PA PSRS
Pennsylvania Patient Safety Reporting System

Patient Safety Advisory

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SUPPLEMENTARY ADVISORY

Use of Color-Coded Patient Wristbands Creates Unnecessary Risk

A hospital in Pennsylvania submitted a report to the Pennsylvania Patient Safety Reporting System (PA-PSRS) describing an event in which clinicians nearly failed to rescue a patient who had a cardiopulmonary arrest because the patient had been incorrectly designated as "DNR" (do not resuscitate). The source of the confusion was that a nurse had incorrectly placed a yellow wristband on the patient. In this hospital, the color yellow signified that the patient should not be resuscitated. In a nearby hospital, in which this nurse also worked, yellow signified "restricted extremity," meaning that this arm is not to be used for drawing blood or obtaining IV access.

Fortunately, in this case, another clinician identified the mistake, and the patient was resuscitated. However, this "near miss" highlights a potential source of error and an opportunity to improve patient safety by re-evaluating the use of color-coded wristbands.

To assess the potential scope of the problem, PA-PSRS surveyed the Patient Safety Officers of all Pennsylvania hospitals and ambulatory surgical facilities (ASFs). The 139 survey respondents represented one-third of these healthcare facilities.

Color-coded wristbands are widely used in Pennsylvania healthcare facilities. Nearly four out of five (78%) survey respondents' facilities use patient wristbands to communicate clinical information other than the patient's identity. Of those that do, nearly all (98%) report that color is significant (i.e., used to communicate the meaning) on some or all wristbands. While color-coded wristband use appears more prevalent among hospitals, with nearly 87% reporting that they use them, wristband color-coding is also common among ASFs (67%). Some facilities report using as many as five color-coded wristbands, in addition to the patient identification (ID) band.

There is wide variation among facilities on the types of clinical information they communicate via color-coded wristbands. Among those that use this method of communication, there is little consistency in the colors used to communicate specific clinical information (see Table 1).

The potential for confusion is obvious and significant. About one in seven survey respondents use wristbands to communicate a patient's DNR status. Of those, over half use the color blue to indicate patients designated as DNR. In other facilities the same message is communicated using purple, yellow, pink, red, and other colors.

While DNR status may be most commonly associated with the color blue, other facilities use this same color to signify that a patient:

- Is prone to fall.
- Has a pacemaker.
- Is an elopement risk (i.e., may wander off).
- Has a latex or tape allergy.
- Is on anticoagulants (blood thinners).
- Has diabetes.
- Has a name similar to another patient's.
- Should not have blood drawn from this arm.
- Is an outpatient.

Highlights

1. In a recent survey, about four out of five PA facilities responding use color-coded patient wristbands to communicate important medical information.
2. There are no standard meanings among healthcare facilities for different colors. This problem can be resolved by coordination among PA healthcare facilities.
3. Limiting the number and colors of wristbands may help to avoid confusion for the many healthcare providers working in multiple facilities.
4. Printed instructions on wristbands can help to reinforce the message conveyed by a particular color.

Another example of the potential for error found in the survey was that one facility uses a pink wristband to communicate patients' blood types, while another facility uses the same color to identify patients who should not receive blood products.

Table 1 shows the wide variety of medical "messages" and colors used to communicate them. Table 2 describes the more common wristband uses.

Compounding the potential for confusion from the lack of standardization across facilities is that many wristbands do not contain text that would provide an additional cue to their meaning. Of the 108 respondents that use these types of wristbands, only 48% use text on all such wristbands in use in their facility.

We asked all respondents whether their facilities require patients to remove colored wristbands they may have been wearing outside the healthcare facility, such as the yellow "Live Strong" wristbands associated with the cyclist Lance Armstrong. Only one-third of the respondents answered affirmatively, and 14% said sometimes. Over half (53%) said no or said that they did not know.

Other Common Wristband Errors. The errors that commonly occur with patient ID bands can also occur with color-coded wristbands used to convey medical information.

Wristbands may be omitted when they should be put on, or they may be removed or covered up by clinicians or patients. PA-PSRS has received a number of reports in which patient allergy bands were not applied. In another report, a patient was mistakenly resuscitated because a DNR wristband had not been applied as ordered by the physician.

Clinicians may not notice a wristband and may therefore provide treatment inconsistent with the patient's condition or preferences. For example, many reports to PA-PSRS describe patients having blood drawn from a restricted extremity or receiving an intervention to which they have a docu-

Table 1. Variety of Medical "Messages" and Colors Used on Patient Wristbands in Pennsylvania Facilities

Message \ Colors	Purple	Blue	Teal	Green	Red	Pink	Orange	Yellow	White
DNR	■	■			■	■		■	
Limited DNR			■						
Fall Risk	■	■		■	■	■	■	■	
Restricted Extremity	■	■		■	■	■	■	■	
Allergy (other than latex)	■	■		■	■	■	■	■	
Allergy to Latex	■	■		■					
Tape Allergy		■							
Procedure Site	■							■	
Blood Type/Blood Bank ID				■	■	■			
No Blood Products						■			
Outpatient or ER Patient		■		■		■	■	■	
Pediatrics/Mother-Child Match								■	
Parent/guardian		■							
Similar Name		■							
Observation							■		
Isolation				■				■	
Elopement		■							
Pacemaker		■							
Anticoagulants		■							
Nothing by Mouth (NPO)								■	
Dietary Restrictions	■								
Diabetics		■							

mented allergy, despite having color-coded wristbands applied.

Wristbands are sometimes removed during medical procedures, such as surgery or when starting an IV. Facilities have submitted many reports to PA-PSRS about ID bands or other wristbands being temporarily removed and not reapplied. Forgetting to reapply a wristband can be avoided by instituting a practice of removing a wristband from one extremity only after a duplicate one has been placed on another extremity.

Wristbands are sometimes applied in error. For example, PA-PSRS received a report in which a color-coded wristband was applied to indicate that a patient had been cleared for a surgical procedure and that all necessary documentation was in place. During a pre-surgery "time out," in which critical information is reconfirmed before proceeding, the clinical team discovered the patient had not consented for anesthesia. What kept this "near miss" from becoming an adverse event was that the surgical team did not rely on a single piece of evidence (the wristband) for confirmation. When faced with contradictory information (lack of documentation that consent was obtained), they delayed the procedure to resolve the discrepancy.

What Can Healthcare Facilities Do? The following guidance will help facilities avoid unanticipated adverse events, if they choose to use color-coded wristbands:

- Limit the number of different colors in use on patient wristbands.
- Standardize the meanings of specific colors among healthcare facilities.
- Use only primary and secondary colors. Avoiding use of shades of the same color to convey different messages can help reduce potential confusion.
- Use brief, pre-printed descriptive text on wristbands to provide clarification to clinicians. This can minimize misperception of colors in dimly lit patient rooms and alleviate confusion for color-blind caregivers. Text may also help reinforce the color-coding system for new clinicians.
- Emboss or pre-print text rather than using handwriting. Handwriting on wristbands should only be done in an emergency. Writing on wristbands, as is often done with allergy bracelets, is best avoided. [Remember: an allergy wristband is not intended to be a sole source of information, but is a warning to the clinician to confirm the allergy status with the patient or to review the allergy history on the patient's chart.]
- If your facility uses wristbands for pediatric patients that relate to the Broselow color-coding system for pediatric resuscitation carts, consider the potential for confusion between the Broselow bands (which are most likely to be used in the Emergency Department, Pediatrics, and Neonatal Intensive Care) and other colored wristbands your facility uses.
- Explain to patients and/or their families the purpose of all wristbands as they are put on. This provides an opportunity for them

Table 2. Medical Information Commonly Communicated with Wristbands

Clinical Topic	Number (%) of Facilities Using*	Dominant Color (% of Facilities Using)†	Number (%) of Facilities Using Text/Symbols on Colored Wristbands†
Allergies	82 (76%)	Red (78%)	48 (56%)
Fall Risk	45 (42%)	Green (31%)	8 (23%)
Restricted Extremity	34 (32%)	Purple (27%)	8 (24%)
DNR Status	21 (19%)	Blue (52%)	4 (19%)
Blood Type/Blood Bank ID	13 (12%)	Red (92%)	9 (69%)

*Percentages are based the 108 facilities indicating that they do use color-coded wristbands.
†Percentages are based on the number of facilities indicating that they use a color-coded wristband for this clinical topic.

to identify errors. This also reinforces a facility's commitment to promoting a culture of safety by encouraging patients and their families to participate in efforts to prevent errors.

- Consider removing colored wristbands that patients may be wearing when they present to the facility. Explain the hazards to patients who refuse, and cover the wristband with a bandage or medical tape.
- Consider instructing staff to periodically reconfirm with the patient or family the meaning of wristbands that have been applied and to correct errors immediately. For example, reconfirmation might be done before invasive procedures, at transfer, and during changes in level of care.
- Consider making wristband verification part of the nursing assessment during shift changes.
- Make it clear in policies and procedures who has responsibility and authority to place wristbands on patients and that all staff have a role in making sure any errors or omissions are quickly corrected.

While human error can never be eliminated, these steps can help to reduce the potential for the system *itself* to contribute to errors. Short of eliminating the use of color-coded wristbands or standardizing the meaning of specific colors, facilities should implement procedures to ensure that the messages conveyed through color-coded wristbands are correctly interpreted.

PATIENT SAFETY AUTHORITY

An Independent Agency of the Commonwealth of Pennsylvania

The Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error ("Mcare") Act. Consistent with Act 13, ECRI, as contractor for the PA-PSRS program, is issuing this newsletter to advise medical facilities of immediate changes that can be instituted to reduce serious events and incidents. For more information about the PA-PSRS program or the Patient Safety Authority, see the Authority's website at www.psa.state.pa.us.

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