



# John Radcliffe Hospital, Oxford, Tracks Vital Blood Samples with Motorola MC50



“We have seen a vast increase in the accuracy and efficiency of our work since implementing this system. Blood is a precious resource that should only be used when absolutely necessary. The system is used to lift patient identification directly from the wristband to label blood samples thus reducing the rate of rejection and improving patient safety.”

– Barbara Cripps, Manager, Blood Safety & Conservation Team

## The company: John Radcliffe Hospital

Founded in 1973, the John Radcliffe Hospital is the main medical centre in the Oxford area, and teaching hospital of the University of Oxford. The ORH NHS Trust currently covers three sites; the John Radcliffe Hospital itself and the Churchill Hospital, both in Headington, Oxford, and the Horton Hospital in Banbury. As well as standard general hospital services, the John Radcliffe Hospital houses Accident & Emergency (A&E), Intensive Care Unit (ICU), Neurosciences, Head & Neck, Ear, Nose & Throat and Specialist Children’s wards. The hospitals have beds for approximately 1,500 in-patients.

## The challenge: Blood must be tracked as it circulates in the system

Given its size and the variety of services it provides, the John Radcliffe Hospital has a great need for donated blood for its patients, and must monitor and control this valuable resource.

With understandably stringent regulations in place, the hospital has to be able to track and identify blood at all times, from acquisition, to storage, to its eventual use. Blood needs to be correctly recorded and identified to assure compatibility with intended recipients, and also to ensure that any unusual variables, such as the need for irradiated blood or particular components, are known. Furthermore, it must be stored correctly to ensure it remains safe for transfusion; as such it is vital that its movements into and out of storage are accurately monitored.

Before implementing the system blood samples were labelled by hand. The sample would be sent to the transfusion laboratory, where the sample details from the label were then entered into the laboratory IT system manually.

## Customer profile

### John Radcliffe Hospital

#### Company

John Radcliffe Hospital

#### Location

Oxford, UK

#### Industry

Healthcare

#### Motorola products

- MC50 Enterprise Digital Assistants (EDAs)

#### Applications

- Olympus BloodTrack Courier blood tracking system

#### Partner

- Olympus

#### Benefits

- Improved quality of care, and virtual elimination of major errors.
- Reduced rejection of blood samples from 6-8% of all samples to 1.8. %
- Reduced complexity of blood recording and monitoring; previously 27 pieces of information had to be manually checked when transfusing blood, this has now reduced to 16
- Only one nurse is needed now to check blood transfusions, leaving the previously required second nurse free to perform other important duties



This practice allowed the chance for human error. Samples are now labelled using the system, and then the bar coded patient identification details are scanned directly into the transfusion laboratory IT system. In the past when a blood unit was required, it was removed from its storage, the removal logged, again by hand, and the blood taken to the patient. Two nurses would then cross-check this blood against the patient to ensure it was correct. In all, prior to the implementation of the system, there were 27 separate checks to ensure the right blood was being given to the right patient. Now, following the implementation, there are 16 checks which can be performed by one nurse only.

“While these systems were in place to record blood’s movements, they were time-consuming and far from 100% effective,” says Barbara Cripps, manager of the Blood Safety and Conservation team at the hospital. “The old system’s reliance on handwritten information was time-consuming and subject to inaccuracies, either through mistakes or less-than-perfect handwriting. As a result, there were a number of instances where incorrectly or incompletely labelled blood samples had to be rejected, and a further sample taken from the patient.” Removal of the wrong blood from the fridge or inadequate bedside checking had the potential for a patient receiving the wrong blood.

“It was clear we needed a system to record the information available more effectively,” says

John Skinner, head of IT at the hospital. “Using technology to solve the problem was an obvious choice – at the moment, the average junior doctor is helped less by personal technology than the average delivery driver. We needed to be able to scan all patients’ bar codes at the bedside and instantly produce labels with all the information required. We also had to be able to fully integrate with our IT system to make sure that blood could be tracked and matched at all stages of its life. The devices used needed to be robust to cope with inevitable accidents, capable of delivering data across the hospital’s network and able to continue working independently if the network were to fail.”

#### **The solution: Motorola handsets to scan & track samples**

The team at John Radcliffe Hospital chose to work with Olympus and use its specialist BloodTrack Courier application which manages blood stock by controlling staff access to fridges, and monitoring transportation of blood products around the clinical environment, ensuring the right blood is released for the right patients. Olympus has a long-standing relationship with Motorola and chose to use Motorola’s MC50 Enterprise Digital Assistant (EDA) for the task. The MC50 is rugged, has a high-quality scanner capable of capturing all types of code used in the hospital, can easily inter-operate with existing systems and can run the BloodTrack software by itself if the hospital’s wireless network is disconnected.

The hospital trialled and implemented the MC50 over a 12-month period, taking a steady, academic approach to the implementation. It now has over 150 devices across the hospital, with more to be put into service in the new 217 bedded Cancer Centre when it opens next month.. The MC50s work in tandem with Zebra QL220 mobile printers and the hospitals own systems to scan patient data, print labels for blood samples, record the movement of blood into, and out of, storage and ensure its compatibility with patients.

The hospital's MC50s and Zebra mobile printers are spread over the wards, with each ward being equipped according to need. So, for example, an average ward will generally only need one MC50 and printer; intensive care and A&E will have three and five respectively and pre-operation areas will have one per nurse room. In each case, the use of the devices remains the same.

When a blood sample is taken from a patient for testing, the patient's bar coded wristband is scanned using the MC50. This information is then printed onto a label using the Zebra QL220 printers. At the same time the MC50 transmits the information to the system's management system to ensure that all records are accurate and up-to-date. The labelled sample is then taken to the transfusion laboratory for testing. Whenever blood is taken from storage refrigerators, or replaced it is scanned via a kiosk to update the system regarding movement of blood.

When blood is needed to be given to a patient, the labelled bag is taken from storage and, again, scanned at a kiosk before being taken to the patient. At the bedside it is scanned against the patient's ID contained in the bar code on the wristband worn by the patient. Thanks to this, if blood is incompatible with the patient or has been out of storage for too long, it automatically triggers an alert on the MC50 so that the nurse is aware of the danger. The hospital's network is continually wirelessly updated throughout the process, but even with no network present the MC50 will still identify incompatible or over-exposed blood thanks to the installed BloodTrack software.

### **The results: Faster, more accurate blood transfer and storage**

As a result of this system, with the MC50 as its linchpin, the efficiency and accuracy of blood sampling, transport, storage and provision has increased dramatically. The number of pieces of information needed for checking blood transfusion at the bedside is now down from 27 to 16, and transfusion checking requires one nurse, not two as previously, which, coupled with the increased ease and automation of entry on the MC50, is more efficient and saves time. The rate of rejection of blood samples when the system is used has dropped from between 6% and 8% to 1.8% of all cases. This increased accuracy has proved popular with hospital staff and, of course, patients. Medical personnel benefit from increased speed, and the security of knowing that the blood is being continually monitored, as well as knowing that the recording and monitoring process is now far less susceptible to human error. Patients benefit from more accurate blood provision, with a much reduced chance of treatment being being delayed due to an incorrect blood bag or requiring multiple blood samples.

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Now that the MC50 has proved its capability with handling blood samples, the John Radcliffe Hospital is investigating expanding the system's capabilities across other materials. The same system can potentially be adapted to include chemotherapy remedies and other controlled drugs, to reduce the possibilities for human error. It can also be used for monitoring glucose and other biological products to produce a more accurate picture of patient welfare.

Beyond this, the John Radcliffe Hospital uses the new system as a means to change the method for blood distribution. Previously blood was held and issued by a central laboratory at the main hospital

*“The new system has improved efficiency, safety and care for patients and has demonstrated how IT solutions can work to support patient care. Now that the potential of this system has been proved with blood supplies, we can begin implementing it for other uses. We are trialling the use of PDAs to support after-care to stroke victims. The strategic use of bar code tags to identify patients and staff ID badges with bar codes to record staff identity is being used in this application and elsewhere for near patient testing. This technology allows a great deal of flexibility in implementing new ideas that will only continue to increase efficiency, patient safety and record keeping for the hospital in the future.”*

– John Skinner, Head of IT (Director Oxfordshire Health Informatics Service)

and transported to the other hospitals for storage prior to being transfused to the patients. The increased accuracy and networked nature of the new system means that blood can be stored and issued locally at each hospital by clinical staff, using a safe and secure algorithm on the kiosks next to the fridges. This has reduced the time it takes to get blood to patients and made better use of a precious resource.

“The new system has made the IT department a vital part of the hospital,” says John Skinner. “Now that the potential of this type of system has been proved with blood supplies, we can begin implementing it for other uses, such as providing after-care to stroke victims. The use of bar coded wristbands for every patient allows a great deal of flexibility in implementing new ideas that will only continue to increase patient safety, and the reputation of the hospital in the future.”

#### **About Olympus**

A leading manufacturer of professional opto-digital products, Olympus pioneers key technologies in the fields of imaging and voice products, endoscopy, microscopy, bioanalytics and diagnostics. Olympus offers comprehensive support for medical

practitioners, from development of medical equipment for diagnoses and treatments to design of hospital management support systems and other healthcare IT systems, as well as support training for doctors and nurses in using Olympus equipment.

#### **About Motorola**

Motorola is known around the world for innovation in communications. The company develops technologies, products and services that make mobile experiences possible. Our portfolio includes communications infrastructure, enterprise mobility solutions, digital set-tops, cable modems, mobile devices and Bluetooth accessories. Motorola is committed to delivering next generation communication solutions to people, businesses and governments. A Fortune 100 company with global presence and impact, Motorola had sales of US \$36.6 billion in 2007. For more information about our company, our people and our innovations, please visit <http://www.motorola.com>.



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