COMPUTERIZED VIRTUAL CROSSMATCH FOR SOLID ORGAN TRANSPLANT DONOR SELECTION: EVALUATION OF VXMATCH
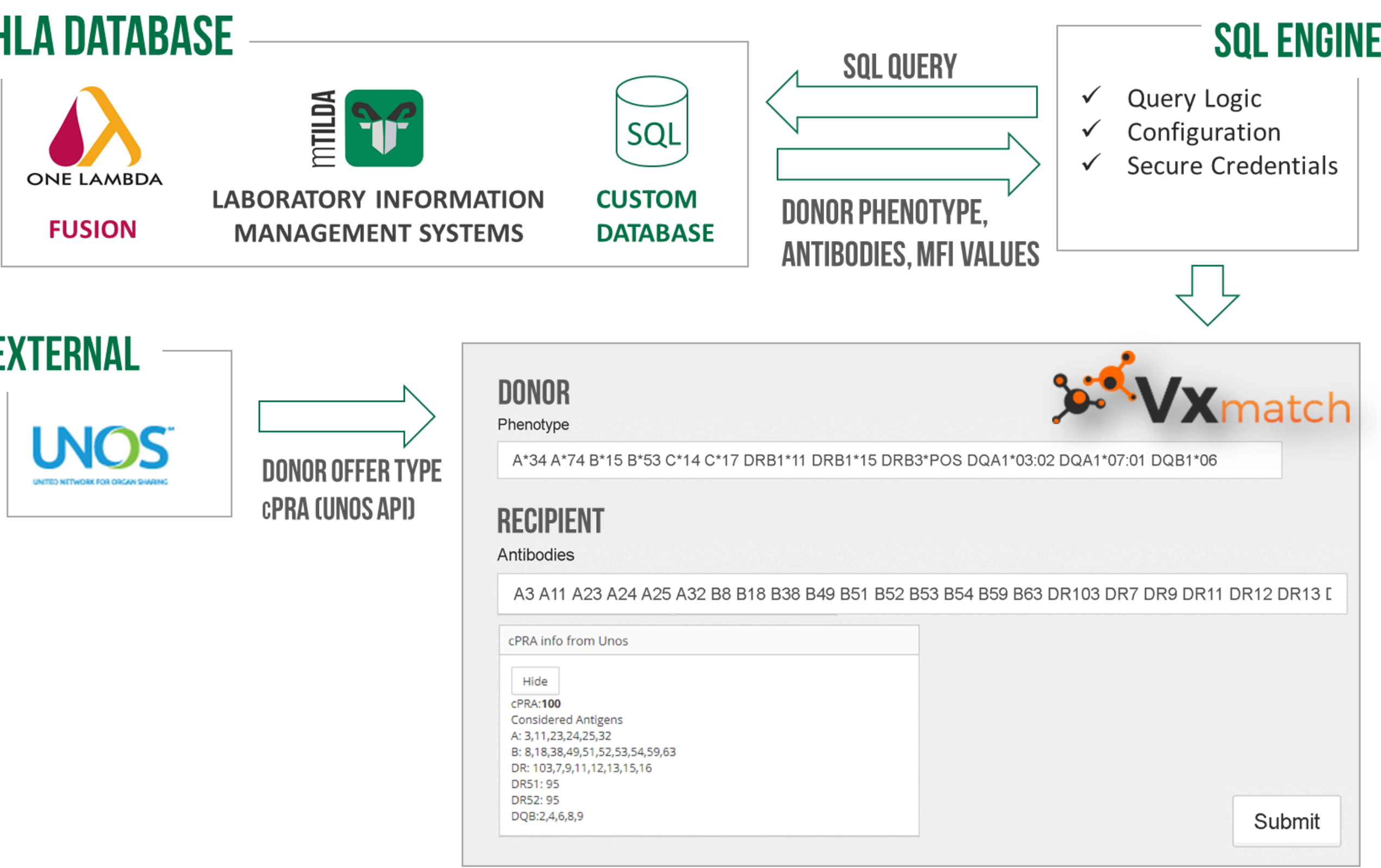
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mTILDA HLA DATA SYSTEMS

BACKGROUND

- mTilda VxMatch (HLA Data Systems) is a commercially available software system that integrates multiple HLA databases to perform virtual crossmatch and post-transplant DSA surveillance.

- VxMatch programmatically integrates data stores (below) containing donor typings and recipient antibodies and constructs visualizations of reactivity trends, recent and historical DSA.

- Lab-specific customization of queries allows for tailored MFI cut-offs and data retrieval ranges.
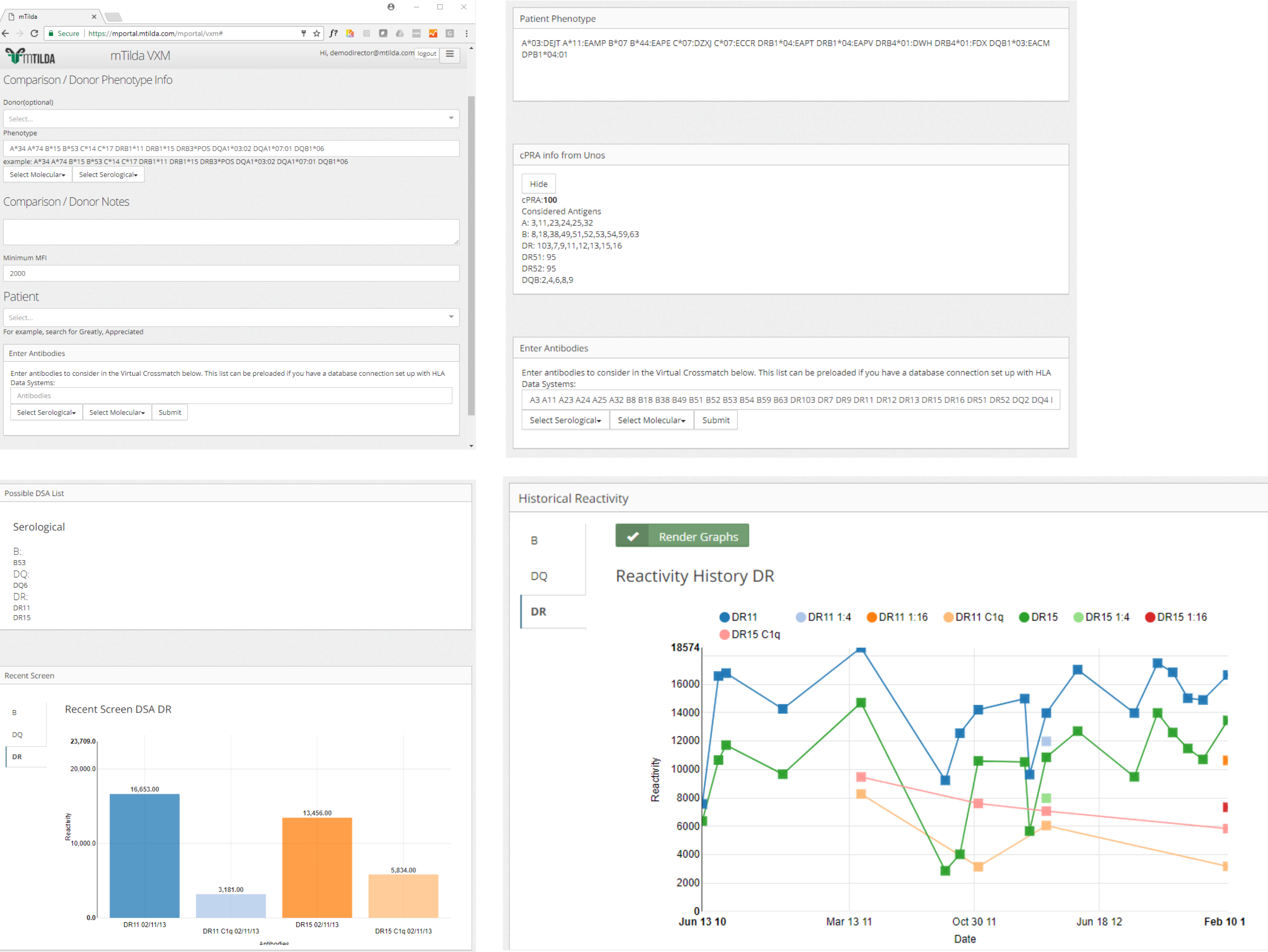
AIM

For heart and lung transplantation, a prospective crossmatch (XM) may not be possible unless a local donor is available. Our transplant center has used virtual crossmatch (vXM) to select deceased donors for heart and lung transplantations for more than ten years, which has allowed us to accept donors from outside our organ procurement territory. The vXM was done by manually checking the recipient's HLA antibody profiles within our HLA lab database against the donor's HLA typing to identify if the recipient has any donor-specific antibodies (DSA) in the most recent serum tested and in historical sera. To ensure no DSA was present vXM was manually done by multiple transplant professionals at different stages for each sensitized recipient when a donor offer was available. We recently deployed a computerized virtual crossmatch system, VxMatch, from laboratory informatics vendor HLA Data Systems. VxMatch programmatically integrates our lab database (mTilda) containing donor typings and recipient antibodies and constructs visualizations of reactivity trends, recent and historical DSA. MFI cut-offs of antibodies and data retrieval ranges can be customized as needed. The aim of the validation is to evaluate VxMatch performance.

DATA INTEGRATION

MANUAL vXM

COMPUTERIZED vXM

METHODS

A total of 55 vXMs were performed manually for sensitized recipients and re-analyzed by using the new program VxMatch. 35 of the 55 patients have calculated panel reactive antibodies (cPRA) equal to or greater than 80%.

Organ	# of VXM	DSA Neg	DSA Pos
Kidney	28	11	17
Lung	23	17	6
Heart	2	0	2
Intestine	2	2	0
Total	55	30	25

RESULTS

We found a 100% concordance for identification of DSA between manual vXM and computerized VxMatch. It took less than 5 minutes to complete the VxMatch while the conventional vXM took 30 minutes on average. For each identified unacceptable antigen, VxMatch provides detailed information, including antibody specificities, mean fluorescence intensity (MFI), serum date and a graph showing the MFI changes of DSA over time. The VxMatch can operate in two different modes: a technologist's level and supervisory level. The supervisory module allows us to review each individual bead carrying potential unacceptable HLA antigen at alpha chain, beta chain, or allele level. This VxMatch can also be used to identify the sera, for example the serum with peak DSA, for final crossmatch and the ability to track the change of DSA post-transplant.

CONCLUSIONS

Our validation suggests that this new computerized VxMatch program is a clinical user-friendly, reliable and powerful tool for virtual crossmatch donor selection and post-transplant DSA management.

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