The ‘Five Rights’ of patient care – right medication, right dose, right time, right patient and right route – specify the requirements of an optimal patient medication administration process, and give healthcare management a template that supports the minimisation of errors in patient identification.

It’s a fact of life that no process or person can be guaranteed free from the capacity to make mistakes. Whatever the preventive measures taken, errors in healthcare provision are still reported to be the seventh most common cause of death in critical care. Misidentification, wrong dose, exceeded shelf-life, labelling errors, misplaced patient notes, pressure of workloads; any and all can and do put patients at risk and are potentially fatal.

Misidentification, wrong dose, exceeded shelf-life, labelling errors, misplaced patient notes, pressure of workloads; any and all can and do put patients at risk and are potentially fatal.

WHAT ARE MEDICATION ERRORS AND PATIENT SAFETY INCIDENTS?

Correct patient identification can be a challenge in hospitals because of the number of complex interventions patients undergo, ranging from drug administration and phlebotomy to complicated invasive procedures. These occur in a variety of locations and are provided by large teams of clinical and non-clinical staff, many working shifts. Healthcare environments are purposefully but unavoidably busy, with patients, staff and visitors constantly on the move, and information constantly needing to be exchanged and shared.

The trend towards limiting working hours for clinical team members leads to an increased number of people caring for each patient, increasing the likelihood of hand-over and other communication problems. Working at pace brings its own risks – for the most experienced staff, there will always be situations where attention is diverted, or a patient’s handwritten notes misread.

In the UK, the National Reporting and Learning Systems (NRLS) defines a ‘patient safety incident’ (PSI) as, ‘any unintended or unexpected incident, which could have or did lead to harm for one or more patients receiving NHS care’.

Medication errors are any PSIs where there has been an error in the process of prescribing, preparing, dispensing, administering, monitoring or providing advice on medicines. These PSIs can be divided into two categories; errors of commission or errors of omission, the former including, for example, wrong medicine or wrong dose, and the latter, omitted dose or a failure to monitor.

The extent to which patient misidentification happens is widely under-estimated and under-reported by clinical staff, as very often they are unaware that an error has occurred, but near miss incidents are reported on a daily basis in healthcare environments worldwide.

In terms of statistics available, a review of medication error incidents reported to the NRLS over six years between 2005 and 2010 recorded 525,186 incidents. Of these, 86,821 (16%) of medication incidents reported actual patient harm, 822 (0.9%) resulted in death or severe harm2. Clearly any technological advances that help to reduce or eliminate errors are central to improved patient safety and more cost-effective ways of working.

Under the new EU Directive 2010/84/EU1 that came into force in July 2012, the term ‘adverse drug reaction’ (ADR) is defined as, 'a response to a medicinal product that is noxious and unintended effects resulting not only from the authorised use of a medicinal product at normal doses, but also from medication errors and uses outside the terms of the marketing authorisation, including the misuse, off-label use and abuse of the medicinal product'.

A study was conducted in two large hospitals in Merseyside, UK to determine the current burden of ADRs in the NHS3. The study found that of 18,820 patients aged over 16 years admitted to hospital over a six-month period, there were 1,225 admissions judged to be related to an ADR, giving a prevalence of 6.5%. Of these 1,225, the ADR was judged to have led directly to the admission in 80% of cases.

The majority (72%) of ADR-related admissions were judged as avoidable, including medication errors. The median bed stay was eight days, accounting for 4% of the hospital bed capacity, and the projected annual cost of these admissions to the NHS was £466 million.

In addition to medication-specific incidents, other major areas where patient misidentification can occur include:

- Performance of the wrong procedure on a patient
- Serious delays in commencing treatment on the correct patient, for instance, mislabelling of an abnormal blood sample
- Patient is given the wrong diagnosis
- Patient receives inappropriate treatment
- Patient is over-exposed to radiation
- Wrong patient is brought to theatre
- Cancellation of operations due to misfiling of results, GP letters and correspondence

---


Today’s advances in mobile, digital identification, printing and labelling make it easy to print patient-related documents at bedside and confirm the identity of the patient in question.

Printing patient-related documents away from bedside has a number of disadvantages. Administratively, returning to a central location such as a nurse’s station to pick up printed forms, tags or labels always runs the risk of returning to bedside with the wrong item, and consequently following the wrong directions for a given patient. And more time spent to-ing and fro-ing to the department printer is less time spent actively caring for patients.

By way of example, prior to converting from centralised printing to bedside specimen labelling, staff at a US hospital identified 63 steps in its phlebotomy collection process where errors could occur. Labelling specimens at the patient bedside eliminated 44 of these steps from the process. After implementing a bedside labelling system, the hospital reported zero misidentified patients and specimens, zero incorrect specimen containers and zero unnecessary phlebotomies after six months and 8,000 phlebotomies.4

The hospital also analysed specimen identification errors and found that carrying multiple labels into a patient room was the leading cause of specimen mislabelling. Labelling away from the bedside was the second-leading cause. The reasons for creating processes to prevent specimen labelling errors are clear. So is the value of bedside labelling for specimen identification.

Numerous other studies and anecdotal results have shown the practice to be highly effective. Becton Dickinson reported that studies by two of the hospitals that installed its BD.id system for positive patient identification and specimen collection found nearly a 100 percent reduction in specimen collection errors.5

Hospitals and laboratories across Europe have reported significant error reductions related to barcode-based patient and specimen identification and point-of-care labelling.
Using mobile printing technologies is becoming the definitive means of reducing errors in patient identification.

These solutions are being used to improve safety, comfort and efficiency at every stage of a patient’s hospital journey. Barcodes, and more recently RFID (radio frequency identification) are being used to help reduce identification mistakes as well as to speed up hospital processes from admission to discharge, from the pharmacy to the wards.

Patient identification using wristband media and printers, provides a critical first step in many patient-safety-improvement initiatives. Incorporating a barcode or an RFID tag as well as text provides a vital extra safeguard against mistaken identity.

Medical records that carry a printed label incorporating a barcode are a more reliable way of ensuring that each patient’s record can be uniquely identified and tracked.

With a mobile printer, pharmacists can label a patient’s personal medication on the hospital floor, which saves time walking back to the pharmacy. The hospital pharmacy can also print unit-of-use barcode labels to provide a full audit trail.

Blood transfusions are a high risk-area, where inaccurate identification can lead to potentially fatal errors. Blood bags are routinely barcoded with their type. Adding a label with the intended patient’s details enables additional safety checks to be made automatically before the blood is given.

A wide range of healthcare-related tasks can be carried out more confidently and efficiently using mobile printing, while looking towards the adoption of electronic medical records, meeting relevant legislation and achieving budgetary and business goals.

**The practical benefits of mobile printing solutions**

- Better patient safety
- Better risk management
- Better compliance
- Better administration
- Better use of staff time
- Better asset utilisation
- Lower costs
THE DEPARTMENT-SPECIFIC BENEFITS OF MOBILE PRINTING

For the patient
In terms of patient reassurance, labels, tags and documents printed at bedside are the most easily seen and confirmable as being relevant and correctly aligned with the individual in question.

For nursing staff
Mobile printing at bedside is the simplest means of checking that the right information is available for the right patient, saving time, inconvenience and the potential for errors.

For IT
Modern mobile printers combine portability, and ease of use, reducing the workloads of the IT department to maintain productive working and simplicity of system and device updates. New technologies enable IT staff to deploy, manage and monitor printers centrally from a single PC screen anywhere on the network. Installation and configuration are fast, out of the box, and management is quick and simple with drag-and-drop functionality and wizard assistance.

For operations
Mobile printing reduces the risks associated with errors, and makes compliance simpler to achieve. By moving to an automated data-entry and verification system, many administration tasks are speeded up and simplified so that staff can spend more time with patients and less time dealing with paperwork. These systems also improve overall visibility by providing real-time information on specimens, tests and results. They also improve staff productivity and reduce wastage of printer supplies such as ink and paper.

MOBILE PRINTING IN PRACTICE

Today’s mobile printers are lightweight, easy-to-use and durable, offering excellent print quality along with support for a variety of media. Balance, grip, and ease of carrying and operation are crucial in increasing, not hindering staff productivity as they go about their working day.

They are available in multiple designs to meet specific healthcare needs and budgets. Devices can be worn on a belt or shoulder strap, or securely mounted on a vehicle or a cart that can be easily moved from ward to ward.

Essentially, mobility is supported in two ways:

Wearable solutions
Staff can wear printers using either a belt clip or a shoulder strap, giving them the flexibility to keep their hands free for other tasks and reducing fatigue, especially in high-use environments.

Cart-mounted solutions
Stationary and tabletop printers offer mobility when users mount them on a movable cart. This configuration is ideal for when the application requires more media capacity or added functionality beyond the capabilities of a smaller mobile printer.
THE BENEFITS OF WIRELESS COMMUNICATIONS

Most mobile printers offer wireless capabilities for connecting to a local area network (LAN) and enterprise resource planning (ERP) applications from anywhere in the facility. They are typically used in conjunction with handheld, wearable, or mountable computers. The printer receives commands from the mobile computer, smart phone, or tablet through either a cabled or a wireless connection using Bluetooth®, with the user generating relevant information and print jobs or receiving tasks pushed down directly from the wireless network. A wide range of print jobs, label formats, variable data and other relevant patient and facility information can be communicated.

MOBILE PRINTER AND DEVICE MANAGEMENT

Mobile printers can meet many print needs that require fine-tuning of features such as darkness setting and print speed. These are key to high quality documents and labels, particularly important where, for instance, information needs to be scanned on a regular basis.

Print methods and media

Thermal-based technology is ideal for mobile printing because of the high print quality output, media flexibility and the low-maintenance, durable nature of the equipment. Impact printers are more vulnerable in busy environments, often lack the print quality to produce scannable barcodes, and contain no optimisations for adhesive label media.

There are two thermal printing methods, direct thermal and thermal transfer.

Direct thermal applications

Direct thermal printers can satisfy most mobile application needs. Top-coated media resists ultraviolet light and remains readable for years.

Thermal transfer applications

Thermal label printers are ideal for barcode printing because they produce accurate, high-quality images with excellent edge definition. Thermal printers are engineered to print within tight tolerances and to produce the exact bar widths that successful barcode printing and scanning require.

Typical mobile printers accept a variety of label, tag, ticket, and other media for producing durable specimen labels, inspection labels, and other labels and documents. Users can customise blank label stock to include colour and graphics, with the variable text and barcode printed on-demand from the mobile printer.

Mobile printers can meet many print needs that require fine-tuning of features such as darkness setting and print speed.
MOBILE PRINTING IN PRACTICE

The example here, for a typical bedside specimen labelling procedure, outlines how a mobile printing solution can change the way jobs are done and increase certainty in the delivery of care.

Draw orders are downloaded to mobile computers issued to the nurses or phlebotomists who collect the specimen sample. At the bedside, the patient is identified, ideally by barcode scanning. The patient ID is matched against a draw order on the mobile computer to verify that a sample is required and the correct patient is being tested.

Confirmation can come from checking a record stored in the mobile computer, or through a wireless network connection to a central patient record system. After receiving instant confirmation of the patient identification and sample order, the sample is collected. The mobile computer or network immediately directs the printer to produce an ID label, which is applied to the sample container.

Printing labels on-demand, one-at-a-time virtually eliminates the possibility of applying the wrong label to the specimen. The entire process is carried out at bedside, with no risks of confusion or error a return to the nursing station might entail.

SUMMARY

Where patient safety is concerned, the risks of misidentification are too significant to be ignored. Legislation will only become more stringent, and adopting the available technology sooner rather than later delivers a range of proactive business benefits that go much further than the ward.

Zebra Technologies Corporation gives customers in a wide range of business sectors visibility of critical assets, people and transactions through a broad range of printing and location technologies. Our barcode, card, kiosk and RFID printers, as well as real-time location solutions, have made us a recognised global leader in providing solutions that provide the right people with the right information at the right time, increasing business efficiency and reducing costs.

For more information about how Zebra mobile printing solutions could help you to mitigate risk, improve patient safety and increase organisational efficiency, visit www.zebra.com/mobility