

# Paired Exchange Results Quarterly Report

As of March 31, 2015


Join Us For The 3rd Annual

***Future Directions in Paired Exchange***

Friday June 19th 2015

New York City

*See enclosed brochure for more details about all  
NKR hosted events for June 18th & 19th, 2015*



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## Message From the Founder

I am pleased to report that the NKR facilitated 90 transplants in the first quarter of this year, up 12% over the 80 transplants facilitated in the prior quarter. We set a new record of 38 KPD transplants in March. Not only was March the largest month in NKR's history but we also ended our longest chain on March 26th. This chain is being featured on Nightline and involved 70 people, 35 donors with 35 patients. Five of the 35 patients were nearly impossible to match having cPRA values greater than 99%.

Growth increased in the first quarter due to a reduction in swap failures which reached a new low of 41% in March. This is a dramatic reduction in swap failures compared to last year's swap failure rate of 64%. The primary root cause for swap failures continues to be unexpected unacceptable cross match results which impacted 38 transplants in the first quarter. These unexpected unacceptable cross matches can now be virtually eliminated with the utilization of timely exploratory cross matching, coupled with donor cell cryopreservation, a recent NKR offering being adopted by many centers.

During the first quarter several important innovations were launched including the utilization of a central lab, allowing centers to outsource the cryopreservation and storage of donor cells. An outsourced service for serology testing was also deployed to provide fast and consistent turnaround for pre-op serology tests. We've additionally upgraded our GPS fleet which now offers enhanced tracking detail and temperature-monitoring of the kidney inside its shipping container.

We are once again hosting our Educational Events and Awards Gala at the Waldorf in New York City on June 18th and 19th. We have a world class lineup of speakers who are presenting cutting edge research directly impacting KPD effectiveness. The Gala is again honoring kidney donors and transplant professionals who are effecting miracles. See the attached brochure for details. These events are filling quickly so RSVP while seats are still available.

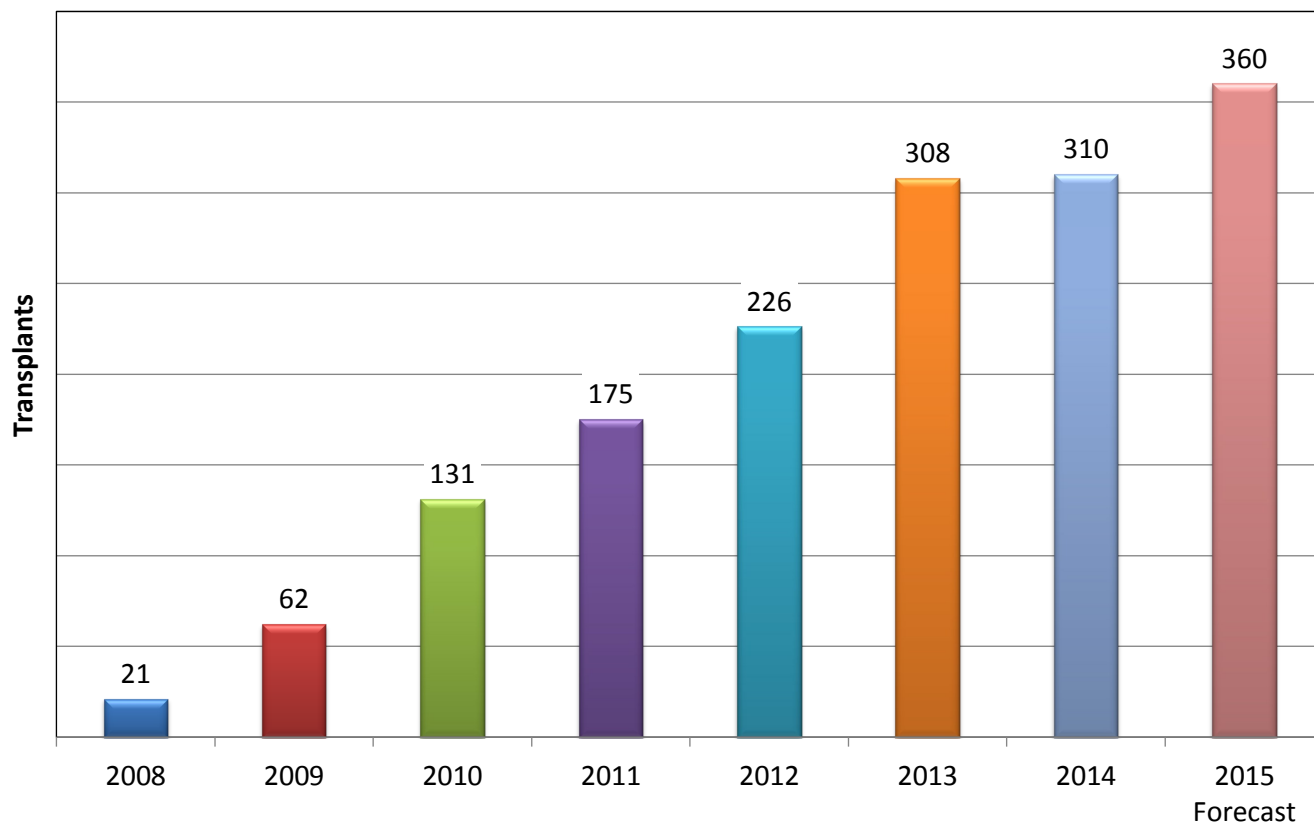
The great dedication and effort of our member centers' medical professionals drive the NKR's continued success. Thank you for your continued collaboration and keep up the great work.

Sincerely,

A handwritten signature in blue ink, appearing to read 'G. Hil'.

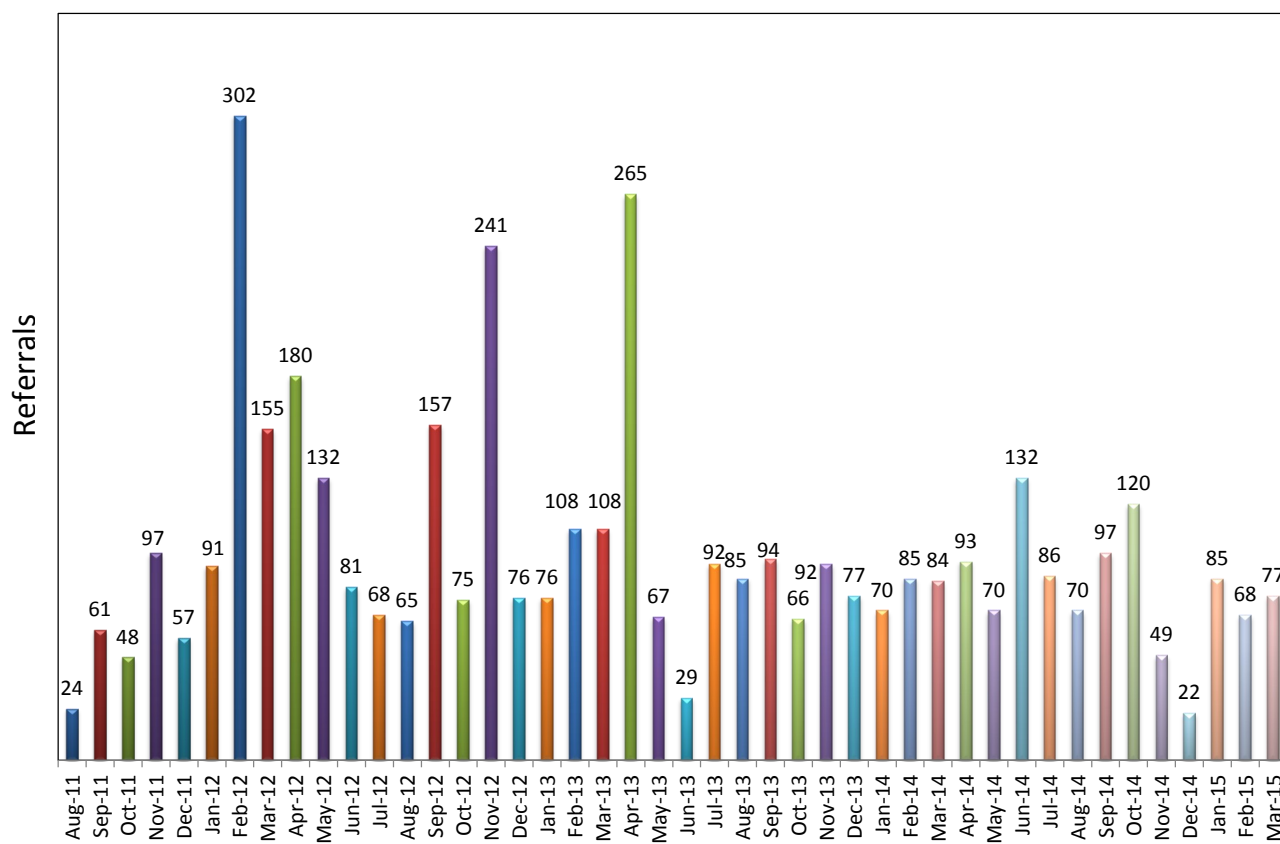
Garet Hil  
Founder & CEO  
National Kidney Registry

## Transplants Facilitated



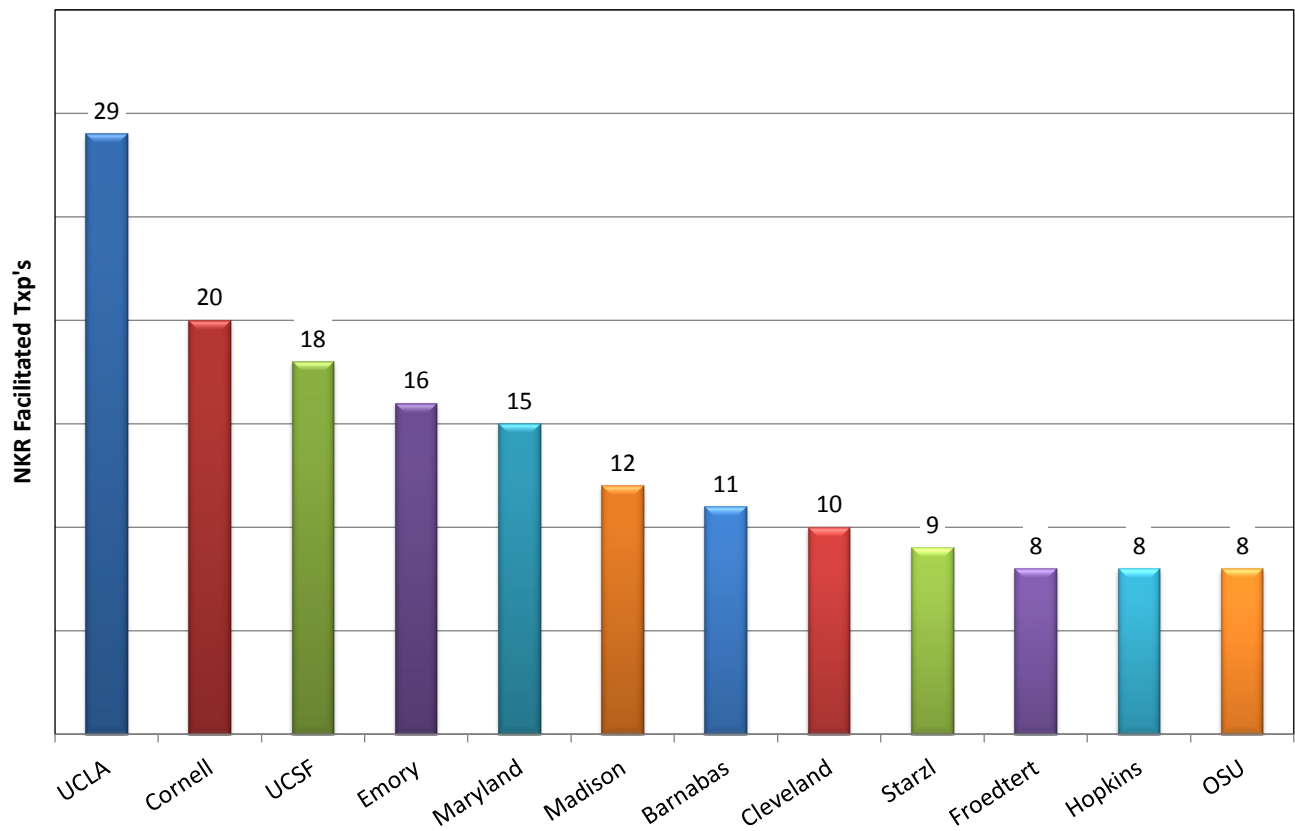
## Patient Referrals

To NKR Member Centers



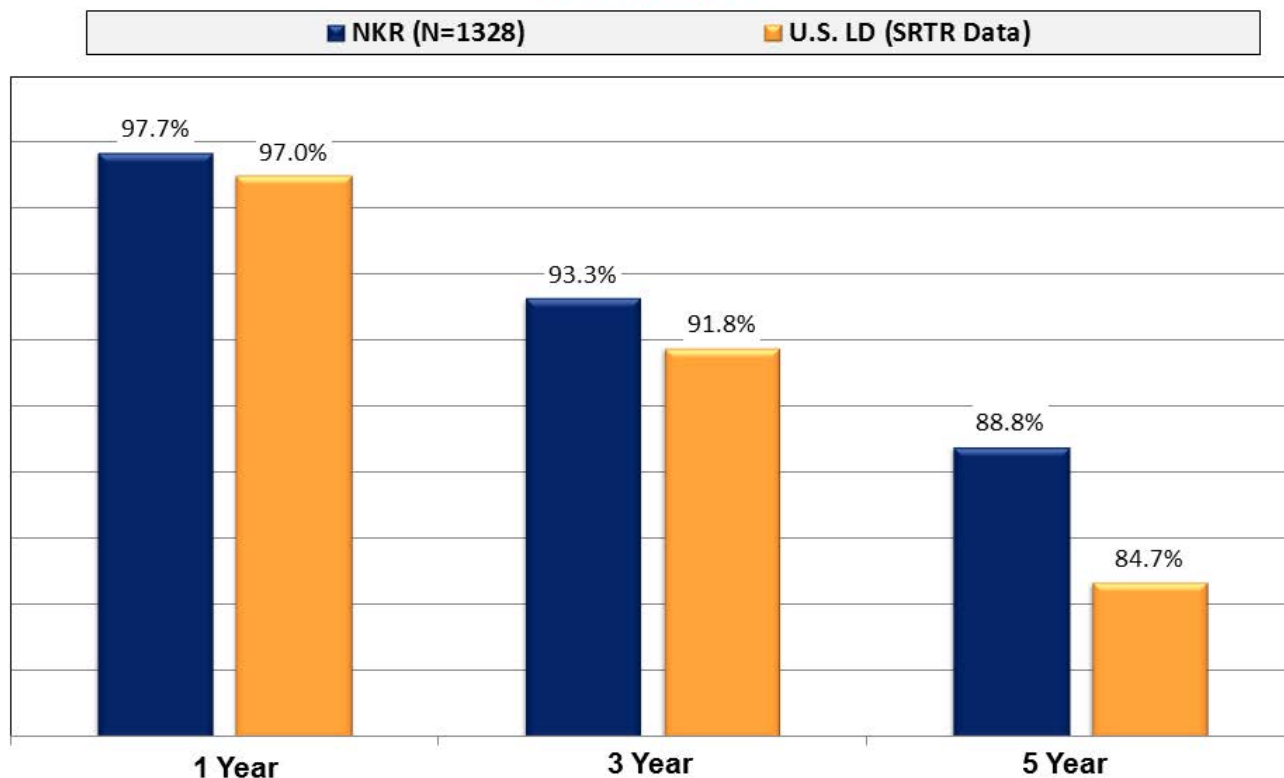
## Top Centers

Transplants in Last 12 Months



# NKR Graft Survival Advantage

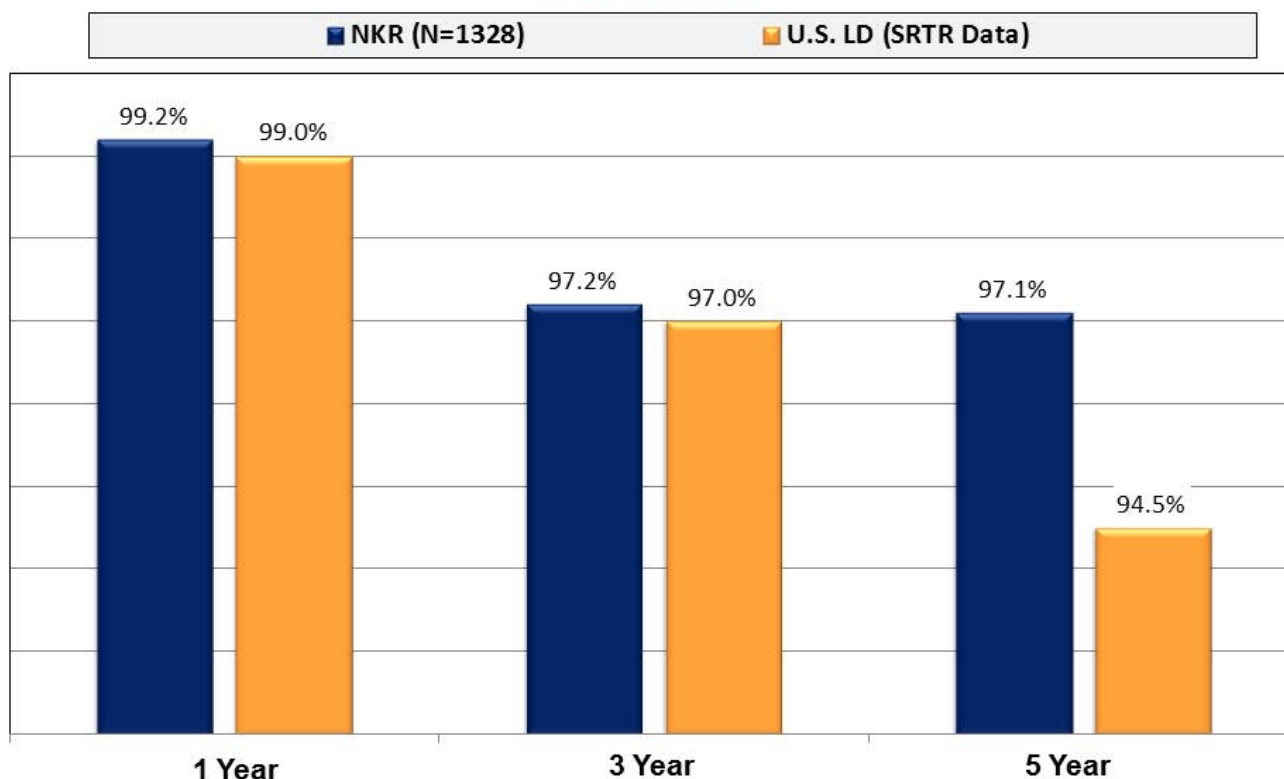
NKR Transplants vs. U.S. Living Donor Transplants  
As of 3/31/2015



\*NK R Kaplan-Meier GS calculations provided courtesy of UCLA Departments of Nephrology and Urology  
\*\*U.S. LD - Scientific Registry of Transplant Recipients. [www.srtr.org/annual\\_reports/2011/509d\\_ki.aspx](http://www.srtr.org/annual_reports/2011/509d_ki.aspx) Accessed 4/12/15

# NKR Patient Survival Advantage

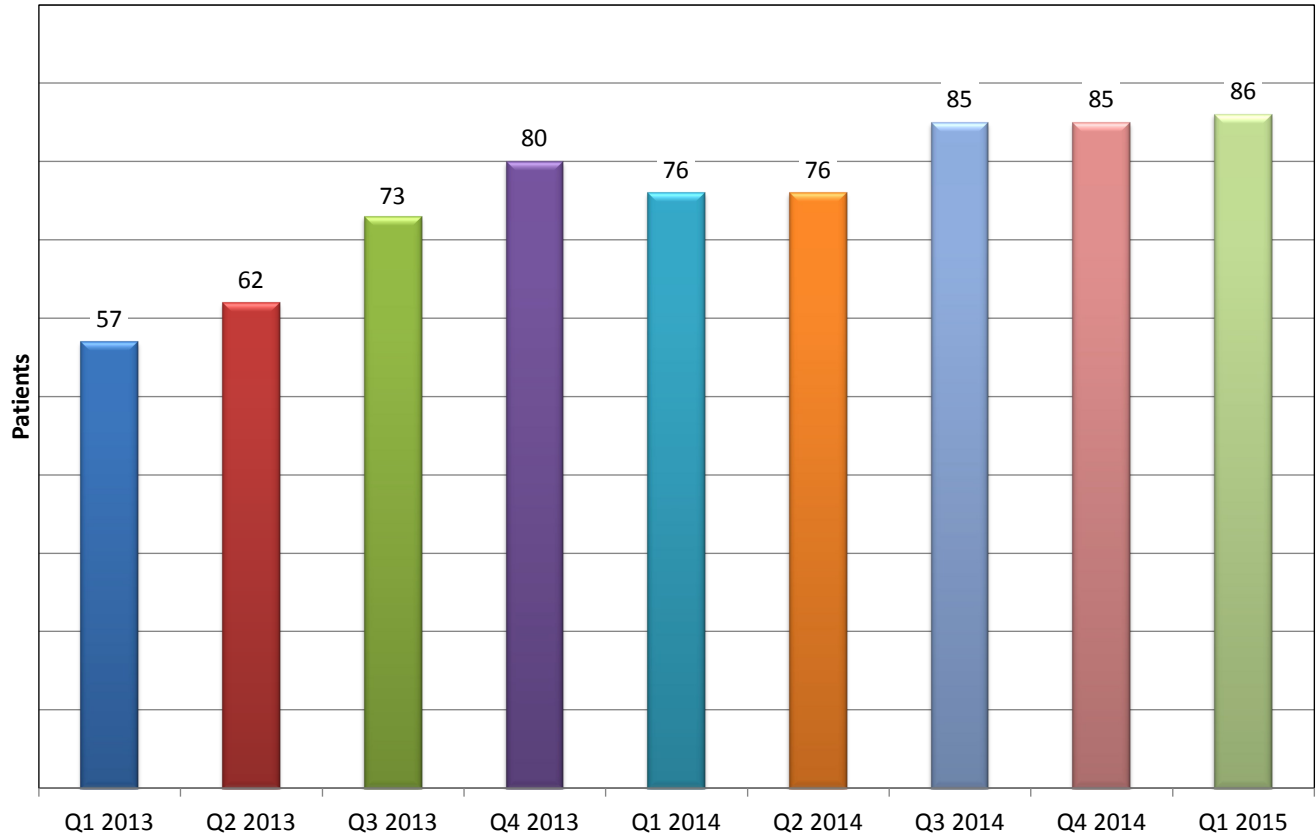
NKR Transplants vs. U.S. Living Donor Transplants  
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\*NK R Kaplan-Meier PS calculations provided courtesy of UCLA Departments of Nephrology and Urology  
\*\*U.S. LD - Scientific Registry of Transplant Recipients. [www.srtr.org/annual\\_reports/2011/513d\\_ki.aspx](http://www.srtr.org/annual_reports/2011/513d_ki.aspx) Accessed 4/12/15

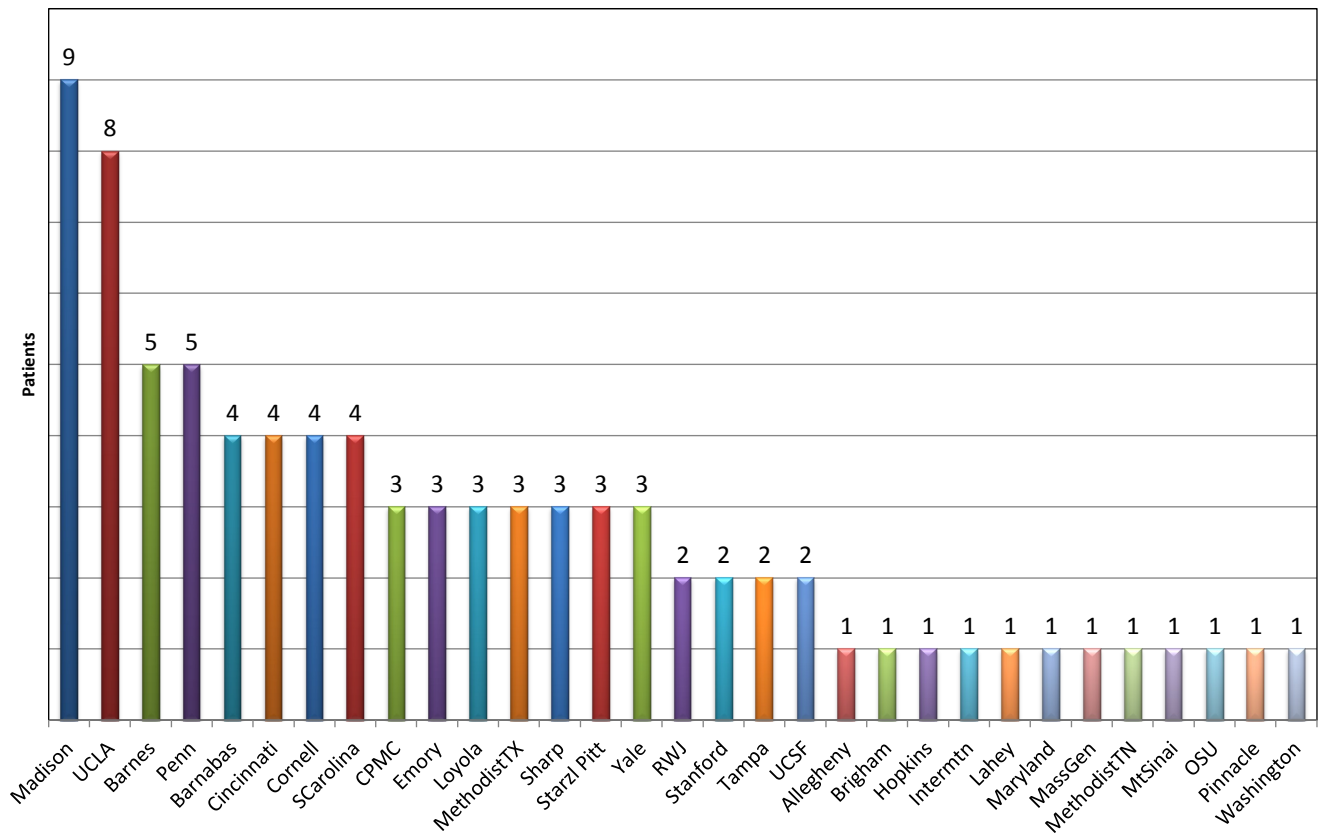
## Patients Waiting > 1 Year

As of 3/31/2015



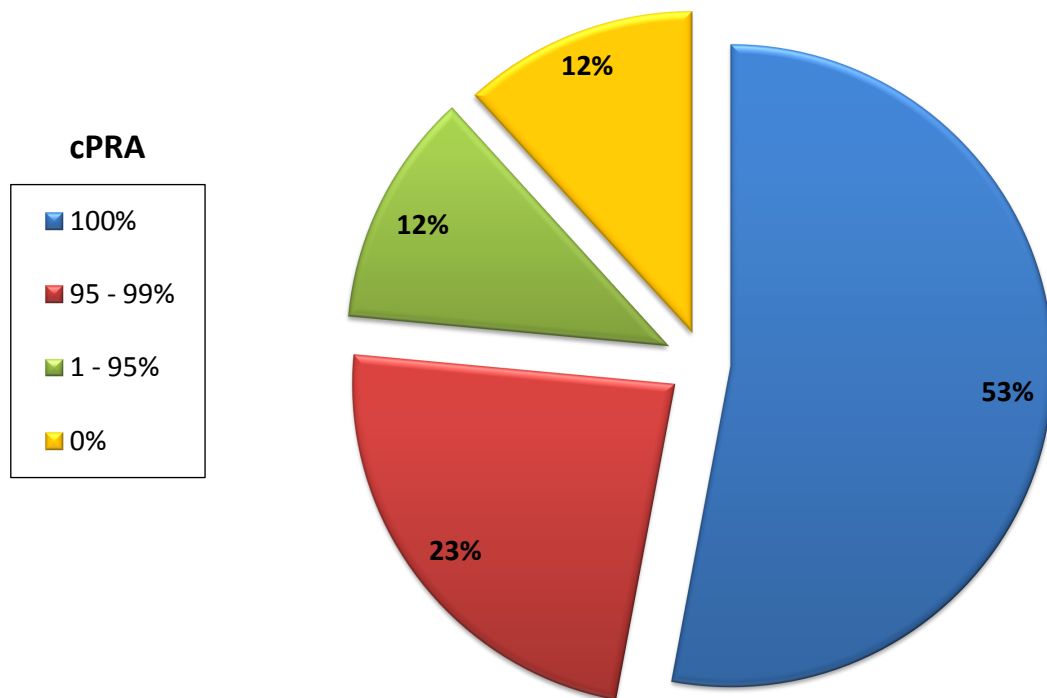
## Patients Waiting > 1 Year by Center

As of 3/31/2015



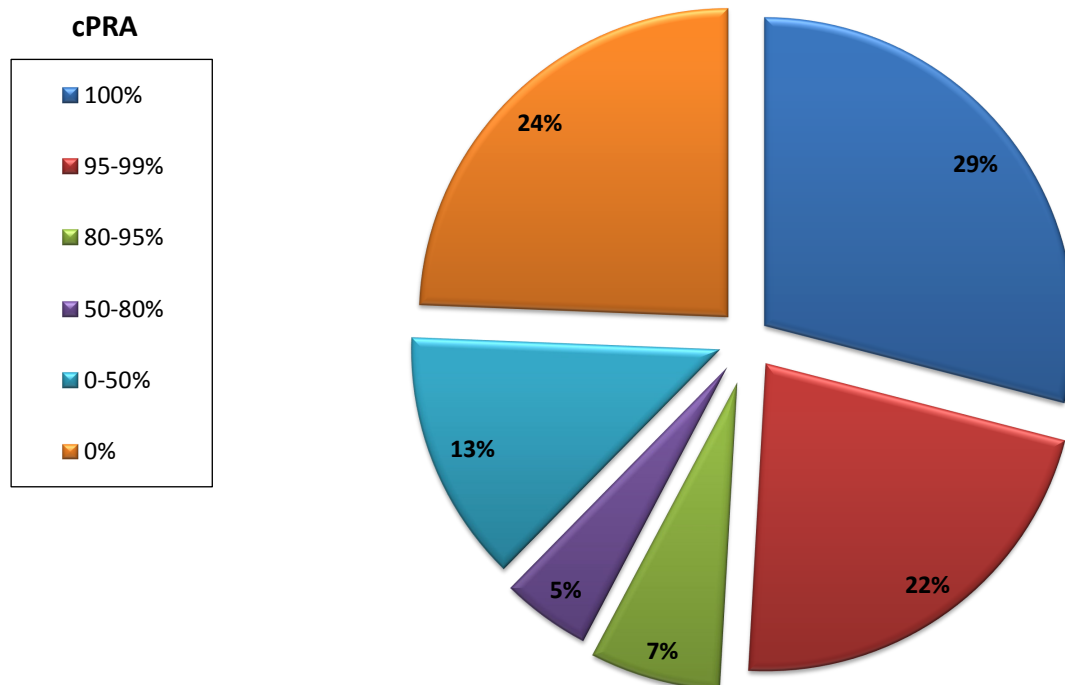
## Patients Waiting > 1 Year by cPRA

As of 3/31/2015



## Pool Composition by cPRA

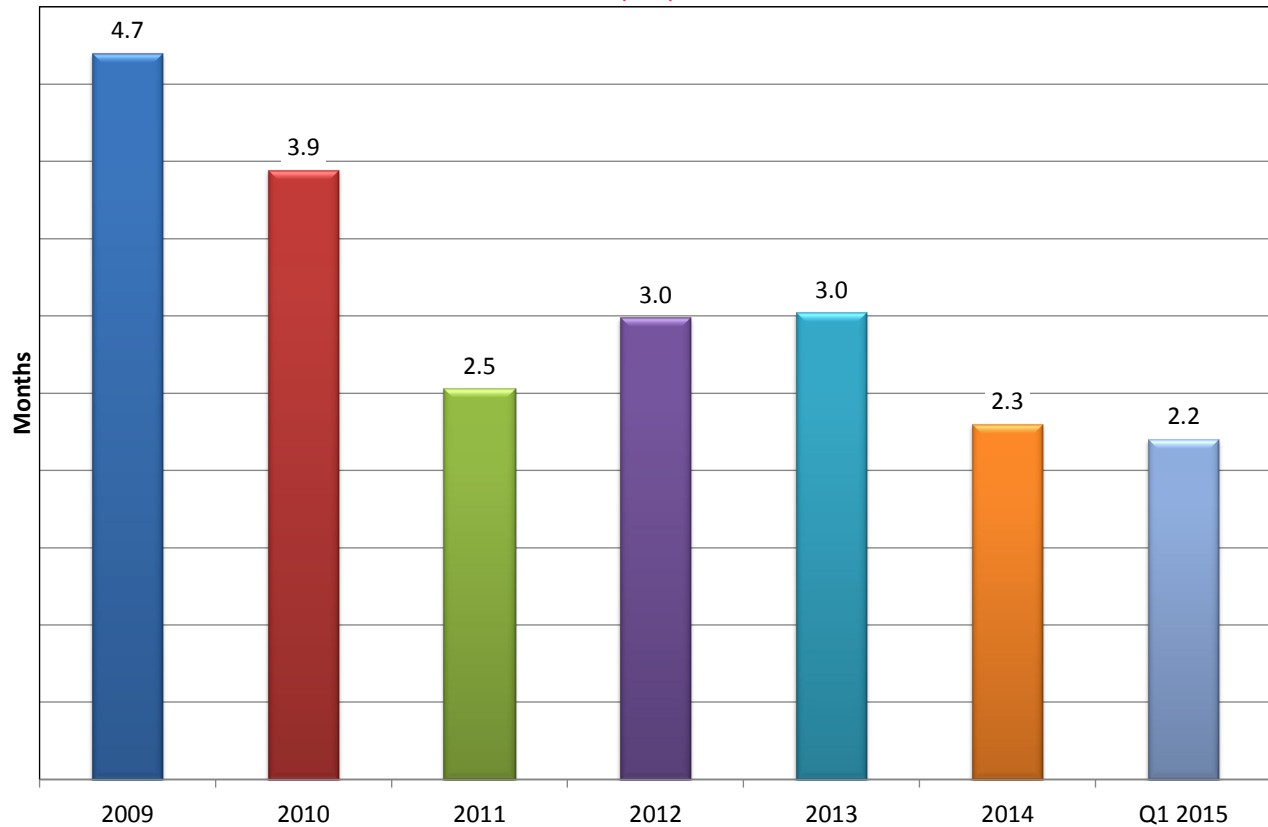
As of 3/31/2015



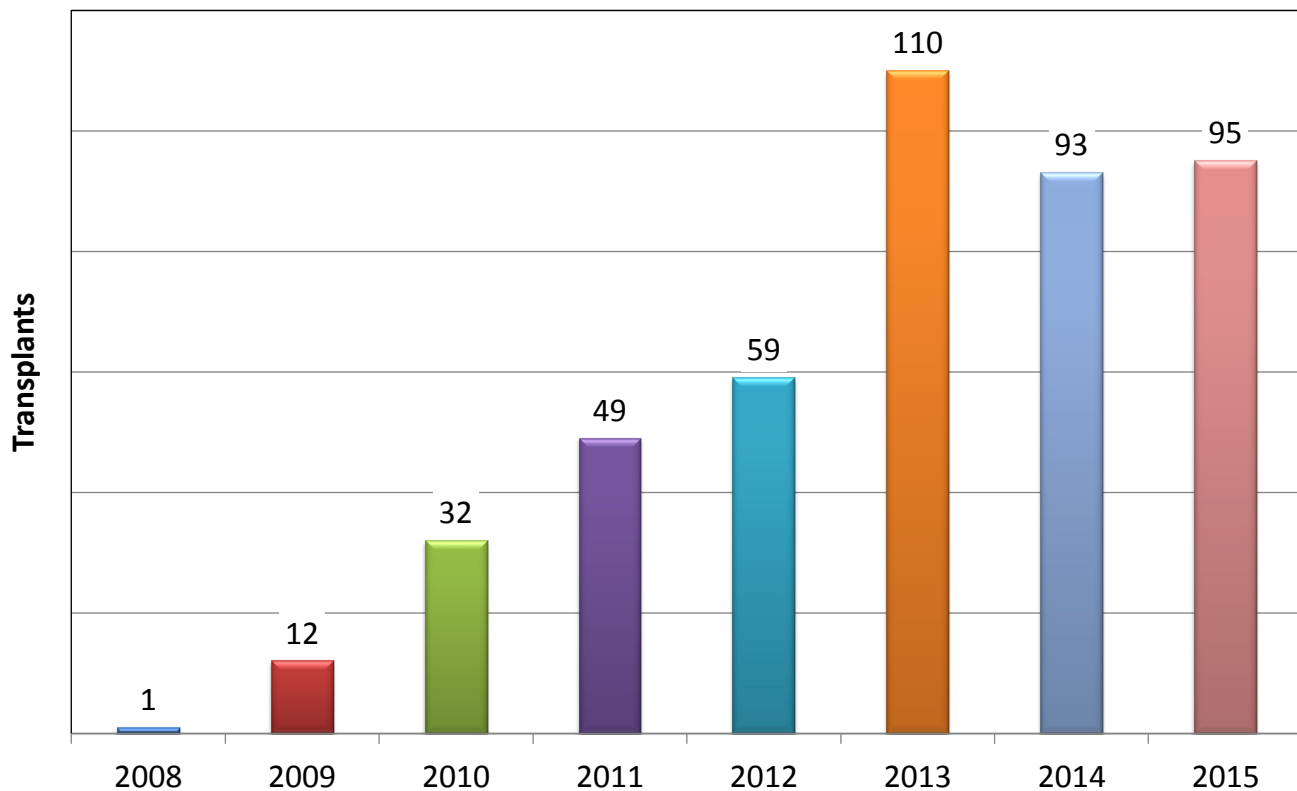


## Transplanted Patient Median Wait Time

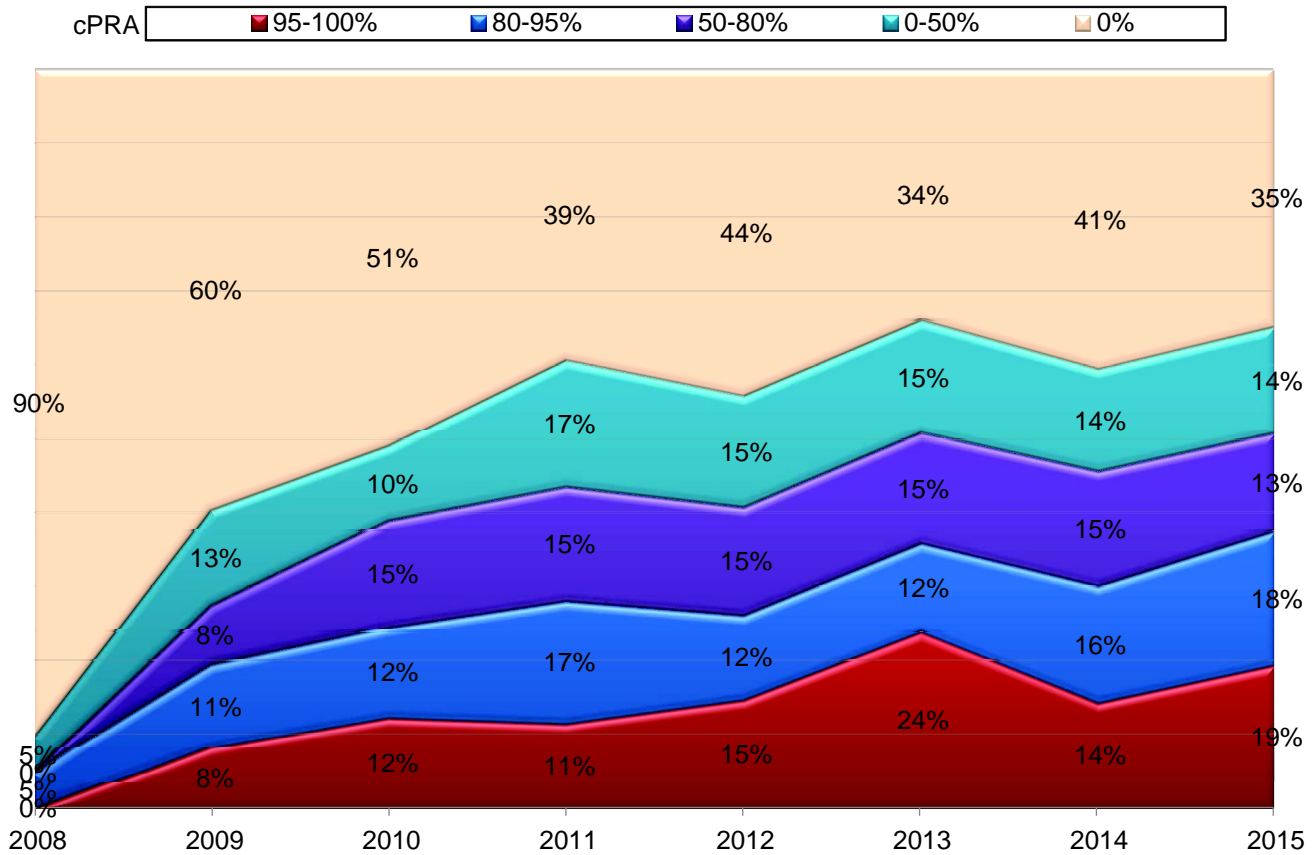
Wait times of patients transplanted during the year  
As of 3/31/2015



## Transplanted Patients with cPRA > 80%

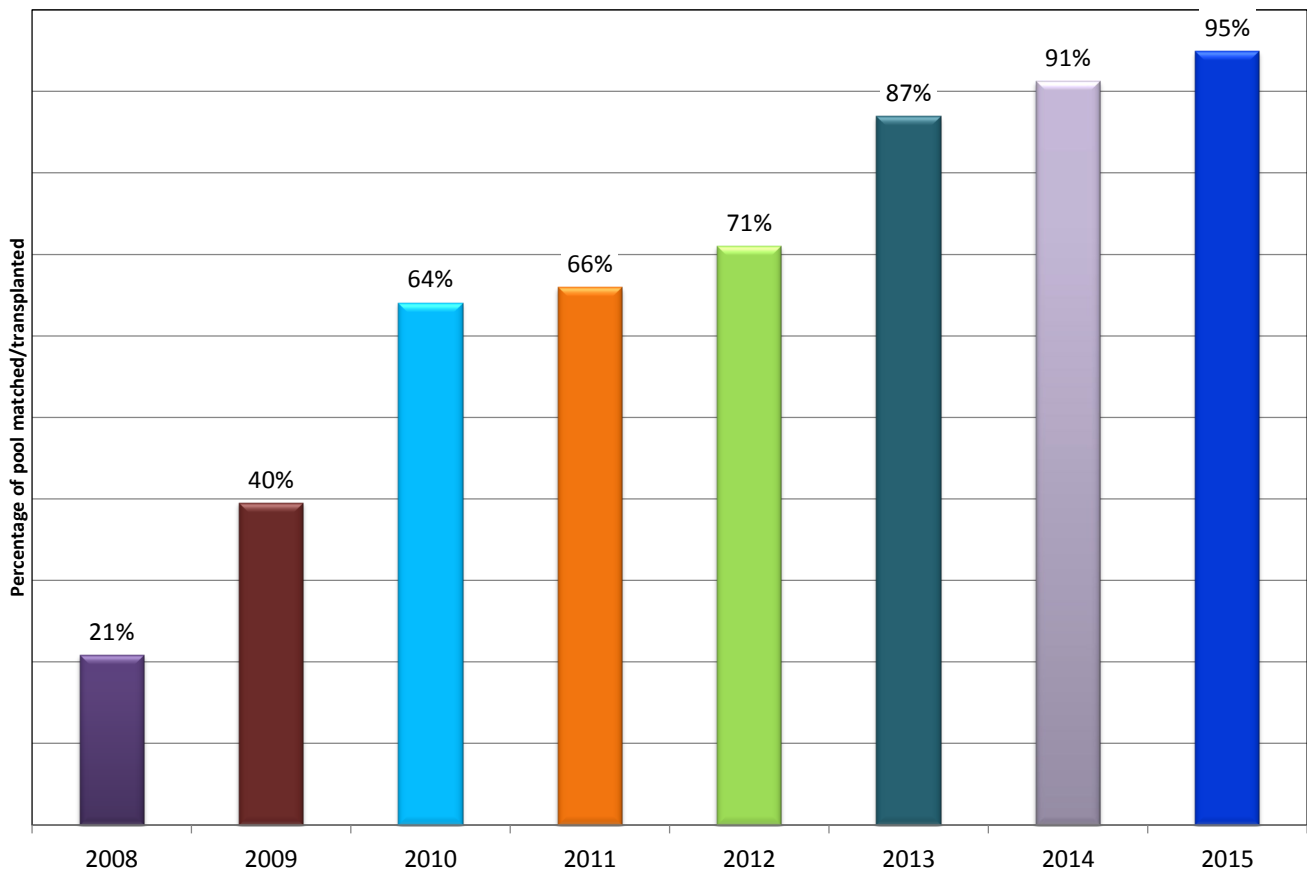


## Transplanted Patients by cPRA



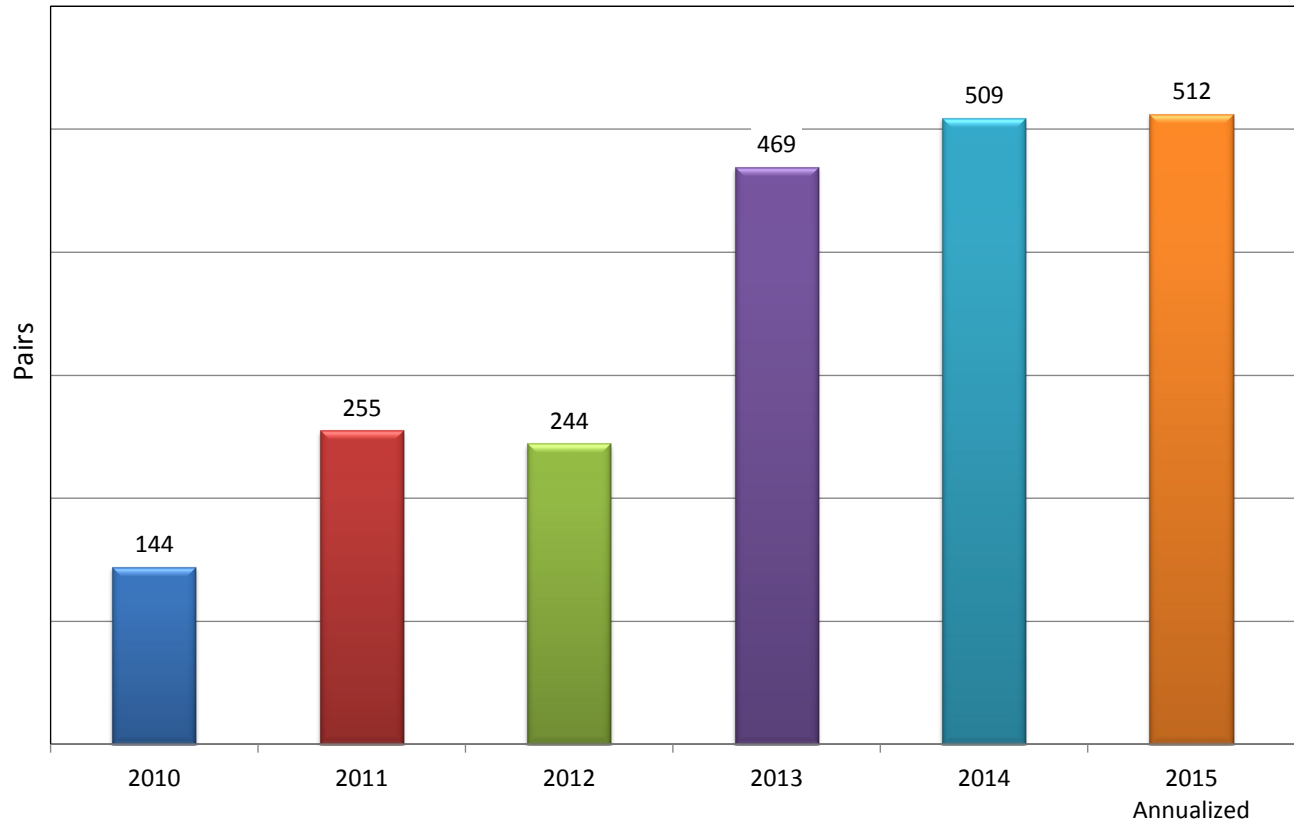
## Percent of Pool Matched and/or Transplanted

As of 3/31/2015



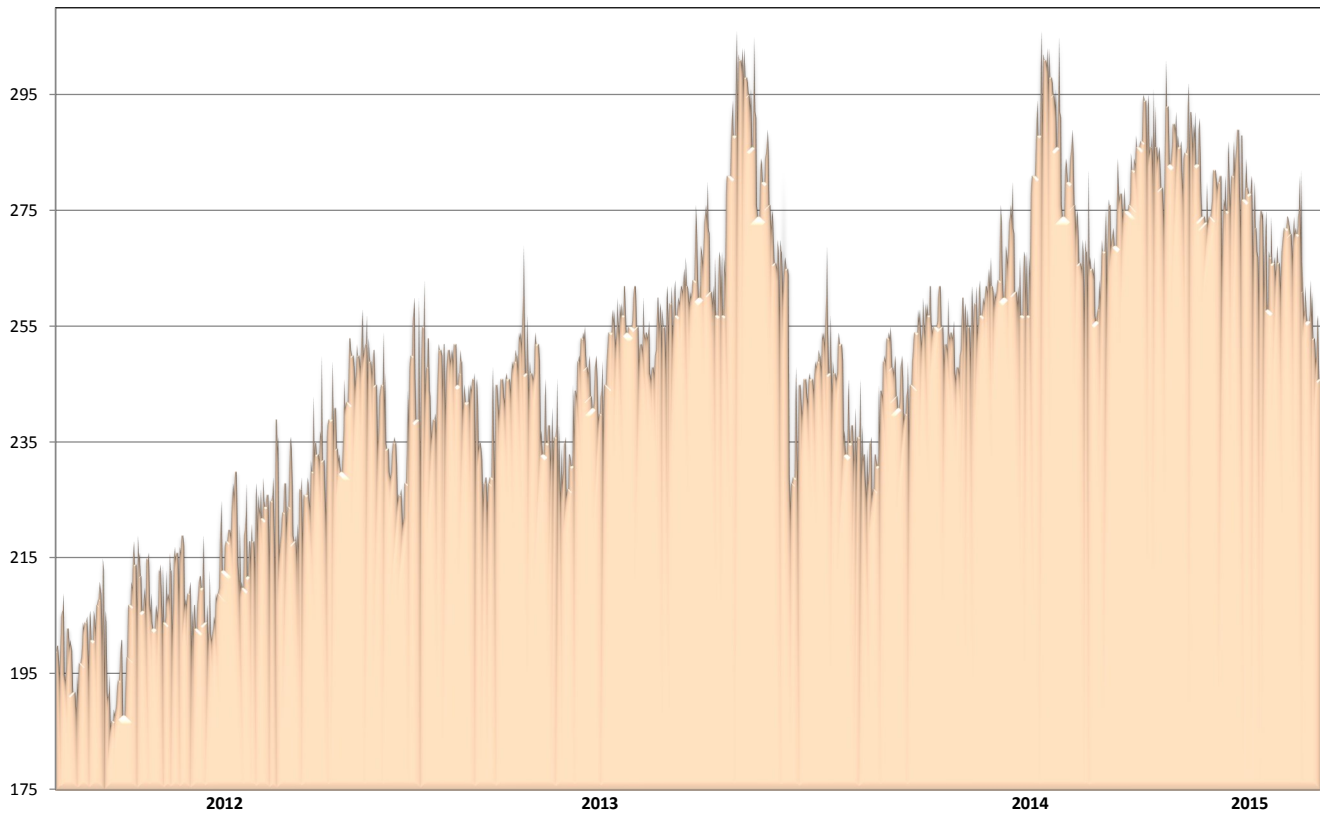
## New Pair Enrollments

Patients available for match runs



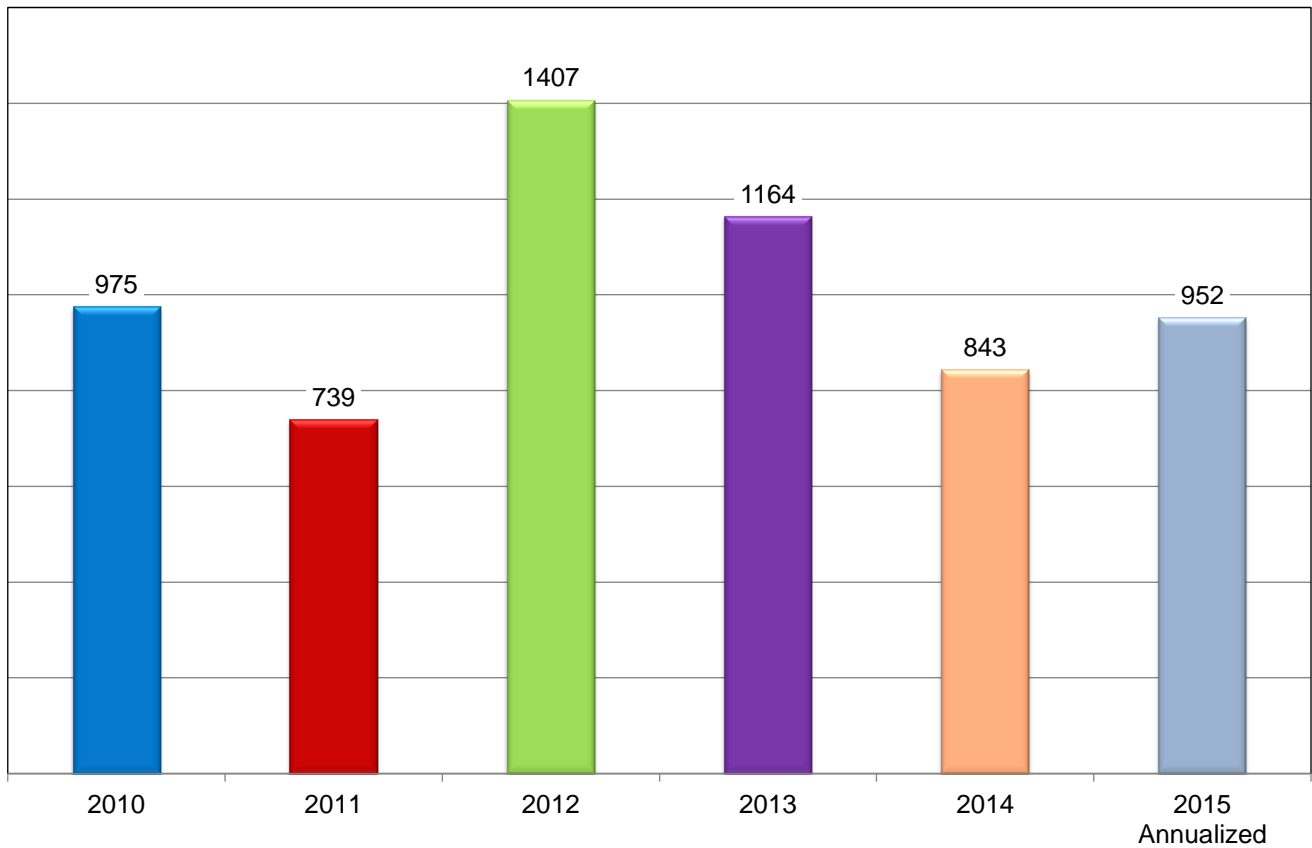
## Pool Size

Unmatched patients by day  
1/1/2012 – 3/31/2015



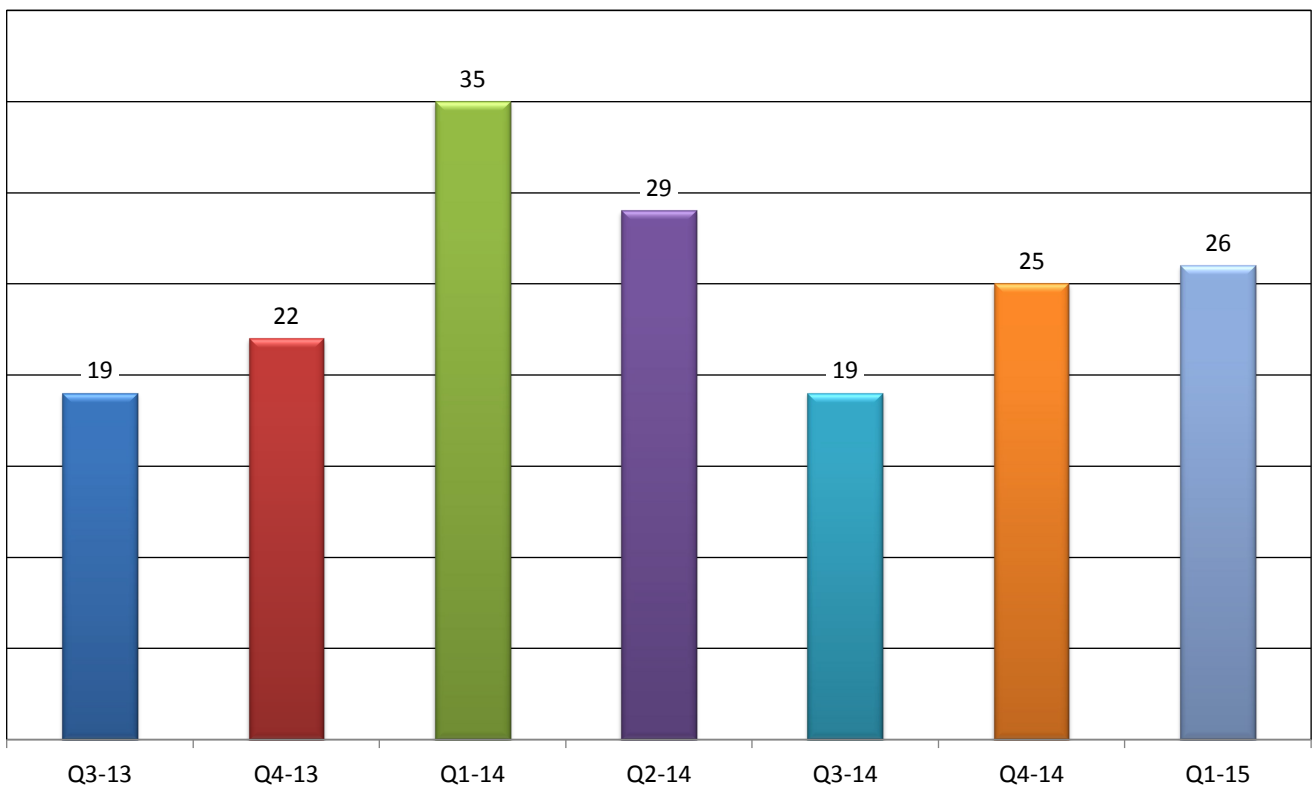
## Non-Directed Donor Registrations

Via NKR Web Site



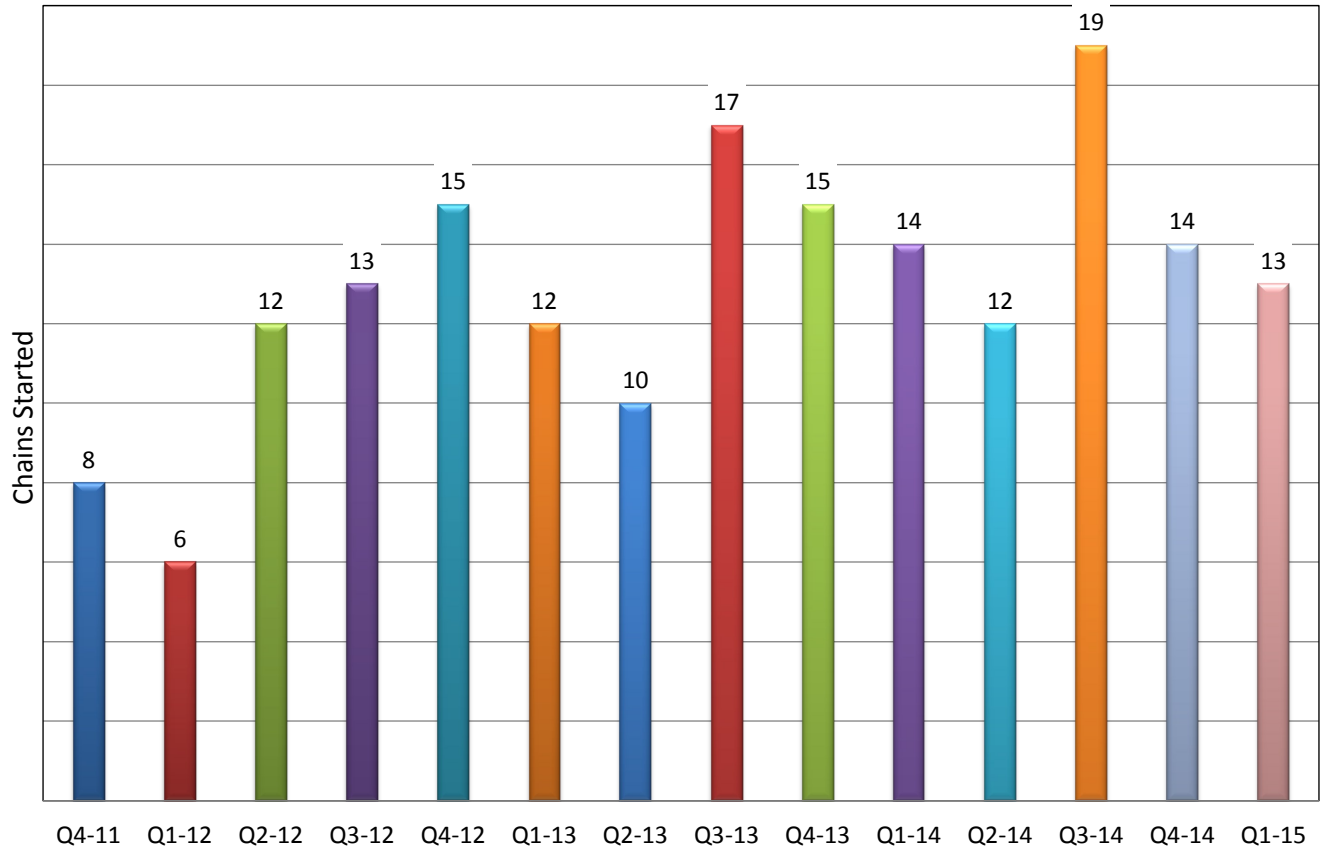
## Non-Directed Donor Referrals

Referred to NKR member centers



## Chains Started

Via non-directed donors



## Chain and Loop Statistics

Category	Count	Mean Length	Transplants
Ended	228	4.61	1051
Broken	18	4.17	75
Active	3	12.33	37
Chain Total	250	4.67	1163
Loops	70	2.31	160
Total	320	4.15	1323

# Great HLA Matches

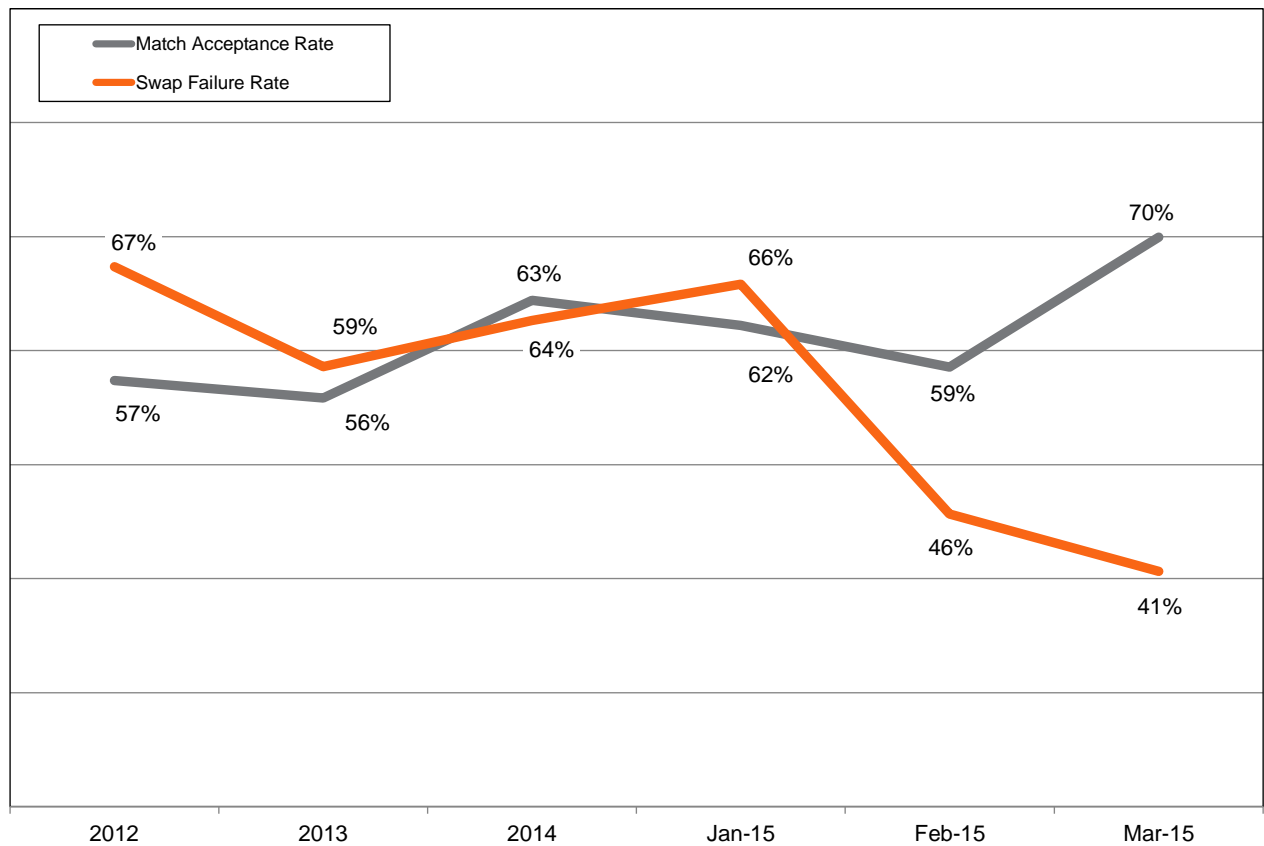
> 80 Match Points

Count	Recipient Center	Swap #	XP Date	Donor ABO	Recipient ABO	NKR cPRA	Wait Time In Months	Donor Age ATOT	Recipient Age ATOT	HLA Points
1	UCLA	357	2/17/2015	A	A	100	34	39	52	100
2	Emory	351	12/11/2014	A	A	100	5	25	33	100
3	Hopkins	330	11/13/2014	A	O	96	1	41	38	100
4	Loyola	324	8/5/2014	A	A	100	1	37	55	100
5	Madison	674	1/9/2014	O	A	99	5	29	33	100
6	Barnabas	182	10/3/2012	A	A	92	4	51	50	100
7	Barnes	105	3/31/2011	A	A	100	7	60	32	100
8	UCSF	58	6/15/2010	A	A	100	6	47	58	100
9	Emory	780	3/12/2015	O	O	7	6	46	21	90
10	MethodistTN	266	1/29/2014	A	A	89	2	44	66	90
11	Barnabas	266	1/16/2014	O	O	99	23	54	67	90
12	Madison	221	4/30/2013	O	O	99	17	45	52	90
13	Barnabas	187	12/4/2012	A	A	94	2	48	45	90
14	VAHD	161	6/12/2012	O	O	100	7	29	62	90
15	MethodistTX	124	12/7/2011	A	A	99	14	39	68	90
16	UCLA	124	8/31/2011	O	O	100	12	33	22	90
17	CPMC	115	6/22/2011	B	B	33	1	44	62	90
18	Starzl Pitt	109	4/21/2011	A	A	70	2	59	49	90
19	MethodistTN	365	3/4/2015	B	B	100	4	53	51	85
20	Barnabas	330	11/13/2014	O	O	96	2	33	49	85
21	PorterAH	322	9/3/2014	O	O	27	5	29	24	85
22	Barnabas	304	7/17/2014	O	O	99	1	53	62	85
23	Cornell	733	7/8/2014	A	A	0	1	57	67	85
24	Barnes	266	1/16/2014	A	A	100	13	33	40	85
25	SCarolina	266	1/14/2014	O	O	89	3	55	44	85
26	UCLA	659	10/24/2013	O	O	100	25	54	56	85
27	Penn	199	12/11/2012	B	B	87	5	47	52	85
28	Madison	169	7/25/2012	B	B	97	3	30	62	85
29	UCLA	538	5/22/2012	A	O	88	7	28	12	85
30	Intermtn	118	6/29/2011	O	O	96	16	27	27	85
31	Allegheny	62	5/6/2010	A	A	0	5	60	70	85
32	Madison	332	11/4/2014	O	O	96	20	63	42	80
33	UCLA	258	10/3/2013	A	A	98	1	47	36	80
34	CPMC	19	7/31/2009	A	A	0	5	51	54	80

## Compatible Pairs Transplanted

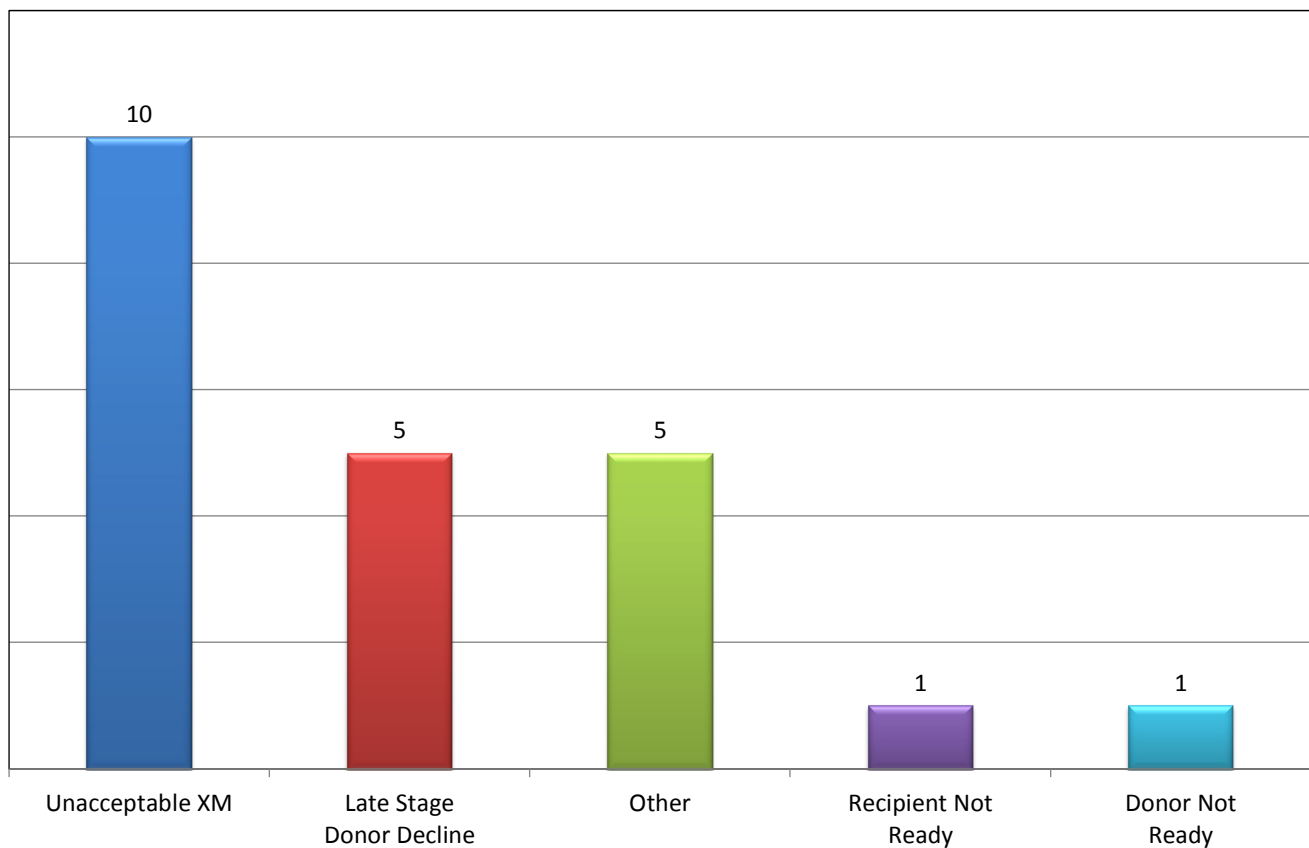
#	Recipient Center	Recipient Alias	XP Date	Recipient ABO	Paired Donor ABO	Donor ABO	Recipient Age	Paired Donor Age	Donor Age	Age Advantage	Donor HLA Pts	Paired Donor HLA Pts	HLA Points Advantage	Paired Donor Relationship	Additional XP's	Additional XP's cPRA >80
1	Hopkins	KAAS1021	10/3/2013	A	O	A	19	65	38	27	25	50	-25	Other	2	0
2	Cornell	TRAC78	11/20/2013	O	O	O	34	37	59	-22	75	25	50	Spouse	3	1
3	Cleveland	RCCF23	12/18/2013	O	O	O	43	41	55	-14	25	0	25	internet friend	4	2
4	Maine	MOOD082970	1/28/2014	A	O	A	43	40	53	-13	75	10	65	Spouse	4	0
5	UCLA	R4037	1/29/2014	A	A	A	7	34	37	-3	60	50	10	Mother	3	0
6	Dartmouth	RW022168	4/9/2014	O	O	O	45	37	43	-6	35	50	-15	Friend	2	1
7	Stanford	SUR2220	4/23/2014	O	O	O	29	66	24	42	25	50	-25	Father	2	0
8	Cornell	BLUMC10	4/23/2014	O	O	O	3	24	43	-19	0	0	0	Cousin	0	0
9	Madison	HAWKR	4/28/2014	O	O	O	62	57	39	18	45	10	35	Friend	6	2
10	Barnabas	GEOKOC	6/11/2014	B	O	B	69	57	41	16	10	40	-30	Significant Other	3	0
11	UCSF	RCV275	8/26/2014	O	O	O	28	57	22	35	10	85	-75	Father	5	1
12	MassGen	GCAR	8/28/2014	A	O	A	69	51	33	18	60	0	60	niece through marriage	4	1
13	Emory	AL2140339	9/30/2014	A	A	A	18	52	37	15	50	65	-15	Father	2	0
14	Loyola	R113KU8885	11/11/2014	A	O	A	42	43	48	-5	25	25	0	Spouse	8	3
														<b>Totals</b>	<b>48</b>	<b>11</b>

## Match Failure Rates



## Swap Failures by Primary Root Cause

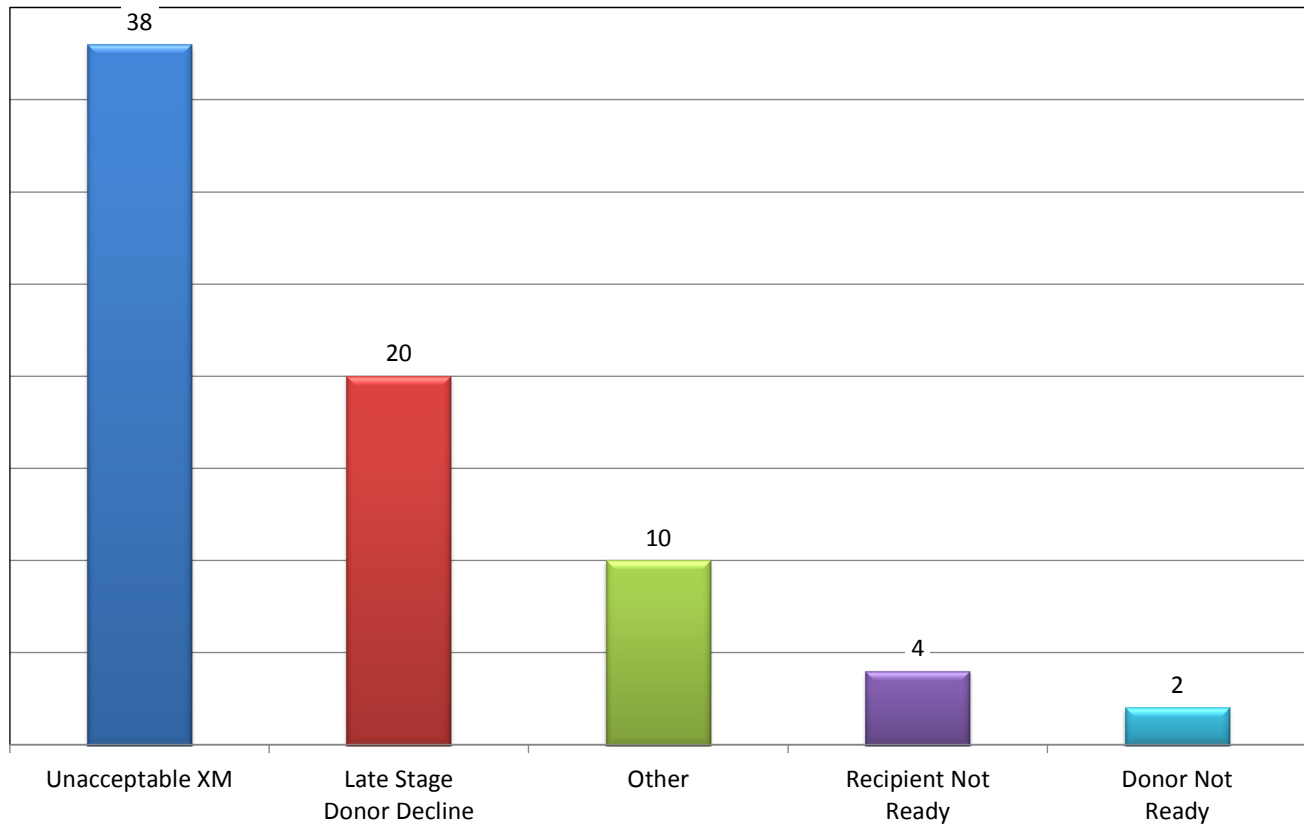
Q1 2015





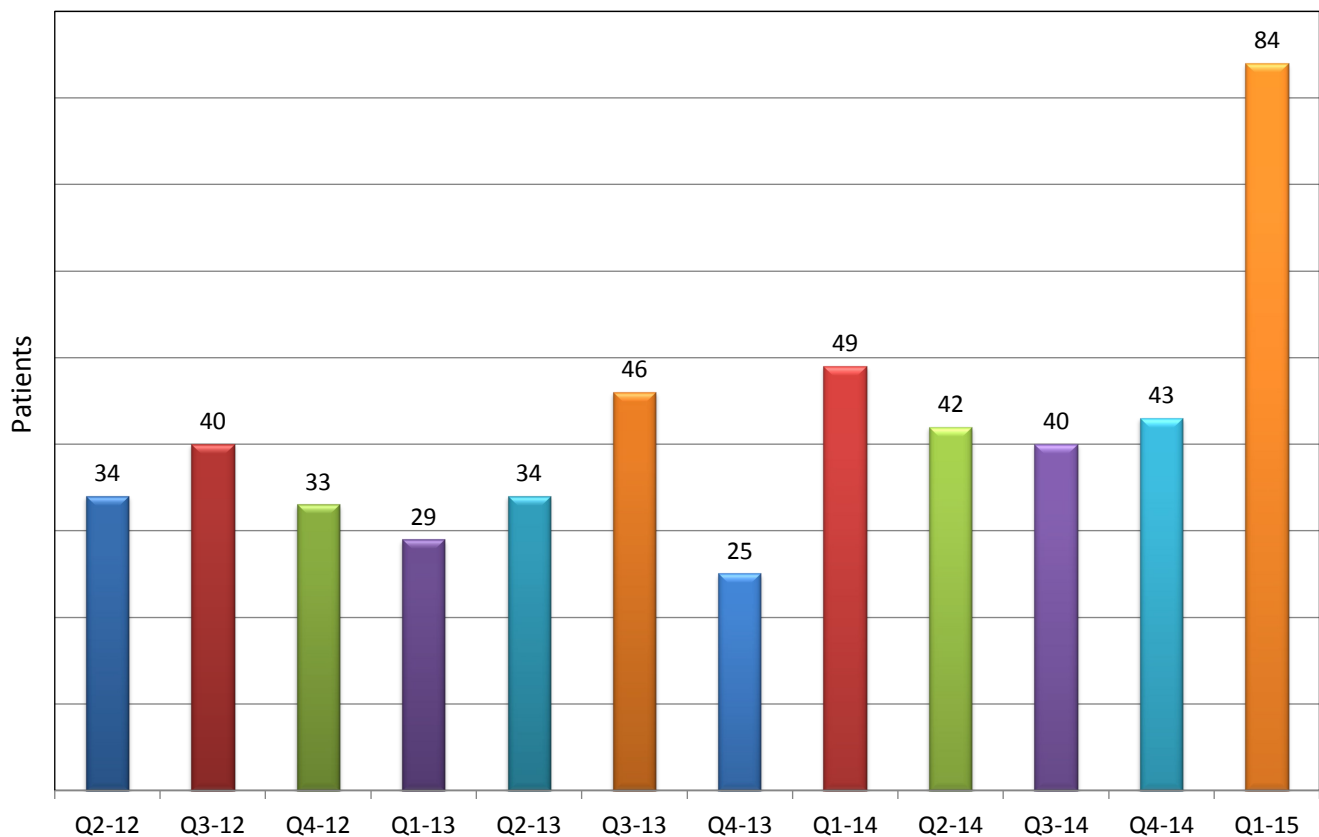
# Transplants Impacted by Primary Root Cause

Q1 2015



## Patients Deleted

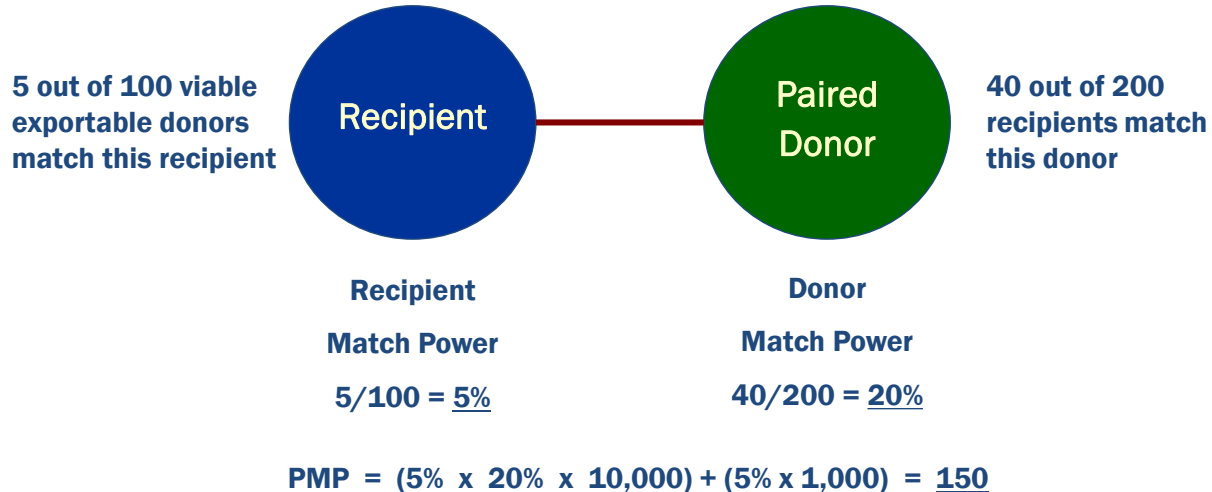
As of 3/31/2015



# Pair Match Power is the Key to Understanding Wait Time

Pair Match Power (a.k.a. PMP) along with pair blood type combination is the most accurate predictor of paired exchange wait time and should be used by patients and clinicians to develop individual matching strategies for all pairs enrolling in the NKR program

## How is PMP Calculated



## NKR Wait Times

Matching Ease	ABO Combination	PMPc
1-Very Easy	Any	> 125
2-Easy	Favorable	31 to 125
3-Hard	Favorable	1 to 30
4-Very Hard	Unfavorable	31 to 125
5-Ext Hard	Unfavorable	1 to 30
6-No Match	Any	0

**ABO Combination:** Patients with a non-O blood type are favorable. Patients with an O blood type who are paired to at least 1 exportable donor with an O blood type are favorable. All others are unfavorable and CHIP patients are excluded from this population.

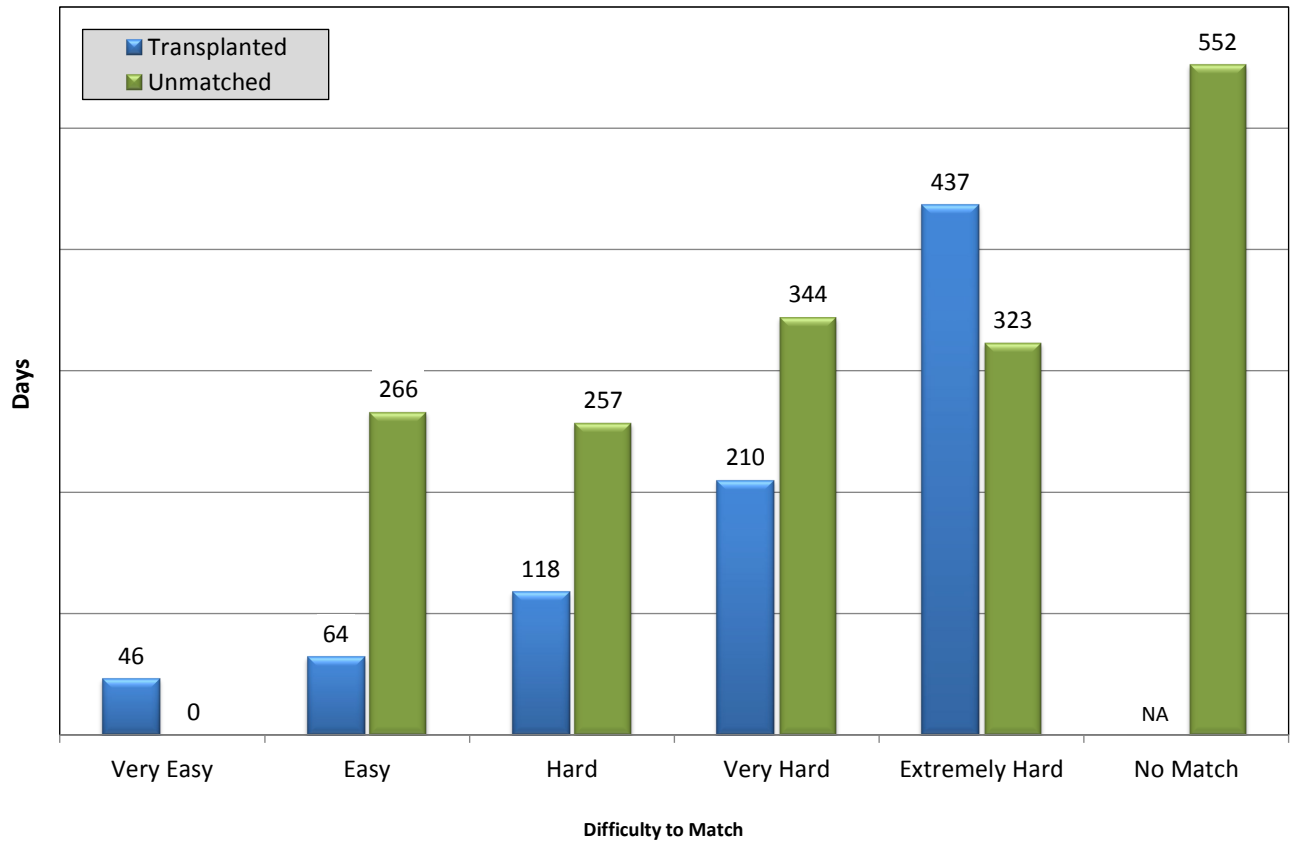
### Paired Transplants Completed Between 1/1/2014 and 3/31/2015

Match Ease	Pairs	%	Mean	Median	Std Dev	Range Min	Range Max
1-Very Easy	114	34	67	46	71	8	439
2-Easy	93	28	94	64	99	6	674
3-Hard	64	19	202	118	218	22	1055
4-Very Hard	52	16	244	210	168	23	635
5-Ext Hard	8	2	451	437	224	42	770
6-No Match	0	---	---	---	---	---	---
<b>7-ALL</b>	<b>331</b>	<b>100</b>	<b>138</b>	<b>68</b>	<b>163</b>	<b>6</b>	<b>1055</b>

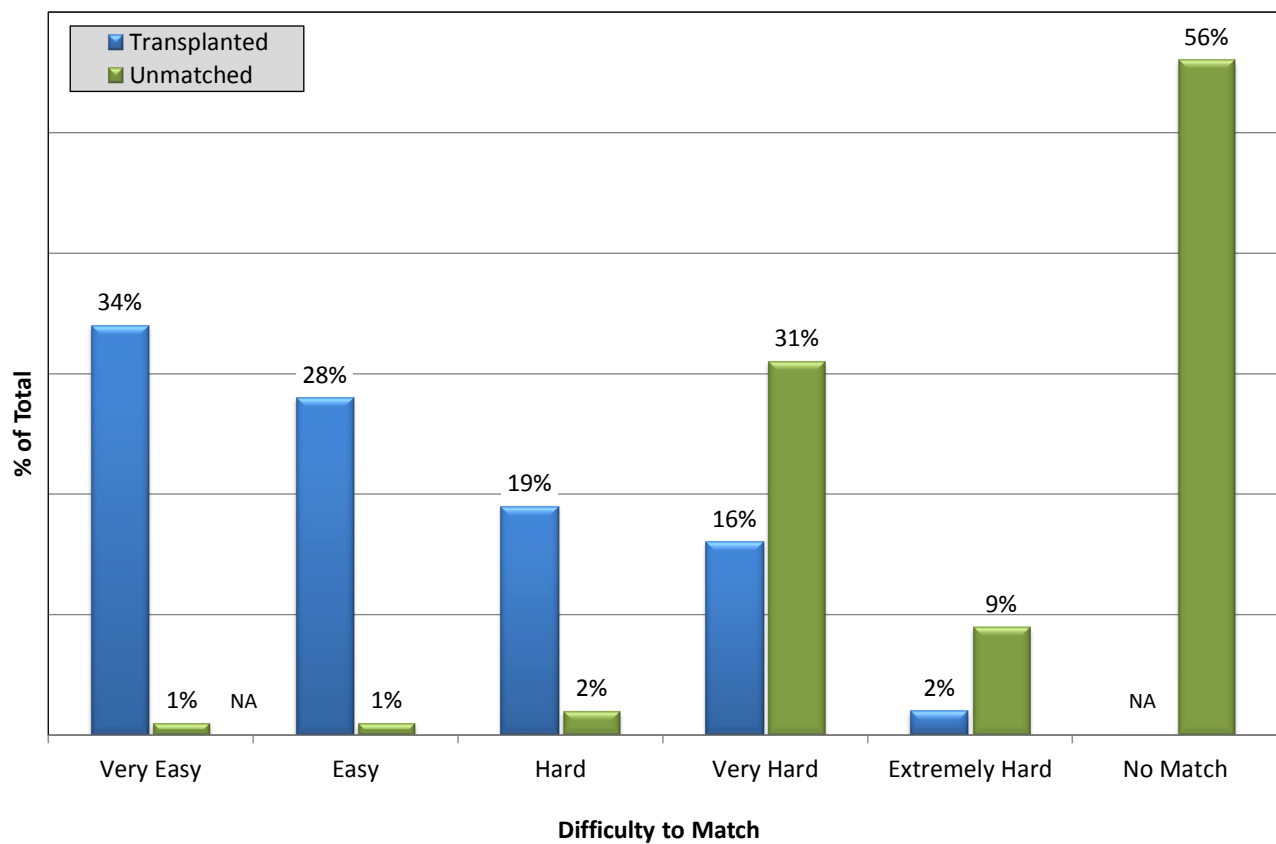
### Paired Patients Waiting 6 Months or Greater as of 3/31/2015

Match Ease	Pairs	%	Mean	Median	Std Dev	Range Min	Range Max
1-Very Easy	1	1	193	193	0	193	193
2-Easy	1	1	266	266	0	266	266
3-Hard	3	2	294	257	93	202	422
4-Very Hard	43	31	380	344	135	207	663
5-Ext Hard	13	9	356	323	116	210	593
6-No Match	79	56	638	552	366	188	1886
<b>7-ALL</b>	<b>140</b>	<b>100</b>	<b>519</b>	<b>437</b>	<b>319</b>	<b>188</b>	<b>1886</b>

## Median Wait Time Analysis



## Population Wait Time Analysis



# Summary Report

## Broken Chains & Real Time Swap Failures

<i>Year</i>	<i># Bridge Donors</i>	<i># Real Time Swap Failures</i>	<i># Broken Chains</i>	<i>% Broken Per Year</i>
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	44	--	--	0%
<b>Total Bridge Donors</b>	<b>314</b>	<b>6</b>	<b>18</b>	

# Detail Report

## Broken Chains & Real Time Swap Failures

<i>#</i>	<i>Reason Given</i>	<i>Real Time Swap Failures</i>	<i>Broken Chains</i>	<i>Center</i>	<i>Date</i>
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 Reneged	✓	✓	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	✓		ChristHosp	3/11/14
18	Medical		✓	Hopkins	7/15/14
19	Medical		✓	Hopkins	10/9/14
	<b>Totals</b>	<b>6</b>	<b>18</b>		

# NKR Program Statistics

As of 3/31/2015

		2008	2009	2010	2011	2012	2013	2014	2015
1	Transplants Facilitated	21	62	131	175	226	308	310	90
2	Paired Transplants Facilitated	21	39	91	131	164	252	255	81
3	Chip Transplants Facilitated	0	23	40	44	62	56	55	9
4	Ending Unmatched Patient Pool	80	127	120	201	241	255	279	249
5	Cumulative Transplants	21	83	214	389	615	923	1233	1323
6	Cumulative Paired Transplants	21	60	150	280	526	777	1030	1111
7	Cumulative Chip Transplants	0	23	64	109	89	146	203	212
8	Cumulative Paired Patient Pool	101	210	334	590	805	1062	1351	1394
9	Percent of Pool Transplanted (Paired Recipients)	21%	40%	64%	66%	71%	87%	91%	95%
10	Enrolled Patient Mean Wait Time (years)	3.8	2.0	0.9	1.1	1.1	1.0	0.9	0.9
11	Transplanted Patient Mean Wait Time (months)	5.1	5.3	6.0	5.0	5.1	5.4	4.8	4.3
12	Transplanted Patient Median Wait Time (months)	5.3	5.3	3.9	2.5	3.0	3.0	2.1	2.3
13	Mean cPRA of Transplanted Patients	4.1%	25.9%	34.5%	40.3%	44.1%	54.0%	48.3%	51.7%
14	Number of Transplants Completed by cPRA								
15	100%	0	1	4	10	4	5	3	3
16	95-100%	0	4	12	10	29	68	41	13
17	80-95%	1	7	16	29	26	37	49	18
18	50-80%	0	5	19	27	33	46	48	12
19	0-50%	1	8	13	30	34	47	43	12
20	0%	19	37	67	69	100	105	126	32
21	Sub-total	21	62	131	175	226	308	310	90
22	Percent of Transplants Completed by cPRA								
23	100%	0%	2%	3%	6%	2%	2%	1%	3%
24	95-100%	0%	6%	9%	6%	13%	22%	13%	14%
25	80-95%	5%	11%	12%	17%	12%	12%	16%	20%
26	50-80%	0%	8%	15%	15%	15%	15%	15%	13%
27	0-50%	5%	13%	10%	17%	15%	15%	14%	13%
28	0%	90%	60%	51%	39%	44%	34%	41%	36%
29	Sub-total	100%	100%	100%	100%	100%	100%	100%	100%
30	Number of Transplanted Patients with cPRA >80%	1	12	32	49	59	110	93	34
31	Percent of Transplanted Patients with cPRA >80%	5%	19%	24%	28%	26%	36%	30%	37%

# NKR Program Statistics

As of 3/31/2015

		2008	2009	2010	2011	2012	2013	2014	2015
32	Number of Unmatched Patients by cPRA (3/31/2015)								
33	100%				79	73	83	81	65
34	95-99%				73	73	61	61	52
35	80-95%				15	15	24	19	18
36	50-80%				14	11	14	13	17
37	0-50%				14	10	22	37	37
38	0%				50	59	51	68	60
39	Sub-total				245	241	255	279	249
40	Percent of Unmatched Patients by cPRA (3/31/2015)								
41	100%				32%	30%	33%	29%	26%
42	95-99%				30%	30%	24%	22%	21%
43	80-95%				6%	6%	9%	7%	7%
44	50-80%				6%	5%	5%	5%	7%
45	0-50%				6%	4%	9%	13%	15%
46	0%				20%	24%	20%	24%	24%
47	Sub-total				100%	100%	100%	100%	100%
48	Number of Transplants Completed by Wait Time								
49	< 6 months	21	42	74	106	180	232	243	73
50	6-12 months	0	10	14	19	24	44	35	9
51	1-2 years	0	4	15	14	20	25	27	7
52	2+ years	0	0	2	2	2	7	5	1
53	Sub-total	21	56	105	141	226	308	310	90
54	Percent of Transplants Completed by Wait Time (3/31/2015)								
55	< 6 months	100%	75.0%	70.5%	75.2%	79.6%	75.3%	78.4%	81.1%
56	6-12 months	0.0%	17.9%	13.3%	13.5%	10.6%	14.3%	11.3%	10.0%
57	1-2 years	0.0%	7.1%	14.3%	9.9%	8.8%	8.1%	8.7%	7.8%
58	2+ years	0.0%	0.0%	1.9%	1.4%	0.9%	2.3%	1.6%	1.1%
59	Sub-total	100%	100%	100%	100%	100%	100%	100%	100%
60	Total Chains Started	4	9	28	36	46	55	63	19
61	Total Loops Completed	0	3	2	3	12	24	17	2
62	Number of broken chains	3	2	2	0	4	3	4	0
63	Bridge Donors Held (2015)	9	29	61	75	54	37	49	44
64	Percent of broken chains	33%	7%	3%	0%	7%	8%	8%	0%

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