EVALUATION OF COMPUTERIZED VIRTUAL CROSSMATCH PROGRAM VXMATCH
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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 programatically 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
Our aim is to evaluate the performance of a computerized virtual crossmatch within the Duke University Medical Center HLA laboratory. Our HLA lab 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 of our Organ Procurement Organization territory. The virtual crossmatches were done by manually checking the recipient’s HLA antibody profiles within our lab database against the potential 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 missed, the vXM was manually done by multiple transplant professionals at different stages for each sensitized recipient when a donor offer was available. Laboratory informatics vendor HLA Data Systems, developers of the mTilda Lab Management System, has developed a stand-alone software program which performs a computerized vXM (cVXM) under the product name VxMatch. The VxMatch program directly connects to any HLA lab database to query required data for analysis.

DATA INTEGRATION

MANUAL vXM
- N/A

COMPUTERIZED vXM
- N/A

METHODS
We performed 56 cVXMs by using the new program for patients who had previously received manual vXMs (mVXMs) over the past few months. 35 of the 56 patients have calculated panel reactive antibodies (cPRA) =>80%.

<table>
<thead>
<tr>
<th>Organ</th>
<th>No of vXM</th>
<th>DSA neg</th>
<th>DSA pos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney</td>
<td>13</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Lung</td>
<td>12</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
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RESULTS
We found a 100% concordance for identification of DSA between cVXM and mVXM. It took less than 5 minutes to complete the cVXM while the conventional mVXM took 30 minutes on average. For each identified unacceptable antigen, the cVXM program provides detailed information, including antibody specificities, mean fluorescence intensity (MFI), serum date and a graph showing the MFI changes of DSA over time. The mTilda cVXM 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 cVXM can also be used to identify the sera (for example the serum with peak DSA) for final XM and the ability to track the change of DSA post-transplant.

CONCLUSIONS
Our evaluation suggests that this new computerized vXM program is a user-friendly, reliable and powerful tool for HLA testing and management.

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