

## Patient Information Page

### Introduction

The availability of safe blood is a key component of current medical practice.<sup>1</sup> Blood is transfused during 10-15% of all hospitalizations.<sup>2</sup> While the American blood system has proved extraordinarily robust for more than 50 years,<sup>3</sup> striking a balance between adequate collection and supply is something that blood centers and hospitals wrestle with every day.

Blood has a shelf life of 42 days. Inventory management is important to ensure the appropriate number of donors are collected each day to ensure an optimal blood supply is readily available to the hospitals. To ensure this occurs, during an event, blood centers may limit collections to only O-negative red blood cells (RBCs), AB plasma or require appointments. The most important donation needs occur before a mass casualty event occurs, since it takes 1-2 days to process and test blood before it is available to hospitals.<sup>3</sup> Certain patients have medical conditions, such as thalassemia, sickle cell anemia and certain forms of blood cancer, that make them transfusion-dependent and require a consistent inventory for support. Finally, blood shortages can occur during routine scenarios such as holidays and summer vacation, when collections decrease, and during natural disasters or extreme weather. If not addressed, surgeries could be delayed or patients may need to stay in the hospital or clinic longer to await a needed procedure. In recent years, implementation of the “Choosing Wisely” initiative of the American Board of Internal Medicine Foundation has helped patients and doctors engage in conversations to reduce overuse of tests and procedures, and to support physician efforts to help patients make smart and effective care choices.<sup>4</sup>

## Donation

Since September 11, 2001, there has been increased awareness of over-donation in response to mass casualty events. When disasters occur, the public often wants to help by donating blood. Of the 500,000 units collected in the days after September 11, 260 units were transfused to patients affected by the terror attacks.<sup>5</sup> Unfortunately, this altruistic response of the public provided minimal benefit to victims. The blood banking community was somewhat underprepared to handle the large influx of donations and recognized the need to participate in national disaster planning.

The AABB Interorganizational Task Force on Domestic Disasters and Acts of Terrorism created the Disaster Operations Handbook in 2003 to help blood centers and hospitals prepare for, and respond to, disasters that could affect the U.S. blood supply.<sup>6</sup> The handbook highlights the importance of a blood center's need to be prepared for a diverse type of disasters and be integrated into its local hospitals' and emergency medical plans. A blood center should also be connected at a national level in case the local supply cannot meet the local blood needs. A solid communication plan should also be in place so that the blood center, hospitals and emergency response organizations can quickly coordinate local and national efforts.

Although public concern and interest in donating blood in the aftermath of disasters is greatly appreciated, the need to minimize the donor surge is of paramount importance. An acute influx of donors can ironically compound the problem.<sup>7</sup> When disasters end, blood shortages often occur, as many people have the impression that "everyone" has already donated. Coordinated, national media messages must emphasize that in the wake of disasters, the need for

blood is constant. Donor messaging must communicate that blood collected today will not be used today, so future donations will be required to replace and maintain the local and national blood supplies.

### **Chronically Transfusion-Dependent Medical Conditions**

Transfusion-dependency is a state in which a patient relies on transfusions of blood for support because his or her own bone marrow cannot produce enough blood and/or produces abnormal blood cells. Such conditions include sickle cell anemia, thalassemia and myelodysplastic syndrome. Together, these conditions affect an estimated 150,000 to 500,000 patients in the United States; a high proportion of these patients become transfusion-dependent. Supporting these patients with blood products can be challenging to the health care system since many require blood specially matched or prepared for them because of potential transfusion-associated risks. In addition, delays in acquiring and preparing (i.e., crossmatching) blood for these patients in outpatient clinics can be dissatisfying to these patients.

### **Supply**

In the U.S., there is an established task force to assist hospitals in maintaining an adequate blood supply during both planned and unplanned disasters. During or after a disaster, such as a hurricane or mass shooting, the blood bank medical director at a local hospital will implement its disaster plan to make sure that blood is available for patients who need a transfusion. They will also contact the local blood supplier to continue coordinating the supply of blood that will be needed.

Often, when there is a disaster, the generosity of people makes getting sufficient blood easy. Getting collected blood to local hospitals in times of a disaster may be the challenge. In order to make sure there is blood when it is needed, many hospitals maintain an adequate supply at all times in order to be prepared for the possibility of a disruption in the supply lines.

Some patients (such as women who are pregnant or may have children) need a special blood supply (O-negative), and these units of blood may be reserved for these special populations during a disaster. Therefore, patients who have O-negative blood or are aged 50 years or older may receive O-positive blood. The primary concern in these situations surrounds the risk of a pregnant patient developing an antibody that may harm her fetus. However, if the blood bank is experiencing a shortage of O-negative blood, it is also acceptable to provide Rh-positive RBCs to everyone in emergencies.

## **Conclusions**

The availability of a safe and adequate blood supply is a key component of current medical practice. While blood centers are prepared for handling disasters regarding collections and inventory management, it is important to follow messaging from blood center following the event. It is also important for eligible donors to consider donating regularly, since the blood most likely used during a disaster was collected prior to the event.

Chronically transfusion-dependent patients, such as those with sickle cell disease, thalassemia and certain types of blood cancers, represent a sizeable population that is expected to grow as better therapies are developed and patients live longer.<sup>8,9</sup> It is important that there is

good availability of blood products to ensure a hospital's or clinic's ability to provide timely care and a good patient experience.<sup>10,11</sup>

For anticipated disasters, hospitals develop disaster response plans. For unexpected disasters, hospitals maintain an inventory adequate to serve their patient population at all times in order to be prepared for the possibility of a disruption in the supply lines.<sup>11</sup> Approximately 7-10% of Americans have O-negative blood; however, at some hospitals the documented may be 5% or more.<sup>12</sup> Hospitals need to ensure these are monitored for appropriate usage.

In conclusion, collecting and maintaining an appropriate blood supply that is robust enough to handle the routine and planned or unplanned disasters can be challenging. Blood centers need donors' assistance to ensure hospitals have blood available to support patients when they need it. Collaboration of all blood centers, hospitals and donors will allow optimization of resources, improved patient care and ensure appropriate donations sustain an adequate blood supply.

## References

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