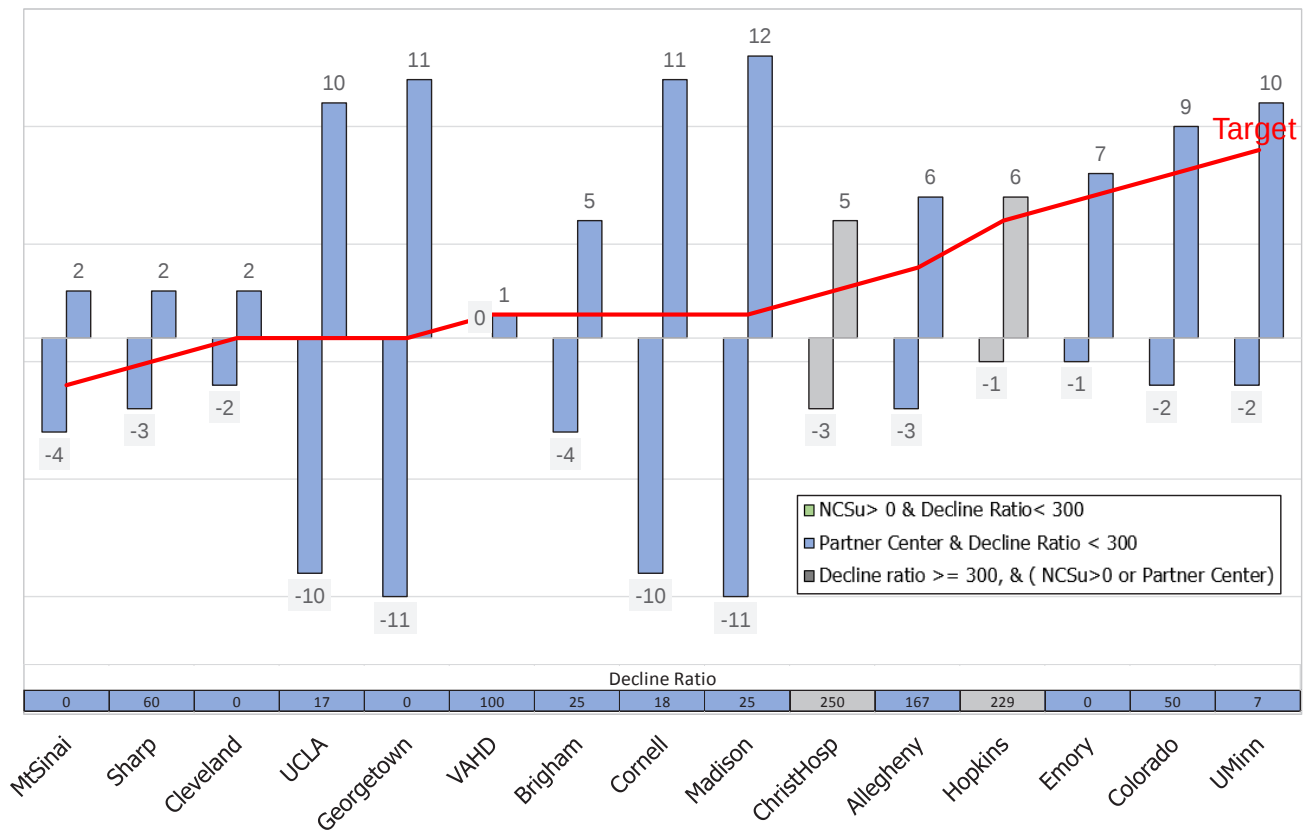
Private Label DASH Installations



Remote Donor Centers



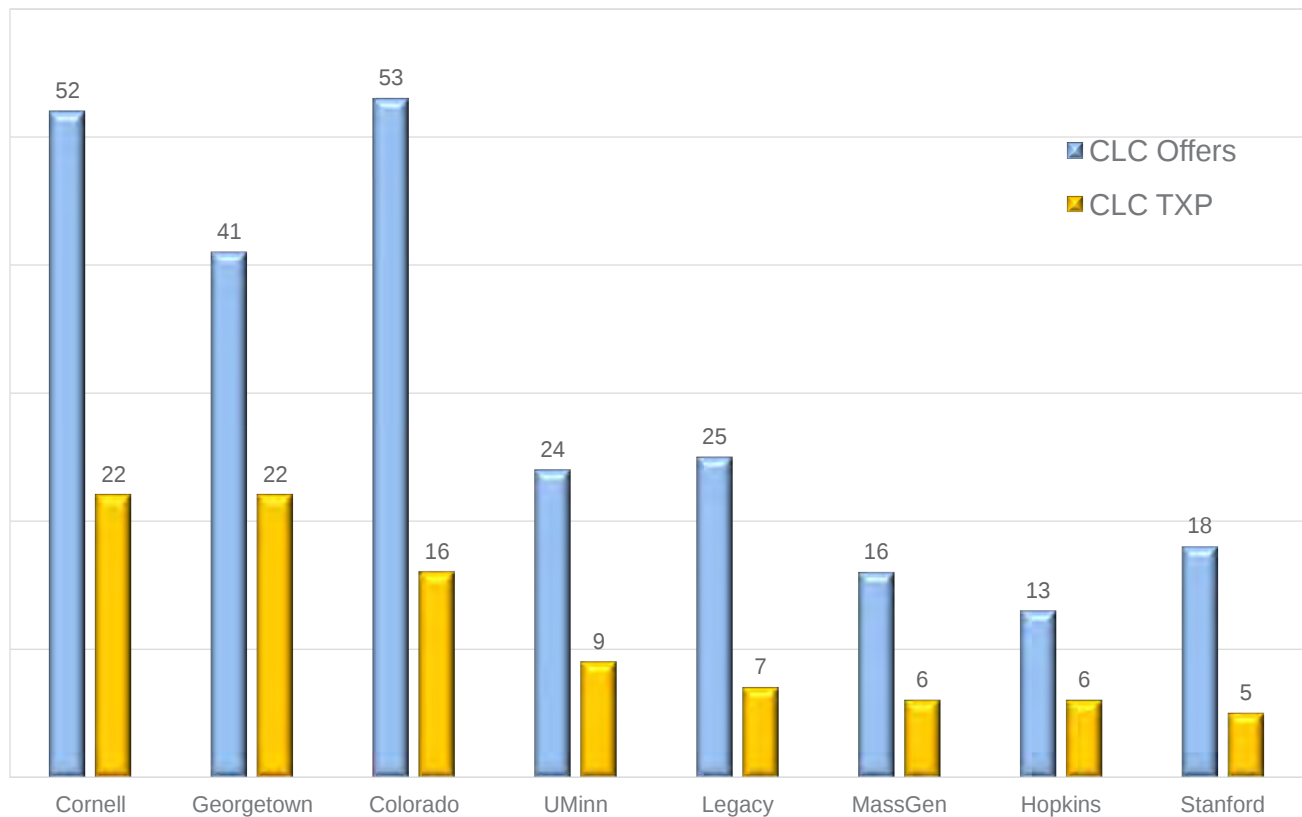
Partner Center Chain End Targets



* <https://clc.kidneyregistry.org/WebForm1.aspx?ReportKeyPass=ag5Ghnf76Tghd765GFtre&NcsSummary=1&Sort=DefaultSort&Supress=1> Accessed 10/09/18 at 15:11 ET

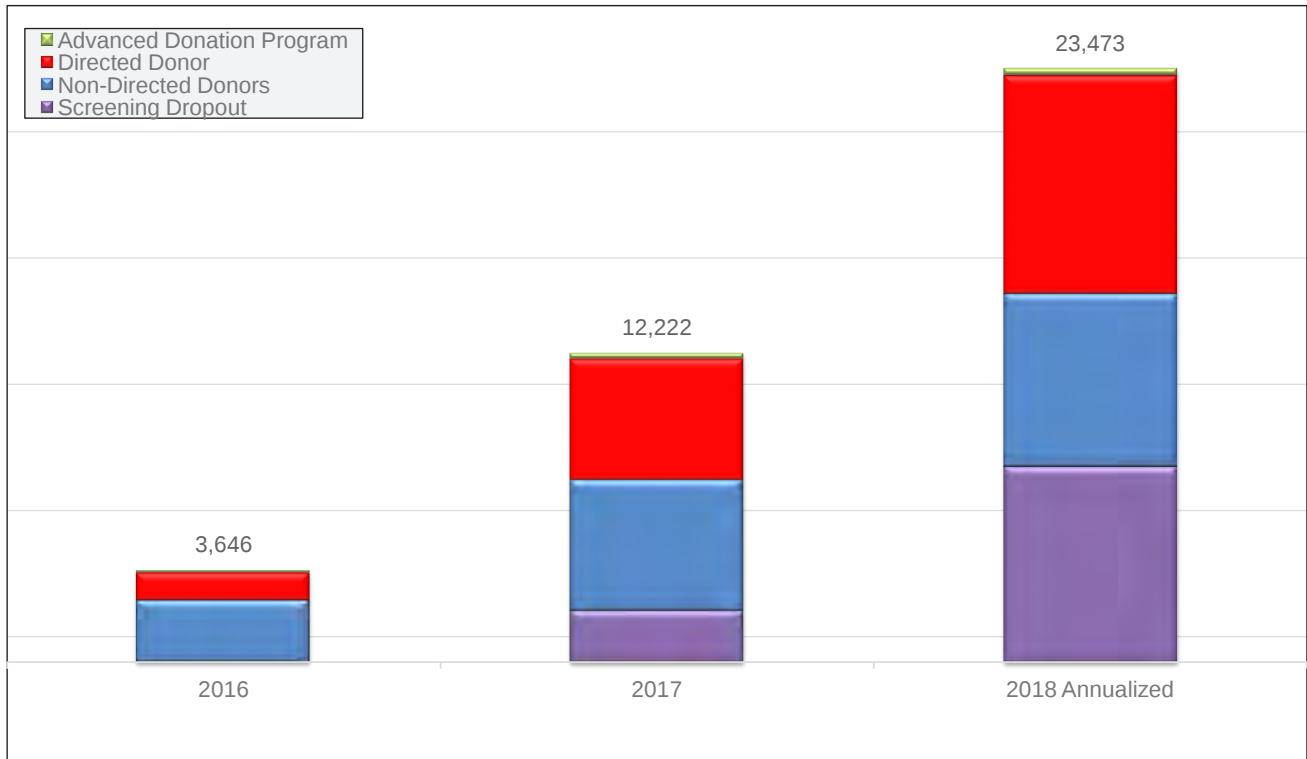
Top Center Liquidity Contributors

CLC Driven Match Offers - 9/17 - 9/18



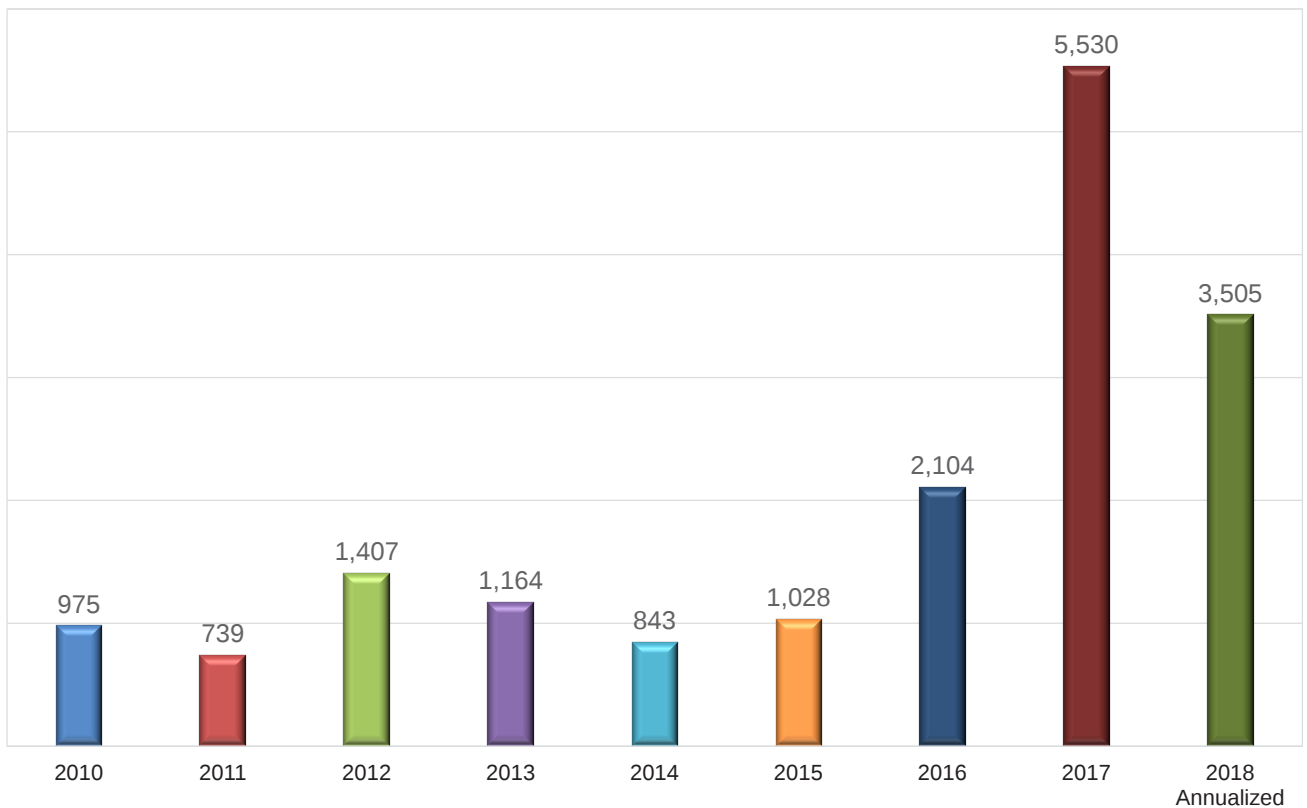
Donor Contacts

Across All Donor Intake Platforms



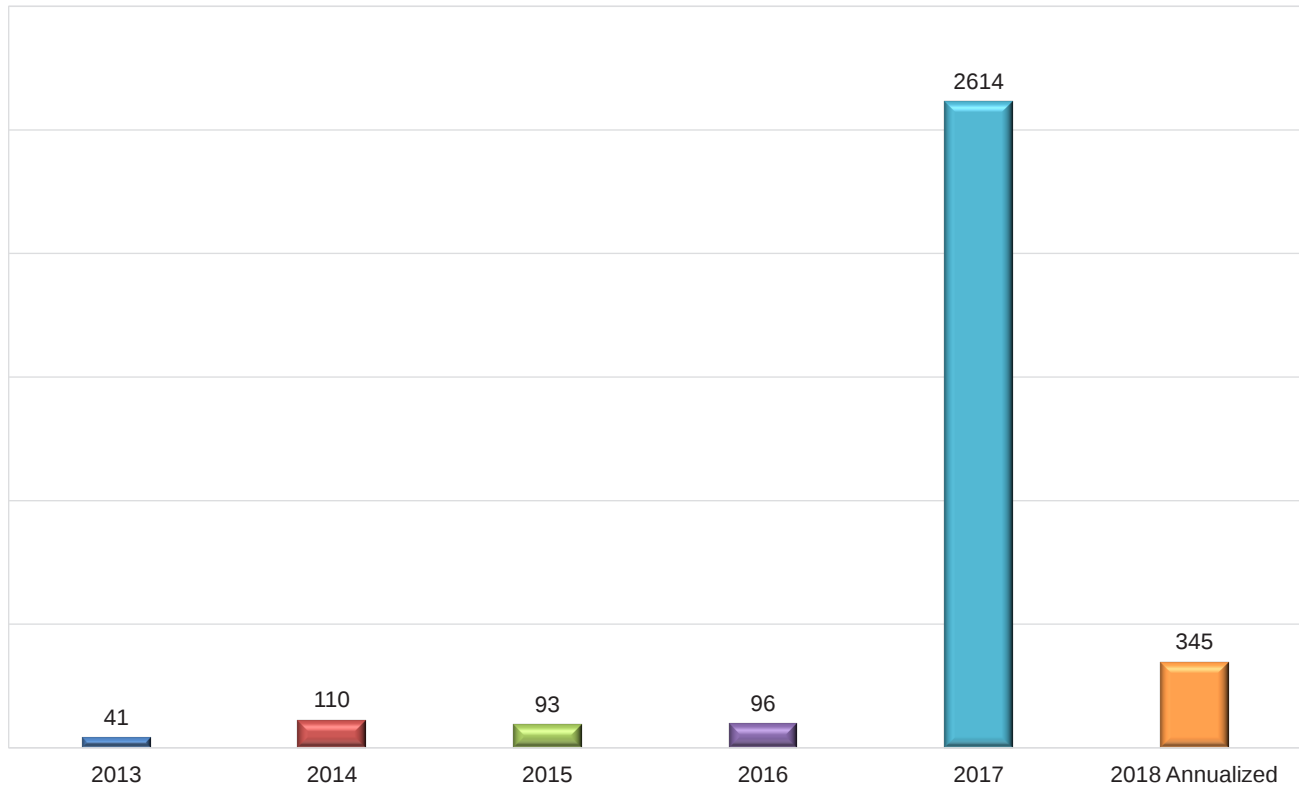
Non-Directed Donor Contacts

Via NKR Donor Intake Platform



Non-Directed Donor Referrals

Referred to NKR Member Centers

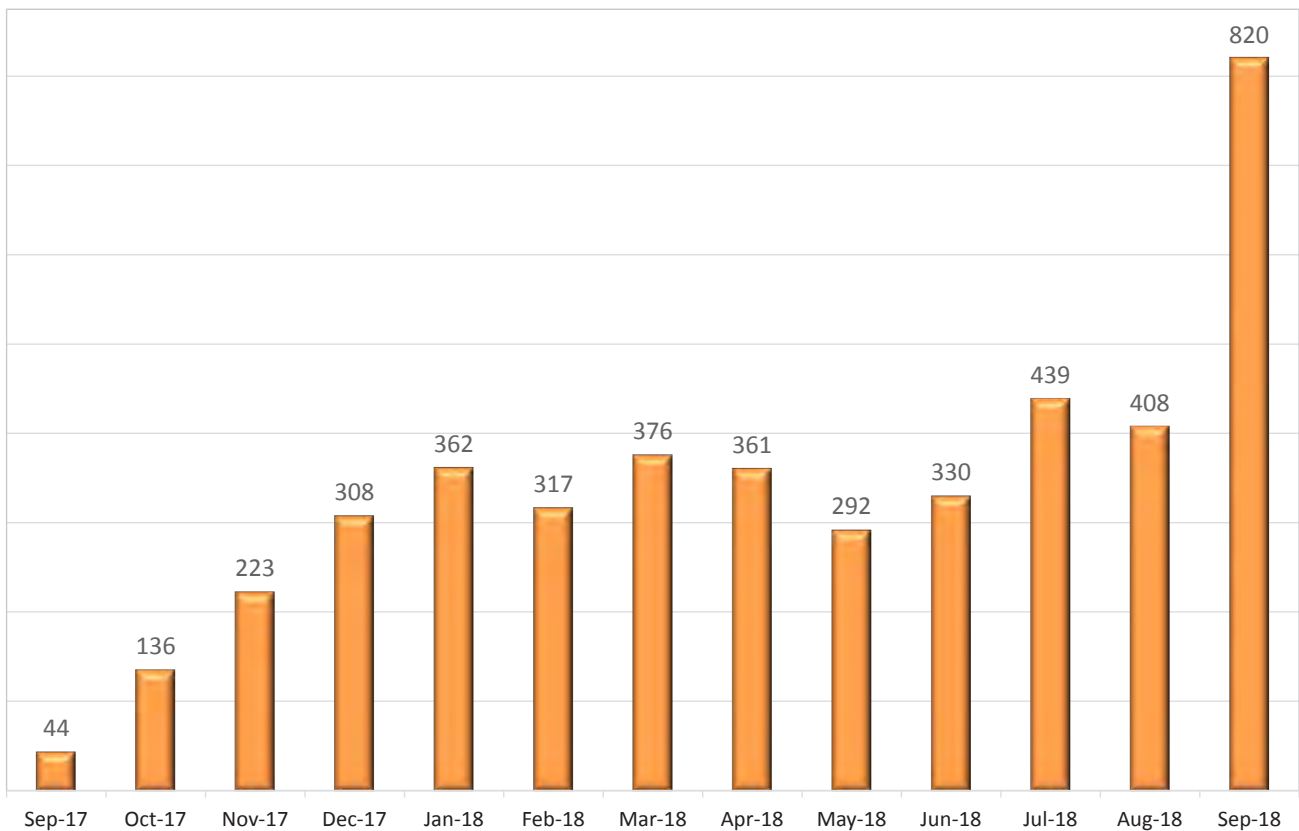


*2017: Donor intake system was re-engineered and the donor certification form was removed

*2018: Pre-workup labs were implemented which screened out candidates not willing to complete 24 hour urine test

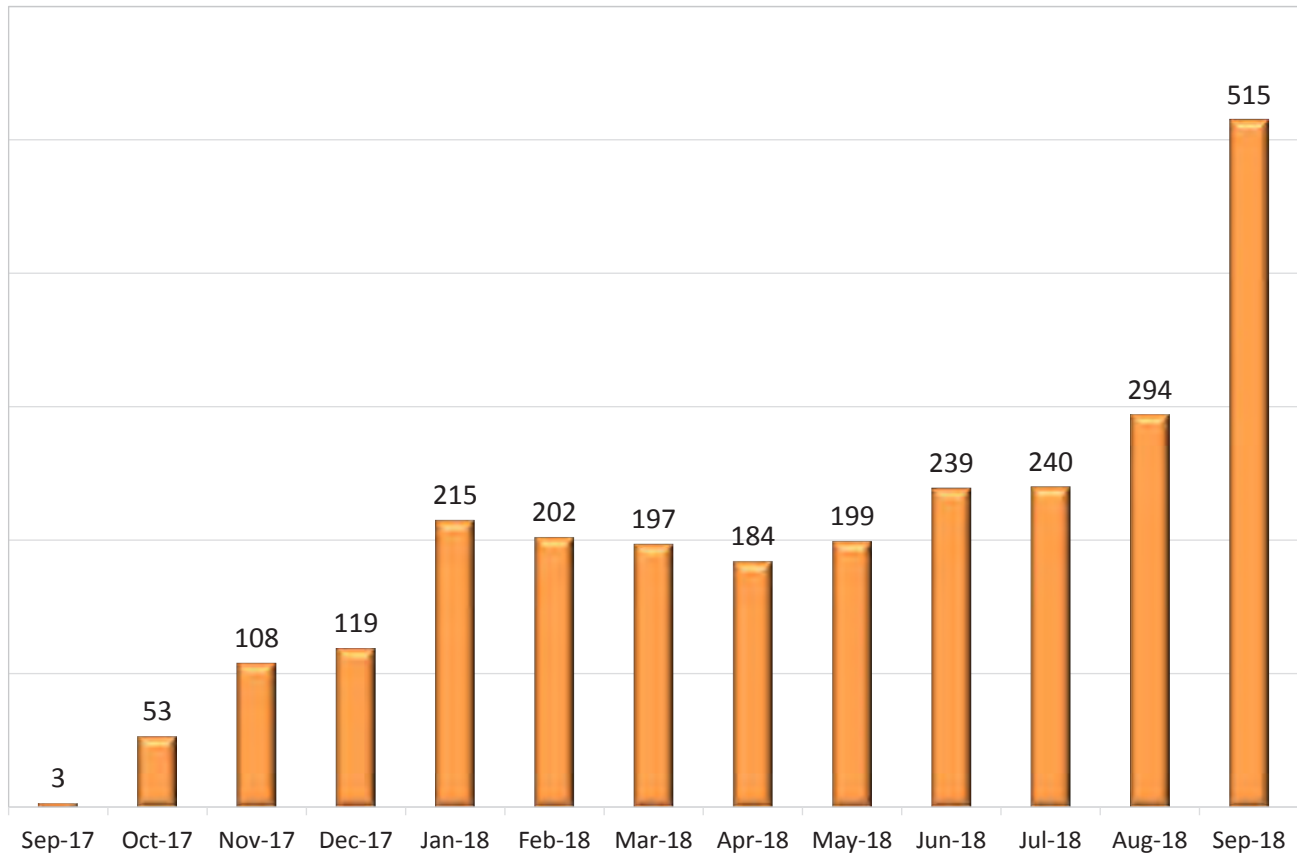
Pre-Workup Labs

24-Hour Urine Jugs Shipped



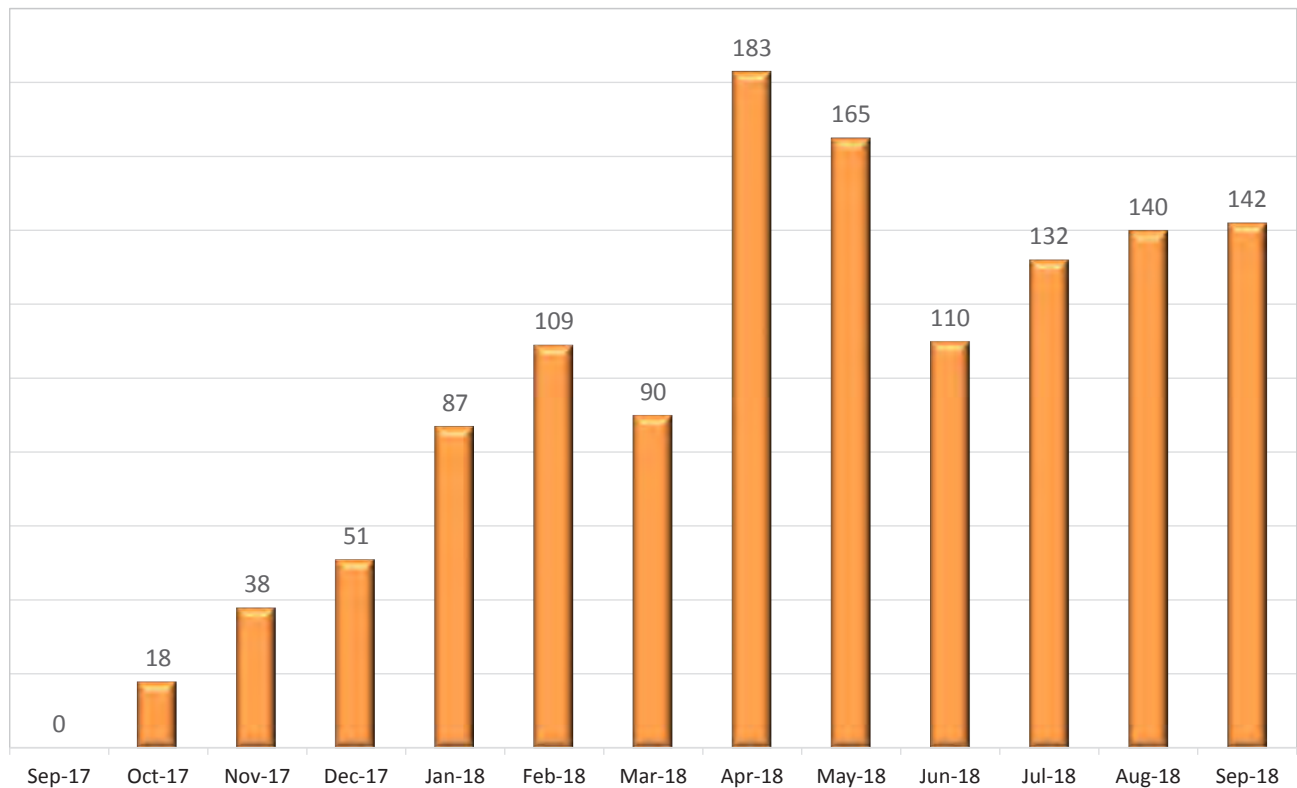
Pre-Workup Labs

Scripts Uploaded



Pre-Workup Labs

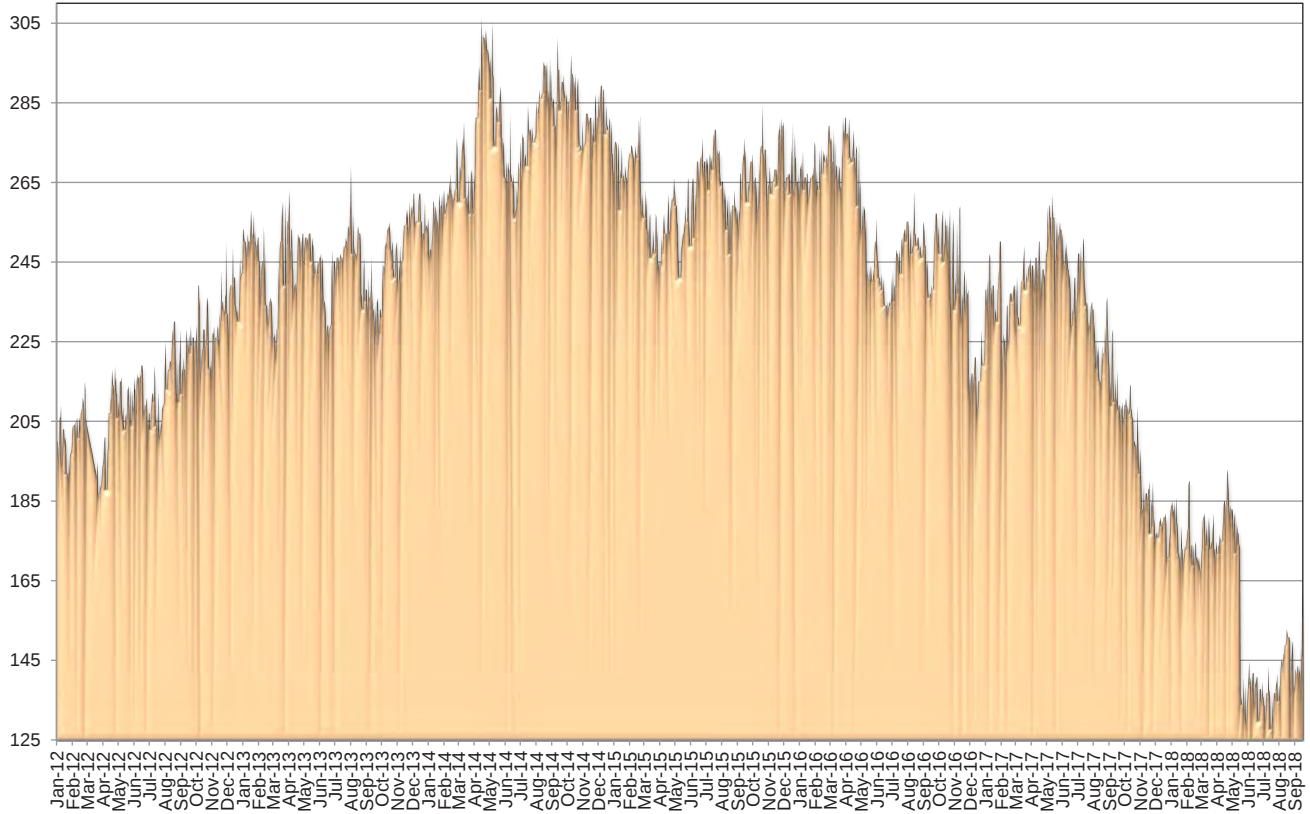
Results Uploaded



Pool Size

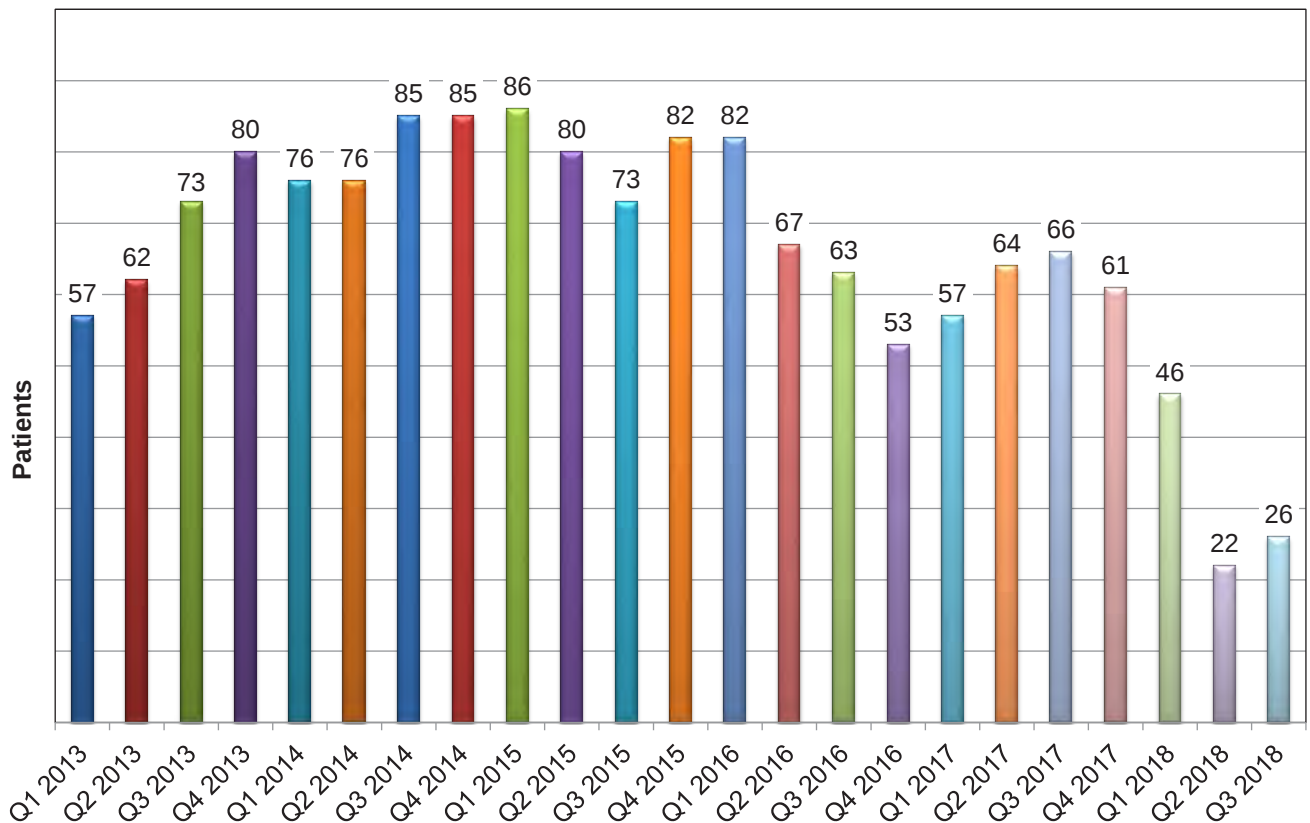
Unmatched Patients by Day

1/14/2012 – 9/30/2018



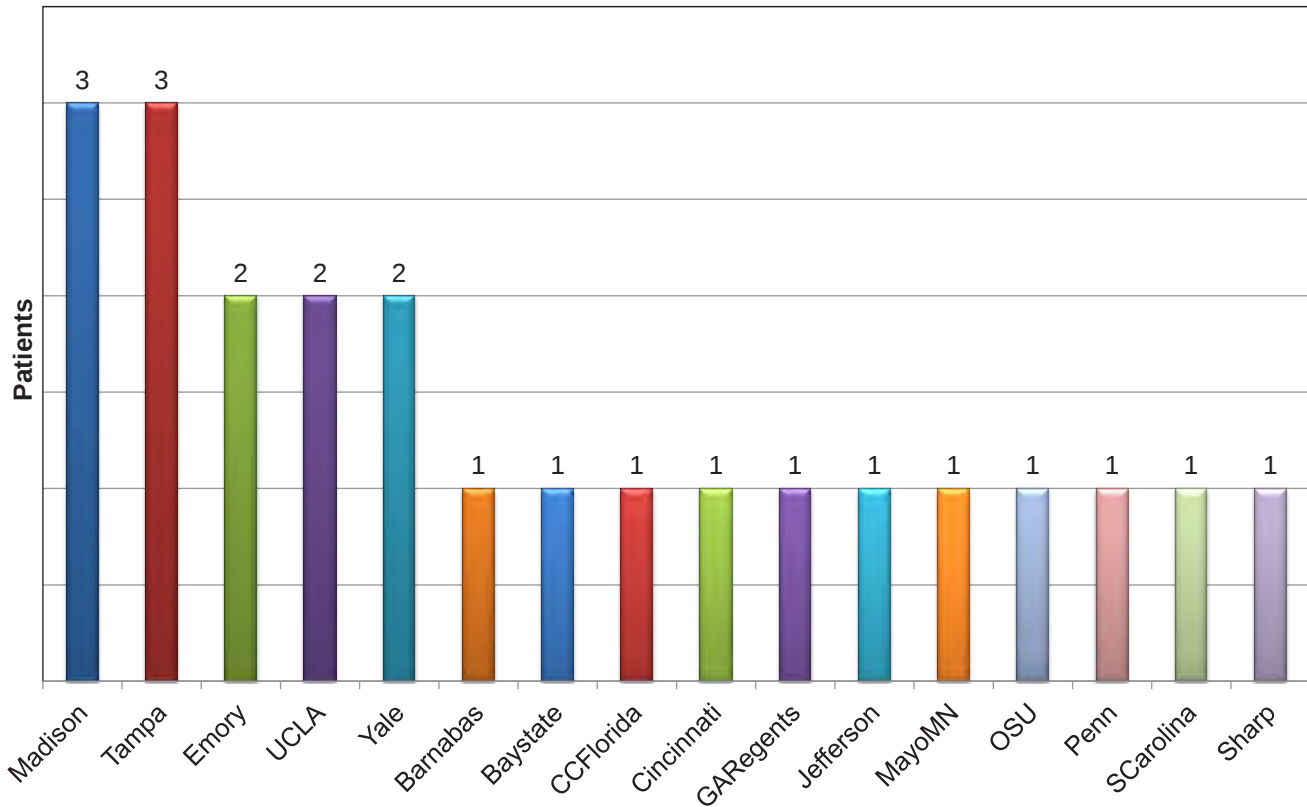
Patients Waiting > 1 Year by Quarter

As of 9/30/2018



Patients Waiting > 1 Year by Center

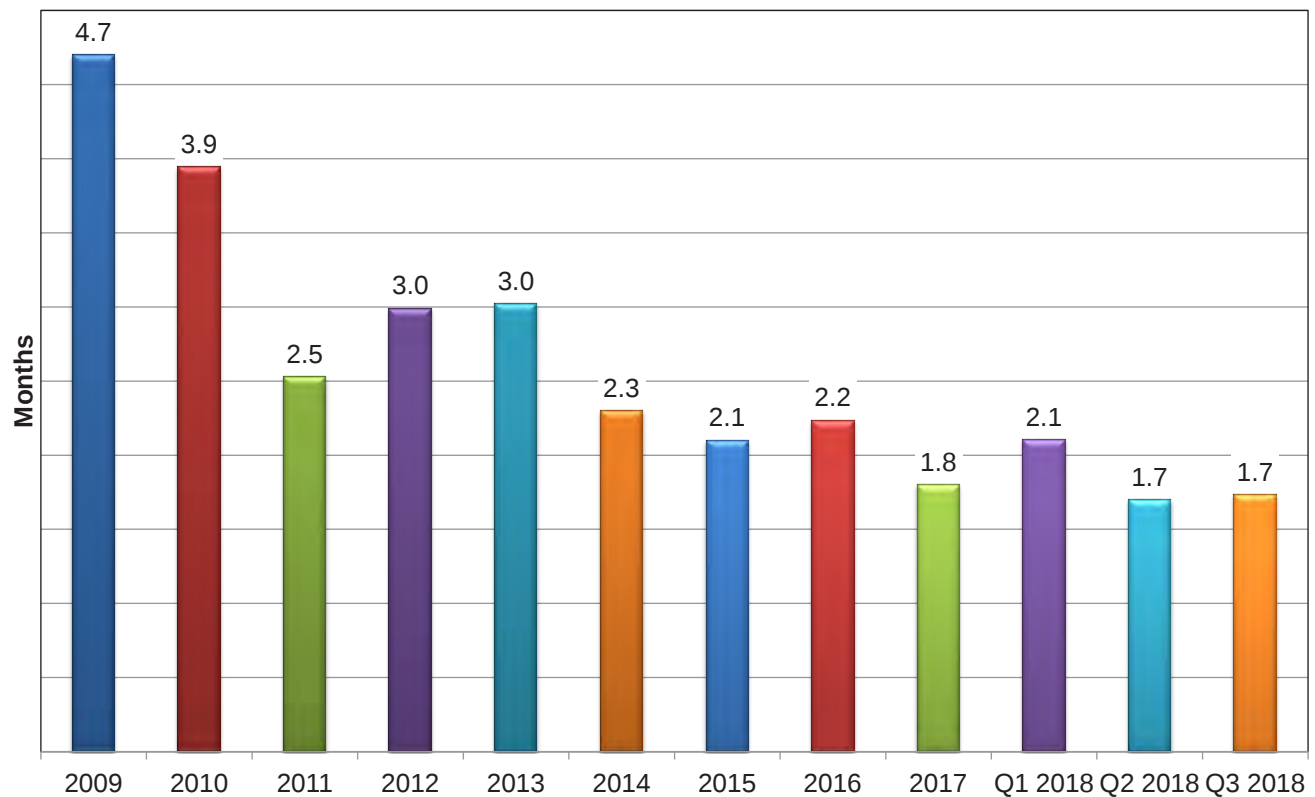
As of 9/30/2018



Transplanted Patient Median Wait Time

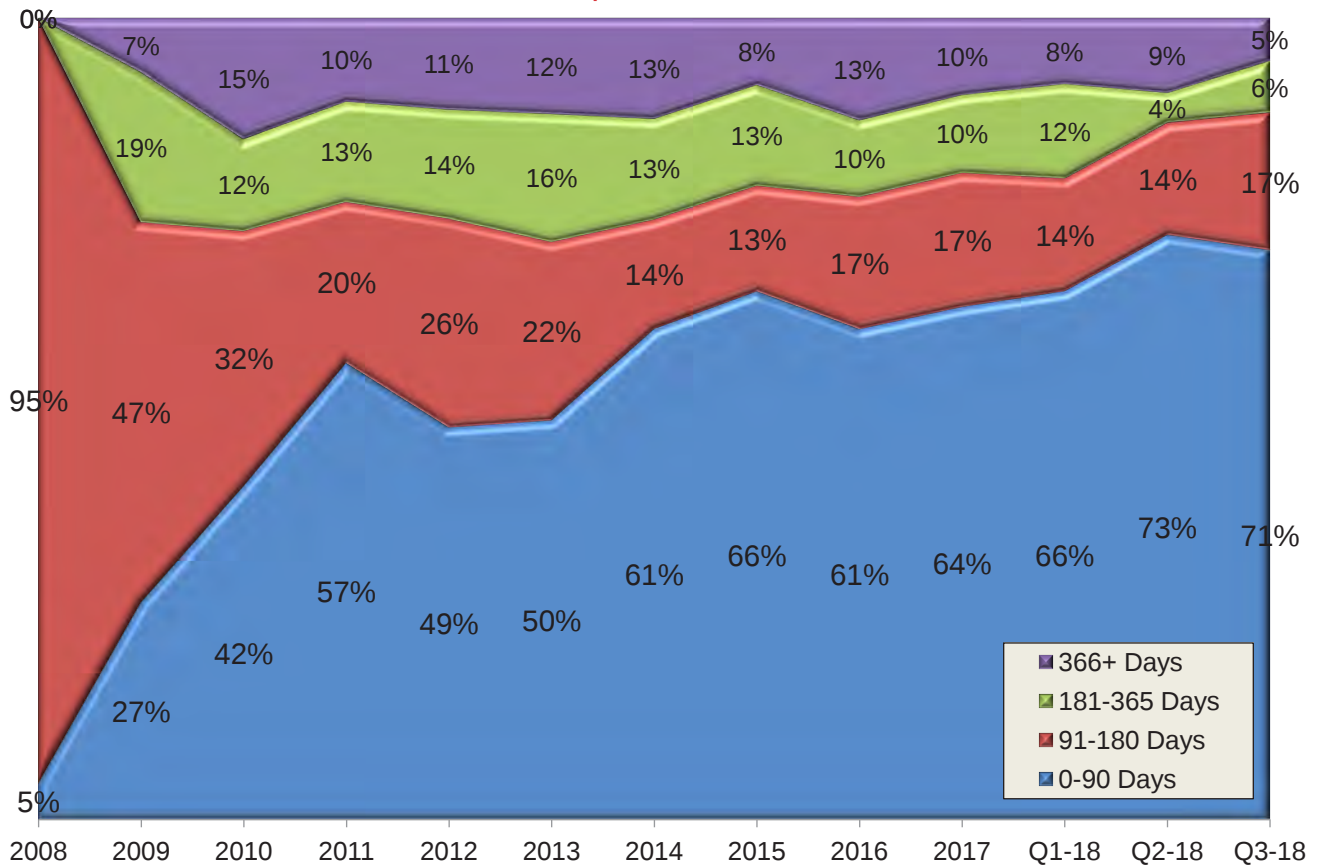
Wait times of patients transplanted during prior 12 months

As of 9/30/2018



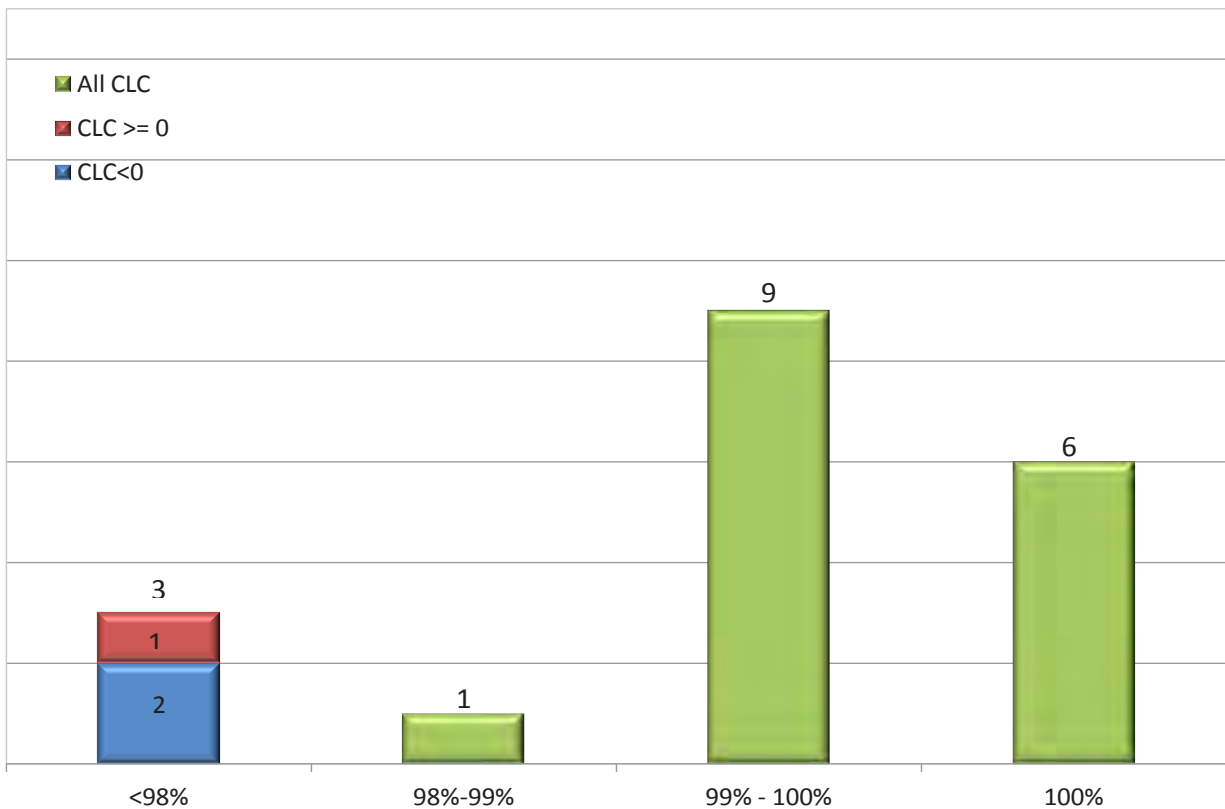
Wait Time Distribution

Transplanted Pairs



Unmatched Target Pairs

Waiting more than 12 Months



*As of 10/12/18, 2:36 PM

Pairs Waiting > 1 Year

Due to Unfavorable Blood Type Combination

#	R Alias	R ABO	D ABO	MHP	cPRA4	R Age	D Age	PMPc	Wait (Months)	CLCu
1	RFLCC14	O	A	0	2.50	39	67	98	18	-3840
2	BSMCWA	O	A1	0	0.00	67	55	106	18	-2630
3	R393130	O	A1	45	0.00	35	64	29	17	-11080
4	SF797753	O	A2	0	62.64	53	45	4	14	1000
5	EVADEB	O	A2	65	0.00	57.6	64	61	14	-4070

*As of 10/23/18, excludes patients matched since close of third quarter

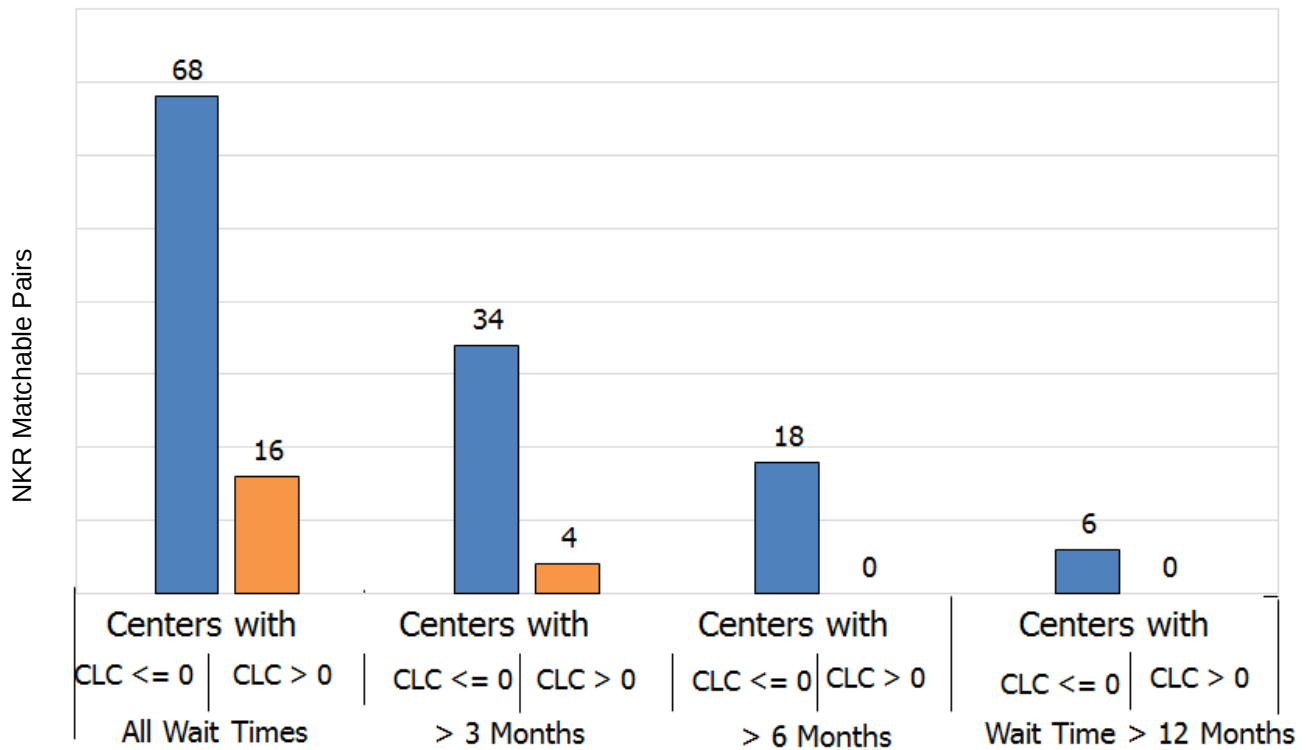
Pairs Waiting > 1 Year

Due to High cPRA

#	R Alias	R ABO	D ABO	MHP	cPRA4	R Age	D Age	PMPc	Wait (Months)
1	STORB	O	A	0	100.00	61	66	0	70
2	MAB1402991	AB	O	0	100.00	14	50	0	61
3	R3148	A	AB	0	100.00	39	34	0	30
4	EGUE357	O	O	0	100.00	62	36	0	21
5	SCHNALRE	O	O	0	100.00	54	54	0	21
6	DEKEDRE	O	O	0	100.00	47	35	0	20
7	SS4105110	A	A1	0	100.00	54	48	0	19
8	STESCA	B	B	6	100.00	44	41	0	17
9	JAJO7378	B	O A O	0	99.98	39	47 37 36	0	62
10	GM8784	B	O	0	99.98	23	31	0	36
11	TP0728	O	B	0	99.98	53	52	0	12
12	UC06142609	O	O	0	99.95	66	49	0	25
13	CR02221971	O	A1	0	99.90	46	45	0	13
15	JS966563	O	O	0	99.88	38	52	0	21
14	BURCHD77	B	B	0	99.83	40	38	0	35
16	BC1946	O	A1	0	99.81	71	44	0	73
17	KARORA	A	A1	0	99.76	55	52	0	13
18	AD0043	O	O	0	99.71	50	53	0	43
19	GISA510195	B	O	0	99.43	61	57	0	17
20	SMHCOL	O	A	0	99.12	22	55	0	35

As of 10/23/18, excludes patients matched since close of third quarter

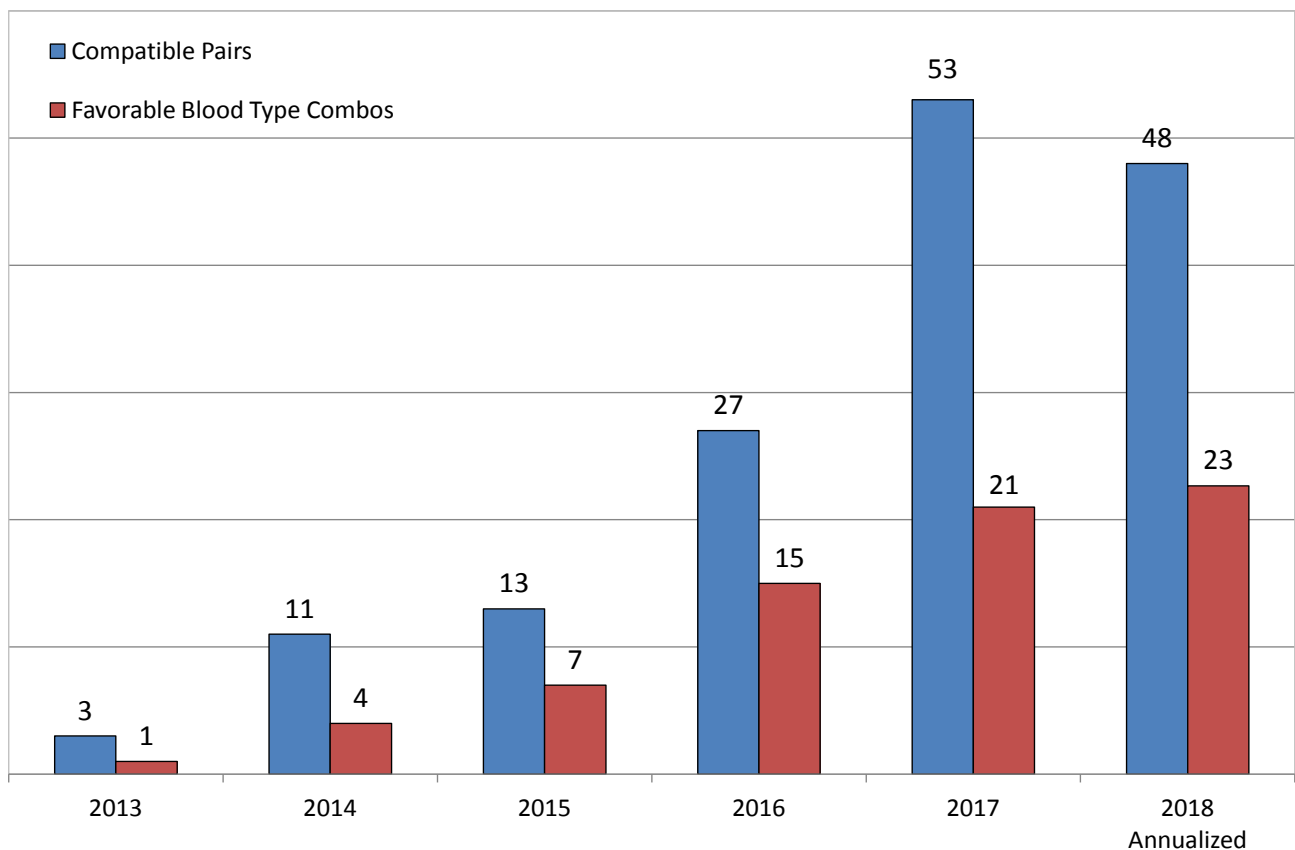
Pair Wait Time Analysis



* Data as of 10/12, 2:36pm

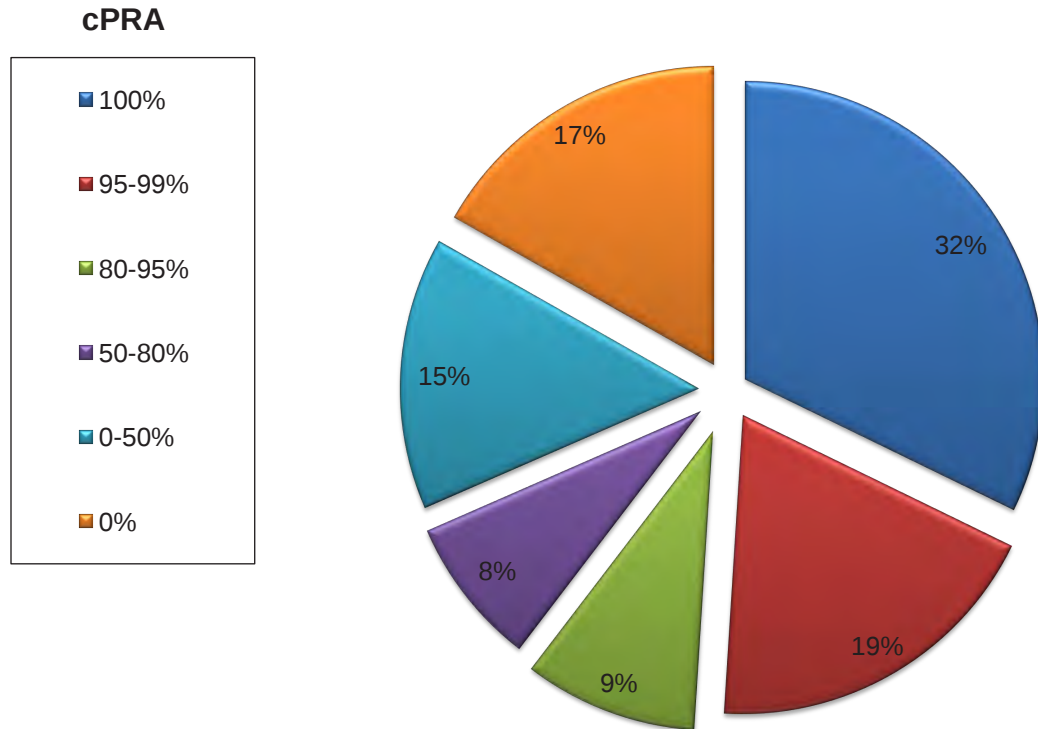
Compatible Pairs Transplanted

As of 9/30/18

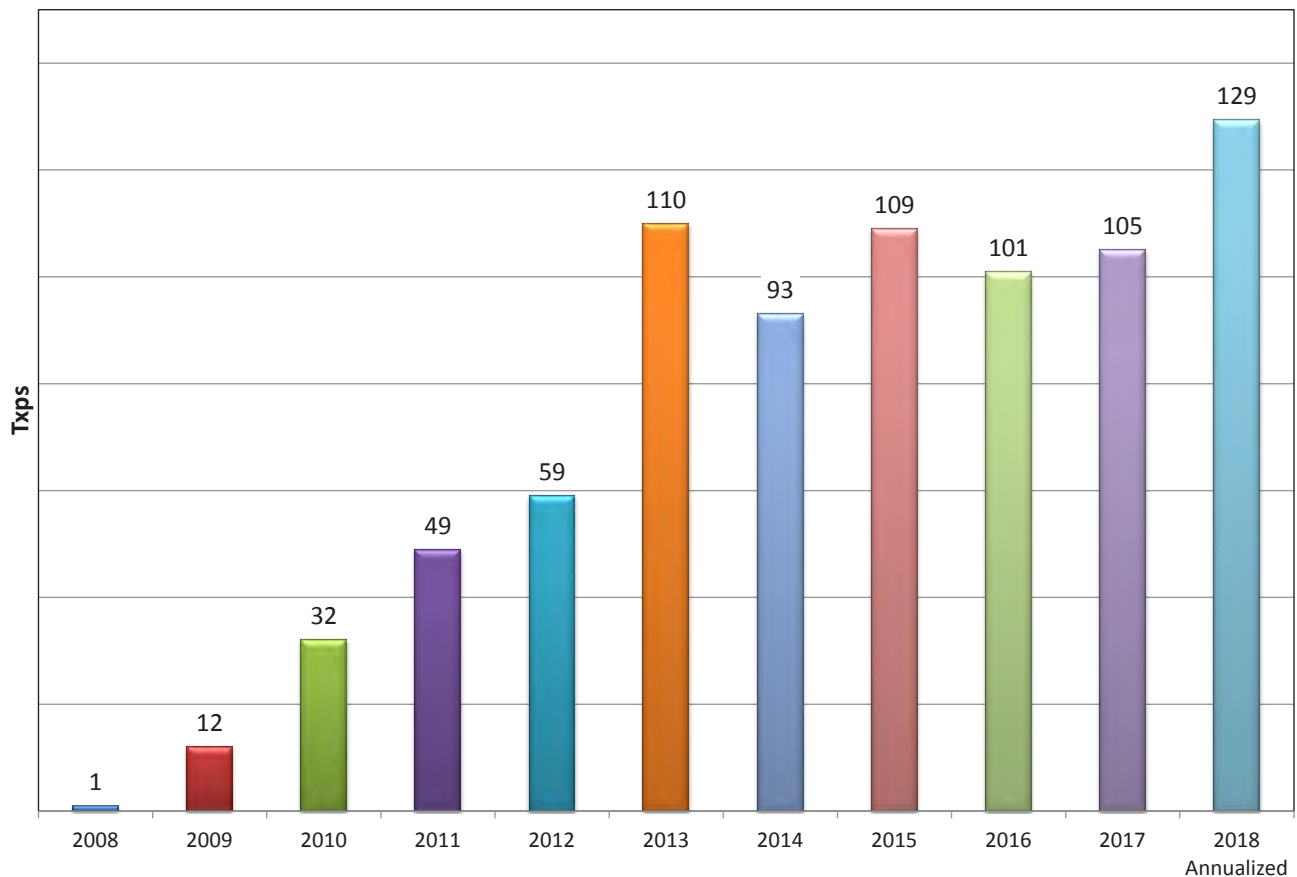


Pool Composition by cPRA

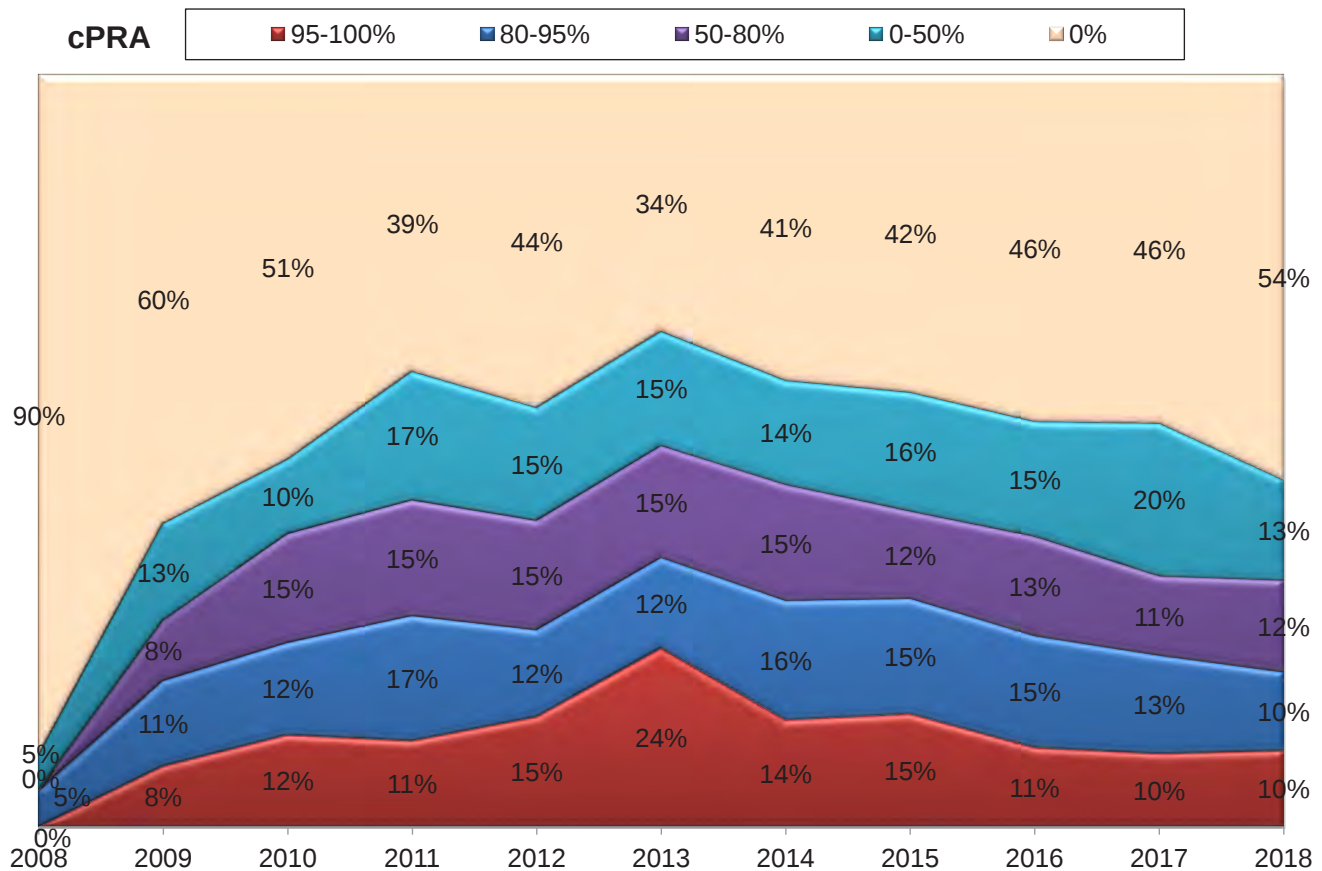
As of 9/30/18



Transplanted Patients with cPRA > 80%



Transplanted Patients by cPRA

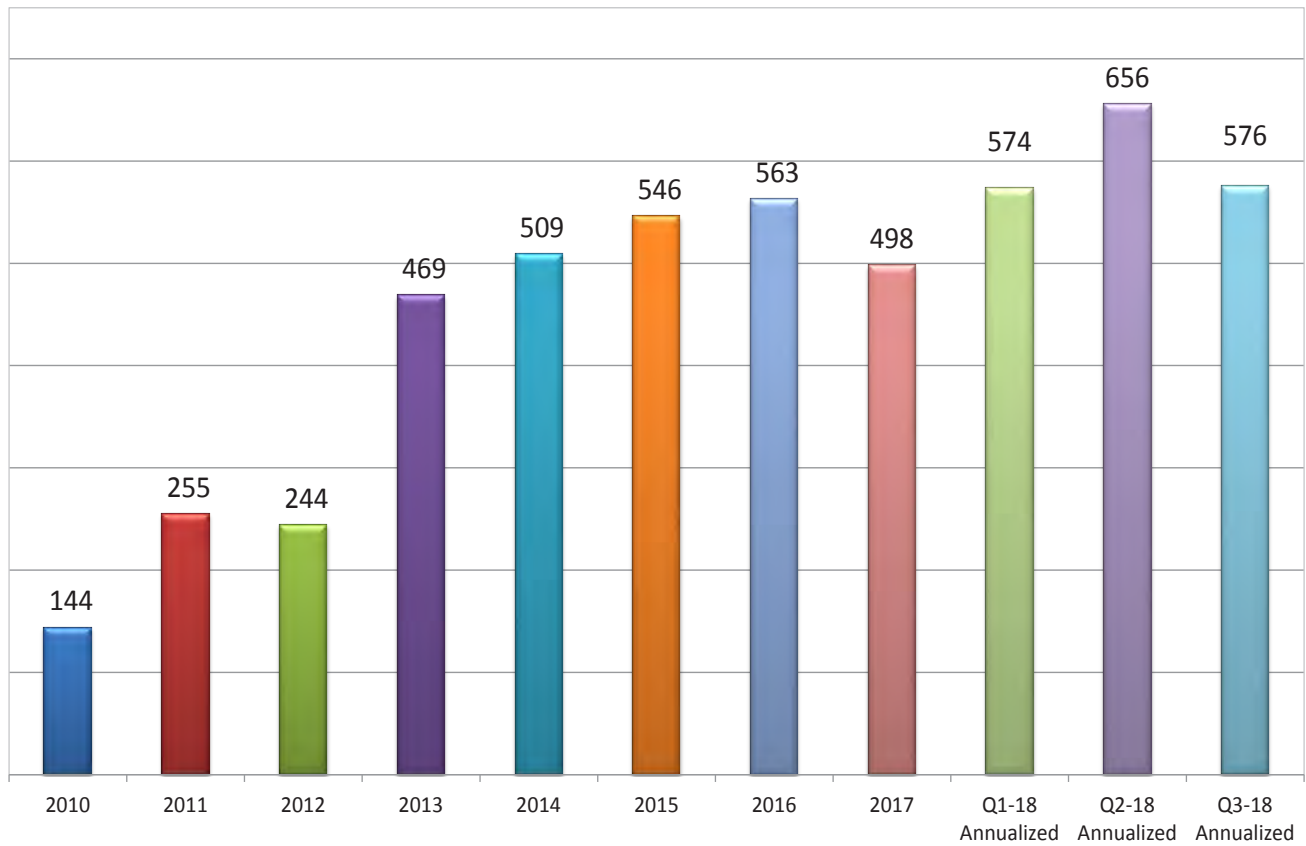


Great HLA Matches

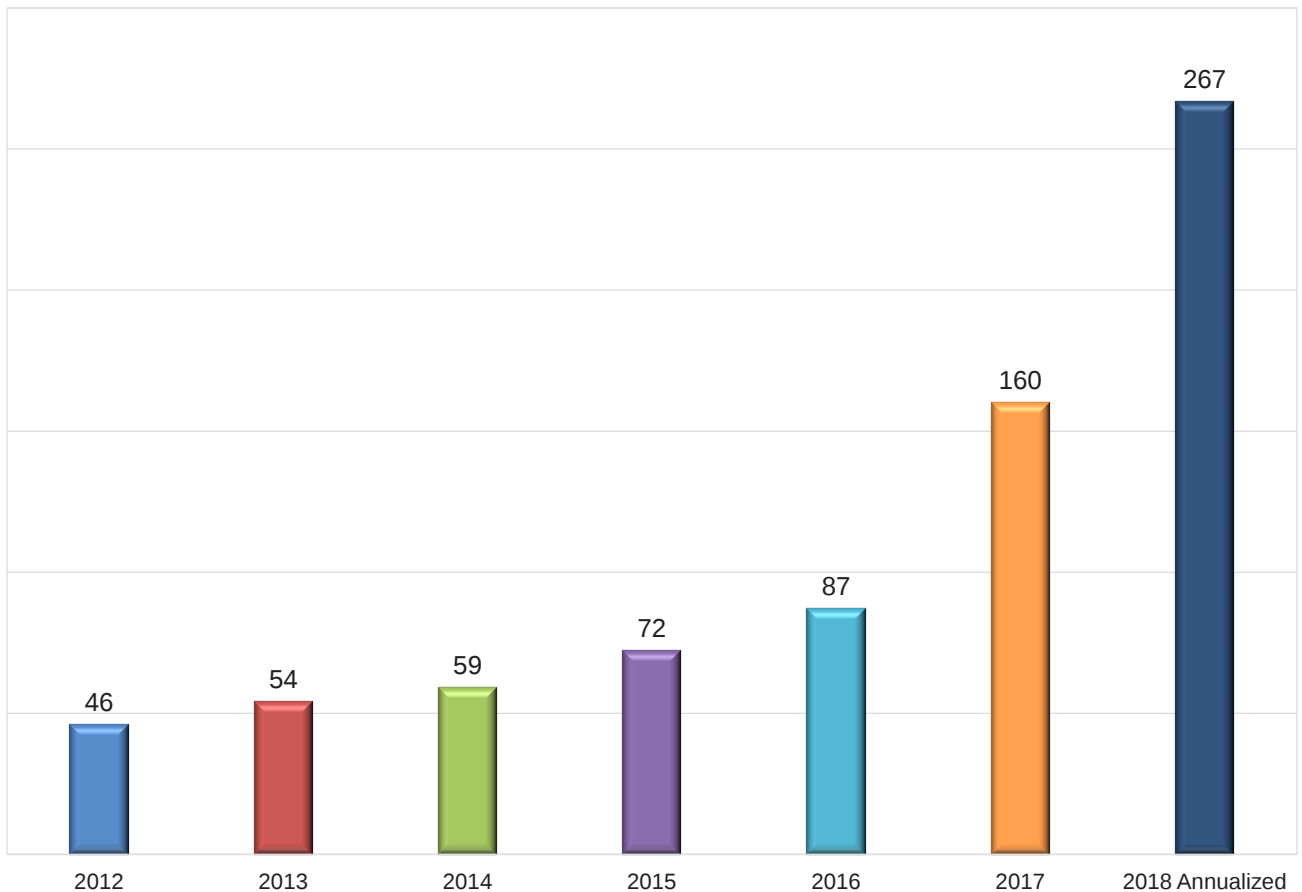
Zero Mismatch

Count	Recipient Center	Swap #	TXP Date	Donor ABO	Recipient ABO	NKR cPRA	Wait Time In Months	Donor Age ATOT	Recipient Age ATOT	HLA Points
1	Piedmont	1295	6/12/2018	O	O	100	2	29	61	100
2	Cornell	1266	4/4/2018	B	AB	0	1	68	63	100
3	Penn	1227	2/14/2018	O	O	7	3	58	26	100
4	Walter Reed	1203	2/8/2018	A	AB	100	5	61	40	100
5	Maine	1157	1/3/2018	A	A	100	9	54	52	100
6	Hartford	1191	1/3/2018	O	O	0	9	46	59	100
7	Hopkins	1019	6/1/2017	A	AB	0	2	40	55	100
8	Brigham	1026	5/24/2017	A	A	95	2	58	33	100
9	ChristHosp	952	1/18/2017	A	A	99	1	57	34	100
10	UMinn	928	11/8/2016	A	A	100	4	66	12	100
11	Cincinnati	884	8/31/2016	A	A	73	1	28	40	100
12	OSU	509	8/30/2016	A	A	91	1	38	67	100
13	SCarolina	459	2/11/2016	A	A	100	3	64	53	100
14	Madison	442	12/22/2015	A	A	97	6	22	63	100
15	UMinn	440	11/19/2015	O	O	100	5	23	20	100
16	UCLA	357	2/17/2015	A	A	100	34	39	52	100
17	Emory	351	12/11/2014	A	A	100	5	25	33	100
18	Hopkins	330	11/13/2014	A	O	96	1	41	38	100
19	Loyola	324	8/5/2014	A	A	100	1	37	55	100
20	Madison	674	1/9/2014	O	A	99	5	29	33	100
21	Barnabas	182	10/3/2012	A	A	92	4	51	50	100
22	Barnes	105	3/31/2011	A	A	100	7	60	32	100
23	UCSF	58	6/15/2010	A	A	100	6	47	58	100

New Exportable Pairs



Chains Started



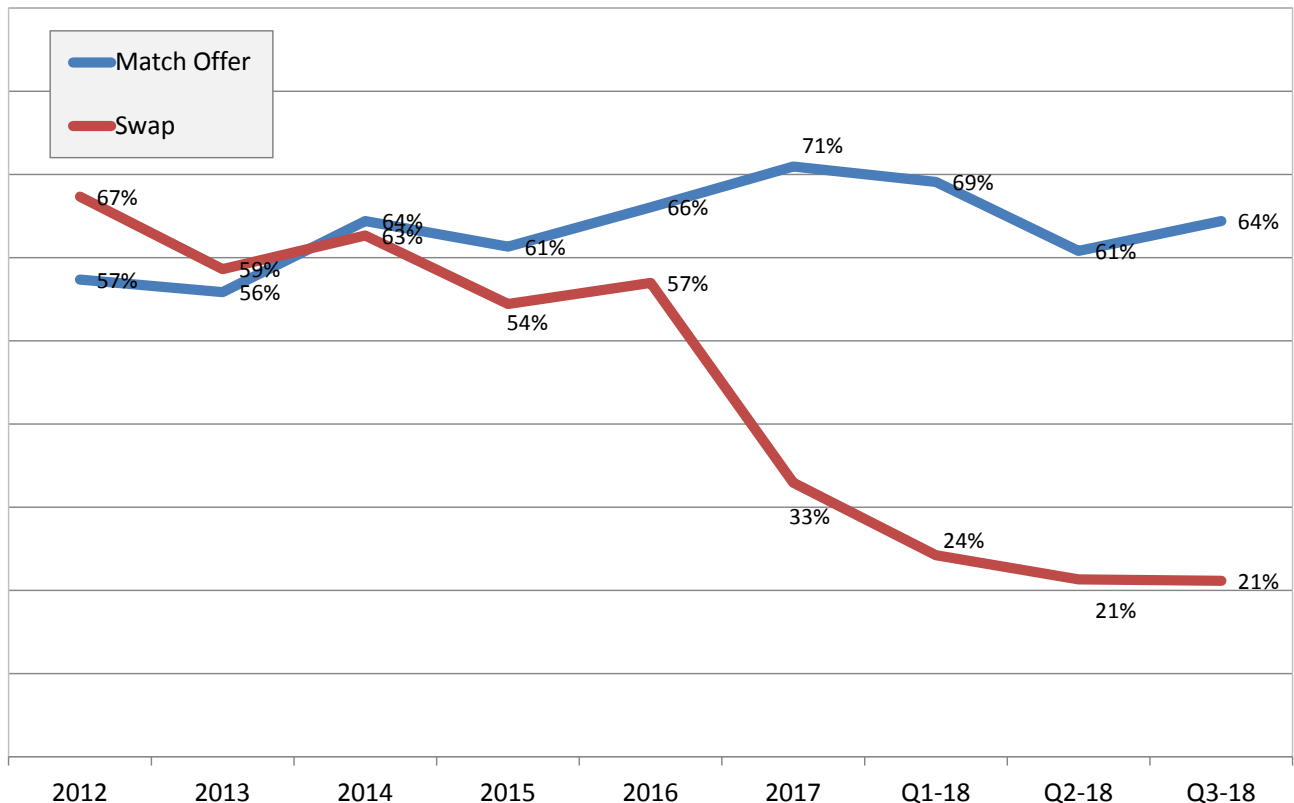
Chain and Loop Statistics

Category	Count	Mean Length	Transplants
Ended	712	3.62	2579
Broken	27	3.85	104
Active	1	4	4
Chain Total	740	3.63	2687
Loops	115	2.33	268
Total	855	3.46	2955

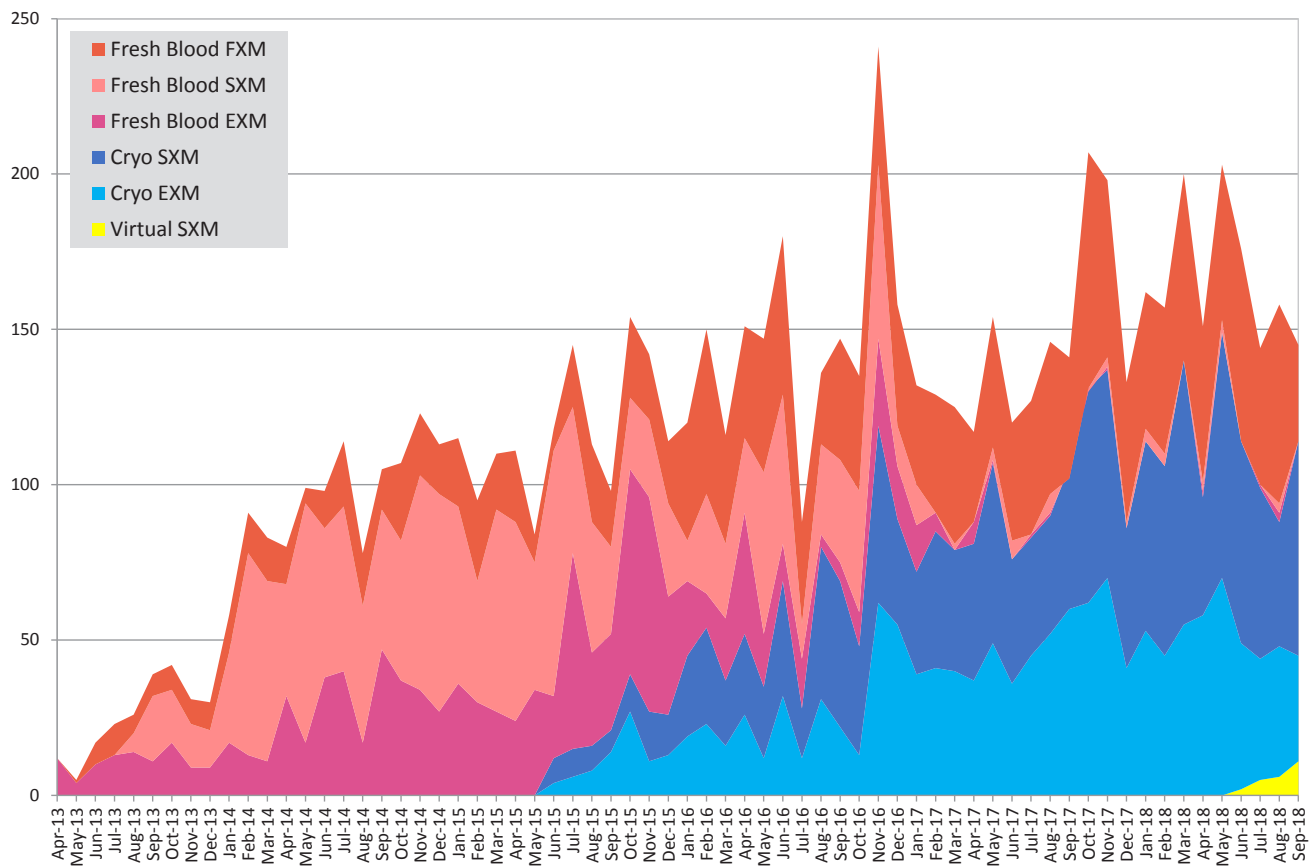
**Updates as of 10/18/18

Failure Rates

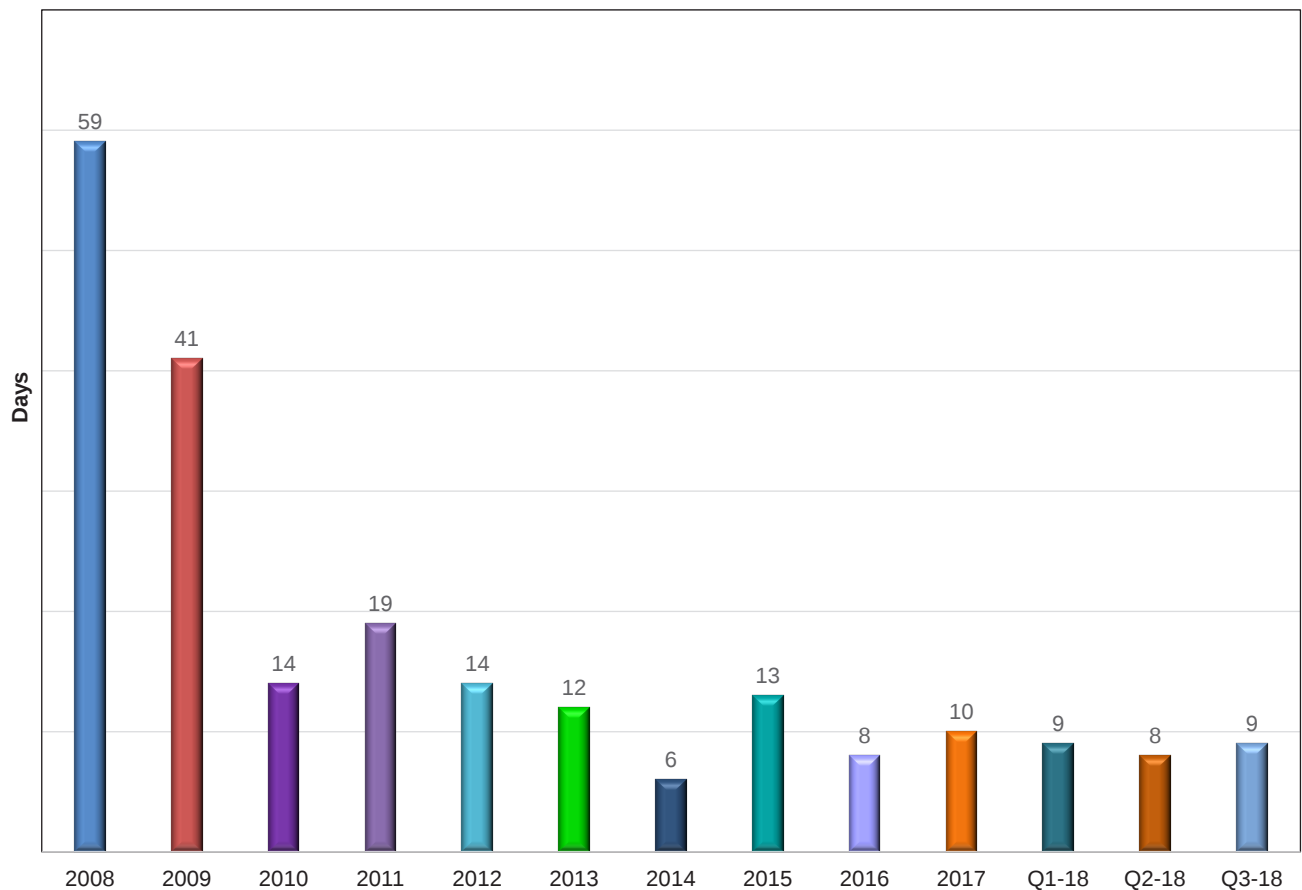
MO Rate = $1 - (XM/MO)$
 Swap Rate = $1 - (TXP/XM)$



Streamlined XMs Requested



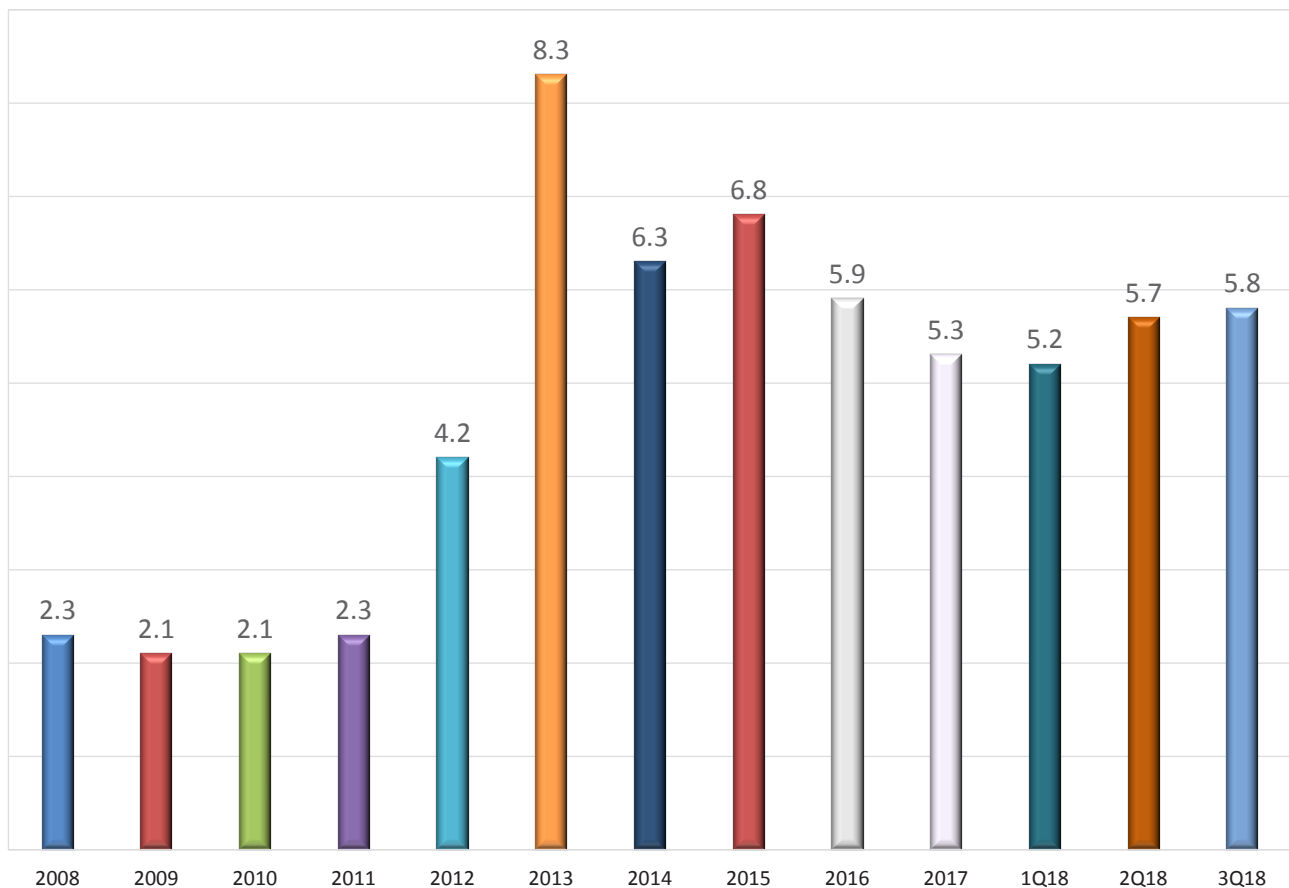
Bridge Donor Median Wait Times



Bridge Donor Wait Times

Year	Median	Mean	Max	Min
2008	59	53	77	16
2009	41	59	187	3
2010	14	51	385	2
2011	19	23	68	4
2012	14	29	314	2
2013	12	20	92	2
2014	6	11	97	2
2015	13	26	175	2
2016	8	14	71	2
2017	10	16	114	2
Q1-18	9	12	44	2
Q2-18	8	12	47	2
Q3-18	9	13	47	2

NKR Transplants per Bridge Donor



Summary Report

Broken Chains & Real Time Swap Failures

Year	# Bridge Donors	# Real Time Swap Failures	# Broken Chains	% Broken Per Year
2008	9	--	3	33%
2009	29	1	2	7%
2010	61	--	2	3%
2011	75	--	0	0%
2012	54	--	4	7%
2013	37	3	3	8%
2014	49	2	4	8%
2015	53	1	1	2%
2016	68	1	1	3%
2017	62	1	3	5%
2018	*64	1	4	6%
Total	532	10	27	

*Annualized

Detail Report

Broken Chains & Real Time Swap Failures

#	Reason Given	Real Time Swap Failures	Broken Chains	Center	Date
1	Job Issues/ long wait time/ many failed XMs		✓	Cornell	5/1/2008
2	No Reason		✓	Cornell	8/21/2008
3	No Reason		✓	CPMC	11/19/2008
4	Donor sick for swap then reneged later	✓	✓	UTMC	6/9/2009
5	Medical		✓	UCSF	11/10/2009
6	Medical		✓	UCLA	3/16/2010
7	Second nuclear GFR test < 80 (79 down from 82)		✓	AGH	9/16/2010
8	No Reason		✓	MethodistTX	2/3/2012
9	No Reason		✓	UCSF	4/4/2012
10	Medical		✓	UCLA	6/28/2012
11	Medical/Surgical		✓	Washington	11/5/2012
12	Aborted donor surgery	✓	✓	CPMC	6/27/2013
13	Kidney declined by recipient surgeon	✓	✓	RWJ/UPenn	7/23/2013
14	Recipient Medical Issue	✓	✓	Porter	10/16/13
15	Kidney Declined by Recipient Surgeon	✓	✓	Porter/Jefferson	1/9/14
16	Medical		✓	UCLA	3/4/14
17	Recipient Medical Issue	✓	Loop	ChristHosp	3/11/14
18	Medical		✓	Hopkins	7/15/14
19	Medical		✓	Hopkins	10/9/14
20	Kidney Declined by Recipient Surgeon	✓	✓	Tampa/Hopkins	7/7/15
21	Kidney Declined by Recipient Surgeon	✓	--	Porter/Aurora St Lukes	3/17/16
22	Donor reneged		✓	Maryland	8/8/16
23	Donor reneged		✓	SCarolina	1/10/17
24	Kidney Declined by Recipient Surgeon	✓	✓	Indiana/UNC	9/27/2017
25	Donor Ruled Out- Medical Issue		✓	UMinn	8/23/2017
26	Donor reneged		✓	CC Florida	4/4/2018
27	Recipient became too sick for transplant	✓	✓	Loyola	6/19/2018
28	Late Stage Donor Decline		✓	Legacy	7/9/2018
29	Kidney Thrombosis		✓	CC Florida	8/14/2018
	Total	10	27		

Advanced Donation Program (ADP)

Summary

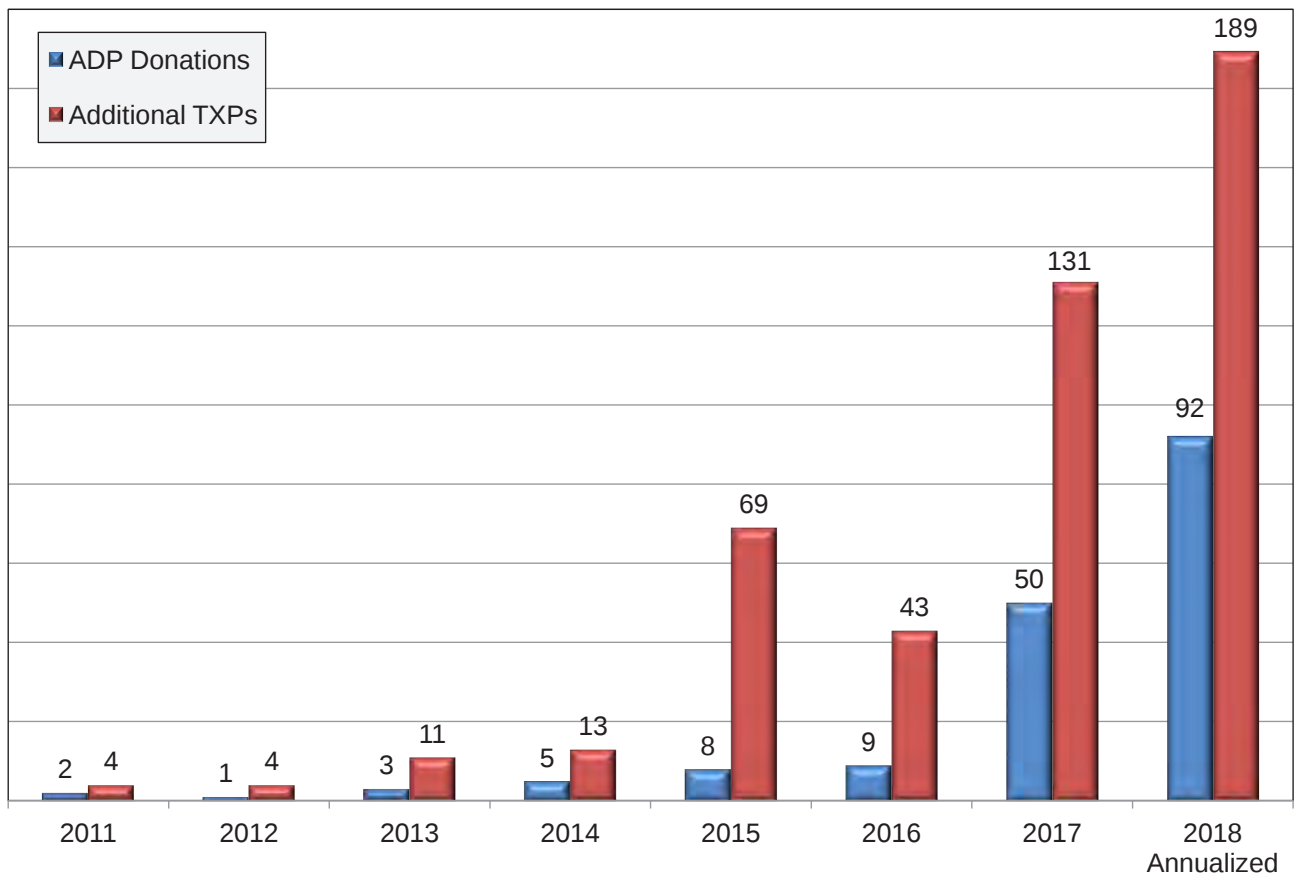
As of 9/30/2018

Type	Cases	Add'l TXPs Facilitated	80 % + cPRA TXPs Facilitated	95 % + cPRA TXPs Facilitated
Short-Term*	109	319	94	47
Voucher**	39	100	18	8
Total	148	419	112	55

*Short-Term– At time of advanced donation the intended ADP Recipient is in need of transplant.

**Voucher - At time of advanced donation the intended ADP Recipient is not in need and may never be in need of transplant.

ADP Donations & Additional TXPs Facilitated

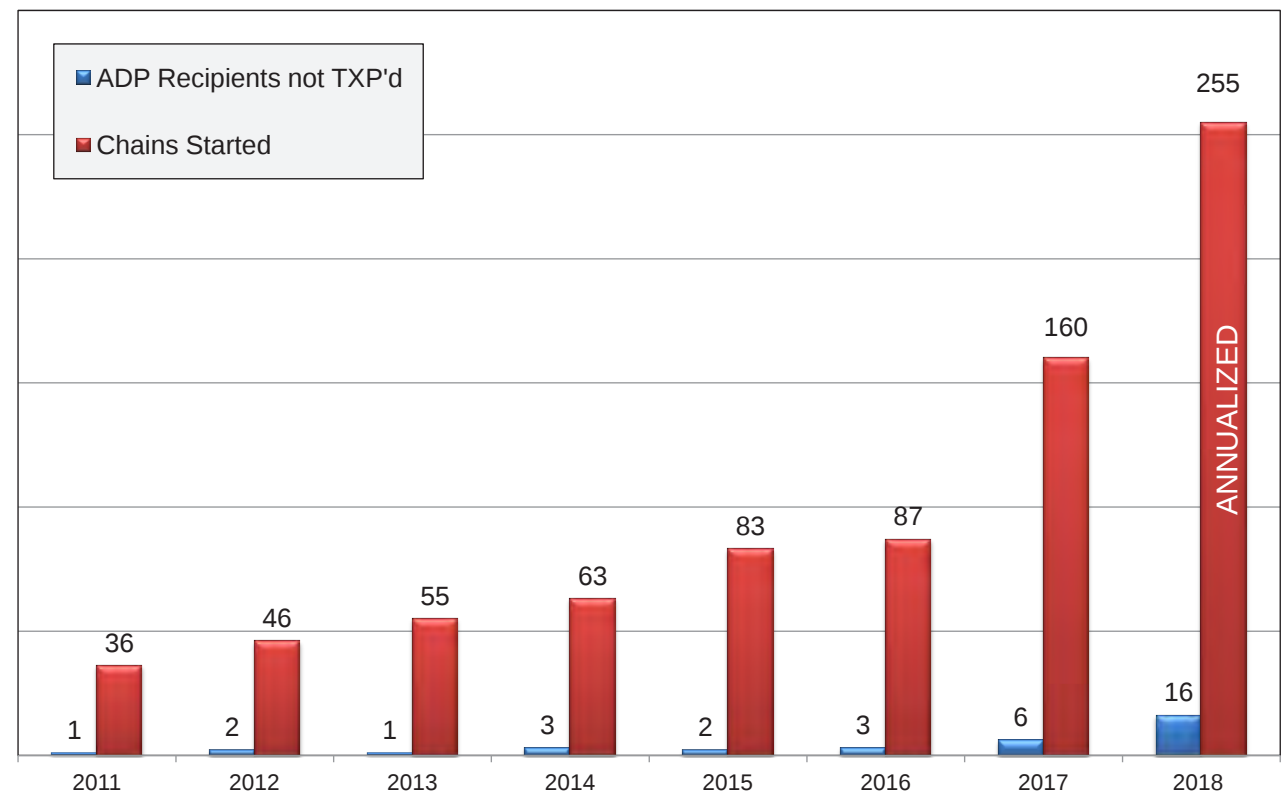


ADP Recipient Pool



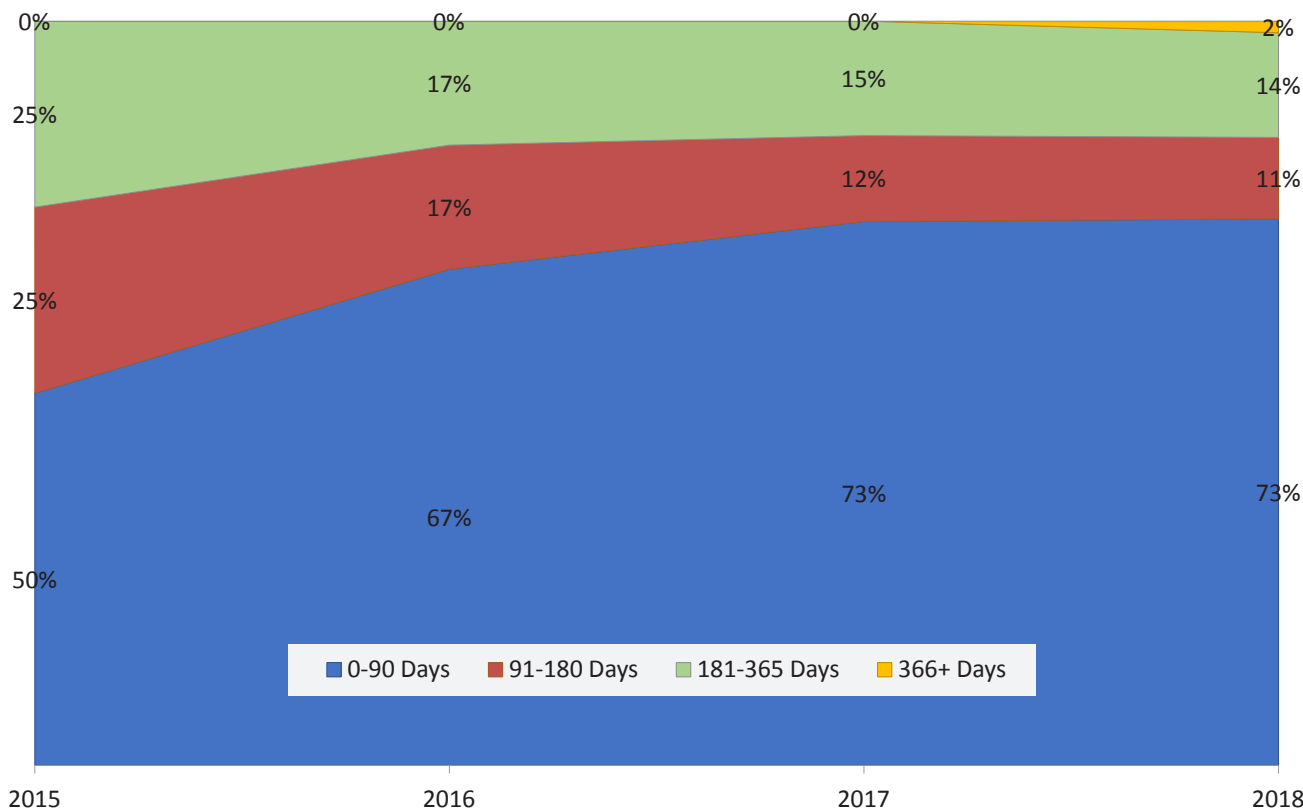
*As of 10/15/18, 09:44 AM

ADP Recipients Outstanding vs. Overall Chains Started



*ADP Recipients not transplanted are recipients whose donor has donated and they are "Active" and "Need Match."

ADP Recipient Wait Time Distribution



*Wait time count begins after the ADP donor has donated and recipient has been activated.

Program Statistics

As of 9/30/2018

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Transplants Facilitated	21	62	131	175	226	308	310	360	399	462	473
2	Paired Transplants Facilitated	21	39	91	131	164	252	255	288	315	318	289
3	Chip Transplants Facilitated	0	23	40	44	62	56	55	72	84	144	184
4	Ending Unmatched Patient Pool	80	127	120	201	241	255	279	280	215	181	149
5	Cumulative Transplants	21	83	214	389	615	923	1233	1593	1992	2454	2927
6	Cumulative Paired Transplants	21	60	150	280	526	777	1030	1316	1630	1946	2235
7	Cumulative Chip Transplants	0	23	64	109	89	146	203	277	362	508	692
8	Cumulative Paired Patient Pool	101	210	334	590	805	1062	1351	1615	1877	2152	2420
9	Percent of Pool Transplanted (Paired Recipients)	21%	40%	64%	66%	71%	76%	79%	84%	89%	92%	94%
10	Enrolled Patient Mean Wait Time (years)	3.8	2.0	0.9	1.1	1.1	1.0	0.9	0.9	0.9	0.9	0.6
11	Transplanted Patient Mean Wait Time (months)	5.1	5.3	6.0	5.0	5.1	5.4	4.8	4.1	4.7	4.0	3.7
12	Transplanted Patient Median Wait Time (months)	5.3	5.3	3.9	2.5	3.0	3.0	2.3	2.1	2.2	1.8	1.7
13	Mean cPRA of Transplanted Patients	4.1%	25.9%	34.5%	40.3%	44.1%	54.0%	48.3%	48.9%	42.8%	41.9%	39.8%
14	Number of Transplants Completed by cPRA											
15	100%	0	1	4	10	4	5	3	7	3	4	4
16	95-100%	0	4	12	10	29	68	41	47	39	41	44
17	80-95%	1	7	16	29	26	37	49	55	59	60	49
18	50-80%	0	5	19	27	33	46	48	42	53	49	58
19	0-50%	1	8	13	30	34	47	43	57	61	94	63
20	0%	19	37	67	69	100	105	126	152	184	214	255
21	Sub-total	21	62	131	175	226	308	310	360	399	462	473
22	Percent of Transplants Completed by cPRA											
23	100%	0%	2%	3%	6%	2%	2%	1%	2%	1%	1%	1%
24	95-100%	0%	6%	9%	6%	13%	22%	13%	13%	10%	9%	9%
25	80-95%	5%	11%	12%	17%	12%	12%	16%	15%	15%	13%	10%
26	50-80%	0%	8%	15%	15%	15%	15%	15%	12%	13%	11%	12%
27	0-50%	5%	13%	10%	17%	15%	15%	14%	16%	15%	20%	13%
28	0%	90%	60%	51%	39%	44%	34%	41%	42%	46%	46%	54%
29	Sub-total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
30	Number of Transplanted Patients with cPRA >80%	1	12	32	49	59	110	93	109	101	105	97
31	Percent of Transplanted Patients with cPRA >80%	5%	19%	24%	28%	26%	36%	30%	30%	26%	23%	20%

Program Statistics

As of 9/30/2018

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
32	Number of Unmatched Patients by cPRA											
33	100%				79	73	83	81	80	80	63	48
34	95-99%				73	73	61	61	53	37	32	28
35	80-95%				15	15	24	19	22	12	14	14
36	50-80%				14	11	14	13	25	13	8	12
37	0-50%				14	10	22	37	35	28	16	22
38	0%				50	59	51	68	65	45	48	25
39	Sub-total				245	241	255	279	280	215	181	149
40	Percent of Unmatched Patients by cPRA											
41	100%				32%	30%	33%	29%	29%	37%	35%	32%
42	95-99%				30%	30%	24%	22%	19%	17%	18%	19%
43	80-95%				6%	6%	9%	7%	8%	6%	8%	9%
44	50-80%				6%	5%	5%	5%	9%	6%	4%	8%
45	0-50%				6%	4%	9%	13%	13%	13%	9%	15%
46	0%				20%	24%	20%	24%	23%	21%	27%	17%
47	Sub-total				100%	100%	100%	100%	100%	100%	100%	100%
48	Number of Transplants Completed by Wait Time											
49	< 6 months	21	42	74	106	180	232	243	298	327	392	420
50	6-12 months	0	10	14	19	24	44	35	38	30	37	27
51	1-2 years	0	4	15	14	20	25	27	22	32	29	22
52	2+ years	0	0	2	2	2	7	5	2	10	4	4
53	Sub-total	21	56	105	141	226	308	310	360	399	462	473
54	Percent of Transplants Completed by Wait Time											
55	< 6 months	100%	75.0%	70.5%	75.2%	79.6%	75.3%	78.4%	82.8%	82.0%	84.8%	88.8%
56	6-12 months	0.0%	17.9%	13.3%	13.5%	10.6%	14.3%	11.3%	10.6%	7.5%	8.0%	5.7%
57	1-2 years	0.0%	7.1%	14.3%	9.9%	8.8%	8.1%	8.7%	6.1%	8.0%	6.3%	4.7%
58	2+ years	0.0%	0.0%	1.9%	1.4%	0.9%	2.3%	1.6%	0.6%	2.5%	0.9%	0.8%
59	Sub-total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
60	Total Chains Started	4	9	28	36	46	55	63	83	99	160	191
61	Total Loops Completed	0	3	2	3	12	24	17	15	7	15	8
62	Number of broken chains	3	2	2	0	4	3	4	1	2	2	2
63	Bridge Donors Held (2018 Annualized)	9	29	61	75	54	37	49	53	68	62	68
64	Percent of broken chains	33%	7%	3%	0%	7%	8%	8%	2%	3%	3%	3%