

Four Italian Hospitals Use RFID to Share Blood and Monitor Transfusion

To help avert errors, the system uses EPC Gen 2 tags to not only identify patients and bags of blood, but also the staff members who draw samples and administer transfusions.

By Claire Swedberg

March 28, 2008—In early December, four Italian hospitals began piloting an RFID-based system to track all steps of the transfusion process, starting with taking a sample of the patient's blood, and ending with the blood transfusion.

The participating hospitals consist of Policlinico Universitario Tor Vergata, in Rome; Ospedale Casa Sollievo della Sofferenza, in San Giovanni Rotondo; Azienda Ospedialiera Policlinico Universitario di Bari; and Azienda USL 3 Pistoia. The pilot participants are using 3RFID's Blood Transfusion System (BTS), which includes EPC Gen 2 RFID hardware desktop and handheld interrogators, tags and software.

Human errors are a critical concern for blood transfusions. In the process of drawing donated blood, transporting it and administering it to a patient, a mistake could have lethal results. "If nobody is aware of the error, the wrong bag is transfused to the patient, and he will suffer severe health damage or, at worst, death," says Giuseppe Ancona, 3RFID's CEO.

"It's very important to identify who does what—to improve security and individual responsibility," says Ancona. With the BTS system, the identities of the staff members drawing and administering the blood are input and stored with other data.

With the pilot, a patient checking into one of the hospitals is given an ID bracelet with an EPC Gen 2 RFID tag that stores the unique ID number linked to that patient's data on the hospital's back-end system. That data includes the patient's health records and a photo. If a transfusion is needed, a sample of the patient's blood is drawn into a test tube, and an EPC Gen 2 RFID label encoded with the patient's unique ID number is attached to that test tube. A similarly encoded EPC RFID label is affixed to the blood request document, and spare RFID tags for blood bags, also encoded with the patient's ID number, are sent with it.

Once the patient's blood type is determined, bags filled the appropriate blood type are taken from storage and the RFID labels encoded with the patient's ID number are attached to the bags. When the transfusion is conducted, a hospital worker scans the patient's wristband tag and the blood bags' tags to confirm that the blood is the right match. The staff member who conducts the transfusion also must scan the RFID tag embedded in his or her own ID badge. That worker's data is then linked to the patient and transfusion to set up a permanent record in the hospital database as to who conducted the transfusion and when.

Most Italian hospitals use bar-coded labels to track bags of blood inside the facility's blood ward. The bar-coded labels are encoded with a unique ID number linked, in a database, to the patient's name and medical information. Other hospitals or health-care facilities, however, can't read those bar codes, so if a bag of blood

goes to another facility, medical technicians there track blood assignment through the recipient's name and birth date written on the bag itself. If an error is caught before the blood is administered, the transfusion is canceled and new blood is requested.

With BTS, the system tracks all processes. Each of the participating hospitals hosts a server that makes the blood-transfusion data available to anyone with a password, which allows hospitals to share data in the event that blood bags travel from one hospital or medical center to another.

The pilot will end in June 2008. "We expect to obtain the technical report from hospitals," says Ancona, after which point, he says, "We [the participating hospitals] hope to gather all the information required to optimize and improve the user interface usability."

"Our objective is to plan development of a blood-tracking real-time system that will upgrade our current implementation," Ancona says. If all goes well, the next step will be building a national blood network between hospitals that could be shared through agreement with local administrations.

Thus far, Ancona says, "The pilot has shown it's easy to use [the] technologies; it offers work-reduction times and we have seen an error reduction by 100 percent."

With the RFID system, "We hope to gain improved security on patient-donor identification," says Donato Dimonte, director of the transfusion center at Azienda Ospedaliera Policlinico Universitario di Bari, "by avoiding any human-related errors during the blood bags assignment phase." Ancona says he also hopes the network will allow the hospitals to better integrate different transfusion centers within each of their own facilities as well as multiple hospitals.

RELATED_ARTICLES "We hope to gain a perfect integration in our network of this system in order to attain an optimal patient surveillance and care," says Dimonte. If the pilot goes well, he says, "We hope to adopt such system and extend it to as many wards as possible."

In Bologna, Italy, the [Ospedale Maggiore](#), participated in another blood tracking RFID system designed and installed by [Tiomed](#) (see [RFID-enabled Locks Secure Bags of Blood](#)), and a hospital in Saarbrücken, Germany, is using an RFID solution from [Siemens Business Services](#) to track blood (see [German Clinic Uses RFID to Track Blood](#)). In 2007 the [BloodCenter of Wisconsin](#), in cooperation with several business and technology partners, began testing to determine whether RFID has any harmful effects on blood products (see [BloodCenter of Wisconsin to Study RFID's Effect on Blood](#)).

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