

Scrub Colors and Safety: Rethinking Role Identification in Critical Events



Keywords: clinical roles, emergency response, staff identification, code team, patient safety

¹Patient Safety Authority

Disclosure: The author declares that they have no relevant or material financial interests.

Submitted

June 2, 2026

Accepted

June 4, 2026

Published

July 1, 2026

License 

This article is published under the [Creative Commons Attribution-NonCommercial 4.0 \(CC BY-NC\)](https://creativecommons.org/licenses/by-nc/4.0/) license.

Sanchez CE. Scrub Colors and Safety: Rethinking Role Identification in Critical Events. *Patient Safety*. 2026;8(2):163776. doi:10.33940/001c.163776

By Christine E. Sanchez, MPH¹

Color-coding and color differentiation have been used in healthcare to facilitate the identification of healthcare personnel¹⁻³ and support patient safety.⁴⁻⁷ Color-coding assigns a specific meaning to a given color,^{8,9} such as using red to signal “stop” or assigning scrub colors to specific staff roles. In contrast, color differentiation uses color to signal differences between items or bring attention to something without assigning a fixed meaning,¹⁰ for example, using a colored sticker to bring attention to a warning label.

Although color-coding and color differentiation can support rapid recognition, these strategies have limitations from a human factors perspective.¹¹⁻¹³ Color can be a useful cue; however, relying on color alone is insufficient and can introduce confusion, particularly in environments where lighting, stress, visual overload, or individual differences in color perception affect how colors are interpreted.¹² Because color cues require individuals to notice, process, and correctly interpret each color, they are considered a low-leverage risk mitigation strategy and vulnerable to human error.¹³ These vulnerabilities become evident when color cues fail to support accurate role identification in fast-paced environments, especially when cues must be remembered or transferred across contexts.¹¹

A recent review of events submitted to the Pennsylvania Patient Safety Reporting System (PA-PSRS) included an event report that described a scenario that highlights how different groups of healthcare professionals wearing the same scrub colors can cause confusion and possibly compromise patient safety in an emergent situation. In this example, a group of clinical students were in a patient’s room when the patient deteriorated and a code was called. These students’ scrubs were

the same color that was designated for a specific group of licensed healthcare professionals in this facility. The color overlap made it difficult to determine who had responded to the code and who still needed to be present to attempt resuscitation, creating conditions that could have affected patient safety.

This example illustrates that reliance on scrub color alone to identify key staff during a code or other type of emergency may not be sufficient and can lead to delays in care or treatment. Students can be instructed to wear a unique scrub color^{1,2,4,14,15} or be given a list of colors to avoid; however, facilities can implement other strategies that may have a stronger impact on patient safety. These strategies include:

- Designing staff badges to clearly display the individual's role¹⁶ (e.g., RN, MD, RT) in a large, standard, easy-to-read format, and require badges be worn and legible at all times
- Establishing and assigning predefined roles^{17,18} to staff for codes, traumas, etc.
- Assigning a designated team leader¹⁸⁻²⁰ to verbally assign roles, check in personnel, and manage team structure
- Using callouts and check-backs to strengthen communication²¹⁻²³ and ensure all roles are present

These approaches highlight that effective role identification in emergent situations requires more than color cues; it demands layered, reliable systems that support clear communication and situational awareness. By implementing multiple, complementary strategies, organizations can reduce confusion, enhance teamwork, and promote patient safety.

Notes

Artificial intelligence (Copilot Chat) was used only to improve sentence clarity. No AI was used for generation of original content. The author takes full responsibility for the accuracy and integrity of the newsletter.

References

1. Pearce M, Guidice MD, Kinzey A, et al. Color Coding Nurse Uniforms. *Nurs Manage*. 2014;45(2):14-20. doi:10.1097/01.NUMA.0000442644.93700.58
2. Litak D. Colour Coding Scrubs as a Means of Improving Perioperative Communication. *J Perioper Pract*. 2011;21(5):177-8. doi:10.1177/175045891102100505
3. Hribar CA, Chandran A, Piazza M, et al. Association Between Patient Perception of Surgeons and Color of Scrub Attire. *JAMA Surg*. 2023;158(4):421-3. doi:10.1001/jamasurg.2022.5837; PubMed PMID: 36630142; PubMed Central PMCID: PMC9857704
4. DeBoer S, Seaver M, Broselow J. Color Coding to Reduce Errors. *Am J Nurs*. 2005;105(8):68-71. doi:10.1097/00000446-200508000-00031
5. Kobayashi L, III RMB, Gibbs FJ, et al. Color-Coding and Human Factors Engineering To Improve Patient Safety Characteristics of Paper-Based Emergency Department Clinical Documentation. *HERD*. 2011;4(4):79-88.
6. Shah M. Patient Falls Prevention: Assessing the Use of an Innovative Color-Coded Flag System in an Outpatient Oncology Infusion Center. *Clin J Oncol Nurs*. 2020;24(4):448-50. doi:10.1188/20.CJON.448-450; PubMed Central PMCID: PMC32678370
7. Kelly FE, Frerk C, Bailey CR, et al. Implementing Human Factors in Anaesthesia: Guidance for Clinicians, Departments and Hospitals: Guidelines from the Difficult Airway Society and the Association of Anaesthetists. *Anaesthesia*. 2023;78(4):458-78. doi:10.1111/anae.15941; PubMed PMID: 36630725
8. DeMars SA. *Human Factors Considerations For the Use of Color In Display Systems* (NTIS No. N75-14446; NASA TR-1329). NASA John F. Kennedy Space Center; 1975.
9. Schloss KB. Color Semantics in Human Cognition. *Curr Dir Psychol Sci*. 2023;33(1):58-67. doi:10.1177/09637214231208189
10. Martinovic J, Boyanova A, Andersen SK. Division and Spreading of Attention Across Color. *Cereb Cortex*. 2024;34(6). doi:10.1093/cercor/bhae240; PubMed PMID: 38858841; PubMed Central PMCID: PMC11164655
11. Skulmowski A. When Color Coding Backfires: A Guidance Reversal Effect When Learning with Realistic Visualizations. *Educ Inf Technol (Dordr)*. 2022;27(4):4621-36. doi:10.1007/s10639-021-10796-6; PubMed PMID: 34776749; PubMed Central PMCID: PMC8576459
12. Elliot AJ. Color and Psychological Functioning: A Review of Theoretical and Empirical Work. *Front Psychol*. 2015;6:368. doi:10.3389/fpsyg.2015.00368; PubMed PMID: 25883578; PubMed Central PMCID: PMC4383146
13. Christen M, Brugger P, Fabrikant SI. Susceptibility of Domain Experts to Color Manipulation Indicate A Need for Design Principles in Data Visualization. *PLoS One*. 2021;16(2):e0246479. doi:10.1371/journal.pone.0246479; PubMed PMID: 33539461; PubMed Central PMCID: PMC7861358
14. UPMC. Your Care Team at UPMC in Central Pa. UPMC website. <https://www.upmc.com/campaigns/southcentral-pa/patients-visitors/preparing/stay/team>. Updated April 29, 2026. Accessed May 2026.
15. Trinity Health Mid-Atlantic. Clinical Attire – Direct Care Staff. Nazareth Hospital. <https://www.trinityhealthma.org/sites/default/files/documents/careers/clinical-staff-uniforms-nh.pdf>. Accessed May 2026.
16. Foote MB, Jain N, Rome BN, et al. Association of Perceived Role Misidentification With Use of Role Identity Badges Among Resident Physicians. *JAMA Netw Open*. 2022;5(7):e2224236. doi:10.1001/jamanetworkopen.2022.24236; PubMed PMID: 35900759; PubMed Central PMCID: PMC9335144 Health

17. DeGroot D, Callis A. Role Delineation of the Code Blue Team: A Quasi-Experimental Study During COVID-19. *J Emerg Nurs*. 2023;49(2):287-93. doi:10.1016/j.jen.2022.11.013; PubMed PMID: 36588070; PubMed Central PMCID: PMC9715485
18. Prince CR, Hines EJ, Chyou PH, et al. Finding the Key to a Better Code: Code Team Restructure to Improve Performance and Outcomes. *Clin Med Res*. 2014;12(1-2):47-57. doi:10.3121/cmr.2014.1201; PubMed PMID: 24667218; PubMed Central PMCID: PMC4453307
19. Price JW, Applegarth O, Vu M, Price JR. Code Blue Emergencies: A Team Task Analysis and Educational Initiative. *Can Med Educ J* 2012;3(1):e4-e20. PMID: 26451171; PMCID: PMC4563641
20. Shah P, Havalad V. A Novel Code Team Leader Card to Improve Leader Identification. *J Patient Cent Res Rev*. 2021;8(4):354-9. Epub 2021/11/02. doi: 10.17294/2330-0698.1847. PubMed PMID: 34722805; PubMed Central PMCID: PMC902216
21. Bhangu A, Notario L, Pinto RL, et al. Closed Loop Communication In the Trauma Bay: Identifying Opportunities for Team Performance Improvement Through A Video Review Analysis. *CJEM*. 2022;24(4):419-25. doi:10.1007/s43678-022-00295-z; PubMed Central PMCID: PMC9002216
22. Hargestam M, Lindkvist M, Brulin C, et al. Communication in Interdisciplinary Teams: Exploring Closed-Loop Communication During In Situ Trauma Team Training. *BMJ Open*. 2013;3(10):e003525. doi:10.1136/bmjopen-2013-003525; PubMed PMID: 24148213; PubMed Central PMCID: PMC3808778
23. Leonard M. The Human Factor: The Critical Importance of Effective Teamwork and Communication in Providing Safe Care. *Qual Saf Health Care*. 2004;13(suppl_1):i85-i90. doi:10.1136/qshc.2004.010033

About the Author

Christine E. Sanchez (chrsanchez@pa.gov) is a research scientist on the Data Science & Research team at the Patient Safety Authority. She is responsible for utilizing patient safety data, combined with relevant literature, to develop strategies aimed at improving patient safety in Pennsylvania.

