

Right patient – right care



# Contents

Summary	1
Background	2
Role of the NPSA	3
The NPSA project	5
Manual checking	6
Technologies	8
The interdependence of technology and human factors	10
The National Programme for IT (NPfIT)	11
The way forward	12

## **Right patient – right care**

Improving patient safety through better manual and technology-based systems for identification and matching of patients and their care.

# Summary

This paper is about how patients can erroneously receive health care which is not intended for them or be matched with specimens other than their own. It reviews the background to such mismatching and sets out the findings from two pieces of research commissioned by the NPSA, one on checking using manual methods and the other on technology based systems.

The paper notes the link between this project and the Government's major investment in healthcare IT through the National IT Programme (NPfIT). This will help ensure that any technological solutions developed for mismatching are consistent with that programme both at a national and local level. The paper proposes a way forward with the NHS, industry and patients working together to devise and introduce systems which will help to reduce mismatching significantly and make patient care safer.

## Background

Reducing and, where possible, eliminating errors in the matching of patients with their care is central to improving patient safety in the NHS. Three main types of error can occur:

- a) a patient is given the wrong treatment as a result of a failure to match them correctly with samples, specimens or x-rays;
- b) a patient is given the wrong treatment as a result of a failure in communication between staff or staff not performing checking procedures correctly; and
- c) a patient is given treatment intended for another patient as a result of a failure to identify him or her correctly.

Examples of such errors include:

- Mrs Johns' blood, tissue sample or specimen is confused with Mrs Jones' leading to one or, possibly, both receiving the wrong diagnosis and/or wrong treatment;
- a patient is incorrectly operated on – for example the wrong limb is amputated or the wrong kidney removed – because of a failure in communication between staff and checking procedures;
- Mr U Patel is given the medicines intended for Mr V Patel.

Such errors can have a range of consequences. Many result in little or no harm but can nevertheless be distressing for patients and adversely affect the confidence of patients and staff. Some result in lasting but relatively minor consequences for the patient. Some, however, result in serious, lasting harm, such as chronic pain, undiagnosed cancers, blindness and even death.

There are no accurate figures on the frequency or cost of such mismatching errors. They form a significant part of the whole range of errors in health care. It has been calculated that:

- In the UK about 10 per cent of inpatient episodes result in errors of some kind, of which about half are preventable.<sup>1</sup>
- Of eight million admissions to hospitals in England each year, about 850,000 result in patient safety incidents which cost the NHS about £2 billion in extra hospital days.<sup>1</sup>

1 C Vincent, G Neale and M Woloshynowych (2001), *Adverse Events in British Hospitals: preliminary retrospective record review*, *British Medical Journal* 322: 517-19

## Role of the NPSA

The National Patient Safety Agency (NPSA) is satisfied, on the basis of the work reported below and other evidence, that there is considerable scope in the NHS for improving patient safety both through the development of other fail-safe methods of manual identification and checking – that is checking which does not entail the use of electronic technologies – and through applying technologies such as barcodes, radio frequency identification, and biometrics.

There will, of course, be costs associated with the introduction of new methods, especially technological ones. However, the costs of technologies, including the newer ones such as radio frequency identification, are falling, and are likely to be offset and possibly outweighed in healthcare by:

- savings made in costly litigation resulting from errors in patient care;
- savings made by reducing extra bed days resulting from errors (see page 2);
- the possibility of spin-off efficiency gains from the appropriate use of technologies in matching patients and their care.

The new infrastructure being introduced by the National Programme for IT (NPfIT), outlined on page 11, will support technology-based systems for avoiding mismatching, and offer possibilities for further integration of systems and efficiency gains.

The NPSA is promoting the development and implementation of modern systems and equipment in the NHS for:

- accurately and reliably identifying patients;
- accurately and reliably matching all elements of care, including samples and specimens, medicines and surgical treatment, to patients.

The responsibility for specifying what is needed lies with the NHS. To do so, however, it will need industry to provide information about methodologies, technologies and their potential applications. The NPSA is looking to suppliers to work with the NHS to explore the potential uses of modern technology in healthcare and to devise systems and equipment which will meet NHS needs. These would have as their first aim ensuring the safety of patients, but might potentially offer other improvements in efficiency and effectiveness.

Patient groups have an important role to play. They can, for example, advise on how patients may react to methodologies or technologies used to identify them. They can also advise on how any potential resistance could be addressed.

A partnership between the NHS, patient groups, and providers of relevant technologies can develop appropriate ways forward. The NPSA is helping to initiate and develop such a partnership.

## Case Study

### Bar codes

The haematology department at John Radcliffe Hospital in Oxford developed and tested a barcoded patient identification system. Hand-held computers match blood samples and check that the right patient receives the right blood.

A patient's name, date of birth, gender and hospital number are scanned into wristband barcodes and a portable printer generates a label containing these details. The label is then attached to the patient's cross-matched sample. The whole process takes less than one minute.

Before administering blood, a member of staff, using a hand-held computer, is prompted to make a series of checks and scans. If the blood is not the correct match, the computer indicates 'Do Not Transfuse' and sounds an alert.

The system is now being installed in five hospitals in the Tyne-Tees area. The initial cost of providing a 1,500 bed hospital with the equipment and support to run the bar coding system is about £400,000.

The Serious Hazards of Transfusion (SHOT) annual report published in 2002 recommended the evaluation of computerised transfusion aids and barcode technology for confirmation that the correct blood is administered. In the period 1996 to 2001, SHOT reported 11 deaths and 60 cases of major morbidity due to incorrect blood component transfused. The work at Oxford has been funded by the National Blood Service.

## The NPSA project

In 2003 the NPSA commissioned two pieces of work on matching patients with aspects of care. One, carried out by Human Reliability Associates (HRA), reviewed manual checking processes, that is those which did not rely on or make use of electronic aids, in health care and other industries in the UK and abroad. The other, carried out by Cambridge Consultants Limited (CCL), looked at the present and potential uses of technologies, drawing on existing experience in health care and other industries in the UK and abroad. In both cases, the aim was to identify ways in which methods used in the NHS to match patients and their care could be made more reliable. The full reports are available on the NPSA website at [www.npsa.nhs.uk/health/publications](http://www.npsa.nhs.uk/health/publications)

### Case Study

#### Finger-printing technology

The Wells Park GP Surgery in Sydenham, London, operates a system of identifying patients using finger-printing technology to enable patients access to medical records, inform reception and the doctor of a patient's arrival, confirm with the patient their appointment time and the doctor's name, and of any delays in being seen.

About 15 per cent of the practice's 8,300 patients (1300) are registered. They are asked when they come to the reception desk whether they would like to have their fingerprint taken, so that they can access their own records – it takes about 45 seconds. They are also issued with a PIN – a Personal Identification Number.

The surgery is looking at how patients can add to their notes electronically, without altering existing notes. Patients can already inform reception that their personal details have changed and can ask questions using the system. They can also print out leaflets about some medical conditions for a small fee.

## Manual checking

This study found that it was impossible to quantify reliably the incidence or probability of mismatching patients and their care, but there was sufficient evidence to confirm that it was a significant area of concern.

The study showed that manual checking processes have rarely, if ever, been subject to formal risk assessment, and there has been little systematic research into checking methodologies or the barriers to their effective use. Guidelines and recommendations issued by the various bodies tend to emphasise formal procedures and policies but offer little guidance on how they should be implemented to minimise non-compliance. The implication is that the procedures used may be based on sound common sense and experience but are not grounded in systematic research and formal risk assessments.

The NPSA's general conclusions from this study were that:

- manual checking arrangements should be subject to risk assessment in the same way as any other procedure;
- there is a need for greater emphasis on and understanding of ways of ensuring compliance with checking procedures; and
- there is scope for further research into the factors which can lead to mistakes.

On specific issues raised in the report, the NPSA concludes that:

- bedside identity checking is the final opportunity to pick up any errors. It would appear to be a major source of matching errors, suggesting that work on manual matching procedures should focus on bedside checks rather than earlier stages in the process;
- the high rate of missing patient wristbands is of serious concern, and will potentially be a major difficulty for the use of automated identification methods such as barcodes;
- the tendency for patients not to be asked their name before receiving blood transfusions increases the risk of errors and should therefore be addressed urgently along with other issues concerned with matching blood types to patients;
- double independent checking for high risk tasks is done in comparable industries, such as the airline industry, and should be explored as a possible procedure for the NHS.

The NPSA is researching ways of raising the levels of wristband compliance, as part of a project looking at safer patient ID. It is also commissioning research into bedside checking.

## Case Study

### Active Radio Frequency Identification (RFID)

A trial using the active radio frequency identification (RFID) tagging system to compile operating lists is being carried out at Birmingham Heartlands Hospital.

Each patient has an electronic record which includes a digital photograph taken by the admission ward staff. These photographs then appear on a screen in the operating theatre. A reusable WiFi tag is allocated to each patient to monitor their progress throughout surgery.

Positioning technology allows a patient's location to be tracked within the hospital and their electronic patient record (EPR) is available on all hand-held computers. The pre-operative checks made by the surgical team are added to the EPR and contribute to the 'mistake proofing'. Final manual checks are also logged, and only then can the operation proceed.

The hand-held computer can help avoid misidentification when tests are ordered or drugs administered. The patient's ID is included on all labels. If a biopsy or test is undertaken in theatre, patient ID labels can be printed from the tag to prevent mislabelling.

# Technologies

There are already examples in the UK, and elsewhere, of technology being used to match patients and their care. At present, these predominantly involve the use of barcodes in blood, patient samples and medication. CCL reported a number of examples of the use of barcodes in these areas with reports of positive professional and patient perception. There are also small-scale trials in place on the use of identification (ID) cards and biometrics.

The study identified a wide range of technologies used for ID, each with their own well defined benefits and constraints, which could find applications in healthcare. Examples include:

- *barcodes* – the most familiar form of ID coding technology, using adjacent bars and spaces to present information.
- *radio frequency identification (RFID)* – using radio-frequency transfer of data between a reader and a tag.
- *card based technologies (magnetic strip, IC chip)* – using cards which incorporate a magnetic stripe digitally encoded with information.
- *biometrics (for example, finger printing and iris scan)* – using automated methods of identifying or authenticating a living person based on physiological or behavioural characteristics.

The study did not enable the NPSA to identify a single, clear way forward. The requirements for patient and sample identification in the NHS are many and varied, dependent on the area of use and the stakeholder group. It seems clear that, for the present at least, none of the technologies identified would meet all requirements in all areas. The report suggests that, in the short term, 2D barcodes may offer the best fit for most applications, but that RFID may provide a better solution in the longer term if costs are reduced sufficiently and it gains wider public acceptance. Biometric measures could provide unique benefits in areas such as outpatients.

It cannot be assumed that technology can be easily transferred from other industries into health care. The principal barriers will be professional and patient perception, cost and infrastructure. However, the success of some of the trials under way has demonstrated that the barriers can be overcome with rigorous planning, careful preparation and, where appropriate, pre-emptive educational programmes to overcome negative patient perception. Successful introduction of technology tends to be more closely related to how it is implemented than to technical features of the technology itself.

The NPSA's conclusion from this study, therefore, is that:

- a) the use of technology to prevent mismatching is both desirable and achievable;
- b) there is not a single technology that meets all the requirements for patient identification and matching with care in the NHS:
  - barcoding is currently the best technology for labelling patients and specimens because the technology is readily available, relatively cheap and has a good track record in health care;
  - radio tagging (RFID) is a more sophisticated and potentially more powerful technology but is currently relatively expensive, lacks specific standards and may face negative patient perceptions related to fears of covert tracking. However, this is a rapidly developing area;
  - biometrics are increasingly used in our lives and because of this the technology may become more generally accepted. Also biometrics uses a unique personal identifier for matching purposes and eliminates one stage at which error can occur, namely that of translating information into a barcode or a radio tag.
- c) the appropriate approach may therefore be a mix of technologies; each mix appropriate to the particular circumstances. The mix may change and develop over time with the development of technology and public acceptance.
- d) the process for implementing technology needs to be carried out on a well defined and planned basis, taking into account, for example, the area of use, the specific requirements, risk assessment, staff support and training and the involvement of patients.

## The interdependence of technology and human factors

Both reports stressed that however sophisticated and automated checking processes may be, the possibility of human error will always remain. Introducing new technology may help to avoid some types of error, but can introduce new possibilities of error. Indeed, the introduction of new technology can itself create serious problems and lead to failures and accidents if the analysis, design, management and evaluation processes fail to take account of the interface between people and the technology. Most major accidents, such as Chernobyl, Piper Alpha and the Kegworth and Tenerife aviation disasters, arise through a combination of technical, procedural and human factors. It is essential not to lose sight of human factors in all initiatives aiming to match patients with care.

# The National Programme for IT (NPfIT)

The Government is investing in a major IT programme for the NHS. This will provide over the next few years for:

- A national network (known as N3) with sufficient connectivity and broadband capacity to meet current and future NHS needs.
- Every patient's medical and care records to be held electronically and available securely online.
- GPs and other primary care staff to be able to book hospital appointments electronically.
- Electronic transmission of prescriptions making it easier for GPs to issue prescriptions and for patients to collect medicines.
- Picture Archiving and Communications Systems (PACS) to capture, store, distribute and display static or moving digital medical images.

The NPSA is working with NPfIT to ensure that any technological solutions developed to reduce mismatching are consistent with that programme both at a national and local level.

## Other related work

The NPSA is carrying out a number of other projects to help ensure that the right patient gets the right care. These include:

- developing guidance with the Royal College of Surgeons on ways to minimise the risk of surgery on the wrong site or the wrong patient;
- exploring local NHS initiatives for reducing incidents of incompatible blood transfusions which have the potential for wider implementation across the service. This is a joint project with Serious Hazards of Transfusion (SHOT), National Transfusion Committee (NTC) and National Blood Service (NBS);
- conducting a regulatory impact analysis on the proposed use of bar codes and/or radio frequency tags on medicines and blood products in the UK.

## The way forward

This initiative offers a significant opportunity for the NHS to improve patient safety, with possible side benefits arising from the well-planned use of technology, and for providers of services and equipment who could find a large market for well-designed systems. The challenge to the NHS is to ensure that in taking advantage of the new technologies, no new risks to patient safety are created. This can be addressed through careful and appropriate risk assessment. The NPSA is publishing this material as a way of stimulating interest and promoting local action. We will continue to monitor developments in this field and within our limited resources, where we identify the potential to improve patient safety, share information through our website and in other ways. We will also promote exchanges and interactions between interested parties.

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