Theater Blood Management: Tracking Products During Military Operations

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The Armed Services Blood Program, or ASBP — composed of the Armed Services Blood Program Office, or ASBPO, and the Army, Navy and Air Force Blood Program Offices — in 2007 began to track blood products in Iraq and Afghanistan. These countries are within the U.S. Central Command, or CENTCOM, a part of the military that responds to crises, supports development and fosters multinational collaboration in specific regions of the world. Previously, blood management in theater was handled by a 510(k)-approved medical device, the Defense Blood Standard System, or DBSS. However, field experts were encountering difficulties with DBSS and ASBP decided to build its own system. In the process, it tried and discarded several means and methods.

Historical Tracking Methods

Significant efforts were made to develop and deploy an electronic tracking system on the battlefield; however, an inability to maintain the system, personnel training requirements, and the volume and immediate need of blood products made utilization impractical. As operating the system was not possible, the end product became little more than an inventory tool. For that reason, all major transfusion service facilities in theater decided not to use the system.

Instead, personnel in CENTCOM facilities, blood bank officers and technicians began documenting blood operations (inventory management and transfusion activity) using manual notebooks and transferring the data to spreadsheets. These spreadsheets became known as the Mother of All Spreadsheets, or MOAS, by the military blood banking community and required technicians to enter data by hand, which increased the risk of error. Significant time and labor were required to input information into the MOAS.

Winds of Change

ASBP Director Cmdr. Michael Libby, MSc, MT(ASCP)SBB, was the linchpin in reporting the operational problems and began working with the leadership of CENTCOM, the DBSS Project Office and the Joint Staff Surgeons Office staff on a solution. He led the effort to detail the capability gaps and began assembling the documentation for the Department of Defense, or DoD, medical leadership.

Two field officers were central to the push that would bring about a far better system. Air Force Lt. Col. Rick McBride, MT(ASCP)BB, who was in charge of the Joint Blood Program Office in CENTCOM, worked with deployed blood bank specialists to present specific issues to CENTCOM and ASBP leadership that were interfering with ability of personnel to accomplish their jobs. This endeavor was followed by a letter that Army Lt. Col. Barbara Bachman, MS, MT(ASCP)SBB, (then a major) sent to CENTCOM leadership, stating the problem: "This blood report from inception has since evolved into a huge, cumbersome file, taking one person from the blood support detachment or blood support unit approximately six to eight hours to prepare, update and then roll up the theater blood status daily."

Lt. Col. Dave Lincoln Takes Charge

At the direction of Deputy Assistant Secretary of Defense for Force Health Protection and Readiness Ellen Embry and Joint Chief of Staff Surgeon Maj. Gen. Joe Kelley, MD, and based upon ASBP input, Cmdr. Mike Libby assigned Air Force Lt. Col. Dave Lincoln, MT(ASCP)SBB, to work the project as the subject matter expert.

Lincoln was the ideal candidate as he had previously deployed to CENTCOM and worked on the massive spreadsheet. He collaborated with systems engineers and technical experts to establish the requirements (a particularly tedious and critical aspect of the project), assembling 487 total requirements to capture the needed functions to track blood.

A contract was awarded to Akimeka LLC to develop this automated tracking system, Theater Blood, or TBLD. Lincoln and Don Dahlheimer, DAC, MBA, deputy director of information management for ASBPO, began working with the lead developer Matt Rauls and Defense Health Information Management Systems' John Franzese.

To move the product through its lifecycle, a team of code writers and testing engineers as well as a group from the blood community performed specific tasks to bring this enormous project to fruition.

"In my 10 years of working for the DoD, the TBLD product is by far the best received product we have developed," Rauls said. "The collaborative relationship we developed with ASBPO stands out as unique in my career, and I think that factor above all others explains why the product was developed and deployed successfully."

The work was unique in that the developers collaborated with the blood functional experts to fully understand end-user needs — creating, testing and executing an early-user assessment to provide hands-on feedback. A critical concern for ASBP was that another 510(k) medical device was not being built. The DoD had to rapidly and accurately track the blood products to meet the needs of physicians and patients in forward deployed medical surgical units and aid stations, beyond the technological support chain.

Benefits of the New System

On Jan. 17, 2011, ASBP began using the new data tracking system — a module within a larger data system called Theater Medical Data Store — to help track and monitor blood product inventory in CENTCOM. This online database system manages all blood products in those operating areas. Scanned blood products can be tracked throughout inventory to a final disposition of either transfused or destroyed units. The final product, known commonly and rather affectionately as the Electronic Mother of All Spreadsheets, enables electronic capture of blood product data, eliminates clerical errors and significantly reduces quality control and patient safety risks associated with blood products that are not licensed by the Food and Drug Administration.

About 10 percent of Theater Medical Data Store active users are utilizing the blood module. To date, more than 123,776 blood products have been entered and 133,000 blood products have been processed. The capability to scan blood products immediately frees up four to six hours daily for the blood program staff, who can focus on transporting the products to the medical units.

Through the automated reporting, ASBP can quickly and more accurately determine who received what types of blood — and how much — with the click of a button. This access to blood product disposition data sharpens communication with military medical personnel, enhances oversight, and ultimately helps improve patient care both in the field and at treatment facilities.

The Future

ASBP is committed to ensuring that the system, which does not meet the definition of a Blood Establishment Computer System, is compliant with FDA guidance and all regulatory requirements, and meets AABB Standards. Moreover, ASBP wants to make every effort to deliver the highest quality blood products as far forward as possible to support the men and women serving outside of brick and mortar establishments. When blood products are used, ASBP will provide accurate tracking data.

The dynamic environment of battlefield transfusion medicine necessitates practical consideration of real-time medical operations, and current theater medical surgical support moves blood products farther forward than ever before — including medical evacuation missions via helicopter. These needs in turn require that the blood inventory move closer to our asymmetrical battlefront. Tracking blood usage will help make that happen.

Theater Blood By the Numbers

- **4-6 hours** of staff time are saved each day.
- More than **123,776** blood products have been entered.
- **133,000** blood products have been processed.

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