

An innovation that stores essential patient information on one barcode wristband has been shown to improve safety and efficiency in blood transfusion checking

# Reducing errors in blood transfusion with barcodes

## In this article...

- Using technology to improve systems and patient safety
- Reducing error in blood transfusion with a barcode wristband
- Benefits of partnership between technology and clinical teams

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**Abstract** Bolger G, Moss R (2015) Reducing errors in blood transfusion with barcodes. *Nursing Times*; 111: 15, 18-19. Healthcare technology can deliver safety and efficiency improvements. Effective solutions are best developed by a partnership between technology and clinical teams. Blood transfusion-checking procedures were simplified by ensuring that a single wristband contained all the information required to deliver safe patient care. Barcoding and use of handheld computers reduced potential for error and removed the need for two nurses to be involved in the checking procedure.

Nurses working in hospitals face major demands on their time and often have to make complex decisions about patient care. In some areas, errors can lead to patient harm or even death. While technology cannot replace clinical skills and decision-making, some innovations can help make healthcare safer and simpler.

To improve blood transfusion safety, an opportunity arose at Imperial College Healthcare Trust to have a single wristband barcode containing all key patient information, rather than two separate wristbands required by some patients in the current system. This article reports on how the innovation was implemented.

### Historical context

Safety of blood transfusion has always been a priority in the UK. Concerns that

patients undergoing transfusion were receiving the wrong blood led in 1996 to the formation of the Serious Hazards of Transfusion (SHOT) haemovigilance scheme to monitor adverse events in blood transfusion. Following the first and subsequent annual SHOT reports (SHOT, 2014), the Department of Health set up Better Blood Transfusion in 1998, replaced by Patient Blood Management in 2012, with an emphasis on patient safety and appropriate use of blood.

From this patient-safety culture, bedside blood tracking was developed. The National Patient Safety Agency produced guidance on content and appearance of wristbands in 2005 and 2007 (NPSA, 2007; 2005), and the NPSA Safer Practice Notice in 2006 recommended the development of “vein-to-vein” electronic systems to improve transfusion safety (NPSA, 2006).

### Role of technology

A bedside blood-tracking system, using handheld computers in the form of a personal digital assistant (PDA), has been developed as a safety measure to reduce the risk of incompatible blood transfusions occurring (Dzik, 2006). The process uses the PDA to scan the barcodes on the patient wristband, the transfusion tag issued by the transfusion laboratory and on the bag of blood, so the patient is positively identified by the staff member.

The user is prompted through the key steps of the transfusion process, ensuring that the correct protocol is followed and that patients receive the right blood.

Staff are also required to identify themselves on the system by scanning barcodes on their identity badges.

Using a single-nurse check, with the

## 5 key points

**1** Using barcode technology in the blood transfusion checking procedure will improve patient safety by reducing potential errors

**2** Clinical leadership supported by technology can drive through solutions to problems

**3** Effective solutions for patient safety are best developed by clinical staff and technology providers working in partnership

**4** Clinical technology can be used to release time to care

**5** Introduction of technology solutions can also lead to increased cost effectiveness



An opportunity arose to have wristband barcode containing all key patient details

device being the “second checker”, frees up the time of the second nurse traditionally involved in the transfusion checking process. This can be regarded as an indirect saving, as well as allowing time for care (Murphy et al, 2012).

### Blood tracking system

In 2007, we introduced the Haemonetics blood tracking system on our wards.

The first issue was to ensure that the existing patient administration system (PAS) could print wristbands with a barcode in the format required; once that problem had been resolved, the system was rolled out across many of the medical and surgical wards. As printed wristbands for hospital-based patients were a recommendation from the NPSA, this meant the trust was then compliant with the safer practice notice on patient wristbands issued in 2005.

Traditionally, we used two nurses to check blood transfusions. But with a great deal of support from the trust transfusion team and senior nurses, we were able to introduce single-nurse checking when barcoded wristbands and the PDA were introduced. The PDA acted as a second checker. This benefited clinical areas, particularly ICU and the haematology day unit, where a high number of patients undergo the transfusion of blood and blood components simultaneously. It reduced the number of potential near misses, as well as reducing the time for checking and delays waiting for a second nurse.

The change meant that patient transfusions were given in a more timely manner. The only challenge was when patients required a special wristband.

In our trust, patients with allergies required a red wristband that could not be printed by the system and had to be handwritten, meaning it did not contain the barcode needed to use the blood-track scanning system. This meant these patients required two wristbands – one printed (which was compatible with using the PDA blood-tracking system and so allowed for the one-nurse transfusion check) and a red, handwritten allergy wristband.

### Opportunity for change

When the trust changed its patient administration system to Cerner Millennium, as part of its strategic direction towards a paperless health record (Department of Health, 2012), an opportunity arose to have a single wristband containing all the key patient information.

## BOX 1. BENEFITS OF BARCODE TECHNOLOGY IN BLOOD TRANSFUSION ADMINISTRATION

- All patients require only one wristband
- Patient demographics can be integrated into the blood transfusion system through the use of handheld devices
- The number of errors and DATIX/ Incident reports around blood administration reduced
- Times from collection to administration reduced
- Subjectivity was taken out of patient checks by the introduction of an objective audited system
- Nursing time is saved as nurses use the PDA as a second checker

The specification for the wristband barcode was submitted to the PAS provider from the technology company.

The benefits of this would be:

- » A single wristband could be produced that covered allergies, therefore reducing potential incidents;
- » The wristband would meet the positive patient identification requirements (NPSA, 2007);
- » Having a single readable printable wristband with all the information required for clinical care reduced risk.

In order to achieve a single joined-up solution, we needed input from trust clinical staff and our systems suppliers’ technical staff to understand and work collaboratively to bring the key information into a single wristband solution.

The solution meant the trust had to identify the minimum dataset for positive patient identification that would be the foundation for all clinical information systems, including point-of-care testing devices needing to read the patient wristband. Eventually this dataset could be captured in just two barcodes, containing all the information to meet current and future requirements for secure patient identification. The benefits of barcode technology are outlined in Box 1.

In addition to the patient safety element of the bedside transfusion tracking system, the system has other benefits which, although not formally quantified, have been shown to have cost savings. Miller et al (2013) stated that “overall cost savings are expected with hospital-wide introduction of a more developed end-to-end transfusion system”, and this includes

the cost of adverse events. The Frontier Economics report (DH, 2014), *Exploring the Costs of Unsafe Care in the NHS*, estimates the cost of preventable adverse events to be between £1 billion and £2.5bn a year.

### Conclusion

The NHS is under huge pressure to become increasingly efficient. NHS England has set out its vision in *The Five year forward view* of how the NHS uses health information and technology to bridge the efficiency gap (NHS England, 2014). Adopting and embracing health technology adds value and can release time to care.

For this to happen, a partnership is needed between clinical staff, especially nurse and health informatics and systems suppliers, who can work together to design safety along the patients’ journey (Hamer and Cipriano, 2013).

When this happens, nurses will use and embrace health information technology, because they have helped to shape it for the benefit of their patients, as well for ease of use. **NT**

### References

- Department of Health (2012) *The Power of Information: Putting all of us in Control of the Health and Care Information we Weed*. [Bit.ly/DHPowerofinformation](http://bit.ly/DHPowerofinformation)
- Department of Health (2014) *Exploring the Cost of Unsafe Care in the NHS*. Report by Frontier Economics for the Department of Health. [Bit.ly/NHSUnSafeCare](http://bit.ly/NHSUnSafeCare)
- Dzik WH (2006) New technology for transfusion safety. *British Journal of Haematology*; 136, 181-190.
- Hamer S, Cipriano P (2013) Involving nurses in developing new technology. *Nursing Times*; 109: 47, 18-19.
- Miller K et al (2013) Piloting the use of 2D barcode and patient safety-software in an Australian tertiary hospital setting. *Vox Sanguinis*; 105: 159-166.
- Murphy MF et al (2012) How do we monitor hospital transfusion practice using an end-to-end electronic transfusion management system? *Transfusion*; 52: 2502-2512.
- NHS England (2014) *Five Year Forward View*. [Bit.ly/FiveYearForwardView](http://bit.ly/FiveYearForwardView)
- National Patient Safety Agency (2005) *Wristbands for hospital inpatients improves patient safety*. [Bit.ly/NPSASPN11](http://bit.ly/NPSASPN11)
- National Patient Safety Agency (2007) *Safer practice notice 24: standardising wristbands improves patient safety*. [Bit.ly/NPSACAS24](http://bit.ly/NPSACAS24)
- National Patient Safety Agency (2006) *Safer Practice Notice 14: Right Patient, Right Blood*. [Bit.ly/NPSASPN14](http://bit.ly/NPSASPN14)
- Serious Hazards of Transfusion (SHOT) (2014) Bolton-Maggs PHB (Ed) et al on behalf of the Serious Hazards of Transfusion steering group. *Annual SHOT Report 2013*. [Bit.ly/AnnualSHOT2013](http://bit.ly/AnnualSHOT2013)

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