Managing Surge Needs for Injuries:
Blood Bank Response

PURPOSE

Within 4 hours of an event, respond in an organized manner to provide blood products for up to 300 injured patients and sustain support for up to 72 hours.

BACKGROUND

The Madrid, Spain, terrorist bombings were used as a model to help develop solutions for managing rapid surge problems during a mass casualty event.

On March 11, 2004, 10 explosions occurred almost simultaneously on commuter trains in Madrid, killing 177 people instantly and injuring more than 2,000. On that day, 966 patients were taken to 15 public community hospitals. More than 270 patients arrived at the closest facility between 8:00 a.m. and 10:30 a.m.

Federal resources should not be expected to arrive sooner than 72 hours from the time of the explosion. Resources can be delayed by the time taken to deploy them and by emergency personnel responding to multiple communities.

GOAL

During the first 4 hours of a disaster, ensure that appropriate blood products can be located, processed, and administered in a timely manner to admitted patients requiring treatment. Identify additional needs so that blood products can be collected, processed, and administered for up to 72 hours.

REQUIRED RESOURCES

- American Association of Blood Banks (AABB) documents (including the *Disaster Operations Handbook: Coordinating the Nation's Blood Supply During Disasters and Biological Events*[32] and the *Disaster Operations Handbook—Hospital Supplement: Coordinating the Nation's Blood Supply During Disasters and Biological Events*[33]).

- Disaster response plans for hospital and blood collection centers.
- Laboratory personnel to collect, process, and distribute products.
- Transportation resources, diesel and unleaded fuel, and storage equipment (e.g., dry ice).
- Transfusion supplies.
- Massive transfusion protocol to include patient identification methods. Appropriate use of O negative blood only for women of childbearing age that satisfies blood bank requirements to move to type-specific blood.
- "Medical Needs Assessment for Blood" form.
- Quick reference card to be developed/updated for supplementing available resources.
- Transportation plan to include alternative transportation modes.
- Critical services restoration plan for blood collector to ensure it is on local priority restoration lists.
- Key contacts list maintained for all suppliers of blood products, including whole blood providers, to include multiple methods of communications.
- Emergency communications plan for blood provider and transfusion services that includes amateur radio and/or satellite phone.
- Disaster response plans for hospital transfusion services.
- Assessment of blood needs from all patient care disciplines provided to the incident management commander, transfusion service, and blood provider.

▶ ***This document is a resource guide. Local needs, preferences, and capabilities of the affected communities may vary.***

ASSUMPTIONS

- Blood bank staff will be familiar with the hospital disaster plan, their individual roles and responsibilities, and the roles and responsibilities of all essential departments.
- Overall blood product inventory management within the United States should include a regional approach to communication among blood collection facilities and hospital transfusion services to ensure that federal regulations regarding blood product collection, testing, transport, and administration are followed during a disaster.
- The most difficult problems involve disruption or interference of the blood supply system. The following list describes these difficulties:
  1. Historically, blood supply needs during disaster response have been met with the quantity of blood products available at that time.
  2. Facilities currently maintain about a 3-day supply of blood products, which may need to be expanded to a 7-day supply.
  3. Typically, fewer casualties require blood products than the total number of victims.
  4. Local communities have limited sources of blood products.
  5. If faced with a surge increase in demand, communities will need to have blood products transported from blood centers outside the local area.

- After a disaster, the public usually responds by volunteering to donate larger quantities of blood products than are needed:
  1. An influx of blood donors could strain the ability of the blood supply system to collect and process those products.
  2. When resources (personnel, equipment, and supplies) are unnecessarily applied to collecting and processing unneeded products, these resources cannot process and distribute available and urgently needed products.
- The media must continuously provide the community with reliable information about need and supply of blood products.
- Limited personnel have the training, education, and skills to process and administer blood products within treating facilities. The following should then be considered:
  1. Additional qualified laboratory personnel may be needed to process requests for blood products.
  2. Additional nursing personnel may be needed to administer blood products.
- Methods of transporting or transferring blood products from supplier to destination may be limited during a disaster.
- Commercial transport services (air and ground) may be limited because of the disaster.
- Federal, state, and local governments consider blood needs to be a critical element of the public health infrastructure in emergencies.
- The AABB Interorganizational Task Force on Domestic Disasters and Acts of Terrorism, formed in January 2002, has developed a process to educate the community about donations and to facilitate collection, processing, and movement of blood products during a disaster:
  1. This multi-organizational task force includes federal and national organizations.
  2. Published references include a disaster operations handbook[32] and a hospital supplement[33] that specifically address these issues. These references include a flowchart outlining the process for involving AABB and appropriate national and federal organizations in response efforts to provide blood products during a disaster.

ACTION STEPS

The following is an overview of the hospital transfusion service disaster response:

1. Hospital emergency incident management commander

- Delegates coordination of medical needs assessment for blood. The quantity of disaster-related hospital admissions is communicated to the hospital transfusion service.
- Ensures that the hospital security staff has approved blood provider access to the hospital for blood product deliveries.
- Determines if an alternate delivery point is required for blood deliveries as a result of the disaster. Once determined, this information is provided to the transfusion service and blood supplier.
- Determines if routine phone service will be interrupted during this disaster. If alternate communication methods are necessary, the incident management commander should inform the transfusion service of the alternative communications pathways that are available.

2. Hospital blood bank

- Hospital blood bank completes "Hospital Disaster Response Medical Needs Assessment for Blood."
- Incident management commander provides information necessary to complete expected hospital admissions, security approval, alternate delivery points, and phone service status.
- To determine current available inventory of type O blood (both positive and negative) for nondisaster-related patients, planners may follow this list of steps:
  1. Determine one day's worth of red blood cell inventory based upon historical usage.
  2. Determine total O red blood cell inventory (both positive and negative).
  3. Determine how many days of inventory are available by dividing the total O red blood cell inventory by one day's worth of inventory.
- Completed "Hospital Disaster Response Medical Needs Assessment for Blood" is provided to the primary blood supplier for the transfusion service. Only send the blood assessment to the primary blood supplier to prevent duplication of inventory data.
- Blood products reserved for nonemergent needs can be released for emergency utilization.
- Critical supplies are identified.
- Critical staff are identified.
- Core critical staff should have capabilities in order to be augmented.
- Critical staff should be provided appropriate clearance for restricted access.

3. Hospital disaster plan

- The hospital/transfusion service disaster plan should include patient identification processes for mass casualties.
- The hospital/transfusion service disaster plan should include triggers for implementing massive transfusion protocols.
- The hospital's disaster response plan should address the responsibility of determining if the hospital should cease routine transfusions until the disaster patient surge has passed.
- The emergency communications plan should include routine, emergency, and several backup lines of communication with the area blood provider.

If the hospital transfusion service is also a blood collector, the requirements of the blood provider included below should be addressed in the transfusion service's disaster response plan.

4. Blood provider response and responsibilities

- Evaluate scope of disaster based upon information provided from emergency medical services for affected area(s) and from emergency management agencies (EMAs) at the local, state, and federal agencies that are involved with disaster management.
- If the immediate hospital area is considered a restricted area, determine if hospital security has approved blood deliveries.
- Determine the location of the central staging area or if an alternate delivery point is needed.
- Determine if the hospital's phone service is affected by the disaster.

For immediate disaster-related casualty's blood product transfusion support, determine the type O red blood cells estimated for all disaster-affected hospitals.

- From the emergency communications plan, identify the alternative communication options.
- Determine liquid and frozen blood product storage capacity at area transfusion services.
- Summarize blood assessment needs from the hospital transfusion services within the affected area.
- For immediate disaster-related casualty's blood product transfusion support, determine the type O red blood cells estimated for all disaster-affected hospitals.
- Determine if local blood product inventories will support the transfusion needs of the casualties for
  1. the first 24 hours,
  2. days 1–10, and
  3. days 10–30.
- If the blood provider has the advantage of forewarning (e.g., hurricane warnings), blood products will be pushed into the patient care areas based upon their storage capacity. If local blood product inventories are estimated to be insufficient, the closest blood providers are contacted for blood product transport.
- If these transfers are insufficient to support the transfusion needs in the affected areas, the blood collector(s) establishes which outside blood collector(s) to contact for coordination of blood product transfers into the disaster-affected area.
- AABB's Interorganizational Task Force on Domestic Disasters and Acts of Terrorism is contacted if the disaster has national impact potential. The task force works to provide a consistent message to the blood community, blood donors, and the public.
- The blood provider can also contact the task force to coordinate the movement of blood if the normal means of product exchange is insufficient.
- Determine if area inventories are contaminated or potentially contaminated by the effects of the disaster.
- Determine if radiological agents are involved with the disaster.
- Alert staff related to collecting, processing, or storing bone marrow and stem cells of the potential for patient support.
- Determine if blood product inventories need to be transferred to hospitals that will be treating the disaster casualties.
- Determine if the transfusion service's blood product storage is jeopardized.
- Arrange for blood product transport containers if needed within the affected hospitals.
- Determine the effects of the disaster on the donor base.

5. Media relations

- To prevent an unnecessary response of persons wishing to donate blood, all blood-related media releases should be handled by the local blood provider. Consistent, accurate messages to the public regarding the need for blood donations is crucial for an adequate supply of blood during and in the days following a disaster.
- The AABB Interorganizational Task Force on Domestic Disasters and Acts of Terrorism has developed a process to educate the community about donations and how to collect, process, and move blood products during a disaster. This multi-organizational task force includes federal and national organizations.

EVALUATION

- Request that hospitals and collection organizations participate in a local or regional exercise requiring administration of blood products within 4 hours of an event and up to 72 hours.

For more information, visit **http://emergency.cdc.gov/masscasualties**.