

# The Evolution of a Successful Kidney Paired Donation Program



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# Introduction and Background

In 2001, 14 New England transplant centers established a UNOS Region 1 kidney paired donation (KPD) program. In 2004, the New England Program for Kidney Exchange (NEPKE) was created to support the effort, which evolved from a manual system to a fully integrated matching program. This is a presentation of the evolution of this successful program.



# Methods

- Initially, compatible donor recipient pairs were identified manually.
- Only two-way matches involving mostly ABO incompatible pairs were considered.
- In 2005, NEPKE began utilizing a computer optimized matching program developed by Roth, Unver, and Sonmez, at Harvard Business School.
- Incompatible pairs were entered into the optimization program via an Excel spreadsheet to identify 2- and 3-way matches, including closed non-directed donor (NDD) and list exchange chains for both ABO and crossmatch(XM) incompatible pairs.



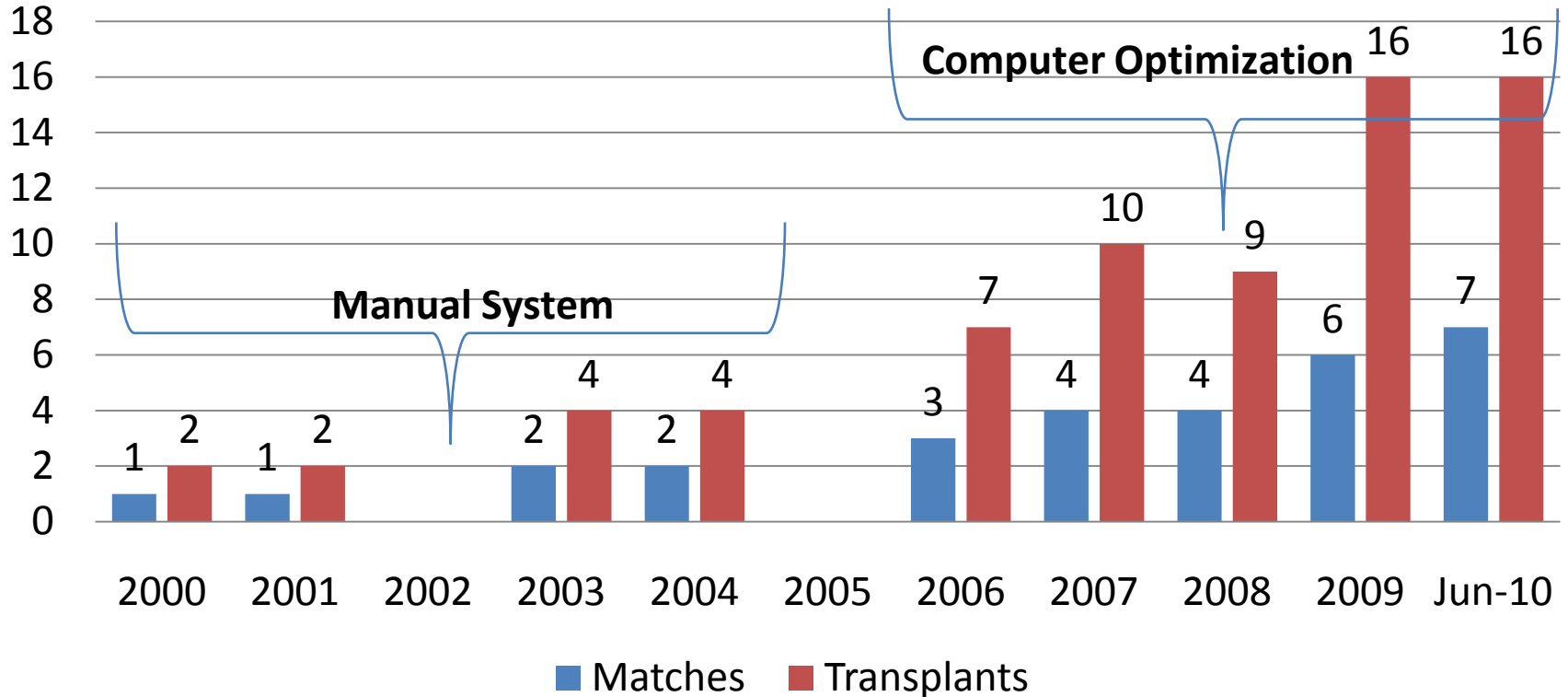
# Methods

- Beginning in 2007 a secure web-based data entry system was integrated into the optimization program.
- In 2008 the first 4-way offer was made, followed in 2010 with the first open NDD chain.
- From 2005 to 2009 the computer program ran approximately every 45 days. In 2010 NEPKE began searching for matches every 2 weeks.
- The number of transplant centers working with NEPKE increased from 14 to 21 in 2010.



# Results

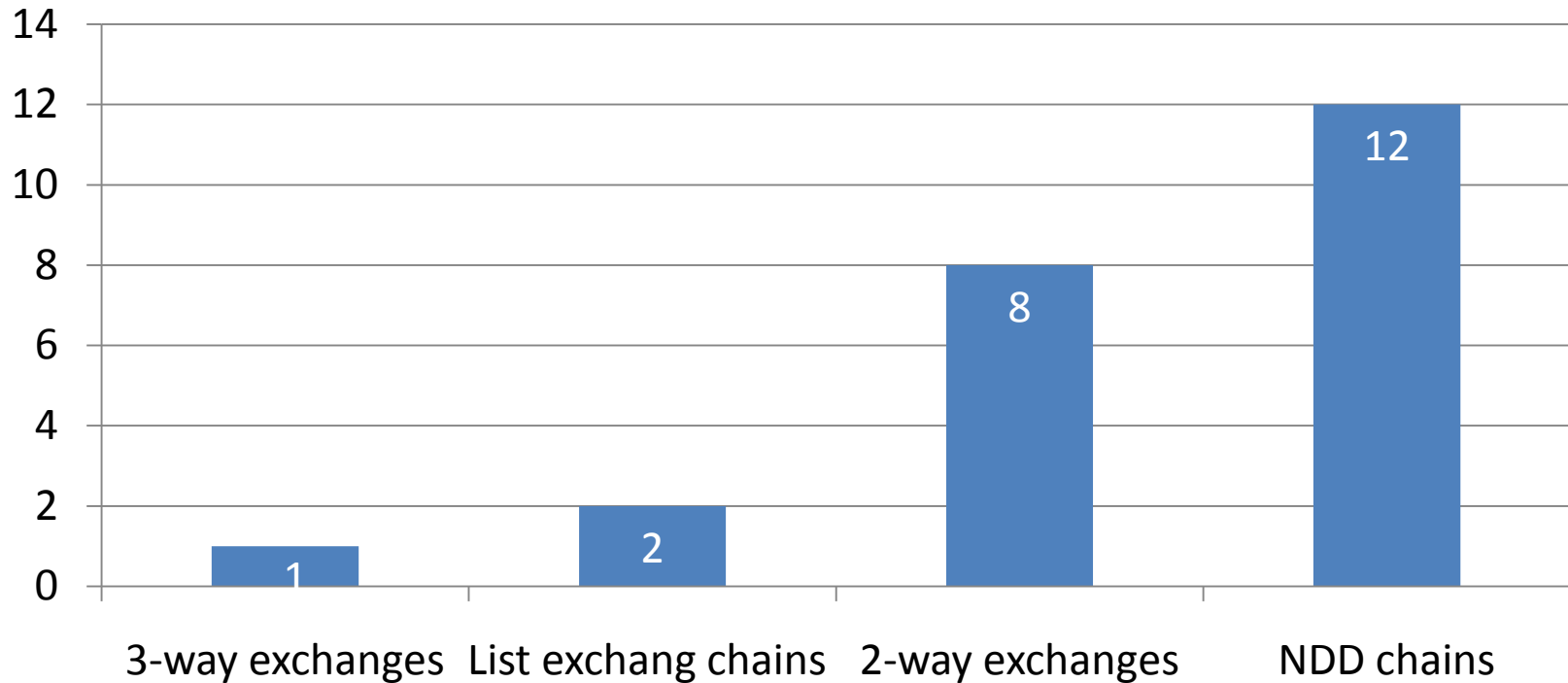
## Number of Matches and Kidney Transplants/Donations by Year



Between 2000 and June 2005, 6 matches were identified and 12 KPD transplants performed. After initiation of the computer optimization program, the number of KPD transplants increased each year with 3 matches/7 transplants in 2006; 4/10 in 2007; 4/9 in 2008; 6/16 in 2009; and 5/12 through May 2010.

# Results

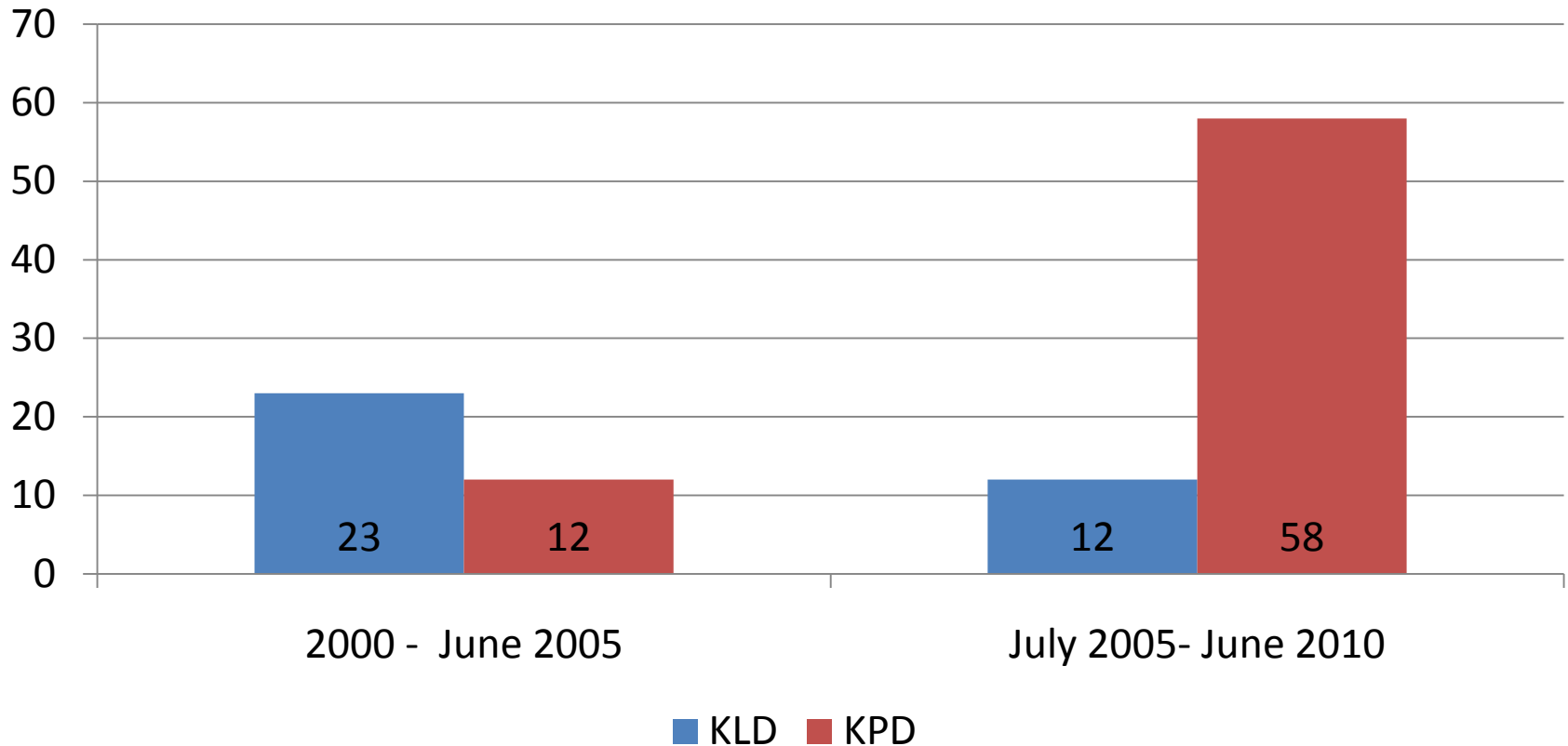
## Number of exchanges by type 2005 – June 2010



Non-directed donor chains dominate the type of exchanges that move forward to donation and transplantation. From 2006 – June 2010 24 NDD entered NEPKE with an average of 2 donating in a chain/year. Thirteen NDD were not able to initiate chains and donated directly to transplant center waitlists, these donors were usually ABO type A.

# Results

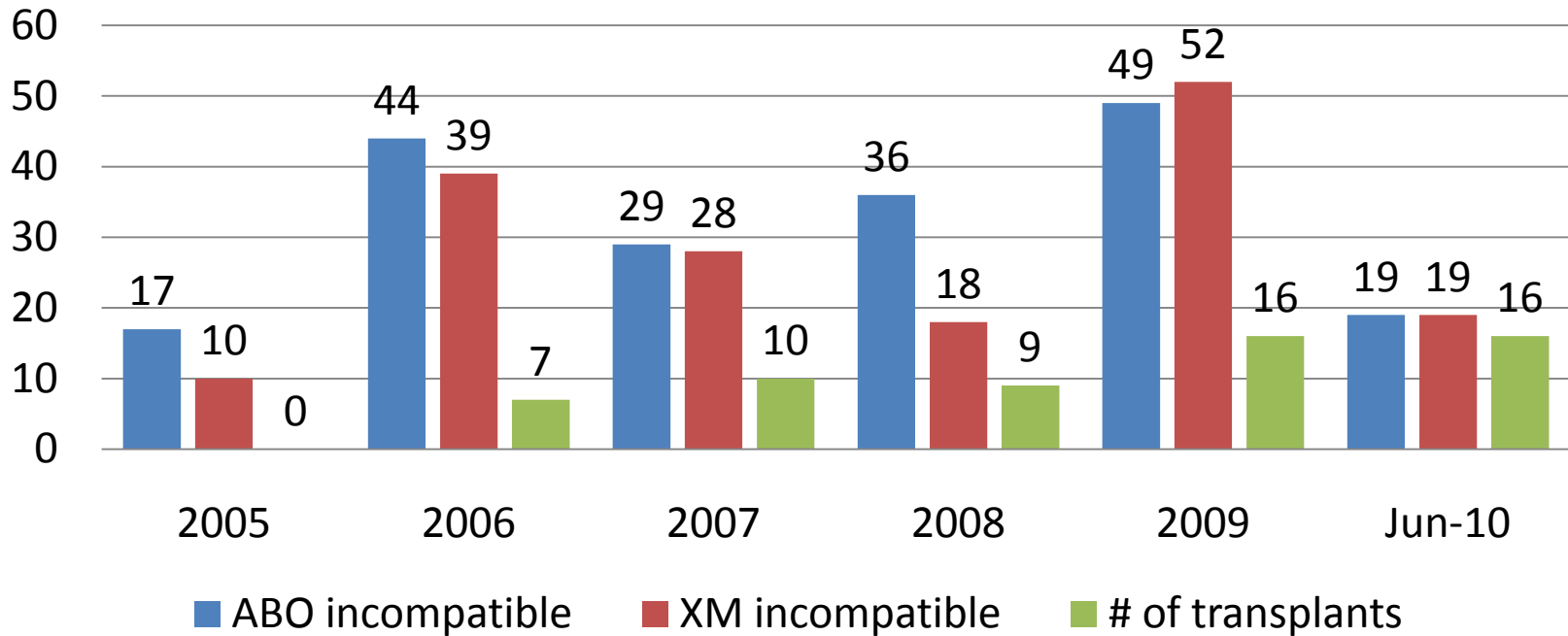
## Kidney List Donation



23 Kidney List Donations (living donor/deceased donor exchanges) were performed prior to implementation of the KPD computer optimization program (an average of 5/year); compared to 12 (an average of 2.4/year) after KPD began increasing.

# Results

Number of ABO versus XM Incompatible pairs in NEPKE by Year

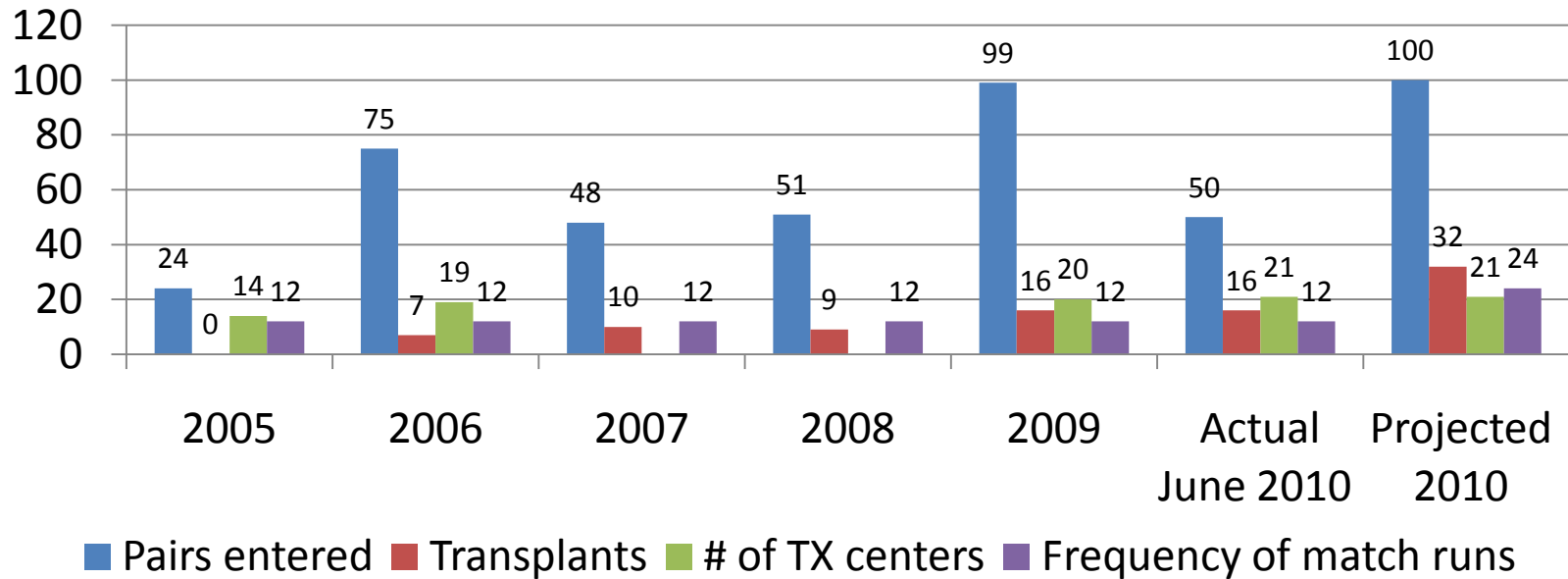


The ratio of ABO versus XM incompatible pairs entered into NEPKE was approximately 1:1 each year except 2005 and 2008 where twice as many ABO incompatible pairs were entered compared to XM incompatible. Total ABO incompatible pairs entered is 194 versus 166 XM incompatible and 1 other. Ratio of ABO versus incompatible pairs is not associated with increasing number of transplants.



# Results

Number of New Pairs Entered in NEPKE, number of transplants, # of centers participating, and frequency of match runs by Year



The ratio of pairs entered to transplants remained stable until 2010 when the number of transplants per pairs entered doubled. The average number of pairs per match run, however, remains consistent at 80. The number of transplant centers working with NEPKE, the average number of match runs/year and the number of transplants increased in 2010.

# Conclusions

- The number of pairs per match run, NDD's per year, and ratio of ABO versus XM incompatible pairs remain consistent in NEPKE over time.
- Building a strong KPD program has decreased the number of kidney list donations.
- Increasing the number of transplant centers, and frequency of match runs/year, may contribute to the increased number of KPD matches and transplants.



# Summary

Kidney Paired Donation is one way to increase the number of living donor kidney transplants. Previous held belief was that waiting several weeks to months would lead to an increase in matches found in the optimization system , NEPKE experience suggests that increasing the number of match runs/year, decreasing the match run time to every 2 weeks, leads to increased number of matches. In addition, increasing the number of Kidney Paired Donations reduces the need for Kidney List Donation.