

# Paired Exchange Results Quarterly Report

As of March 31, 2014

Join Us For The 2nd Annual

## ***Future Directions in Paired Exchange***

The Premier Paired Exchange Symposium of The Year

**Friday May 16th 2014**

**New York City**

*See enclosed brochure for more details about all  
NKR hosted events for May 15th & 16th, 2014*



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## Message From the Founder

We are pleased to report that we facilitated 87 transplants in Q1 and completed our 1000th transplant on March 12th at the University of Cincinnati Hospital. Our first quarter results were up 38% over Q1 2013 and based on the OPTN reported KPD numbers for 2013, NKR facilitated 52% of all paired exchange transplants in the United States last year.

Our patient outcomes continue to exceed national averages. Using Kaplan–Meier graft survival methodology, NKR exceeds the one-year national graft survival rate (NKR 98.3% vs. U.S. 97.0%) and also exceeds the three-year national graft survival rate (NKR 94.9% vs. U.S. 91.7%). This demonstrates NKR's better HLA and age matching can improve patient outcomes for compatible pairs who are not traditionally paired exchange candidates.

We witnessed dramatic improvements in cross match accuracy with unacceptable cross matches dropping from 10 in Q4 2013 to an all-time low of 3 this past quarter. With 87 transplants in the first quarter, this exceptional performance by the HLA labs delivered 96.6% virtual XM accuracy. Late stage donor declines due to incomplete donor profiles and donors who were not ready for surgery accounted for over 70% of the swap failures in the first quarter.

The Pair Match Power wait time section of this report has been enhanced to better predict wait time expectations. While the median wait time from enrollment to transplant dropped from 3.0 months last year to 2.1 months in the first quarter, the median wait time for easy to match pairs was only 49 days. Patients with Pair Match Power scores less than 30 along with "O" blood type patients with non-"O" donors continue to be a challenge to match and transplant quickly. The inclusion of compatible pairs is the most promising opportunity for the hard to match pairs.

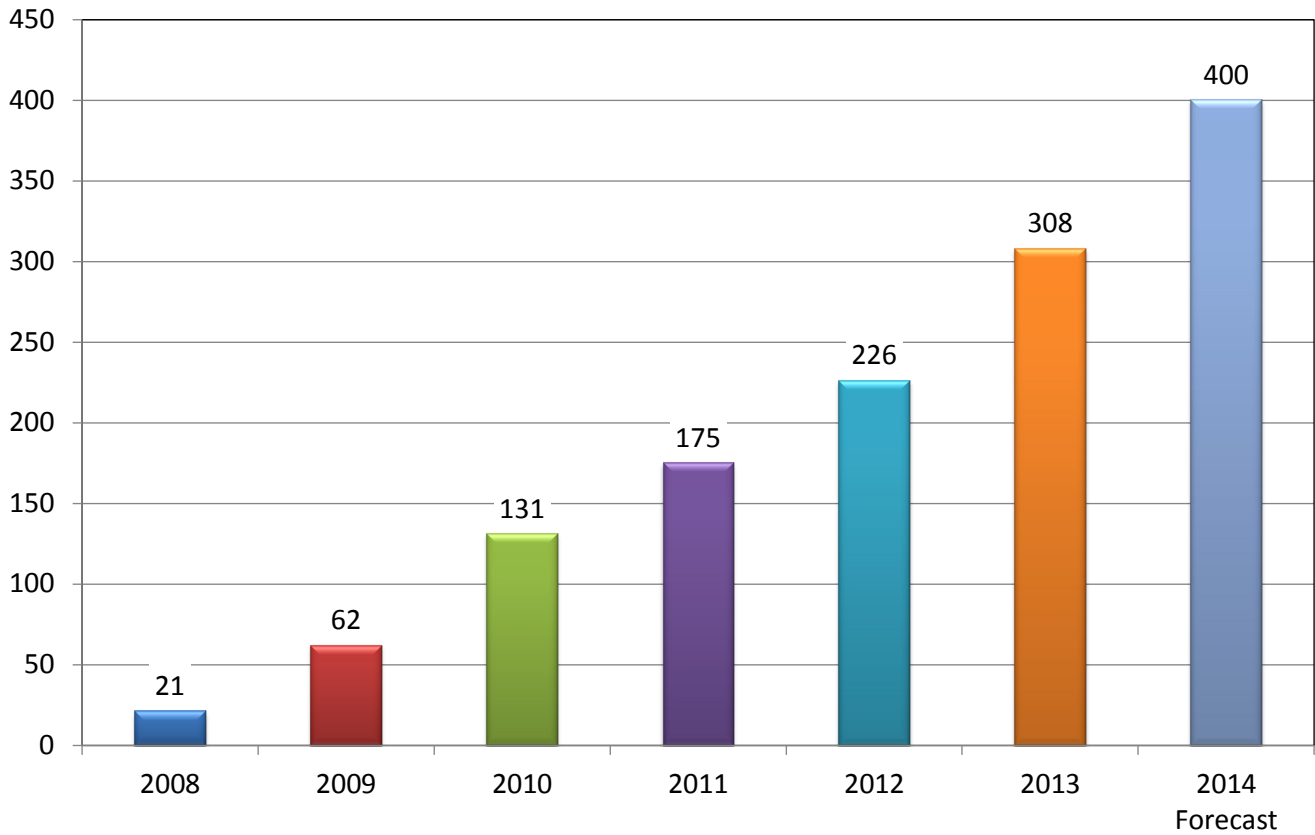
None of this success would be possible without the effort and dedication of the medical professionals at our Member Centers. Thank you and keep up the great work.

Sincerely

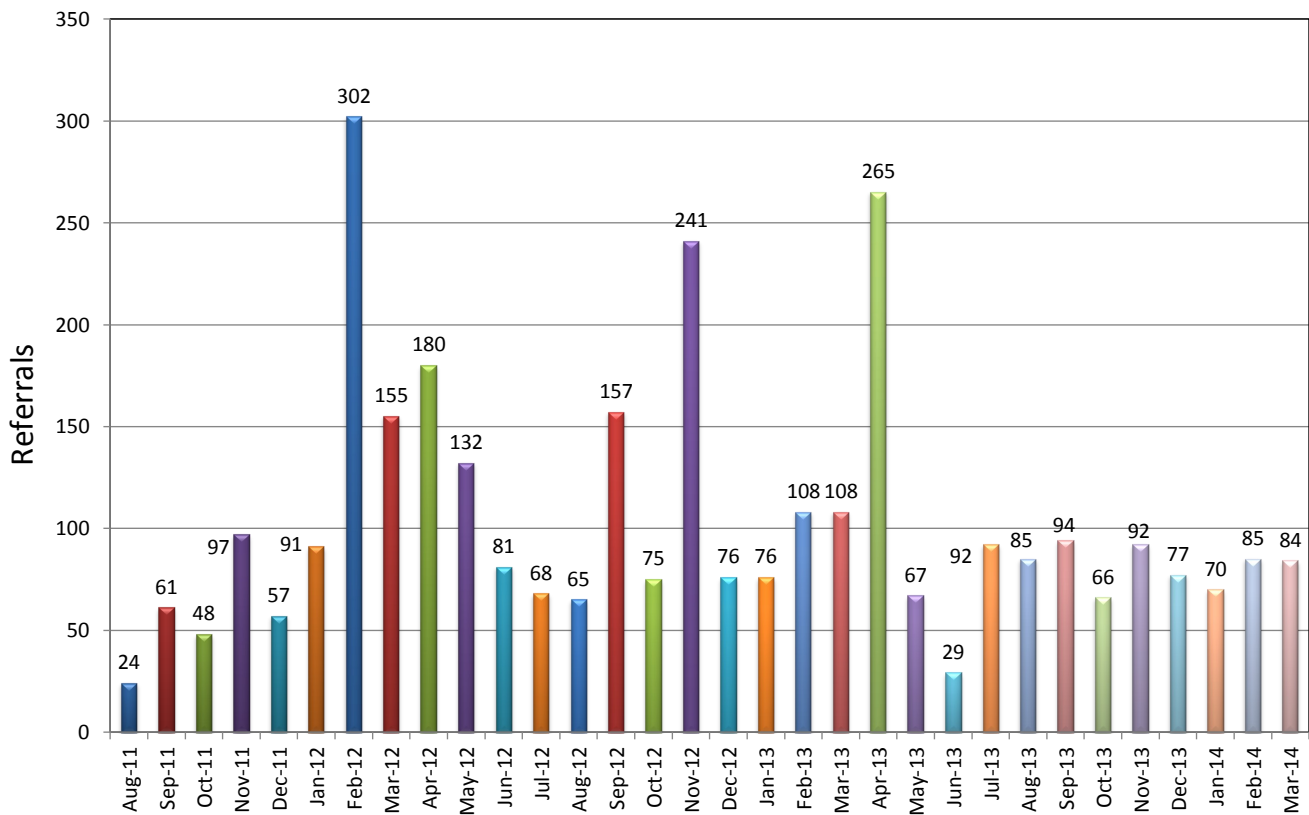
A handwritten signature in blue ink, appearing to read 'G. Hil'.

Garet Hil  
Founder & CEO  
National Kidney Registry

## Transplants Facilitated

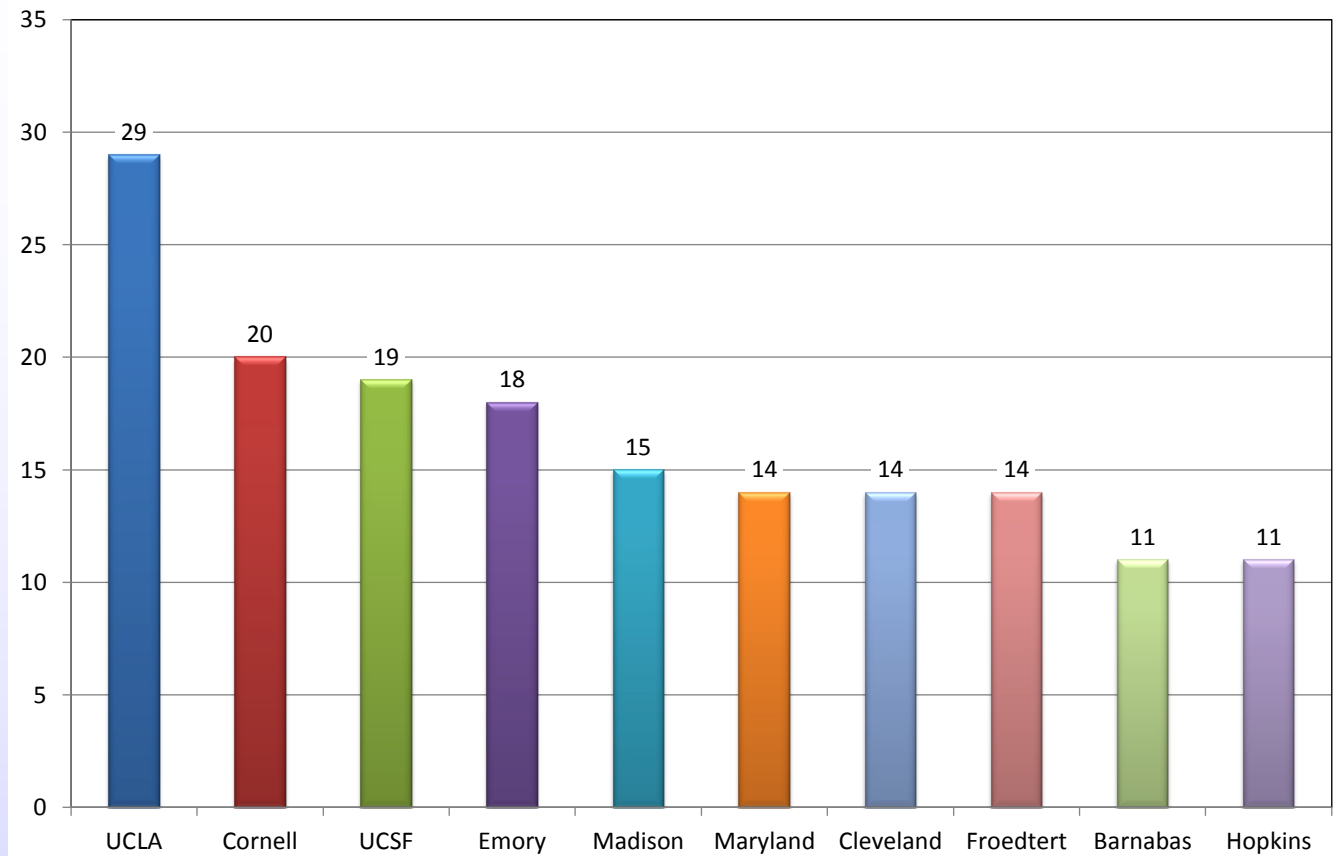


## Patient Referrals To NKR Member Centers



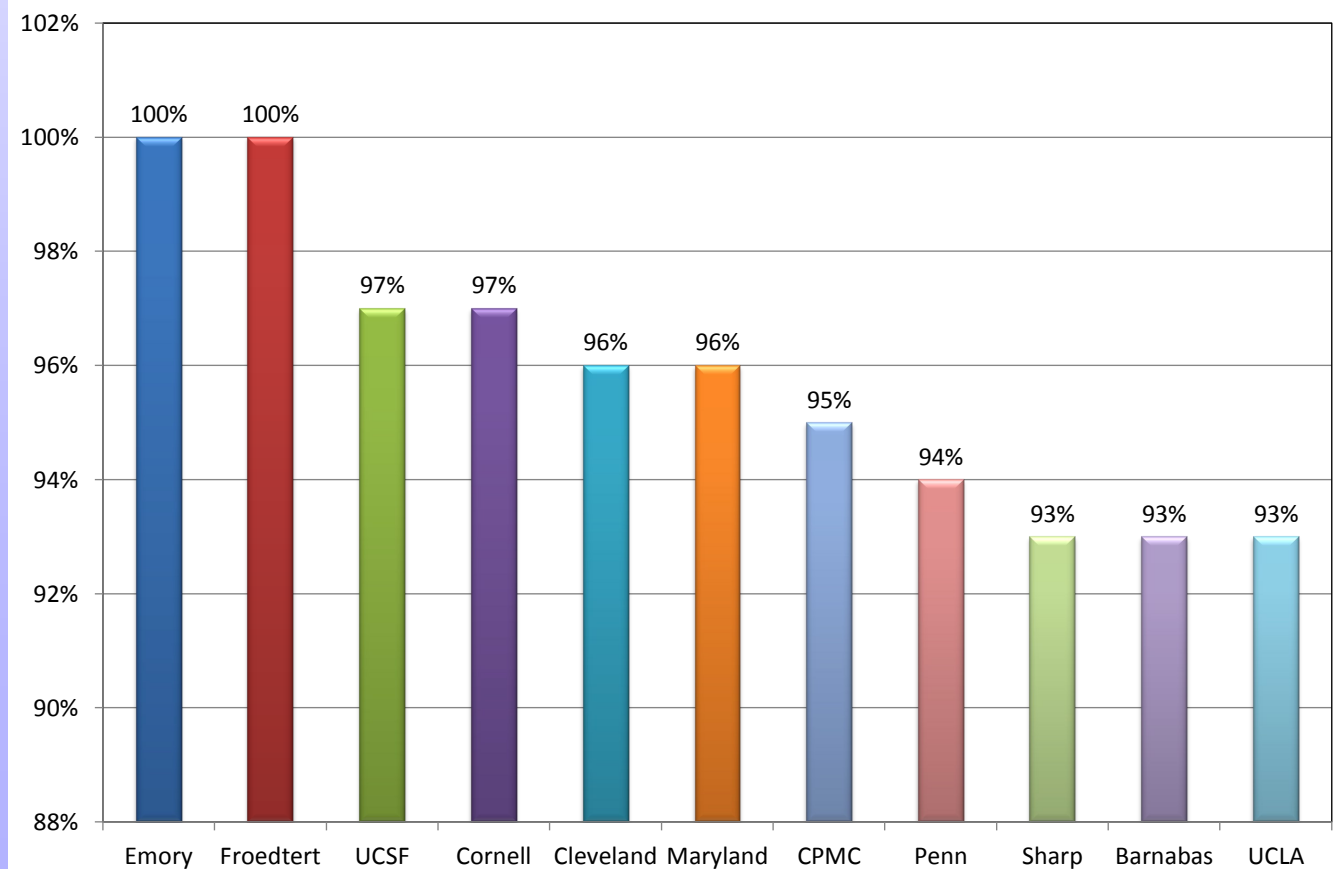
# Top 10 Centers

## Transplants in Last 12 Months



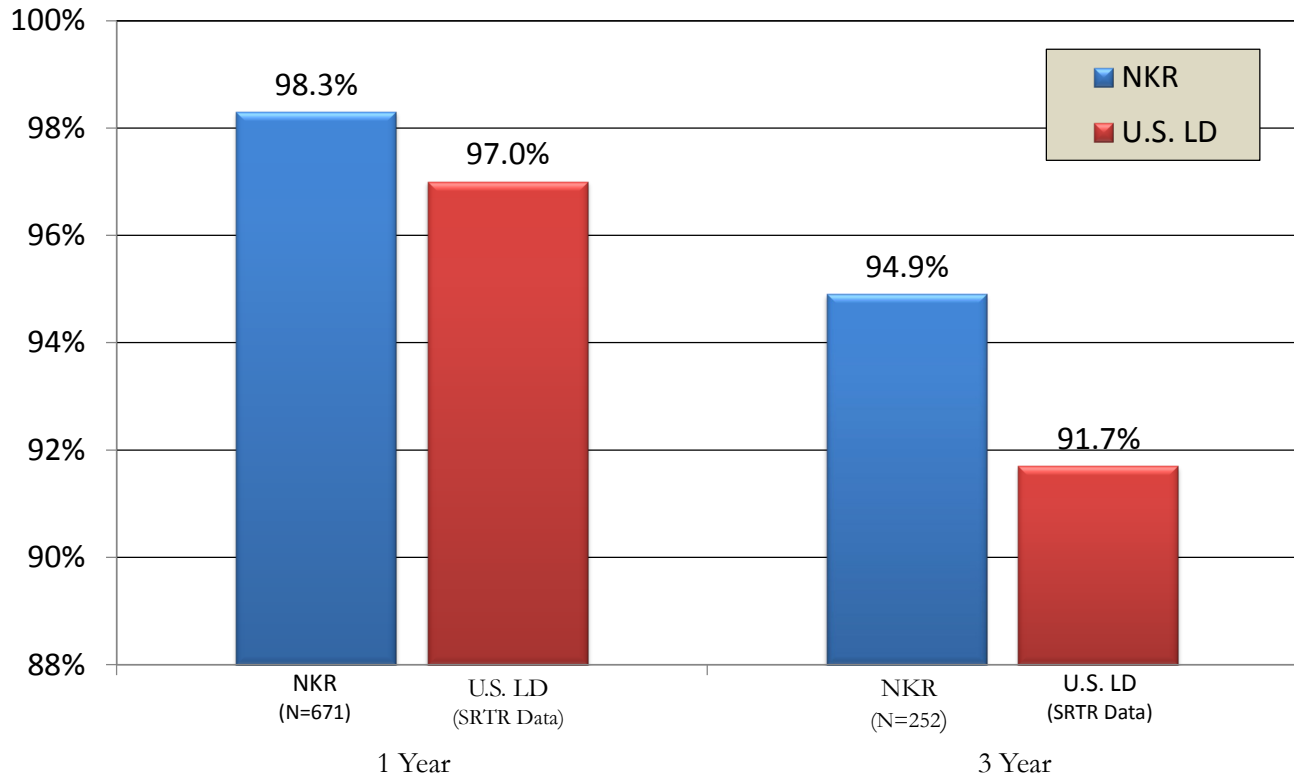
# Success Rate of Top Centers

## Patients Matched/Transplanted



# Graft Survival

## NKR Transplants vs. U.S. Living Donor Transplants

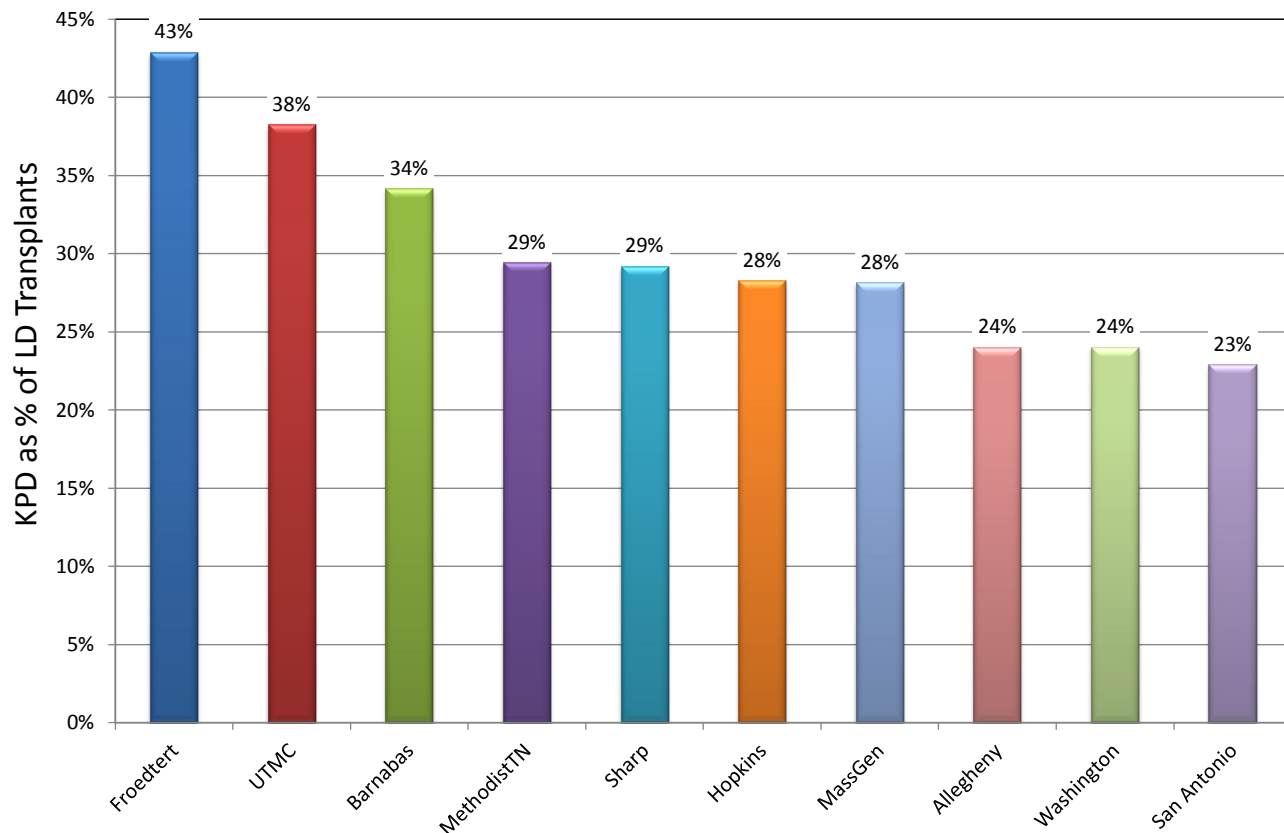


\*As of 3/21/2014

\*\*NKR Kaplan-Meier GS calculations provided courtesy of UCLA Departments of Nephrology and Urology.

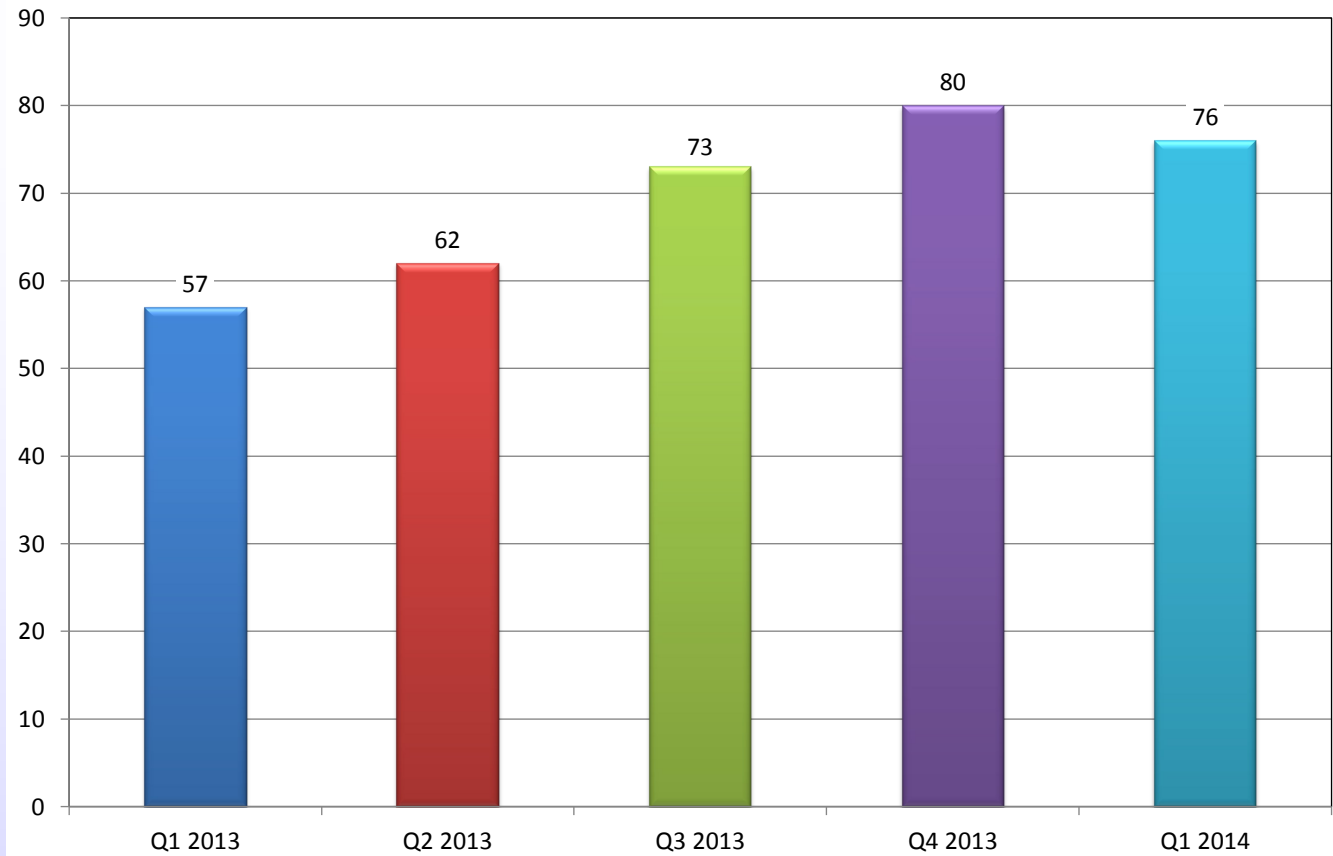
## 2013 KPD Transplants as % of LD Transplants

### Top 10 Centers



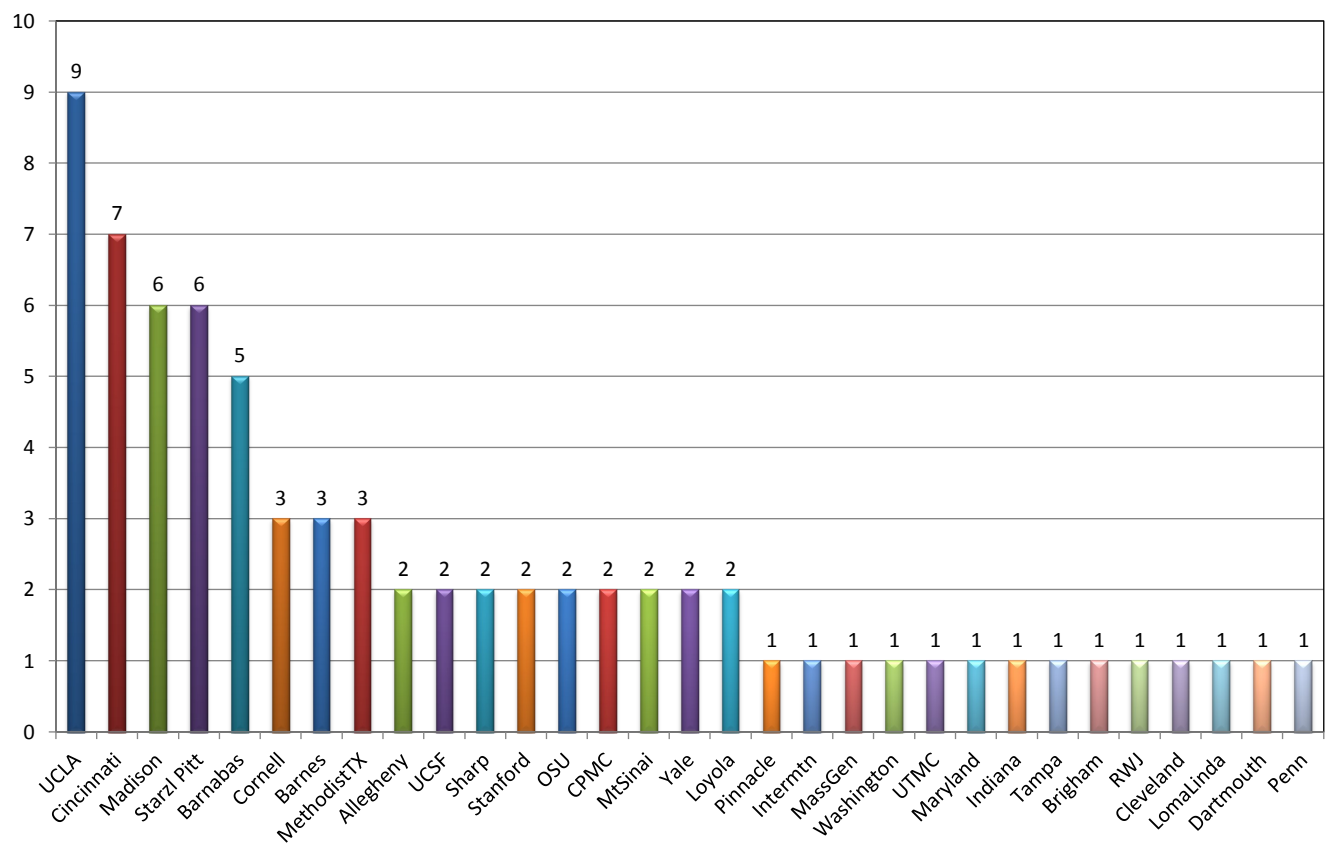
## Patients Waiting > 1 Year

As of 3/31/2014



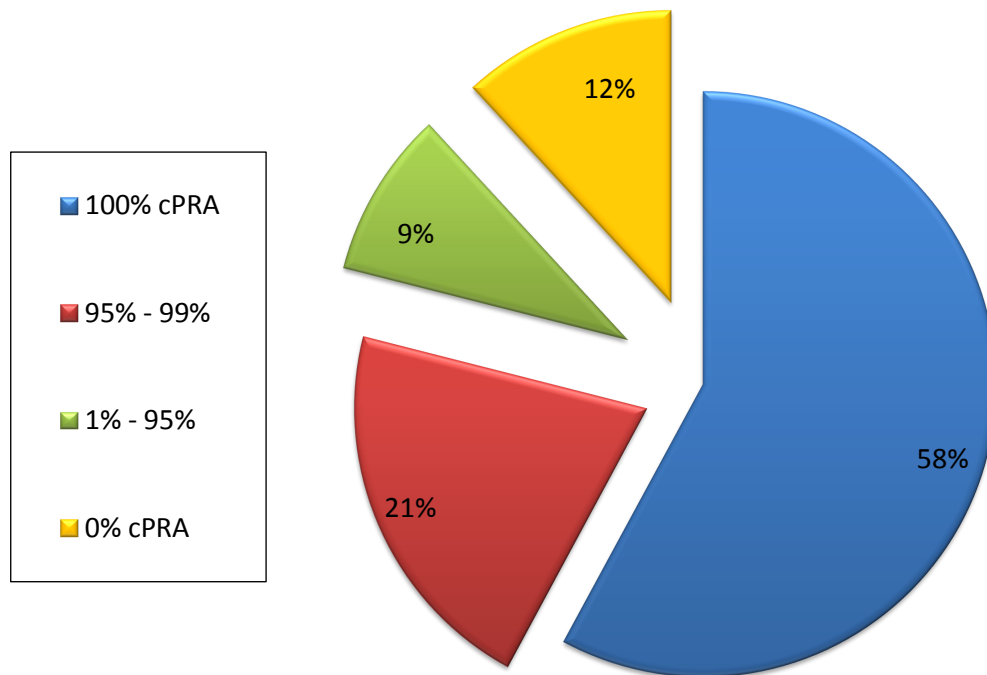
## Patients Waiting > 1 Year by Center

As of 3/31/2014



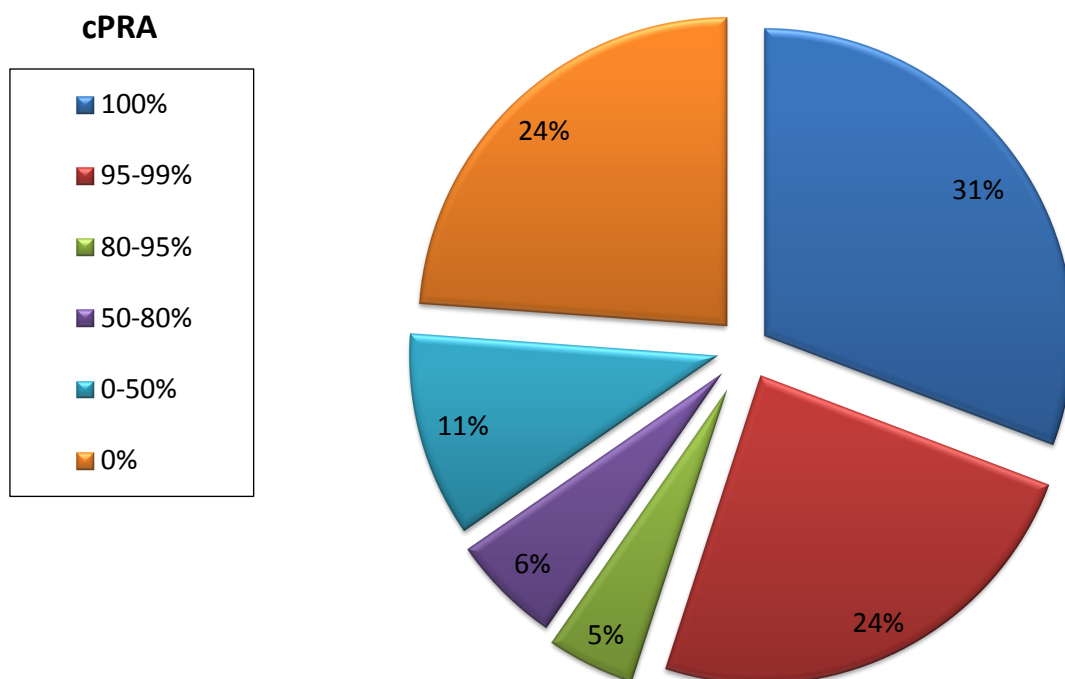
## Patients Waiting > 1 Year by cPRA

As of 3/31/2014



## Pool Composition by cPRA

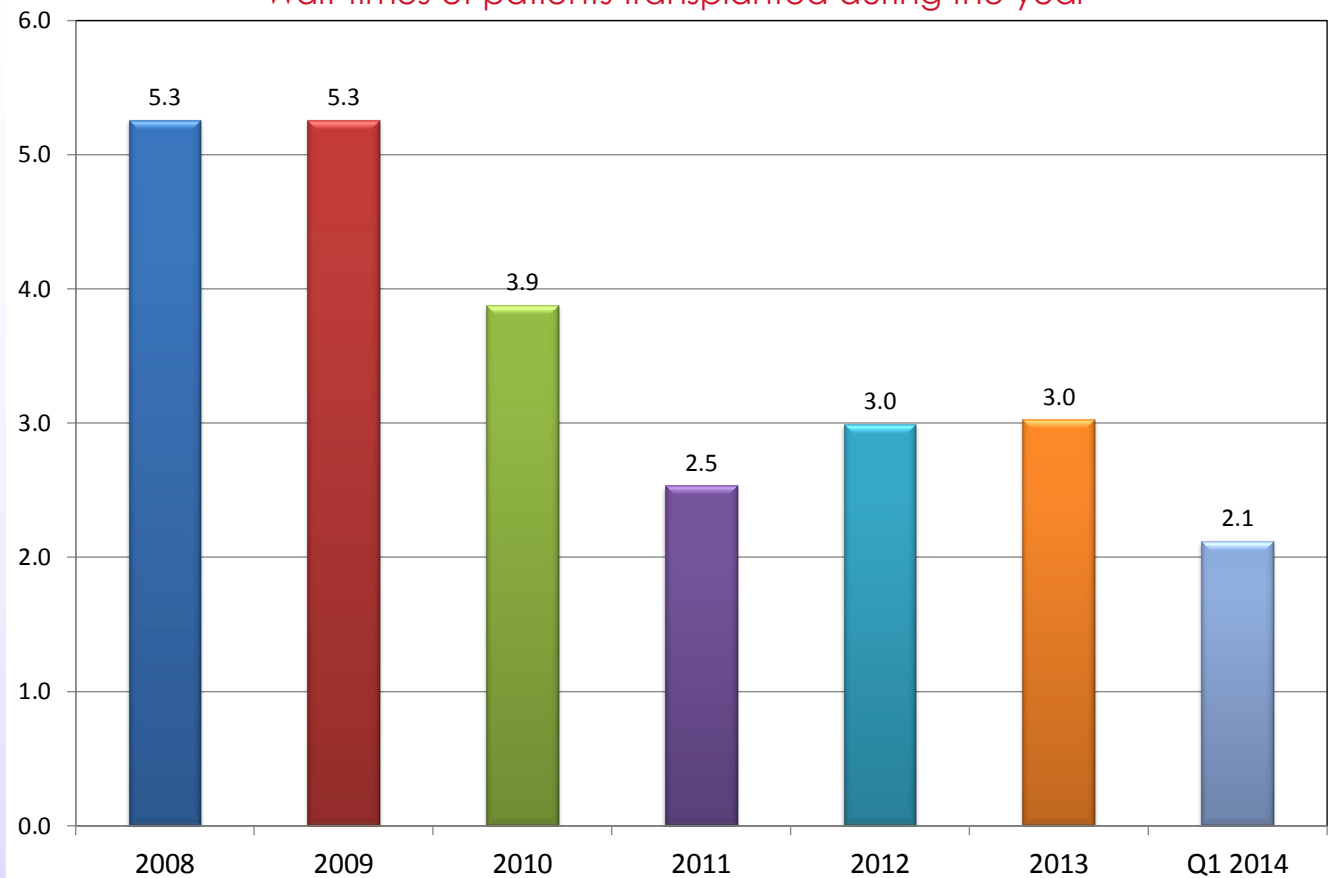
As of 3/31/2014





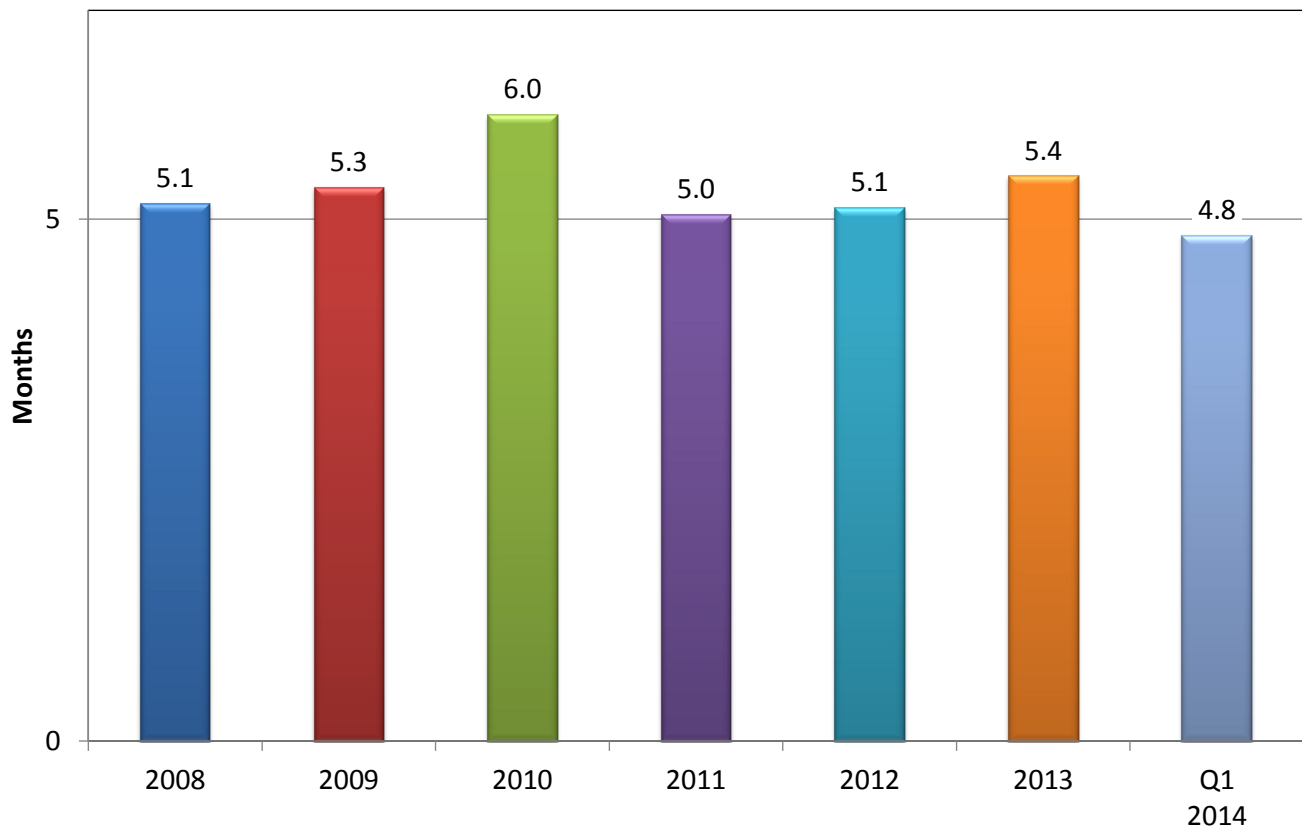
## Transplanted Patient Median Wait Time

Wait times of patients transplanted during the year

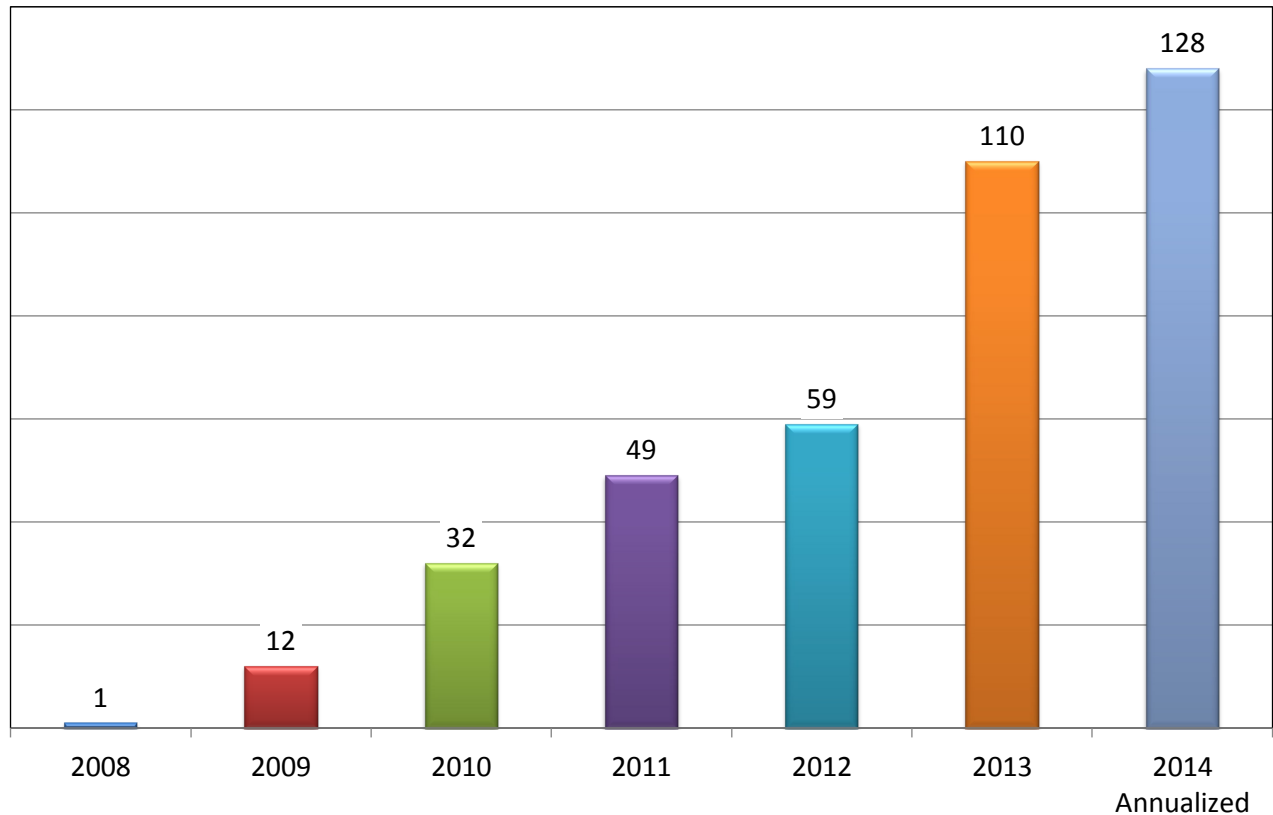


## Transplanted Patient Average Wait Time

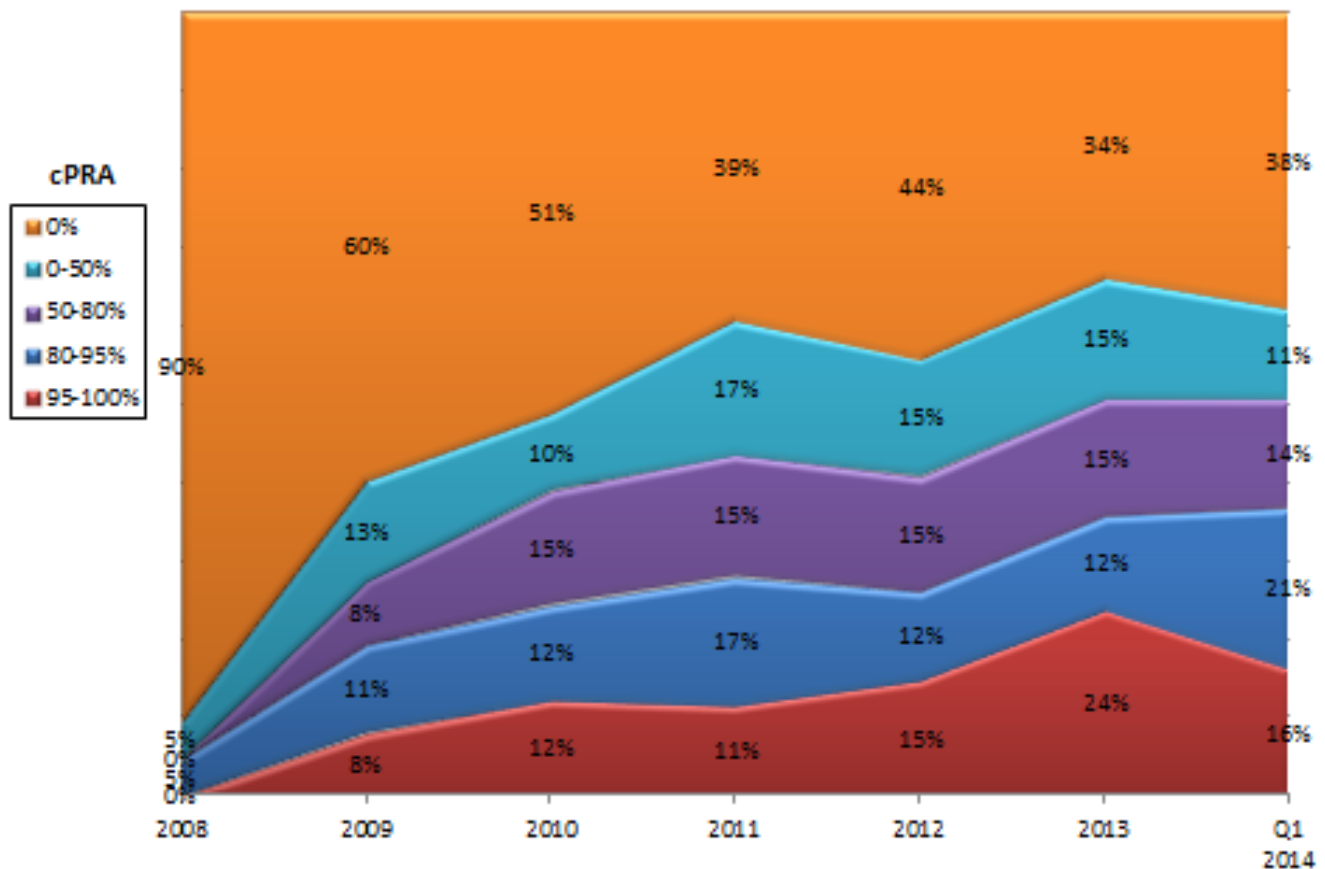
Wait times of patients transplanted during the year



## Transplanted Patients with cPRA > 80%

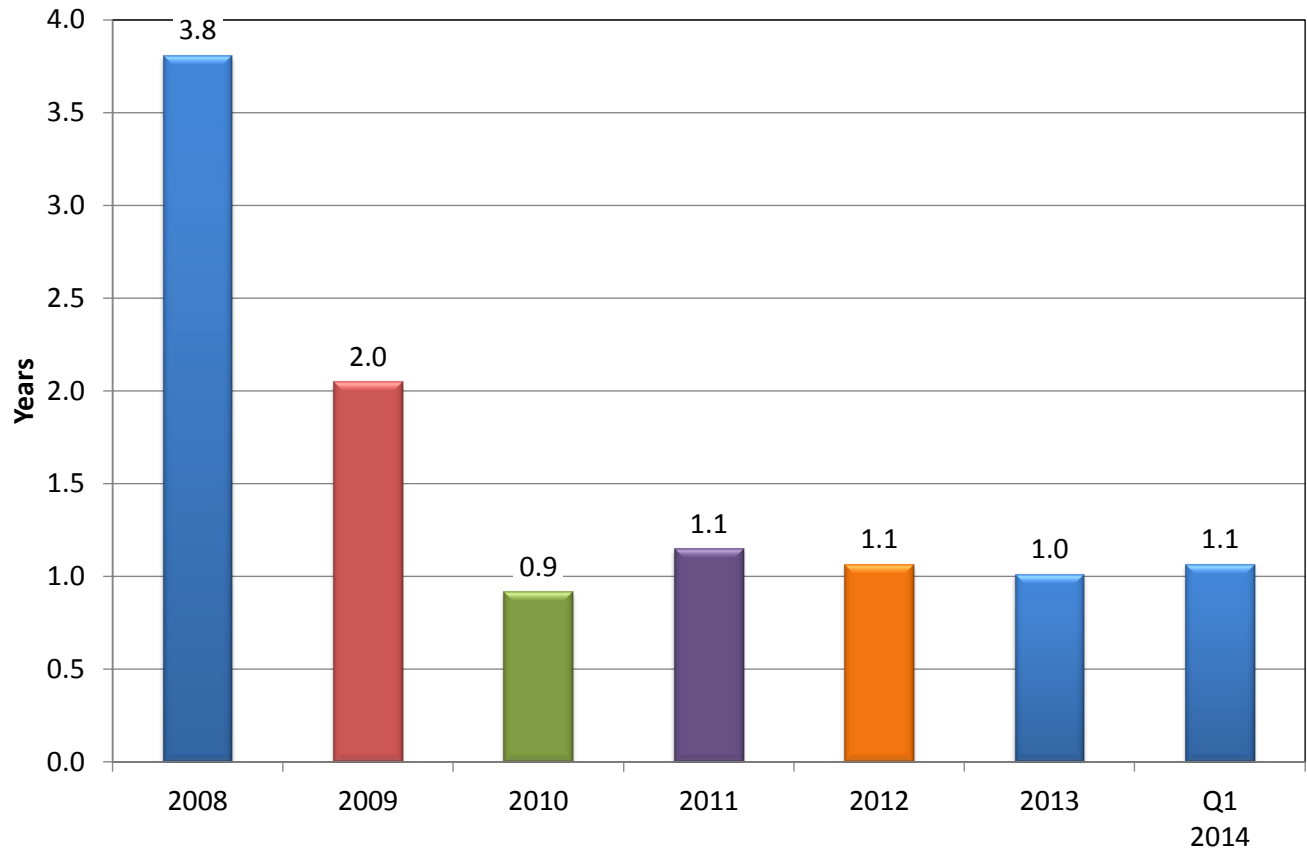


## Transplanted Patients by cPRA

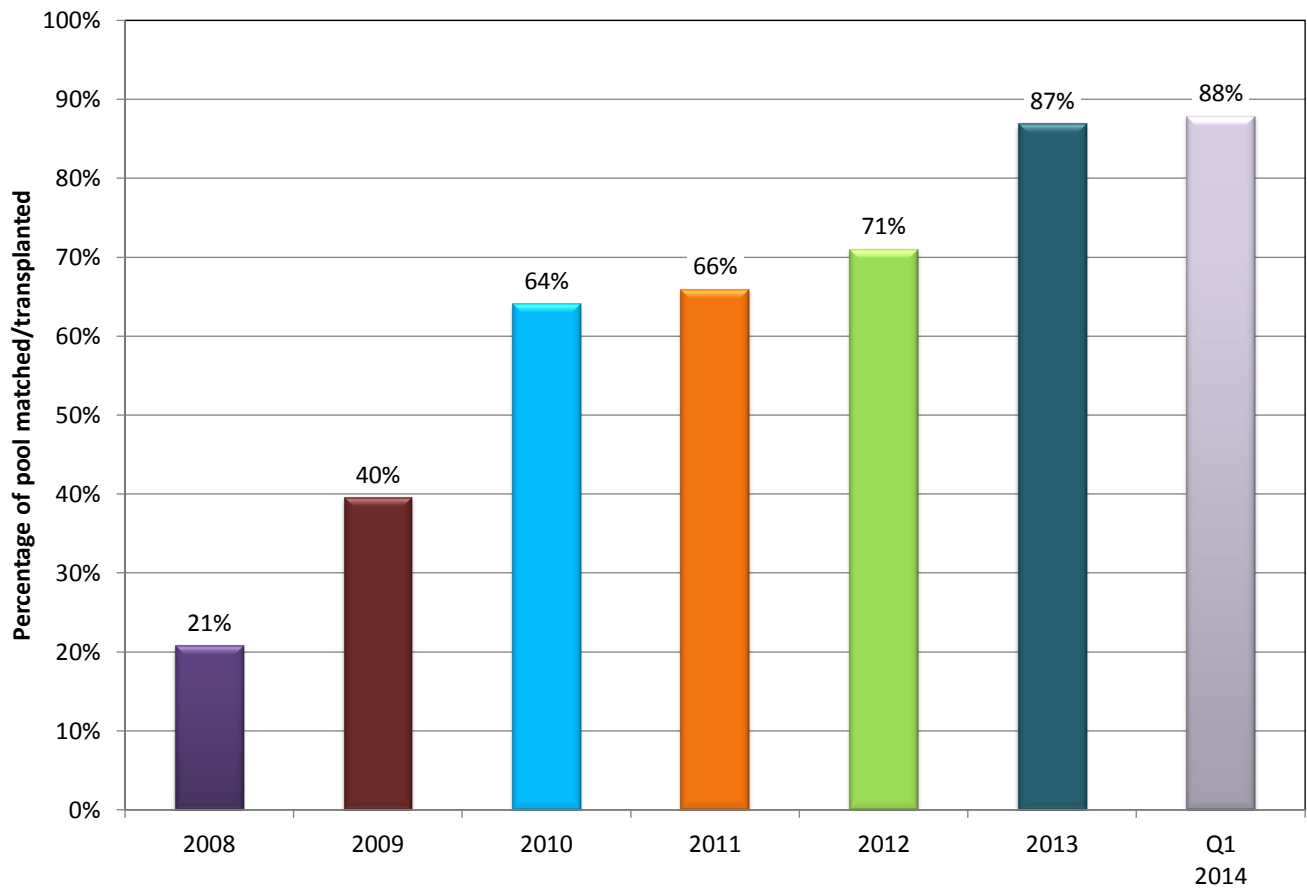


## Enrolled Patient Average Wait Time

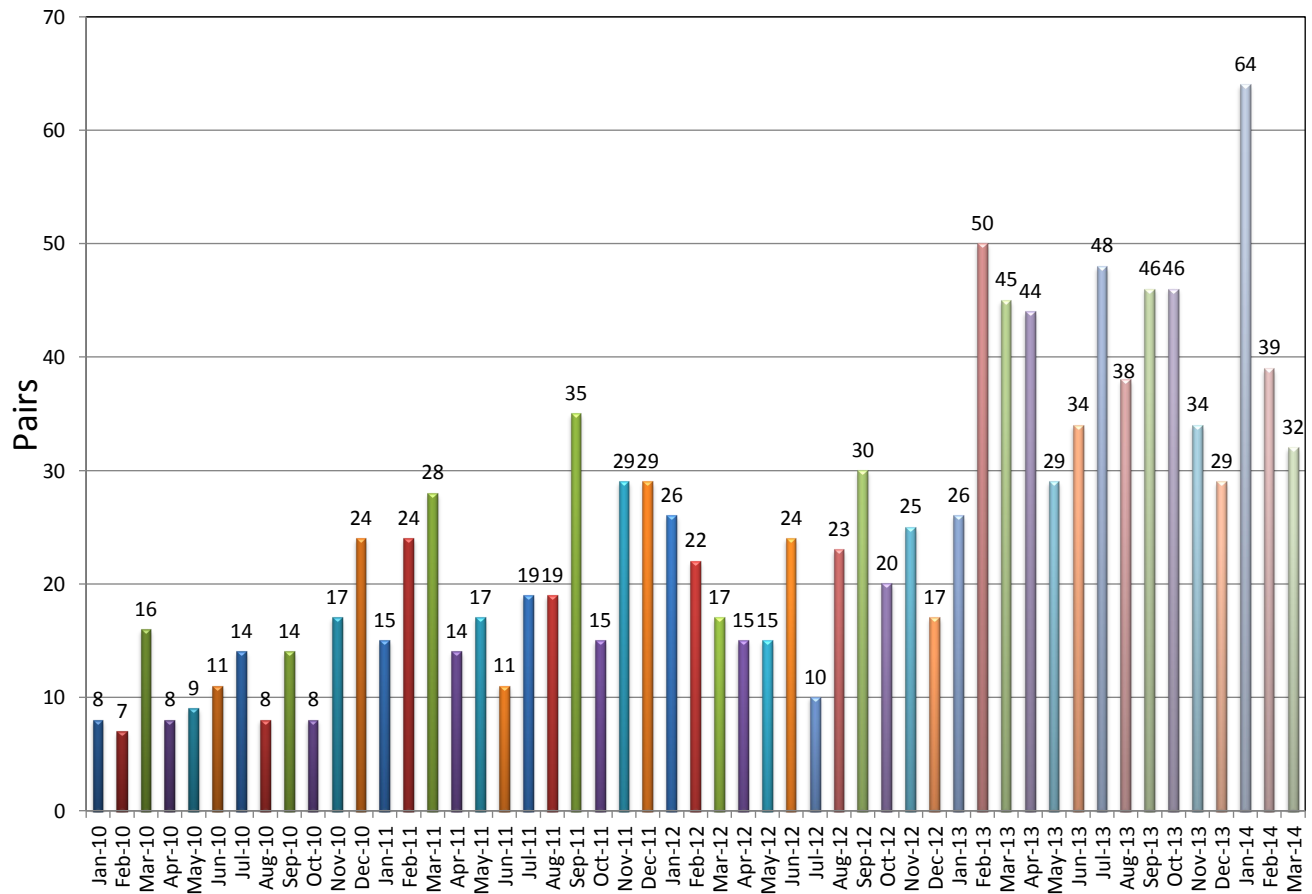
Ending unmatched patient pool/annual transplant run rate



## Percent of Pool Matched/Transplanted

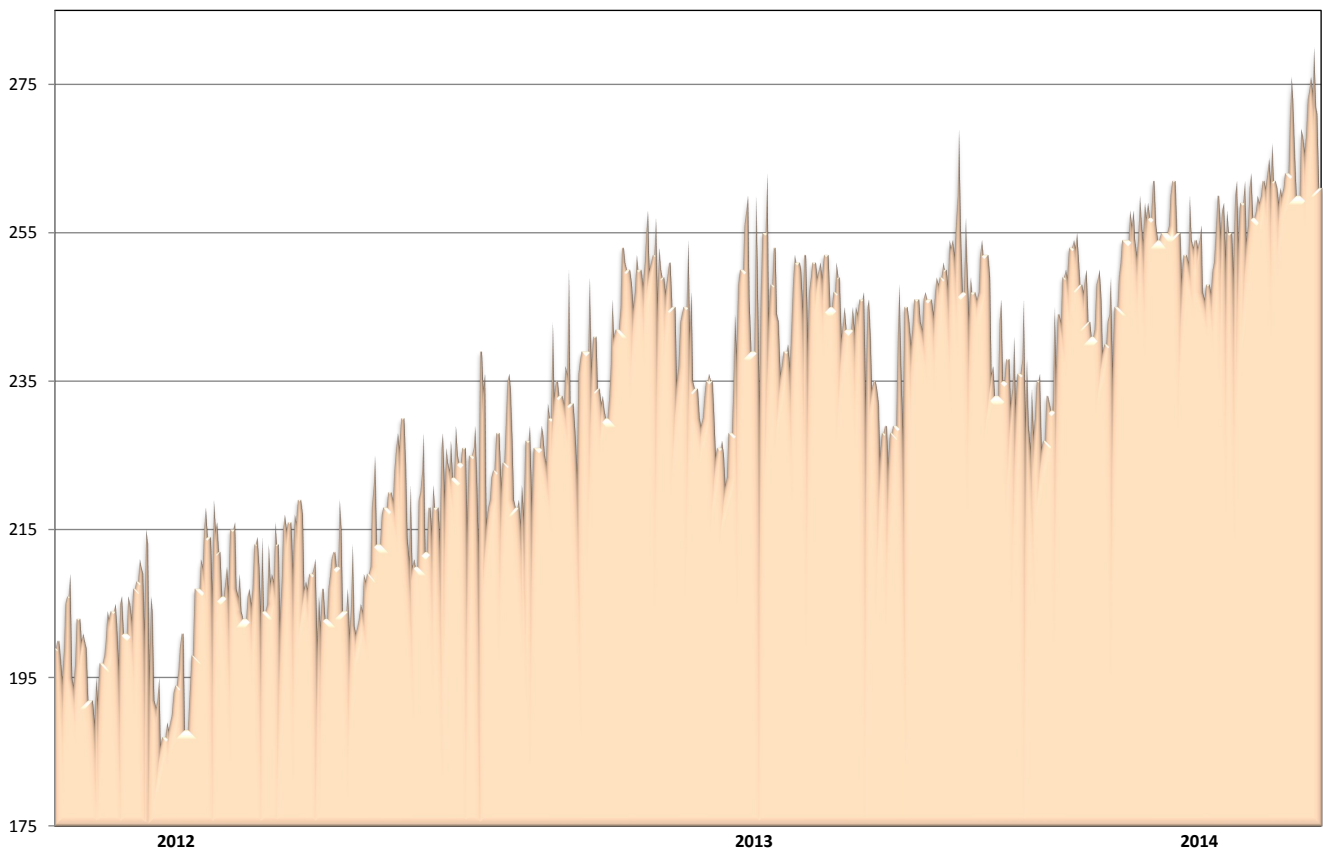


## New Pair Enrollments Per Month



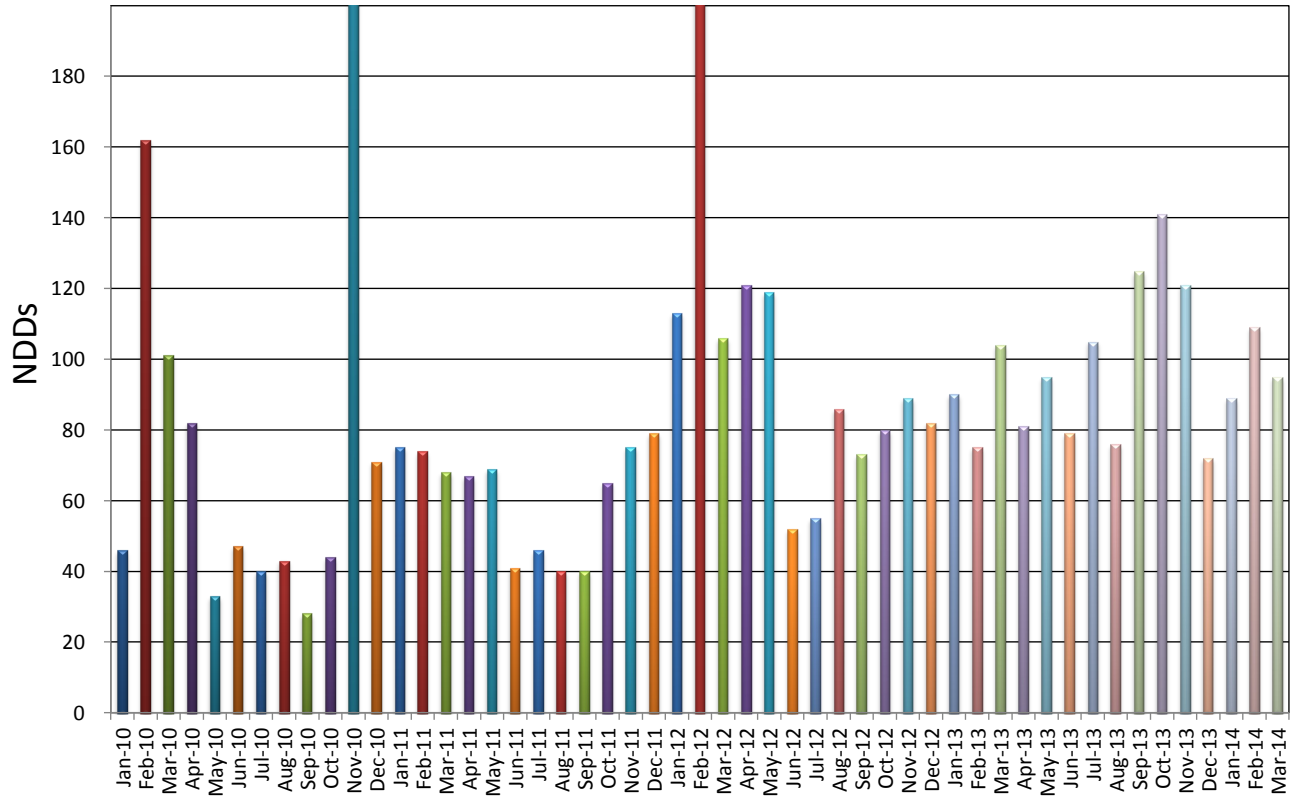
## Pool Size - Unmatched Recipients

1/1/2012 - 3/31/2014



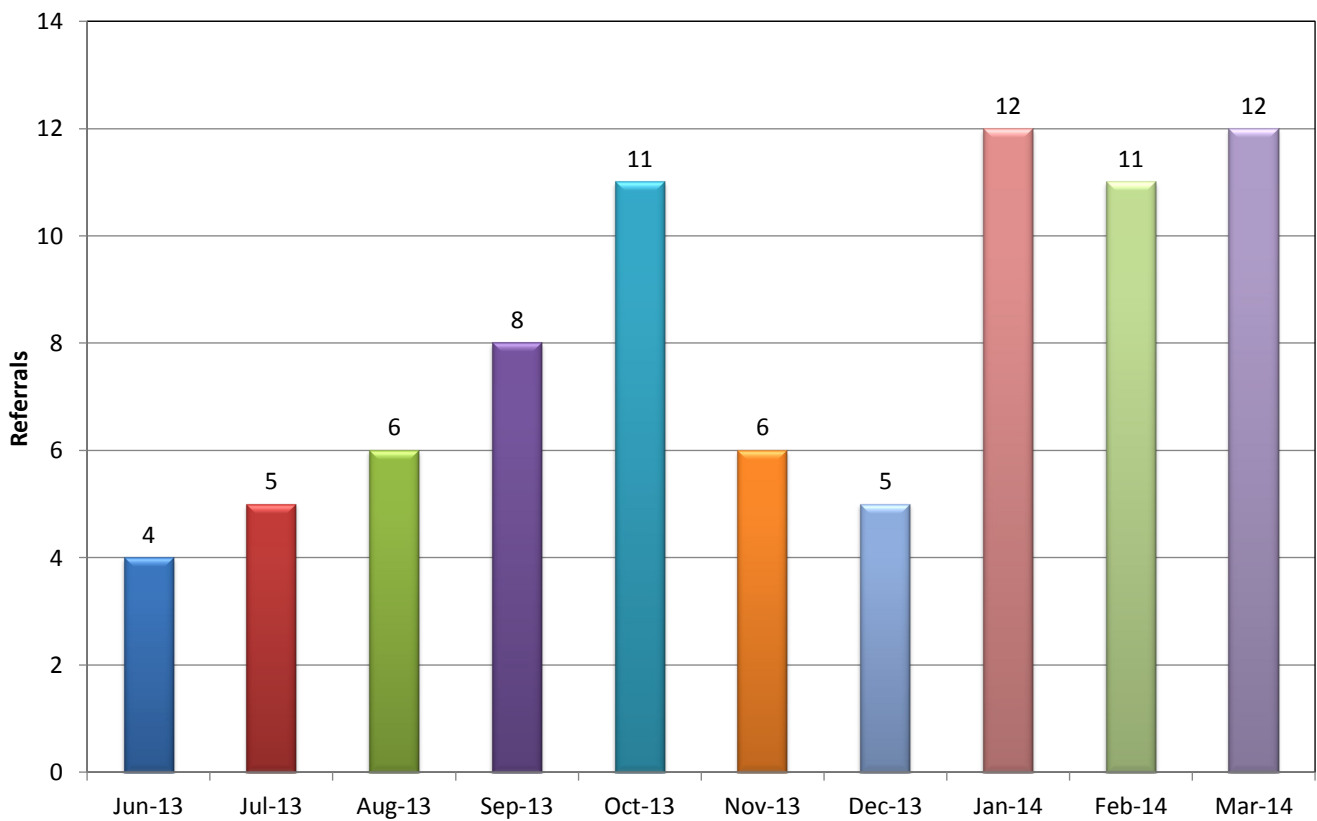
# NDD Registrations

NKR Web Site

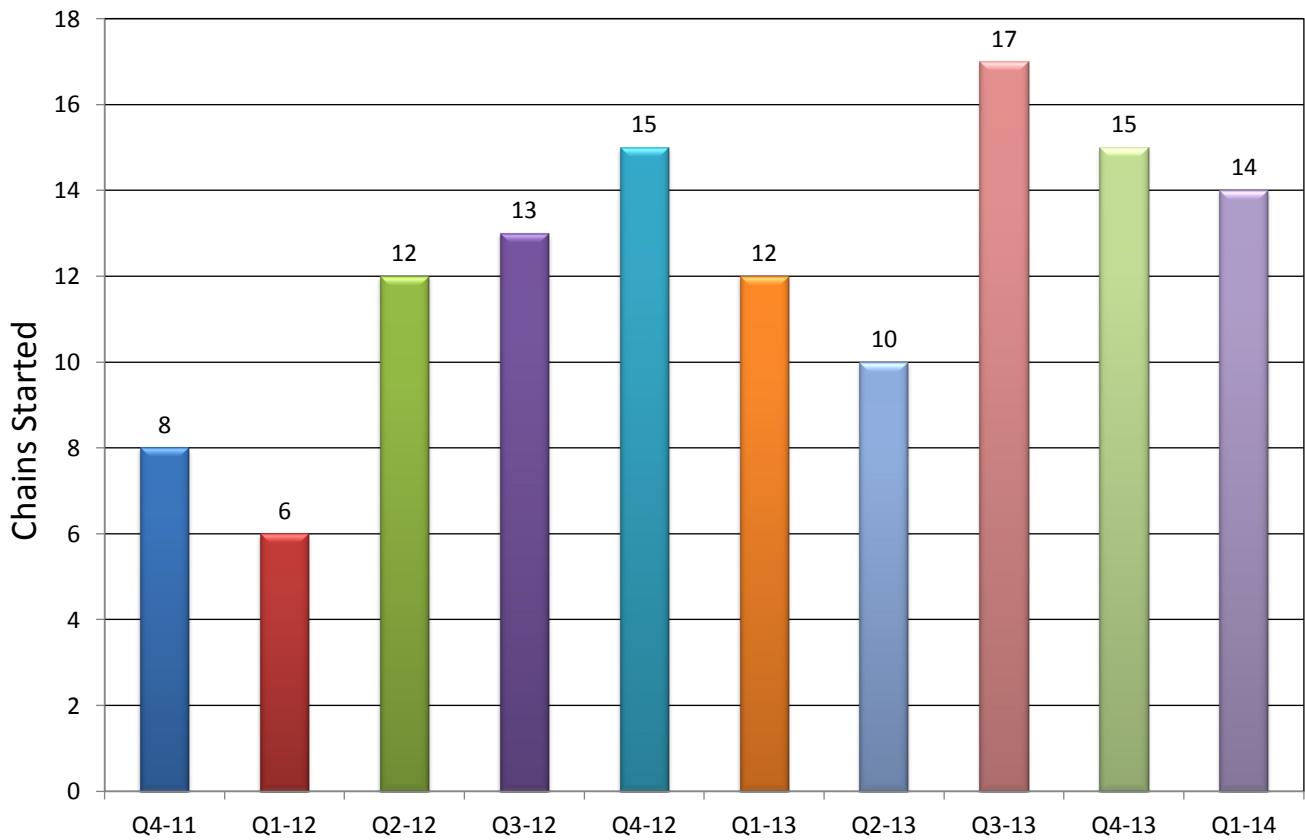


# NDD Referrals

To NKR Member Centers



## Chains Started by Quarter



## Chain & Loop Length Statistics

Category	Count	Average Length	Transplants
Ended	176	4.73	833
Broken	14	3.79	53
Active	3	4.67	14
Chain Total	193	4.66	900
Loops	48	2.31	111
Total	241	4.20	1011

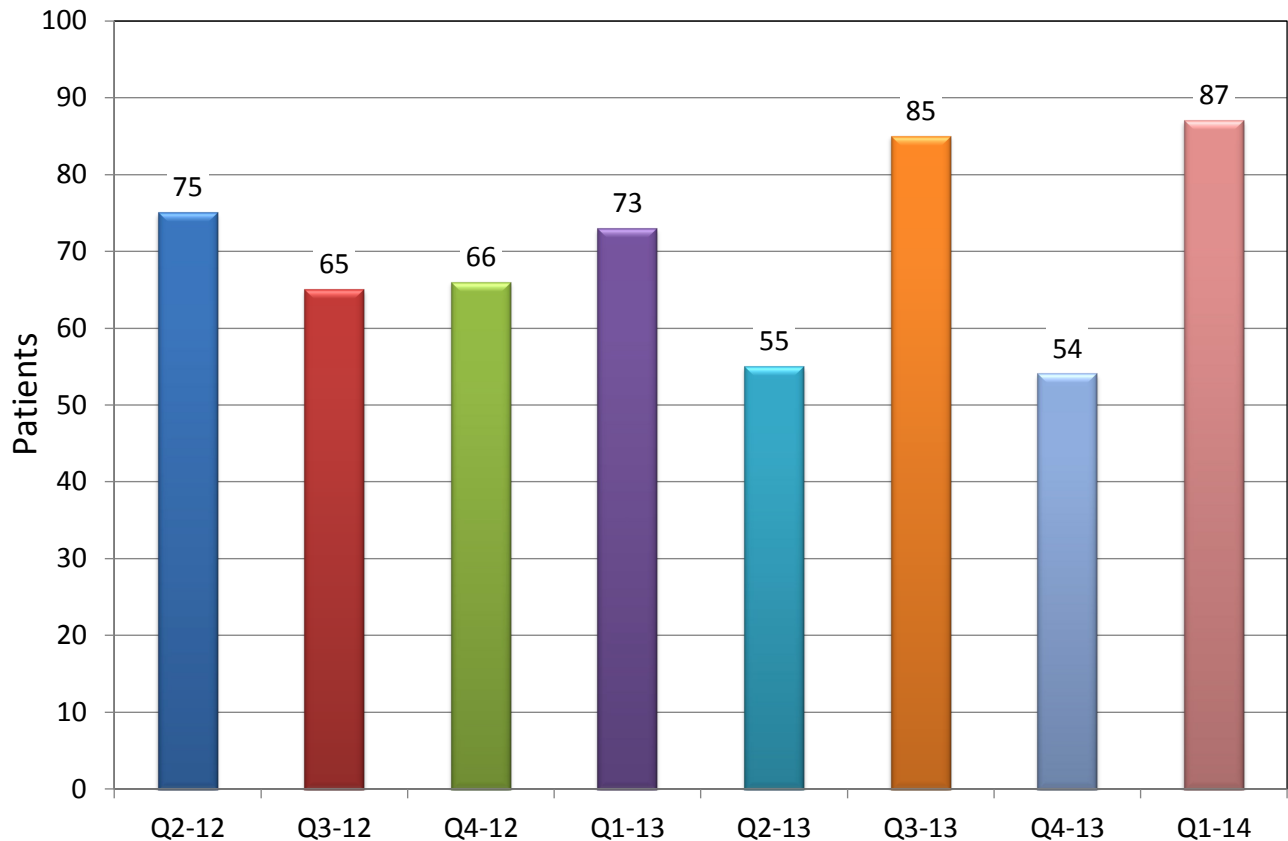
# Great Matches

>75 HLA Match Points

Count	R Center	Swap #	Xplant Date	D ABO	R ABO	NKR cPRA	Wait	D Age ATOT	R Age ATOT	HLA pts
1	MethodistTX	124	12/7/2011	A	A	99	14	42	69	100
2	Barnabas	182	10/3/2012	A	A	92	4	53	51	100
3	UMinn	253	9/12/2013	A	AB	90	2	32	38	100
4	Madison	221	4/30/2013	O	O	99	17	46	52	90
5	UCSF	58	6/15/2010	A	A	100	6	51	58	90
6	UCLA	265	11/22/2013	A	A	80	5	55	58	90
7	Madison	674	1/9/2014	O	A	99	5	29	33	90
8	Pinnacle	138	3/6/2012	B	B	0	3	50	47	90
9	UCLA	659	10/24/2013	O	O	100	25	55	57	85
10	Barnes	570	12/18/2012	O	O	62	13	23	46	85
11	Barnes	266	1/16/2014	A	A	100	13	33	40	85
12	Barnes	105	3/31/2011	A	A	100	7	63	32	85
13	UCLA	538	5/22/2012	A	O	88	7	30	12	85
14	Emory	139	2/7/2012	O	O	93	5	29	55	85
15	SCarolina	266	1/14/2014	O	O	89	3	55	44	85
16	Maine	259	1/28/2014	A	A	0	1	53	43	85
17	Cornell	281	12/19/2013	A	A	98	4	38	59	80
18	Vermont	221	5/24/2013	B	B	95	3	35	29	80
19	UCLA	102	3/14/2011	B	B	95	2	46	67	80
20	Emory	192	4/26/2013	O	O	33	1	46	60	80
21	Intermtn	118	6/29/2011	O	O	96	16	30	27	75
22	MtSinai	178	8/21/2012	B	B	99	15	39	61	75
23	Cincinnati	237	9/26/2013	A	A	98	10	21	32	75
24	UCLA	61	10/25/2010	B	B	46	7	50	48	75
25	UCLA	157	6/12/2012	A	A	96	7	41	26	75
26	UCLA	152	4/18/2012	B	B	0	6	57	47	75
27	UCLA	124	12/7/2011	O	O	93	6	30	49	75
28	UCSF	18	2/18/2010	AB	AB	0	5	47	46	75
29	Barnabas	9	3/13/2009	B	B	32	5	30	52	75
30	Allegheny	62	5/6/2010	A	AB	0	5	64	?	75
31	Sharp	222	3/26/2013	A	A	80	5	38	37	75
32	Starzl Pitt	525	3/7/2012	O	O	61	3	45	41	75
33	Madison	169	7/25/2012	B	B	97	3	32	63	75
34	Cornell	268	11/20/2013	O	O	0	2	60	35	75
35	Madison	221	5/30/2013	A	AB	74	2	52	57	75
36	CPMC	109	4/22/2011	O	O	0	2	66	55	75
37	Maryland	282	2/26/2014	A	A	96	1	30	53	75
38	Madison	129	11/1/2011	O	O	25	0	66	67	75
39	Madison	127	10/19/2011	B	B	0	0	61	69	75

# Patients Deleted

As of 3/31/2014



## New System Innovations

First Quarter 2014

### 1. Enhanced Donor Preselect- helps find matches for your hardest to match patients

- Find ABO Incompatible or weak positive XM donors
  - Ability to deploy advance matching strategies for hardest to match patients
  - Donors grouped (Accepted, preferred, ABOi, Avoid Conflict etc.)
- Allows more organized approach to review and decision process
  - Provides a targeted approach to advanced matching strategies
  - Ability to batch decline donors you deem unacceptable
- Reduces time required to accept or decline donors
  - Makes it much easier to enter compatible and easy to match pairs
  - Donor alias displayed for every donor
- Easy to decline and accept donor after exploratory XM result

### 2. XM Kit Tracking – Minimizes XM delays and lost kits

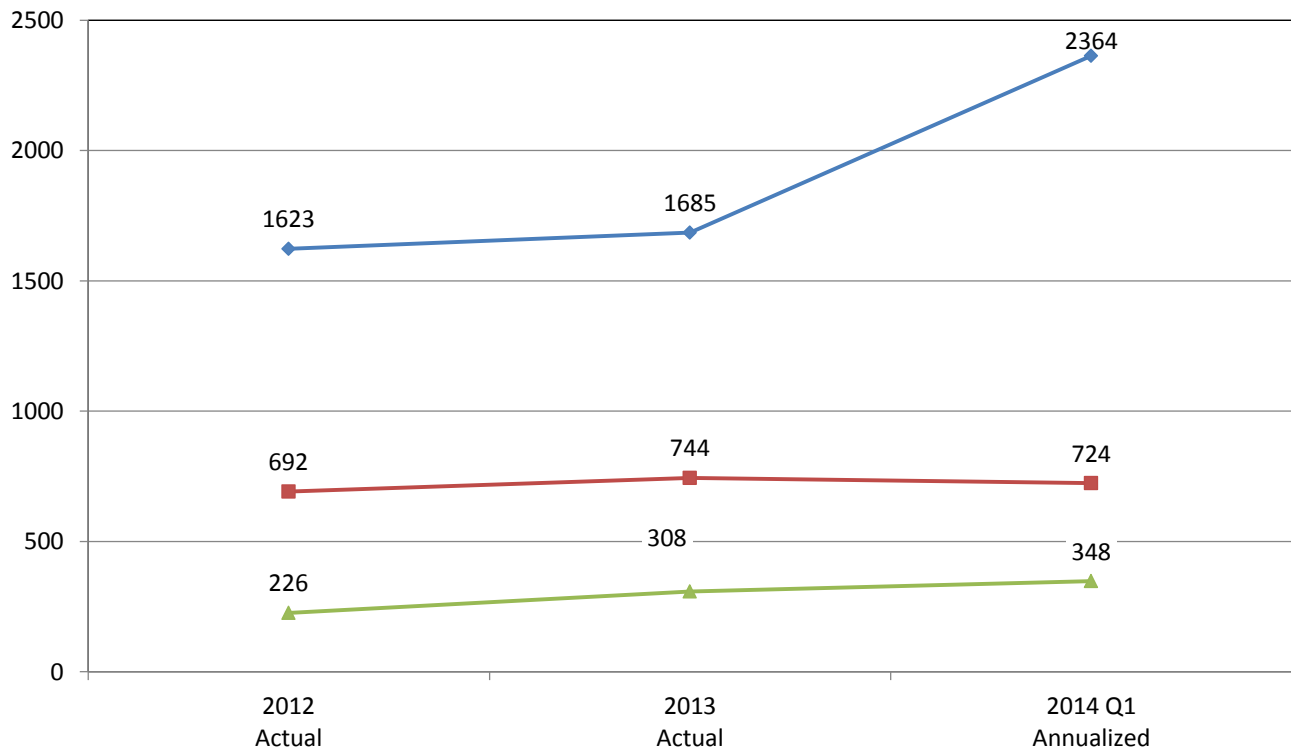
- History of cross match requests and the results
  - Allows centers to keep track of all requests
- Elimination of lost kits
  - Locates delivered kit within the center
- Reduction in donor blood draw delays
  - Eliminate missed XM deadlines and extensions
- Tracking number visibility and access
  - Includes kit delivery and return of drawn blood
- Less overall swap delays
  - Keeping swaps on track gets more people transplanted

### 3. Direct Shipping of XM Kits to remote donors - Eliminates extra step for coordinators



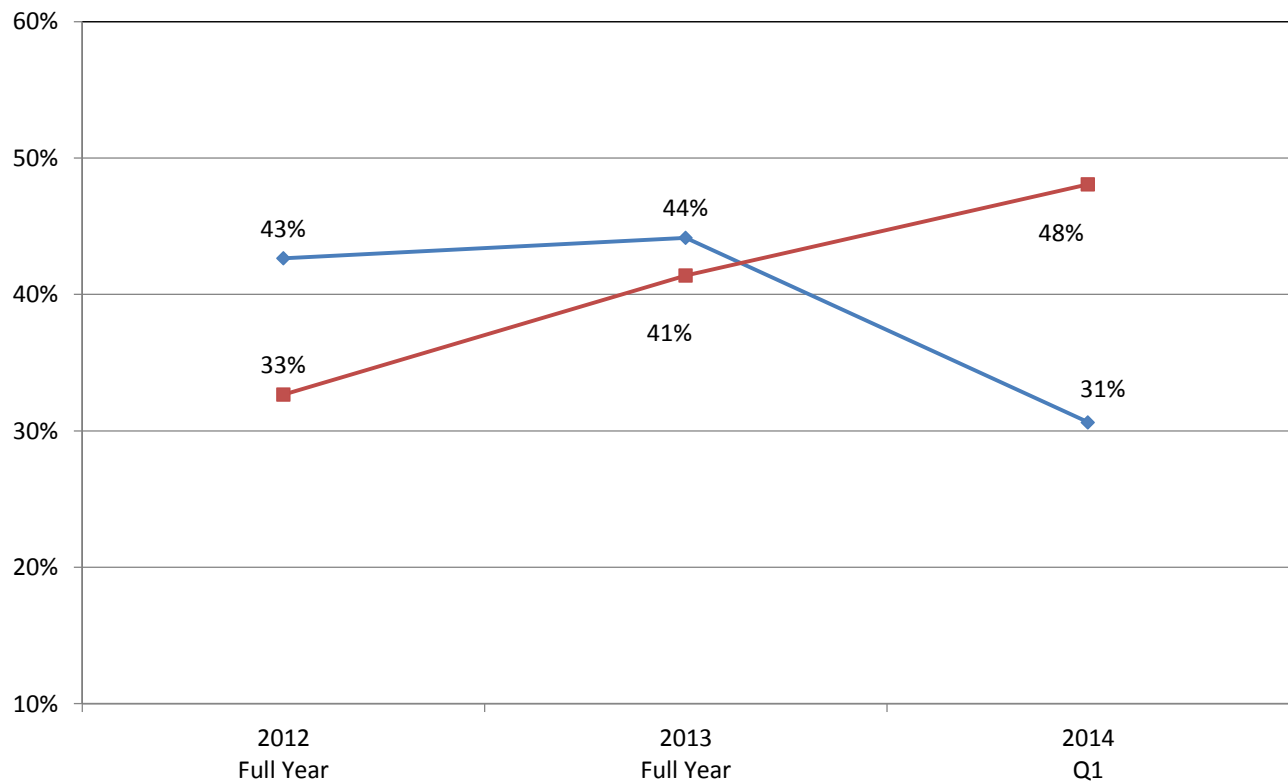
## Process Volume

◆ Individual Matches Offered    ■ XMs Requested    ▲ Transplants Facilitated



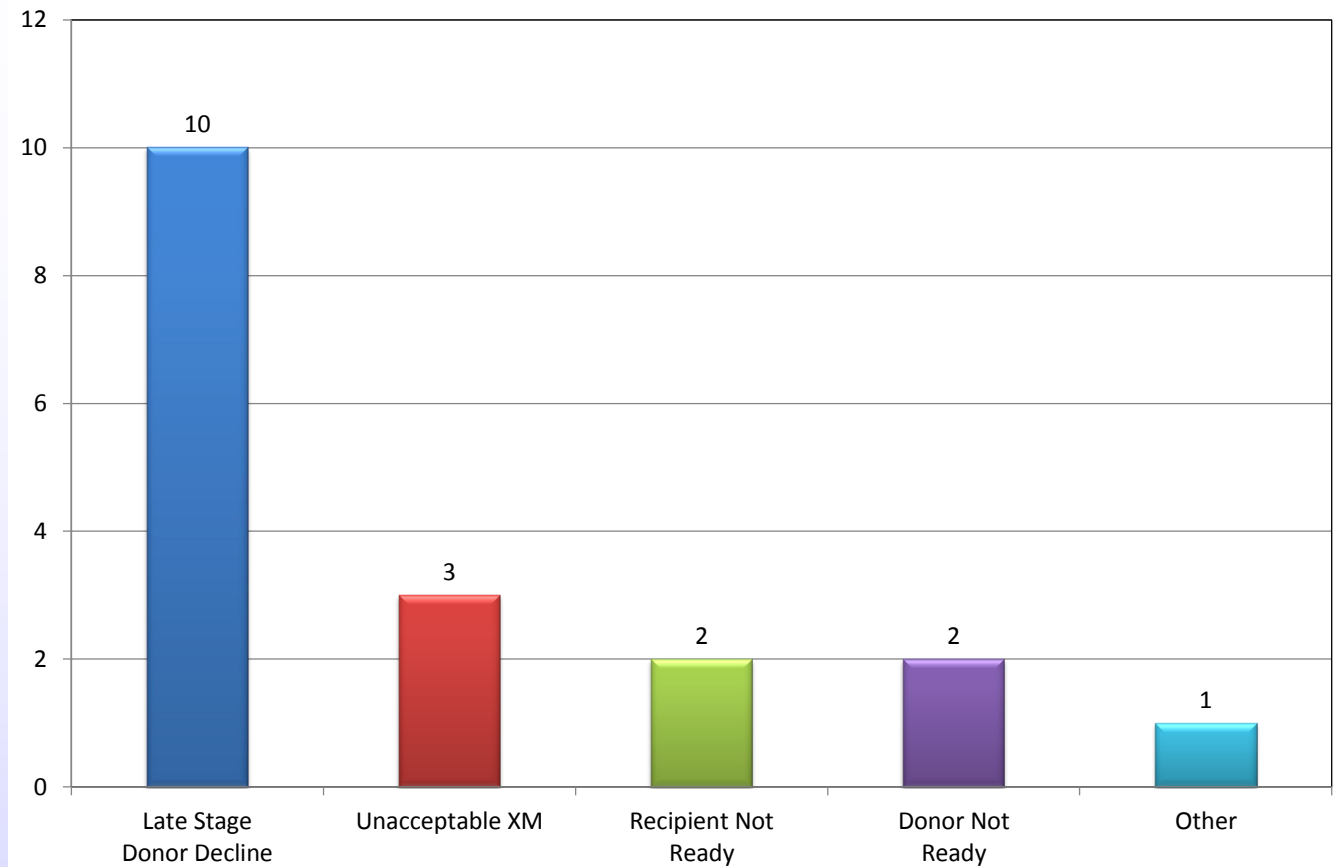
## Match Success Rates

◆ Individual Offers to XMs    ■ XMs to Transplants



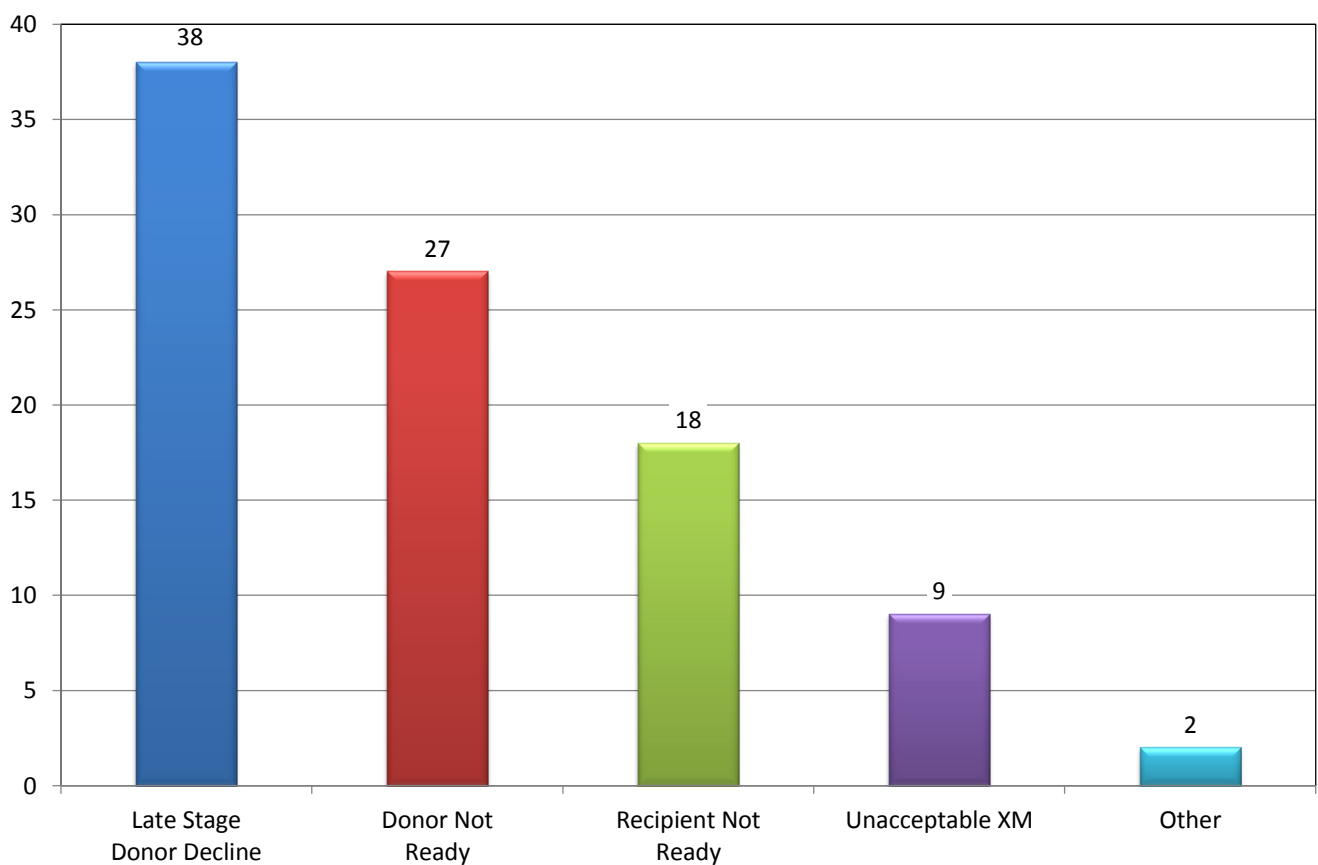
## Swap Failures by Primary Root Cause

Q1 2014



## Transplants Impacted by Primary Root Cause

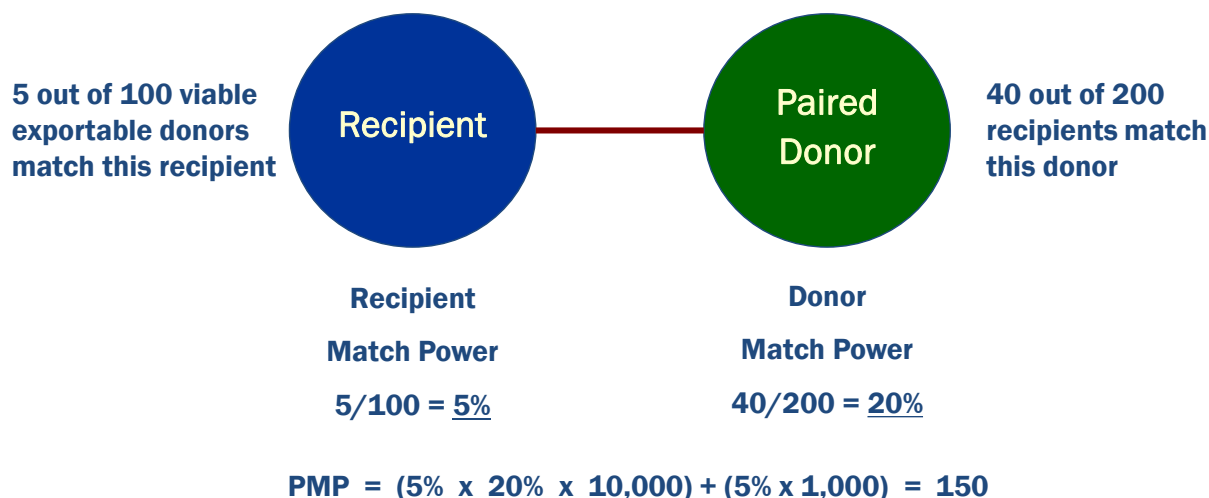
Q1 2014



# 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

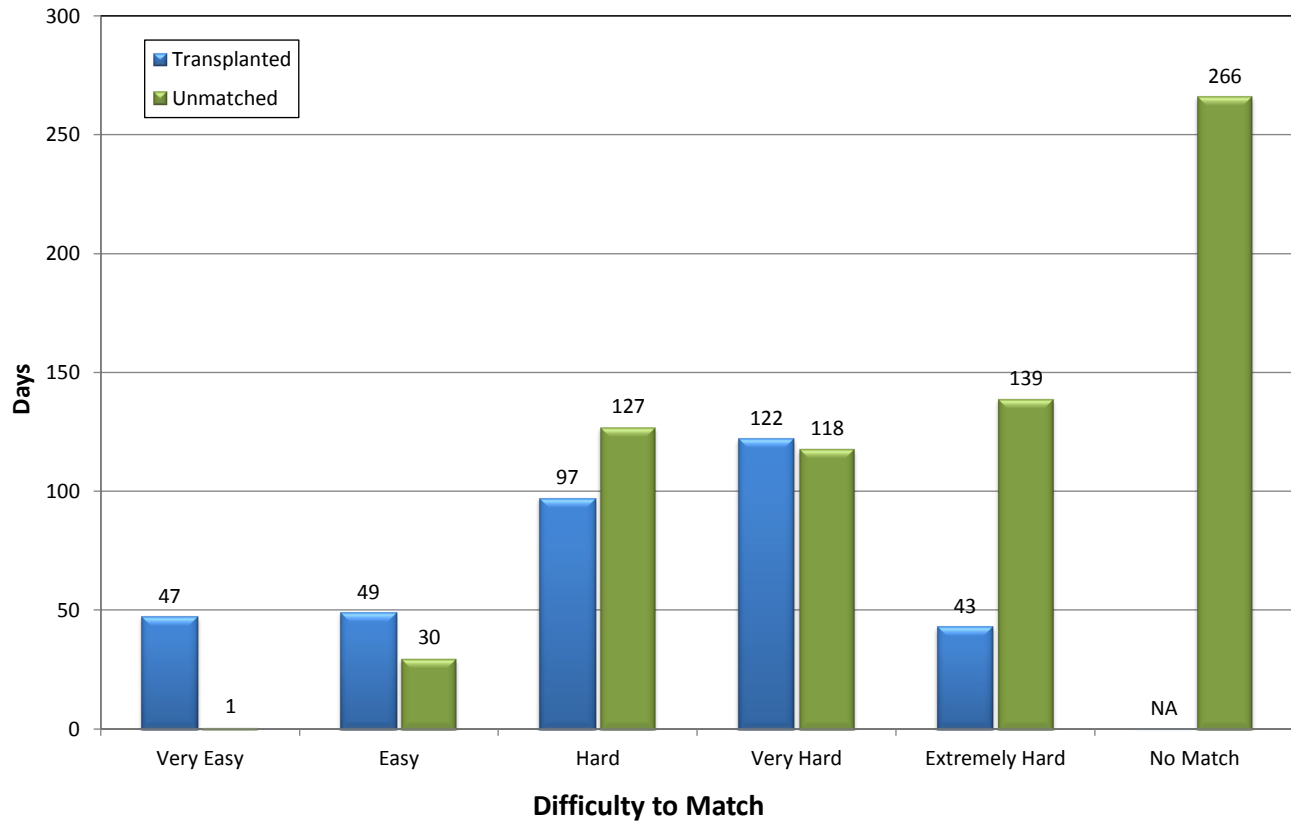
## How is PMP Calculated



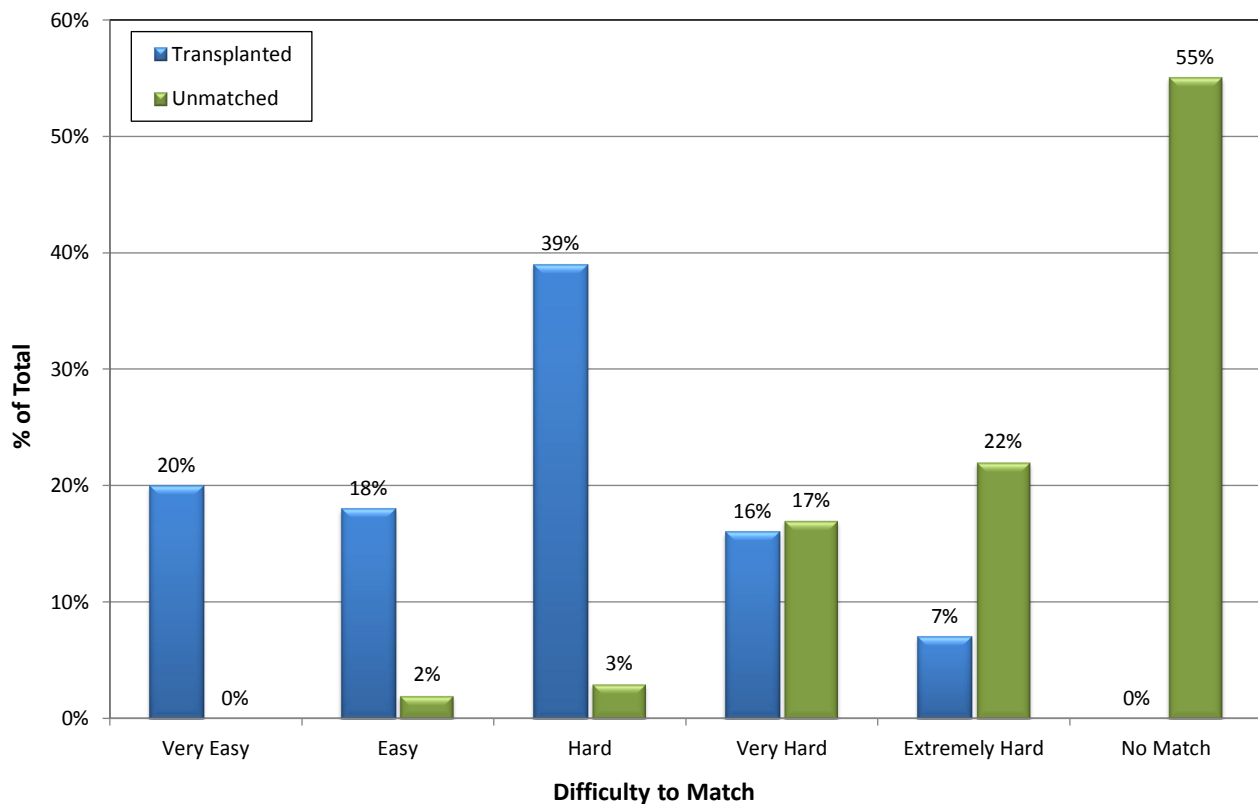
## NKR Wait Times

			Transplanted						Unmatched Pool					
Pair Type	ABO Combo	PMPc Score	9/1/13 - 4/1/14			Range			As of 4/1/14			Range		
			n	% n	Median	Mean	Min	Max	n	% n	Median	Mean	Min	Max
Very Easy	All	126+	32	20%	47	50	10	128	1	0%	1	1	1	1
Easy	Favorable	31-125	29	18%	49	113	17	404	4	2%	30	35	19	60
Hard	Favorable	1-30	62	39%	97	194	19	1190	9	3%	127	260	19	1392
Very Hard	Unfavorable	31-125	26	16%	122	206	35	623	45	17%	118	161	11	496
Extremely Hard	Unfavorable	1-30	12	7%	43	191	23	691	58	22%	139	215	12	871
No Match	All	0	0	NA	NA	NA	NA	NA	143	55%	266	388	14	1999
<b>Total</b>			<b>161</b>		<b>73</b>	<b>152</b>	<b>10</b>	<b>1190</b>	<b>260</b>		<b>209</b>	<b>299</b>	<b>1</b>	<b>1999</b>

## Median Wait Time Analysis



## Population Wait Time Analysis



## Broken Chains by Year - Detail

<i><b>Year</b></i>	<i><b># Bridge Donors</b></i>	<i><b># Broken Chains</b></i>	<i><b>% Broken Per Year</b></i>
2008	9	3	33%
2009	29	2	7%
2010	61	2	3%
2011	75	0	0%
2012	54	4	7%
2013	37	3	8%
2014	42	1	2%
<b>Total Bridge Donors</b>	<b>265</b>	<b>15</b>	

## Summary of Broken Chains

<i><b>#</b></i>	<i><b>Reason Given</b></i>	<i><b>Center</b></i>	<i><b>Date</b></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	Real Time Swap Failure – 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	Real Time Swap Failure – Aborted donor surgery	CPMC	6/27/2013
13	Real Time Swap Failure – Kidney declined by recipient surgeon	RWJ/UPenn	7/23/2013
14	Real Time Swap Failure – Recipient Medical Issue	Porter	10/16/13
15	Real Time Swap Failure – Kidney Declined by Recipient Surgeon	Porter/Jefferson	1/9/14

# NKR Program Statistics

		2008	2009	2010	2011	2012	2013	Q1 2014
1	Transplants Facilitated	21	62	131	175	226	308	87
2	Paired Transplants Facilitated	21	39	91	131	164	252	74
3	Chip Transplants Facilitated	0	23	40	44	62	56	13
4	Ending Unmatched Patient Pool	80	127	120	201	241	255	260
5	Cumulative Transplants	21	83	214	389	615	923	1010
6	Cumulative Paired Transplants	21	60	150	280	526	777	851
7	Cumulative Chip Transplants	0	23	64	109	89	146	159
8	Cumulative Paired Patient Pool	101	210	334	590	805	1062	1150
9	Percent of Pool Transplanted (Paired Recipients)	21%	40%	64%	66%	71%	87%	88%
10	Enrolled Patient Average Wait Time (years)	3.8	2.0	0.9	1.1	1.1	1.0	1.1
11	Transplanted Patient Average Wait Time(months)	5.1	5.3	6.0	5.0	5.1	5.4	4.8
12	Transplanted Patient Median Wait Time(months)	5.3	5.3	3.9	2.5	3.0	3.0	2.1
13	Average cPRA of Transplanted Patients	4.1%	25.9%	34.5%	40.3%	44.1%	54.0%	52.2%
14	Number of Transplants Completed by cPRA							
15	100%	0	1	4	10	4	5	1
16	95-100%	0	4	12	10	29	68	13
17	80-95%	1	7	16	29	26	37	18
18	50-80%	0	5	19	27	33	46	12
19	0-50%	1	8	13	30	34	47	10
20	0%	19	37	67	69	100	105	33
21	Sub-total	21	62	131	175	226	308	87
22	Percent of Transplants Completed by cPRA							
23	100%	0%	2%	3%	6%	2%	2%	1%
24	95-100%	0%	6%	9%	6%	13%	22%	15%
25	80-95%	5%	11%	12%	17%	12%	12%	21%
26	50-80%	0%	8%	15%	15%	15%	15%	14%
27	0-50%	5%	13%	10%	17%	15%	15%	11%
28	0%	90%	60%	51%	39%	44%	34%	38%
29	Sub-total	100%	100%	100%	100%	100%	100%	100%
30	Number of Transplanted Patients with cPRA >80%	1	12	32	49	59	110	32
31	Percent of Transplanted Patients with cPRA >80%	5%	19%	24%	28%	26%	36%	37%

# NKR Program Statistics

		2008	2009	2010	2011	2012	2013	Q1 2014
32	Number of Unmatched Patients by cPRA (3/31/2014)							
33	100%				79	73	83	80
34	95-99%				73	73	61	63
35	80-95%				15	15	24	12
36	50-80%				14	11	14	15
37	0-50%				14	10	22	28
38	0%				50	59	51	62
39	Sub-total				245	241	255	260
40	Percent of Unmatched Patients by cPRA (3/31/2014)							
41	100%				32%	30%	33%	31%
42	95-99%				30%	30%	24%	24%
43	80-95%				6%	6%	9%	5%
44	50-80%				6%	5%	5%	6%
45	0-50%				6%	4%	9%	11%
46	0%				20%	24%	20%	24%
47	Sub-total				100%	100%	100%	100%
48	Number of Transplants Completed by Wait Time (3/31/2014)							
49	< 6 months	21	42	74	106	180	232	69
50	6-12 months	0	10	14	19	24	44	7
51	1-2 years	0	4	15	14	20	25	10
52	2+ years	0	0	2	2	2	7	1
53	Sub-total	21	56	105	141	226	308	87
54	Percent of Transplants Completed by Wait Time (3/31/2014)							
55	< 6 months	100%	75.0%	70.5%	75.2%	79.6%	75.3%	79.3%
56	6-12 months	0.0%	17.9%	13.3%	13.5%	10.6%	14.3%	8.0%
57	1-2 years	0.0%	7.1%	14.3%	9.9%	8.8%	8.1%	11.5%
58	2+ years	0.0%	0.0%	1.9%	1.4%	0.9%	2.3%	1.1%
59	Sub-total	100%	100%	100%	100%	100%	100%	100%
60	Total Chains Started	4	9	28	36	46	55	20
61	Total Loops Completed	0	3	2	3	12	24	2
62	Number of broken chains	3	2	2	0	4	3	1
63	Bridge Donors Held (2013)	9	29	61	75	54	37	42
64	Percent of broken chains	33%	7%	3%	0%	7%	8%	2%



P.O. Box 460 • Babylon • NY 11702-0460

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