Patient Identification and Patient Safety

J. Kay[a,b]

[a]*Department of Clinical Biochemistry, Oxford Radcliffe Hospitals, Oxford,*
[b]*Centre for Health Informatics, City University, London*

Incorrect identification of patients is clinically dangerous[1,2]. Requiring staff to repeatedly re-enter patient information is inefficient. A combination of auto-identification technology and process re-engineering therefore allows improvements in both patient safety and process efficiency.

The dominant auto-identification technology is currently bar codes, and they are ubiquitous in commerce and logistics. A newer technology, radio frequency identification (RFID), is now appearing. The principals of RFID are the same as those for bar coding but it allows remote sensing of multiple objects. The two major problems with RFID are the cost of the devices and the current proprietary technologies used by different manufacturers. When both of these are overcome it will probably replace barcoding in many applications.

In the request-report cycle for central laboratory testing patient identification is predominantly a matter for the pre-analytical phase, with the key step being the linking of the patient identity to the request and specimen that are sent to the laboratory. However, problems in identification are usually revealed in the post-analytical phase when the report is interpreted by the appropriate clinician.

In introducing barcoding a series of design questions need to be addressed, including the data content to be carried in the bar code, whether it is accompanied by human readable information, the format of the bar code and the scope of use of the bar code. Scope can extend to include commercial activities across the entire world, as has been achieved for books, or might be restricted to a single organisation such as a hospital. Agreements have been reached so that bar codes used to identify blood products are consistent and may be safely used across the world.

Our first applications of patient autoidentification in Oxford have used bar coded wristbands worn by inpatients to support point of care testing for blood glucose with handheld blood glucose meters, and the blood transfusion process, where they are used both at specimen collection and when blood products are administered[3,4].

We have not yet studied similar processes in primary care or for hospital outpatients. Badges, tokens and biometric identification are all likely to have roles.

For clinical uses of barcodes it is necessary to think about other technologies including the printers and readers, which may be fixed or mobile, and the associated technology of wireless connected portable computers which may be taken to patients in a wide variety of clinical areas. For point of care testing different media are required for the two main approaches. If an analyzer can be taken to the patient a wristband may be used. But where a specimen is taken to the analyzer another medium is necessary, this could be either printed on demand or in advance.

Auto-identification technology can clearly be used for a wide range of other clinical applications including patient tracking and medicines management[5]. The same devices can be used across all of these with consequent improvement in cost-effectiveness.

The processes by which patients are identified differ greatly between countries and healthcare systems. For several years England has had a unique patient identifier within the National Health Service, known as the "New NHS Numbers". The new NHS number, as well as being unique across the country, has several desirable properties including a standard format (10 numeric characters) and a check character which allows automatic detection of errors at manual data entry. However, when we started this work this was not widely used and the dominant model was a locally defined patient administration number. The migration has been very difficult and we have consistently identified the need to carry both identifiers in both human readable and barcoded format during the period of transition.

It is possible to replace traditional methods of identification with auto-identification technology without making major changes to processes. However this will not usually optimise either patient safety or process efficiency. In order to achieve these it is necessary to re-design processes. This will usually be in the direction of simplification and the aim should be to prevent errors, rather than merely recording them. Processes can be divided into those in which real time access to a definitive database is available and those in which it is not. The former are likely to require portable wireless-networked devices in clinical applications.

Benefits that have been identified in the blood transfusion projects[3,4] include better identification and the introduction of processes which patients and staff prefer. Difficulties we have encountered in implementing this technology include agreement on identifiers, agreement on

Ricevuto:18-09-2006 Pubblicato on-line: 25-09-2006

Corrispondenza a: Prof. Jonathan D.S. Kay, Department of Clinical Biochemistry, Oxford Radcliffe Hospitals, Oxford OX3 9DU, England. Tel. 0044-1865-220473, e-mail: jonathan.kay@ndcls.ox.ac.uk

format of bar codes, agreement on which is the master source of identification, finding appropriate wristbands for adults, infants and babies, and managing the migration from a locally defined identifier to the new national system.

Improved patient identification and the devices to deliver it will rapidly spread across all areas of clinical care, including central laboratory testing, point of care testing and blood transfusion. Fortunately the devices and the lessons learned in commercial uses can be transferred into healthcare. The greatest problems will continue to be those of organisational change.

Acknowledgements

A very large number of colleagues have taken part in these projects and I would particularly like to thank Mike Murphy, Richard Taylor, Brian Shine, Ian Smith, Chris Pipkin, Julie Staves, Lyn Sharman and Andrew Dyckhoff. This work would have been impossible without the collaboration and support from Abbott Diagnostics and Olympus Osyris.

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