

# VIRTUAL CROSSMATCH QUESTIONS FOR CLIAC DELIBERATION

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**VIRTUAL CROSSMATCH  
DEFINITION**  
**CONSIDER THE WORKGROUP'S**

***DEFINITION***

*A VIRTUAL CROSSMATCH IS AN ASSESSMENT OF  
IMMUNOLOGIC COMPATIBILITY BASED ON THE  
RECIPIENT'S ALLOANTIBODY PROFILE COMPARED  
TO THE DONOR'S HISTOCOMPATIBILITY ANTIGENS.*

**WHICH OF THE WORKGROUP'S SUGGESTED  
CRITERIA FOR DETERMINING WHEN VIRTUAL  
CROSSMATCHES ARE APPROPRIATE SHOULD BE  
CONSIDERED BY HHS?**

**ARE THERE OTHER CRITERIA THAT YOU  
RECOMMEND BE CONSIDERED?**

- 1. Virtual crossmatching can be applied to all organ, tissue, and/or cellular product transplantation.**
- 2. The laboratory's policies and procedures should define the organ, tissue, and cellular product types to which virtual crossmatching will be applied, how the data from virtual crossmatching and physical crossmatching will be used for each type, and the time limits between the donor/recipient testing and the virtual crossmatch. The policies should be based on the agreements between the laboratory and each transplant program.**

**3. The following criteria for determining recipient eligibility for virtual crossmatching should be considered, when there are sufficient data on a recipient's alloantibody status to meet the transplant program-specific criteria.**

- a)** Recipients must be tested for antibodies against HLA (A,B,C,DRB1, DRB 3,4,5, DQB1, DQA, DPB1, DPA) and, when relevant, other non-HLA antigens
- b)** When possible and based on transplant urgency and organ type, it is recommended that assessments of alloantibodies be made with more than one specimen.
- c)** Assessments of alloantibodies should be performed using at least one solid phase immune assay.
- d)** Recipient antibody specificity for virtual crossmatching should be confirmed by more than one method. Multiple solid phase testing platforms or surrogate physical crossmatches may be used.

- e) Recipient antibody specificity should be reconfirmed on an on-going basis, time frames to be based on recipient sensitization and transplant program practices.
- f) For recipients with no identified alloantibodies, the frequency of testing may be less than for recipients with identified alloantibodies.
- g) When evaluating eligibility, the recipient's historic and potentially sensitizing events should be considered when available.
- h) A recipient specimen must be collected and stored on the day of transplant. The sample may be needed for post-transplant donor specific antibody assessments or medical/legal issues

- 4. The following criterion for determining donor eligibility for virtual crossmatching should be considered.**
  - a) Donor typing to include HLA and other histocompatibility antigens to which antibodies have been identified in the potential recipient.**
  
- 5. Recipients and donors should have sufficient level of HLA typing to permit accurate virtual crossmatch assessment. For broadly sensitized patients, this may include typing at all major HLA loci: HLA-A, B, C, DRB1, DRB3-5, DQA, DQB1, DPA, and DPB1.**

# Discussion



**WHICH OF THE FOLLOWING GUIDELINES PROVIDED BY THE WORKGROUP SHOULD BE CONSIDERED BY HHS FOR LABORATORIES PERFORMING VIRTUAL CROSSMATCHING?**

**ARE THERE OTHER GUIDELINES THAT YOU RECOMMEND BE CONSIDERED?**

## DECISION ALGORITHMS

1. **The following factors should be considered in developing decision algorithms for virtual crossmatching.**
  - a) Patient risk factors, such as previous transplants, sensitization history, breadth of sensitization and relative antibody strength.
  - b) The acceptable level of risk at the transplant center, which may be patient specific.
  - c) Acceptable time frames for sera used for pre-transplant testing – may be patient specific (e.g., <30 days for sensitized patients and >30 days for unsensitized patients).
  - d) Procedures for ensuring compatibility at the time of transplant when non-recent sera are used for the pre-transplant testing.

- 2. Policies for managing “indeterminate” virtual crossmatch results should be determined by each transplant program and included in the agreement between the laboratory and that program. Indeterminate results may be reason to require a physical crossmatch.**

# **VIRTUAL CROSSMATCHING PROCESS**

- 1. Requests for a virtual crossmatch should be initiated by the transplant program, and should indicate the donor/recipient pair (one request per pair). The report should indicate that a virtual crossmatch was performed. If available, the results from the physical crossmatch and the virtual crossmatch should be included on the same report. The report should be submitted to the potential recipient's permanent record, whether or not a transplant occurs, thus documenting that a candidate was considered for transplant.**

- 2. Virtual crossmatch compatibility is assessed by comparing recipient and donor criteria.**
  
- 3. The time limits between the donor and recipient testing and the virtual crossmatch should be specified within the agreement between the laboratory and the transplant program. Time limits may vary based on recipient level of sensitization and history.**
  - a) The agreement should include a definition of a “recent” specimen.**
  - b) Laboratory protocols should outline procedures for verifying compatibility via a physical crossmatch or antibody testing on the sample obtained on the day of transplant.**

- 4. In some circumstances, confirmation of a virtual crossmatch by a serologic crossmatch is necessary. These decisions are complex and must be part of the agreement between the laboratory and the transplant program. In those circumstances in which a confirmatory crossmatch is necessary, it must be completed prior to transplantation.**
  
- 5. It is possible that the recipient antibody screening, the donor typing, and the virtual crossmatching could all be done in separate locations. All testing must be performed in a CLIA-certified and OPTN-approved laboratory. Results must be available to the person who performs the virtual crossmatch. The person performing the virtual crossmatch must be appropriately qualified.**

- 6. The agreement between the laboratory and the transplant program must describe the circumstances when a prospective physical XM may or may not be required.**

# Discussion