

Region 5 Collaborative
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The Value of a Pediatric Blood Draw Guideline for Organ Procurement
February 10, 2021

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The Protocol Origins

Situation: Obtaining donor blood for organ packaging causes instability in pediatric donors in the ICU and the OR on both local and import donors.

Background: In the past, the OPO obtained donor blood for organ packaging in the OR prior to cross clamp in an attempt to reduce donor instability in the ICU due to blood loss. In some cases, drawing packaging blood right before cross clamp unfortunately ended up creating instability in the OR with the potential to affect the heart and other organ recovery. Surgeons have encountered the same issues when traveling to recovery at outside OPOs.

Assessment: The need was then for the OPO to find a way to get the required packaging blood before the OR without causing donor instability on both local and import hearts. After speaking with pediatric MDs and HLA staff, a guideline was made to best accommodate all parties and provide safe donor care.

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What is Total Blood Volume? - Perspective

- 100 mL/kg for premature infants; (example 5kg baby would have 500ml total blood volume)
- 85 mL/kg for babies younger than 3 months
- 75 mL/kg for children over the age of 3 months
- 70 mL/kg for male adolescents
- 65 mL/kg for female adolescents

(<https://www.omnicalculator.com/health/pediatric-blood-volume>)

- **Primary Children Hospital Practice Guideline: 2ml/kg = limit/day**

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Blood Draw Needs or Requirements

From donation consent to start of case:

- HLA Typing
 - 1ml of blood is usually sufficient to complete HLA typing (Yellow Top) – **often 10cc to fill tube**
- Serologies
 - Red and Purple Top – 1-2cc/tube- **often 14cc to fill both tubes**

During Case:

- Cross Matches
 - Blood cannot be older than 48 hours
 - Impact of blood transfusion on cross match blood (hemodilution calculator)-**Any blood transfusion given before crossmatch blood being drawn may dilute the specimen and may require more donor blood to be sent**
 - Yellow Top Tube – at least 5ml – **often 10cc**

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Variabilities in Donor Procurement

- Location
- Time
- Personnel
- Equipment
- Competing Objectives
- Hemodynamics

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OR/Procurement Blood Draw Needs/Requirements:

Table 2-4: Minimum Typing Materials

The host OPO must provide:	For this organ:
One 7 to 10 mL clot red top tube	Any organ
Two acid-citrate-dextrose (ACD) yellow top tubes	Kidney or pancreas
If available, one 2 by 4 cm wedge of spleen in culture medium	Kidney or pancreas
Three to five lymph node samples	Each kidney or pancreas Any organ, if the receiving transplant hospital requests and they are available.

UNOS policy for blood/material for packaging organs:

- OR Packaging Blood
 - Heart – 1 Full Red Top
 - Lungs – 1 Full Red Top
 - Liver – 1 Full Red Top
 - Kidney or Kidney / Pancreas – 1 Full Red Top/2 Full Yellow Top

UNOS does not have a specific policy regarding pediatric donor packaging requirements; they fall under the same requirements as adults.

Importance of Hemodynamics and Associated Challenges

- Monitoring Capabilities
- Inotropic Support
- Importance of Intravascular Volume
- Liability regarding Intravascular Volume

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Suggested Guidelines - Recommendations

Organ Allocation:

- HLA Typing (Obtain start of case)
 - 1ml of blood is usually sufficient (5 ml maximum) to complete HLA typing (Yellow Top)
- Serologies: (Obtain start of case)
 - Red and Purple Top 1-2cc each
- Cross Matches (Obtain during case)
 - Blood cannot be older than 48 hours
 - Impact of blood transfusion on cross match blood
 - Yellow Top Tube – at least 5ml
- Lab Check – (CBC 6 hours prior to Donor OR time)
 - Threshold Hgb < 8- **transfuse PRBC**

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Suggested Guidelines - Recommendations

Prior to Donor OR : (Obtain 2 hours prior to OR start time)

- Estimate needed mls of blood for OR packaging blood
 - Heart – 1 Full Red Top (10cc)
 - Lungs – 1 Full Red Top (10cc)
 - Liver – 1 Full Red Top (10cc)
 - Kidney or Kidney / Pancreas – 1 Full Red Top (10cc)/2 Full Yellow Tops (20cc)

Order 1:1 replacement PRBC and have blood hanging and ready to transfuse immediately after OR packaging blood drawn

Eliminates any transfused blood being identified as donor blood for crossmatches and increases donor stability in OR

Check with outside OPOs to assess their HLA labs required mls for crossmatches and packaging requirements. UNOS will allow varying mls in packaging blood if host OPO has documentation that it was discussed and acceptable for receiving center

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