

# **Design and specification of patient wristbands**

**Evidence from existing literature, NPSA-facilitated workshops, and a NHS Trusts survey**

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## **1. PURPOSE**

The purpose of this document is to summarise the evidence available to the NPSA regarding the design and the specification of hospital wristbands.

## **2. AUDIENCE**

The document supports the relevant NPSA Safer Practice Notice (SPN) on the standardisation of hospital wristbands. As such, the document is targeted to all recipients of the SPN.

## **3. SOURCES OF INFORMATION**

The information presented in this document is collated from four sources, which are listed below and described in detail in section 4.

### ***3.1. Existing NPSA reviews***

The NPSA has contributed to two different reviews carried out in relation to hospital wristbands. The first review was carried out in May 2005 by Imran Syed, a former Research Associate with the NPSA (Syed, 2005). The review aimed to assess the prevalence and the impact of wristband non-compliance – i.e., hospital patients not wearing wristbands or wearing wristbands with inadequate, illegible, erroneous, or missing information. The review is unpublished (internal document).

The second review was carried out in July 2005 by Leroy Edozien, a Consultant Obstetrician and Gynaecologist in St. Mary's Hospital, Manchester (Edozien, 2005). In the review, Edozien discusses the causes of patient misidentification, the consequences for hospitalised patients of misidentification, and solutions that have been shown or are likely to enhance correct patient identification. The review is published on the Saferhealthcare website ([www.saferhealthcare.org.uk](http://www.saferhealthcare.org.uk)).

### ***3.2. Other published evidence/literature***

In addition to the two reviews mentioned above, a literature search was carried out. The search was focused on the specification of hospital wristbands – especially whether colour-coding is used. The search included academic databases and web-search engines. It also included papers identified by domain experts and members of the project team.

### ***3.3. Survey of NHS Trusts***

A number of NHS Trusts in England and Wales were surveyed regarding the specifications of the wristbands that they use (colour and type), the process of issuing wristbands and the required information, and the positive and negative features of the wristbands that they are using. Since the aim of the survey was to analyse wristband users' requirements, front-line staff were surveyed and, where possible, we collected more than one response per Trust.

### ***3.4. NPSA-facilitated workshops***

In addition to the Trusts survey, the NPSA organised and facilitated six workshops between June and July 2006. In five of them, the participants were healthcare professionals and in one they were patients.

## **4. METHODS**

This section summarises the method of the literature search (subsection 4.1) and the design of the Trust survey (subsection 4.2) and of the workshops (subsection 4.3).

## 4.1. Literature search

The aim of the search was to assess current evidence and thinking in the UK and internationally regarding the specifications of wristbands for hospital in-patients. The review is not a 'systematic' one in the technical sense of the term. The search of relevant documents included:

- (i) a number of academic databases
- (ii) web-search engines
- (iii) articles identified by domain experts and members of the team

The academic databases that were searched were PubMed, ISI Web of Knowledge, and the databases available through the KA24 NHS portal ([www.hilo.nhs.uk](http://www.hilo.nhs.uk)). The search terms and outcomes are summarised below.

PubMed:

- "wristband" (no limits) = 27 documents
- "bracelet" (in "title" or "abstract" and in "English" language) = 110 documents

ISI Web of Knowledge:

- "wristband design" in "topic" = 0 documents; in "title": 0 documents
- "wristband" in "topic" = 19 docs; in "title" = 9 documents
- "patient identification" (no limits) = 205 documents

KA24 databases:

- British Nursing Index - 1994 to date (BNID)
  - CINAHL (R) - 1982 to date (NAHL)
  - DH-DATA - 1983 to date (DHSS)
  - EMBASE - 1974 to date (EMZZ)
  - EMBASE - 1996 to date (EMED)
  - King's Fund - 1979 to date (KFND)
  - MEDLINE - 1950 to date (MEZZ)
  - MEDLINE - 1996 to date (MEDL)
  - PsycINFO - 1806 to date (PSYC)
- "wristband" in "title" or "abstract" = 196 documents across all databases

All the articles that were retrieved from the search of the academic databases outlined above and, in addition, all the articles identified through domain experts and members of the team were reviewed by the author of this report. Initial review was carried out on the title and abstract of the article. If these appeared relevant, the paper was retained for detailed consideration.

## 4.2. Survey of NHS Trusts

A survey tool was developed by the project team. The tool was designed to achieve multiple inter-related aims. First, the tool aimed to assess the specifications of the wristbands that are currently in use in NHS Trusts in England and Wales (colour and type), the process of issuing them and the required information, and the positive and negative features of the wristbands in use. Thus the survey was aimed to capture wristband user requirements.

Secondly, the tool also aimed to provide the baseline data for the evaluation of the project. In other words, the same questionnaire will be sent out to Trusts when the NPSA has published the Safer Practice Notice (SPN) regarding wristband specification. The comparison of the responses before and after the publication of the SPN will be fed into the evaluation of the project (in addition to other information).

Thirdly, the questionnaire was designed to function as a basis for the workshops with NHS staff and patients that were organised and facilitated by the NPSA. The aims and structure of these workshops are described in detail in section 4.3.

The initial survey questionnaire was developed by the author in May 2006. The questionnaire was reviewed by the entire team and amendments were made in June 2006. The finalised version of the questionnaire was mailed to Trusts in the first week of July 2006. (The questionnaire is attached in Appendix A.)

In compiling the list of Trusts to receive the questionnaire, the project team took care not to include Trusts that took part in the baseline survey that preceded the publication of the previous wristband-related Safer Practice Notice in November 2005 (SPN 11: "*Wristbands for hospital inpatients improves safety*"). For that SPN, a random sample of 96 Trusts across Strategic Health Authorities was recruited. For the current project, in order to avoid overwhelming the Trusts with paperwork, the project team chose to approach all the acute Trusts (i.e., those who have in-patients identified by wristbands) that were not part of the sample for SPN 11. This strategy resulted in 99 Trusts being recruited. (In fact, one of the Trusts was keen to participate in both surveys, so it was included in both samples.)

For participating Trusts, four copies of the questionnaire were mailed to the Trusts' Clinical Risk Manager with instructions to complete one and pass the remaining three to front-line staff. Clinical Risk Managers were also informed that the NPSA would welcome additional responses if there was sufficient interest from Trust staff. Instructions requested completed copies to be returned to the NPSA by the end of July 2006. A reminder was sent out via email a week prior to the expiration of the deadline.

Questionnaire responses were entered into an Excel spreadsheet for descriptive analyses.

### **4.3. NPSA-facilitated workshops**

In addition to the Trusts survey, the team organised and facilitated a number of workshops with NHS staff and with patients. The aim of the workshops was to complement the information captured by the Trust survey and to provide space, sufficient time, and appropriate structure for wristband users to elaborate on the issues addressed by the survey (i.e., available wristband specifications (colour/type), process of issuing wristbands and required information, positive and negative features of wristbands in use).

Initial discussion by the project team suggested that groups should be held with staff in clinical areas that had the greatest number of patient safety incidents related to wristband specification. Review and exploration of the incidents reported to the NRLS identified these specific areas as those caring for babies, unconscious patients and deceased patients and also patients undergoing diagnostic tests. Therefore, the project team took care to invite staff working in these areas. In addition, care was taken to have a sample of opinions across Trusts in England and Wales. The workshops were thus held in the North, South, and East of England, as well as in the West of England/Wales. Each staff workshop was attended by between six and 32 healthcare professionals. The patient workshop was attended by 15 patients.

In order to facilitate the analysis of the collected information and to ensure consistency in the issues addressed in both the Trust survey and the workshops, the Trust survey questionnaire was used as a "platform" for the workshops. In other words, the questionnaire was used as a workshop protocol – with the appropriate modifications in the workshop with patients.

## **5. FINDINGS**

### **5.1. Existing NPSA reviews**

Syed's (2005) NPSA review focused specifically on wristband compliance, using existing peer-reviewed literature and other types of publications (e.g., Trust audit data or data summaries) to establish the extent to which hospital in-patients are likely to wear a name band throughout their hospital stay. The most systematic and detailed examination of wristband compliance was found in transfusion patients. In this patient group, the review found wristband non-compliance in 10% of audited transfusion episodes – i.e., one in ten audited transfusion patients was not wearing a wristband. Large variations were

observed between different hospital departments, with Paediatrics (29%), Special Care Baby Units (26%), Oncology (22%), and ITU (21%) showing the highest non-compliance and Obstetrics and Gynaecology (6%), Orthopaedics (5%), Surgical units (4%), and Cardiac units (3%) showing the lowest non-compliance (National Blood Service and the Royal College of Physicians, 2003).

Similar findings for wristband non-compliance were obtained in a more recent report on transfusion patients (National Blood Service and the Royal College of Physicians, 2005). In this report, wristband non-compliance was observed in 6% of all audited transfusions. Moreover, in 9% of audited episodes not all required information was present on the wristband, whereas in 78% of audited patients the wristbands were fully compliant with the British Committee for Standards in Haematology (which requires the first and last name of the patient, their date of birth, gender and patient identification number).

In the US, a study included in Syed's (2005) review found that about 72% of all wristband-related errors were instances in which a patient was not wearing a wristband (Howanitz et al., 2002). Other errors included patient wearing other patients' wristbands (1%), multiple conflicting wristbands (4%), and missing, incorrect, or illegible information on the wristband (24%; Howanitz et al., 2002).

A second review prepared in collaboration with the NPSA was broader in scope, focusing on patient misidentification – including wristband-related identification errors (Edozien, 2005). This review highlighted surgery as a specialty in which patient misidentification has potentially catastrophic consequences – including operating on the wrong patient, or performing the wrong procedure, or performing on the wrong body part (e.g., right vs. left knee replacement operation). Among other findings, the review highlighted a number of contributing factors to identification errors related to the process of creating and issuing wristbands to patients. These errors include:

- Clerical / administrative errors:
  - transposing digits in hospital numbers
  - use of the wrong addressograph
  - incorrect, illegible, or incomplete documentation
- Failure of verification:
  - inadequate or non-existent verification protocols
  - non-compliance with verification procedures
- Communication difficulties:
  - due to patient's illness, mental state, unconsciousness or language

Taken together, these reviews suggest that patient misidentification does occur, that wristband-related errors contribute to it, and, finally, that the consequences of such errors are potentially devastating (especially in surgical specialties).

## 5.2. Other published evidence/literature

The subsequent search carried out identified very few papers in which the question of wristband specification was addressed directly.

One issue addressed was colour-coding of wristbands. A study reporting on the use of colour-coding (jointly with other interventions) in patients undergoing rehabilitation, where red wristbands were used to indicate patients at risk of falls, showed no clear contribution to a reduction in falls (Vassallo et al., 2004).

In another study, researchers investigated the accuracy of the allergy information provided by patients in a paediatric emergency department and, in addition, the identification of the obtained information via a coloured wristband (Porter et al., 2006). The researchers documented problems in the process of obtaining allergy-related information from patients, as this information was often inaccurate. Importantly, this study also revealed that even accurate allergy-related information did not always trigger the issuing

of a coloured wristband as an indicator. In the 256 parent-child dyads that the researchers observed, they found 28 cases of true allergies according to a guideline-based assessment. Of those 28 cases, only 16 (about 57%) were issued with an allergy wristband. Moreover, the authors report that, according to parental descriptions of the care process, in 10-25% of the cases no further allergy history was solicited or reviewed by the emergency department staff. The authors' conclusion was that triage assessment is inadequate to provide accurate allergy information.

In other published work that has focused on the process of issuing wristbands, researchers have examined bar-coding on wristbands. In one paper, the author reports that a diabetic patient was erroneously given the bar-coded wristband of another patient who was admitted at the same time (McDonald, 2006). The incident was a near miss: due to a mix-up of the two patients' test results, the diabetic patient was later given an almost fatal dose of insulin. This case echoes other research (summarised in Syed's (2005) review) that has documented inaccuracies on transfusion patients' wristbands or missing wristband in such patients.

Although such errors do occur, wristbands are often recommended as means of identifying special patient status (e.g. in Vassallo et al.'s (2004) study, red wristbands were used to identify patients at risk of falls). In a study of patients with anticonvulsant sensitivity who were treated with Phenytoin, Phenobarbital, or Carbamazepine, the authors concluded that such patients should be identified via special bracelets (Brown et al., 1997). Similarly, diabetic patients have been encouraged to wear "some form of medical identification" alerting healthcare staff to the fact that they are diabetic (Resource Guide 2004, Diabetes Forecast).

Little evidence supports the effectiveness of such strategies. In addition, even if one assumes that such strategies are effective in isolation, taken together they are not unlikely to confuse hospital staff via the use of multiple colours to identify multiple conditions.

In addition to the issuing of wristbands, their checking is another potential locus of error. In Porter et al.'s (2006) study, it was found that sometimes the information that is elicited from patients on admission is not reviewed or checked further by hospital staff.

Moreover, even when such checks are done, errors are not eliminated. For instance, Kaplan (2005) suggests that even a two person check at the bedside is ineffective against sampling and testing errors in blood transfusion.

In the light of such incidents, others have designed and piloted specially designed wristbands for transfusion patients (Lau et al., 2000; Lau & Cheng, 2001). The tested prototype wristbands could only be removed by cutting and they contained a transfusion label with a transfusion barcode. In order to make the intervention effective, transfusion labels that were removed from the wristbands had a characteristic tear-mark, so that staff were able to distinguish them from those removed prior to attachment. Importantly, these wristbands were designed with a wider identification programme in mind – that of the Hong Kong government, who introduced electronic identification cards for all citizens.

Some of the problems with wristbands that have been identified by academic research have also been highlighted in non-peer-reviewed papers often published by healthcare or other governmental organisations. Most of these papers come from the US, specifically the State of Pennsylvania. One such paper cites a near miss in a Pennsylvania hospital, in which the patient almost died as a result of staff confusion stemming from a yellow wristband (OR Manager, 2006). As a result of the case, colour-coding was submitted to review in this state. In a 2005 Pennsylvania Patient Safety Authority report, 78% of the healthcare facilities within the state that responded reported using colour-coding (Patient Safety Authority, 2005). Colours were used inconsistently across hospitals. For example, depending on the hospital a red wristband could indicate "do not resuscitate" status, fall risk, a restricted extremity, allergy (excluding latex), or blood type/blood bank ID. The same was found to be the case with other colours commonly used on wristbands, such as purple, blue, green, pink, and orange. These findings led to the formation of a Colour of Safety Task Force, which recommended the following standardisation in colour-coding across all Pennsylvania hospitals (Patient Safety Authority, 2006; The Color of Safety, 2006):

- Red: allergy
- Yellow: fall risk
- Green: latex allergy
- Blue: Do Not Resuscitate
- Pink: restricted extremity

Similar findings regarding the multiple, and often conflicting, use of colour-coding on wristbands were obtained in the state of Arizona by the Arizona Hospital Patient Safety Officer Workgroup (AHPSWG). The AHPSWG recently reported that they are in the process of standardising colour-coded wristbands across the state (AHPSWH, 2006).

In summary, the review of the available literature suggests that there is very little empirical evidence regarding optimal wristband specifications. Individual institutions, in the US and in the UK, are still opting for multiple different types of wristbands, including, importantly, different colour schemes to flag different patient conditions. Yet other institutions do not tackle the issue at all in their patient identification policy documents. In the light of such variability in practice, it is perhaps not surprising that, at governmental level, there have been some initial steps towards standardisation of wristbands specifications.

### 5.3. Survey of NHS Trusts

This section summarises the results of the survey of NHS Trusts. 166 questionnaire responses were received from 62 Trusts. In 8 questionnaires the Trust could not be identified due to missing or illegible information, reducing the total number of identifiable Trusts to 54.

All respondents' data were used to analyse the usefulness of the different patient identifiers, the process of issuing, checking, and applying wristbands, and the relevant problems. However the analysis of colour-coding usage was limited to the data from the 54 identifiable Trusts. (The questionnaire that was posted to the Trusts is attached; see Appendix 1.)

#### Survey Section I: Patient identifiers used on wristbands in responding Trust

Respondents were first asked what information is currently used in their Trust to identify patients. They were instructed to tick the relevant identifiers from a list and also to rate how useful each identifier is using a five-point response scale, anchored at 1 = not at all and 5 = very much.

Responses are summarised in the table below.

	Number of respondents using	Rated usefulness	
		Mean	SD
	<i>Absolute N</i>		
<b>First name</b>	146	4.55	0.92
<b>Last name</b>	146	4.82	0.55
<b>Hospital number</b>	146	4.78	0.58
<b>DOB</b>	143	4.71	0.67
<b>Ward</b>	96	3.67	1.39
<b>Consultant</b>	52	2.75	1.36
<b>Sex</b>	48	2.72	1.61
<b>NHS number*</b>	61	n/a	n/a

\*Break down of responses in relation to NHS No: 61 "yes", 96 "no", 3 "don't know", 3 "sometimes"

Other identifiers mentioned: address, bar coding, religion

**Most common problems in obtaining identifiers** (categories are not exclusive)

- confused, unconscious, disabled, or incapacitated patients without relative/carer: 75
- wristband-related (availability/accuracy of info, related to the specifications of the wristband, or related to the process of issuing a wristband): 25
- language problems: 12

**Survey Section II: Processes for issuing, checking & applying wristbands**

*Are wristbands readily available?* **157 “yes”** (2 “no”; 5 “don’t know”)

*When are wristbands issued to patients in the process of care?* **153 “on admission”**

In some responses, we found additional information, such as:

- on patient transfer
- at birth
- in outpatients department
- prior to invasive treatment
- in the ward

*Who issues wristbands?*

- Nurse/midwife = 70
- Trained or untrained nursing staff or other untrained staff = 78
- Other / Unclear = 17

*Who checks information on wristbands initially?*

- Nurse/midwife or other qualified staff = 85
- Trained or untrained nursing staff or other untrained staff = 38
- No one = 5
- Don’t know = 13
- Other / Unclear = 19

Double-checking of wristband information was mentioned by 4 respondents.

*Who applies wristbands?*

- Nurse/midwife = 100
- Trained or untrained nursing staff or other untrained staff = 57
- Untrained staff = 1
- Admission staff = 2
- Don’t know = 5

*Do you use of multiple wristbands?* **117 “yes”**, 44 “no”, 3 “don’t know”

*If you do use multiple wristbands, do you apply them onto the same limb?* Of the 117 positive responses above:

**75 “yes”**

30 “no”

7 “don’t know”

1 “sometimes”

4 no response

**Most common problems in using, checking and applying wristbands onto patients** (categories are not exclusive)

- information-related (inaccurate, unavailable, illegible etc): 30
- patient-related (confused, uncomfortable etc): 29
- wristbands not issued in the first instance, subsequently removed by staff and not replaced: 17
- time pressure, staffing, unclear responsibility: 12

### Survey Section III: Wristband Design

Are there different types/designs of wristbands (excluding colour)? **48 “yes”**, 96 “no”, 6 “don’t know”

Different types mentioned include:

- Adult, children, or baby bands
- Card/paper-insert or write-on
- Studded closure or self-adhesive
- Hand-written or type-written/computer-generated

*Is colour-coding used?*

Of the 54 identifiable Trusts, 16 had only one respondent, whereas 38 had multiple respondents (2 or more).

- From the 16 single-response Trusts, 15 used colour coding and 1 did not.
- From the 38 multiple-response Trusts, 29 gave consistent responses (either all “yes” or all “no”) and 9 gave mixed responses (a mixture of “yes”, “no”, and “I don’t know”).
  - From the 29 consistent Trusts, 27 use colour coding and 2 do not.
  - In the 9 inconsistent Trusts, 7 responded “yes” and “no”, 1 “yes” and “don’t know”, and from 1 we received all three responses.

*Further analysis of inconsistent Trusts’ responses*

- The inconsistent Trusts provided between two and 17 responses each.
- In four Trusts, most respondents reported using colour-coding (“yes”：“no” responses: 3:1, 2:1, 5:2; 2:1).
- In two Trusts most respondents reported not using colour-coding (“yes”：“no” responses: 2:3, 4:13).
- In two Trusts, equal numbers of respondents reported using and not using colour-coding (“yes”：“no” responses: 1:1, 2:2).
- In the two Trusts where “don’t know” responses were obtained, most respondents reported using colour coding (“yes”：“no”：“don’t know” responses: 2:1:1, 2:0:1).

*What colours are used and what for?*

Respondents reported using red (N = 123), green (N = 45), blue (N = 26), yellow (N = 24), pink (N = 9), orange (N = 4), opaque (N = 1), and blue and white (N = 1).

In what follows, a summary is presented of what patient status is associated with what colour(s). The summary is based on all the responses received (i.e., it is not “by Trust”, as the analysis above).

#### **RED**

Allergy: 105

Alert: 5

Allergy/alert: 4

Allergy/hypersensitivity: 1

Allergy/no blood products: 1

Blood transfusion: 2

Blood cross-match: 1

Language ID: 2

Diabetic: 1

Group and save: 1

**GREEN**

All patients' ID: 32

Risk of falls: 9

Implanted defibrillator: 1

Confused patient: 1

Breast care: 1

Mastectomy limb: 1

**BLUE**

Baby boys: 8

Babies: 1

Boys: 1

All patients' ID: 5

Jehovah witnesses: 4

Neck breather: 2

Blood transfusion risk: 2

Risk of falls: 1

Language ID: 1

**YELLOW**

Risk of falls: 13

Radioactive patient: 5

Lymphoedema: 3

Confused patient: 1

Mobility: 1

Thrombolysis: 1

**PINK**

Baby girls: 8

Girls: 1

**ORANGE**

Risk assessment: 2

Risk of falls: 2

**OPAQUE**

Paediatrics (tagging): 1

**BLUE & WHITE**

Bone donor: 1

*Summary of confusing/overlapping indications above*

- All patients' ID (in addition to white/clear): green, blue
- Risk of falls: yellow, green, orange, blue
- Language ID: red, blue
- Confused patient: green, yellow
- Blood transfusion/blood transfusion risk/no blood products: red, blue
- No blood products/Jehovah's witness: red, blue

*Which type of wristband do you prefer and why? (categories are not exclusive)*

- Colour-coded bands: 66
- White/clear bands: 27
- Some sort of standardisation is desirable: 11
- No preference/all work equally well: 9

*What are the most common problems in the design of wristbands that you have used? (categories are not exclusive)*

- They are not waterproof: 63
- Problems with the materials/design of the bands: 26
- Problems with the size of the bands: 20
- Inaccurate/unavailable information on the bands: 7

## **Survey Section IV: Patient reactions to wristbands**

*Have you ever witnessed a patient refusing to wear a wristband? 39 “yes”, 126 “no”*

*Why would a patient refuse to wear a wristband?*

- Patient confused, oedematous, or “difficult”: 24
- Younger patients do not like them: 7
- Discomfort: 8

*Have you ever witnessed a patient complaining about their wristband? 67 “yes”, 96 “no”*

*Why would a patient complain about a wristband?*

- Discomfort: 55
- Inaccurate information on wristband: 5
- Confused patients: 4
- Younger patient do not like them: 3

## **5.4. NPSA-facilitated workshops**

This section summarises the results from the workshops, starting from the five staff workshops (5.4.1) and then summarising the single patient workshop (5.4.2).

As mentioned above, the survey questionnaire was used as the workshop protocol. Workshop participants received the questionnaire in the beginning of the workshop. They then discussed the questions in the order that they appeared in the questionnaire with the facilitation of a number of project team members. Team members made notes of participants’ responses and probed participants to explain and/or elaborate on specific issues. An additional staff member of the NPSA was present as a note-taker and also to provide transcripts of the workshops.

Using the survey questionnaire in the workshops as a “platform” for the discussion enables the comparison of the responses to the NHS Trust survey with these from the workshops. Since the workshop protocol replicates the structure and content of the survey, the structure of this section follows closely the structure of section 5.3 above.

### **5.4.1. Staff workshops (N = 5)**

#### **Staff workshops, Section I: Patient identifiers**

*Essential identifiers:* First name, Last name, Date of Birth, and Hospital Number.

*Ward:* identified as a potential essential identifier by some of the staff within the workshops as particularly useful for ‘wandering patients’.

*Time of birth:* thought an essential identifier for newborns especially when no hospital number yet available or when a multiple birth.

*NHS Number* used on wristband in some areas identified by staff in two workshops – but not used on wristbands in the other three. (Since participants came from different Trusts, this indicates that the use of the NHS number is not nationally consistent.)

*Most common problems* cited in obtaining accurate, sufficient and necessary identifiers from patients:

- Language barrier
- Verbal communication problems caused by for example: hearing difficulties, confusion, unconscious patient, sedated patient
- Carer/relative speaking for incapacitated patient knows insufficient detail

## **Staff workshops, Section II: Processes for issuing, checking & applying wristbands**

*Are wristbands readily available?*

Most staff agreed that wristbands were readily available.

*When are wristbands issued to patients in the process of care?*

Consensus was that wristbands are commonly issued on admission/during initial assessment. Identified by the groups that issue of the wristband at admission would be delayed by the need for other more time critical interventions, e.g., resuscitation measures.

*Issuing, checking, and applying wristbands.*

Usually nursing staff – qualified or unqualified – but also clerical staff and other types of staff can be involved (e.g., radiographers, anaesthetists, operating department practitioners).

*Use of multiple wristbands and application onto the same limb?*

There appears to be widespread use of multiple wristbands (although not all Trusts use multiple wristbands). Where multiple wristband use was identified, there appeared to be variation in practice across Trusts as to whether these were applied onto the same limb or not.

*Most common problems in using, checking and applying wristbands onto patients.*

- Illegibility – writing too small, worn away or just illegible
- Wristband being taken off/or falling off and not being replaced

## **Staff workshops, Section III: Wristband Design**

*Types of wristbands available (excluding colour)*

Various designs:

- Wristbands with card inserts
- 'Write on' wristbands
- Wristbands able to accommodate addressograph label
- Wristbands with pre-printed prompts for main identifiers – these were particularly liked within one of the workshops, where it was felt that this had led to standardisation of what information was written on the wristbands across the Trust. In another workshop, pre-printed prompts on wristbands were also identified as useful.
- Soft plastic
- Studded closure

*Use of colour-coding.*

A couple of the workshops highlighted that there were areas/Trusts where coloured wristbands are not used. Where coloured wristbands are in use, the following colour-coding applies:

*Red:* seemed most commonly used and was used to denote allergy or alert. However, it did have other uses (e.g., surgical patient, renal patients with 'fistula').

*Green:* in two of the Trusts, this colour was most commonly used as the general identity band for all patients. For the others it denoted 'risk of falling' or 'wandering patients'.

*Blue:* one workshop identified that blue was used for patients that declined blood products.

*Which type of wristband do you prefer and why?*

- Those Trusts/areas that used coloured wristbands appeared to support their use, although there was comment that consistency across the NHS is needed. The majority of red band users utilised them as an extra prompt re: allergy/alert.
- There were various comments about type of design liked. Some staff noted that it was better if the procedure for issue was as simple and as quick as possible and for this reason liked bands they could stick an addressograph on.
- Other staff liked wristbands with pre-printed prompts that encouraged staff to complete the essential identifiers.
- Several staff identified that they liked 'write on' wristbands - one reason being that details could be cross checked with patients/parents when being written on. For these wristbands, it was important that the writing was clear.
- All groups were in agreement that the wristband used needed to be soft, comfortable, and easy to fasten and adjust to correct length. One suggestion by a critical care nurse was that elasticated wristbands might be good to prevent unnecessary removal for IV cannulas.

*What are the most common problems in the design of wristbands that you have used?*

- Problem with size – i.e., not long enough for larger patients, too loose or too tight, difficulty in adjusting to correct size
- Skin trauma/irritation (from wristbands that were applied too tightly or became too tight or because material is not soft/comfortable enough).
- Lack of space for completing all details
- Legibility issues – quality of handwriting, 'wear and tear' that caused identifiers to fade, be smudged, be washed off, or, in the case of card inserts, to be dislodged.
- Removal issues – too easily fall off or taken off and not replaced. Query from a few of the groups was whether wristbands can be made easier to unfasten and refasten.

## **Staff workshops, Section IV: Patient reactions to wristbands**

*Why would a patient refuse to wear a wristband?*

- Refusal by aggressive and/or confused patients.
- Comfort issues (generally uncomfortable, too sharp, irritating, allergy provoking)
- Children sometimes refuse to wear them either through fear or in the case of teenagers as a potentially rebellious act.

*Why would a patient complain about a wristband?*

- Wristband being too tight or too loose.
- Wristband itchy, irritating got in the way when washing, got caught on clothing and infusion lines.
- Confused patients were often noted to complain if didn't appreciate what it was and/or the wristband's importance.
- Some (young) patients felt they were unnecessary particularly when could verbally provide the detail required.

### **5.4.2. Patient workshop (N = 1)**

#### **Patient workshop, Section I: Patient identifiers**

*Essential identifiers:* First name, Last name, Date of Birth.

- Some patients mentioned hospital number; 6 knew theirs, whereas 7 did not
- One or two mentioned NHS number, NI number, sex, blood group, other medical conditions, non-English speaker

*Information that should **not** be written on wristband:*

- Contact details / home address
- Telephone number
- Email address
- Marital status
- Sexuality
- Ethnicity
- Financial details

Inclusion of religion was debated at length.

*Most common problems cited in providing identifiers:*

- Being distracted
- Being too unwell
- Lack of knowledge (e.g., of hospital number)

It was suggested that staff have check-list to ensure all necessary info has been elicited from patients.

**Patient workshop, Section II: Processes for issuing, checking & applying wristbands***When are wristbands issued?*

Mostly on admission, on admission to A&E, on reception for day surgery.

Some participants were not issued a wristband; one mentioned the reason was that she was “well-known in the hospital”.

*Issuing, checking, and applying wristbands.*

Nursing staff

*Subsequent checks of wristbands?*

Patients mentioned that, during their hospitalisation, their wristbands were checked:

- Before being administered medication
- Twice on the way to operating theatre
- Before blood was taken/X-ray
- BP and temperature check
- On change over staff and in transfer between wards
- On discharge

**Patient workshop, Section III: Wristband Design***Use of colour-coding*

Most patients had experienced white wristbands. A few had been given red wristbands as well. Patients thought white was a “good” colour for a wristband. Moreover, they thought that multiple wristbands are likely to confuse staff. Furthermore, they suggested that red could be used in circumstances requiring attention and that it should direct the staff to check the patient notes.

*Allergy identification*

Nine of the 15 participants reported having a known allergy.

- One delegates the son to mention the allergy to hospital staff/doctors
- Two said it was indicated in wristband and one had a special wristband
- Two said it was written in their notes
- Two said they communicated it orally to staff

In addition, one patient mentioned that she had an unknown allergy to anaesthetics, which went undocumented for years.

## **Patient workshops, Section IV: Patient reactions to wristbands**

*Why would a patient refuse to wear a wristband?*

- Problems related to the comfort of the wristband

Moreover, it was mentioned that the information sometimes washes off the wristband and that occasionally, patients had trouble removing the wristbands when they were at home.

*Which type of wristband do you prefer and why?*

Attributes that were mentioned:

- Comfortable
- Not fiddly
- Waterproof
- Tamperproof
- Easy to apply/clean
- Wristwatch design
- Concertina or collapsible section to hold patient info

Moreover, it was suggested that perhaps patient's name could be in larger print than any other piece of information and that a digital photo printed on the band could be useful. Finally, if barcodes are to be used, patients stressed that they would need to know exactly what information is contained in the barcode.

*What are the most common problems in the design of wristbands that you have used?*

Attributes that were mentioned:

- Difficult to read
- Unknown information contained by barcode

## 6. Conclusions & Recommendations

- Patient misidentification contributes to errors and is a cause of patient safety incidents with potentially grave consequences for patients.
- In acute hospitals, wristbands are the main means of identifying patients. In such settings, errors in patient identification are associated with missing or incorrect information on wristbands and with missing or incorrect wristbands.
- There is considerable variation in the information that is being recorded on wristbands. Similar variation exists in the colour-coding schemes used on wristbands to signal risk or other patient conditions.
- The effectiveness of colour-coding is not supported by evidence.
- Empirical evidence collected in a survey and in workshops with healthcare professionals and patients that the NPSA conducted confirms the existence of variation in the design, colour-coding, and recorded information on wristbands in UK NHS Trusts.
- Surprisingly, in addition to the anticipated between-Trust variation, within-Trust variation in the use of colour-coded wristbands was also found (i.e., different departments within the same Trusts use wristbands of different colours).
- The patient's first and last name, their date of birth and their local hospital number are the identifiers most commonly used. The NHS number is used by about a third of the respondents.
- The processes of issuing wristbands, checking the information on them, and applying them onto patients' limbs are mainly the responsibility of qualified nursing staff. However, untrained staff is often involved in these processes.
- Healthcare staff and patients agreed that some sort of standardisation in the design/specifications (including colour-coding) of wristbands would be useful.

## 7. REFERENCES

- Arizona Hospital Patient Safety Officer Workgroup (2006). *Initiative # 2 – Color coded wristbands*.
- Brown, C. E., Smith, G. D., & Coniglione, T. (1997). Anticonvulsant hypersensitivity: An unfortunate case of triple exposure to phenytoin. *Journal of Family Practice*, 45, 434-437.
- Edozien, L. (2005). *Patient identification. Correct patient, correct sire, correct procedure*. Saferhealthcare. BMJ Publishing Group and NPSA.
- Howanitz, P. J., Renner, S. W., and Walsh, M. K. (2002). Continuous wristband monitoring over 2 years reduces identification errors. A College of American Pathologists Q-Tracks study. *Archives of Pathology and Laboratory Medicine*, 126, 809-815.
- Kaplan, H. S. (2005). Getting the right blood to the right patient: the contribution of near-miss event reporting and barrier analysis. *Transfusion Clinique et Biologique*, 12, 380-384.
- Lau, F. Y., and Cheng, G. (2001). To err is human nature. Can transfusion errors due to human factors ever be eliminated? *Clinica Chimica Acta*, 313, 59-67.
- Lau, F. Y., Wong, R., Chui, C. H., Ng, E., and Cheng, G. (2000). Improvement in transfusion safety using a specially designed transfusion wristband. *Transfusion Medicine*, 10, 121-124.
- McDonald, C. J. (2006). Computerization can create safety hazards: A bar-coding near miss. *Annals of Internal Medicine*, 144, 510-516.
- National Blood Service and the Royal College of Physicians (2003). *Comparative report for blood transfusion in England*.
- National Blood Service and the Royal College of Physicians (2005). *Comparative report for blood transfusion in England*.
- OR Manager (2006). Color-coded wristbands create unnecessary risk. 22(2),13.
- Patient Safety Authority (2005). Use of color-coded wristbands creates unnecessary risk. *Patient Safety Advisory*, 2, Sup. 2.
- Patient Safety Authority (2006). Update on use of color-coded patient wristbands. *Patient Safety Advisory*, 3, Sup. 1.
- Porter, S. C., Manzi, S. F., Volpe, D., and Stack, A. M. (2006). Getting the data right: information accuracy in pediatric emergency medicine. *Quality and Safety in Health Care*, 15, 296-301.
- Resource Guide 2004. Medical identification products (2004). *Diabetes Forecast*, 57, RG74-77.
- Syed, I. (2005). *Delivering safer patient identification: Wristband compliance literature review*. NPSA.
- The Color of Safety (2006). *Patient safety: Color banding. Standardization and implementation manual*.
- Vassallo, M., Vignaraja, R., Sharma, J. C., Hallam, H., Binns, K., Briggs, R., Ross, I., and Allen S. (2004). The effect of changing practice on fall prevention in a rehabilitative hospital: The Hospital Injury Prevention study. *Journal of the American Geriatric Society*, 52, 335-339.

## Appendix A

### Questionnaire used in Trust survey and workshops

#### SECTION I: PATIENT IDENTIFIERS USED ON WRISTBANDS IN YOUR TRUST

**Q.1** What information is currently used on wristbands in your Trust to identify patients? Please select the information you use from the list below. You can also list additional identifiers, if necessary.

For each piece of information, rate how much it helps you identify your patients on the 5-point scale provided (1=not at all to 5=very much).

INFORMATION (circle your answer)	Does this information help you identify your patients?				
	1	2	3	4	5
1. First name: NO YES	1	2	3	4	5
2. Last name: NO YES	1	2	3	4	5
3. Hospital number: NO YES	1	2	3	4	5
4. Date of birth: NO YES	1	2	3	4	5
5. Ward: NO YES	1	2	3	4	5
6. Consultant: NO YES	1	2	3	4	5
7. Sex: NO YES	1	2	3	4	5
Other (specify): NO YES	1	2	3	4	5
Other (specify): NO YES	1	2	3	4	5
Other (specify): NO YES	1	2	3	4	5
Other (specify): NO YES	1	2	3	4	5

**Q.2** In your Trust, is the patient's NHS number used as a patient identifier on the wristband?(circle one) NO YES  
Don't know

**Q.3** What are the most common problems in obtaining accurate, sufficient and necessary identifiers from patients?  
(list problems)

**SECTION II: PROCESS OF ISSUING, CHECKING, & APPLYING WRISTBANDS IN YOUR TRUST**

<b>Q.4</b>	Are wristbands readily available? (circle one)	NO	YES	Don't know
<b>Q.5</b>	When are wristbands issued to patients in the process of care?			
<b>Q.6</b>	Who creates the wristbands?	Please list job title(s)		
<b>Q.7</b>	Who checks the accuracy of the information that is provided on the patients' wristbands?	Please list job title(s)		
<b>Q.8</b>	Who applies the wristbands onto the patients?	Please list job title(s)		
<b>Q.9a</b>	Are multiple wristbands ever applied onto the same patient? (circle one)	NO go to Q.10	YES go to Q.9b	Don't know go to Q.10
<b>Q.9b</b>	Are wristbands ever applied onto the same limb? (circle one)	NO	YES	Don't know

**Q.10** What are the most common problems in issuing, checking, and applying wristbands onto patients?

(list problems)

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**SECTION III: WRISTBAND DESIGN IN YOUR TRUST**

<b>Q.11a</b>	Are there wristbands of different types/designs used (excluding colour)? (circle one)	NO go to Q.12a	YES go to Q.11b	Don't know go to Q.12a
<b>Q.11b</b>	What designs/types are available?	(list types/designs – NOT product names)		
<b>Q.12a</b>	Are wristbands of different colours available? (circle one)	NO go to Q.13	YES go to Q.12b	Don't know go to Q.13

		Colour	Used for...
<b>Q.12b</b>	What are the different colours used for?	Red	
		Green	
		Yellow	
		Other ( <i>specify</i> ):	
		Other ( <i>specify</i> ):	
<b>Q.13</b>	Which type/colour of wristband do you think works best? Why?	<i>Type/Colour ...</i>	<i>Because...</i>
<b>Q.14</b>	What are the most common problems in the design of wristbands that you have used?	<i>(list problems)</i>	

#### SECTION IV: PATIENT REACTIONS TO WRISTBANDS IN YOUR TRUST

**Q.15** Have you ever witnessed a patient refusing to wear a wristband? (*circle one*) NO YES

If yes, what were the patient's reasons for refusing:

**Q.16** Have you ever witnessed a patient complaining about or having problems with his/her wristband? (*circle one*) NO YES

If yes, what were the patient's reasons for complaining: