

Blood and Disasters: Frequently Asked Questions

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Traditional mass casualty incidents (MCIs) rarely place significant stress on local blood supplies. Victims of blast and penetrating trauma, however, may require massive transfusions, and when multiple victims present at once, this may create challenges for local blood banks, including problems managing unidentified patients (and the risk of transfusion reactions), the need to run multiple massive transfusion protocols at once, and the need to perform many crossmatches in a short period of time. This document includes answers to frequently asked questions about blood use during disasters and concludes with a list of related [ASPR TRACIE](#) resources.

1. Are there frequently shortages of blood and blood products during disasters?

Not during most disasters. However, in recent mass shooting incidents several hospitals have used over 300 units of packed red blood cells (PRBCs), which would put a severe strain on most hospital blood banks. A recent review noted that each severely injured casualty from a terrorist event required an average of 5.9 units of packed red blood cells. Nationally, the blood supply has always been sufficient to handle any MCI. Blood is shipped in as needed.

2. We use a 1:1 ratio of fresh frozen plasma (FFP) and PRBCs in our massive transfusion protocol. Will this be a challenge after an MCI?

Most trauma centers are not able to run more than a few massive transfusion protocols at once. In particular, keeping up with FFP is difficult. AB FFP (i.e., universal donor FFP) is often in short supply and must be thawed, which takes approximately 45 minutes. The rapid thawing of multiple units cools the baths and increases thaw time. Consider some of the following strategies:

- Reduce ratio to 2:1 red cell concentrate: FFP.
- Pre-thaw/ use extended shelf-life products.
- Optimize thawing systems via additional units or emergency access to outside systems.
- Substitute Group A plasma for AB.
- Use [liquid plasma](#) where available.
- Use lyophilized or spray dried plasma.

3. What about whole blood?

Whole blood is excellent for trauma resuscitation and can simplify massive transfusion protocols. Multiple considerations go into transfusing whole blood, including the effectiveness

of fresh vs. stored product. Hospitals should consult with their blood bank and transfusion medicine specialists to determine a strategy.

4. What issues can we expect with crossmatching?

If your “standard trauma labs” include a crossmatch test by default, this may present a challenge in an MCI. Obtaining a sample pre-transfusion is critical; the standard operating procedure should be to draw blood as IVs are started. It is more important to get an ABO type than to crossmatch. To save time and ensure the best outcome for patients, consider ordering crossmatches only on patients receiving transfusions.

Blood banks should have a process to triage samples based on whether the patient is being transfused and other factors. Lab systems should be able to be interrupted during batch runs to accommodate stat samples. Consider using group-specific (but uncrossmatched) blood.

In the event you are caring for many unidentified patients, consider broader use of O-/O+ blood until you can ensure that protocols can be followed. Blood banks should be prepared to deal with “mixed field” testing results that occur after uncrossmatched transfusion. Blood banks should coordinate with emergency medicine and surgery to agree on procedures and strategies in advance and conduct a risk / benefit analysis of the strategies for the institution.

5. What does the hospital blood bank need to prepare for?

Blood bank personnel should be on the disaster notification list for the hospital and be able to perform a mass notification / rapid call back of their staff. Staff will be needed in the first hours of an incident to do crossmatches and keep up with requests for blood products that may be diverse and sustained, affecting multiple areas of the hospital.

Blood banks should ensure:

- That they have redundant methods for communication with their local/regional blood suppliers (phone, email, text, fax, and radio).
- Blood suppliers participate in hospital emergency radio networks.
- Immediate contact with the blood suppliers upon notification of an MCI and notify them of inventory and expected number of casualties. The presence of blood bank staff in the emergency department may be helpful if staffing allows. As discussed above, disaster blood bank protocols should be agreed upon in advance.
- The information technology systems used by the hospital are congruent with the plans for disaster blood product use to preserve patient safety. If possible, these systems may also be able to block massive transfusion pack ordering during disasters and allow easier ordering of universal components.

6. What roles do regional blood centers play in a disaster?

Regional blood centers should be notified of all significant MCIs. Some regional blood suppliers will “push” product to hospitals when notified of an MCI. Hospital blood banks should understand the regional center’s blood dispersal plans as well as mutual support plans for distribution. Participation of blood suppliers in healthcare coalition planning is critical and can help members better understand the role of blood centers as it relates to hospitals’ needs.

Redundant communication with blood suppliers is critical. Further, if a hospital is controlling access during an MCI, make sure the blood deliveries can still arrive! The time to delivery and potential traffic and other barriers should be taken into account. Depending on the scope of the disaster, transportation interruption may affect regional center re-supply. Regional blood centers should have prepared messages for public release advising the public *not* to come to donate blood unless specifically requested.

Disasters can disrupt power, traffic, and other infrastructure components; the regional blood center should have robust continuity of operations plans in place including plans for augmented cold chain capability.

7. What other supplies should we consider when looking at blood use?

Lab supplies for crossmatching, blood tubing, pressure bags, tranexamic acid, calcium gluconate (usually given after every 4 units of PRBCs) should all be taken into account when planning for MCIs. Emergency collection issues should be planned for by the regional blood centers (e.g., augmented supplies for donation and additional cold chain assets). Consider the need for remote/mobile collection sites. Cold chain continuity can be difficult during disasters; blood banks should have contingencies to maintain proper temperature controls during prolonged transportation / temporary storage.

8. What are some possible conservation priorities?

Overall principles of patient blood management should be applied to MCI response. Early hemorrhage control is the primary factor affecting transfusion requirements and surgical and other damage control strategies should be implemented. You may consider:

- Aiming for hemoglobin targets for patients receiving blood (unless anemia is contributing to end-organ damage or the hemorrhage is ongoing and severe).
- Limiting massive transfusion protocols to individuals going to the operating room with isolated injuries and an otherwise good prognosis.
- Restricting blood products from trauma patients with refractory hypotension and evolving disseminated intravascular coagulation (DIC).
- Substituting products as required (e.g., group A for AB plasma and O+ for O- for males and post-menopausal females).

9. How can blood banks be involved in disaster exercises?

Exercises and drills offer both the hospital blood bank and the regional blood supplier opportunities to test their systems and processes and also engage with providers and educate them about disaster procedures. This could include but is not limited to:

- Testing (via redundant channels) communication and call back process with healthcare facility and local and regional blood bank staff.
- Testing ability to manage multiple massive transfusion protocols concurrently.
- Evaluating blood products on hand against potential needs of the exercise patients.
- Determining staff, system, and supply challenges that could result from patient surges.
- Evaluating process for providing blood to multiple unidentified patients simultaneously.
- Ensuring ability to complete blood deliveries during periods of hospital access controls.
- Testing regional blood center “push” plans to hospitals.
- Evaluating regional blood center's ability to support multiple hospitals with blood product needs during a disaster.
- Testing continuity of operations plans for communications failure, utilities failure, and other contingencies.
- Ensuring blood couriers are able to pass established law enforcement perimeters if needed to provide hospital deliveries.

Related ASPR TRACIE Resources

[Blood and Blood Products Topic Collection](#)

[Explosives and Mass Shooting Topic Collection](#)

[Pre-Hospital Topic Collection](#)

[Trauma Care and Triage Topic Collection](#)

[Issue 3 of *The Exchange*](#)

[Issue 7 of *The Exchange*](#)

[No-Notice Incident Tip Sheets](#)