Labelling system for matching blood to patients
Interim evaluation report

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1 Purpose

1.1 The Right patient, right blood project is a joint initiative between the National Patient Safety Agency (NPSA), the Chief Medical Officer’s National Blood Transfusion Committee (NBTC) and Serious Hazards of Transfusion (SHOT). This report presents the evaluation of a labelling system which uses a unique set of labels bearing a unique number to provide an additional link between the patient and the units of blood to be transfused. This report identifies the evaluation process, information gathered, findings and recommendations.

1.2 The evaluation comprised:

- user group meeting;
- patient workshop;
- survey questionnaire distributed to healthcare staff six months after implementing the labelling system within their hospital;
- five focus group discussions with healthcare professionals involved in the blood transfusion process;
- risk assessment.

2 Introduction

2.1 The NPSA has set a target of reducing the number of inadvertent ABO incompatible transfusions by 50 per cent over three to five years from 1 January 2005 as measured by the SHOT database. This target has been set as part of the blood safety project, a joint initiative between the NPSA, NBTC and SHOT to reduce the incidents of ABO incompatible transfusions by improving bedside checking.

2.2 Following a workshop held in December 2004, with the aim of identifying effective local solutions to wrong blood events at the bedside, the labelling system was selected as one of four initiatives for further testing and development.

2.3 The labelling system for matching blood to patients is an approach to improving blood safety already established in some hospitals. Some hospitals refer to this system as the ‘red label’ system. The aim is to concentrate the attention on the bedside check between the labelled blood and the patient. The system is designed to be a simple, inexpensive process for use within inpatient, outpatient and community settings. This system does not replace other patient identifier checks and works to improve the safety of blood transfusions.

2.4 The system is based on a set of unique numbered labels per patient. Each self-adhesive label has the same unique number printed on it. This unique numbered set of labels is assigned to one patient for a single episode of care. This unique number provides a direct link between the blood sample, patient and cross-matched blood. For patients whose identity is unknown, it provides a further link between blood sample and patient. This aims to prevent mis-transfusions by samples being labelled with another patient’s details or the wrong patient being bled.

2.5 An evaluation of the system was required to ensure appropriate advice was distributed to the service, and before it could be included and recommended in an NPSA safer practice notice.
3 Overview

3.1 A steering group was set up in April 2005 with the aim of ascertaining the effectiveness of the system and whether it is applicable on a national basis. The steering group was charged with looking at the following:

- a review of the labelling system currently in use at South Tyneside NHS Trust, taking into account the experience of other hospitals who had used or are using the system;
- an informed recommendation to the NHS on the benefits and risks of introducing the labelling system as an additional unique manual identifier into the blood administration process. This recommendation would, if appropriate, include a standard for use.

The first objective of the steering group was to identify all hospitals using or having used such a system. This was achieved through a survey sent to hospital liaison managers. Once identified, the hospitals were invited to a user group meeting in September 2005. The aim of this meeting was to learn as much as possible from users about the strengths and weaknesses of the labelling, or other unique identifier, system in order to inform decision making about a national roll-out of the system as a means of improving blood transfusion safety.

3.2 The general conclusions from the meeting were that the labelling system:

- required staff to make an additional check on the patient’s wristband;
- is an episode specific identifier;
- provides an additional and separate check;
- requires adherence to protocol for successful implementation;
- is worthy of further consideration.

3.3 During the meeting a generic standard process map of the labelling system was devised (flow chart; appendix one). The group agreed to remove the compatibility form from the checking process as this was viewed as an unnecessary and potentially hazardous step where error could occur because the member of staff’s attention is taken away from the bedside check.

3.4 Further work was undertaken to finalise the standard process map (flow chart) and supporting materials were developed (guidance document and staff leaflet) for trusts to use if implementing the system. It was agreed by the user group that one pilot site would be sufficient for evaluating the system, but various focus groups should be held to explore the views of both patients and staff.

4 Patient workshop

4.1 In November 2005 a patient workshop was held to capture the views of patients and carers of patients who have received blood transfusions in the past. The focus was on drawing on the participants’ experience when receiving blood transfusions. Sixteen people took part in the workshop. Of these:

- fourteen had sickle cell anaemia (or were parents of children with the disease);
- one had leukaemia;
- one represented others with leukaemia.
All had been recruited through relevant organisations: Sickle Watch, Merton Sickle Cell and Thalassaemia Group, Waltham Forest Sickle Cell Action and Support Group, Makanga Koy Anane Bertrand and Leukaemia Care. There was also an observer from the National Blood Service and a consultant haematologist working with the NPSA.

4.2 The labelling system was explained to the participants and their views recorded. Initially there was general enthusiasm for the system. Comments included:

“I think it's beautiful in its simplicity because the numbered labels were more immediately visible to the eye and did not depend on any kind of technology.”

“There's no error coming in. It's going to have a label right from the onset right through to when it comes back with the same label.”

4.3 Some participants were concerned about the potential for human error and noted that bar codes would have more information on them. For example, some were concerned that the large number of labels could be mixed up in the laboratory, it would therefore be important for there to be a form to accompany the blood. Furthermore, some felt that similar-looking numbers could confuse tired nurses. One participant commented:

“People might not take the time to read it properly. Human beings are fallible and we all make mistakes…. You could be tired and you may not read it properly or you have forgotten your glasses.”

4.4 The number of people attending enabled a good discussion about key issues, but statistical inferences cannot be drawn from the comments made.

5 Pilot

5.1 The labelling system is currently used in nine acute hospitals in England. Maidstone Hospital in Kent has used the system for over a decade. Maidstone and Tunbridge Wells NHS Trust was formed, comprising of three acute sites including Maidstone Hospital. These sites refer to the system as the 'red label' system. In August 2005, the 'red label' system was implemented across the other two sites: Kent and Sussex, and Pembury Hospitals. As part of the evaluation of the system, the trust agreed for this implementation to act as a pilot site to inform the national blood safety project. An evaluation survey questionnaire was agreed by the steering group (see appendix two). In February 2006, the questionnaire was tested on 10 staff, following which 250 questionnaires were distributed to staff involved in the blood transfusion process. These included nurses, phlebotomists, blood transfusion laboratory staff, porters and medical staff.

5.2 Of the 250 evaluation survey questionnaires distributed, 24 were returned. This gave a very poor response rate of just less than 10 per cent, despite several reminders from the trust's transfusion practitioner. Thirteen nurses (54 per cent) and 11 phlebotomists (46 per cent) returned the questionnaire. Nineteen of the respondents (79 per cent) said they had received training in the labelling system and 23 (95 per cent) said they had used it.

5.3 The following figures are an overview of the findings from an analysis of the survey. Nineteen (79 per cent) felt the system was easy to use; four (16 per cent) neither agreed nor disagreed; and one (four per cent) said it was not easy to use. Interestingly, 17 (61 per cent) felt it was more time consuming taking blood samples from patients using the 'red label' system. However, only four (16 per cent) felt it was more time consuming with the system when performing the bedside checks prior to transfusion; with five (21 per cent) neither agreeing or disagreeing; and five (21 per cent) disagreeing. Ten (41 per cent) respondents either wrote ‘N/A’ or left the answer blank.
5.4 When asked what they thought of the statement ‘the red label system improved patient safety’, only one (four per cent) respondent disagreed; five (21 per cent) neither agreed nor disagreed; and 15 (62 per cent) agreed the system improved safety. Additional comments were made about why they felt it improved safety:

“If patient does not have corresponding bracelet – blood not administered.”
“Ensures you spend a bit longer checking patient and patient feels involved.”
“Because of the unique number.”
“It is another safety check for identifying blood correctly.”

5.5 When asked if they thought the labelling system had increased the chance of needing to repeat blood samples there was no overriding view. Six (25 per cent) disagreed; six (25 per cent) agreed; eight (33 per cent) neither agreed nor disagreed; and four (17 per cent) did not answer the question. Similarly, the answers to the question about whether the system sometimes delayed blood transfusions, showed no strong preference. Four (17 per cent) disagreed, six (25 per cent) agreed and six (25 per cent) neither agreed nor disagreed. Eight (33 per cent) respondents either wrote ‘N/A’ or left the answer blank.

5.6 Respondents were asked if they agreed with the statement that ‘the red label system enabled patients to be more aware and involved in their treatments’. Eleven (46 per cent) agreed; and two (8 per cent) disagreed; and 11 (46 per cent) neither agreed nor disagreed.

5.7 Additional comments were added by some of the respondents. Four respondents mentioned concern if patients were wearing more than one labelled wristband at a time, and wondered who should remove these. Others stated that training was very important, and two mentioned that the labelled wristbands were difficult to use.

5.8 Due to the poor response rate to the survey it is not possible to draw far-reaching statistical conclusions from the analysis. The statistics, here, provide only a flavour of what is experienced by a few at the pilot site. However, the majority of nurses and phlebotomists that responded thought the ‘red label’ system was easy to use and made the blood transfusion process safer.

6 Supporting documentation: staff guidance and leaflet

To support the implementation, a guidance document outlining the process for the labelling system and a staff leaflet were prepared. Draft versions of these documents were agreed by the steering group to be shared with the healthcare staff focus groups only as part of the evaluation process (see appendices three and four).

7 Healthcare staff focus groups

7.1 To gain staff opinion of the implementation and the proposed staff guidance and leaflet for the labelling system, five focus groups were held across the country during February and March 2006. To optimise the use of staff time, where possible, access to existing networks of staff involved in the blood transfusion process from sample to administration were used.

7.2 Further details of the focus groups are in table 1 below. Although junior doctors and porters were invited to attend the focus groups at the Royal West Sussex NHS Trust, Frimley Park Hospital NHS Foundation Trust and Salisbury Healthcare NHS Trust, none were able to attend.
### Table 1

<table>
<thead>
<tr>
<th>Forum/network</th>
<th>Number present</th>
<th>Number of groups</th>
<th>Healthcare professionals present</th>
<th>Previous knowledge and experience of the ‘red label’ system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. South West transfusion practitioners’ meeting</td>
<td>14</td>
<td>2</td>
<td>Specialist transfusion practitioners; clinical audit manager.</td>
<td>Four had heard of the system. No one present with previous experience of using the system.</td>
</tr>
<tr>
<td>2. Newcastle Blood Bank Managers Forum</td>
<td>13</td>
<td>2</td>
<td>Blood bank managers; lead biochemists; biomedical scientist trainer; haematologist; blood liaison practitioner.</td>
<td>Three had previously used the system; the majority had heard of the system; one trust considered system use, but went with IT.</td>
</tr>
<tr>
<td>3. Royal West Sussex NHS Trust</td>
<td>7</td>
<td>1</td>
<td>Specialist transfusion practitioner; consultant haematologist; senior biochemist; clinical nurse specialist; ward staff nurse; phlebotomist manager; clinical governance manager.</td>
<td>One had heard of system. No one had previously used the system.</td>
</tr>
<tr>
<td>4. Frimley Park Hospital NHS Foundation Trust (Clinical Risk Management Committee)</td>
<td>18</td>
<td>2</td>
<td>Senior nursing staff; laboratory managers and staff; risk management team representation; Director of Nursing.</td>
<td>No prior knowledge or use of the system.</td>
</tr>
<tr>
<td>5. Salisbury Healthcare NHS Trust</td>
<td>10</td>
<td>1</td>
<td>Two ward nursing sisters; three ward staff nurses; medical A&amp;E consultant; patient safety facilitator; phlebotomist; blood transfusion technician; clinical nurse; specialist haematology.</td>
<td>No prior knowledge or use of the system.</td>
</tr>
</tbody>
</table>

7.3 NPSA Patient Safety Managers, Bridget James and Alison Huggett, facilitated the focus groups using the same format at each. A ten-minute presentation provided the background to the national blood safety project and they introduced the four solutions. This was followed by an explanation of the labelling system. Depending on the number of people present, the attendees were then split into groups of between seven and 12 people for discussion. The sessions lasted between 45 and 60 minutes.
7.4 Table 2 below is a summary of the findings.

**Table 2**

<table>
<thead>
<tr>
<th>Comments</th>
<th>Example responses</th>
</tr>
</thead>
</table>
| Initial comments | **For**  
- Simple and easy to use.  
- Potential to work with inpatients.  
- Good for unknown patients.  
- Potential to work in A&E alone.  
- Should focus on bedside check.  
- Could empower patients more and involve them further in the transfusion checking process.  
- Could potentially have prevented a recent incident.  
- Good for tracking journey of the blood sample.  
|  
|   | **Against**  
- Where is the evidence that this system is safer?  
- The blood bank staff would need to police this system to achieve consistency and compliance.  
- An additional check, which could potentially be less safe than good compliance with existing policies.  
- If the bedside check is undertaken properly, this system is not required.  
- System worked well when used in Oxford years ago. However, since then IT/computers have been introduced into the blood laboratories and therefore systems have improved.  
- Would be going backwards if introduced.  
- Manually adds a system, how can this be safer?  
- IT e.g. scanners/electronic checking becoming cheaper. Would recommend a trust waits for this rather than investing and implementing labelling system.  
- Implementation could increase the amount of rejected samples and therefore rebleeding of patients.  
- Could give false sense of security.  
- Encourages staff to bypass the national standard for checking patient identification details.  
- Too reliant on labels as check.  
- Concerns expressed about number of stickers already in use and potential to add another to a blood sample e.g. infection risk and patient with similar name.  
- Concerns regarding transcribing in the emergency situation when more than number of labels available.  
- Extra paperwork.  
- A system more reliant on humans.  
- Community link difficult to manage.  
- The label has the potential to become the primary check.  
- Could be seen as a short cut to checking patient and blood transfusion.  
- Concerned this process only for red cells and not for plasma and platelets, therefore having two different systems would increase the risk.  
|  
| Barriers to implementation |  
- Large trusts multiple sites with links to more than 10 community hospitals and more than 100 GP practices. Overwhelming implications for implementation especially with no further resources.  
- Same name for system used for ‘unknown patients’.  
- Cost.  
- One trust looking to remove the compatibility form as used to check patient ID rather than wristband and medical records. Labelling system therefore reintroduces another check and further change.  
- Concerns raised over the need for training and implementation – who would do it?  
- How does this work with electronic requests – no paper forms?  
|
- Implications of training and the initial cost or rejected samples.
- Could potentially undermine the existing checking process.
- Two batches of blood cross-matched together due to staff shortages. This would complicate this process.
- Adding process for disposal of unused labels – who is responsible for this?
- High number of agency and locum staff – implications for training.
- Difficult to maintain.
- Patient could potentially be wearing three wristbands e.g. patient ID, allergy and label.
- Increasing number of treatment centres – patients more mobile.
- Training required and resources available.
- A&E design not conducive to writing by the bedside.

<table>
<thead>
<tr>
<th>Suggestions to overcome these</th>
<th>Collect audit data to show improved outcomes and compliance with labelling system.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Identify costs of implementation to demonstrate it is an inexpensive way of improving patient safety.</td>
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<tr>
<td></td>
<td>Cascade training to senior nurses to improve ownership and achieve more extensive training.</td>
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<tr>
<td></td>
<td>Extend request form with labels so it becomes one package and those taking blood are less likely to bypass system.</td>
</tr>
<tr>
<td></td>
<td>Ensure strict procedures in place, for example, keep to policy of rejecting samples not correctly labelled.</td>
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<tr>
<td></td>
<td>Pilot in one area first – possibly ward where majority of transfusions occur.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Possible reasons why system would not work</th>
<th>Poor compliance to the system by medical staff and in an emergency situation.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Create extra work for laboratory staff.</td>
</tr>
<tr>
<td></td>
<td>Need local champions to implement system and train staff.</td>
</tr>
<tr>
<td></td>
<td>Further complicating transfusion checking procedure.</td>
</tr>
<tr>
<td></td>
<td>Clinical time taken.</td>
</tr>
<tr>
<td></td>
<td>The change would focus on the label rather than the patient.</td>
</tr>
<tr>
<td></td>
<td>Bad timing for more change following EU Directive.</td>
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<tr>
<td></td>
<td>Size of trust therefore perhaps only suitable for small one site trusts.</td>
</tr>
<tr>
<td></td>
<td>Needs strong evidence to persuade trusts to implement.</td>
</tr>
<tr>
<td></td>
<td>Major trauma – two wristbands required.</td>
</tr>
<tr>
<td></td>
<td>Practicalities of the wristband for outpatients. Would they bring them back in with them?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information and resources required to support implementation</th>
<th>Staff guidance and leaflet.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Posters.</td>
</tr>
<tr>
<td></td>
<td>Flow chart.</td>
</tr>
<tr>
<td></td>
<td>Agreement from primary care trusts and GPs’ support for system to support the introduction.</td>
</tr>
<tr>
<td></td>
<td>Business case.</td>
</tr>
<tr>
<td></td>
<td>Extra resources for project managers implementing the system, especially in large trusts.</td>
</tr>
<tr>
<td></td>
<td>Introduction supported by national campaign e.g. press, journals and website.</td>
</tr>
<tr>
<td></td>
<td>Materials for training package e.g. PowerPoint presentation with notes and DVD.</td>
</tr>
<tr>
<td></td>
<td>Feedback from trusts who currently use system especially on compliance, incident data and rejection of samples.</td>
</tr>
<tr>
<td></td>
<td>Patient leaflet and information.</td>
</tr>
<tr>
<td></td>
<td>Frequently asked questions and answer sheet.</td>
</tr>
<tr>
<td></td>
<td>National blood transfusion policy required where all trusts using the same process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff guidance</th>
<th>Needs to be succinct, clear, readable and easy to follow.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concerns regarding patients taking responsibility for their wristband and labels if bled as an outpatient pre-admission, especially the elderly and confused patients.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff leaflet</th>
<th>Useful to support initiative.</th>
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<table>
<thead>
<tr>
<th>Flow chart</th>
<th>Useful to support initiative.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Important to support successful implementation.</td>
</tr>
<tr>
<td></td>
<td>Compatibility sheet not mentioned – approved of this.</td>
</tr>
<tr>
<td></td>
<td>Useful if a trust chose to implement.</td>
</tr>
</tbody>
</table>
**Other issues and comments**

- Reflected a good system.
- Suggestion that all patients transfused should be provided with a transfusion card.
- Any system introduced needs to be universal.
- Red wristbands used widely to indicate patient has an allergy.
- The red label suggests a warning and therefore it is something that needs to be checked.
- It’s good if it does improve the bedside check.

**Overall impressions**

**Focus Group 1a**

Good idea in principle. However, overall the group was concerned that the system would not be feasible in larger organisations due to the logistics of implementation. If only a recommended initiative, their choice would be not to recommend implementation within their organisations. Further evidence would be required.

**Focus Group 1b**

- Could see that the process would focus staff on the bedside check but not convinced this is enough to make them implement it.
- Potential for use in A&E for the unconscious patient.
- Implementation and links with community staff could be problematic and may prevent successful implementation.

**Focus Group 2a**

- Liked basic simplicity of process.
- Could be useful in A&E for the unconscious patient but if it was not introduced in the rest of the hospital it would be more likely to be unsuccessful.

**Focus Group 2b**

Good idea, easy, simple and possibly of use in small trusts based on one site. Overall the group felt the system was outdated and more suited to the paper systems in use at least 10 years ago.

**Focus Group 3**

The system would be cheap, yet education and training a big issue. It could be adopted successfully within A&E alone and for unknown patients within their trust. However, the additional check and reliance on medical staff to follow procedure was a concern.

**Focus Group 4**

Positive response to system, which would require strict control and management. Would appreciate further information following the results of the staff evaluation survey at Maidstone and Tunbridge Wells NHS Trust.

**Focus Group 5**

Worth looking at, but system at present would work well if followed. Some would go for labelling system.

### 8 Risk assessment

8.1 A risk assessment of the labelling system was undertaken (see appendix five). The outcome of the assessment shows that the system is highly dependent on effective implementation, adequate training of staff and strict monitoring of compliance to ensure adherence to the process. The system can be worked around at many stages and the ability to minimise human error with the labelling system is limited. The system ultimately adds an extra task to the blood transfusion process but not necessarily an extra barrier.

8.2 In conclusion, the risk assessment highlights that the additional solutions proposed have limited use in improving the safety of the blood transfusion process and therefore are unlikely to be adopted by the majority of organisations.
9 Options

9.1 Option one: the labelling system is not included in the safer practice notice recommendations distributed to the NHS.

9.2 Option two: the labelling system is not included in the safer practice notice recommendations distributed to the NHS. However, the evaluation report is put on the website.

9.3 Option three: the labelling system is included in the safer practice notice recommendations distributed to the NHS, with all information available on the website.

9.4 Option four: the labelling system is included in the safer practice notice recommendations distributed to the service, with acknowledgements that the system has limited use and minimal evidence to support improvements in patient safety.

10 Conclusion and the steering group's recommendation

10.1 Following considerations of all the options in section nine, the steering group concluded that the labelling system should be included in the safer practice notice due to the successful implementation by several NHS trusts. It would be included as an initiative for organisations to consider, with an acknowledgement that the system has limited evidence to support improvements in patient safety.

10.2 The evaluation report, including all appendices will be available on the NPSA website. These can be used to help review and risk assess the labelling system for local adoption.

10.3 In conclusion, the labelling system has existed for about 20 years. However, few organisations have chosen to implement the system and those that have use different adaptations to suit local situations. Even so, if successfully implemented, the system has the potential to highlight incorrect blood in the sample tube, thereby preventing the wrong blood being given to the patient. The system also promotes the bedside check of the blood unit with the patient’s wristband.

11 Acknowledgements

The NPSA would like to thank and acknowledge the significant contribution the following organisations and networks have made in evaluating and informing the evaluation of the labelling system:

- South Tyneside NHS Foundation Trust
- Maidstone & Tunbridge Wells NHS Trust
- South West Regions Transfusion Practitioners’ quarterly meeting
- Newcastle Blood Bank Manager’s Forum
- Frimley Park Hospital NHS Foundation Trust
- Salisbury NHS Foundation Trust
- Royal West Sussex NHS Trust