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Automation in Blood Banking

Technology advances relentlessly. The international transfusion medicine community is nearing completion of their implementation of a new barcode-based identification standard called *ISBT 128.* But even before the dust has settled on that major transition, some forward-thinking blood bankers are working with the next advance in automatic identification – Radio Frequency Identification, or RFID. In 2006, the International Society for Blood Transfusion (ISBT) created a Task Force on RFID to study the technology. More recently, several blood banks, led by the Blood Center of Wisconsin, formed the RFID Consortium and are partnering with label, software, and hardware vendors to explore how RFID can be used in transfusion medicine. Launched in 2009 by a grant from the National Institutes of Health, a live pilot should be ready for launch by Q1 of 2012 within a blood center and one of its key clients (see graphic).

Barcodes have been very good for the blood bank community. They offer high speed and accurate data collection in a life-or-death application. To launch *ISBT 128* worldwide, leading suppliers of auto ID labels, scanning, and printing technology worked closely with users and regulatory agencies to ensure the safety of the world's blood supply. Unique data structures were created so regardless of where in the world the barcode was scanned, the host system would know the nature of the specific data field being entered: Donation Identification Number (DIN), ABO/Rh, blood product, or expiration date/time. These data structures have been preserved within the RFID application. The change is simply the medium used to communicate those data structures – smart chips as opposed to labels.

But barcode labels aren't being replaced; rather, RFID is being implemented as an enhancement, augmenting the barcodes, while the barcodes back up the RFID tag. The tags will not substitute for, replace, or contradict any required barcode or key labeling information.

So why use RFID at all? The technology has at least two features that make it particularly attractive for the identification of human blood.

> First, unlike barcodes, RFID tags can be scanned without a line-of-sight. In other words, the user doesn't have to see the object being scanned. With the right combination of tags and readers, it's possible to read an entire carton of uniquely-identified blood containers without even opening the box. That would be impossible with barcodes.
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> The chips used to identify blood will be 'Read/Write' which means some space is reserved within the chip for updated information to be provided. This may be particularly useful as blood products are processed and modified—the chip can contain 'real time' data regarding the exact nature of the bag contents. Using only a label-based system would require relabeling of the blood unit to accommodate updated data.

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Where will RFID likely offer the greatest benefits? At the blood center, several areas appear to be prime prospects, including: (a) automated reconciliation at check-in; (b) automated inventory check-in; (c) locating a specific DIN-numbered product; (d) validation of outbound shipments; and (e) returns processing support.

As RFID technology proliferates within hospitals, features of the technology will benefit those facilities, as well. RFID-enabled patient identification, when coupled with 'smart' blood containers, can reduce errors and improve overall patient outcomes.

The blood bank community was one of the first industries to standardize on barcode technology. Although software modifications were required, along with investments in hardware, the benefits were compelling. Since then, hundreds of millions of blood units have been uniquely identified via barcodes, successfully scanned, and safely transfused. It is obvious that blood banks will invest in technology with demonstrable safety and/or efficiency benefits.

While some of the benefits of RFID technology are compelling, some wonder if it will be widely adopted in transfusion medicine. No one knows, of course, but the most significant issue is a simple one: Do the expected safety improvements and cost benefits justify the costs? While RFID tags are expected to become less costly as worldwide supply increases, in the short term the premium to be paid for a smart label is significant. Faced with declining revenues as a result of patient blood management efforts, many blood banks are consolidating with others in an effort to survive. In this economic climate, will the expected benefits of this technology be sufficient to warrant substantial investment? Stay tuned.

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