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EMERGENCY NURSES ASSOCIATION

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- The Quality of Symptoms in Women and Men Presenting to the Emergency Department With Suspected Acute Coronary Syndrome
- Anxiety and Stress in Live Disaster Exercises
- Emergency Nurses' Perception of Geriatric Readiness in the ED Setting: A Mixed-Methods Study
- Shared Decision-Support Tools in Hospital Emergency Departments: A Systematic Review
- Pediatric Triage Education for the General Emergency Nurse: A Randomized Crossover Trial Comparing Simulation With Paper-Case Studies
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- Creating a Sensory-Friendly Pediatric Emergency Department
- Using Mathematical Modeling to Improve the Emergency Department Nurse-Scheduling Process

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2022: A Year in Review

Jennifer Schmitz, MSN, EMT-P, CEN, CPEN, CNML, FNP-C, NE-BC

The year has come to an end. I have had the pleasure of serving in the role of Emergency Nurses Association (ENA) President during a time in which circumstances have been challenging and incredibly rewarding. At the beginning of the year, in January, I was unsure what to expect as world events continued to evolve. Turns out, I couldn't have asked for a better experience serving the members of this association. As I've said time and again, this year has truly been the highlight of my career in emergency nursing.

The year began with ENA's first in-person event, in Charleston, South Carolina, at Leadership Orientation 2022. Attending in person was a milestone in and of itself, and observing people reconnect with one another was an exhilarating "recharge" moment for me. Speaking of recharge, this event is where we kicked off the idea of "recharge" and encouraging emergency nurses to focus on caring for themselves to best care for others. The concept has been a consistent theme for the year and one that I hope people will continue to hold on to, as it will help keep those working in this field energized.

ENA was faced with many substantial public health events and unprecedented political actions. We have continued to navigate issues including gun violence and women's health rights and have found ways to strengthen our voice on the advocacy front. I applaud both the association and its members for their passion about issues that impact both the profession and the communities we serve. At the ENA Day on the Hill event, we watched that advocacy in action. Members from each state attended, meeting with legislators and supporting important bills related to emergency nursing. We were so fortunate to have the opportunity during that time to partner with the American College of Emergency Physicians in our "No Silence on ED Violence" media event. This event was quite moving, and its focus on the impact of workplace violence on caregivers was forceful.

Another milestone in 2022 was the ENA annual conference in Denver, CO. The conference was last held in person in 2019, so this event was a key networking and "recharge" occasion for emergency nurses from all around the globe. Watching people reconnect with old friends and colleagues, engage in hands-on simulation training, and participate in informational and innovative education was great. As nurses, we heard from some of the best speakers and teachers in our profession and are grateful for the knowledge-sharing opportunity.

The close of this year is truly bittersweet. I could certainly imagine a life being the ENA President for the rest of my career—I mean really, who couldn't—and I deeply appreciate the time I have had in the role. I had the opportunity to travel to emergency departments throughout the country, meet ENA members all over and see the incredible work happening in their hometowns, and connect with committed and innovative industry partners. The appreciation for what an emergency nurse does is widespread, and I echo the sentiment of those I have encountered. I am grateful for what each of you does to care for your community and for one another. You take care of people in their most challenging moments and when they least expect to need care. You do that with compassion, grace, and true respect for being the care givers that you are. My hope is that I have represented you and the association well this year. Please know that I am your colleague and that I share the love of emergency nursing. This year has been one of great opportunity for me and I am honored to have been in the role. Thank you for your work and continue to find ways to recharge!

Author Disclosures

Conflicts of interest: none to report.

Jennifer Schmitz is President, Emergency Nurses Association, Cape Elizabeth, Maine.

For correspondence, write: Jennifer Schmitz, MSN, EMT-P, CEN, CPEN, CNML, FNP-C, NE-BC, Emergency Nurses Association, Cape Elizabeth, Maine; E-mail: jennifer.schmitz@board.ena.org

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Listening to Emergency Nurses Association Members and *Journal of Emergency Nursing* Readers

Authors: Gordon L. Gillespie, PhD, DNP, RN, CEN, CNE, CPEN, PHCNS-BC, FAEN, FAAN, and Laura Jiggens, CAE, Cincinnati, OH, and Schaumburg, IL

Shortly after making the announcement to hire a new Editor-in-Chief for the *Journal of Emergency Nursing* (*JEN*), a readership survey was conducted to gauge readership habits and the satisfaction with and usefulness of various *JEN* features. Ultimately, the findings from this survey will be one element used by the new Editor-in-Chief to guide *JEN*'s strategic direction.

This summer, a random sample of 5000 Emergency Nurses Association members was surveyed by email for this purpose; 283 members responded. We learned that the leading reasons why members read *JEN* were to expand their knowledge (67%), become aware of new trends (51%), and learn about information important to practice (44%). Figure 1 provides a listing of additional reasons for members reading *JEN*.

Overall, readers believed that the content and quality of *JEN* was very good to excellent rather than poor, fair, or good. The area reflecting a potential for improvement was the rating for sections and columns in *JEN*; only 69% rated this component as very good to excellent. We are pleased to announce that *JEN* is committed to bringing clinically oriented content back. In this issue, you will find a Pediatric Update article detailing the new neonatal resuscitation guidelines, Geriatric Update article describing an innovative project to increase older adult driver safety, and Triage Decisions article reporting a clinical case for an adult with vision changes. Figure 2 provides a depiction of the ratings for additional content in the Journal.

From our readers, we learned that clinical practice guidelines and position statements are still valuable (Figure 3). We anticipate partnering with the Emergency Nurses Association to regularly publish priority documents in this area in the upcoming issues of *JEN*.

Popular sections that readers would like to read more of in the Journal include the Trauma Notebook (60%), Triage Decisions (59%), Case Reviews (50%), and Emergency Nursing Review Questions (50%). Figure 4 indicates additional columns that readers would like prioritized in future issues of *JEN*. This list of priority sections reflects several comments that respondents provided such as "I like the CEs and CEN review questions" as well as "Bring back more clinical articles—things I can use in my day-to-day practice and when I educate the peers in my department." These comments resonate with the *JEN* Editorial Board, who is committed to increasing the clinical content in the Journal.

While we will continue to publish quality research in *JEN*, we also will ensure that the research articles have relevance to the clinical practice of emergency nursing. Including research is important to build the science for evidence-based emergency care. From our readers, we heard that many read *JEN* cover-to-cover but want the focus on clinical content. To further ensure that the clinical content going forward is highlighted, the front half of *JEN* issues will feature the section content most closely tied to daily clinical practice. Research will continue to be published but moved to the latter half of each issue.

We believe that the merits of the Journal will continue to meet our readers' desires and that they will continue reading *JEN* cover-to-cover. And most importantly, we hope that readers will be able to apply *JEN* content to transform their clinical practice for the betterment of clinical outcomes.

Author Disclosures

Conflicts of interest: none to report.

Gordon L. Gillespie, *Member, Greater Cincinnati Chapter,* is a Professor, University of Cincinnati College of Nursing, Cincinnati, OH. **Twitter:** @glgillespie2. **ORCID identifier:** https://orcid.org/0000-0002-0231-1123.

Laura Jiggens is a Market Research Manager, Emergency Nurses Association, Schaumburg, IL.

For correspondence, write: Gordon L. Gillespie, PhD, DNP, RN, CEN, CNE, CPEN, PHCNS-BC, FAEN, FAAN, University of Cincinnati College of Nursing, Post Office 210038, Cincinnati, OH 45221-0038; E-mail: gordon.gillespie@uc.edu

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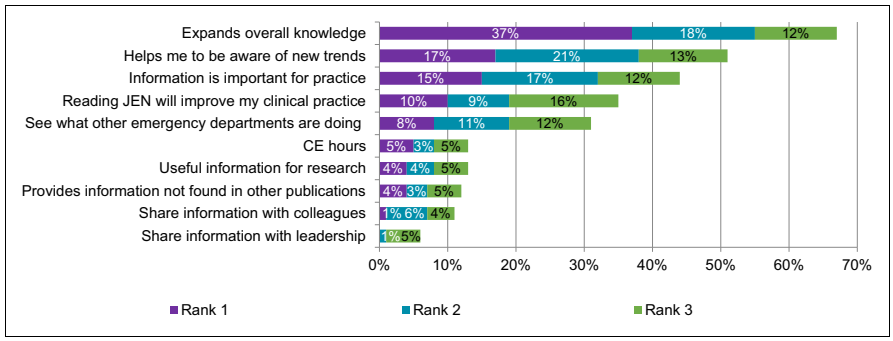

FIGURE 1

Findings reflect responses to the following statement: Please rank the order of the reasons for reading JEN with "1" being the "number 1 reason" you read the publication. Respondents could rank as many reasons as applicable to them. CE, continuing education.

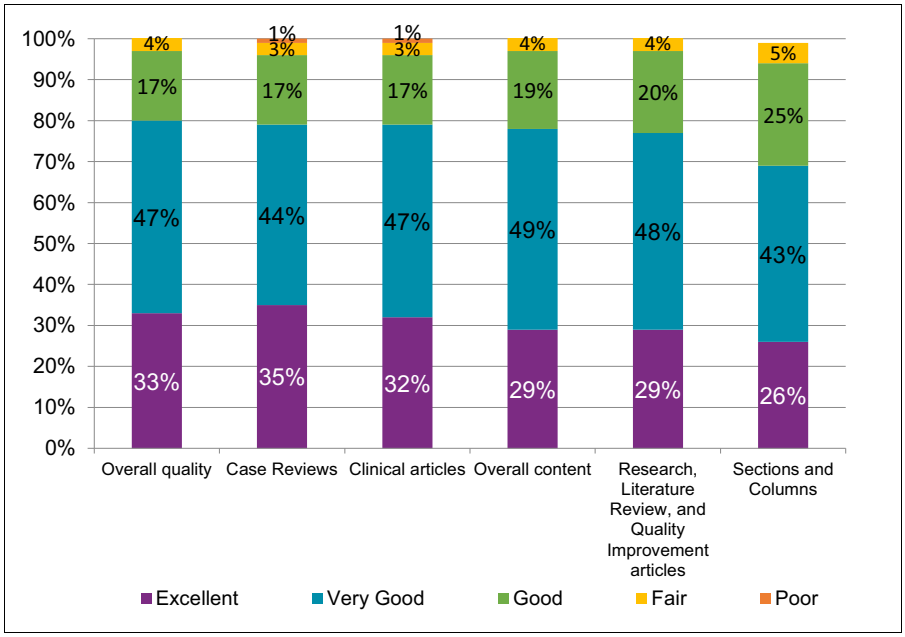

FIGURE 2

Findings reflect responses to the following question: How would you rate JEN in terms of…

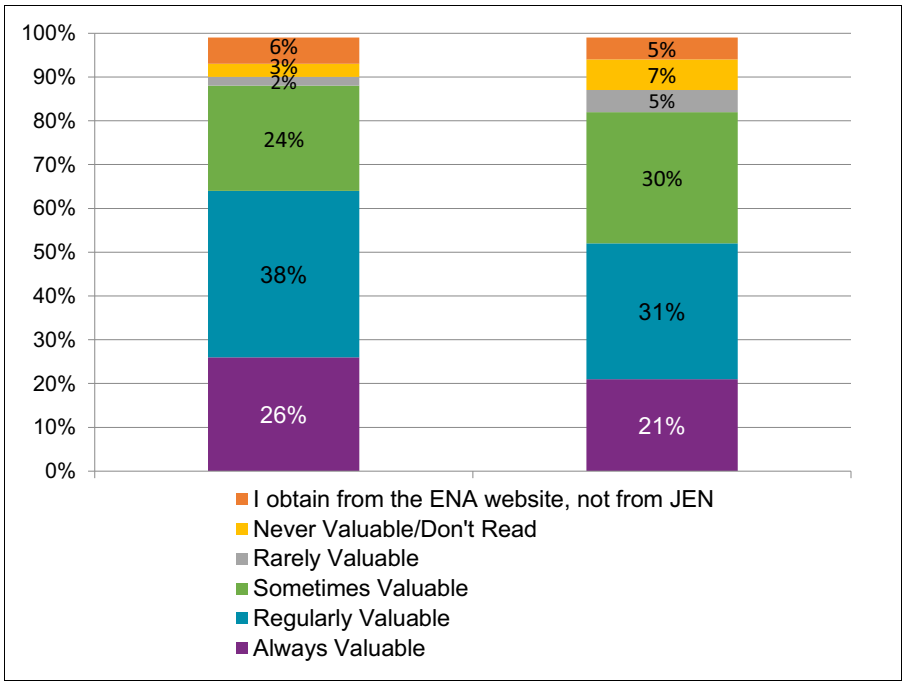

FIGURE 3

Findings reflect responses to the following statement: Please rate how often the ENA position statements and clinical practice guidelines published in JEN are of use to you and your practice. ENA, Emergency Nurses Association; *JEN, Journal of Emergency Nursing*.

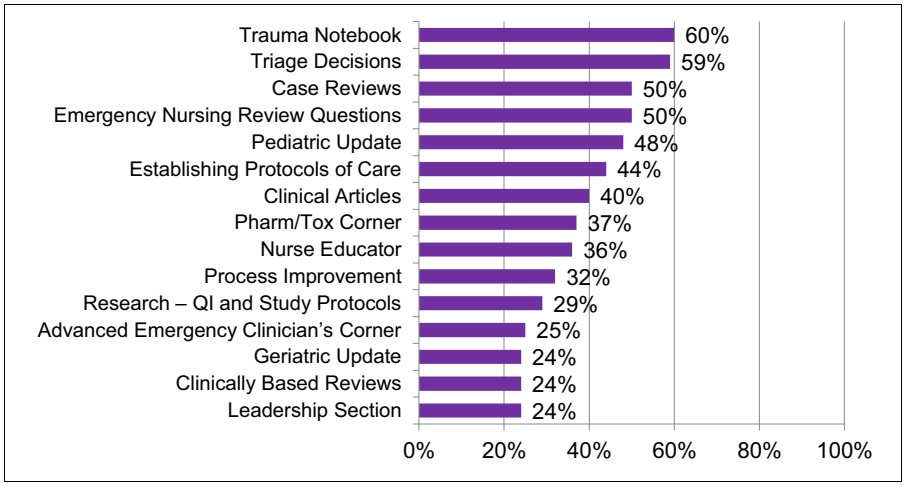

FIGURE 4

Findings reflect responses to the following question: In future issues of JEN, would you like to see more articles in any of the following categories? Select all that apply. QI, quality improvement.

Guest Editorial: Collaboration Yields 2021 ENP Competencies

Authors: Wesley D. Davis, DNP, ENP-C, FNP-C, AGACNP-BC, CEN, FAANP, FAEN, Nancy Denke, DNP, ACNP-BC, FNP-BC, FAEN, CEN, CCRN, Melanie Gibbons Hallman, DNP, FNP-BC, ACNP-BC, ENP-C, CNS, CEN, TCRN, FAEN, FAAN, David House, DNP, FNP-BC, ENP-C, CNE, CNS, CEN, FAEN, Diane Fuller Switzer, DNP, FNP-BC, ENP-C, ENP-BC, CCRN, CEN, FAEN, FAANP, and Jennifer Wilbeck, DNP, RN, FNP-BC, ACNP-BC, ENP-C, FAANP, FAAN

The American Academy of Emergency Nurse Practitioners (AAENP) and the Emergency Nurses Association (ENA) are pleased to announce the publication of the 2021 Emergency Nurse Practitioner (ENP) competencies. These competencies represent the integration of previously published competencies from AAENP (2018) and ENA (2019) as delineated by representatives from both organizations. The Consensus Model for APRN Regulation places responsibility for the development and governance of nurse practitioner (NP) specialty areas, including competencies and standards, with professional organizations (Advanced Practice Registered Nurse Consensus Work Group & National Council of State Boards of Nursing APRN Advisory Committee, 2008).

The first set of ENP competencies was delineated in 2008 based on a national Delphi study and practice analysis (ENA, 2008). As ENP practice advanced and expanded, experts identified the need for updated competencies more reflective of current practice. These original competencies were first updated in 2018 when AAENP published ENP competencies, titled Practice Standards for the ENP Specialty, based on data from a 2016 ENP national practice analysis (American Academy of Nurse Practitioners Certification Board [AANPCB], 2016; Tyler et al 2018). Based on the findings of this research, the knowledge, tasks, and procedures associated with ENP practice were categorized into five domains: medical screening, medical decision-making/differential diagnoses, patient management, patient disposition, and professional, legal, and ethical practices (AAENP, 2018). The competencies can serve to differentiate entry level knowledge, skills, and abilities from advanced ENP specialty expertise within the broader framework of practice standards while carefully encompassing the comprehension, psychomotor capability, and acumen necessary to adeptly guide care for patients across the life span, including procedures most frequently utilized in emergency settings (Ramirez, Schumann, & Agan, 2018).

Also, in 2018, ENA President Jeff Solheim appointed content experts to the ENP Competency Revision Work Group to review and update the 2008 ENA Competencies for Nurse Practitioners in Emergency Care. Utilizing the framework from the 2008 ENP competencies, the workgroup met regularly over 2 years and created a grid to map the competencies with the AANPCB ENP certification examination blueprint, the Scope and Standards for Emergency Nurse Practitioners (AAENP, 2016), and the Practice Standards for the Emergency Nurse Practitioner Specialty (AAENP, 2018). Following a public comment period and resulting revisions, the revised competencies were submitted to the American Nurses Association (ANA) for endorsement and were approved in July 2020.

While ENA (2008, 2019) and AAENP (2016) competencies had many similarities, the existence of different ENP competencies published by the two organizations created confusion among the workforce and stakeholders. In 2021, AAENP and ENA Presidents charged the Emergency Nurse Practitioners Competencies Workgroup to align the

Wesley D. Davis, DNP, ENP-C, FNP-C, AGACNP-BC, CEN, FAANP, FAEN Family and Emergency Nurse Practitioner Program Coordinator and Assistant Professor, College of Nursing University of South Alabama Mobile, Alabama

Nancy Denke, DNP, ACNP-BC, FNP-BC, FAEN, CEN, CCRN Arizona State University Tempe, Arizona

Melanie Gibbons Hallman, DNP, FNP-BC, ACNP-BC, ENP-C, CNS, CEN, TCRN, FAEN, FAAN University of Alabama at Birmingham Birmingham, Alabama

David House, DNP, FNP-BC, ENP-C, CNE, CNS, CEN, FAEN University of Alabama at Birmingham Birmingham, Alabama

Diane Fuller Switzer, DNP, FNP-BC, ENP-C, ENP-BC, CCRN, CEN, FAEN, FAANP Seattle University Seattle, Washington

Jennifer Wilbeck, DNP, RN, FNP-BC, ACNP-BC, ENP-C, FAANP, FAAN Vanderbilt University Nashville, Tennessee

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two sets of competencies. Using a grid-like framework to distinguish similarities and differences between the two documents, the workgroup identified, analyzed, and organized the competencies by theme. Whereas the AAENP competencies were broad, the ENA competencies were very detailed. There were no identified significant variances or gaps other than some terminology differences. Despite being originally derived from different studies, the two sets of competencies demonstrated similar competencies, lending validity to the final merged set of competencies. An agreement was made to use the AAENP core competency domains: medical screening, medical decision-making, patient management, patient disposition, and professional, legal, and ethical practices. Competencies from the AAENP and ENA documents were ultimately merged and arranged according to the appropriate corresponding domain.

Not only were the initial two sets of competencies aligned with each other but they were ultimately also aligned with other national initiatives and documents guiding NP education. Regardless of the population focus during academic education, all NPs are prepared with core competencies (National Organization of Nurse Practitioner Faculties [NONPF], 2017) as a basis for population and specialty-focused competencies. Specialty competencies are not considered entry level but rather demonstrate and incorporate higher levels of targeted knowledge and abilities. The ENP competencies build upon the Core NP Competencies (NONPF, 2017) and the advanced-level nursing competencies outlined in The Essentials: Core Competencies for Professional Nursing Education (American Association of Colleges of Nursing, 2021). In addition, the 2021 ENP competencies are congruent with The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity (National Academies of Sciences, Engineering, & Medicine, 2021).

Although it may appear to be a seemingly simple goal, merging this information was complex and involved deconstructing, analyzing, and synthesizing aspects of ENP practice, along with consensus-based decision-making that resulted in the desired outcome of improving the values, expertise, and quality in managing patient health care by the ENP. Through a collaborative work effort, the unified set of 2021 ENP competencies provides support for academic ENP programs as they move toward competency based education. In addition, the updated competencies demonstrate the alignment of evidence-based ENP practice in the delivery of safe, quality patient care to support regulatory frameworks, credentialing, and reimbursements.

REFERENCES

Advanced Practice Registered Nurse Consensus Work Group & National Council of State Boards of Nursing APRN Advisory Committee. (2008). APRN Joint Dialogue Group Report. Consensus model for APRN regulation: Licensure, accreditation, certification, and education. Chicago, IL: National Council of State Boards of Nursing. Retrieved February 15, 2022, from https//www.ncsbn.org/Consensus_Model_for_APRN_Regulation_July_2008.pdf

American Academy of Emergency Nurse Practitioners (AAENP). (2016). Scope and standards for ENP practice. Retrieved February 15, 2022, from https://www.aaenp-natl.org/assets/docs/aaenp_scope_and_standards.pdf American Academy of Emergency Nurse Practitioners (AAENP), 2018AAENP. (2018). Practice standards for the emergency nurse practitioner (ENP). Scottsdale, AZ: Author. Retrieved February 15, 2022, from https://www.aaenp-natl.org/assets/docs/practice_standards_for_the_emergency_nurse_practitioner.pdf

American Academy of Nurse Practitioners Certification Board (AANPCB). (2016). Executive summary of the 2016 practice analysis of emergency nurse practitioners. Austin, TX: Author. Retrieved February 15, 2022, from https://www.aanpcert.org/resource/documents/AANPCB%202016%20ENP%20Practice%20Analysis%20Executive%20Summary.pdf

American Association of Colleges of Nursing. (2021). The Essentials: Core competencies for professional nursing education. Retrieved February 15, 2022, from https://www.aacnnursing.org/Portals/ 42/AcademicNursing/pdf/Essentials-2021.pdf

Emergency Nurses Association (ENA). (2008). Competencies for nurse practitioners in emergency care. Des Plaines, IL: Author. Emergency Nurses Association (ENA). (2019).

Emergency nurse practitioner competencies. Des Plaines, IL: Author. National Academies of Sciences, Engineering, & Medicine. (2021). The future of nursing 2020- 2030: Charting a path to achieve health equity. Retrieved February 15, 2022, from https://www.nap.edu/catalog/25982/the-future-of-nursing-2020-2030-charting-a-path-to National Organization of Nurse Practitioner Faculties. (2017). Nurse practitioner core competencies content. Retrieved February 15, 2022, from https://cdn.ymaws.com/www.nonpf.org/resource/resmgr/competencies/20170516_NPCoreCompsContentF.pdf

Ramirez E, Schumann L, Agan D, Hoyt KS, Wilbeck J, Tyler D, Evans DD. Beyond competencies: Practice standards for emergency nurse practitioners—A model for specialty care clinicians, educators, and employers. *Journal of the American Association of Nurse Practitioners*. 2018;30(10):570-578. https://doi.org/10.1097/JXX.0000000000000_0139

Tyler D, Hoyt K, Evans D, Schumann L, Ramirez E, Wilbeck J. Emergency nurse practitioner practice analysis: Report and implications of the findings. *Journal of the American Association of Nurse Practitioners*. 2018;30(10):560-569. https://doi.org/10.1097/jxx.0000000000000118

Chief Complaint: Vision Changes

Author: Andi Foley, DNP, RN, APRN-CNS, EMT, ACCNS-AG, CEN, TCRN, FAEN, Boise, ID
Section Editor: Andi Foley, DNP, RN, APRN-CNS, EMT, ACCNS-AG, CEN, TCRN, FAEN

NCPD Earn Up to 8.5 Hours. See page 719.

Jane, a 36-year-old woman, presents to your ED triage desk reporting recent vision changes. Her partner, standing nearby holding their 3-week-old child, shares that Jane started bumping into walls and doorways about an hour ago. Jane tells you that she has never had anything like this before. She initially denies blurred vision but then corrects herself, stating, "Well, I guess there is some blurriness, but it comes and goes." She shares, "I thought I was just really, really tired, but then I just got so scared. We called my doctor who told us to come in to be seen."

She reports being in otherwise good health, with no prescribed medications, no known allergies, and no significant medical history. Her recent pregnancy, which had no complications except extended gestation resulting in a cesarean delivery (C-section) at 41 weeks and 5 days. Jane's vital signs were as follows: blood pressure, 146/82 mm Hg; heart rate, 86; respiratory rate, 18; oximetry, 98% on room air; temperature, 37.2 °C (98.9 °F) orally; and 2 out of 10 discomfort in her lower abdomen from the C-section surgical incision.

Something does not feel right, but you are not sure what it is. Knowing that you are an inexperienced triage nurse, you excuse yourself to consult with the more experienced charge nurse.

On the basis of the scenario above, what triage acuity level is most appropriate? What are possible differential diagnoses? This article covers 2 high-risk conditions Jane could be experiencing.

Stroke Symptoms

Care of the patient experiencing a stroke is common for the emergency nurse and typically presents with speech changes, arm or leg weakness, or facial drooping.[1] Jane has none of these.

Visual changes may be sign of a posterior stroke and were reported in one prevalence study to be present in 48% of patients being admitted to the hospital with a stroke diagnosis.[2] Assessment using a stroke scale including questions about vision could identify patients with complaints such as Jane's as high risk for possible stroke. There are several validated stroke scales in which vision is an assessment component, and for all of them, a positive screening requires an immediate rapid response.

- BEFAST is an acronym for its elements of balance, eyes, face, arms, speech, and time.[1] Screening would be considered positive if any BEFAST element is present[1] within the time frame specified by the organization, which can range from 3 to 24 hours.
- ROSIER (rule out stroke in the emergency room) assesses syncope, facial weakness, arm weakness, leg weakness, speech changes, and vision changes; a positive screening includes 1 or more of those signs present.[3,4]
- VAN is a screening for large cerebral vessel occlusion and is an acronym for its elements of vision, aphasia, and neglect. A positive screening requires motor weakness and 1 or more of the VAN elements.[5]

In an emergency department using a stroke screening scale with an eye or vision component, and given the short time since symptom onset, activation of the emergency department's stroke response process for Jane may be appropriate.

Postpartum Pre-eclampsia

As a woman 3 weeks postpartum after a C-section, Jane is at risk for postpartum pre-eclampsia (PPPE). Typically, PPPE is experienced within 4 to 6 weeks after delivery; however, symptom onset has been reported as long as 3 months postpartum.[6,7] Delivery by C-section and health factors such as hypothyroidism, kidney disorders, elevated prepregnancy body mass index, or mild to moderate hypertension before or during pregnancy are also independent factors for PPPE.[8]

Patients often present with headache and an elevated blood pressure defined as over 160 mm Hg systolic and/or 110 mm

Andi Foley, *Member, Idaho State Council,* is a Clinical Nurse Specialist, Emergency Services, St Luke's Health System, Boise, ID. **ORCID identifier**: http://orcid.org/0000-0002-5685-0376.

For correspondence, write: Andi Foley, DNP, RN, ACCNS-AG, CEN, TCRN; E-mail: Andii42@yahoo.com

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Hg diastolic.[9,10] However, any new neurologic sign, especially when combined with a blood pressure at or over 140 mm Hg systolic and/or 90 mm Hg diastolic, in a postpartum woman is a red flag. Even though she did not report a headache, Jane's vision changes and slightly elevated systolic blood pressure, combined with her history of C-section delivery, may appropriately raise your suspicion of Jane's risk for PPPE.

It is worthy to note that one elevated blood pressure during pregnancy or in the postpartum period does not equate to a diagnosis of PPPE. The American College of Obstetricians and Gynecologists recommends confirmation by measuring blood pressure at least 4 hours after the previous measure, unless the initial measurement was considered severe (greater than either 160 mm Hg systolic or 110 mm Hg diastolic), in which case treatment is recommended within the hour.[11] Suresh et al[12] suggest a more rapid recognition and management strategy, which may be more appropriate in the emergency department. Their recommendation is to retake an initially severe level blood pressure measurement within 15 minutes.[12] In addition, Hauspurg and Jeyabalan[6] suggest that PPPE should be a diagnosis of exclusion after other, more serious diagnoses, such as stroke, are ruled out.

Triage Decision

You are grateful for the guidance from your charge nurse and the quick refresher on possible high-risk considerations such as stroke and PPPE. As neither of these conditions requires immediate life-saving intervention,[13] you assign the patient an Emergency Severity Index triage acuity level 2 because of the risk associated with her presenting complaints. Fortunately, the patient is quickly taken to an available ED room for evaluation and care.

Conclusion

Jane is fearful and presents with high-risk symptoms. Although her symptoms could be attributed to extreme exhaustion, she also could be experiencing a stroke or postpartum pre-eclampsia, among other possible diagnoses. As a triage nurse, recognizing a high-risk situation from vague presentation symptoms can save a life or prevent a condition from worsening. Rapid, appropriate care could make a significant difference for Jane and for her family.

Acknowledgments

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Author Disclosures

Conflicts of interest: none to report.

Most "Triage Decisions" submissions are based on actual cases, but this submission uses a simulated patient to remind the reader of a presentation that may be familiar and a condition which may be uncommon.

REFERENCES

1. Aroor S, Singh R, Goldstein LB. BE-FAST (balance, eyes, face, arm, speech, time) reducing the proportion of strokes missed using the FAST mnemonic. *Stroke*. 2017;48(2):479-481. https://doi.org/10.1161/strokeaha.116.015169
2. Rowe FJ, Hepworth LR, Howard C, Hanna KL, Cheyne CP, Currie J. High incidence and prevalence of visual problems after acute stroke: an epidemiology study with implications for service delivery. *PLoS One*. 2019;14(3):e0213035. https://doi.org/10.1371/journal.pone.0213035
3. Nor AM, Davis J, Sen B, et al. The Recognition of Stroke in the Emergency Room (ROSIER) scale: development and validation of a stroke recognition instrument. *Lancet Neurol*. 2005;4(11):727-734. https://doi.org/10.1016/S1474-4422(05)70201-5
4. Zhelev Z, Walker G, Henschke N, Fridhandler J, Yip S. Prehospital stroke scales as screening tools for early identification of stroke and transient ischemic attack. *Cochrane Database Syst Rev*. 2019;4(4):CD011427. https://doi.org/10.1002/14651858.CD011427.pub2
5. Teleb MS, Ver Hage A, Carter J, Jayaraman MV, McTaggart RA. Stroke vision, aphasia, neglect (VAN) assessment—a novel emergent large vessel occlusion screening tool: pilot study and comparison with current clinical severity indices. *J Neurointerv Surg*. 2017;9(2):122-126. https://doi.org/10.1136/neurintsurg-2015-012131
6. Hauspurg A, Jeyabalan A. Postpartum preeclampsia or eclampsia: defining its place and management among the hypertensive disorders of pregnancy. *Am J Obstet Gynecol*. 2021;226(2S):S1211-S1221. https://doi.org/10.1016/j.ajog.2020.10.027
7. Giwa A, Nguyen M. Late onset postpartum preeclampsia 3 months after delivery. *Am J Emerg Med*. 2017;35(10):1582.e1-1582.e3. https://doi.org/10.1016/j.ajem.2017.07.024
8. Takaoka S, Ishii K, Taguchi T, et al. Clinical features and antenatal risk factors for postpartum-onset hypertensive disorders. *Hypertens Pregnancy*. 2016;35(1):22-31. https://doi.org/10.3109/10641955.2015.1100308
9. ACOG Practice Bulletin No. 202: Gestational hypertension and preeclampsia. *Obstet Gynecol*. 2019;133(1):1. https://doi.org/10.1097/AOG.0000000000003018
10. Bryant T, Adelson S, Baumal CR. 31-year-old postpartum patient experiences acute-onset blurry vision. Ocular Surgery News. October 25, 2018. Accessed September 8, 2022. https://www.healio.com/news/ophthalmolog

y/20181016/31yearold-postpartum-patient-experiences-acuteonset-blurry-vision

11. Hypertension in pregnancy. Report of the American college of obstetricians and gynecologists' task force on hypertension in pregnancy. *Obstet Gynecol.* 2013;122(5):1122-1131. https://doi.org/10.1097/01.aog.0000437382.03963.88
12. Suresh SC, Duncan C, Kaur H, et al. Postpartum outcomes with systematic treatment and management of postpartum hypertension. *Obstet Gynecol.* 2021;138(5):777-787. https://doi.org/10.1097/aog.0000000000004574
13. Gilboy N, Tanabe P, Travers DA, Rosenau AM, Eitel DR. Emergency severity index, version 4: implementation handbook. Emergency Nurses Association (ENA). 2020. Accessed September 8, 2022. https://www.ena.org/docs/default-source/education-document-library/triage/esi-implementation-handbook-2020.pdf?sfvrsn=fdc327df_4

Please submit manuscripts to Andi Foley, DNP, RN, ACCNS-AG, CEN, FAEN, at: andii42@yahoo.com.

CORRIGENDUM

Corrigendum to Pneumothorax [*Journal of Emergency Nursing*, Volume 46, Issue 6, November 2020, Page 895]

Nana Ohene Baah, MD, and Ashwani Kumar Sharma, MD, Interventional Radiology, University of Rochester Medical Center, Rochester, NY

The authors regret that the clinical presentation of the case in the above article was incomplete. It should read:

A 40-year-old man was brought to the emergency department after a massive motor vehicle crash with a tractor trailer. He was resuscitated in the emergency department. A tracheostomy tube and left chest tube were placed. Because of severe symptomatic bradycardia, a pacemaker also was placed. Ultimately, the patient was transferred to the intensive care unit and recovering. Subsequently, on day 10 of admission, the patient complained of sudden onset of right-sided chest pain and dyspnea. Frontal chest radiograph was performed at the bedside (Figure). At the time, his vital signs were as follows: blood pressure, 110/60 mm Hg; heart rate, 94 beats per minute; respiratory rate, 18 breaths per minute; and oxygen saturation by pulse oximetry, 90% on room air.

The authors would like to apologize for any inconvenience caused.

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y/20181016/31yearold-postpartum-patient-experiences-acuteonset-blurry-vision

11. Hypertension in pregnancy. Report of the American college of obstetricians and gynecologists' task force on hypertension in pregnancy. *Obstet Gynecol.* 2013;122(5):1122-1131. https://doi.org/10.1097/01.aog.0000437382.03963.88
12. Suresh SC, Duncan C, Kaur H, et al. Postpartum outcomes with systematic treatment and management of postpartum hypertension. *Obstet Gynecol.* 2021;138(5):777-787. https://doi.org/10.1097/aog.0000000000004574
13. Gilboy N, Tanabe P, Travers DA, Rosenau AM, Eitel DR. Emergency severity index, version 4: implementation handbook. Emergency Nurses Association (ENA). 2020. Accessed September 8, 2022. https://www.ena.org/docs/default-source/education-document-library/triage/esi-implementation-handbook-2020.pdf?sfvrsn=fdc327df_4

Please submit manuscripts to Andi Foley, DNP, RN, ACCNS-AG, CEN, FAEN, at: andii42@yahoo.com.

CORRIGENDUM

Corrigendum to Pneumothorax [*Journal of Emergency Nursing*, Volume 46, Issue 6, November 2020, Page 895]

Nana Ohene Baah, MD, and Ashwani Kumar Sharma, MD, Interventional Radiology, University of Rochester Medical Center, Rochester, NY

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Refractory Anaphylactic Shock Requiring Emergent Venoarterial Extracorporeal Membrane Oxygenation in the Emergency Department: A Case Report

Authors: Jese Joseph, BSN, BPH, RN, AC, CEN, TNCC, and Joseph Bellezzo, MD, San Diego and Poway, CA

NCPD Earn Up to 8.5 Hours. See page 719.

Contribution to Emergency Nursing Practice

- It is well established that extracorporeal membrane oxygenation is a temporary form of life support that can offer circulatory and pulmonary support for patients experiencing cardiopulmonary failure who have not responded to traditional therapies.
- This case review adds to current published literature in that it exemplifies the use of venoarterial extracorporeal membrane oxygenation in managing patients who experience cardiac arrest and or refractory cardiogenic shock.
- The most important implication for clinical practice demonstrated by this case review is the value of an established emergency department venoarterial extracorporeal membrane oxygenation program.

Abstract

Venoarterial extracorporeal membrane oxygenation is a viable salvage intervention for patients who experience cardiopulmonary arrest or profound shock from any cause. Acute anaphylactic shock is a rare cause of cardiac arrest. We present a case of a 35-year-old male who experienced cardiac arrest owing to anaphylactic shock while receiving general anesthesia for a routine outpatient surgical procedure. Traditional advanced cardiac life support therapies were provided by paramedics en route to the emergency department of a suburban, community-based hospital. Maximal medical management including endotracheal intubation, intravenous steroids, intravenous crystalloid fluid administration, intravenous vasoactive medications, and high-quality cardiopulmonary resuscitation was provided. Although return of spontaneous circulation was achieved, profound cardiogenic shock persisted. Venoarterial extracorporeal membrane oxygenation was initiated by the emergency department provider and nursing team. The patient survived, was neurologically intact, had full recovery, and was discharged home several days later. We have extensive experience with venoarterial extracorporeal membrane oxygenation, and this case exemplifies the value of an established emergency department extracorporeal membrane oxygenation program in managing all causes of cardiac arrest or refractory shock.

Key words: Emergency department; Resuscitation; Extracorporeal membrane oxygenation; Extracorporeal cardiopulmonary resuscitation; Venoarterial extracorporeal membrane oxygenation

Introduction

Venoarterial extracorporeal membrane oxygenation (VA-ECMO) is a viable salvage intervention for patients who experience cardiopulmonary arrest or profound shock from any cause, including anaphylaxis. We present a case of a 35-year-old male who experienced cardiac arrest owing to anaphylactic shock during a routine outpatient surgical procedure. This case exemplifies the value of an established ED ECMO program in managing all causes of cardiac arrest or refractory shock.

Jese Joseph is an Advanced Clinician/Registered Nurse, Sharp Memorial Emergency Department, San Diego, CA. **ORCID identifier:** http://orcid.org/0000-0003-4722-6309. ENA ID: 1356959.

Joseph Bellezzo is a Physician, Sharp Memorial Emergency Department, San Diego, CA. **Twitter:** @drbellezzo. **ORCID identifier:** http://orcid.org/0000-0002-4653-5911.

For correspondence, write: Jese Joseph, BSN, BPH, RN, AC, CEN, TNCC, 8865 Spectrum Center Blvd #9316, San Diego, CA 92123; E-mail: JeseLyn3@yahoo.com

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Patient Presentation

A 35-year-old male was transported by emergency medical services to the emergency department from an outpatient surgical center after experiencing cardiopulmonary arrest while undergoing induction of general anesthesia during an elective excision of a ganglion cyst from his left leg. In addition to general anesthesia, the patient was prophylactically given the antibiotic ceFAZolin (2 g). He had no known allergies to medications or known medical history. The anesthesiologist who performed the induction at the surgical center accompanied the patient in the ambulance to the emergency department and was therefore available to describe the events that surrounded the arrest event.

At 9:10 AM, the patient was put under general anesthesia with propofol, succinylcholine, fentaNYL, and midazolam (exact doses were not immediately available for review). Approximately 10 minutes after induction, the patient was suddenly and unexpectedly found to be hypoxemic (60%) with an end-tidal capnography of 30 mm Hg. He quickly became pulseless, and cardiopulmonary resuscitation was initiated by the anesthesiologist. Advanced cardiac life support (ACLS) protocols were initiated. Hypoxemia was refractory to aggressive bag valve mask ventilation (Fraction of inspired oxygen [FiO_2] 100%) through the supraglottic airway that was placed during induction. Before emergency medical services arrival to the surgical center, the anesthesiologist replaced the supraglottic airway with an endotracheal tube and confirmed proper positioning within the trachea with direct visualization using glide scope. Despite 12 minutes of cardiopulmonary resuscitation and 2 doses of intravenous (IV) EPINEPHrine (0.1 mg/mL), the patient remained pulseless with a narrow-complex electrical rhythm. At 9:45 AM, just before the patient's arrival to the emergency department, the emergency medical services team was able to achieve return of spontaneous circulation after administration of the third dose of IV EPINEPHrine (0.1 mg/mL).

Upon presentation to the emergency department, the following vital signs were documented: temperature of 36.5 °C (97.7 °F), blood pressure of 116/65 mm Hg, heart rate of 125 beats per minute, oxygen saturation of 87% with bag valve mask (100% FiO_2), and end-tidal capnography of 25 mm Hg. Point of care iStat and ChemStat (Abbott Labrotories) were performed at 10:05 AM, in addition to a formal laboratory results that reflected a severe respiratory acidosis (pH 7.158, partial pressure of carbon dioxide 56.1 kPa, bicarbonate 20 mmol/L, and partial pressure of oxygen 136 kPa). The ED physicians placed a 9-French (Fr) central line (9 Fr, 10 cm, 0.035 inch diameter, Arrow International, Inc, Reading, PA) in the right femoral vein and 5 Fr arterial line (5.0 Fr, 7 cm, 0.035 inch diameter, Cook Inc, Bloomington, IN) in the left common femoral artery. A rapid ultrasound for shock and hypotension evaluation was performed, which determined the cause of shock to likely be distributive.[1] In response, the patient received IV crystalloid (normal saline 30 cc/kg) while vasopressor therapy was initiated. The emergency provider administered 7 doses of IV push-dose EPINEPHrine (10-20 mcg each) to address the vasoplegia. Norepinephrine and EPINEPHrine drips were quickly titrated to the maximal rates of 32 mcg/min and 10 mcg/min, respectively. A fixed-dose vasopressin drip was started at 0.04 units/min. To specifically treat anaphylaxis, methylPREDNISolone 125 mg, diphenhydrAMINE 50 mg, and famotidine 20 mg were each given IV push. The patient remained hypotensive, with a mean arterial pressure of 40 to 50 mm Hg, despite these interventions. Rearrest was considered imminent.

FIGURE

Emergency department team initiating VA-ECMO on patient described in this report. ECMO, extracorporeal membrane oxygenation cannula.

The decision was made to initiate VA-ECMO for cardiopulmonary support, because concern was mounting that the refractory hypotension was causing insufficient perfusion of the brain and vital organs. Using the previously placed femoral arterial and venous lines as conduits for ECMO cannula placement, Seldinger technique was performed and guidewires (Super Stiff Amplatz, 145 cm, 0.035 inch diam, Boston Scientific, Heredia, Costa Rica) were placed. Serial dilation was performed, and ECMO cannulas (21 Fr venous, 55 cm; 17 Fr arterial, 23 cm, Maquet Cardiopulmonary GmbH, Rastatt, Germany) were successfully placed (Figure). The entire procedure was facilitated by an emergency nurse who had received extensive previous training in ECMO initiation. The nurse assisted with guidewire management, dilator selection, and placement of the ECMO cannulas. The nursing team then optimized ECMO hemodynamics as follows: pump flow was steadily

increased and initial ECMO parameters were selected: 2.8 liters per minute flow rate, 2500 revolutions per minute, 3 liters per minute sweep gas rate, and 100% FiO_2. The settings were appropriately adjusted based on initial and serial arterial blood gas results. The profound respiratory acidosis was corrected by adjustment of the ECMO circuit's sweep gas rate.

Additional diagnostics were completed and alternative causes of cardiac arrest were ruled out. Ultimately, all involved providers surmised that the most likely cause of arrest was caused by anaphylactic shock caused by the ceFAZolin that was administered as a component of routine preoperative care.

After stabilization on VA-ECMO in the emergency department, the patient was transported to the intensive care unit where he remained on ECMO for 2 days before decannulation. The patient walked out of the hospital, neurologically intact 10 days after a 10-day stay.

Discussion

Anaphylaxis is an allergic reaction that can be life threatening.[2] The global incidence of severe anaphylactic reactions is between 50 and 112 per 100,000 people, and ED visits for anaphylactic reactions increased 101% between 2005 and 2014.[3] One of the top 3 causes of anaphylactic reaction is the administration of antibiotic agents, with penicillins, cephalosporins, and sulfonamides being common culprits.[4] Anaphylactic reactions are typically categorized by their phenotypic presentation and underlying endotype (type I, cytokine storm, mixed, and complement).[5] Anaphylactic reactions may present with a variety of symptoms including: flushing, pruritus, throat tightness, cardiovascular collapse, shortness of breath, and hypoxemia. These symptoms can be caused by immunoglobulin E– and nonimmunoglobulin E–mediated mechanisms.[5] Among all patients admitted to hospitals with anaphylaxis, fatalities account for only 1%, and the fatality rate remains stable at 0.63 to 0.75 per million adults per year.[5]

Medication reactions that occur during the perioperative period can be life threatening and unpredictable.[6] Among medications used in the perioperative arena, the first-generation cephalosporin, ceFAZolin, is a common choice for first-line prophylaxis during surgical procedures.[6] The overall incidence of adverse drug reactions or hypersensitivity drug reactions to cephalosporins ranges from 1% to 10%, with rare anaphylaxis rate less than 0.02%.[7] CeFAZolin is the most causative agent for perioperative anaphylaxis in the United States.[7] The most important risk factor for cephalosporin allergy is a known allergy to penicillin or history of reaction to cephalosporin.[6]

VA-ECMO is a temporizing form of life support that offers circulatory and pulmonary support for patients experiencing both cardiac and pulmonary failure who are unresponsive to conventional therapies.[8] The concept of artificial cardiopulmonary support was first proposed by LeGallois in 1813 but implementation required the discovery of heparin in 1918.[9] Since its first successful initiation in 1953, exceptional efforts have been made to allow for prolonged and expanded use.[8] It was not until the 1970s that the first cases of extracorporeal cardiopulmonary resuscitation (ECPR)/salvage cases were published.[9] ECPR defines initiation of ECMO during cardiac arrest as a salvage option in patients unresponsive to traditional interventions and therapies.[10] In their 2019 guidelines for cardiopulmonary resuscitation and emergency cardiovascular care, the American Heart Association supports the use of ECPR in select situations: "We suggest ECPR may be considered as a rescue therapy for selected patients with cardiac arrest when conventional cardiopulmonary resuscitation is failing, in settings where this can be implemented."[11]

During VA-ECMO, deoxygenated blood is drained from the venous system by a large bore cannula that is typically placed in the common femoral vein and advanced to the right atrial inlet via the inferior vena cava.[8] Blood is drawn, by negative pressure, from the right atrium by a centrifugal pump. Blood is then advanced, by positive pressure, from the pump to the membrane oxygenator, whereby gas exchange occurs (oxygenation and removal of carbon dioxide). The blood is then returned to corporeal circulation through a separate cannula that is typically placed in the femoral artery.[8] Although VA-ECMO is a common intervention for support of cardiogenic shock, this case suggests a role for VA-ECMO in profound anaphylactic shock refractory to traditional medical therapies.

As ED physicians and nurses become more adept with its utility, ECPR is becoming more commonly used in emergency departments throughout the world. Programs have been developed to train physicians and nurses in ECPR initiation and management of patients on ECMO after cardiopulmonary arrest.[12] In 2016, Tonna et al[13] reached out to the 99 United States centers that submitted ECPR data to the Extracorporeal Life Support Organization. Of those that responded, only 36 centers had attempted ECMO in the emergency department.[13] Several early studies have shown efficacy in its use over traditional ACLS, and the American Heart Association has endorsed the use of ECMO in appropriate situations.[10,14]

As ED teams become more and more experienced with ECPR, the individual roles of the team members also have evolved. Years ago, this ED team deployed the concept of the "nurse-led code" whereby experienced emergency nurses are given the responsibility to run the ACLS components of a resuscitation.[15] This strategy allows the physician to focus on the elements of ECMO needed for successful resuscitations.[15] As it stands, the roles and responsibilities of both the physicians and nurses continue to evolve, leading to increased interest, motivation, engagement, and satisfaction with their contributions to resuscitation science. We have found this collaborative approach to benefit all.

Implications for Emergency Nurses

We present a case of a patient who experienced profound cardiopulmonary collapse owing to anaphylactic shock most likely caused by the administration of IV ceFAZolin. Despite aggressive use of IV fluid administration, attempts to correct the profound respiratory acidosis, ventilatory support, and escalation of multiple vasopressors, the patient remained hypotensive and cardiac rearrest was considered imminent. Being a facility with over a decade of experience using ECMO as a rescue tool, this ED team was able to rapidly deploy VA-ECMO with an excellent outcome. The aforementioned case demonstrates the value of establishing an ED ECMO program and its potential impact on resuscitation survival rates.

Patient Recount of Events

In the Fall of 2021, I scheduled an elective surgery to remove a ganglion cyst from the lower part of my left leg. I wanted to get this thing removed, because first of all, it was unsightly, and secondly, I enjoy an active lifestyle and there was always a fear something worse would happen if I hit it or tied my boots too tight while enjoying the outdoors (maybe a little irrational but in the back of my head nonetheless). I thought to myself a quick outpatient procedure and a little bit of recovery and I won't have to worry about this lump on my leg anymore.

The day of the scheduled surgery I remember being dropped off, taking a quick inventory of what I walked in with, and then getting settled in for what I thought wasn't supposed to be more than an hour. When I woke up the next day, you could say I was a little confused. Where in the world was I, why does my groin hurt and I don't remember discussing anything about a catheter for this elective surgery! I don't remember the faces of those I spoke with after coming to but what I do remember is being told multiple times how lucky I was to be alive. When I was more alert, the ER staff explained everything that happened.

I'm grateful for everything the ER team has done to save my life. I'm happy to be back to life as normal and coaching my daughters'softball and watching my son play volleyball. I'm glad to have another opportunity to live to a ripe old age with them.

Conclusion

ED ECMO is a salvage therapy to be considered only after traditional interventions fail to resolve profound shock or cardiopulmonary arrest. This emergency department has considerable experience using VA-ECMO in a variety of extremis situations.[15] A collaborative team of ED physicians and emergency nurses work closely together to make this happen, and the roles of all team members continue to expand. This specific case review depicts the utility of an implemented ED ECMO program.

Author Disclosure

The patient care evaluated in this case report was performed in the emergency department where both authors are currently employed.

Data, Code, and Research Materials Availability

A written informed consent was obtained from the patient regarding publication of this case report, use of personal statement, and any/all accompanying images. A copy of written consent is available for review by the editor-in-chief of this journal.

REFERENCES

1. Weingart S. EMCrit 256–RUSH redux with Jacob Avila. *EMCrit Blog*. Posted September 18, 2019. Accessed June 25, 2022. https://emcrit.org/emcrit/rush-redux/
2. Motosue MS, Li JT, Campbell RL. Anaphylaxis: epidemiology and differential diagnosis. *Immunol Allergy Clin North Am*. 2022;42(1):13-25. https://doi.org/10.1016/j.iac.2021.09.010
3. Tejedor Alonso MA, Moro Moro M, Múgica García MV. Epidemiology of anaphylaxis. *Clin Exp Allergy*. 2015;45(6):1027-1039. https://doi.org/10.1111/cea.12418

4. Lieberman P. Anaphylactic reactions during surgical and medical procedures. *J Allergy Clin Immunol*. 2002;110(2 Suppl):S64-S69. https://doi.org/10.1067/mai.2002.124970
5. Castells M. Diagnosis and management of anaphylaxis in precision medicine. *J Allergy Clin Immunol*. 2017;140(2):321-333. https://doi.org/10.1016/j.jaci.2017.06.012
6. Kelkar PS, Li JT. Cephalosporin allergy. *N Engl J Med*. 2001;345(11):804-809. https://doi.org/10.1056/NEJMra993637
7. Annè S, Reisman RE. Risk of administering cephalosporin antibiotics to patients with histories of penicillin allergy. *Ann Allergy Asthma Immunol*. 1995;74(2):167-170.
8. Lafç G, Budak AB, Yener AÜ, Cicek OF. Use of extracorporeal membrane oxygenation in adults. *Heart Lung Circ*. 2014;23(1):10-23. https://doi.org/10.1016/j.hlc.2013.08.009
9. Mattox KL, Beall Jr AC. Resuscitation of the moribund patient using portable cardiopulmonary bypass. *Ann Thorac Surg*. 1976;22(5):436-442. https://doi.org/10.1016/S0003-4975(10)64452-9
10. Bellezzo JM, Shinar Z, Davis DP, et al. Emergency physician-initiated extracorporeal cardiopulmonary resuscitation. *Resuscitation*. 2012;83(8):966-970. https://doi.org/10.1016/j.resuscitation.2012.01.027
11. Dennis M, Lal S, Forrest P, et al. In-depth extracorporeal cardiopulmonary resuscitation in adult out-of-hospital cardiac arrest. *J Am Heart Assoc*. 2020;9(10):e016521. https://doi.org/10.1161/JAHA.120.016521
12. Johnston L, Williams SB, Ades A. Education for ECMO providers: using education science to bridge the gap between clinical and educational expertise. *Semin Perinatol*. 2018;42(2):138-146. https://doi.org/10.1053/j.semperi.2017.12.010
13. Tonna JE, Johnson NJ, Greenwood J, et al. Practice characteristics of Emergency Department extracorporeal cardiopulmonary resuscitation (eCPR) programs in the United States: the current state of the art of emergency department extracorporeal membrane oxygenation (ED ECMO). *Resuscitation*. 2016;107:38-46. https://doi.org/10.1016/j.resuscitation.2016.07.237
14. Yannopoulos D, Bartos J, Raveendran G, et al. Advanced reperfusion strategies for patients with out-of-hospital cardiac arrest and refractory ventricular fibrillation (ARREST): a phase 2, single centre, open-label, randomised controlled trial. *Lancet*. 2020;396(10265):1807-1816. https://doi.org/10.1016/S0140-6736(20)32338-2
15. Weingart S. Podcast 204–the nurse-led code with Joe Bellezzo. *EMCrit Blog*. Posted July 24, 2017. Accessed June 22, 2022. https://emcrit.org/emcrit/nurse-led-code/

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Case Review Section: Submit a manuscript directly to *JEN*.

ED Update: Overview of New Neonatal Resuscitation Guidelines

Authors: Patricia A. Normandin, DNP, RN, CEN, CPN, CPEN, FAEN, and Stacey A. Benotti, PharmD, Boston, MA
Section Editor: Patricia A. Normandin, DNP, RN, CEN, CPN, CPEN, FAEN

NCPD Earn Up to 8.5 Hours. See page 719.

Key words: Perinatal mortality; Infant mortality; Neonatal care; Birth; Newborn; Resuscitation

Emergency deliveries are high-risk low-volume situations that can happen in any emergency department. Even in planned labor and delivery settings, unexpected neonatal resuscitation may be required. Successful neonatal resuscitation requires an organized, evidence-based team approach, which is provided in the new Neonatal Resuscitation Program (NRP) 8th Edition guidelines.[1,2] The NRP was updated by the American Academy of Pediatrics and American Heart Association in June 2021.[1,2] The NRP 8th Edition practice changes can be seen in Table 1.[1,2] It is critical that emergency nurses anticipate and be prepared to resuscitate a neonate at any time. Many emergency nurses have not completed NRP 8th Edition education. This article is not intended to replace NRP.[1,2] The purpose of this article is to describe new evidence-based neonatal resuscitation changes in the NRP 8th Edition.[1,2]

Hundreds of births occur across emergency departments in the United States.[3] The exact number of births in the emergency department is not known.[4] In 2021, The United States had 3,659,289 registered births.[4] Infant mortality rate in 2019 was 558.3 per 100,000 live births.[4] This statistic reveals the possibility of neonate death after a live birth in the emergency department.[4] Preterm births accounted for 10.48% of these 2021 births in the United States.[4] It is important for emergency nurses to remain calm and supportive while incorporating medical-legal considerations, from triage of the pregnant patient to the ultimate admission of the neonate. The initial approach during care of the emergent birth of the neonate in the emergency department should begin with stabilization of the airway, breathing, and support circulatory measures. The emergency nurse should anticipate initiation of measures that stabilize the neonate's temperature and blood sugar levels until the neonate is admitted. Most neonates at birth make the transition to extrauterine life without intervention.[1] About 85% of term neonates will begin breathing within 30 seconds after birth.[1] Another 10% of these neonates will begin to breath in response to drying and stimulation.[1] Five percent of term neonates will need positive-pressure ventilation intervention to successfully transition to extrauterine life.[1] Two percent of term neonates will need to be intubated.[1] Unfortunately, 1 to 3 neonates per 1000 births will need chest compressions or emergency medications after birth.[1] These data outline the importance of emergency nurses maintaining neonatal resuscitation competence.[4,5]

There are multiple perinatal risk factors that increase the possibility of the need to provide neonatal resuscitation at birth. Neonatal resuscitation may be required for neonates who have no fetal or maternal identified risk factors.[1] Pregnant patients who have 1 perinatal high-risk factor should prompt emergency nurses to prepare as a team and plan neonatal resuscitation in case of an emergent delivery.[1] Examples of risk factors that emergency nurses should consider depend on the gestational age of the neonate to be delivered.[1] There will be an increased potential need for neonatal resuscitation in the neonate who is delivered at a gestational age <36 weeks or ≥41 weeks.[1] Some maternal antenatal risk factors to consider during a potential emergency delivery include pre-eclampsia or eclampsia, hypertension, polyhydramnios, and oligohydramnios.[1] Women not having had prenatal care increases the risk that neonatal resuscitation may be required at birth.[1]

Patricia A. Normandin, *Member, Massachusetts Beacon Chapter,* is an Emergency Department Staff Nurse, Tufts Medical Center; and a Faculty Member, Tufts University School of Medicine, Boston, MA. **Twitter:** @PnormandinRN. **ORCID identifier:** http://orcid.org/0000-0002-4432-829X.

Stacey A. Benotti, is a Clinical Pharmacist Specialist, Pediatric and Adult Emergency Department, Tufts Medical Center, Boston, MA.

For correspondence, write: Patricia A. Normandin, DNP, RN, CEN, CPN, CPEN, FAEN, 7 Bowl Road, Chelmsford, MA 01824; E-mail: pnormandin@tuftsmedicalcenter.org

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Pregnant women with acute or chronic medical conditions, trauma, infection, and use of legal and illegal substances may increase the risk for neonatal resuscitation at birth. Some intrapartum risk factors that may increase the risk for neonatal resuscitation at birth are intrapartum bleeding, meconium-stained amniotic fluid, chorioamnionitis, shoulder dystocia, prolapsed umbilical cord, and placental abruption.[1] Perinatal risk factors that relate to the fetus are multiple gestation, fetal anemia, fetal hydrops, fetal macrosomia, intrauterine growth restriction, and significant fetal malformations or anomalies.[1] Requiring an emergency cesarean delivery or forceps- or vacuum-assisted delivery and breech or other abnormal presentation are risk factors that indicate that neonatal resuscitation may be required at birth.[1] Emergency nurses need to be aware that mothers who had opiates within 4 hours of delivery increases the neonate risk of requiring resuscitation after delivery.[1] In addition, mothers who are receiving general anesthesia or magnesium therapy increases the risk for the neonate to require resuscitation after delivery.[1]

Important Steps in the Neonatal Resuscitation New Guidelines

It is recommended that emergency nurses and the emergency delivery team be trained and prepared for an emergency delivery. When it is identified that your team may need to deliver a baby in the emergency department, once your team has assembled, it is critical to complete a preresuscitation team briefing that reviews the current situation, including any plans that the patient and her physician or certified nurse midwife developed during antenatal counseling.[1] A team leader should be identified, assess risk factors present, anticipate potential complications including the team response, identify who will be documenting the events as they occur, delegate tasks, discuss needed equipment including supplies, and review how to call for additional help if required.[1] The NRP 8th Edition recommends a specific algorithm that begins with antenatal counseling, which is usually done by patient's delivery team before delivery, and team briefing and equipment check before the neonate is born.[1] NRP 8th Edition includes 4 new prebirth questions, which are, "What is the expected gestational age?"; "Is the amniotic fluid clear?"; "Are there additional risk factors?"; and "What is our umbilical cord management plan?"[1] The fourth new prebirth question involves the health care team discussing with the patient the umbilical cord management plan after the neonate is born to see whether delayed cord clamping is an option or risk factors contraindicate it.[1,2] The umbilical cord management plan is important for the team and patient to discuss in anticipation of an emergency delivery rather than the number of babies that will be delivered, which was included in the previous NRP guidelines.[1] The rationale for adding the umbilical cord management plan is that scientific evidence suggests there are benefits for term neonates and vigorous preterm neonates to have delayed umbilical cord clamping after birth for 30 to 60 seconds.[1] Evidence is inconclusive on whether to delay cord clamping for newborns who are not vigorous.[1] Immediate or early cord clamping may be indicated if there are placental circulation concerns.[1] Another new NRP 8th Edition change is that the period for cessation of resuscitation efforts has been extended from 10 minutes up to 20 minutes after birth, which highlights that the decision is individualized for each patient and situation. (Table 1).[1,2]

Initial Steps in Neonatal Resuscitation

The NRP 8th Edition changes include initial steps in neonatal resuscitation, electronic cardiac monitoring, EPINEPHrine dosing, 0.9% normal saline flush volume, and the time frame to stop resuscitative efforts.[1] The initial NRP resuscitation steps were rearranged in the order that represents the most widespread practice.[1] Foundations of neonatal resuscitation include a rapid evaluation to determine whether there is a need for resuscitation or whether the neonate can remain with the mother.[1] NRP 8th Edition resuscitation steps include warm, dry, stimulate, position airway, and suction if needed.[1,2]

- Within 1 minute of a neonate's birth, health care providers should assess whether neonate is term gestation, has a good tone, and is breathing or crying. If the neonate is term, has good tone, and is breathing and crying, then the neonate stays with the mother for the beginning steps of routine care and ongoing evaluation.[1]
- If during the 1-minute assessment the neonate is not term gestation, does not have good tone, or is not breathing or crying, then the health care provider should provide warmth, dry the neonate, stimulate, and position the airway.[1] Establishing an open airway is the initial step to perform and support spontaneous respirations.[1] The proper neonate airway position includes placing the neonate on the back, keeping the head and neck in neutral position (sniffing position),

TABLE 1
[1,2]NRP 8th Edition updates[1] with author translation

Old NRP 7th Edition information	New NRP 8th Edition update
Prior prebirth question, "How many babies?" removed as 1 of the 4 prebirth questions.	New: 4 prebirth questions[1,2] 1. "What is the gestational age?" 2. "Is the amniotic fluid clear?" 3. "Are there additional risk factors?" a. Antepartum risk factors b. Intrapartum risk factors 4. "What is our umbilical cord management plan?" (New fourth prebirth question).[1,2] a. If term or late preterm is expected, discuss whether delayed umbilical cord clamping will be considered. The recommendation is to delay umbilical cord clamping for 30-60 seconds after birth for strong crying neonates.[1] b. If a preterm neonate will be delivered, assess risk and benefit of delayed cord clamping or whether immediate cord clamping will be done to provide resuscitative measures.[1] c. Very preterm neonates are fewer than 32 weeks gestation.
Initial steps did not reflect existing practice	Initial steps changed to existing practice.[1,2] The initial steps include: 1. Warm 2. Dry 3. Stimulate 4. Position airway 5. Suction if needed
Electronic cardiac monitor was recommended during cardiac compressions to assess heart rate. This is later than the current recommendation.	Cardiac monitoring is recommended when an alternative airway is necessary to provide a precise neonate heart rate assessment. This is earlier than old recommendation.[1,2]
The old 0.9% normal saline flush IV/IO after EPINEPHrine administration recommendation was lower and variable mL volume.	New 0.9% normal saline flush volume recommendation after administration of EPINEPHrine IV/IO is 3 mL. The volume of 3 mL is the new recommendation for all gestational ages and weights.[1,2]
Old EPINEPHrine IV/IO and endotracheal doses were complex.	The new initial IV or IO EPINEPHrine dose recommendation is 0.02 mg/kg, which equals 0.2 mL/kg (from EPINEPHrine concentration 1 mg/10 mL) ET EPINEPHrine dose recommendation, while awaiting vascular access, is 0.1 mg/kg, which equals 1 mL/kg (from EPINEPHrine concentration 1 mg/10 mL).[1,2]
Old timeframe was after 10 minutes of resuscitation, providers could stop resuscitative measures if there was confirmed absence of heart rate. The decision to stop or continue was individualized.	New timeframe is that if after approximately 20 minutes of resuscitation after birth if there is no neonatal heartbeat after all appropriate resuscitative measures were performed, health care providers consider stopping resuscitation. The decision to stop or continue remains individualized.[1,2]

IV, intravenous; IO, intraosseous; ET, endotracheal; HR, heart rate; NRP, Neonatal Resuscitation Program.[1,2]

placing a small towel under the neonate's shoulders, and avoiding hyperextension or neck flexion.[1]

- During an emergency delivery, remember that ventilation of the neonate's lungs is the most critical step in effective neonatal resuscitation.[1] If spontaneous breathing does not occur, then you should provide positive-pressure ventilation to assist breathing for neonates with apnea or bradycardia.[1] Other interventions are to apply continuous positive airway pressure or supplemental oxygen if the neonate has labored breathing or low oxygen saturation.[1]
- Routine suctioning of the neonate is not recommended for the crying, vigorous neonate.[1] Secretions should be cleared from the neonate who is not breathing, is gasping or has poor tone.[1] A bulb syringe may be used gently to remove upper airway secretions in the neonate who has secretions that are blocking the airway, for neonates who cannot clear their own secretions, or if you anticipate providing positive-pressure ventilation.[1] Remember that neonates are obligatory nose breathers, which means that if suctioning is needed, suction the mouth before nose.[1] If suction is required, do not suction too deep or vigorously, because it may cause bradycardia or apnea due to vagal stimulation.[1] Neonates with copious secretions can be managed by turning the head to the side, which allows the secretions to collect in the cheek for easier removal.[1]

Steps After 1-minute Assessment

The neonate with labored breathing or persistent cyanosis during the 1-minute assessment rather than apnea or gasping with a heart rate less than 100 beats per minute should have the airway repositioned in the sniffing position; suction if needed, place pulse oximetry, apply oxygen if needed, and consider positive-pressure ventilation (see Table 2).[1] If the neonate has apnea or gasping with a heart rate less than 100 beats per minute, provide positive-pressure ventilation within 60 seconds of birth.[1] A pulse oximeter should be placed on the neonate's right hand or wrist along with cardiac monitoring.[1] Emergency nurses need to be aware that targeted oxygen saturation percentages for neonates are significantly different during the first 10 minutes of life compared with adult oxygen saturations.[1] (See Table 2). If these measures are successful, then provide the neonate postresuscitation care and team debriefing.[1,2]

TABLE 2
[1]Neonatal Resuscitation Program 8th Edition neonate oxygen saturation expected percentage per minute of life guidelines[1]

Neonates age of life in minutes	Oxygen saturation percentage
Neonates targeted oxygen saturation table at birth[1]	
1 minute of life	60%-65%
2 minutes of life	65%-70%
3 minutes of life	70%-75%
4 minutes of life	75%-80%
5 minutes of life	80%-85%
10 minutes of life	85%-95%
Initial oxygen concentration for positive-pressure ventilation	
≥ 35 weeks gestational age	21% oxygen
< 35 weeks gestational age	21%-30% oxygen

If positive-pressure ventilation is provided, you should anticipate that the neonate may need endotracheal intubation or use of a laryngeal mask airway adjunct.[1] Positive-pressure ventilation that is successful will demonstrate a rise in heart rate.[1] If the neonate's heart rate does not increase within the first 15 seconds of positive-pressure ventilation and if no chest movement is observed, then start ventilation corrective steps.[1] Corrective ventilation steps include the mnemonic, MR. SOPA, which are mask adjustment (M), reposition the head and neck (R), suction the mouth and nose (S), open the mouth (O), increase pressure (P), and consider alternative airway (A).[1] If the neonate's heart rate is less than 60 beats per minute, endotracheal intubation or laryngeal mask placement should be considered as well as chest compressions with coordination of positive-pressure ventilation with 100% oxygen.[1] The International Liaison Committee on Resuscitation NRP currently recommends chest compressions if there is bradycardia (heart rate less than 60 beats per minute) that does not resolve after 30 seconds of effective positive-pressure ventilation with a properly secured advanced airway.[5] With that in mind, scientists are still investigating when the best time is to initiate compressions, which may guide future NRP updates. Umbilical vein cannulation should only be considered by trained health care providers.[1] When neonatal resuscitation is required, try to identify and correct causes. If these measures are successful, then

the emergency nurse should provide postresuscitation care and team debriefing.[1]

EPINEPHRINE CONSIDERATION

In the situation that the neonate's heart rate remains less than 60 beats per minute, intravenous administration of EPINEPHrine should be given every 3 to 5 minutes while trying to identify causes such as hypovolemia or pneumothorax.[1] Circulation measures may be needed if severe bradycardia persists despite assisted ventilation.[1] Circulation support includes performing chest compressions, which are coordinated with positive-pressure ventilation.[1] The drug EPINEPHrine should be administered if severe bradycardia remains despite assisted ventilations that coordinate with chest compressions and continue.[1]

Two medication changes in the new NRP 8th Edition guidelines are simplifying the initial dose of intravenous EPINEPHrine.[1] The drug EPINEPHrine is important during neonatal resuscitation, because it is a cardiac and vascular stimulant.[1] EPINEPHrine is advised only if the neonate's heart rate remains less than 60 beats per minute after 30 seconds of positive-pressure ventilation that demonstrates inflation of the lungs, which is seen by chest movement; as well as 60 seconds of chest compressions coordinated with positive-pressure ventilation with 100% oxygen ventilation provided through a correctly placed endotracheal tube or laryngeal mask insertion.[1]

Recalling dose ranges for any medication during a high stress situation with accuracy can been difficult. This can be especially difficult when it comes to EPINEPHrine doses, because they are expressed in mg/kg per dose and mL/kg per dose, where 0.01 mg = 0.1 mL. The only EPINEPHrine that should be used is the EPINEPHrine labeled either 0.1 mg/mL or 1 mg/10 mL.[1] Interchanging mg/kg dosing with mL/kg dosing could result in a 10 times medication overdose or underdose. The emergency nurse should always make sure to obtain the 1 mg/10 mL concentration of EPINEPHrine and be attentive to the units of the dose being given, so the correct volume can be drawn up for administration. Double checking the dose with a second registered nurse or pharmacist is ideal before administration. To decrease confusion, the NRP 8th Edition guideline simplifies the dose range for EPINEPHrine by suggesting an initial dose within the previously established range.[1,2] Their suggested initial dose falls in the middle of the dosing recommendation, but this may vary between emergency settings. The NRP 8th Edition suggests the initial intravenous or intraosseous dose of 0.02 mg per kg (equal to 0.2 mL/kg).[1,2] EPINEPHrine dose by the endotracheal route is recommended to be 0.1 mg/kg (equal to 1 mL/kg), which can be used until intravenous access is established.[1,2] Familiarizing oneself with the initial dose in the emergency department's neonatal resuscitation policy is critical to being prepared for this type of an emergency.[1,2]

Emergency nurses should prepare the EPINEPHrine by using a sterile connector or stopcock to transfer the EPINEPHrine from the glass vial injector to a syringe.[1] The 1 mL syringe size should be used for the intravenous or intraosseous routes of EPINEPHrine.[1] Endotracheal route of EPINEPHrine should be administered with a 3 to 5 mL syringe.[1] All syringes should be labeled with the EPINEPHrine name and the route of administration. EPINEPHrine should always be given rapidly to be effective.[1] The doses of EPINEPHrine for intravenous/intraosseous administration have not changed but have been made a dose range, which is easier to recall, although additional research is required.[1,2]

NORMAL SALINE FLUSHES

The new NRP 8th Edition has changed the 0.9% normal saline flush volume, which is given after EPINEPHrine intravenous or intraosseous doses. The change is that all EPINEPHrine intravenous or intraosseous doses should be followed immediately with a 3 mL 0.9% normal saline flush for all neonates regardless of gestational age or weight.[1,2] The rationale for increasing the flush volume and standardizing it to 3 mL is that scientific evidence found that the volume was safe, and the lower dose flush volume may not be enough to ensure circulation of the EPINEPHrine throughout the body.[1] The emergency nurse should have a labeled flush ready to be administered after the EPINEPHrine is given to increase the circulation of EPINEPHrine to the heart.[1,2]

VOLUME EXPANDERS

There is no change in the administration of a volume expander if the neonate is not responding to the resuscitation attempts and is demonstrating shock signs or blood loss history.[1] Volume expanders should be considered in neonates in hypovolemic shock due to acute fetal-maternal hemorrhage from extensive vaginal bleeding, vasa previa, fetal trauma, umbilical cord prolapse, placental laceration, tight nuchal cord, or blood loss from the umbilical cord.[1]

Neonates who are in hypovolemic shock appear pale and do not respond to effective ventilation, chest compressions, and EPINEPHrine.[1] The recommendation for volume expanders are 0.9% normal saline or type O Rh (Rhesus) factor negative packed red blood cells administered via intravenous or intraosseous route.[1] Volume expanders should be prepared in 30 to 60 mL syringes that are labeled.[1] The dose of volume expanders remains 10 mL/kg, which are given over 5 to 10 minutes.[1] If no neonatal improvement is noted after the first dose, a second dose of packed red blood cells of 10 mL/kg may be given.[1] Do not routinely give volume expander during neonatal resuscitation in the absence of acute blood loss with signs of shock.[1]

POSTRESUSCITATION DEBRIEFING

After a neonatal resuscitation has taken place, NRP recommends a debrief for all team members involved.[1] A debrief should be led by ED leadership experienced in debriefing. The debriefing questions include asking team members to discuss what went well, what could have been done differently, comments, or suggestions for future neonatal resuscitation events.[1]

Implications for Emergency Nursing

Emergency nurses at any time may be expected to provide neonatal resuscitation measures. However, the reality is that most emergency nurses may not have completed the NRP provider course, which would offer a competence measurement for emergency neonatal resuscitation. It is important that emergency nurses stay up to date with the most current neonatal resuscitation care recommendations to offer the neonate the highest possibility of survival. All emergency nurses should know their organization's emergency delivery care and care of the neonate plan. If an organization does not have an emergency delivery policy and procedure, the emergency nurse can collaborate with their ED leadership team to develop one. Emergency nurses and all personnel involved in emergency deliveries should brief before and debrief after the event to review and correct any equipment or system issues identified.[1]

Conclusion

All emergency nurses need to anticipate and prepare for emergency neonatal resuscitation. The NRP 8th Edition changes provide an organized evidence-based algorithm of the practice changes that can improve patient safety outcomes.[1] It is recommended that nurses working in settings where an emergency birth could occur consider the NRP 8th Edition provider course training.[1]

Author Disclosures

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REFERENCES

1. Weiner GM, Zaichkin J. *Textbook of Neonatal Resuscitation*. 8th ed. American Academy of Pediatrics; 2021.
2. NRP 8th edition busy people update #1-december 2020 (Updated 6/10/21). American Academy of Pediatrics. Updated June 10, 2021. Accessed June 19, 2022. https://savingamericanhearts.com/blog/nrp-8th-edition-busy-people-update-1-december-2020-updated-61021/
3. Barss VA. Precipitous birth not occurring on a labor and delivery unit. UpToDate. Accessed June 17, 2022. https://www.uptodate.com/contents/precipitous-birth-not-occurring-on-a-labor-and-delivery-unit
4. Benzoni TE. Labor and delivery in the emergency department clinical presentation. Updated June 07, 2022. Accessed June 19, 2022. https://emedicine.medscape.com/article/796379-clinical
5. American Pediatric Society. New study evaluates current neonatal resuscitation guidelines. Medical Xpress. Published April 22, 2022. Accessed June 19, 2022. https://medicalxpress.com/news/2022-04-current-neonatal-resuscitation-guidelines.html

Send submissions to Patricia A. Normandin, DNP, RN, CEN, CPN, CPEN, FAEN at: pnormandinrn@aol.com

Building a Campaign to Increase Older Driver Safety

Author: Joan Somes, PhD, RN-BC (geriatrics), CEN, CPEN, FAEN, NRP, Apple Valley, MN
Section Editor: Joan Somes, PhD, RN-BC (geriatrics), CEN, CPEN, FAEN, NRP

NCPD Earn Up to 8.5 Hours. See page 719.

Abstract

With aging, physical and cognitive changes can affect driving safety. Emergency nurses can provide education for seniors that can create awareness of these changes and ways to mitigate the changes, allowing the older driver to remain independent and a safer driver.

Key words: Aging driver safety; Cognition; Injury prevention

As the population in the United States ages, the number of drivers older than the age of 60 years (older adult drivers) is increasing, and, unfortunately, so are the number of their deaths on the road. In 2021, 7530 drivers at the age of 60 years and older died nationwide as a result of road-related crashes.[1] This is a 14.5% increase from 6578 deaths of those older than the age of 60 years in 2020[1] and an 11% increase from 6784 deaths in 2017.[2] Reports show that based on per mile traveled, fatality rates rapidly increase in drivers older than the age of 70 years and even more so in those at the age of 85 years and older.[3,4] These rising trends have been noted since 2014 despite the efforts of many states working to reduce road-related fatalities in all ages.[3,4]

Crash-related injuries have been rising as well. Motor vehicle crashes (MVCs) are the second most common reason for injuries in those older than the age of 65 years, with falls being first.[5] In 2017, there were approximately 289,000 adults at the age of 65 years and older who were seriously injured as a result of MVCs. In 2019, there were 355,111 adults older than the age of 65 years seriously injured. In 2020, there were only 271,209 serious injuries as a result of MVCs, but this decrease is suspected to be caused by older adults staying home owing to COVID-19.[6] Serious injury data for 2021 have not yet been published by the National Highway Traffic Safety Administration, but if serious injury statistics follow the fatality trend, these numbers will increase. (It should be noted that, when surveying crash data, reports vary when defining an "older adult driver," with fatality statistics using the age ≥60 years, serious injury statistics using the age ≥65 years, and Insurance Institute for Highway Safety using the age ≥70 years when describing fatalities and injuries based on "miles traveled" in their reports.)

When considering the safety of older adult drivers on the road and their risk of injury and death, several factors come into play. Older adult drivers have more driving experience, drive fewer miles on average, and experience fewer MVCs.[2-5] However, aging leads to physical and cognitive changes, which not only put them at an increased risk of being involved in a crash but also increase frailty and fragility, thus putting the older adult driver at risk of death even in a minor MVC.[3-7] Not all deaths are immediate, but may occur in the days to months after the crash as a result of complications related to injuries that occurred during the crash. Of note, MVC-related deaths that occur 30 days beyond the crash do not factor into crash fatality statistics.[6] Education focusing on older adult driver safety is an injury prevention strategy emergency nurses could spearhead in their communities and incorporate into education when discharging an older adult driver back onto the roadways and home.

Taking Action

While acknowledging how essential rapid assessment, triage, and care of the older adult crash victim are, our goal is to describe injury prevention strategies related to older adult drivers that emergency nurses can deploy as part of discharge education or as a community outreach activity. It is

Joan Somes, *Member, Greater Twin Cities Chapter,* is Critical Care Educator, Regions Hospital EMs, Apple Valley, MN.

For correspondence, write: Joan Somes, PhD, RN-BC (geriatrics), CEN, CPEN, FAEN, NRP, 5718 Upper 136 Street Court, Apple Valley, MN 55124; E-mail: someswasblackhole@gmail.com

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BOX 1

With aging, physical strength and flexibility lessen and medications affecting alertness can cause reactions to slow; thus it is important to think about some things before getting behind the wheel.

The 4 things associated with aging that can affect driving include:

- physical changes
- cognitive changes
- medications
- medical conditions

Seven actions a driver can take to be safe include:

1.) Plan ahead
2.) Ask yourself: "Am I safe to drive now?"
3.) Exercise your driving muscles
4.) Limit distractions
5.) Correctly adjust your steering wheel, car seat, and mirrors
6.) Properly use your safety belt
7.) Ask yourself: "Will my medications or alcohol intake affect my driving?"

This information is derived from the 4/7 poster created by the Dakota County Toward Zero Death Older Driver Coalition. Used with permission.

TABLE
Screening tools that can be used to identify mobility and cognitive ability

Ability	Screening tools
Physical ability	Timed up and go test[8] Rapid pace walk[8]
Cognitive ability	Driver Orientation Screen for Cognitive Impairment[9] • 9 question screening tool that scores cognitive ability primarily used by law enforcement, but adaptable for others Mini-COG • 3-word recall and clock drawing[5] MMSE • 10-task screening tool to assess cognitive function[10] MoCA* • 11-task screening tool to assess cognitive function[5]

Descriptions of the MoCA tool can be found in Appendix C of The Clinicians Guide to Assessing and Counseling Older Drivers fourth edition (pg 394) and the others in the identified reference articles.
*The MoCA is recommended for providers' usage rather than lay public, but an older adult may bring screening test and ask the meaning of the results.[5,8–10]

important to recognize that older adult drivers may be suspicious that safe driving education might be an attempt to get them to stop driving, but by using noncritical language and a nonthreatening approach, emergency nurses will find active older adults are eager to learn.[5] Experience has shown that not only are older adult drivers interested in driving tips to make them safer but family members and friends are interested in the same information and frequently have stories to share and questions related to older adult drivers.

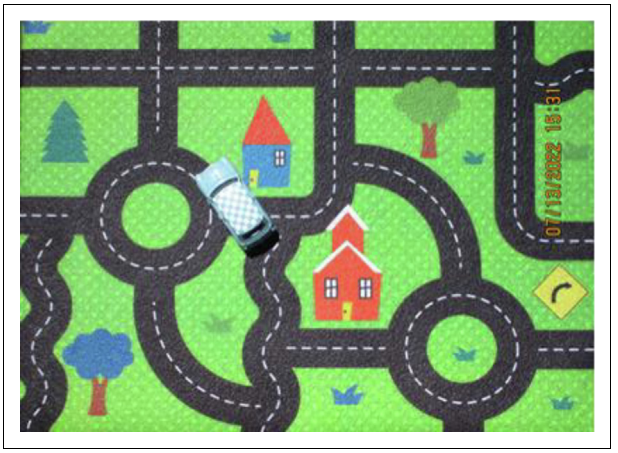
When presenting older adult driver safety information, a good ice breaker starts with the notion that everyone ages and everyone experiences these changes—just at differing rates. A successful approach in the past used a large poster or slide (and matching handouts) that stated "With aging, physical strength and flexibility lessen. Medications affecting alertness can cause reactions to slow. Before getting behind the wheel consider these things!" The "4-7 poster" as it came to be known lists the 4 things associated with aging that affect driving and 7 actions that can increase driver safety (see Box 1).[5] The poster provided a backbone for a variety of discussions and educational opportunities by listing the effects of aging on driving and actions that can be taken. By putting these things into perspective, discussions become less threatening for older adults. By identifying and elaborating on actions that can mitigate changes associated with aging, drivers can select actions that help them to be a safer driver, even before getting behind the wheel. These "topic suggestions" provide fuel for additional questions, discussions, and learning opportunities related to safe driving.

Examples of safe driving content that can be teased from the poster include the following:

- Signs and symptoms of physical and cognitive changes that occur as a normal part of aging while reminding learners that aging occurs in all, just in different stages and at different rates
- Lists of common medical conditions—diabetes, dementia, Alzheimer's disease, Parkinson's disease, visual changes, stroke or cardiac conditions, and mobility issues that can affect driving[5]
- Simple screening tools for physical and cognitive changes that affect driving (see Table)[5,7,8]

- Lists of prescription medications, over-the-counter medications, and herbals that can affect driving[5]
- Sheets of exercises to strengthen driving muscles or puzzles that can challenge the brain[5]
- Driving and road conditions that can be problematic, but adjusted for when planned for ahead of time[5]

Other useful information such as how to appropriately wear a seat belt, adjust the seat and mirrors, and recognize driving situations that are higher risk such as intersections, merging, and left-hand turns can be shared.[4,5,11] An older adult driver safety event may simply be the nurse presenting information, or the nurse could lead a discussion about a chosen topic, a question/answer session, or could involve a slide show, short video clips, or a demonstration involving a nonmoving vehicle (when COVID-19 restrictions allow), or providing small mats or rugs that show a variety of road configurations including roundabouts, merging lanes, and intersections, which participants can "practice" driving using toy cars (see Figure). The use of "props" and "fun" when teaching has been shown to be effective in all age learners, and the road mats have been found to be a nonthreatening way to demonstrate safe driving.[12-14] Hard-copy examples of resources that can be downloaded for printing, or accessed on the internet, and information about older adult driver safety classes, CarFit events (see description later), and a list of how to access low cost rides can be provided. Creating and sharing links to website pages that are dedicated to older adult driver safety and injury prevention are a great way to provide information, especially for local senior center leaders or others to use or share. Box 2 identifies a variety of websites that have free and downloadable information related to older adult driver safety.



FIGURE

This 9 × 11 inch table top mat and a small (approximately 1 inch in length) toy car works well to demonstrate how to drive through roundabouts or merge into traffic in a nonthreatening way. Adults seem to enjoy driving the cars as much as the children do. These "town" mats can be found as large as 3 feet by 5 feet at local home improvement center (photo by J. Somes).

Limiting Driving and Safety

Most drivers recognize when it is time to self-limit, or stop driving, usually at approximately the age of 65 years.[4,5] Common reasons older adult drivers identified as reasons to limit or stop driving include vision changes, warnings on medication bottles, medical conditions, or no longer feeling comfortable behind the wheel of a motor vehicle.[4,5] Some older adults continue to drive but adjust their driving to avoid driving in poor weather, after dark, in areas where there is a lot of traffic, confusing intersections and traffic patterns, or where speed limits are higher.[4,5]

Sometimes an unsafe older adult driver will not, or cannot, stop driving for a variety of legitimate reasons such as not having alternative methods of transportation, or they are the only means of transportation for required activities of daily living for themselves or a family member (such as grocery shopping, health care provider appointments, and trips to the pharmacy). It is then that family members or others must step in.[5] A frequent "ask for help" from family members is for information on how to manage the older adult driver who refuses to relinquish the keys and is at risk of harming themselves or others when driving. Recognize that this is often a difficult conversation to have. Families are uncomfortable because this conversation often can strain relationships with their loved one. Medical personnel are often just as uncomfortable having this discussion because there is the risk that the patient may switch providers if the topic is broached.[5] Concern about an older adult's loss of independence and ability to have an active life are frequent reasons given by law enforcement, health care, and families for not taking steps that would lead to having an older adult driver's driving skills evaluated.[5] It should be noted that having one's driving skills evaluated does not always lead to loss of driving privileges. Sharing this information may relieve some of the guilt felt by those asking for the evaluation of skills by the State's Driver Vehicle Services Department.

A great resource related to this issue is the Hartford Foundation's "We Need to Talk" booklet (see Box 2). The booklet is free to download and contains much useful information. A second valuable resource is the local occupational therapy practioner or driving rehabilitation specialist.

BOX 2
List of useful resources and links related to the older adult driver

AAA (American Automobile Association): https://seniordriving.aaa.com/
AARP (American Association of Retired Persons): https://www.aarp.org/auto/driver-safety/
American Occupational Therapy Association: https://www.aota.org/Practice/Productive-Aging/Driving.aspx
CarFit: https://www.car-fit.org/
CDC (Centers for Disease Control and Prevention): https://www.cdc.gov/trasnportationsafety/older_adult-drivers/index.html
CHORUS (Clearinghouse for Older Road User Safety): https://www.roadsafeseniors.org/blog/10-suggestions-how-approach-your-aging-parent's-driving
Hartford Foundation resources found at: https://www/thehardford.com/resources/mature-market-excellence/publications-on-aging
The Hartford Foundation booklet: "We need to talk" is found at: https://s0.hfdstatic.com/sites/the_hartford/files/we-need-to-talk.pdf
NHTSA (National Highway Traffic and Safety Administration): https://www.nhtsa.gov/road-safety/older-drivers

These experts are trained to assess patient's ability to perform activities required for driving. Depending on who requests the assessment and the driver's insurance, an assessment related to driving fitness may be covered, or partially covered, by health insurance.[5] Being able to provide a list of the area occupational therapy practioners and driving rehabilitation specialists can be helpful, as can asking the emergency care provider to write a prescription for an assessment. Providing information about these resources and other materials related to older adult drivers can help either guide a conversation or provide support for those concerned.

A program offered by the American Occupational Therapy Association, in conjunction with the American Association of Retired Persons, is CarFit (see Box 2). During this interactive event, the older adult drives their vehicle into a "station" where the CarFit technician goes through a 12-point check sheet that ensures the driver "fits" in their vehicle appropriately and can use its safety features.[11] Emergency nurses can train to be a CarFit technician and help with events. Simple adjustments to seats, seatbelts, and mirrors can be taught to the driver by the technician. If more extensive teaching or reinforcement of teaching is needed, the technician can check a box indicating this or note other concerns. During "checkout," the last step of the event, an occupational therapy practioner or driving rehabilitation specialist at the event will provide additional training or suggestions that can increase the driver's safety.[11] Becoming a CarFit technician can lead to great collaborations between emergency nurses and occupational therapy practitioners while providing great opportunities for emergency nurses to conduct injury prevention activities.

If one is highly concerned about an older adult's driving skills, there is an additional resource emergency nurses should be aware of to provide this information to drivers and their families. All states have a process that allows others to request the Department of Vehicle Services to have a driver be examined for continued driving privileges if they are concerned about a driver's safety.[5] It is important to know that submitting this request does not automatically lead to loss of license, but doing so initiates a multistep process, which may show the person is still safe to drive, may limit the times or places they drive, or may result in loss of license. As a word of caution, unless "protected" by state statute, the name of the person submitting the request will generally be released to the driver should they ask.[5] However, this is a helpful option families can use when they are concerned about an older adult family member's driving. Emergency nurses do need to remind families that they also need to take action to ensure the driver does not have access to the vehicle's keys or take steps to disable the vehicle. Revocation of a driver's license does not automatically mean the older adult driver will not still attempt to drive.

Methods to spread older adult driver risk awareness and safety information are only limited by the imagination. If there are concerns about spread of infection—such as COVID-19—providing older adult driver safety information virtually is certainly an option. As people start getting back together, venues can include senior centers, senior gyms, churches, fairs, and other events where active older adults and/or their families gather. Interactive question and answer sessions where coffee and snacks are available seem to increase older adult attendance.

Taking steps to increase older adult driver safety is an action that emergency nurses can do in small doses or as large events. Funds to offer this education can often be obtained by providing brief awareness education about older adult driver risks and safety to those who have funds for injury prevention and simply asking for financial support. Before conducting the "ask," it is important to prepare a budget, which explains the items for which the funds will

be used. Providing safety education as part of discharge instructions related to seat belt usage, seat and mirror adjustment, or the "4/7 older driver safety hints" may help save a life. Providing education that will help to keep older adults mobile, independent, and safe on the roads is something emergency nurses can and need to do.

Author Disclosures

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Joan Somes, PhD, RN-BC (geriatrics), CEN, CPEN, FAEN, NRP, is grant manager of a Minnesota Department of Transportation/Office of Traffic Safety Older Driver Safety Project and has been responsible for creating increased awareness and safety on the roads for Minnesota seniors for the past 4 grant cycles. She is also a CarFit technician and event coordinator.

REFERENCES

1. Early estimates of motor vehicle traffic fatalities and fatality rate by subcategories in 2021. National Highway and Traffic Safety Administration, National Center for Statistics and Analysis. Published May, 2022. Accessed May 30, 2022. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298
2. Traffic safety facts 2017, a compilation of motor vehicle crash data. National Highway and Traffic Safety Administration, National Center for Statistics and Analysis, US Department of Transportation. Published September 2019. Accessed 30, May 2022. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi0-Ks0fb4AhXyk4kEHat_AD4QFnoECAMQAQ&url=https%3A%2F%2Fcrashstats.nhtsa.dot.gov%2FApi%2FPublic%2FPublication%2F812806&usg=AOvVaw27fDXPDgnbrUIAhqMCBvol
3. Fatality facts 2020: older people. Insurance Institute for Highway Safety. Published May 2022. Accessed May 30, 2022. https://www.iihs.org/topics/fatality-statistics/detail/older-people
4. Older drivers. Insurance Institute for Highway Safety. Updated July 2022. Accessed May 30, 2022. https://www.iihs.org/topics/older-drivers
5. Chapter 1-the older adult driver: an overview. In: Pomidor A, ed. *Clinicians Guide to Assessing and Counseling Older Drivers*. 4th Ed. American Geriatrics Society; 2019:6-17.
6. Overview. National Safety Council Injury Facts. Published 2022. Accessed June 4, 2022. https://injuryfacts.nsc.org/motor-vehicle/overview/introduction/#:~:text=NHTSA%20counts%20only%20traffic%20fatalities,30%20days%20after%20thecrash
7. Kuska TC. Traffic safety and older drivers. *J Emerg Nurs*. 2020;46(2):235-238. https://doi.org/10.1016/j.jen.2019.12.010
8. Mielenz TJ, Durbin LL, Cisewski JA, Guralnik JM, Li G. Select physical performance measures and driving outcomes in older adults. *Inj Epidemiol*. 2017;14(1):4. https://doi.org/10.1186/s40621-017-0110-2
9. Hill LL, Rybar J, Stowe J, Jahns J. Development of a curriculum and roadside screening tool for Law enforcement identification of medical impairment in aging drivers. *Inj Epidemiol*. 2016;13(1):3. https://doi.org/10.1186/s40621-016-0078-3
10. Shin RD. Delirium, dementia, and amnesia in emergency medicine clinical presentation. Medscape. Published 2018. Accessed May 30, 2022. https://www.medscape.com/answers/793247-158301/how-is-the-mini-mental-status-exam-mmse-administered-in-the-diagnosis-of-delirium-dementia-and-amnesia
11. CarFit. helping mature drivers find their safest fit. American Occupational Therapy Association, American Association of Retired Persons, American Automobile Association. Accessed May 30, 2022. https://www.car-fit.org/
12. Chapter 3. Ultimate adult learning office. In: Edmunds C, Lowe K, Murray M, Seymour A, eds. *The Ultimate Educator: Achieving Maximum Adult Learning Through Training and Instruction*. Office for Victims of Crime; 2002:1-14.
13. Trainer's toolbox-february 2012. Office for Victims of Crime, Training Technical Assistance Center. Accessed May 30, 2022. http://www.ncdsv.org/images/OVCTTAC_Trainer'sToolbox_2-2012.pdf
14. Lucardie D. The impact of fund and enjoyment on adult's learning. *Procedia Soc Behav Sci*. 2014;142:439-446. https://doi.org/10.1016/j.sbspro.2014.07.696

Send submissions to Joan Somes, PhD, RN-BC (geriatrics), CEN, CPEN, FAEN, NRP at: someswasblackhole@gmail.com

Understanding Research: The Importance of Research Mentors

Authors: Michael Callihan, PhD, RN, CEN, NRP, Elizabeth Mizerek, MSN, RN, CEN, CPEN, CNE, FAEN, and Lisa Wolf, PhD, RN, CEN, FAEN, FAAN, Tuscaloosa, AL
Section Editor: Lisa Wolf, PhD, RN, CEN, FAEN

Mentoring in Nursing Research

Nurse researchers strive to improve the delivery of emergency nursing care through a wide range of activities such as documenting problematic issues in emergency departments, developing theories for why these problems are occurring, and testing interventions to produce a body of evidence; other activities may include implementation of evidence-based interventions or using evidence to support policy. Nurse researchers are dedicated to improving outcomes for patients, emergency nurses, their facilities, and the health care system. Just as it is necessary to develop stretcher-side nurses and emergency department leaders, nurse researchers with knowledge specific to the emergency department are essential to the advancement of the emergency nursing specialty. This column will address the usefulness of research mentors and the elements and goals of the mentor-mentee relationship for emergency nurses interested in research both at the bedside and in academia.

The Oncology Nursing Society developed a description of challenges and strategies for nurse researchers and identified mentoring as a key component for advancement of both the individual and the nursing discipline.[1] Challenges that arise for novice researchers regarding development of the research plan and methodology, adhering to timelines, and increasing research responsibilities can be met using strategies such as training programs, formation of supportive cohorts, and a search for funding opportunities[1] and experiential learning with targeted mentorship allowing the nurse to transition from novice to expert within their new and evolving role.[2] Well-matched and engaged mentors can provide support to both those who are within academia and those at the stretcher side who want to explore and describe practice problems. Given the need for knowledge generation in emergency nursing practice, the role played by nurse researchers as mentors is critical to moving the profession forward in the academy and at the stretcher side.

The Mentoring Relationship

A novice researcher must gain competence in both research and dissemination skills,[3,4] which can be developed through effective mentoring.[5] Mentorship can be either transactional or translational in nature. A transactional relationship focuses on the output of the researcher.[6] For example, a transactional relationship might focus on a mentor guiding the mentee through a grant application or providing feedback on a research proposal. The translational relationship focuses on developing the strengths of the mentee, allowing them to develop their own research trajectory, and is often achieved in a collaborative fashion.

Finding a Good Mentor

A good mentor is someone who has admirable qualities, acts as a guide but is purposeful in tailoring the support to each mentee, is available to meet with the mentee, supports the personal and professional balance of the mentee, and leaves a legacy through role modeling of the profession.[5] A good mentor for the novice nurse researcher must have both the technical skill in research and the psychosocial qualities of being a mentor.[7] This person will lead by example[8] rather

Michael Callihan is Assistant Professor, School of Nursing, University of Alabama, Tuscaloosa, AL. **ORCID identifier:** https://orcid.org/0000-0002-5585-7701.

Elizabeth Mizerek is Director of Nursing Education, Mercer County Community College, West Windsor, NJ. **ORCID identifier:** https://orcid.org/0000-0002-7768-9032.

Lisa Wolf is Director, Emergency Nursing Research, Emergency Nurses Association, Schaumburg, IL. **ORCID identifier:** https://orcid.org/0000-0002-7065-470X.

For correspondence, write: Michael Callihan, PhD, RN, CEN, NRP, Capstone College of Nursing, University of Alabama, 650 University Boulevard, East Tuscaloosa, AL 354012; E-mail: mlcallihan@ua.edu

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than simply sending the researcher off to do the work, unguided and unassisted.

Many avenues exist for identifying a mentor. Professional organizations, such as the Emergency Nurses Association, provide a platform for novice researchers to reach out to experienced researchers to help develop emergency nursing research. In particular, the Academy of Emergency Nursing has a mentorship program that matches members with Fellows for either short-term (transactional) or long-term (translational) mentoring; this program is appropriate for both academically situated and clinically situated novice researchers. In addition, the Emergency Nursing Research Advisory Council is focused on developing new stretcher side–situated researchers through their Emergency Nursing Diverse Voices Research Fellowship program, supported by the Emergency Nurses Association Foundation.

Where else can mentors be found? Investigate whether your health care organization has a nursing research team. Your alma mater or a college or university regionally close to the emergency department also might provide a connection to research professionals. Beyond professional or academic organizations, search the literature. If there is a topic that you are interested in exploring, identify experts by investigating who has authored peer-reviewed publications on that topic. Journals typically provide the contact information of the authors; reach out and ask for assistance. Many researchers are eager to connect with those who share an interest in their program of work and may be able to serve as a mentor. Finding researchers that work in your field or with your preferred research methods can allow for collaborative efforts and strong mentoring relationships.

Being a Good Mentee

Communication is key to the establishment of a good mentoring relationship. Both parties must be able to set boundaries for expectations of the relationship, recognizing their limitations and expressing them to each other. Writing out the expectations of both the mentee and mentor can help clarify expectations and provide a roadmap for the collaboration. A mentee must be motivated to improve. The ability to take constructive feedback and apply it to change is critical in the growth and development process.

The mentee must be able to develop skills in critical thinking and critical appraisal to develop research competency.[9] Critical thinking is the ability to apply higher-order cognitive skills with deliberative thinking leading to actions that are appropriate and logical.[10] This higher level of thinking is foundational in a mentor/mentee relationship, so that part of the joint work between mentor and mentee is to specifically develop those competencies, with the goal of becoming an independent researcher.

Emergency nursing research needs to be conducted by those with intimate knowledge of research methods and strategies and familiarity with the challenges of the emergency care setting. An effective mentoring relationship supports the novice researcher in skill development and research expertise, with the goal of ultimately improving emergency nursing practice both in academia and at the stretcher side.

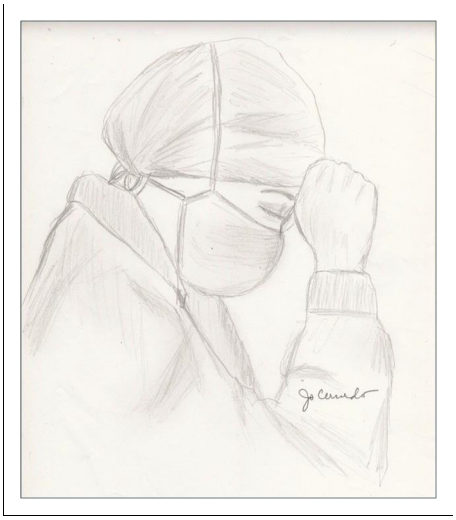
REFERENCES

1. Voss J, Alfes CM, Clark A, Lilly KD, Moore S. Why mentoring matters for new graduates transitioning to practice: implications for nurse leaders. *Nurse Lead*. 2022;20(4):399-403. https://doi.org/10.1016/j.mnl.2022.01.003
2. Benner P. Using the Dreyfus model of skill acquisition to describe and interpret skill acquisition and clinical judgment in nursing practice and education. *Bulletin of Science, Technology, and Society*. 2004;24(3):188-199. https://doi.org/10.1177%2F0270467604265061
3. Cleary M, Sayers J, Watson R. Essentials of building a career in nursing research. *Nurse Res*. 2016;23(6):9-13. https://doi.org/10.7748/nr.2016.e1412
4. Hafsteinsdottir TB, van der Zwaag AM, Schuurmans MJ. Leadership mentoring in nursing research, career development and scholarly productivity: a systematic review. *Int J Nurs Stud*. 2017;75:21-34. https://doi.org/10.1016/j.ijnurstu.2017.07.004
5. Cho CS, Ramanan RA, Feldman MD. Defining the ideal qualities of mentorship: a qualitative analysis of the characteristics of outstanding mentors. *Am J Med*. 2011;124(5):453-458. https://doi.org/10.1016/j.amjmed.2010.12.007
6. Brymer E, Gray T. Effective leadership: transformational or transactional? *Journal of Outdoor and Environmental Education*. 2006;10(2):13-19. https://doi.org/10.1007/BF03400835
7. Cypress BS. Fostering effective mentoring relationships in qualitative research. *Dimens Crit Care Nurs*. 2020;39(6):305-311. https://doi.org/10.1097/dcc.0000000000000444
8. Kichloo A. Early mentoring for research and academic careers. *J Investig Med High Impact Case Rep*. 2020;8:2324709620949316. https://doi.org/10.1177/2324709620949316
9. Chen Q, Liu D, Zhou C, Tang S. Relationship between critical thinking disposition and research competence among clinical nurses: a cross-sectional study. *J Clin Nurs*. 2020;29(7-8):1332-1340. https://doi.org/10.1111/jocn.15201
10. Papp KK, Huang GC, Lauzon Clabo LM, et al. Milestones of critical thinking: a developmental model for medicine and nursing. *Acad Med*. 2014;89(5):715-720. https://doi.org/10.1097/acm.0000000000000220

Submissions to this column are encouraged and may be sent to Lisa Wolf, PhD, RN, CEN, FAEN at lwolf@ena.org

Finding My Joy: Fighting Nurse Burn-out

Author: Jocelyn C. Sese, MSN, RN, CEN, TCRN, NE-BC, NHDP-BC, Queens, New York



At the beginning of April 2020, the COVID-19 pandemic burned me out. I was ready to quit nursing. I wanted to run as far away as I could, away from dying patients, away from the heartaches.

I remember waking up in bed, physically drained from a fitful sleep, emotionally shattered by the friends and the patients we lost. I debated calling out sick that morning just because I dreaded hearing the frequent overhead pages for the code team.

The apex of this pandemic that we were preparing for came much too early. Physicians, nurses, and technicians were running around responding to calls for intubations, desperately trying to race against time. We were all covered from head to toe with impervious gowns, face shields, double gloves, boots, and surgical caps; the N95 masks would later leave marks on our faces. The scars in our hearts were unseen, and post-traumatic stress disorder, a real threat.

We were protected, we assured ourselves, but how could you be confident about how safe you are when the COVID-19 fatalities keep on rising? The whole hospital (and all of New York City) was in a pandemic chokehold.

It took a few minutes of deep breaths before I could summon the courage to rise from my bed. For the first time in my long nursing career, I was at a crossroads I never thought I would be at. I had considered myself unshakable. "Been there, done that; nothing can ever make me turn away from nursing," or so I thought.

That morning, I felt burnt out, but I went to work. I could not abandon my staff. To fortify myself, I looked up onto the heavens and whispered, "My Lord God, take charge of my life."

On The Frontline

New York streets were empty. The "city that never sleeps" had been in total lockdown since March, and only essential workers were allowed to travel. Along the Cross Bronx Expressway on my way to work, what was once a traffic nightmare looked more like an apocalypse with nary a car nor truck in sight for miles on end. Times Square was a ghost town. The silence was both eerie and deafening. I felt as though I was going to war, but I was scared and helpless. I hated being vulnerable.

I was on the frontline but felt like a spectator. I was not actually at the bedside giving direct care as I wanted to be. The responsibility of being a Director of Nursing in an emergency department amid a health care crisis was overwhelming but not more than what the emergency nurses, technicians, medical providers, and other ancillary personnel had to go through. I can only imagine the enormous impact of the unending crisis on their psychological well-being when their best efforts sometimes failed.

My nurses forbid me to go into the rooms, even to help prepare the bodies for the morgue. They wanted me safe. I joked that I was not that old, that I could fight alongside them. As with imposter syndrome, I felt inadequate and

Jocelyn C. Sese is retired, Independent Consultant, Author of "ER Nurse: The Warrior Within", Queens, New York. **Twitter:** @Filnurseinameri.

For correspondence, write: Jocelyn C. Sese, MSN, RN, CEN, TCRN, NE-BC, NHDP-BC; E-mail: jocerse@yahoo.com

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that I was not quite pulling my own weight on the battlefield. I felt guilty that I was not at the bedside.

All I could do was make rounds, check on the staff, order supplies, request more staffing help from the Incident Command, coordinate travel nursing coverage, handle family complaints, and act as a cheerleader and emotional support for the staff. I followed up with my quarantined staff members for COVID-19 exposure and illness. It was difficult to hear their anxiety, and I feared that they could hear the quiver in my voice, so I preferred texting to phone calls.

I saw the patients come through the triage area with no family members to sit by their bedside. They were whisked directly to rooms and supplied with high-flow oxygen masks to aid in their breathing. I saw patients inside the isolation room as they lay with apprehensive eyes looking at their oxygen saturation numbers on the cardiac monitors. I also saw some patients lose the battle and die.

I remember the eyes of the ED staff beyond their masks and face shields. Eyes that were sad and worried. Eyes haunted by the final goodbyes between the patients and their loved ones on an iPad. Eyes filled with despair because of the unprecedented challenge wrought by the COVID-19 onslaught. These were our darkest times.

I tried to be transparent in providing information to the staff. But I grappled with what I could share. So, in my emails and our daily huddles, I talked about the nurse travelers coming in, the nonclinical activities, and nonemergent procedures that were put on hold to deploy the staff to the emergency department and other patient units. My news was as upbeat and hopeful as I could possibly communicate it to my already disheartened staff. I informed them of other surge capacity activities that the hospital leadership had initiated to accommodate the influx of patients with COVID-19.

I did not share my concerns about the grim statistics and the dwindling supplies and equipment (because we compete with other hospitals for resources). I did not share that the morgue was full and that there were medical examiner trailers on our campus. I did not confess that I wanted to quit nursing.

I did not want to stop and answer questions about my state of mind for fear that the tenuous hold on my fragile emotions would break. I did not want anyone to see me ugly-cry because of the sadness in my heart. So I cried behind the doors.

My priority was to have my staff feel supported so that they could take care of the patients who needed their expert help. I had to be the leader they deserved. I learned how to appear confident on the outside while I was frazzled on the inside. I learned to hide my fear. I could not afford to be weak.

Epiphany: Self-Care

The staff needed a sort of personal protective equipment for our mental well-being. We corroborated with the mental health liaison psychologists, who offered counseling and other options for the team to de-stress, decompress, and start healing our broken hearts. The psychologists taught us to reach out and seek help.

My epiphany was that I had to do self-care. How could I help my staff when I was running on empty? In my personal life, through all of life's ups and downs, I relied on my family and friends, my church, and my writing to endure. I knew I was strong enough to survive my personal travails, but I was unsure if I could remain a nurse amid the challenges that had brought down my colleagues. I resolved to look for my joy triggers at work. I knew I had to heal myself before I could lead others.

One day, a nurse asked to speak with me. The nurse broke down crying as soon as we got into my office. Words of pain and despair poured out, and repressed emotions from the past months finally tumbled out. The nurse was not suicidal but was profoundly sad and depressed. We talked for a long time, but mostly I just listened. I called one of the mental health counselors and arranged an emergency visit. Then we hugged, and the nurse thanked me for listening and being there. I am glad to report that today that nurse is healthy and thriving.

Finding My Joy

I promised myself that COVID-19 would not be my downfall. Having witnessed the heroism and fortitude displayed by all health care personnel during these uncertain times made me realize how much I love the nursing profession. In my little way, I am privileged to have made a difference, and I wanted to continue to be a nurse.

That moment of indecision in my nursing career, that short period of burn-out, that temporary insanity is no longer. I have recovered my self-worth; I have found my joys and my "why."

What turned me around? What prevented me from leaving my profession?

My healing came as I continued working as a nurse. I poured out my emotions into my daily journal, a catharsis that helped me exorcise my negative feelings. My writing brought everything into perspective. Much as there were so many heartaches, I found comfort in our small triumphs. As a nurse, I was part of the army against this virus.

There were numerous things to celebrate. Let me recount the reasons I persevered:

- The clapping and appreciation from the hospital neighborhood and other heroes such as the firefighters and police officers.
- The outpouring of support from the community with unsolicited food deliveries, which fed both our bodies and our souls.
- The staff working as a team and caring for one another.
- The staff coming in extra days so that their peers did not work short-handed.
- The deployed staff working in unfamiliar places and doing their very best to help.
- Dancing to the music "Call on Me" each time a patient was discharged.
- Receiving thank you's from the patients and their families.
- The staff rising to the challenge, despite the threat of COVID-19.
- The knowledge that every single hospital employee was doing their best under the most extreme circumstances.
- The realization that we were doing God's work.

I created a Facebook photo album using pictures from the staff to celebrate the resilient group that they are. It was a way to pay tribute to and highlight this particular group on the frontlines of this war. I wanted to preserve in posterity the faces of the brave ones who had come to fight the battle against COVID-19.

The Facebook photo album grew into a photo journal. It chronicles the moments of levity captured in between the moments of heartbreak, those moments just before the staff rushes back to the unit to save more lives.

Frozen in time, the pictures capture the ED team taking a much-deserved break, a respite from the hard work–just a little breather. They show the spirit of our camaraderie, of having bonded as we worked together. As time went on, the staff started to "SMIZE" they smiled with their eyes.

These health care workers, heroes of my time, were simply inspiring.

Nurses' Month

In May 2020, the hospital managed to celebrate the "Year of the Nurse" creatively despite the constraints of social distancing and face masks. We danced in the streets, gave out cookies and cupcakes, published the emergency department's virtual nursing journal, enjoyed the gifts from numerous sponsors, and were treated to an aerial display from the US Air Force and Navy. The festivities were a harbinger of hope that we would survive. The end of the pandemic would come. And then we prayed for the vaccine, our fighting chance.

In 2022, the American Nurses Association chose the theme, "You Make A Difference." Nurses in all specialties and sectors truly matter as we give our patients a chance for a better life. Every day. Our strength is rooted in determination and dedication to serving those who need help, and is fortified by the challenges and disruptions of the past years.

Every single nurse affected by the pandemic crisis should be proud to be still standing. Bruised maybe, but still standing. Today, I am retired, but, one way or another, through my teaching and my writing, I am still a nurse.

Submissions to this column are encouraged and may be submitted at jenonline.org where submission instructions can be found in the Author Instructions.

Emergency Department Immersion: A Clinical Elective

Author: Miranda M. Smith, EdD, RN, Huntsville, AL

Contribution to Emergency Nursing Practice

- Nursing schools are attempting to find creative ways to incorporate clinical rotations during the COVID-19 crisis. A creative way to incorporate clinicals is the use of electives in specialty areas.
- This article explains how professional relationships between hospital management teams and nursing school faculty can help increase students' clinical experiences while immersing them into the world of the emergency department.
- This elective provided unique opportunities for the students and allowed them to increase their clinical judgment and confidence in their skills. There were numerous opportunities to help the students improve on their career development skills.

Key words: Nursing education; Clinical competence; Interprofessional education; Clinical reasoning; Clinical skills

Many scholars agree that clinical experiences are the best way to develop deep knowledge of nursing practice. Even though clinical hours are planned in the curriculum, students enjoy additional opportunities to prepare for graduation and career opportunities. This article explains how an elective ED course helped to enhance nursing students' clinical judgment, interprofessional collaboration skills, and technical nursing skills during the COVID-19 pandemic.

Miranda M. Smith, is Clinical Assistant Professor, The University of Alabama in Huntsville, Huntsville, AL. **ORCID identifier:** https://orcid.org/0000-0001-7516-3013.

For correspondence, write: Miranda M. Smith, EdD, RN, 1610 Ben Graves Drive, Huntsville, AL 35899; E-mail: miranda.smith@uah.edu

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Attempting to obtain clinical experiences during a time of crisis was hard for many nursing schools. Federal and state protective orders shut down many hospitals that students had attended.[1] Students had to adapt and learn through a new environment using video conferencing devices. However, this article focuses on creating an elective in an emergency department made possible by existing professional relationships between the management team and a faculty member from a prominent bachelor of science in nursing program.

Creating a trusting and supportive relationship with the hospital's management team made it possible for this elective to succeed during a crisis. The faculty members and management shared common ideas, such as a structure for the students during clinical experience, immersion in the emergency department's reality, and focused, high-quality, patient care. During the COVID-19 pandemic, hospitals became understaffed, and the staff was very stressed and tired. However, by allowing the students to participate in this ED elective, they could perform nursing procedures, learn how to communicate with patients and their families, and complete assessments.

The faculty member created an application to learn why students were interested in the course. The students were interviewed by faculty and offered acceptance to the most promising students. At the end of the process, 6 students were enrolled in the course. Students typically have a knowledge deficit in specialty areas,[2] and specialty electives help students strengthen knowledge deficits or focus on clinical interests to prepare for nursing practice. Previous literature has shown that providing additional opportunities strengthens relationships with practice partners, helps with the graduating students' job placement, and increases students' clinical judgment.[3,4] Nursing electives allow students to explore nursing areas that may not be available during clinical rotations, such as hospice or palliative care, perioperative, rehabilitation, geriatrics, oncology, and global health.

Goals for the Course

The student learning outcomes for this nursing elective focused on students applying their previous knowledge, increasing hands-on skills, reinforcing professional behaviors

and core values, and focusing on the safety of the patients and the students. The participating students had completed third-semester courses, and this elective course helped them apply their knowledge to complex situations in the ED setting. The students also focused on delegation, leadership, communication, interprofessional collaboration, and applying evidence-based practice within the health care setting.

Description of Course

The faculty member planned the ED elective course in a 941-bed community hospital. In preparation for ED practice, the faculty member planned the first clinical day in the campus-based Learning Resource and Technology Center to practice using ventilators, hot-line tubing, warming blankets, and defibrillators; the students also reviewed skills with the placement of intravenous catheters and urinary catheters. This experience exposed them to the equipment and skills that they would encounter in the emergency department, allowing them to practice with the equipment in a nonstressful environment. The students used case studies and ED protocols to help them learn to think through common emergent conditions.

Immersion Experience

Students immersed themselves in 10-hour days where they learned how to function in a complex, chaotic ED. They worked and interacted with nurses, physicians, respiratory therapists, radiology technicians, and many others who were part of the health care team. The students completed 90 hours. Students filled out an assessment form on their patients during their clinical and then reflected on their experiences throughout that day. Clinical experiences provided the students with opportunities to build their clinical judgment, interprofessional collaboration, and technical nursing skills. Students took care of patients involved in traumas, cardiac or respiratory arrest, shortness of breath, abdominal pain, and injuries, among many other issues. Students debriefed at the end of the clinical day to reflect on what they learned and connect disease processes to nurses' actions to care for their patients.

Clinical Judgment

The students developed their clinical judgment by applying the knowledge they had learned in their classes and putting it into practice. The students analyzed laboratory data, reviewed diagnostic studies, looked at prescribers' orders, and performed assessments. This experience increased their clinical judgment by linking different concepts and assessing how different disease processes affect one another.

Interprofessional Collaboration

The students learned to anticipate the client's needs by engaging with the health care team members. Students learned from physicians and interacted with them during their time in the emergency department. During these encounters, the students learned communication and professional skills that they did not have before this experience. Many students interacted with respiratory therapists while patients were on the ventilator and learned about the ventilator while helping perform nursing care on these patients. Students interacted with radiology technicians and learned the importance of monitoring the patient in radiologic procedures. Students collaborated with the pharmacists while they made their rounds consulting about medication. Pharmacists also were present during trauma codes and cardiac arrests, so the students observed the role of the pharmacists in the hospital in an emergent situation. This interaction with interprofessional teams allowed the students to understand how important it is for health care teams to work together.

Technical Nursing Skills

Many students are eager to perform skills during their usual clinical rotations. Students performed assessments, initiated intravenous placement, performed catheterizations, administered medications, and assisted health care providers with procedures, postmortem care, and many other nursing skills. Some students got to assist with level I or level II traumas. This experience allowed the students to practice chest compressions, watch chest tube placements, observe endotracheal intubations, and help with running a code on a patient. By the end of this ED elective, most students were proficient in starting intravenous placements, using infusion pumps, and performing assessments. Students assisted providers with procedures; they understood teamwork by helping with these patients during an emergent situation.

Career Development

This ED elective allowed the students to develop their future career and professional skills. The students learned how to manage patients, organize their time and care,

prioritize patients for assessment, and communicate with other health care professionals. Through this elective, students gained more confidence in themselves and their skills before participating in their preceptorship. Most students who participated in this elective stated that the emergency department was where they wanted to work after graduation, giving them an inside look at the work of an ED nurse.

Reflections from Students and Faculty

Students were eager to learn and take care of the patients. When the students met in the morning, they were eager for their assignments and to start the day. Students repeatedly said that they enjoyed this elective, and they were grateful for the opportunity to learn. Students commented, "I felt I had more opportunities to learn hands-on skills and what it is like to be a nurse during this summer's clinical than I have in all other clinical experiences. This elective was easily the most beneficial clinical I have had." Another student commented, "I learned so much and will be able to use the information I learned in next semester and my nursing career. I give this course a 10/10 recommendation." At the end of each 10-hour day, the students continued to smile and were excited to share their experiences.

This experience was very humbling as a faculty member because it is easy to get discouraged in times of crisis. It was re-energizing because of the students' dedication to learning and passion for caring. The students dealt with death, suicide, trauma, and very sick patients, but they provided care with poise and grace. They gave all they had to help patients and learn how to give their best to future patients. As the faculty member involved in this course, it is of recommendation that nursing schools provide more elective courses in specialty areas such as the emergency department, intensive care units, and the operating room.

Author Disclosures

Conflicts of interest: none to report

REFERENCES

1. Fay DL, Ghadimi A. Collective bargaining during time of crisis: recommendations from the COVID-19 pandemic. *Public Adm Rev*. 2020;80(5):815-819. https://doi.org/10.1111/puar.13233
2. Robinson E, Epps F. Impact of a palliative care elective course on nursing students' knowledge and attitudes toward End-of-Life care. *Nurse Educ*. 2017;42(3):155-158. https://doi.org/10.1097/nne.0000000000000342
3. Maneval R, Hepburn M, Brooks C, et al. Enhancing the undergraduate nursing education experience with clinical elective courses. *J Prof Nurs*. 2021;37(2):366-372. https://doi.org/10.1016/j.profnurs.2020.04.014
4. Schmidt NA, Brown JM. The effect of perioperative nursing elective on nursing career paths. *AORN J*. 2019;109(1):87-94. https://doi.org/10.1002/aom.12444

Emergency Nursing Review Questions: November 2022

Author: Benjamin E. Marett, EdD, MSN, CEN, TCRN, CCRN, COHN, NPD-C, NE-C, FAEN, FAHA, Schaumburg, IL
Section Editors: Benjamin E. Marett, EdD MSN CEN TCRN CCRN COHN NPD-C NE-C FAEN FAHA and Sara Webb, MSN, C-PNP, CFNP, C-NPT

These review questions are based on the Emergency Nursing Core Curriculum and other pertinent resources to emergency nursing practice. They offer emergency nurses an opportunity to test their knowledge about their practice.

QUESTIONS

1. A patient with a potential eye injury is attempting to read the Snellen eye chart. The patient cannot identify the E at the top of the chart, 20/200 with the injured eye. What is the next level regarding vision testing?
   - **A.** Document 20/200 as the maximum measurable visual acuity.
   - **B.** Ask the patient whether they can see finger movement at a 20-foott distance.
   - **C.** Document unable to determine a visual acuity for the injured eye.
   - **D.** Instill fluorescein stain to determine whether vision improves.
2. A 4-year-old child is airlifted to a trauma center with burn injuries from a backyard grill fire. The child has burns to the entire left arm, left anterior leg, and anterior chest and abdomen. Based on the rule of "9"s, what is the approximate percentage of body burns?
   - **A.** 44%
   - **B.** 34%
   - **C.** 18%
   - **D.** 27%
3. An ED patient is being treated for paroxysmal supraventricular tachycardia. The initial and repeated doses of Adenocard (adenosine) have not altered the rhythm. The provider orders a bolus of Cardizem (diltiazem) and an infusion. Vital signs are noted to be BP 130/80 mm Hg, pulse rate of 180 beats per minute, respiratory rate of 16 beats per minute, temperature of 36.8 °C (98.3 °F), pulse oximetry (SiO_2) of 99% room air, and weight of 65 kg. Your suggested action would be:
   - **A.** hold off on the Cardizem (diltiazem) because of the vital signs.
   - **B.** suggest additional Adenocard (adenosine) before Cardizem (diltiazem).
   - **C.** administer 16 mg bolus of Cardizem (diltiazem) and 10 mg/hour infusion.
   - **D.** administer 65 mg bolus of Cardizem (diltiazem) and a 25 mg/hour infusion.
4. A patient arrives in triage with a possible insect bite to the left hand. You observe a single puncture wound with moderate edema and redness. The patient is complaining of severe cramping to the upper arm and abdomen. You would suspect what type of insect bite?
   - **A.** Brown recluse spider
   - **B.** Scorpion
   - **C.** Black widow spider
   - **D.** Fire ant
5. Compartment syndrome is suspected in a patient with severe swelling to the forearm from a crush injury. Which of the following would confirm the diagnosis?
   - **A.** Distal capillary refill of 2 seconds
   - **B.** Compartment pressure of 70 mm Hg
   - **C.** Palpable radial pulse
   - **D.** Arterial pressure of 90 mm Hg

ANSWERS

1. Correct answer: B

If a patient is unable to see the largest print on an eye chart, 20/200, the next option would be to ask the patient whether they can perceive hand or finger motion, followed by the

Benjamin E. Marett is a Past President of ENA and a member of South Carolina State Council, Emergency Nurses Association, Schaumburg, IL.

For correspondence, write: Benjamin E. Marett, EdD, MSN, CEN, TCRN, CCRN, COHN, NPD-C, NE-C, FAEN, FAHA; E-mail: bmarett@comporium.net

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ability to see light (B). Documentation of 20/200 would indicate the patient was able to see the largest letters. In the situation described, the patient was unable to see the largest letter (A). Other options for obtaining visual acuity would include finger movement, reducing the distance of the visual chart, light perception, and hand movement (C). Fluorescein stain is used to stain any abrasions or injury to the cornea, being enhanced with a black light (D).[1]

2. Correct answer: B

The rule of "9"s for children defines the entire left arm as 9%, left anterior leg as 7%, and the anterior chest and abdomen as 18%, or 34% of the total body surface area (B). The other choices listed do not match the percentage distribution in accordance with the rule of "9"s for children (A, C, D). Other methods for determining percentage of body surface area burned include the Lund and Browder formula and an estimation of 1% of body surface area by using the palm of the child's hand.[2]

3. Correct answer: C

The next treatment option for a patient with stable paroxysmal supraventricular tachycardia refractory to Adenocard (adenosine) would be a calcium channel blocker such as Cardizem (diltiazem). The initial dose should be 0.25 mg/kg followed by an infusion of 5 to 15 mg/hour. This patient is described as weighing 65 kg, so the correct initial bolus should be 16 mg followed by an infusion of 10 mg/hour (C). The listed vital signs would be defined as stable, not prohibiting the use of a calcium channel blocker such as Cardizem (diltiazem) (A). Current recommendations are for the use of Adenocard (adenosine) for an initial treatment and a repeated double dose. Further repeated dosing is not described (B). The dosing and infusion are not correct for the current recommendations of Cardizem (diltiazem) (D).[3]

4. Correct answer: C

A typical bite from a black widow spider may cause localized numbness initially then followed by localized pain and muscle spasms. The venom is neurotoxic, causing damage to nerve tissue. The symptoms may progress to a rigid board-like abdomen and difficulty in breathing. The female spider is larger and more toxic (C). A brown recluse spider bite is cytotoxic, causing local tissue damage (A). A scorpion sting is painful, not causing muscle cramps, and causes skin discoloration and swelling (B). Fire ant bites cause itching, skin redness, and pustule formation (D).[4]

5. Correct answer: B

A compartment pressure of 70 mm Hg would be high, indicating increased pressure within the extremity compartment. A normal compartment pressure is less than 10 mm Hg. Increased pressure is indicative of compartment syndrome and requires immediate intervention such as a fasciotomy (B). Distal capillary refill of 2 seconds would be considered normal (A). A palpable radial pulse would be a normal finding, although it could be obtained with mild compartment syndrome. (C). An arterial pressure of 90 mm Hg would be considered a normal finding (D).[5]

REFERENCES

1. Nolan-Kelley L. Ocular emergencies. In: Sweet V, Foley A, eds. *Sheehy's Emergency Nursing Principles and Practice*. 7th ed. Elsevier; 2020:265-267.
2. Wraa C. Burn trauma. In: Sweet V, ed. *Emergency Nursing Core Curriculum*. 7th ed. Elsevier; 2018:530-532.
3. American Heart Association. *ACLS for Experienced Providers, Manual and Resource Text*. American Heart Association; 2017.
4. Butterfras B. Environmental emergencies. In: Pollak A, Mejia A, McKenna K, Edgerly D, eds. *Emergency Care and Transportation of the Sick and Injured*. 12th ed. Jones and Bartlett; 2021:1228-1232.
5. Cerepani M. Orthopedic and neurovascular trauma. In: Sweet V, Foley A, eds. *Sheehy's Emergency Nursing Principles and Practice*. 7th ed. Elsevier; 2020:313-339.

Send submissions to Benjamin E. Marett, EdD MSN CEN TCRN CCRN COHN NPD-C NE-C FAEN FAHA at: bmarett@comporium.net or Sara Webb, MSN, C-PNP, CFNP, C-NPT, Paramedic at: sara.webb@jhmi.edu.

Optimizing Pediatric Patient Safety in the Emergency Care Setting

Authors: Madeline M. Joseph, MD, FAAP, FACEP, Prashant Mahajan, MD, MPH, MBA, Sally K. Snow, BSN, RN, CPEN, FAEN, Brandon C. Ku, MD, and Mohsen Saidinejad, MD, MS, MBA, and the AMERICAN ACADEMY OF PEDIATRICS COMMITTEE ON PEDIATRIC EMERGENCY MEDICINE, AMERICAN COLLEGE OF EMERGENCY PHYSICIANS PEDIATRIC EMERGENCY MEDICINE COMMITTEE, and EMERGENCY NURSES ASSOCIATION PEDIATRIC COMMITTEE, Jacksonville, FL, Ann Arbor, MI, Philadelphia, PA, and Los Angeles, CA

Abstract

This is a revision of the previous American Academy of Pediatrics policy statement titled "Patient Safety in the Emergency Care Setting" and is the first joint policy statement by the American Academy of Pediatrics, the American College of Emergency Physicians, and the Emergency Nurses Association to address pediatric patient safety in the emergency care setting. Caring for children in the emergency setting can be prone to medical errors because of a number of environmental and human factors. The emergency department has frequent workflow interruptions, multiple care transitions, and barriers to effective communication. In addition, the high volume of patients, high decision density under time pressure, diagnostic uncertainty, and limited knowledge of patients' history and preexisting conditions make the safe care of critically ill and injured patients even more challenging. It is critical that all emergency departments, including general emergency departments who care for the majority of ill and injured children, understand the unique safety issues related to children. Furthermore, it is imperative that all emergency departments practice patient safety principles, support a culture of safety, and adopt best practices to improve safety for all children seeking emergency care. This policy statement outlines the recommendations necessary for emergency departments to minimize pediatric medical errors and to provide safe care for children of all ages.

Madeline M. Joseph, Division of Pediatric Emergency Medicine, Department of Emergency Medicine, University of Florida College of Medicine—Jacksonville, Jacksonville, Florida; University of Florida Health Sciences Center—Jacksonville, Jacksonville, Florida.

Prashant Mahajan, Departments of Pediatrics and Emergency Medicine, University of Michigan Medical School, Ann Arbor, Michigan.

Sally K. Snow, Independent Consultant in Pediatric Emergency and Trauma Nursing.

Brandon C. Ku, Department of Pediatrics, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, Pennsylvania.

Mohsen Saidinejad, The Lundquist Institute for Biomedical Innovation at Harbor-UCLA, David Geffen School of Medicine at UCLA, Los Angeles, California.

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Corresponding Author: Madeline M. Joseph, MD, FAAP, FACEP; E-mail: madeline.joseph@jax.ufl.edu.

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Abbreviations:
AAP, American Academy of Pediatrics; ACEP, American College of Emergency Physicians; AI, artificial intelligence; CDS, clinical decision support; CPOE, computerized physician order entry; ED, emergency department; EHR, electronic health record; ENA, Emergency Nurses Association; EMS, Emergency Medical Services

Policy Statement

Over the last 2 decades, patient safety has become a key priority for health care systems because of increased recognition of the risks of medical care. Since the publication of the 2000 report of the Institute of Medicine (now the National Academies of Sciences, Engineering, and Medicine) "To Err is Human: Building a Safer Health System,"[1] there have been significant increases in research, education, collaboration among numerous organizations, and development of outcome measures to promote safety in the medical care arena. Despite such progress, medical errors and patient harm remain common.[2,3]

Since the publication of the original American Academy of Pediatrics (AAP) policy statement on this topic,[4] several specific policies of the AAP, American College of Emergency Physicians (ACEP), and Emergency Nurses Association (ENA) related to patient safety strategies have been published in the peer-reviewed medical literature, including pediatric readiness in the emergency department (ED), handoffs, patient- and family-centered care, and medication safety.[5-8] In addition, the revised policy expands on the principles of pediatric patient safety in the AAP policy statement from the Council on Quality Improvement and Patient Safety[9] to address elements specific to caring for pediatric patients in the emergency care setting. Of note, the revised policy statement is also intended for promoting pediatric safety in all emergency care settings, including general EDs caring for children and pediatric EDs.

The Joint Commission constructed a framework that health care organizations can use to accelerate their progress toward the ultimate goal of zero harm. The framework is organized around 3 major domains of change including: 1) commitment of leadership to the goal of zero harm; 2) promotion of safety culture; and 3) empowerment of the work force to employ robust process improvements tools.[10] In addition, the Institute for Healthcare Improvement and Safe & Reliable Healthcare collaborated to develop the Framework for Safe, Reliable, and Effective Care. The framework consists of 2 foundational domains—culture and the learning system—along with 9 interrelated components, with engagement of patients and families at the core.[11] The 9 components include leadership, 4 cultural components (psychological safety, accountability, teamwork and communication, and negotiation) and 4 components of the learning system (transparency, reliability, improvement and measurement, and continuous learning). This policy statement will address adopting these frameworks of The Joint Commission as well as the Institute for Healthcare Improvement and Safe & Reliable Healthcare in the emergency care setting to provide resources and recommendations that promote pediatric patient safety.

Recommendations for Optimizing Pediatric Patient Safety in the Emergency Care Setting

LEADERSHIP COMMITMENT TO SAFETY THROUGH ADOPTING PEDIATRIC READINESS

- Make patient safety in the ED a priority for hospital and ED leadership.
- Ensure that all EDs have the appropriate resources (medications, equipment, policies, and education) and capable staff to provide emergency care for children, per the AAP, ACEP, ENA joint policy on pediatric readiness in the emergency department.[5]
- Support the presence of a pediatric ED quality and patient safety committee or pediatric representative on the ED quality and safety committee, which increases the culture of safety and addresses pediatric specific safety issues.[12]
- Support the concepts and encourage acceptance of tenets of pediatric readiness in all EDs across communities at state and national levels.[5]
- Establish processes for ongoing quality improvement and regular assessment of pediatric readiness in the ED and develop a plan to address any deficiencies.

Factors Influencing Patient Safety Culture in the ED

The main factors influencing patient safety culture in the ED are human, managerial, and organizational and environmental.[13,14]

I. FACTORS THAT INFLUENCE PEOPLE AND THEIR BEHAVIOR

Patient- and Family-Centered Care

- Acknowledge the family's role in the health of the patient as one of the core principles of patient- and family-centered care to ensure patient safety.[15]
- Engage patients and families at all points of emergency care, including family presence during procedures and resuscitation, cultural sensitivity, communication, shared decision-making, coordination with the medical home, and discharge planning and instructions.[7]
- Establish a clear policy and procedure for family presence, supported by all levels of the hospital staff including physician specialties, which will decrease family and staff anxiety when family is present during procedures and resuscitations[7,16,17]
- Support attention to the physical, emotional, and distinct medical needs of children. Having designated areas in a general ED allows for taking steps toward making the physical environment safer for children, such as locks on cabinets, and placing dangerous equipment—ie, the sharps containers high and out of reach of children.
- Support patient- and family-centered care and safe care of all children, including children and youth with special health care needs such as children with intellectual disabilities, children who are nonverbal and have cerebral palsy, and children with deafness. This includes ensuring specific components of dignity and respect (such as listening to families), participation, collaboration, information and child-oriented resources, support for families, and environmental resources (eg, conducive and welcoming waiting room design and wait-time strategies).[18]
- Support the presence and expertise of a certified child life specialist in the ED that focuses on age-appropriate distraction techniques to minimize anxiety and fear and need for sedation in children undergoing procedures like intravenous line insertion, wound repair, and other invasive and painful procedures to positively affect the experience for the child and their caregiver and help improve safety and satisfaction with the ED visit.[19-21]. Training for nurses and physicians regarding distraction and pain-alleviating strategies is important especially in the absence of a child life specialists.
- Encourage timely communication between the ED and the medical home to ensure safe and continuum of care.
- Encourage seeking resources available at the Institute for Patient- and Family-Centered Care on the subject including a self-assessment inventory specific to the ED.[22]

Communication

- Cultural competency, cultural humility
  - Acknowledge the impact of racial and/or ethnic disparities on many aspects of emergency care, such as recognizing disparities in analgesic management for children presenting with acute abdominal pain, appendicitis, and fractures[23-25]; imaging[26]; and antibiotic prescriptions in viral infections.[27]
  - Advocate for efforts to target implicit bias training and diversify the ED workforce, which has the potential to close some of the gaps in heath disparities in the emergency care settings.[28,29]
  - Improve clinicians' cultural competency and awareness of their own implicit bias on the safety and quality of care of children in emergency care settings by providing education in health equity.[30] The fast pace and stressors in the ED environment may lead to cognitive shortcuts and greater use of stereotypes, which exacerbate implicit biases.[28]
- Language barriers
  - Identify language and cultural barriers in the emergency care setting, because they have a large impact on health care delivery and patient safety because of higher rates of medical errors and worse clinical outcomes.[31,32] Patients with language, culture, and socioeconomic challenges are disproportionately at risk of experiencing preventable adverse events in the health care system.[33-35]
  - Implement shared decision-making practices and address issues of ethnic culture, literacy, and language barriers by using trained language interpreter services rather than bilingual relatives or limited clinician's proficiency in the patient's language.[36,37] Lack of such resources can increase the risk of adverse safety events, return visits to the ED, or deviation from evidence-based guidelines in emergency care setting.[38-41]
  - Expand available resources for beside ED interpreters, such as using tele-interpreter services, which include sign language.[42]

Errors in Diagnosis in Pediatric Emergency Medicine

- Recognize that diagnostic errors or delayed diagnoses can occur throughout all settings of care including the ED. Such errors may cause harm to patients by preventing or delaying appropriate treatment, providing unnecessary or harmful treatment.[43]
- Identify factors that can cause breakdown in the diagnostic process. These include patient factors (language barriers, lower health literacy, and altered mentation), provider factors (overconfidence, cognitive biases, inadequate training, loss of skills/competencies, drug use), and systems factors (such as lack of available resources and poorly designed electronic health system). System factors also include socioeconomic factors (disparities attributable to insurance, race, language barriers, social determinants of health) that predispose patients to diagnostic errors.[43]
- Become aware of common cognitive biases in the clinician that can lead to diagnostic error.
- Systematically address diagnostic errors in the pediatric emergency care setting to provide high-quality and safe care.[44-48]

Shift Work/Burnout/Wellness

It has long been recognized that clinician factors, such as physician burnout, have a significant influence on the health care system in terms of productivity, care quality, and patient safety.[49-51] Burnout has led many physicians to consider reducing workload, retiring early, quitting, or even suicide.[52] Clinicians' mental health is also often affected by burnout.[50]

- Recognize clinician's burnout and poor well-being as factors contributing to poor safety outcomes such as incorrect medication orders, delayed care, and incorrect documentation, all of which contribute to diagnostic errors and patient harm.[51]
- Be aware of the potential impact of "off hour" shift work (evenings, nights, weekends, and holidays), changing shift assignment from day to night in the ED on premature burnout as well as poor overall physical, cognitive, mood and mental health.[53-56] All of these factors impact the potential to cause medical errors and risk to patient safety.[56,57]
- Consider using behavioral interventions such as light therapy, keeping a consistent shift, moderate caffeine consumption, and scheduled naps to minimize the short-term negative effects of a shifting sleep schedule. In addition, many of the risks of shift work are associated with metabolic syndrome and obesity. Therefore, encouraging all ED staff in keeping a healthy weight, exercising regularly, and adopting healthy eating habits might decrease such risks.
- Take into account improvement in clinicians' wellness when planning interventions to improve patient safety.[53] It is also critical to advocate for governments and health policy makers to invest in the wellness of health care professionals, especially nursing, to counter workforce shortage, which was exacerbated during the COVID-19 pandemic in hospitals and EDs, to ensure a healthy population.[58]

II. MANAGERIAL FACTORS

Psychological Safety and Reporting Close Calls

- Enhance patient safety by using reports from frontline staff of near misses and unsafe conditions to identify latent safety events. Such reporting is vital to continue to improve systems within the ED environment to ensure patient safety.[59]
- Encourage open communication and joint review and auditing (morbidity and mortality conferences or other mechanisms) of "near misses" among ED physicians and ED nursing staff. That practice can help create "just culture" with no individual blame for errors, which can mitigate reluctance among clinicians to report and discourage the hiding of events.[60]
- Listen to families, as an underused source of data in emergency care settings, to learn about errors, especially preventable adverse events, many of which may not be otherwise recognized by the medical team or documented in the medical record or event reporting.[61]

ED Crowding and Patient Safety

- Recognize that ED crowding threatens pediatric patient safety and poses an increased risk of medical errors, including errors related to delays in providing emergent care.[62-68]
- Support sustainable solutions to ED crowding that decrease input by increasing primary care access through extended hours of the medical home.[69,70]

- Support ED throughput by implementing a 5-level triage system with nurse-initiated, evidence-based, standardized protocols and order sets at the point of initial triage consistent with the recommendations of the AAP policy statement on overcrowding and ACEP standardized protocols for optimizing ED care and policy triage scale standardization.[71-75]
- Increase the use of clinical pathways, which could be included as part of the electronic health record (EHR) order set, in emergency care settings to decrease variation, increase efficiency, and improve safety for pediatric patients.[76,77]
- Improve the efficiency of care provided in emergency care settings to all acuity levels through the use of fast track and split flow on presentation.[73,78,79]
- Develop innovative ED staffing models that adapt to growing patient needs [80] and introduce active bed management to facilitate timely ED to inpatient bed transfer and improve ED throughput.[81,82] Active bed management includes improvement of hospital inpatient discharge processes, such as timely room cleaning, streamlining the discharge process, and conducting early rounds to determine patients' eligibility for discharge. All of these practices can facilitate early transfer of patients from ED to the inpatient unit.
- Address nursing and staff shortage in the inpatient unit as well as in the ED, which can worsen during disasters such as during the COVID-19 pandemic. Such shortages can exacerbate the lack of available beds for admitted patients and also overburden nursing staff and create potential safety concerns.[83]
- Recognize that boarding, because of pediatric mental health issues, can worsen during disasters such as during the COVID-19 pandemic, where mental health illnesses increased in frequency and severity.[84] Disparities also exist in the outcomes of mental health; Black and Hispanic families are at risk for increased burden of grief because they experience higher mortality with certain illnesses such as with COVID-19, food insecurity, financial instability, and education interruption.[85,86]
- Advocate for increased mental health services in schools; integrate mental health into pediatric primary care; increase insurance coverage and payment for mental health in the ED as well as follow up care; and extend access to telehealth, all of which can decrease children and adolescents in crisis requiring ED visits. Advocacy for having appropriate mental health resources in the ED is critical for safety planning and post-discharge mental health outreach.
- Explore research, education, and collaboration to develop and implement sustainable solutions to prevent and manage ED crowding.

III. ORGANIZATIONAL AND ENVIRONMENTAL FACTORS

Teamwork/Team Training

- Train ED staff in teamwork that teaches individuals to crosscheck each other's actions using easy to remember acronyms[87,88] and mnemonics like those identified in the Children's Hospital's Solutions for Patient Safety-Zero Harm program to decrease the possibility of errors.[89]
- Optimize classroom education in teamwork by using simulation with specific scenarios to facilitate critical thinking skills, team interaction, and communication in the ED.[88] Multidisciplinary teams benefit from pre-event briefing, huddles, and post-event de-briefing to help identify opportunities for improvement. Simulation training is an effective tool to modify safety attitudes and teamwork behaviors in the ED setting. Sustaining cultural and behavioral changes requires repeated practice opportunities and accountability of the entire ED team to complete such training.[90]
- Support the integration of team training in the physician, nursing, and emergency medical services (EMS) training programs. The Agency for Healthcare Research and Quality provides information on several team-training programs with documented success in managing the challenging environment of the ED.[91]
- Incorporate a cultural broker (a go-between, one who advocates on behalf of another individual or group), when available, in the care team who can support the team to effectively address cultural differences in the patient's practices and subsequently promote health equity and safety.[92]

Emergency Department Shift Huddles

- Conduct shift huddles among all staff involved in the patient's care regularly in the ED to improve care

coordination, relationships, and collaboration and strengthen the culture of safety.[93,94] In addition, if time and circumstances allow, encourage less formal "spot" meetings at mid-shift to tackle any foreseeable concerns.
- Support safety huddles/safety briefings including daily check-ins. Huddles are recommended as a team building tool in Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS), which is an evidence-based teamwork system aimed at optimizing patient outcomes and safety to increase situational awareness and decrease error.[95]
- Support interprofessional and interdepartmental communication and collaboration between the ED and hospital units to improve patient flow from the ED to other units.[96]

Handoffs in the Emergency Department

Communication errors are a contributing factor for approximately two-thirds of sentinel events,[97] more than half of which involve handoff failures.[98]

- Recognize that patients requiring emergency care often transition across and within multiple care areas, including the prehospital setting, the ED, inpatient units, and medical homes. All of these transitions of care require handoffs to exchange mission-specific information, responsibility of care, and authority for treatment and procedures.[6] The joint policy statement from the AAP, ACEP, and ENA on handoffs reviewed many recommendations to improve the safety practice in the ED setting.[6]
- Recognize that miscommunication and misinformation that starts in the ED may affect a patient's inpatient and outpatient care as well, because such information can be perpetuated throughout the entire patient encounter (and future encounters). Handoffs are a well-documented safety risk in the ED attributable to communication errors,[6,99-102] cognitive biases,[102] and environmental factors.[6]
- Increase structured handoffs in the ED, which occur in less than 20% of handoffs from ED to inpatient care.[103] Numerous models have been implemented and studied to improve the quality of handoffs, including checklists[102-105] structured mnemonics,[104,106,107] and handoff bundles.[108,109] Examples of mnemonics include SBAR (**s**ituation, **b**ackground, **a**ssessment, and **r**ecommendation),[110] SOUND (**s**ynthesis, **o**bjective data, **u**pcoming tasks, **n**ursing input, and **d**ouble check),[104] ABC-SBAR (**a**irway, **b**reathing, **c**irculation followed by **s**ituation, **b**ackground, **a**ssessment, and **r**ecommendation),[108] and I-PASS (**i**llness severity, **p**atient summary, **a**ction list, **s**ituation awareness and contingency planning, and **s**ynthesis by receiver).[106]
- Develop novel and innovative physician staffing models to allow overlapping shifts to decrease the number of handoffs that occur.[111] Of note, the needs of each individual ED are unique. Therefore, the utilization and distribution of various staffing models utilizing physicians and other clinicians within the ED should be determined at the site level by local ED leadership.[112]
- Monitor patients in high-risk situations, in which key team members will visit such patients regularly to assess for change in clinical status. This situation includes handoff of a patient with an uncertain diagnosis or disposition, an unstable patient, a consultant-driven evaluation, a pending imaging study, deviations from a typical diagnosis or treatment plan, or a prolonged stay in the ED.[113]
- Explore further research comparing different handoff models in the ED setting to determine their effects on patient harm and clinical outcomes. In addition, best practices for handoffs need to be derived and validated so they can be implemented to improve patient safety in the emergency care setting.

Empowerment of the Workforce to Employ Robust Process Improvements and Safety Strategies

It is critical for patient safety to ensure that staff has the ability to do what is necessary for patients in a timely manner, keeping the best interest of the patient in mind, including adapting to technology and developing and implementing strategies for providing safe and quality medical care. Information from frontline clinicians is critical to continue to improve any system process or strategies taken to increase patient safety.

THE ROLE OF INFORMATION TECHNOLOGY IN PATIENT SAFETY

- Recognize the important role of information technology in improving health care safety and quality. In the modern ED, EHR functionally integrates

bed management, patient flow, medication ordering and administration, abnormal study results, documentation, changes in clinical status, and disposition planning.

- Increase the implementation of computerized physician order entry (CPOE) and clinical decision support (CDS) with electronic prescribing to reduce ordering medication errors. On the other hand, CPOE systems may not fully eliminate medication errors in children, because commercial or independently developed CPOE systems may fail to address critical unique pediatric dosing requirements.[114] In addition, because true dosing alerts for medication errors can be overridden by clinicians, system refinements are necessary to reduce the high false-positive alert rate, which could lead to alert fatigue.[115]
- Develop CDS tools and integrate them into EHR to streamline workflows. An example of a guideline embedded within information systems to increase adherence to best practices is the successful CDS implementation in EHR of the 2 Pediatric Emergency Care Applied Research Network (PECARN) prediction rules to identify children at very low risk of clinically important traumatic brain injury. As a result, head computed tomography (CT) utilization rates decreased from 26.8% to 18.9% with no increase in returns within 7 days and no significant missed diagnoses.[116]
- Identify technological solutions to medical safety concerns such as the use of electronic equipment (eg, programmable "smart" infusion pumps in neonates,[117] barcoding to compare identification bands with medications). Such solutions have resulted in improved detection of medication calculations and administration errors.[118]
- Leverage the use of telehealth to enhance patient safety by connecting patients and pediatricians to remote specialist care. Telehealth can help in preventing unnecessary transfers and keeping patients in rural areas connected to the health care system when in-person visits are difficult to achieve.[119-122]
- Recognize and support the evolving role of data science, and specifically artificial intelligence (AI) methods, in creating statistical models that can be integrated into CDS to improve patient safety and outcomes. In the ED, data science methods such as AI are increasingly being used for disease identification, admission or discharge prediction, and patient triage.[123] AI is also being used to guide "smart" staffing decisions and resource allocation.[124]

STRATEGIES FOR IMPROVING MEDICATION SAFETY IN THE EMERGENCY CARE SETTING

- Use strategies for improving medication safety as outlined in the joint policy statement from the AAP, ACEP, and ENA on pediatric medication safety in the ED.[8] This includes the development of a standard pediatric formulary that includes standard concentrations and dosage of high-risk and frequently used medications, such as resuscitation medications, vasoactive infusions, narcotics, and antibiotics, as well as look-alike and sound-alike medications.[8]
- Establish a process to ensure that body weight is measured and recorded in kilograms only to avoid inappropriate calculations.[8,125,126]
- Advocate for the integration of ED pharmacists, when possible, within the ED team to verify the preparation, dosing, dispensing, and reconciliation of medications administered in the ED as well as drug education to heath care team and patients.[127-129] Having pharmacists in the ED directly or in a consultative fashion remotely (telepharmacy) may increase medication safety in the emergency care setting.
- Establish the use of a distraction-free medication safety zone and implementation of an independent 2-clinicians check process[130] for high-alert medications, as suggested by the Institute for Safe Medication Practices and The Joint Commission.[131,132] Patient-identification policies, consistent with The Joint Commission National Patient Safety Goals, should be implemented and monitored.[130-132]
- Recognize risk factors for medication errors during ordering, preparation, and administration such as not using the appropriate weight and performing medication calculations based on pounds instead of the recognized standard of kilograms, inappropriate calculations including tenfold-dosing errors, and making medication errors in the 5 rights of medication (the right patient, the right medication, the right dose, the right time, and the right route).
- Establish safe sedation practices using guidelines such as the recently developed guidelines through a collaborative effort of the AAP and the American Academy of Pediatric Dentistry.[133]
- Advocate for policies to address timely tracking, reporting, and evaluation of patient safety events and for the disclosure of medication errors or unanticipated outcomes. Education and training in medication error disclosure should be available to care providers who are assigned this responsibility.[5,134,135]

PEDIATRIC EMERGENCY CARE SAFETY DURING DISASTERS INCLUDING INFECTIOUS OUTBREAKS

- Recognize that one of the fundamental foundations of pediatric disaster readiness is ensuring that general EDs are able to meet the needs of children on a daily basis. Thus, one of the key components of disaster preparedness for EDs is to be "pediatric ready."[5,125]
- Ensure disaster planning takes into consideration the unique needs of children, especially those with access and functional needs and preexisting and complex medical conditions, as well as recognition of physical, developmental, and psychosocial differences, because the majority of children present to community hospital EDs.[136]
- Review ED disaster plans to ensure the safety of unaccompanied children, because during disasters, children may present unaccompanied by caregivers and unable to self-identify,[137] and have an established protocols for patient tracking and family reunification.[137]
- Recognize that in a hazardous materials event, plans for decontamination of children should include attention to water temperature and pressure to reduce hypothermia and prevent further dermal injury.[138]
- Ensure that ED staff has practiced pediatric disaster plans either through simulations or including children in disaster drills given that disasters are "low frequency, high impact events."[139-141]
- Recognize that the mental health needs of children experiencing disasters can extend into adulthood.[142] Therefore, hospital ED pediatric disaster plans may include identifying personnel to attend to the psychosocial and psychological needs of children to immediately decrease mental stress/trauma.
- Ensure that staff and pediatric patients have adequate personal protective equipment to reduce transmission during infectious outbreaks.
- Use available resources to improve pediatric disaster preparedness and response. The Emergency Medical Services for Children Improvement and Innovation Center has excellent resources for disaster preparedness.[143] The AAP offers a resource kit and related tabletop exercises scenarios on a collaborative website as well as a chapter within the Topical Collection Part One on Pediatric Preparedness Exercises.[144,145] This kit was based on implementation of an AAP and Centers for Disease Control and Prevention virtual exercise.[146]

Conclusion

Patient safety remains a critical priority for all clinicians caring for children who are ill and injured as it is the foundation of high-quality health care. Clinicians must practice patient safety principles, support a culture of safety, and adopt best practices to continue to improve safety for all children seeking emergency care.

Lead Authors

Madeline M. Joseph, MD, FAAP, FACEP
Prashant Mahajan, MD, MPH, MBA, FAAP
Sally K. Snow, RN, BSN, CPEN, FAEN
Brandon Ku, MD, FAAP
Mohsen Saidinejad, MD, MS, MBA

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Diane Pilkey, RN, MPH – Maternal and Child Health Bureau
Katherine Remick, MD, FAAP – National Association of Emergency Medical Technicians

Sam Shahid, MBBS, MPH – American College of Emergency Physicians
Elizabeth Stone, RN, PhD, CPEN, FAEN – Emergency Nurses Association

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Muhammad Waseem, MD, MS
Dale P. Woolridge, MD, PhD, FACEP

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Sam Shahid, MBBS, MPH

Consultant

Marianne Gausche-Hill, MD, FACEP, FAAP, FAEMS

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Catherine Olson, MSN, RN

REFERENCES

1. Institute of Medicine, Committee on Quality of Health Care in America. To Err Is Human: Building a Safer Health Care System. Kohn LT, Corrigan JM, Donaldson MS, eds. Washington, DC: National Academies Press; 2000.
2. Walsh KE, Bundy DG, Landrigan CP. Preventing health care-associated harm in children. *JAMA*. 2014;311(17):1731-1732.
3. Alghamdi AA, Keers RN, Sutherland A, et al. Prevalence and nature of medication errors and preventable adverse drug events in pediatric and neonatal intensive care settings: a systematic review. *Drug Saf*. 2019;42:1423-1436.
4. Krug SE, Frush K; American Academy of Pediatrics, Committee on Pediatric Emergency Medicine. Patient safety in the pediatric emergency care setting. *Pediatrics*. 2007;120(6):1367-1375. Reaffirmed June 2011 and July 2014.
5. Remick K, Gausche-Hill M, Joseph MM, et al; American Academy of Pediatrics, Committee on Pediatric Emergency Medicine, Section on Surgery; American College of Emergency Physicians, Pediatric Emergency Medicine Committee; Emergency Nurses Association, Pediatric Committee. Pediatric readiness in the emergency department. *Pediatrics*. 2018;142(5):e20182459.
6. American Academy of Pediatrics, Committee on Pediatric Emergency Medicine; American College of Emergency Physicians, Pediatric Emergency Medicine Committee; Emergency Nurses Association, Pediatric Committee. Handoffs: transitions of care for children in the emergency department. *Pediatrics*. 2016;138(5):e20162680.
7. Dudley N, Ackerman A, Brown K, Snow S; American Academy of Pediatrics, Committee on Pediatric Emergency Medicine; American College of Emergency Physicians, Pediatric Emergency Medicine Committee; Emergency Nurses Association, Pediatric Committee. Technical report. Patient- and family-centered care of children in the emergency department. *Pediatrics*. 2015;135(1):e255.
8. Benjamin L, Frush K, Shaw K, et al; American Academy of Pediatrics, Committee on Pediatric Emergency Medicine; American College of Emergency Physicians, Pediatric Emergency Medicine Committee; Emergency Nurses Association, Pediatric Emergency Medicine Committee. Pediatric medication safety in the emergency department. *Pediatrics*. 2018;141(3):e20174066.
9. Mueller BU, Neuspiel DR, Fisher ERS; American Academy of Pediatrics, Council on Quality Improvement and Patient Safety. Principles of pediatric patient safety: reducing harm due to medical care. *Pediatrics*. 2019;143(2):e20183649.
10. Chassin MR, Loeb JM. High-reliability health care: getting there from here. *Milbank Q*. 2013;91:459-490.
11. Frankel A, Haraden C, Federico F. Lenoci-Edwards J. *A Framework for Safe, Reliable, and Effective Care. White Paper*. Cambridge, MA: Institute for Healthcare Improvement and Safe & Reliable Healthcare; 2017.
12. Shaw KN, Ruddy RM, Olsen CS, et al. Pediatric patient safety in emergency departments: unit characteristics and staff perceptions. *Pediatrics*. 2009;124(2):485-493.
13. Tourani S, Hassani M, Ayoubain A, et al. Analyzing and prioritizing the dimensions of patient safety culture in emergency wards using the TOPSIS technique. *Glob J Health Sci*. 2015;7(4):143-150.
14. Vebeek-Van Noord I, Wagner C, Van Dyck C, et al. Is culture associated with patient safety in the emergency department? A study of staff perspectives. *Int J Qual Health Care*. 2014;26(1):64-70.
15. Byczkowski TL, Gillespie GL, Kennebeck SS, et al; Family-centered pediatric emergency care: a framework for measuring what parents want and value. *Acad Pediatr*. 2016;16(4):327-335.
16. Vanhoy MA, Horigan A, Stapleton SJ, et al; Emergency Nurses Association, Clinical Practice Guideline Committee. Clinical practice guideline: family presence. *J Emerg Nurs*. 2019;45(1):76.e1-76.e29. https://doi.org/10.1016/j.jen.2018.11.012
17. Zavotsky KE, McCoy J, Bell, et al. Resuscitation team perceptions of family presence during CPR. *Adv Emerg Nurs J*. 2014;36(4):325-334.
18. Nicholas DB, Muskat B, Zwaigenbaum L, et al. Patient and family-centered care in the emergency department for children with autism. *Pediatrics*. 2020;145(Suppl 1):e20191895.
19. Hall JE, Patel DP, Thomas JW, Richards CA, Rogers PE, Pruitt CM. Certified child life specialists lessen emotional distress of children undergoing laceration repair in the emergency department. *Pediatr Emerg Care*. 2018;34(9):603-606.
20. Sanchez Cristal N, Staab J, Chatham R, Ryan S, Mcnair B, Grubenhoff JA. Child life reduces distress and pain and improves family satisfaction in the pediatric emergency department. *Clin Pediatr (Phila)*. 2018;57(13):1567-1575.
21. Koller D. Child Life Council. Evidence-Based Practice Statement Summary: Preparing Children and Adolescents for Medical Procedures. Accessed May 28, 2020. Available at: https://www.childlife.org/docs/default-source/research-ebp/ebp-statements.pdf?sfvrsn=6395bd4d_2
22. Institute for Patient- and Family-Centered Care. Patient- and Family-Centered Care. Accessed January 20, 2022. Available at: https://www.ipfcc.org/about/pfcc.html
23. Johnson TJ, Weaver MD, Borrero S, et al. Association of race and ethnicity with management of abdominal pain in the emergency department. *Pediatrics*. 2013;132(4):e851.
24. Goyal MK, Kuppermann N, Cleary SD, Teach SJ, Chamberlain JM. Racial disparities in pain management of children with appendicitis in emergency departments. *JAMA Pediatr*. 2015;169(11):996-1002.
25. Goyal MKJT, Chamberlain JM, Cook L, et al; Pediatric Emergency Care Applied Research Network. Racial and ethnic differences in emergency department pain management of children with fractures. *Pediatrics*. 2020;145(5):e20193370.
26. Marin JR, Rodean J, Hall M, et al. Racial and ethnic differences in emergency department diagnostic imaging at US children's hospitals, 2016-2019. *JAMA Netw Open*. 2021;4(1):e2033710.
27. Goyal M, Johnson TJ, Chamberlain J, et al. Racial and ethnic differences in antibiotic use for viral illness in emergency departments. *Pediatrics*. 2017;140(4):e20170203.
28. Raphael JL, Oyeku SO. Implicit bias in pediatrics: an emerging focus in health equity research. *Pediatrics*. 2020;145(5):e20200512.

29. FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. *BMC Med Ethics*. 2017;18(1):19.
30. McMichael B, Nickel A, Duffy EA, et al. The impact of health equity coaching on patient's perceptions of cultural competency and communication in a pediatric emergency department: an intervention design. *J Patient Exp*. 2019;6(4):257-264.
31. Agency for Healthcare Research and Quality. Chart Book on Patient Safety. Rockville, MD. Accessed November 15, 2020. Available at: https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/patientsafety/index.html
32. Johnstone MJ, Kanitsaki O. Culture, language, and patient safety: making the link. *Int J Qual Health Care*. 2006;18(5):383-388.
33. Flores G; American Academy of Pediatrics, Committee on Pediatric Research. Technical report—racial and ethnic disparities in the health and health care of children. *Pediatrics*. 2010;125(4):e979-e1020.
34. Cheraghi-Sohi S, Panagioti M, Daker-White G, et al. Patient safety in marginalized groups: a narrative scoping review. *Int J Equity Health*. 2020;19(1):26.
35. Goenka PK. Lost in translation: impact of language barriers on children's healthcare. *Curr Opin Pediatr*. 2016;28(5):659-666.
36. Taveras EM, Flores G. Why culture and language matter: the clinical consequences of providing culturally and linguistically appropriate services to children in the emergency department. *Clin Pediatr Emerg Med*. 2004;5(2):76-84.
37. Agency for Healthcare Research and Quality. Chapter 1: Background on Patient Safety and LEP Populations. In: *Improving Patient Safety Systems for Patients With Limited English Proficiency*. Rockville, MD: Agency for Healthcare Research and Quality; 2012 (last reviewed September 2020). Accessed January 12, 2022. Available at: https://www.ahrq.gov/health-literacy/professional-training/lepguide/chapter1.html
38. Steinberg EM, Valenzuela-Araujo D, Zickafoose JS, Kieffer E, DeCamp LR. The "battle" of managing language barriers in health care. *Clin Pediatr (Phila)*. 2016;55(14):1318-1327.
39. Mosquera RA, Samuels C, Flores G. Family Language Barriers and Special-Needs Children. *Pediatrics*. 2016;138(4):e20160321.
40. Gallagher RA, Porter S, Monuteaux MC, Stack AM. Unscheduled return visits to the emergency department: the impact of language. *Pediatr Emerg Care*. 2013;29(5):579-583.
41. Zamor R, Byczkowski T, Zhang Y, et al. Language barriers and the management of bronchiolitis in a pediatric emergency department. *Acad Pediatr*. 2020;20(3):356-363.
42. Fileccia J. Sensitive care for the deaf: a cultural challenge. *Creat Nurs*. 2011;17(4):174-179.
43. Institute of Medicine, Committee on Diagnostic Error in Health Care. *Improving Diagnosis in Health Care*. Balogh EP, Miller BT, Ball JR, eds. Washington, DC: National Academies Press; 2015.
44. Medford-Davis LN, Singh H, Mahajan P. Diagnostic decision-making in the emergency department. *Pediatr Clin North Am*. 2018;65(6):1097-1105.
45. Mahajan P, Basu T, Pai C, et al. Factors associated with potentially missed diagnosis of appendicitis in the emergency department. *JAMA Netw Open*. 2020;3(3):e200612.
46. Sundberg M, Perron CO, Kimia A, et al. A method to identify pediatric high-risk diagnoses missed in the emergency department. *Diagnosis (Berl)*. 2018;5(2):63-69.
47. Czolgosz T, Cashen K, Farooqi A, Kannikeswaran N. Delayed admissions to the pediatric intensive care unit: progression of disease or errors in emergency department management. *Pediatr Emerg Care*. 2019;35(8):568-574.
48. Mangus CW, Mahajan P. Common medical errors in pediatric emergency medicine. *Clin Pediatr Emerg Med*. 2019;20(3):100714.
49. Dewa CS, Loong D, Bonato S, et al. How does burnout affect physician productivity? A systematic literature review. *BMC Health Serv Res*. 2014;14:325.
50. Hayashino Y, Utsugi-Ozaki M, Feldman MD, et al. Hope modified the association between distress and incidence of self-perceived medical errors among practicing physicians: prospective cohort study. *PLoS One*. 2012;7:e35585.
51. Tawfik DS, Profit J, Morgenthaler TI, et al. Physician burnout, well-being, and work unit safety grades in relationship to reported medical errors. *Mayo Clin Proc*. 2018;93(11):1571-1580.
52. Stehman CR, Testo Z, Gershaw RS, Kellogg AR. Burnout, drop out, suicide: physician loss in emergency medicine, part I [published correction appears in. *West J Emerg Med*. 2019;20(5):840-841. *West J Emerg Med*. 2019;20(3):485-494. DOI: 10.5811/westjem.2019.4.40970
53. Hall LH, Johnson J, Watt I, et al. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. *PLoS One*. 2016;11(7):e0159015.
54. Wisetborisut A, Angkurawaranon C, Jiraporncharoen W, et al. Shift work and burnout among health care workers. *Occup Med (Lond)*. 2014;64(4):279-286.
55. Øyane NM, Pallesen S, Moen BE, Akerstedt T, Bjorvatn B. Associations between night work and anxiety, depression, insomnia, sleepiness and fatigue in a sample of Norwegian nurses. *PLoS One*. 2013;8(8):e70228.
56. Johnson AL, et al. Sleep deprivation and error in nurses who work the night shift. *J Nurs Adm*. 2014;44(3):17-22.
57. Kuhn G. Circadian rhythm, shift work, and emergency medicine. *Ann Emerg Med*. 2001;37:88-98.
58. Turale S, Nantsupawat A. Clinician mental health, nursing shortages and the COVID-19 pandemic: crises within crises. *Int Nurs Rev*. 2021;68(1):12-14. https://doi.org/10.1111/inr.12674
59. Ruddy RM, Chamberlain JM, Mahajan PV, et al. Near misses and unsafe conditions reported in a pediatric emergency research network. *BMJ Open*. 2015;5:e007541.
60. Paradiso L, Sweeney N. Just culture: it's more than policy. *Nurs Manage*. 2019;50(6):38-45.
61. Khan A, Furtak SL, Melvin P, et al. Parent-reported errors and adverse events in hospitalized children. *JAMA Pediatr*. 2016;170(4):e154608.
62. Sills MR, Fairclough D, Ranade D, et al. Emergency department crowding is associated with decreased quality of care for children. *Pediatr Emerg Care*. 2011;27(9):837-845.
63. Kennebeck SS, Timm NL, Kurowski EM, Byczkowski TL, Reeves SD. The association of emergency department crowding and time to antibiotics in febrile neonates. *Acad Emerg Med*. 2011;18(12):1380-1385.

64. Shenoi R, Ma L, Syblik D, Yusuf S. Emergency department crowding and analgesic delay in pediatric sickle cell pain crises. *Pediatr Emerg Care*. 2011;27(10):911-917.
65. Bekmezian A, Fee C, Bekmezian S, Maselli JH, Weber E. Emergency department crowding and younger age are associated with delayed corticosteroid administration to children with acute asthma. *Pediatr Emerg Care*. 2013;29(10):1075-1081.
66. Sagaidak S, Rowe BH, Ospina MB, Rosychuk RJ. Emergency department crowding negatively influences outcomes for children presenting with asthma: a population-based retrospective cohort study. *Pediatr Res*. 2021;89(3):679-685.
67. Sills MR, Fairclough DL, Ranade D, Mitchell MS, Kahn MG. Emergency department crowding is associated with decreased quality of analgesia delivery for children with pain related to acute, isolated, long-bone fractures. *Acad Emerg Med*. 2011;18(12):1330-1338.
68. Tekwani KL, Kerem Y, Mistry CD, Sayger BM, Kulstad EB. Emergency department crowding is associated with reduced satisfaction scores in patients discharged from the emergency department. *West J Emerg Med*. 2013;14(1):11.
69. Morley C, Unwin M, Peterson GM, Stankovich J, Kinsman L. Emergency department crowding: A systematic review of causes, consequences and solutions. *PLoS One*. 2018;13(8):e0203316.
70. O'Malley AS. After-hours access to primary care practices linked with lower emergency department use and less unmet medical needs. *Health Aff (Millwood)*. 2013;32(1):1-9.
71. American Academy of Pediatrics, Committee on Pediatric Emergency Medicine. Policy statement: Overcrowding crisis in our nation's emergency departments: is our safety net unraveling? *Pediatrics*. 2004;114(3):878-888. Reaffirmed July 2016.
72. American College of Emergency Physicians, Emergency Practice Committee. Emergency Department Crowding: High Impact Solutions. Irving, TX: American College of Emergency Physicians. 2016. Accessed June 2, 2020. Available at: https://www.acep.org/globalassets/sites/acep/media/crowding/empc_crowding-ip_092016.pdf
73. Barata I, Brown KM, Fitzmaurice L, Griffin ES, Snow SK; American Academy of Pediatrics, Committee on Pediatric Emergency Medicine; American College of Emergency Physicians, Pediatric Emergency Medicine Committee; Emergency Nurses Association, Pediatric Committee. Best practices for improving flow and care of pediatric patients in the emergency department. *Pediatrics*. 2015;135(1):e273-e283.
74. American College of Emergency Physician Policy on Standardized Protocols for Optimizing Emergency Department Care. Available at: https://www.acep.org/globalassets/new-pdfs/policy-statements/standardizedprotocols-for-optimizing-emergency-department-care.pdf. Accessed September 20, 2021.
75. American College of Emergency Physicians. Policy Triage Scale Standardization. Available at: https://www.acep.org/globalassets/new-pdfs/policy-statements/triage.scale.standardization.pdf. Accessed January 10, 2022.
76. Lee J, Rodio B, Lavelle J, et al. The impact and safety of an updated anaphylaxis clinical pathway in a busy pediatric emergency department. *J Allergy Clin Immunol*. 2017;139(2):AB222.
77. Iqbal SF, Brown KM. Improving timeliness and reducing variability in asthma care through the use of clinical pathways. *Clin Pediatr Emerg Med*. 2018;19(1):52-54.
78. Arya R, Wei G, McCoy JV, Crane J, Ohman-Strickland P, Eisenstein RM. Decreasing length of stay in the emergency department with a split emergency severity index 3 patient flow model. *Acad Emerg Med*. 2013;20(11):1171-1179.
79. Copeland J, Gray A. A daytime fast track improves throughput in a single physician coverage emergency department. *Can J Emerg Med*. 2015;17(6):648-655.
80. Hung GR, Whitehouse SR, O'Neill C, Gray AP, Kissoon N. Computer modeling of patient flow in a pediatric emergency department using discrete event simulation. *Pediatr Emerg Care*. 2007;23(1):5-10.
81. Howell E, Bessman E, Kravet S, et al. Active bed management by hospitalists and emergency department throughput. *Ann Intern Med*. 2008;149(11):804-810.
82. Barrett L, Ford S, Ward-Smith P, et al. A bed management strategy for overcrowding in the emergency department. *Nurs Econ*. 2012;30(2):82-85.
83. Ramsey Z, Palter JS, Hardwick J, Moskoff J, Christian EL, Bailitz J. Decreased nursing staffing adversely affects emergency department throughput metrics. *West J Emerg Med*. 2018;19(3):496-500. https://doi.org/10.5811/westjem.2018.1.36327
84. Guessoum SB, Lachal J, Radjack R, et al. Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Res*. 2020;291:113264.
85. Purtle J. COVID-19 and mental health equity in the United States. *Soc Psychiatry Psychiatr Epidemiol*. 2020;55(8):969-971.
86. Krass P, Doupnik SK. Equity in emergency mental health care. *Pediatrics*. 2021;147(5):e2020049843.
87. Baker D, Battles J, King H. New insights about team training from a decade of TeamSTEPPS. Rockville, MD: Agency for Healthcare Research and Quality, Patient Safety Network; February 2017. Accessed January 13, 2022. Available at: https://psnet.ahrq.gov/perspective/new-insights-about-team-training-decade-teamstepps
88. Brown L, Overly F. Simulation-based interprofessional team training. *Clin Pediatr Emerg Med*. 2016;17(3):179-184.
89. Lyren A, Brilli RJ, Zieket K, et al. Children's hospitals' solutions for patient safety collaborative impact on hospital-acquired harm. *Pediatrics*. 2017;140(3):e20163494.
90. Patterson MD, Geis GL, LeMaster T, et al. Impact of multidisciplinary simulation-based training on patient safety in a paediatric emergency department. *BMJ Qual Saf*. 2013;22:383-393.
91. Agency for Healthcare Research and Quality, Patient Safety Network. Teamwork Training. September 2019 Accessed October 10, 2020. Available at: https://psnet.ahrq.gov/primers/primer/8
92. Goode T, Sockalingam S, Snyder LL, et al. Bridging the Cultural Divide in Health Care Settings: The Essential Role of Cultural Broker Programs. National Center for Cultural Competence, Georgetown University Center for Child and Human Development; 2004. Accessed September 6, 2020. Available at: http://nccc.georgetown.edu/documents/Cultural_Broker_Guide_English.pdf

93. Provost SM, Lanham HJ, Leykum LK, et al. Health care huddles: managing complexity to achieve high reliability. *Health Care Manage Rev*. 2015;40:2-12. Accessed January 13, 2022. Available at: https://psnet.ahrq.gov/issue/health-care-huddles-managing-complexity-achieve-high-reliability
94. Brady PW, Muething S, Kotagal U, et al. Improving situation awareness to reduce unrecognized clinical deterioration and serious safety events. *Pediatrics*. 2013;131(1):e298-e308.
95. Agency for Healthcare Research and Quality. Daily Huddles. Rockville, MD: Agency for Healthcare Research and Quality, Patient Safety Network; 2017. Accessed January 13, 2022. Available at: https://psnet.ahrq.gov/primer/improving-patient-safety-and-team-communication-through-daily-huddles
96. McBeth CL, Durbin-Johnson B, Siegel EO. Interprofessional huddle: one children's hospital's approach to improving patient flow. *Pediatr Nurs*. 2017;43(2):71-76.
97. The Joint Commission. Sentinel event statistics data: root causes by event type. Accessed January 20, 2022. Available at: https://www.jointcommission.org/resources/patient-safety-topics/sentinel-event/sentinel-event-data-summary/
98. The Joint Commission. Improving hand-off communications: meeting national patient safety goal 2E. *Jt Comm Perspect Patient Saf*. 2006;6(8):9-15.
99. Venkatesh AK, Curley D, Chang Y, et al. Communication of vital signs at emergency department handoff: opportunities for improvement. *Ann Emerg Med*. 2015;66:125-130.
100. Maughan BC, Lei L, Cydulka RK. ED handoffs: observed practices and communication errors. *Am J Emerg Med*. 2011;29:502-511.
101. Horwitz LI, Meredith T, Schuur JD, et al. Dropping the baton: a qualitative analysis of failures during the transition from emergency department to inpatient care. *Ann Emerg Med*. 2009;53:701-710.
102. Croskerry P. From mindless to mindful practice–cognitive bias and clinical decision making. *N Engl J Med*. 2013;368(26):2445-2448.
103. Kessler C, Scott NL, Siedsma M, Jordan J, Beach C, Coletti CM. Inter-unit handoffs of patients and transfers of information: a survey of current practices. *Ann Emerg Med*. 2014;64(4):343.e5–349.
104. Gopwani PR, Brown KM, Quinn MJ, Dorosz EJ, Chamberlain JM. SOUND: a structured handoff tool improves patient handoffs in a pediatric emergency department. *Pediatr Emerg Care*. 2015;31(2):83-87.
105. Mullan PC, Macias CG, Hsu D, Alam S, Patel B. A novel briefing checklist at shift handoff in an emergency department improves situational awareness and safety event identification. *Pediatr Emerg Care*. 2015;31(4):231-238.
106. Starmer AJ, Spector ND, Srivastava R, et al; I-PASS Study Group. I-PASS, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129(2):201-204.
107. McCrory MC, Aboumatar H, Custer JW, et al. "ABC-SBAR" training improves simulated critical patient hand-off by pediatric interns. *Pediatr Emerg Care*. 2012;28:538-543.
108. Bigham MT, Logsdon TR, Manicone PE, et al. Decreasing handoff-related care failures in children's hospitals. *Pediatrics*. 2014;134(2):e572-e579.
109. Starmer AJ, Spector ND, Srivastava R, et al. Changes in medical errors after implementation of a handoff program. *N Engl J Med*. 2014;371(19):1803-1812.
110. Denham CR. SBAR for patients. *J Patient Saf*. 2008;4(1):38-48.
111. Yoshida H, Rutman LE, Chen J, et al. Waterfalls and handoffs: a novel physician staffing model to decrease handoffs in a pediatric emergency department. *Ann Emerg Med*. 2019;73(3):248-254.
112. American College of Emergency Physicians. ACEP policy on Staffing Models and the Role of the Emergency Department Medical Director. Available at: https://www.acep.org/globalassets/new-pdfs/policy-statements/staffing-models-and-the-role-of-the-emergency-department-medical-director.pdf. Accessed September 20, 2021.
113. Cheung DS, Kelly JJ, Beach C, et al. Improving handoffs in the emergency department. *Ann Emerg Med*. 2010;55(2):171-180.
114. Zorc JJ, Hoffman JM, Harper MB. IT in the ED: a new section of pediatric emergency care. *Pediatr Emerg Care*. 2012;28(12):1399-1401.
115. Sethuraman U, Kannikeswaran N, Murray KP, et al. Prescription errors before and after introduction of electronic medication alert system in a pediatric emergency department. *Acad Emerg Med*. 2015;22:714-719.
116. Atabaki SM, Jacobs BR, Brown KM, et al. Quality improvement in pediatric head trauma with PECARN rules implementation as computerized decision support. *Pediatr Qual Saf*. 2017;2(3):e019.
117. Melton KR, Timmons K, Walsh KE, Meinzen-Derr JK, Kirkendall E. Smart pumps improve medication safety but increase alert burden in neonatal care. *BMC Med Inform Decis Mak*. 2019;19(1):213.
118. Damhoff HN, Kuhn RJ, Baker-Justice SN. Medication preparation in pediatric emergencies: comparison of a web-based, standard-dose, bar code-enabled system and a traditional approach. *J Pediatr Pharmacol Ther*. 2014;19(3):174-181.
119. Schinasi DA, Atabaki SM, Lo MD, et al. Telehealth in pediatric emergency medicine. *Curr Probl Pediatr Adolesc Health Care*. 2021;51:100953.
120. Varma S, Schinasi DA, Ponczek J, et al. A retrospective study of children transferred from general emergency departments to a pediatric emergency department: which transfers are potentially amenable to telemedicine? *J Pediatr*. 2021;230:126-132.e1.
121. Dharmar M, Romano PS, Kuppermann N, et al. Impact of critical care telemedicine consultations on children in rural emergency departments. *Crit Care Med*. 2013;41(10):2388-2395.
122. Ray KN, Demirci JR, Bogen DL, Mehrotra A, Miller E. Optimizing Telehealth Strategies for Subspecialty Care: Recommendations from Rural Pediatricians. *Telemed J E Health*. 2015;21(8):622-629.
123. Shafaf N, Malek H. Applications of machine learning approaches in emergency medicine; a review article. *Arch Acad Emerg Med*. 2019;7(1):e34.

124. John Hopkins Medicine (n.d.). Center for Data Science in Emergency Medicine. Accessed online 03082021. https://www.hopkinsmedicine.org/center_data_science_emergency_medicine/
125. Gausche-Hill M, Ely M, Schmuhl P, et al. A national assessment of pediatric readiness of emergency departments. *JAMA Pediatr*. 2015;169(6):527-534.
126. Doherty C, Mc Donnell C. Tenfold medication errors: 5 years' experience at a university-affiliated pediatric hospital. *Pediatrics*. 2012;129(5):916-924.
127. American College of Emergency Physicians. Clinical Pharmacist Services in the Emergency Department. Irving, TX: American College of Emergency Physicians 2021. Accessed November 16, 2020. Available at: https://www.acep.org/patient-care/policy-statements/clinical-pharmacist-services-in-the-emergency-department/
128. American Society of Health-System Pharmacists. ASHP guidelines on emergency medicine pharmacist services. Accessed November 16, 2019. Available at: https://www.ashp.org/-/media/assets/policy-guidelines/docs/guidelines/emergency-medicine-pharmacist-services.ashx
129. Patanwala AE, Sanders AB, Thomas MC, et al. A prospective, multicenter study of pharmacist activities resulting in medication error interception in the emergency department. *Ann Emerg Med*. 2012;59(5):369-373.
130. Subramanyam R, Mahmoud M, Buck D, et al. Infusion medication error reduction by two-person verification: a quality improvement initiative. *Pediatrics*. 2016;138(6):e20154413.
131. Institute for Safe Medication Practices (ISMP). *ISMP Targeted Medication Safety Best Practices for Hospitals*. 2020. Accessed January 28, 2022. Available at: https://www.ismp.org/guidelines/best-practices-hospitals
132. The Joint Commission. National Patient Safety Goals Effective January 2022 for the Critical Access Hospital Program. Accessed January 28, 2022. Available at: https://www.jointcommission.org//media/tjc/documents/standards/national-patient-safety-goals/2022/npsg_chapter_hap_jan2022.pdf
133. Coté CJ, Wilson S; American Academy of Pediatrics; American Academy of Pediatric Dentistry. Guidelines for monitoring and management of pediatric patients before, during, and after sedation for diagnostic and therapeutic procedures. *Pediatrics*. 2019;143(6):e20191000.
134. Koller D, Rummens A, Le Pouesard M, et al. Patient disclosure of medical errors in paediatrics: a systematic literature review. *Paediatr Child Health*. 2016;21(4):e32-e38.
135. American Academy of Pediatrics, Committee on Medical Liability and Risk Management, Council on Quality Improvement and Patient Safety. Disclosure of adverse events in pediatrics. *Pediatrics*. 2016;138(6):e20163215.
136. Needle S, Wright J; American Academy of Pediatrics, Disaster Preparedness Advisory Council, Committee on Pediatric Emergency Medicine. Ensuring the health of children in disasters. *Pediatrics*. 2015;136(5):e1407-e1417.
137. American Academy of Pediatrics, Disaster Preparedness Advisory Council; Massachusetts General Hospital Center for Disaster Medicine. Family Reunification Following Disasters: A Planning Tool for Health Care Facilities [Toolkit]. July 2018. Accessed January 13, 2022. Available at: https://www.aap.org/en-us/Documents/AAP-Reunification-Toolkit.pdf
138. Chung S, Baum CR, Nyquist AC; American Academy of Pediatrics, Disaster Preparedness Advisory Council, Council on Environmental Health, Committee on Infectious Diseases. Policy statement: Chemical-biological terrorism and its impact on children. *Pediatrics*. 2020;145(2):e20193749.
139. Schonfeld DJ, Melzer-Lange M, Hashikawa AN, et al; American Academy of Pediatrics, Council on Children and Disasters, Council on Injury, Violence, and Poison Prevention, Council on School Health. Policy statement: Participation of children and adolescents in live crisis drills and exercises. *Pediatrics*. 2020;146(3):e2020015503.
140. Hewett EK, Nagler J, Monuteaux MC, et al. A hazardous materials educational curriculum improves pediatric emergency department staff skills. *AEM Educ Train*. 2017;2(1):40-47.
141. Bank I, Khalil E. Are pediatric emergency physicians more knowledgeable and confident to respond to a pediatric disaster after an experiential learning experience? *Prehosp Disaster Med*. 2016;31(5):551-556.
142. Amsel L, Cheslak-Postava K, Musa G, et al. The broad impact of childhood trauma: physical-psychiatric comorbidity in a cohort of individuals exposed to 9/11 in childhood. Presented at: 175th Annual Meeting of the American Psychiatric Association, San Francisco, California; May 18-22, 2019; p 8-124.
143. Emergency Medical Services for Children Improvement and Innovation Center. Pediatric Disaster Preparedness Toolkit. Accessed January 28, 2022. Available at: https://emscimprovement.center/education-and-resources/toolkits/pediatric-disaster-preparedness-toolbox/
144. American Academy of Pediatrics. Pediatric Tabletop Exercise Resource Kit and Other Key Resources for Disaster Preparedness. Accessed January 13, 2022. Available at: https://collaborate.aap.org/tabletopexercises/Pages/default.aspx
145. American Academy of Pediatrics. Pediatric Disaster Preparedness And Response Topical Collection Chapter 6: Pediatric Preparedness Exercises. Accessed January 13, 2022. Available at: https://downloads.aap.org/DOCHW/Topical-Collection-Chapter-6.pdf
146. So M, Dziuban EJ, Franks JL, et al. Extending the reach of pediatric emergency preparedness: a virtual tabletop exercise targeting children's needs. *Public Health Rep*. 2019;134(4):344-353.

Quality Improvement: Implementing Nurse Standard Work in Emergency Department Fast-Track Area to Reduce Patient Length of Stay

Authors: Dorothy Williams, BSN, RN, CEN, TCRN, Lawrence D. Fredendall, PhD, BS, MBA, Gregory Hair, MS, BSN, RN, Jim Kilton, BS, LSBB, Cassie Mueller, MSN, RN, PCCN, CNML, SANE-A, Joshua D. Gray, MD, Christian Graver, MSN, RN, CPXP, and Jaeyoung Kim, BBA, MS, Clemson, and Greenville, SC

Contribution to Emergency Nursing Practice

- This paper investigates how to create and maintain nurse standard work, which is essential to maintaining a lean value stream. Nurse standard work in the fast-track area of an emergency department helped to decrease the length of stay of fast-track patients. Management was able to maintain the use of nurse standard work through the use of daily audits of whether the staff were following the standard work procedures.
- Recommendations are that nurses, who perform the care process, should be engaged in the creation and maintenance of nurse standard work.

Abstract

Introduction: The average length of stay of a fast-track area of a large urban hospital was excessively long, which affected the patient experience and the rate at which patients left without being seen. One approach to reducing average length of stay is to create nurse standard work. Nurse standard work was a defined set of process and procedures that reduce variability within a nurse's workflow.

Methods: Nurse standard work was created by a team of nurses assisted by management engineering using lean methodology and A3 problem solving. Data were gathered about average length of stay and left without being seen for patients in the emergency department fast-track area of an urban emergency department from October 2018 to June 2020. This period includes 5 months before the intervention start, 4 months during nurse standard work implementation, 9 months using nurse standard work before the unit was repurposed during COVID-19, and 3 months during COVID-19.

Results: Nurse standard work helped reduce average length of stay in the emergency department fast-track area from 205 minutes before project initiation to 150.4 minutes in the 7 months after implementing nurse standard work. The time spent walking for supplies was reduced from 422 and 272 seconds before nurse standard work to 25 and 30 seconds for the nurse technician and nurse, respectively, after nurse standard work. Left without being seen was decreased from 4.7% in October of 2018 to 0.7% by March of 2020.

Discussion: Nurse standard work reduced the amount of time that nurses spent performing support tasks and reduced

Dorothy Williams is a BSN, RN, Foothills ENA, Greenville, SC. **ORCID identifier:** https://orcid.org/0000-0003-3336-5244.

Lawrence D. Fredendall is a BS, MBA, PhD Professor Department of Management, Clemson University, Clemson, SC. **ORCID identifier:** https://orcid.org/0000-0002-7127-9737.

Gregory Hair is MS, BSN, RN, Greenville, SC. **ORCID identifier:** https://orcid.org/0000-0001-7069-128X.

Jim Kilton is a Project Facilitator, Greenville, SC.

Cassie Mueller is MSN, RN, Foothills ENA, Greenville, SC. **ORCID identifier:** https://orcid.org/0000-0002-9647-5048.

Joshua D. Gray is an MD, Greenville, SC. **ORCID identifier:** https://orcid.org/0000-0002-7341-7996.

Christian Graver is an MSN, RN, Greenville, SC.

Jaeyoung Kim is BBA, MS, PhD Candidate, Clemson University, Clemson, SC. **ORCID identifier:** https://orcid.org/0000-0003-3190-3184.

For correspondence, write: Dorothy William, BSN, RN, CEN, TCRN; E-mail: Dorothy.Williams@prismahealth.org

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delays in providing patient care, which then allowed more time for nurses to interact directly with patients. Nurse standard work provides a clear task sequence that eliminates delays in treating patients, but it also allows for fast identification of delays that do occur and simplifies problem solving to eliminate reoccurrence of delays. Therefore, nurse standard work is an essential component of efforts to reduce patient average length of stay in health care processes and reduce left without being seen to the national standard of less than 2%.

Key words: Nurses; Quality improvement; Emergency service; Problem solving; Standard work; Lean processes; Throughput improvement

Introduction

Overcrowding is an important issue in emergency departments across the United States[1] due to more patients seeking medical care through the emergency department and hospitals operating close to capacity, which creates lengthy patient wait times.[2] These long waits both negatively affect patient satisfaction and increase stress for staff,[3] which previous research about fast-track areas serving low-acuity patients (ie, emergency severity index [ESI] 4 or 5[4]) found decreases patient waiting and average length of stay (ALOS), which then decreases left without being seen (LWBS) and increases patient satisfaction.[5] Creating a fast track is one of the most implemented approaches to increase ED capacity and reduce ED overcrowding.[6]

PROBLEM ADDRESSED

The fast-track area of the emergency department had a patient ALOS of 205 minutes in August 2018, which contributed to a crowded ED waiting room. Management created a "lean team" made up of project engineers (with previous lean experience) and ED leadership to implement lean in the fast-track area to reduce ALOS. After an initial investigation, this lean team determined that there was variance in how nursing tasks were performed, which contributed to patient waiting. The lean team then created a team of nurses whose charge was to establish standard work for the nurse's workflow. The target goal was to achieve and maintain an average ALOS of 162 minutes. This target was set, because it allowed fast track to meet the average demand plus 1 standard deviation (SD).

BACKGROUND

Standard work improves customer response time in several ways. Standard work helps to stabilize the system, which then allows managers to determine whether there is adequate capacity available to meet demand. Standard work also creates clear goals for employees and provides a baseline for further improvement.[7] These characteristics of standard work make it a valuable tool to increase cost-effectiveness and productivity.[8-10] Standard work is also valuable in health care,[11-17] but although the need for standard work practices such as nurse standard work (NSW) is recognized,[18,19] there has been no detailed explanation of how to achieve and, importantly, maintain NSW.[13,20]

Although standard work does not require that 1 patient at a time be processed, 1 tool of lean operations to improve patient flow is to ensure that each step of work is done for only 1 patient at a time, a batch size of 1.[21] Organizing work into batches increases the average waiting time[22] and creates spikes of work within the process that leads to further delays.[23]

NSW is not a clinical pathway, which is a standard set of clinical protocols for disease treatment,[24] but it is a standard sequence of repeatable steps performed by nurses that facilitates patient flow and improves quality.[25] In general, standard work for any process consists of 3 elements: (1) takt time, (2) sequence of tasks to be performed, and (3) standard inventory needed in the workplace that are then listed on a standard work sheet.[26,27] Takt time is the time available to complete the work divided by patient demand (time available/[number of patients/hr]). Takt time states the amount of time within which the standard work needs to be completed. The task sequence is established by observing work as performed to determine the best task sequence to complete all tasks within takt time. To perform tasks within the takt time requires that all necessary supplies be available, so the third standard work component is a list of needed supplies. Standard work improves performance in 3 ways. First, takt time sets a baseline performance level required for the system to serve all the patients. Second, establishing a standard task sequence that can be performed within takt time ensures that the most efficient practice is known and is shared with all nurses. Third, identifying required supplies and setting par levels for them eliminates delays and interruptions when the nurse is doing their work. Hence, NSW can simplify nursing tasks by ensuring that the nursing tasks can actually be performed as designed so nurses are not constantly working around process problems,[28] which reduces variability to ensure consistent care for all patients. NSW is effective, because it increases task performance predictability and allows staff to quickly recognize what tasks are done and undone. Eliminating the need

1. Reasons for action	4. Gap analysis	7. Completion plan
2. Initial states	5. Solution approach	8. Confirmed state
3. Target state	6. Rapid experimentation	9. Insight

FIGURE 1
A3 Standard 9 Block Format.

to search for what to do next frees up staff cognitive resources[29] and simplifies task performance, which allows time for nurses to respond flexibly to patients' heterogeneous needs.[17]

PURPOSE

The project's goal was to create and then maintain NSW to support a lean improvement project in a large urban emergency department. The NSW project team used the A3 standard problem-solving approach as a guide to creating NSW to reduce patient ALOS. This report includes an explanation of how NSW was created using the A3 process and the importance of daily managerial audits of NSW compliance used to sustain the gains in ALOS. We also report about a secondary outcome of reduced LWBS rate.

There are multiple standard problem-solving methods in use, but one characteristic they share is that they operationalize the scientific method by creating a set of steps for the team to follow. This team used the A3 problem-solving method, which divides the plan-do-study-act improvement method into smaller steps.[30] The A3 9 block format used to establish NSW is shown in Figure 1. The A3 directs the team to perform each of these steps in sequence and to focus its effort on tasks (e.g., the specified step in the template) that lead to problem solution. As standard procedure in A3 problem solving, the NSW team shared its progress with others weekly. It posted the updated A3 on a white board outside the ED nurse lunchroom.

ETHICAL CONSIDERATIONS

This research was determined to be exempt by the hospital institutional review board, because the research did not involve human subjects research. None of the participants had a conflict of interest.

Methods

This study was done in a large academic level I trauma center in the southeastern United States that treats more than 100,000 patients annually in the 102 beds in a pediatric and adult emergency department. Three nurses, a nursing assistant manager, a nurse educator, a nurse technician, and a project engineer comprised the group for the NSW project. The NSW project was part of a larger lean implementation that included multiple disciplines including physicians, ED leadership, pharmacy, radiology, and patient experience. This project began in December of 2018 and was completed by May 2019. NSW was maintained until the pandemic closed the unit in March of 2020.

MEASURES

ALOS (the time of patient arrival until discharge) and LWBS (the number of patients who leave before seeing a provider) were both measured for this project. The ALOS is a performance measure that is routinely gathered by the hospital. The primary goal of this intervention was to reduce ALOS. The ED lean team that sponsored this project investigated changes in the process weekly to determine whether this intervention was successful and whether the changes were cost effective.

CREATING NURSE STANDARD WORK

A nurse serving on the ED lean team was charged with creating and leading the NSW team and serving as the liaison between the lean and NSW teams to report weekly progress and barriers being encountered. The NSW team consisted of nursing staff who worked in the triage and fast-track areas. Gathering data was a lengthy part of the project taking 5 weeks as NSW team members spent only 2 hours each shift observing and recording the process steps as performed and did their clinical work for the remainder of

	Task	Sample observation (s)				Average repeatable/ base time (s)
		1	2	3	4	
Cyclic task						
1	Monitor EPIC for ESI 4 and 5 patients. Use standardized introduction and explanation of care when bringing patient to fast-track. Inform patient about next steps. Record arrival in electronic medical record.	198	249	156	150	171
2	Help provider and RN as needed.	424	255	120	242	254
3	Help with discharge (vitals). Take patient to lobby.	122	130	180	420	230
4	Clean room. Record room ready in electronic medical record.	167	132	244	120	166
Noncyclic task						
5	Walk for supplies	212	694	424	300	422
6	Walk for tube station	173	568	180	96	239

FIGURE 2

Nurse specialty technician job element worksheet. ESI, emergency severity index; RN, registered nurse.

their shift. The team was assisted by a lean facilitator experienced using the A3 problem-solving approach. The NSW team methods are explained step by step below using the 9 block A3 format given in Figure 1.

Blocks: 1. Reasons for Action and 2. Initial State of A3

The NSW team was charged with creating NSW to create a stable process for providing patient care with a target ALOS of 162 minutes for the fast-track area. This target time allowed staff to meet takt time within the fast-track area and time for the processes before the fast-track area. The first step was to determine the initial baseline state from the patient's perspective as they moved from arrival at security until they were discharged. The team observed, timed and documented all cyclical and noncyclic work elements during each process step similar to previous research.[31] The NSW team used the same observation sheet to gather data about tasks performed by each of the 8 different staff roles patients interacted with during their ED visit until the observers saw convergence on the work elements performed and the time taken to do the work (eg, 1 role required 40 observations). Convergence meant that the team was not observing any new cyclic (ie, repeatable) or noncyclic work. Figure 2 shows a sample of 4 detailed observations of the nurse specialty technician (NST) role. Note that task 2 in Figure 2, labeled "2. Help provider and RN as needed," shows high variance in task time (ie, 424-120 seconds) with an average of 254 seconds (see "Average repeatable/"Base time" column).

Blocks: 3. Target State and 4. Gap Analysis of A3

The target state was to develop NSW that allowed all tasks to be completed within takt time, and the gap was any difference between the takt and actual time. The first step in calculating takt time was to measure the SD and average demand per hour during the previous year. Demand for the next year was forecast to equal last year's average demand per hour plus 1 SD as shown in Figure 3. The annual demand for fast track was forecast to be 33,000 patients. The second step in calculating takt time was to determine the time available in minutes for the year. The fast-track area was scheduled for 20 hours per day, 7 days a week, which equals 438,000 minutes per year. The third step was to calculate takt time as (time available)/demand, so takt = (438,000 minutes)/(33,000 patients), or 13.27 minutes per patient room. Given that fast track has 6 rooms, each patient needs to have all tasks from arrival to discharge completed within 79.62 minutes (4772 seconds). Finally, each role interacting with the patient was assigned a portion of the takt time. Given that the fast-track registered nurse (RN) and NST needed the most time, they were each given the largest allocation of any of the 8 roles or 809 seconds.

To analyze the gap, the average number of times the RN and the NST performed each task and the percent of times a task was observed (ie, occurrence rate) and the average repeatable/base time to perform that task (Figure 2) were placed into a baseline observation summary sheet for each role and then the weighted average time for

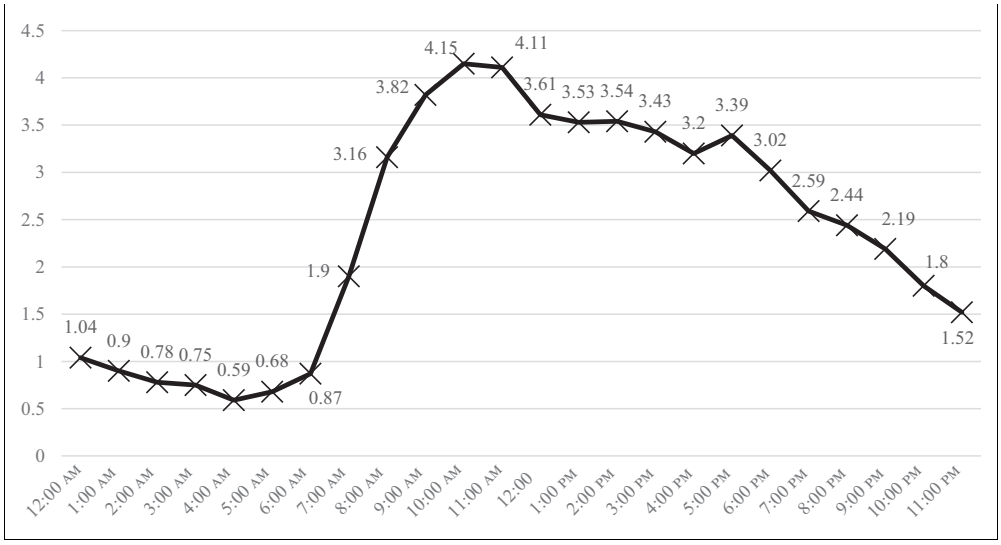

FIGURE 3

ESI 4 and ESI 5 patients average demand + 1 SD per hour. ESI, emergency severity index.

each task was calculated (see Figure 4A). The sum of the weighted averages was compared with the takt time for each role. Both the NST and RN tasks had longer weighted average baseline times than the takt time. Figure 4A shows that the RN baseline time was 907 seconds, which is 98 seconds longer than the 809 second takt time.

Blocks: 5. Solution approach and 6. Rapid Experimentation of A3

To eliminate the RN and NST workload gap (ie, difference between takt time target and actual time), the NSW team examined each task in detail for both the RN and NST. The team posted these tasks and times on a board in the conference room and then listed all the subelements of each task. For example, subelements to complete the RN's "Charting" task included the following: (1) record disposition, (2) charge capture, (3) list all procedures or split/wound care provided, and (4) record any radiology ordered or provided. The team then identified all delays, interruptions, and walking that occurred when a task subelement was performed. For example, how much time did the RN spend searching for supplies or walking between locations to get supplies. To accurately measure walking, the NSW team first created a map of the fast-track area (see Figure 5) and then recorded all staff movements within and out of the area, creating a series of spaghetti diagrams (not shown, see previous examples[32]). The NSW team found that the RN and NST frequently left fast track to get orthopedic supplies and medicines and that almost three fourths of the medications and supplies needed were located outside the fast-track area. To eliminate these times, the NSW team cleaned and standardized the fast-track storeroom using the 5S technique.[32,33] An essential step was to establish a standard set of medicines and supplies to be maintained at par level in the fast-track area. The NST was then charged to check that all fast-track supplies were at par level at the beginning of each day. The spaghetti diagrams also showed the NSW team that there was no standard procedure to bring patients from the waiting room to fast-track area when a room became available. This task was assigned to the NST as well as the task of monitoring the waiting room for arrival of ESI 4 and 5 patients using electronic health record screens.

Observations identified a delay in the RN patient discharge process that was caused by registration not starting patient discharge until the provider submitted discharge orders. This was addressed by creating standard work for registration that specified that registration was to be initiated as soon as feasible after the triage examination. Discussions to accomplish this led to registration and fast-track working together as a team with the common goal of expediting patient care. For example, if the RN was in the room performing a task such as starting an intravenous line, registration could enter and begin their process.

A significant improvement in patient flow was achieved by eliminating work batching. A common practice was for

A Baseline observation summary sheet for fast-track RN role

Task	Occurrence rate	Average repeatable/ base time (s)	Weighted average	Takt
Greet patient	1	51	51	809
Coordinating care	1	458	458	
Discharge patient	1	170	170	
Clean room	0.25	168	42	
Charting	1	60	60	
Walk for supplies	0.3	260	78	
Lab communication	0.25	192	48	
Total			907	

B Task times postintervention for fast-track RN

Task	Occurrence rate	Base time (s)	Weighted average	Takt
Greet patient	1	51	51	
Coordinating care	1	458	458	809
Discharge patient	1	140	140	
Clean room	0.25	168	42	
Charting	1	30	30	
Walk for supplies	0.115	260	30	
Lab communication	0.25	192	48	
Total			799	

C Task times postintervention for fast-track NST

Task	Occurrence rate	Base time (s)	Weighted average	Takt
Pull patient	1	210	210	809
Coordinate care with provider and RN	1	335	335	
Take vitals	1	44	44	
Clean room	1	125	125	
Walk for supplies	0.095	260	25	
Walk to tube station	1	63	63	
Total			802	

FIGURE 4

(A) Baseline observation summary sheet for fast-track RN role. (B) Task times postintervention for fast-track RN. (C). Task times postintervention for fast-track NST. NST, nurse speciality technician; RN, registered nurse.

the provider to place orders for multiple patients at one time. The provider hopes that by batching this process step the average time of performing the step for each patient can be reduced. However, even if the task time is reduced, batching increases patient waiting and prevents other staff from starting their work. Batching at 1 step "starves" the next step and eventually overwhelms the next step when a batch of work suddenly arrives.[34]

Implementing these interventions required cooperation of multiple roles outside of nursing, so creating NSW also standardized other system work. These interventions eliminated delays and clarified task assignments and reduced the

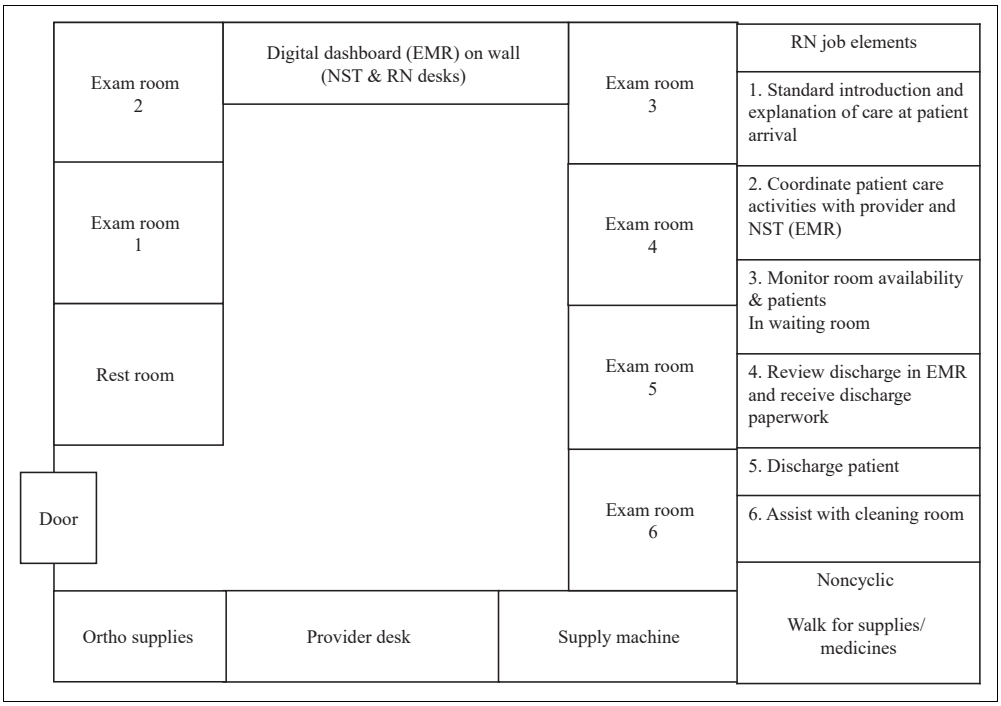

FIGURE 5

Fast-track layout with RN standard work. EMR, electronic medical record; NST, nurse specialty technician; RN, registered nurse.

RN workload to 799 seconds (see Figure 4B) and the nurse technician workload to 802 seconds (see Figure 4C). These workloads were 10 and 7 seconds, respectively, less than their 809 second takt targets.

Blocks 7 Completion Plan and 8 Confirmed State of A3

Once NSW is created, it must become the way work is done. One technique to maintain NSW was to post the NSW tasks in the workplace. For example, the RN NSW was posted above the RN desk as shown in the right-hand side of Figure 5. The team added a standardized introduction and explanation of care to NSW, because it was a hospital-wide requirement for all nurse/patient contacts. Figure 5 shows the NSW noncyclic tasks (eg, walking for supplies and medicines) below the 6 repetitive NSW tasks.

A second step was to include training about NSW within the ED staff training procedures. A third and critical step to maintain NSW was to institute manager daily audits. Daily audits ensure that standard work is performed and demonstrate that management considers standard work to be important.[35] The team developed an audit form (see Table 1) to check daily the extent to which NSW was used. The right-hand side of the Table shows the person responsible for the item being audited. Of the 21 standard NSW tasks, 13 were the responsibility of someone other than the RN or NST. For example, audit items 1, 2, and 3 were the responsibility of the charge nurse, but were required for the fast-track RN to maintain takt. The NSW audit was done at the beginning of each day by an emergency nurse manager. Having a manager conduct the audit is important for 2 reasons: (1) this signals that management cares about NSW. and (2) auditing NSW engages the manager in the standard work. On average this audit took 5 minutes or less each day. To do the audit, managers interviewed the RN in the fast-track area while looking at the digital dashboard (see "Digital Dashboard" in Figure 5). The auditor checked "Yes" or "No" for each of the 21 items in the form. A "Yes" was scored as 1 point and the points were totaled at the bottom. The audit was structured to avoid "blame" and to focus on problems performing NSW.

RESULTS

The primary analysis was a precomparison and postcomparison of ALOS performance using the Xbar and S control charts shown in Figure 6A and 6B, respectively, to identify a significant change.[36] Data from the first 8 weeks of 2019 were used to set the control limits for the Xbar and S chart.

TABLE
Form for audit of fast-track nurse standard work

		Score: yes = 1; no = 0	Responsible
1	Is 1 RN assigned?		Charge nurse
2	Is 1 NST assigned?		Charge nurse
3	Are 2 advanced practice providers assigned?		Charge nurse
4	Are supplies stocked to standards? (lac cart, IV cart, ortho room)		NST
5	Are fast-track rooms full of appropriate patients (if available)?		NST
6	Is the NST pulling patients? (see dashboard)		NST
7	Are rooms cleaned and marked available within 5 min?		NST
8	Is provider seeing patient within 5 min? (see dashboard)		Provider
9	Is the provider seeing one patient and writing orders before seeing the next patient? (see dashboard)		Provider
10	Is RN signing up for patients? (see dashboard)		RN
11	Does the Pyxis have the needed medications?		Material services
12	Are meds being administered within 15 min? (see chart)		RN
13	Is patient ready to depart 15 min or less? (see dashboard)		RN
14	Is discharge paperwork ready once discharge chosen? (ask RN)		Provider
15	Are providers handing nurses discharge paperwork? (ask RN)		Provider
16	Are all tests being processed appropriately? (ask RN)		Lab/Radiology
17	Is RN taking proactive measures for any delayed testing? (ask RN)		RN
18	Has housekeeping rounded on fast-track? (ask RN)		Housekeeping
19	Is person assigned to job knowledgeable of standard work procedure?		Charge nurse
20	Is registration complete before patient being ready for DC? (ask RN)		Registration
21	Is the daily management system (computer screen) updated?		Information systems
Total			

DC, discharge; IV, intravenous; lac cart, laceration cart; RN, registered nurse; NST, nurse specialty technician.

continued

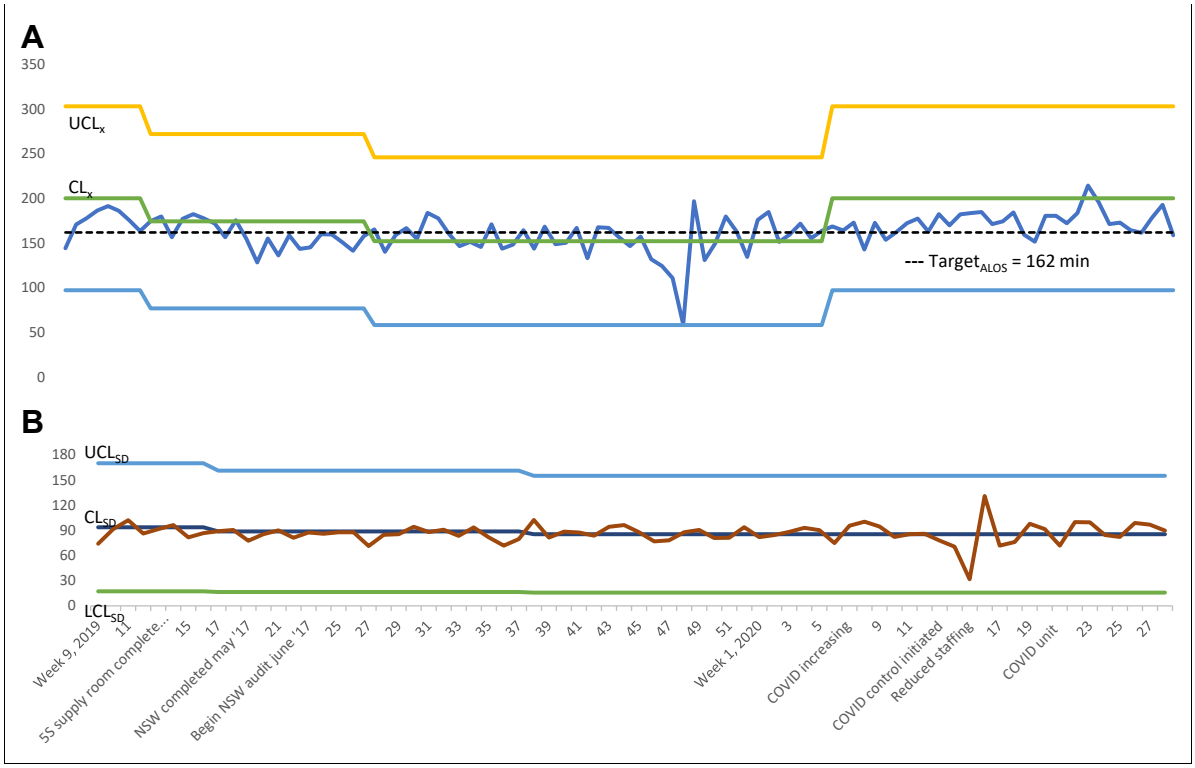

FIGURE 6

(A) ALOS (ALOS = x): week 9, 2019 to week 8, 2021 target ALOS = 162 minutes. (B) SD length of stay (s): week 9, 2019 to week 8, 2021. ALOS, average length of stay; CL, center line; LCL, lower control limit; UCL, upper control limit

The control charts start with week 9, 2019 and extend through February 2021. The charts do not extend further, because the fast-track area was repurposed to manage the large number of COVID-19 patients arriving during the pandemic. Significant events in the creation and maintenance of NSW are shown on the horizontal axis; otherwise, the horizontal axis shows the week of the year. The control limits were updated when the charts indicated a significant change in the process (eg, the ALOS in Figure 6A remained below the centerline for more than 5 consecutive weeks). The NSW team ALOS goal was 162 minutes (see Figure 6A) and the initial centerline for ALOS was 200.2 minutes, which was reduced to 150 minutes as NSW was implemented; however, ALOS increased to 200 minutes when fast track transitioned to a COVID-19 unit. In week 15 of 2020, fast-track patients stayed away from the hospital (ie, there were only 17 ESI 4 and 5 patients for the week) as COVID-19 increased and ALOS was only 59 minutes.

Figure 6B shows that the SD was small and moved randomly around the centerline and never approached its control limits. This means that the SD was within its control limits. Figure 7 gives the ALOS for each month from January 2019 to March 2020 when fast track was converted to treating COVID-19 patients. Figure 7 also includes the monthly LWBS. The horizontal axis shows the month when the NSW tasks were implemented. This shows a gradual drop in ALOS starting in January until in July when it was below 150 minutes. ALOS stayed close to 150 minutes the rest of the year, below the target of 162 minutes, whereas LWBS decreased below its target level of 2% and stayed there through March 2020.

Discussion

This was a quality improvement study where preintervention performance was compared with postintervention performance. The team designing the changes included those who were actually doing the work, which can best be described as an action research methodology as the researchers not only tested an intervention, but they also simultaneously managed the practical realities,

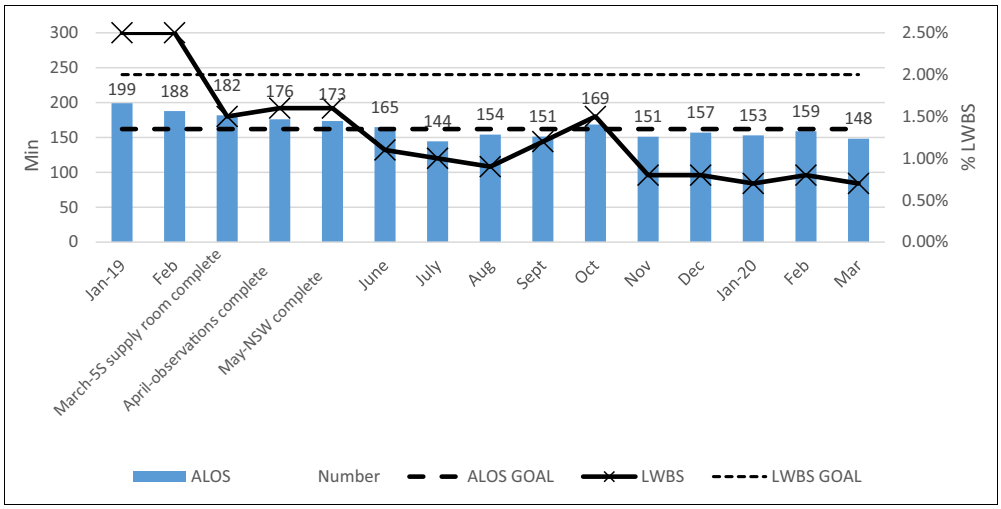

FIGURE 7

ALOS and LWBS. ALOS, average length of stay; LWBS, left without being seen; NSW, nurse standard work.

implementing it within the emergency department.[37] Nursing standard work created here had 3 elements: (1) takt time, (2) task performance sequence, and (3) standard inventory. The NSW team formed the last week of February 2019 and met weekly until the work was completed in the third week of April 2019. The NSW team reported its progress completing its A3 to the larger lean team weekly. All process changes were implemented as they were developed, which was feasible because the NSW team included those actually performing the work. For example, the NST began to pull patients form the lobby the first week of March, the registration process changed the first week of April, and task assignments for the NST and RN were completed by the third week of April and formalized as standard work the first week of May 2019. The audit process was finalized in week 1 of June 2019. Implementing changes slowly allowed for staff to determine whether the change was beneficial to the project and allowed for focused education to be provided to the staff. Initially, the NSW team wanted to implement solutions as they discovered problems; however, taking time to work through the A3 methodology allowed for data-driven changes rather than based off of perceptions.

The NSW team used the A3 problem-solving method to identify and remove barriers to achieving NSW. This structured problem solving forced the NSW team to avoid quick fixes and to instead examine each individual process element. As described earlier, creating NSW was a process of making small changes to multiple job elements. Creating NSW was an example of evidence-based problem solving in health care. It required accurate measurements of patient demand and task performance times and observations of delays and performance barriers. However, creativity also was required for the NSW team to rethink how to perform required tasks to meet the takt time goal. Some creative solutions were to use 5S to address the lack of storage space for supplies. Finally, it required manager discipline via the NSW audit to maintain NSW and not to conduct a "blame"- audit, but rather a problemidentification audit.

The major changes to complete NSW within the takt time were that the NSW team identified excessive walking, delays, and interruptions it could eliminate by standardizing storeroom supplies using 5S and by standardizing the medicine storage in the fast-track area. The NSW team also recognized that assigning the NST the task of monitoring the track board and pulling patients from the waiting room quickly when a fast-track room became available eliminated service delays. The RN and NST shared the task of ensuring that patients going to radiology were properly dressed; this effort to coordinate care eliminated a process delay.

Daily audits by a nurse manager of NSW performance assisted compliance by reminding everyone that system performance depends on standard work, but also gave staff daily access to management when problems were encountered.[38] The audit is feedback to both the manager and staff. It checks the unit compliance level and also provides a means for staff to notify management of operational failures when they occur.[28] When staff can share process problems with managers as they occur, the manager has more information and can intervene to solve throughput problems in real time to enable patient care.[38]

Limitations

The generalizability of one case study of 1 fast-track area experience creating NSW is necessarily limited, but the approach taken here to identify repeatable tasks versus nonrepeatable tasks is applicable to all locations. A second limitation is that the outcome measures were gathered by the hospital, and patient satisfaction with the fast-track experience could not be measured. Third, the NSW team gathered data about task performance through task observation, which is time consuming, so the data gathering was limited. In addition, changes to the task elements, such as delegating tasks to the NST, are situation dependent and may not be applicable to other fast-track units. However, the process steps of implementing NSW and the NSW audit are generalizable to other environments.

Conclusion

NSW was an effective intervention that significantly reduced ALOS for fast-track patients in a large urban hospital. Sustainability depends on management follow-through, given that an essential step in this intervention is the management audit of standard work. There has been a lack of investigation in the health care literature about how to create and maintain standard work practices. A next, very important step is to investigate the effects of standard work in other ED units. After the COVID-19 pandemic, the fast-track area physically moved to another area to allow 2 additional beds, but all processes developed before this were duplicated in the new fast-track area. Hospital management found this process valuable, and other hospitals within the system are now implementing a similar process.

Author Disclosures

Conflicts of interest: The authors do not have any conflicts of interest to report.

REFERENCES

1. Wallingford Jr G, Joshi N, Callagy P, Stone J, Brown I, Shen S. Introduction of a horizontal and vertical split flow model of emergency department patients as a response to overcrowding. *J Emerg Nurs*. 2018;44(4):345-352. https://doi.org/10.1016/j.jen.2017.10.017
2. Bonalumi NM, Bhattacharya A, Edwards C, et al. Impact of a planned workflow change: super track improves quality and service for low-acuity patients at an inner-city hospital. *J Emerg Nurs*. 2017;43(2):114-125. https://doi.org/10.1016/j.jen.2016.03.029
3. Nash K, Zachariah B, Nitschmann J, Psencik B. Evaluation of the fast track unit of a university emergency department. *J Emerg Nurs*. 2007;33(1):14-20. https://doi.org/10.1016/j.jen.2006.08.003
4. Gilboy N, Tanabe P, Travers D, Rosenau AM. *Emergency Severity Index (ESI): A Triage Tool for Emergency Department Care*. Version 4. Agency for Healthcare Research and Quality; 2012. Accessed July 01, 2022. thepafp.org/website/wp-content/uploads/2017/05/2012-Emergency-Severity-Index-for-Triage.pdf
5. Considine J, Kropman M, Kelly E, Winter C. Effect of emergency department fast track on emergency department length of stay: a case-control study. *Emerg Med J*. 2008;25(12):815-819. https://doi.org/10.1136/emj.2008.057919
6. Liu SW, Hamedani AG, Brown DFM, Asplin B, Camargo Jr CA. Established and novel initiatives to reduce crowding in emergency departments. *West J Emerg Med*. 2013;14(2):85-89. https://doi.org/10.5811/westjem.2012.11.12171
7. Hino S. *Inside the Mind of Toyota: Management Principles for Enduring Growth*. Productivity Press; 2006.
8. Imai M. *Gemba Kaizen: A Commonsense, Low-Cost Approach to Management*. McGraw-Hill; 1997.
9. Liker JK, Meier D. *The Toyota Way Fieldbook: A Practical Guide for Implementing Toyota's 4Ps*. McGraw-Hill; 2006.
10. Ohno T. *Taiichi Ohno's Workplace Management*. McGraw-Hill; 2013.
11. Ng D, Vail G, Thomas S, Schmidt N. Applying the Lean principles of the Toyota production system to reduce wait times in the emergency department. *CJEM*. 2010;12(1):50-57. https://doi.org/10.1017/S1481803500012021
12. Bucci S, de Belvis AG, Marventano S, et al. Emergency department crowding and hospital bed shortage: is Lean a smart answer? A systematic review. *Eur Rev Med Pharmacol Sci*. 2016;20(20):4209-4219.
13. Costa LBM, Filho MG. Lean healthcare: review, classification and analysis of literature. *Prod Plan Control*. 2016;27(10):823-836. https://doi.org/10.1080/09537287.2016.1143131
14. de Souza LB. Trends and approaches in lean healthcare. *Leadership in Health Services*. 2009;22(2):121-139. https://doi.org/10.1108/17511870910953788
15. Drotz E, Poksinska B. Lean in healthcare from employees' perspectives. *J Health Organ Manag*. 2014;28(2):177-195. https://doi.org/10.1108/JHOM-03-2013-0066
16. Holden RJ. Lean thinking in emergency departments: a critical review. *Ann Emerg Med*. 2011;57(3):265-278. https://doi.org/10.1016/j.annemergmed.2010.08.001
17. Mazzocato P, Holden RJ, Brommels M, et al. How does lean work in emergency care? A case study of a lean-inspired intervention at the Astrid Lindgren Children's Hospital, Stockholm, Sweden. *BMC Health Serv Res*. 2012;12(1):1-13. https://doi.org/10.1186/1472-6963-12-28
18. Alnajem M, Garza-Reyes JA, Antony J. Lean readiness within emergency departments: a conceptual framework. *Benchmarking. An International Journal*. 2019;26(6):1874-1904. https://doi.org/10.1108/BIJ-10-2018-0337
19. Hallam CRA, Contreras C. Lean healthcare: scale, scope and sustainability. *Int J Health Care Qual Assur*. 2018;31(7):684-696. https://doi.org/10.1108/IJHCQA-02-2017-0023

20. Naik T, Duroseau Y, Zehtabachi S, et al. A structured approach to transforming a large public hospital emergency department via lean methodologies. *J Healthc Qual*. 2012;34(2):86-97. https://doi.org/10.1111/j.1945-1474.2011.00181.x
21. Chalice R. *Improving Healthcare Using Toyota Lean Production Methods: 46 Steps for Improvement*. Quality press; 2007.
22. Kochevar BJ, Schumann MD. Working hard to improve work flow in the lab. In: Wellman J, Jeffries H, Hagan P, eds. *Leading the Lean Healthcare Journey: Driving Culture Change to Increase Value*. 1st ed. Productivity Press; 2010:179-192.
23. Graban M, Toussaint J. *Lean Hospitals: Improving Quality, Patient Safety, and Employee Engagement*. 3rd ed. Productivity Press; 2018.
24. Eitel DR, Rudkin SE, Malvehy MA, Killeen JP, Pines JM. Improving service quality by understanding emergency department flow: a white paper and position statement prepared for the American Academy of Emergency Medicine. *J Emerg Med*. 2010;38(1):70-79. https://doi.org/10.1016/j.jemermed.2008.03.038
25. Radnor ZJ, Holweg M, Waring J. Lean in healthcare: the unfilled promise? *Soc Sci Med*. 2012;74(3):364-371. https://doi.org/10.1016/j.socscimed.2011.02.011
26. Jackson TL. *Standard Work for Lean Healthcare*. CRC Press, Taylor and Francis Group; 2012.
27. Robinson AG. *Continuous Improvement in Operations: A Systematic Approach to Waste Reduction*. Productivity Press; 1991.
28. Tucker AL. The impact of operational failures on hospital nurses and their patients. *Journal of Operations Management*. 2004;22(2):151-169. https://doi.org/10.1016/j.jom.2003.12.006
29. Staats BR, Brunner DJ, Upton DM. Lean principles, learning, and knowledge work: evidence from a software services provider. *Journal of Operations Management*. 2011;29(5):376-390. https://doi.org/10.1016/j.jom.2010.11.005
30. Chakravorty SS. Process improvement: using Toyota's A3 reports. *Quality Management Journal*. 2009;16(4):7-26. https://doi.org/10.1080/10686967.2009.11918247
31. Dickson EW, Anguelov Z, Vetterick D, Eller A, Singh S. Use of lean in the emergency department: a case series of 4 hospitals. *Annals of Emergency Medicine*. 2009;54(4):504-510. https://doi.org/10.1016/j.annemergmed.2009.03.024
32. Labach EJ. Using standard work tools for process improvement. *Journal of Business Case Studies*. 2011;6(1):39-48. https://doi.org/10.19030/jbcs.v6i1.855
33. Hirano H. *Putting 5s to Work: A Practical Step-by-Step Approach*. 1st ed. PHP Institute of America; 1993.
34. Simons JV, Russell GR. A case study of batching in a mass service operation. *Journal Operations Management*. 2002;20(5):577-592. https://doi.org/10.1016/S0272-6963(02)00028-1
35. Mann D. *Creating a Lean Culture: Tools to Sustain Lean Conversions*. 3rd ed. CRC Press Taylor and Francis Group; 2015.
36. Reynolds MS, Spencer SP, Dunaway A, Buckingham D, Bartman T. Scientific approach to assess if change led to improvement—methods for statistical process control analysis in quality improvement. *J Emerg Nurs*. 2021;47(1):198-205. https://doi.org/10.1016/j.jen.2020.09.002
37. Coughlan P, Coghlan D. Action research for operations management. *International Journal of Operations and Production Management*. 2002;22(2):220-240. https://doi.org/10.1108/01443570210417515
38. Tucker AL. The impact of workaround difficulty on frontline employees' response to operational failures: a laboratory experiment on medication administration. *Management Science*. 2016;62(4):1124-1144. https://doi.org/10.1287/mnsc.2015.2170

A Multicenter Retrospective Evaluation of Specialized Laboratory Investigations in the Workup of Pediatric Patients With New-Onset Supraventricular Tachycardia

Authors: Kodi M. Endres, BS, Krista Kierys, MSN, CRNP-AC/PC, Yimeng Shang, MS, Shouhao Zhou, PhD, Gary D. Ceneviva, MD, Neal J. Thomas, MD, and Conrad Krawiec, MD, Hershey, PA

Contribution to Emergency Nursing Practice

- Specialized laboratory evaluation of supraventricular tachycardia in children may occur, but the utility is unknown.
- In this multicenter electronic health record database analysis, we found that cardiac-specific and noncardiac laboratory testing may be ordered for pediatric patients who present with supraventricular tachycardia. Thyroid studies were the most common laboratory testing ordered, but abnormal results only occurred in less than a quarter of subjects.
- These findings may highlight a quality improvement opportunity for emergency nurses and practitioners to change the practice toward ordering laboratory tests based on clinical indication.

Abstract

Introduction: Specialized laboratory evaluation of supraventricular tachycardia in children may occur, but the utility is unknown. The study objectives are to assess the type, frequency, and results of specialized laboratory testing performed in pediatric patients presenting with new-onset supraventricular tachycardia. We hypothesized that when specialized laboratory testing occurs (particularly for cardiac failure, toxicologic, inflammatory, and thyroid diseases), the results are generally within normal limits.

Methods: This is a retrospective descriptive study using an electronic health record database (TriNetX, Inc). We collected and evaluated the following data of subjects aged younger than 18 years with a first-time supraventricular tachycardia diagnosis: demographics, diagnostic codes, deaths, and laboratory codes/results (natriuretic peptide B, natriuretic peptide B prohormone N-terminal, troponin I, toxicology testing, inflammatory markers, and thyroid studies).

Results: A total of 621 subjects (524 [84.4%] without laboratory testing, 97 [15.6%] with laboratory testing) were included. Thyroid studies (65 [10.5%]) were the most frequent laboratory study performed followed by cardiovascular specific studies (35 [5.6%]), inflammatory markers

Kodi M. Endres is Medical Student, Penn State College of Medicine, Hershey, PA. **ORCID identifier:** https://orcid.org/0000-0001-6110-4266.

Krista Kierys is Pediatric Critical Care Medicine Nurse Practitioner, Pediatric Critical Care Medicine, Department of Pediatrics, Penn State Hershey Children's Hospital, Hershey, PA.

Yimeng Shang is PhD Student of Biostatistics, Department of Public Health Sciences; and Division of Biostatistics and Bioinformatics, Pennsylvania State University College of Medicine, Hershey, PA.

Shouhao Zhou is Biostatistician, Department of Public Health Sciences; and Division of Biostatistics and Bioinformatics, Pennsylvania State University College of Medicine, Hershey, PA.

Gary D. Ceneviva is Pediatric Critical Care Physician, Pediatric Critical Care Medicine, Department of Pediatrics, Penn State Hershey Children's Hospital, Hershey, PA. **ORCID identifier:** https://orcid.org/0000-0003-4572-8620.

Neal J. Thomas is Pediatric Critical Care Physician, Pediatric Critical Care Medicine, Department of Pediatrics, Penn State Hershey Children's Hospital; Department of Public Health Sciences; and Division of Biostatistics and Bioinformatics, Pennsylvania State University College of Medicine, Hershey, PA. **ORCID identifier:** https://orcid.org/0000-0002-7991-7510.

Conrad Krawiec is Pediatric Critical Care Physician, Pediatric Critical Care Medicine, Department of Pediatrics, Penn State Hershey Children's Hospital, Hershey, PA. **Twitter:** ckrawiec4. **ORCID identifier:** https://orcid.org/0000-0001-7902-2568.

For correspondence, write: Conrad Krawiec, MD, 500 University Drive, P.O. Box 850, Hershey, PA 17033-0850; E-mail: ckrawiec@pennstatehealth.psu.edu

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(21 [3.4%]), and toxicology tests (10 [1.6%]) ($P = .002$). Obtained laboratory testing was more frequent with older subjects, females, and need for emergency, hospital, and critical care services.

Discussion: Cardiac-specific and noncardiac laboratory testing is frequently ordered for pediatric patients who present with supraventricular tachycardia. Thyroid studies were the most common laboratory testing ordered, but abnormal results only occurred in less than a quarter of subjects. These findings may highlight a quality improvement opportunity for emergency nurses and practitioners in the practice of obtaining laboratory tests to better reflect high-value evidence-based care for this vulnerable population.

Key words: Cardiac dysrhythmias; Laboratory examinations and diagnoses; Pediatrics; Supraventricular tachycardia

Introduction

In the pediatric population, cardiac rhythm disturbances make up approximately 5% of hospitalizations per year and certain types are an important cause of morbidity in infants.[1,2] Thus, children with this condition require not only acute treatment but subspecialty pediatric cardiology care and close follow-up to ensure the best possible outcome.[3] Despite the requirement for subspecialty care, this patient population may first be managed by a general emergency medicine, pediatrics provider, and nursing staff, who not only must be able to identify supraventricular tachycardia (SVT) but manage this condition in collaboration with a prescribing provider while supporting the patient and family.[4,5]

The most common cardiac rhythm disturbance in the pediatric population is SVT.[6] It is a dysrhythmia that originates from atrial or atrioventricular nodal tissue above the bundle of His.[7] In children, the mechanism of SVT is most commonly caused by the presence of an accessory electrical pathway creating a reentrant circuit between the atrium and the ventricle or within the atrioventricular node.[8,9] When triggered, it results in increased heart rates and, if not addressed, may result in heart failure and/or death.[8]

After stabilization, oftentimes in the emergency setting, an extensive diagnostic workup may be performed. In addition to routine laboratory evaluation, this may consist of cardiac-specific laboratory and specialty laboratory tests such as thyroid function studies and drug/toxicology screens.[10] However, its utility is unclear given that most patients with SVT have structurally normal hearts and often do not have any noncardiac associated conditions.[9] Thus, extensive testing could lead to unnecessary invasive evaluation of these patients, excess costs, longer lengths of stays in the emergency department, and unnecessary worry for the parents and practitioners.[4] An understanding of how emergency and nonemergency clinicians assess pediatric patients presenting with SVT may help (1) assess the need for laboratory testing and (2) justify whether a high-value evidence-based approach to medical decision making for children with cardiac dysrhythmias is needed.

The objective of this study is to (1) assess the type and frequency of specialized laboratory testing (cardiovascular specific serum studies [natriuretic peptide B, natriuretic peptide B prohormone N-terminal, troponin I], toxicology testing, inflammatory markers, and thyroid studies) performed with patients younger than 18 years of age who present with SVT for the first time and (2) determine the frequency that these tests reveal an abnormal result. We hypothesize that, although noncardiac specific laboratory testing is frequently performed, it often produces a result that is within normal limits (a low positivity rate).

Methods

STUDY DESIGN

This is a retrospective observational cohort study that was conducted using the TriNetX electronic health record (EHR) data of pediatric patients younger than 18 years of age with a cardiac dysrhythmia–related diagnostic code. TriNetX is a global federated health research network that provides researchers access to continuously updated data elements on EHRs from participating health care organizations, predominantly in the United States.[11] TriNetX is certified to the ISO 27001:2013 standard and protects health care data by maintaining compliance with the Health Insurance Portability and Accountability Act Security Rule. The EHR data elements are aggregated and deidentified, including demographic characteristics, diagnoses, procedures, medications, laboratory values, and genomics, all in compliance with the deidentification standard outlined in Section §164.514(a) of the Health Insurance Portability and Accountability Act privacy rule. Because no protected health information is received by the user, we were provided a waiver from the Penn State Health Institutional Review Board to perform this study.

DATA COLLECTION

On January 22, 2021, we analyzed the available EHR data of 621 pediatric patients aged 18 years or younger who had a first-time SVT-related international classification of diseases diagnostic code and received the following services (emergency department, hospital, and/or critical care). It was assumed that subjects who had this diagnostic code were seen by a clinician, were evaluated, were diagnosed as having SVT, and had no other reason to have this diagnostic code based on the evaluation that was performed. We excluded patients who had previously undergone cardiac surgery, because these patients frequently have cardiac dysrhythmias and may not receive additional testing. We also excluded children with congenital heart disease. The SVT diagnosis entry dates ranged from April 9, 2002, to January 28, 2021. (Please see Supplementary Table for diagnostic code definitions.)

After the query, we obtained the following data: age, sex, race, ethnicity, and type and results of laboratory testing that was performed within the first day after the first reported instance of an SVT-related diagnostic code. For each unique patient, we analyzed the following specific laboratory testing categories: (1) cardiovascular specific studies (natriuretic peptide B, natriuretic peptide B prohormone N-terminal, troponin I) and (2) noncardiovascular studies. Noncardiovascular specific studies were focused on thyroid studies (free thyroxine [T4], thyrotropin), toxicology testing (qualitative urine [substance presence] and quantitative serum [substance presence and amount]), and inflammatory markers (C-reactive protein, erythrocyte sedimentation rate). We determined whether test results were within normal limits for natriuretic peptide B, natriuretic peptide B prohormone N-terminal, troponin I, C-reactive protein, erythrocyte sedimentation rate, free T4, and thyrotropin. Frequency of results not within normal limits was determined for each laboratory category and individual laboratory tests. Owing to a lack of reference values (and the likelihood that the different health care organizations may use different laboratories with different reference ranges), only qualitative and not quantitative serum for the toxicology tests were reviewed. The reference values for all the other laboratory tests were quantitative. Upon review of the nontoxicology laboratory tests, it was noted that some unique subjects had duplicate codes/values (ie, presence of 2 troponin I levels) and the presence of more than 1 distinct laboratory code/value within a laboratory category (ie, presence of C-reactive protein and erythrocyte sedimentation rate in the inflammatory marker category). For duplicate laboratory codes/values, we counted the laboratory once for each unique subject that had this occurrence and recorded the maximum value (ie, troponin I of 0.014 ng/mL and 0.015 ng/mL, only 0.015 ng/mL was recorded). The only exception was the thyrotropin level, where we recorded the minimum value for this, given that the clinician was likely evaluating for hyperthyroidism. For multiple distinct laboratory codes/values within a laboratory category, it was considered as part of the laboratory category and also counted once. In addition to the above, we evaluated for diagnostic codes specific for heart failure, thyroid disorders, and pre-excitation syndrome.

STATISTICAL ANALYSIS

Summary statistics using mean and standard deviation or proportions were reported for demographic, other diagnoses, and common procedural terminology codes for pediatric patients with an SVT diagnosis. Multiple categories of the race were rare; thus, they were regrouped into White and others for analysis.

Fisher's exact test was applied to compare various categorical clinical characteristics between those who received laboratory testing and not. Given that the distribution of age was highly skewed, the Wilcoxon rank sum test was applied to test the difference between the 2 groups.

We used Cochran's Q test to investigate whether a laboratory category was performed more commonly than others. If the null hypothesis of Cochran's Q test was rejected, we further applied pairwise McNemar's tests to examine whether the most commonly performed laboratory category had a higher frequency than the rest. Bonferroni correction was applied to control the familywise error rate.

To investigate whether there is an association between the laboratory evaluation and clinical characteristics (age, sex, race, and common procedural codes), we first used univariate logistic regressions of each variable of interest on each laboratory category and binary outcome in any laboratory or not. A generalized additive model using the thin plate regression spline was fit to confirm the linearity assumption on continuous variables in the logistic regression. For multivariate analysis, we conducted the multivariate logistic regression with backward stepwise variable selection based on the Akaike information criterion. Odds ratio, 95% confidence interval and P value were calculated to assess the relationship between clinical characteristics and each outcome.

We used statistical software R 4.1.1 (R Foundation for Statistical Computing) with packages tidyverse v1.3.1, arsenal v3.6.3, coin v1.4-,1 and mgcv v1.8-36. Given the exploratory nature of the analysis for this retrospective

TABLE 1
Clinical characteristics

Clinical characteristics	No specialized laboratory testing	Specialized laboratory testing	*P* value
Total number of subjects, *n* (%)	524 (84.4%)	97 (15.6%)	-
Approximate age (y, mean, SD)*	7.0 (SD = 5.5)	10.1 (SD = 5.2)	< .001
Age groups, *n* (%)			
0-5 y	227 (43.3)	22 (22.7)	-
6-10 y	123 (23.5)	21 (21.6)	
11-18 y	174 (33.2)	54 (55.7)	
Sex, *n* (%)			.03
Male	275 (52.5)	39 (40.2)	
Female	249 (47.5)	58 (59.8)	
Race, *n* (%)			.1
American Indian or Alaska Native	3 (0.6)	1 (1.0)	
Asian	11 (2.1)	2 (2.1)	
Black or African American	78 (14.9)	20 (20.6)	
Unknown	84 (16.0)	7 (7.2)	
White	348 (66.4)	67 (69.1)	
Ethnicity, *n* (%)			< .001
Hispanic or Latino	109 (20.8)	5 (5.2)	
Not Hispanic or Latino	317 (60.5)	65 (67.0)	
Unknown	98 (18.7)	27 (27.8)	
Associated diagnoses, *n* (%)			
Heart failure	9 (1.7)	2 (2.1)	.70
Thyroid disorders	5 (1.0)	1 (1.0)	> .99
Pre-excitation syndrome	67 (12.8)	4 (4.1)	-
Common procedural terminology codes, *n* (%)			
Emergency department services	324 (61.8%)	71 (73.2%)	.04
Hospitalization	112 (21.4%)	17 (17.5%)	.50
Critical care services	138 (26.3%)	25 (25.8%)	> .99

* Owing to the deidentified nature of the database, only the year of birth was provided. Thus, these ages are approximate based on the day of arrhythmia diagnosis.

study, no adjustment for multiplicity was applied for the regression model. *P* values of less than or equal to .05 were regarded as statistically significant.

Results

DEMOGRAPHIC CHARACTERISTICS

A total of 621 subjects (524 [84.4%] without laboratory studies and 97 [15.6%] with laboratory studies) were included in this study. Associated diagnoses, race, hospitalization, and critical care services were similar in both groups. Demographic characteristics are summarized in Table 1.

FREQUENCY OF SPECIFIC LABORATORY TESTS PERFORMED

A higher frequency of thyroid laboratory studies was performed (65 [10.5%]) compared with cardiovascular specific studies (35 [5.6%]), inflammatory markers (21 [3.4%]), or toxicology tests (10 [1.6%]) ($P = .002$). Of the cardiovascular specific tests, a greater frequency of

TABLE 2
Frequency of specific laboratory tests performed

Laboratory studies	Frequency of unique subjects	*P* value
Any thyroid study	65 (10.5)	.002
Free thyroxine (T4) (LOINC 3024-7)	31 (5.0)	
Thyrotropin minimum value (LOINC 11580-8)	60 (9.7)	
Any cardiovascular specific laboratory study	35 (5.6)	
Natriuretic peptide B (LOINC 30934-4; 42637-9)	10 (1.6)	
Natriuretic peptide B prohormone N-terminal (LOINC 33762-6)	3 (0.5)	
Troponin I (LOINC 10839-9, 42757-5; 49563-0; 76399-5; 89579-7)	27 (4.3)	
Any inflammatory marker level	21 (3.4)	
C-reactive protein (LOINC 1988-5; 11039-5; LP15023-2)	16 (2.6)	
Erythrocyte sedimentation rate (LOINC 4537-7; 30341-2; 82477-1; LP16409-2)	10 (1.6)	
Any drugs and toxicology screen or serum level	10 (1.6)	

Data are number (%) unless otherwise indicated.
LOINC, logical observation identifiers names and codes.

troponin I (27 [4.3%]) was reported than natriuretic peptide B (10 [1.6%]) and natriuretic peptide B prohormone N-terminal (3 [0.5%]). Of the inflammatory marker studies, C-reactive protein (16 [2.6%]) and erythrocyte sedimentation rate (10 [1.6%]) laboratory tests were performed. Of the thyroid studies, 31 (5.0%) were free T4 and 60 (9.7%) were thyrotropin. Toxicology tests had 10 (1.6%) qualitative results available. These results were all negative or unknown (Table 2).

ASSOCIATION OF SPECIALIZED LABORATORY TESTING WITH DEMOGRAPHIC CHARACTERISTICS

Analysis of demographic characteristics indicated an association between specialized laboratory testing and older age (1.11 [1.06-1.16], $P < .001$) and emergency department services (1.69 [1.04-2.73], $P = .04$). Male sex was associated with lower odds of specialized laboratory testing (0.61 [0.39-0.95], $P = .03$). Similar findings were observed after fitting multivariable logistic regression models, with the exception that hospitalization (2.47 [1.19-5.16], $P = .02$) and critical care services (2.73 [1.32-5.62], $P = .007$) were observed to be associated with specialized laboratory testing (Table 3).

FREQUENCY OF LABORATORY RESULTS NOT WITHIN NORMAL LIMITS

The frequencies of laboratory results not within normal limits (occurring once within each category) were nominally similar for cardiovascular (8 [22.9%]) and thyroid (15 [23.1%]) study categories with a higher frequency noted in the inflammatory marker (8 [38.1%]) category. Specific laboratory value results are summarized in Table 4.

Discussion

In this study, we aimed to investigate the type, frequency, and results of laboratory testing performed in pediatric patients presenting with SVT for the first time. We found that thyroid studies were most frequently ordered, but an abnormal result occurred in less than a quarter of subjects where this testing occurred. Laboratory testing was noted to be associated with older subjects (>11 years of age), females, and different types of medical services (emergency, hospital, and critical care). These findings may have implications for the management of pediatric patients who present with new-onset SVT in the emergency and hospital setting, particularly when it is appropriate to send specialized laboratory testing and if quality improvement initiatives are necessary to reduce potentially unwarranted testing.

After stabilizing a child with SVT, clinicians may order additional diagnostic testing. This is often done to evaluate for noncardiac diseases or conditions that are known to

TABLE 3
Association of specialized laboratory testing with sex, race, age, and type of medical services received

Variable	Univariate analysis		Multivariate analysis	
	Odds ratio (95% CI)	*P* value	Odds ratio (95% CI)	*P* value
Male	0.61 (0.39-0.95)	.03	0.57 (0.36-0.90)	.02
Caucasian	1.13 (0.71-1.80)	.61	-	-
Age	1.11 (1.06-1.16)	< .001	1.12 (1.07-1.18)	< .001
Emergency department services	1.69 (1.04-2.73)	.04	2.97 (1.41-6.27)	.004
Hospitalization services	0.78 (0.45-1.37)	.40	2.47 (1.19-5.16)	.02
Critical care services	0.97 (0.59-1.59)	.91	2.73 (1.32-5.62)	.007

CI, confidence interval.

cause cardiac dysrhythmias. For example, thyrotoxicosis is known to induce cardiovascular effects including sinus tachycardia and a predisposition to arrhythmias.[12] Similarly, different forms of cardiac dysrhythmias may be induced by illicit drug abuse.[13,14] Although most pediatric patients who present with a new-onset SVT are unlikely to have one of these conditions as the underlying cause, in the right clinical context, it may be necessary to maintain a low threshold of investigation for one of these causes.[15]

However, even though clinicians obtained thyroid function tests, our study found that less than a quarter of the results were outside normal limits. Perhaps this is because the incidence of hyperthyroidism occurring in children without any predisposing risk factors is rare.[16] Children presenting with thyroid storm account for less than 3% of all patients with hyperthyroidism.[12] Although sinus tachycardia is commonly reported, the presence of other cardiac dysrhythmias is rare with atrial fibrillation and less common forms of SVT ranging from only 2% to 20% in all patients in a hyperthyroid state.[12,15] In our study, the infrequency of elevated thyroid function tests in the setting of a pediatric patient presenting with new-onset SVT suggests routine use of these tests may be unwarranted in the diagnostic workup of these patients.[17] These findings point to the understanding that cardiac dysrhythmias are usually cardiac related, especially in an otherwise healthy pediatric patient. In general, we found that thyroid testing is one of the most commonly ordered laboratory tests but it

TABLE 4
Frequency of abnormal test results

Laboratory value	Frequency of abnormal test result, *n* (%)
Cardiovascular laboratory studies	8 (22.9)
Natriuretic peptide B (LOINC 30934-4; 42637-9)	3 (30.0)
Natriuretic peptide B prohormone N-terminal (LOINC 33762-6)	2 (66.7)
Troponin I (LOINC 10839-9, 42757-5; 49563-0; 76399-5; 89579-7)	12 (44.4)
Inflammatory markers	8 (38.1)
C-reactive protein (LOINC 1988-5; 11039-5; LP15023-2)	5 (31.3)
Erythrocyte sedimentation rate (LOINC 4537-7; 30341-2; 82477-1; LP16409-2)	4 (40.0)
Thyroid studies	15 (23.1)
Free thyroxine (T4) above normal limit (LOINC 3024-7)	3 (9.7)
Free thyroxine (T4) below normal limit (LOINC 3024-7)	3 (9.7)
Thyrotropin minimum above normal limit (LOINC 11580-8)	9 (15.0)
Thyrotropin minimum below normal limit (LOINC 11580-8)	2 (3.3)

LOINC, logical observation identifiers names and codes.

TABLE 5
Laboratory workup recommendations for pediatric patients with supraventricular tachycardia after hemodynamic assessment and stabilization

Type of patient	Practice recommendation
All patients	Perform a comprehensive history and physical examination to guide medical decision making.
All patients	Before testing, consider multidisciplinary communication to obtain high yield laboratory tests and avoid unwarranted laboratory testing.
Patient with hyperthyroidism and/or family history of autoimmune thyroid disease	Consider thyroid function testing.
Patient with underlying heart disease (ie, cardiomyopathy or viral myocarditis)	Consider testing of cardiac biomarkers (troponin, natriuretic peptides) and markers of inflammation (C-reactive protein and/or erythrocyte sedimentation rate).

is generally unrevealing, and when abnormal, it may not change clinical decision making especially if the symptoms of the clinical presentation are nonspecific.[18] All clinicians should be aware of this and only obtain such ordered testing if it is clinically justified and warranted.

Cardiac testing also was noted to be ordered with an abnormal result that also occurred in less than a quarter of the subjects in our study. Elevated cardiac enzymes, particularly troponin, are can indicate myocardial cell injury.[19] Thus, elevated troponin levels are frequently measured to evaluate for ischemic heart disease and risk stratify adult patients for the need for emergent cardiac catherization.[20] However, in children, myocardial injury is rare and elevated troponin can be from cardiac or noncardiac causes and alone does not reveal the etiology of myocardial injury.[20] In these instances, elevated troponin levels may be present owing to reversible cell damage and not necessarily cell death.[19] In particular, elevated troponin is common in patients presenting with cardiac dysrhythmias and is most often thought to be rate related rather than ischemic in nature.[20] Hence, unlike in adults, elevated troponin in pediatric patients is less specific and diagnostic and does not usually require emergency cardiac catherization.[19]

In our study, laboratory testing was significantly associated with older subjects and a similar association was noted between laboratory testing and different medical services rendered (emergency, hospital, critical care). Invasive evaluation of younger children (such as in our study) may not occur owing to phlebotomy difficulty, clinicians recognizing the possibility of a lower yield in positive results, or a clinician's desire to avoid additional stress and anxiety on a sick patient or their caregivers.[21] Even though our retrospective study was limited, these results may reinforce the notion that laboratory testing is not without risk and only should be obtained in children with SVT if clinically indicated. In addition, if our interpretation of these findings is correct, there are other drawbacks, especially in a hospital-based setting. Some of these include increased health care costs, increased length of hospital stays, and attainment of inconclusive or unactionable test results, which could lead to additional anxiety for the patient and their families.[17] In these circumstances, more testing could mean an increased risk of false-positive test results that could trigger unnecessary further investigations or treatment. Furthermore, in a situation where there is a low pretest probability for a particular condition, ordering additional tests also can elicit an aspect of unease for the provider to interpret the test result and determine the next best course of action in the context of a clinically indeterminate patient. From a nursing perspective, when performing phlebotomy, there is a risk of losing future intravenous sites.[22] This is especially important in young children, who may have a smaller superficial vein size and often require multiple venipunctures.[23] This can lead to multiple phlebotomy experiences resulting in additional stress and trauma inflicted on the patient. Repeated laboratory draws, especially if the first result is abnormal, also can lead to anemia.[24,25] Thus, when a child presents to the emergency or hospital setting with a condition (even as serious as SVT), risk stratification needs to occur for all types of patients to best select the necessary tests and interventions for these patients and avoid reflexively ordering laboratory tests.

Based on our study findings, an alternative approach to the diagnostic workup of pediatric patients presenting with new-onset SVT in the emergency and hospital setting should be considered. First, a thorough and comprehensive history and physical examination should be performed on all patients to guide clinical suspicion and decision making.[19] All laboratory testing that is ordered, whenever possible, should be guided by clinical indication and consideration of the patient's comprehensive history to prompt the necessary investigations that need to be performed. This may be challenging in an emergency department, especially when this may be the first time the patient presents with a condition with an acute onset, but there may be particular clinical features that can assist the clinician. Hyperthyroidism is more common in children with other autoimmune conditions and in children with a family history of autoimmune thyroid disease.[16] Therefore, it would be reasonable to obtain thyroid function tests in these patients to evaluate for thyroid disease as a potential underlying cause of the patient's cardiac dysrhythmia. From a cardiac perspective, although elevated troponin is specific for myocardial injury, it alone does not indicate any particular mechanism or etiology.[19] In fact, multiple studies have shown that troponin levels are poor predictors of acute myocardial infarction in the setting of cardiac dysrhythmias.[20] Therefore, isolated elevated troponin levels may have limited usefulness in the investigation of patients with cardiac dysrhythmias without additional testing and workup to determine the underlying etiology of suspected myocardial injury.[19] Therefore, we suggest that cardiac tests such as troponin levels be reserved for patients with a high clinical suspicion such as those who possess additional risk factors that make underlying heart disease (such as a cardiomyopathy or viral myocarditis) more likely or those who present with electrocardiogram changes indicative of ischemic heart disease. Before phlebotomy for ordered laboratory tests, interprofessional communication should be considered. The use of multidisciplinary communication and/or a checklist can reduce the number of unwarranted laboratory testing.[25] Communication in this fashion, so that all contributing services can decide which laboratory tests are necessary, proper, and ultimately unavoidable, may prevent the risk of additional blood loss. In addition, it may reduce the loss of future intravenous sites on patients; reduce trauma, stress, and anxiety on the part of the patient and their family; and reduce institution/patient expenditure. Previous studies in other clinical settings have demonstrated that this type of approach can be a safe and effective method to direct laboratory testing needs.[25] Future study through interprofessional quality improvement initiatives may be necessary (Table 5).

Limitations

This study had several limitations. This was a retrospective study; thus, the associations we found are not causation. Owing to database limitations, clinical documentation is not available for review. Thus, we do not know why these patients received additional testing, including how the patient presented or the risk associated with the patient's condition. We also were unable to investigate why male subjects and younger subjects underwent less laboratory testing. It is possible that the patients provided a clinical history that warranted a thorough workup or were seen at a nonpediatric emergency department. The data were restricted to institutions that participate in this database retrieval system. Owing to database limitations, we were unable to confirm the disease state reported by clinicians potentially resulting in bias. In addition, it is possible that not all EHR data were reported or all subjects who presented with a cardiac dysrhythmia were coded. Because we were not provided the reference ranges for quantitative serum toxicology results, it is unknown whether there were findings that were not within normal limits.

Implications for Emergency Nurses

Pediatric patients who present with new-onset SVT in the emergency and hospital setting require early recognition and treatment. However, after stabilization, they may not need extensive diagnostic testing. The results of this study may indicate that quality improvement initiatives to change practice toward ordering of laboratory tests based on clinical indication are needed to create a high-value evidence-based framework for the workup of pediatric patients presenting with new-onset SVT.

Conclusions

Our study found that both cardiovascular and noncardiovascular testing may be ordered for pediatric patients who present with SVT. Thyroid studies were the most common laboratory testing ordered, but an abnormal result only occurred in less of a quarter of subjects where this testing occurred. Although the providers may have performed this

testing to confirm a negative result, the low positivity rate may potentially call into question the utility of noncardiac laboratory testing in the emergency and hospital setting for patients presenting with new-onset SVT. It also may highlight a quality improvement opportunity for emergency nurses and practitioners in the practice of obtaining laboratory tests to better reflect high-value evidence-based care for this vulnerable population.

Author Disclosures

Conflicts of interest: none to report.

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Ethical Statement

TriNetX is a global federated health research network that provides researchers access to continuously updated data elements on EHRs from participating health care organizations, predominantly in the United States.[11] TriNetX is certified to the ISO 27001:2013 standard and protects health care data by maintaining compliance with the Health Insurance Portability and Accountability Act Security Rule. The EHR data elements are aggregated and deidentified, including demographic characteristics, diagnoses, procedures, medications, laboratory values, and genomics, all in compliance with the de-identification standard outlined in Section §164.514(a) of the Health Insurance Portability and Accountability Act privacy rule. Because no protected health information is received by users of this network, the Penn State Health Institutional Review Board provided a waiver for users from our institution to perform these type of studies.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.07.002.

REFERENCES

1. Sekar RP. Epidemiology of arrhythmias in children. *Indian Pacing Electrophysiol J*. 2008;8(Suppl. 1):S8-S13.
2. Turner CJ, Wren C. The epidemiology of arrhythmia in infants: a population-based study. *J Paediatr Child Health*. 2013;49(4):278-281. https://doi.org/10.1111/jpc.12155
3. Lutfi R, Montgomery EE, Berrens ZJ, et al. Improving adherence to a pediatric advanced life support supraventricular tachycardia algorithm in community emergency departments following in situ simulation. *J Contin Educ Nurs*. 2019;50(9):404-410. https://doi.org/10.3928/00220124-20190814-06
4. Moore A, Nelson C, Molins C, Mead P, Schriefer M. Current guidelines, common clinical pitfalls, and future directions for laboratory diagnosis of lyme disease, United States. *Emerg Infect Dis*. 2016;22(7). https://doi.org/10.3201/eid2207.151694
5. Green EH, Hershman W, DeCherrie L, Greenwald J, Torres-Finnerty N, Wahi-Gururaj S. Developing and implementing universal guidelines for oral patient presentation skills. *Teach Learn Med*. 2005;17(3):263-267. https://doi.org/10.1207/s15328015tlm1703_11
6. Mahtani AU, Nair DG. Supraventricular tachycardia. *Med Clin North Am*. 2019;103(5):863-879. https://doi.org/10.1016/j.mcna.2019.05.007
7. Hanash CR, Crosson JE. Emergency diagnosis and management of pediatric arrhythmias. *J Emerg Trauma Shock*. 2010;3(3):251-260. https://doi.org/10.4103/0974-2700.66525
8. Vignati G. Pediatric arrhythmias: which are the news? *J Cardiovasc Med (Hagerstown)*. 2007;8(1):62-66. https://doi.org/10.2459/01.JCM.0000247438.12817.9e
9. Helton MR. Diagnosis and management of common types of supraventricular tachycardia. *Am Fam Phys*. 2015;92(9):793-800.
10. Lewis J, Arora G, Tudorascu DL, Hickey RW, Saladino RA, Manole MD. Acute management of refractory and unstable pediatric supraventricular tachycardia. *J Pediatr*. 2017;181:177-182.e2. https://doi.org/10.1016/j.jpeds.2016.10.051
11. Harrison SL, Fazio-Eynullayeva E, Lane DA, Underhill P, Lip GYH. Atrial fibrillation and the risk of 30-day incident thromboembolic events, and mortality in adults ≥ 50 years with COVID-19. *J Arrhythm*. 2021;37(1):231-237. https://doi.org/10.1002/joa3.12458
12. Osman F, Gammage MD, Sheppard MC, Franklyn JA. Clinical review 142: cardiac dysrhythmias and thyroid dysfunction: the hidden menace? *J Clin Endocrinol Metab*. 2002;87(3):963-967. https://doi.org/10.1210/jcem.87.3.8217
13. Dominic P, Ahmad J, Awwab H, et al. Stimulant drugs of abuse and cardiac arrhythmias. *Circ Arrhythm Electrophysiol*. 2022;15(1):e010273. https://doi.org/10.1161/CIRCEP.121.010273
14. Lapoint J, James LP, Moran CL, Nelson LS, Hoffman RS, Moran JH. Severe toxicity following synthetic cannabinoid ingestion. *Clin Toxicol (Phila)*. 2011;49(8):760-764. https://doi.org/10.3109/15563650.2011.609822
15. Pandya M, Garcia RA, Awori J. Thyrotoxicosis in a pediatric patient with supraventricular tachycardia and borderline features of thyroid storm. *AACE Clin Case Rep*. 2019;5(6):e393-e395. https://doi.org/10.4158/ACCR-2019-0261
16. Léger J, Carel JC. Hyperthyroidism in childhood: causes, when and how to treat. *J Clin Res Pediatr Endocrinol*. 2013;5(suppl 1):50-56. https://doi.org/10.4274/jcrpe.854

17. Sawin CT, Geller A, Wolf PA, et al. Low serum thyrotropin concentrations as a risk factor for atrial fibrillation in older persons. *N Engl J Med*. 1994;331(19):1249-1252. https://doi.org/10.1056/NEJM199411103311901
18. Kluesner JK, Beckman DJ, Tate JM, et al. Analysis of current thyroid function test ordering practices. *J Eval Clin Pract*. 2018;24(2):347-352. https://doi.org/10.1111/jep.12846
19. Yoldaş T, Örün UA. What is the significance of elevated troponin I in children and adolescents? A diagnostic approach. *Pediatr Cardiol*. 2019;40(8):1638-1644. https://doi.org/10.1007/s00246-019-98-w
20. Ashok A, Cabalag M, Taylor DM. Usefulness of laboratory and radiological investigations in the management of supraventricular tachycardia. *Emerg Med Australas*. 2017;29(4):394-399. https://doi.org/10.1111/1742-6723.12766
21. Fernando H, Adams N, Mitra B. Review article: the utility of troponin and other investigations in patients presenting to the emergency department with supraventricular tachycardia. *Emerg Med Australas*. 2019;31(1):35-42. https://doi.org/10.1111/1742-6723.12971
22. Schiff GD, Martin SA, Eidelman DH, et al. Ten principles for more conservative, care-full diagnosis. *Ann Intern Med*. 2018;169(9):643-645. https://doi.org/10.7326/M18-1468
23. Eldridge DL. Alternatives to intravenous rehydration in dehydrated pediatric patients with difficult venous access. *Pediatr Emerg Care*. 2010;26(7):529-535. https://doi.org/10.1097/PEC.0b013e3181e5c00e
24. Branco BC, Inaba K, Doughty R, et al. The increasing burden of phlebotomy in the development of anaemia and need for blood transfusion amongst trauma patients. *Injury*. 2012;43(1):78-83. https://doi.org/10.1016/j.injury.2010.12.003
25. Jefferson BK, King JE. Impact of the acute care nurse practitioner in reducing the number of unwarranted daily laboratory tests in the intensive care unit. *J Am Assoc Nurse Pract*. 2018;30(5):285-292. https://doi.org/10.1097/JXX.0000000000000050

SUPPLEMENTARY TABLE

Diagnostic code supplemental table

Category	Description
Supraventricular tachycardia	"427" (ICD-9-CM: "Paroxysmal supraventricular tachycardia"); "427.2" (ICD-9-CM: "Paroxysmal tachycardia, unspecified"); "I47.1" (ICD-10-CM: "Supraventricular tachycardia"); "I47.9" (ICD-10-CM: "Paroxysmal tachycardia, unspecified")
Heart failure	"428" (ICD-9-CM: "Heart failure"); "428.42" (ICD-9-CM: "Chronic combined systolic and diastolic heart failure"); "428.21" (ICD-9-CM: "Acute systolic heart failure"); "428.9" (ICD-9-CM: "Heart failure, unspecified"); "I50.21" (ICD-10-CM: "Acute systolic (congestive) heart failure"); "I50.9" (ICD-10-CM: "Heart failure, unspecified"); "I50.30" (ICD-10-CM: "Unspecified diastolic (congestive) heart failure"); "I50.41" (ICD-10-CM: "Acute combined systolic (congestive) and diastolic (congestive) heart failure")
Thyroid disorders	"244.9" (ICD-9-CM: "Unspecified acquired hypothyroidism"); "E03.1" (ICD-10-CM: "Congenital hypothyroidism without goiter"); "E06.3" (ICD-10-CM: "Autoimmune thyroiditis"); "E03.9" (ICD-10-CM: "Hypothyroidism, unspecified")
Pre-excitation syndrome	"426.7" (ICD-9-CM: "Anomalous atrioventricular excitation"); "I45.6" (ICD-10-CM: "Pre-excitation syndrome")

ICD, International Classification of Diseases; CM, Clinical Modification.

Expressions of Compassion Fatigue by Emergency Department Nurses Caring for Patients With Opioid and Substance Use Disorders

Authors: Elizabeth B. Dowdell, PhD, RN, AFC-N, FAAN, Sue Ellen Alderman, MSN, RN, PMHCNS, Naja Foushee, MS, BSN, RN, Emily Holland, BSNc, and Elizabeth A. Reedy, PhD, RN, Villanova, Philadelphia, and Abington, PA

NCPD Earn Up to 8.5 Hours. See page 719.

Contribution to Emergency Nursing Practice

- The misuse of and addiction to opioids, including prescription pain relievers, heroin, and synthetic opioids, are a national public health crisis. As a result, emergency nurses in 1 Philadelphia, PA, hospital are experiencing work stress and higher levels of compassion fatigue related to care delivery issues.
- Findings support that emergency nurses working and providing care to patients with opioid and substance use disorder in this level I trauma center are experiencing compassion fatigue with related levels of frustration, negative emotional responses, and decreasing levels of job satisfaction. Managing compassion fatigue requires proactive assessment, education, and support.
- Areas identified by these emergency nurses to improve compassion levels included opportunities for debriefing, education, increased formal support systems, and management encouragement across all work shifts.

Elizabeth Burgess Dowdell is a Professor; and Coordinator, Undergraduate Research, M. Louise Fitzpatrick College of Nursing, Villanova University, Villanova, PA. **ORCID identifier:** https://orcid.org/0000-0001-9413-9393.

Sue Ellen Alderman is a Clinical Assistant Professor (retired), M. Louise Fitzpatrick College of Nursing, Villanova University, Villanova, PA.

Naja Foushee is a Registered Nurse, Einstein Healthcare Network, Philadelphia, PA.

Emily Holland is a nursing student, M. Louise Fitzpatrick College of Nursing, Villanova University, Villanova, PA. **Twitter:** @emilyh4929.

Elizabeth A. Reedy is an Associate Teaching Professor (retired), College of Nursing, Pennsylvania State University, Abington, PA.

For correspondence, write: Elizabeth B. Dowdell, PhD, RN, AFC-N, FAAN, M. Louise Fitzpatrick College of Nursing, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085; E-mail: elizabeth.dowdell@villanova.edu

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Abstract

Introduction: The misuse of and addiction to opioids are a national public health crisis. The complexity of delivering patient care in emergency departments exposes nurses to stressful work situations with complex patient loads and increasing levels of compassion fatigue. Emergency nurses were asked about their feelings of compassion fatigue while caring for patients with opioid use and/or substance use disorders.

Methods: Twenty-four focus groups with emergency nurses ($N = 53$) at a level I trauma center were conducted in late 2019 and early 2020 are used in this qualitative study using thematic analysis that identified 1 main theme of compassion fatigue with 3 subthemes (nurse frustration with addicted patients, emotional responses, and job satisfaction).

Results: Findings highlight that emergency nurses working with patients with opioid use and/or substance use disorders are dealing with a number of negative emotional stressors and frustrations, which in turn has increased their levels of compassion fatigue. These nurses repeatedly expressed feelings of increasing frustration with addicted patients, negative emotional responses, and decreasing levels of job satisfaction as components of their compassion fatigue.

Discussion: These emergency nurses identified 3 areas to improve their compassion: improved management support with encouragement across all work shifts, debriefing opportunities, and more education. Fostering a high level of self-awareness and understanding of how the work environment influences personal well-being are necessary strategies to avoid the frustrations and negative emotional responses associated with compassion fatigue.

Key words: Nurses; Opioids; Substance use; Compassion fatigue; Qualitative

Introduction

The misuse of opioids affects thousands of people crossing all ages, genders, races, religions, economic groups, and geographic locations. In 2019, the Centers for Disease Control and Prevention (CDC) reported that in the United States opioids were involved in 49,860 overdose deaths accounting for 70.6% of all drug overdose deaths.[1] The abuse of and addiction to opioids, including prescription pain relievers, heroin, and synthetic opioids such as fentaNYL, have been identified as a national public health crisis. There is a growing body of evidence that nurses working with complex patient loads and long shifts in a fast-paced environment that can be emotionally and physically challenging are reporting increasing levels of compassion fatigue.[2-5]

COMPASSION FATIGUE

Often referred to as the "Cost of Caring," the term compassion fatigue was first introduced in 1992 by Carla Joinson,[6] a nurse educator, to explain the "loss of the ability to nurture" in emergency nurses. Compassion fatigue is often defined as a gradual worsening of feelings of frustration with career responsibilities associated with high patient acuity, overcrowding, witnessing tragedy, and problems with administration.[7,8] Compassion fatigue results from the continuing stress of meeting or not meeting the frequently overwhelming needs of patients and their families.[9] Hunsaker et al[2] describe it as a state of exhaustion, including feelings of isolation, confusion, and helplessness encompassing one's physical, emotional, and spiritual states. Compassion fatigue often occurs in conjunction with or as a result of a loss of empathy, which is the inability to relate to what other people are feeling. Declining empathetic ability is also found from repeated exposure to others' suffering. Professionals who have low empathy may excessively criticize others or, in the case of addiction, blame the person for the addictive behaviors and actions.[10]

Health care professionals are generally considered to be in one of the highest-risk groups for experience of compassion fatigue and loss of empathy, which is directly related to emotional strain and the stressful work environment.[5] The impact of compassion fatigue on nurses can be profound, leading to decreased productivity, job dissatisfaction, job turnover, and high levels of frustration.[5,9] All nurses are at risk of compassion fatigue; however, emergency nurses are often found to have 25% higher levels than other groups.[11] Many emergency nurses are exposed to extremely stressful work situations involving high volume and acuity patients along with higher rates of violence and aggression.[4,11-13] Specific ED issues identified in the literature include a lack of resources, workload, no debriefing following challenging patient situations, inability to take breaks or rest periods, abusive patients, abusive families, violent patient situations, psychiatric presentations, and patients affected by alcohol and/or drugs.[3,10,11]

Emergency nurses who work with patients with opioid use disorder (OUD) frequently report high levels of compassion fatigue and low levels of compassion satisfaction such as happiness or professional fulfillment.[14] The notion of offering care to patients who may not be willing or able to fully recover and who have high recidivism rates with poor follow-up often contributes to nurses' negative feelings.[14] In this opioid misuse crisis, emergency nurses across the country have been reporting intense and stressful work environments such as those currently being experienced in Philadelphia, PA.[15] In 2019, 1150 people died in Philadelphia from drug overdoses and more than 80% of those deaths involved opioids, a number nearly 4 times the city's homicide rate.[16] To gain insight and understanding about the perceptions and feelings of emergency nurses caring for patients with OUD and/or substance use disorder (SUD), a study was undertaken at 1 urban emergency department in Philadelphia. Most of the emergency nurses expressed feelings of compassion fatigue specific to working with this challenging patient population. The purpose of this paper is to report on the descriptive qualitative findings specific to the theme of compassion fatigue and its 3 subthemes of nurse frustration with addicted patients, emotional response, and job satisfaction.

Methods

DESIGN

This study used focus groups with emergency nurses at a level I trauma center located in Philadelphia. Before the beginning of data collection, permission from the first author's institutional review board was obtained to conduct this expedited study (IRB-FY2019-147). The use of focus groups with this emergency nurse population was to gather their opinions, ideas, and feelings specific to experiences of working with patients with OUD and/or SUD. Focus groups were used because they can provide an atmosphere where ideas are generated in a nonthreatening way with the facilitator who emphasized that all ideas were valuable and respected.[17]

Recruitment of emergency nurses for the focus groups was done by word of mouth, email blasts, posting of flyers, and reminders from the emergency nurse manager during shift change. Hospital administration provided access for

4 months to recruit and conduct the focus groups, which were all conducted on site at the hospital. Focus group sessions were confidential and held in a private room. Nurses were asked to protect any personal information discussed in the focus groups by not sharing with others after the group to protect confidentiality; additionally, all participating emergency nurse badges were replaced with a color badge so that no names were used. No nurse participated in more than 1 group and each group was led by an advance practice psychiatric nurse who had the expertise and skill set to manage group dynamics. The size of the focus groups was influenced by time, with those following a day shift (7 AM to 7 PM) having the most participants, followed by the night shift (7 PM to 7 AM) and the middle shift (11 AM to 11 PM). Inclusion criteria were being a registered nurse (RN) currently licensed in Pennsylvania and a full-time employee working 90% or more of their time in the emergency department and at least 1 year of ED experience. Exclusion criteria were working part-time or as needed (temporary, per diem, or pool) in the emergency department and/or a member of the administration team (supervisor, management, or education). This study endeavored to maintain subject confidentiality and anonymity. Participation did not affect the nurses' work situations or involve any benefits or incentives.

BOX 1

Focus group questions

1) Do you get satisfaction from being able to help people?
2) How do you feel about working with opioid addicted patients?
3) Do you feel like you receive adequate support from colleagues and supervisors regarding working with opioid addicted patients?
4) Do you ever feel like you are taking your work home?
5) What do you do to soothe or calm yourself when your anxiety level is high as a function of working with opioid addicted patients?
   a. What has worked for you?
   b. What has not worked for you?
6) How do you view drug addiction–is it an acute or chronic disease?
7) Are there any other areas that we have not covered that you would like to discuss?

DATA ANALYSIS

Focus group data were analyzed using the Braun and Clarke[18] qualitative methodology of thematic analysis. Reflexive thematic analysis is an approach to analyzing qualitative data (eg, focus group transcripts), to answer questions about people's experiences, views, perceptions, and representations of events.[18] This data analysis method involves 7 steps: transcription, reading and familiarization, coding, searching for themes, reviewing themes, defining, and naming themes and finalizing the analysis.[18] In our study, all focus groups were audio recorded and asked the same questions (Box 1). The focus groups lasted between 45 to 120 minutes, and following step 1, all of the recordings were transcribed verbatim using a professional service. Step 2, transcripts were then read in their entirety by the first 4 authors (EBD, SEA, NF, EH) to gain an overall impression with familiarization of the text. Step 3, data were then coded in a meaningful pattern in relation to the research question specific to compassion fatigue. For this, all transcripts were entered into the ATLAS.ti8 qualitative software package (Scientific Software Development GmbH), and the code function was used on each transcript to identify words that related to compassion fatigue, which were then pulled into a grid and highlighted. Step 4 involved searching for themes, reviewing themes, defining, and naming themes.[18] A theme was recognized when saturation or a redundancy in the data was found with more than 70% of the sample saying the word or combination of words (eg, "lack of compassion" or "frustration"). The same 4 authors followed recommended steps to ensure trustworthiness in the analysis process, including the preparation, organization, and reporting of results. These same individuals worked in pairs and evaluated the Atlas.ti8 coding for each theme and identified subthemes. Any differences were reconciled by consensus following discussion.

Trustworthiness was addressed by all authors through discussions about data credibility and confirmability to identify any biases that might have influenced the analysis process. Dependability and confirmability were supported by the maintenance of an audit trail through Outlines and Excel tables (Microsoft Office 365) using accessible Google Docs (Google) to assist in systematic comparisons of data.[18] During analysis and discussion, it became clear that there were a number of codes described by the emergency nurses that defined certain feelings or perceptions of compassion fatigue. The theme of compassion fatigue had more than 14 subcodes within this category and was reduced by clustering quotes into subthemes (Table). The 3 subthemes of frustration with addicted patients, emotional responses, and job satisfaction (Figure) were identified.

In this paper, we have chosen to focus on the expressions and perceptions of emergency nurses specific to the theme of compassion fatigue and its 3 subthemes. Expressions and feelings of compassion fatigue by these emergency

TABLE
Numbers of quotes that comprise compassion fatigue and each of the subthemes

Main themes No. of quotes	Subcodes No. of quotes	Subthemes No. of quotes
Compassion fatigue (148)	• Compassion fatigue and frustration with patients (88)	• Emotional responses (36) • Frustration with patients (24)
Frustration (96)	• Frustration with work stress or job (59)	• Job satisfaction (37)

nurses cannot be fully understood without considering the role of emotion, often overwhelmingly negative in this sample, associated with caring for patients with OUD/SUD. Direct quotes are used to support thematic findings, illustrate emergency nurse emotions, and demonstrate the findings of the analysis.

Results

SAMPLE

The level I trauma urban hospital used in this study is a large, more than 500 bed, teaching hospital that routinely sees and provides care to individuals who have health problems related to substance and drug abuse. For this study, there was a total of 24 focus groups that yielded 55 emergency nurses; however, 1 nurse did not talk in the focus group and 1 nurse left at the start of the group, leaving a final sample of 53 RNs. The response rate for this emergency department was found to be 54.6% (53/97). Of the emergency nurse sample, the majority (85%) identified as female ($n = 45$) with 8 males. The racial composition of nurses found that most were Caucasian (74%, $n = 40$), followed by African American (17%, $n = 9$), Asian, Biracial, or Latino (9%, $n = 5$). The emergency department used for data collection is a designated Magnet (American Nurses Credentialing Center) recognized hospital where most nurses reported having a BSN (73.5%, $n = 39$), a master's degree (13.2%, $n = 7$), or an associate degree (9.3%, $n = 5$).

Theme: Compassion Fatigue

Subtheme 1: Frustration with addicted patients. All focus groups were asked "During the past 2 weeks, have you taken care of patients who have addiction or substance problems?" and 100% of this emergency nurse sample answered "yes." They all perceived and felt that they had taken care of at least 1 patient with a substance problem. Negative feelings of frustration related to anger, annoyance, being upset, and disappointment in the patients with OUD and/or SUD were voiced by the majority of nurses.

> RN #1: "I am frustrated with the whole [drug] ordeal. I feel frustrated. I feel aggravated. I feel disrespected and lied to."

> RN #25: "When they come in and they just want drugs, then it's exhausting."

Frustrations about the time spent, resources, and energy devoted to patients with OUD and/or SUD were frequently shared as contributing to the nurses' growing feelings of compassion fatigue. They perceived a high recidivism rate of patients, which when coupled with the needs of patients with OUD and/or SUD seemed to be significant factors that increased nurse feelings of physical and emotional exhaustion. Access to hospital records or statistics on recidivism of patients was unavailable; however, these emergency nurses felt that they were seeing the same individuals repeatedly whether it was true or not. Patients with OUD/SUD entering the emergency department must be treated for their priority problem(s), trauma, medical complication or disease process, opioid relapse, or impending death owing to overdose. Adding to nurse frustration is the feeling of exhaustion, physical and emotional, related to nurse perception that these patients are constantly in and out and returning repeatedly to the emergency department, sometimes multiple times per day.

> RN #24: "I think the opioid stuff probably gets me more than the traumas for the simple fact that it's exhausting. It's just exhausting. They come back and they come back and they come back."

> RN #42: "It's one thing for you to have someone that, like, overdosed, okay, but when you get the same

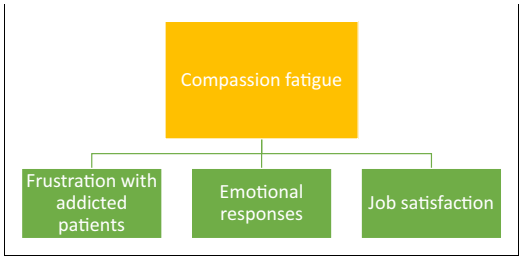

FIGURE
Theme of compassion fatigue and subthemes.

person in day after day – I mean, literally there are people who come, it's like, morning, noon, and night, and they're here. It's a revolving door…"

RN #4: "The first thought is, here we go again… So, you know, I hate to say it like this, but like it is a waste of our time and resources…"

Nurses also talked about feelings of frustration, a lack of empathy, and the resulting conflict when they have to choose between patients with OUD/SUD who are "high" and those with other emergencies.

RN #45: "It's very frustrating when you have people with true cardiac emergencies, or any type of emergency and you have no time, because you are dealing with someone who is high."

RN #39: "I have real sick patients out in the waiting room, and now I have to give a bed or a spot to somebody who chose to get high."

RN #46: "And it's like you're babysitting them when there's other sick people who really need your attention."

Frustrations about drug-using behaviors also were found regarding treatment of patients with OUD with the administration of Narcan (naloxone), which is used to counter the effects of opioid overdose. The resulting withdrawal symptoms can lead patients to leave the hospital before discharge in search of opioids to alleviate their acute distress. Nurses shared experiences of patients with OUD who were no longer "high" fleeing the hospital and the anger or concerns this caused.

RN #44: "You know, heroin high, give the Narcan, save them and the next thing we know, they're eloping with two IV accesses, and they're gone. Then we have to call the police to get them, and you know where they're going to go. Go right outside to get high and then they come back, if they're not dead, you know?"

RN #2: "I had a girl who was overdosing [gave treatment] and we discharged her. She was leaving, and I went to give her the nasal Narcan [part of discharge]…She said, 'What do I need that for? I have a whole purse of it.'…That was a slap in the face."

Subtheme 2: Emotional Response. Emergency nurses in the focus groups identified caring for the patient population with OUD and/or SUD as heavily emotional and not always positive.

RN #26: "We can always relate it [feeling angry] back to the opioid patient and they need my emotion, they need my compassion, they need me to make those phone calls [to rehab, social work] and I just can't do it."

RN #27: "I don't have any sympathy. You know I have no empathy at all for these people, now, none."

Negative or intentional emotional responses are viewed as a component of compassion fatigue.[7,19] Nurses in the focus groups who talked about their emotional response of feeling drained, overloaded, and angry from working with patients with OUD and/or SUD shared that these emotions increased their feelings of compassion fatigue. They shared how their growing levels of negative emotions were adding to a lack of feeling compassion. The need to feel and be seen as human also was identified as an important feeling in terms of how nurses deliver care and are treated by patients with OUD/SUD.

RN #26: "I just want to be careful that it [having no compassion] doesn't, you know, change me in ways that I don't feel or know or want to see."

RN #16: "I think we've all said fuck it at some point or thought it or like hear it or heard someone say it, because you're just frustrated at the time and we're human beings as well as nurses."

RN #15: If someone's like coding [and dies], whether it's an overdose or whatever drug, sometimes we're so numb to it, we're like laughing and joking over the body. And I get it. They put a needle in their arm. They did it to themselves. But then some days I'm driving home and am like damn, I should have been a little bit more compassionate… And I think sometimes we forget, like when we're standing there, like, this is still a human being.

These nurses acknowledged the emotional toll and were fearful of how these negative emotional responses, especially after a major case involving drugs, such as a complex trauma or overdose case, made them feel. These feelings were cause for concern in terms of bringing work into their home by having displaced or projected their work feelings onto family members.

RN #8: I'm taking care of a mom and her baby's brains were all over her hair [gunshot victim from a drug deal gone bad] and I just walked out of the room and I wanted to cry, and I had two new patients where I was and the doctor was like, that person needs

to be seen right now. And I went home and I fought with my boyfriend and my 16-year-old son and I was like, I can't control my anger right now…then I realized it was all about that baby.

RN #35: "The opioid stuff is exhausting. You go home and you're like, what is wrong with these people? It's just exhausting."

Subtheme 3: Job satisfaction. Job satisfaction was frequently discussed in terms of negative and positive feelings by these emergency nurses. Negative job satisfaction was the more common subtheme and related to the ED environment, dealing with nonemergency nurses, and a lack of recognition or support from management/administration.

RN #26: "So no one makes emergency room nursing easy. Not the patients, not the hospital… We have to get these patients out [of the ED]. We have to move them [up to the floor or unit]. There are such fights on the phone from other nurses, who can't take that patient."

RN #28: "It's money, it's volume, push them through… I don't know what happened to the compassion in medicine."

RN #8: "I used to get a lot of satisfaction from being a nurse, but as of now I have zero."

The lack of staff, time, and space for emergency nurses were tangible factors contributing to their compassion fatigue.

RN #1:

But no one ever checks on the nurse to see if they're okay. The physicians can go on with their physician lounge and just take five minutes. We don't have a lounge. The physicians have a lounge. Our old walk-in clinic waiting room is their lounge. I'm talking carpet, computers, a couch for them to crash on weekends…there is no place for the nurses to go. We go in a dirty stairwell by the kitchen to talk or cry….

Nurses shared that the lack of space or a breakroom for nursing in this emergency department contributed to their feeling underappreciated by management and administration. In particular, they did not have a clean and dedicated space or room in or near the emergency department. Their previous breakroom was remodeled and given to the physicians, leaving nursing staff with no place or room, other than a dirty stairwell located off the emergency department, to gather to talk, debrief, or feel relaxed. Doing a job when they were understaffed or not recognized or appreciated by nursing management or hospital administration lowered levels of job satisfaction.

Discussion

The emergency department is a fast-paced clinical site that requires nurses to demonstrate communication, critical thinking skills, and leadership. Patients and families who come to the emergency department desire compassionate care from all the nurses and health care providers with expectations that the delivery of care will be consistent and of high quality. Emergency nurses in this study repeatedly expressed increasing frustration with addicted patients, negative emotional responses, and decreasing levels of job satisfaction. Intensifying these feelings were stressors such as being understaffed, having few available professional supports, and absence of recognition from management/administration. Although most of the feelings and perceptions shared by the emergency nurses in this study were negative, it is important to note that some nurses did share positive feelings. Most talked about having hope that change would happen in the emergency department, with staffing, management, and workload. This sense of hope for the future led emergency nurses in our study to identify 3 areas that would increase feelings of compassion and decrease their fatigue: improved management support with encouragement across all work shifts, debriefing opportunities, and more education.

Implications for Emergency Nurses

MANAGEMENT SUPPORT WITH ENCOURAGEMENT

In the emergency department, there are demanding workloads and aspects of the work environment, such as poor staffing ratios, lack of communication between physicians and nurses, and lack of management or administrative leadership with support, that are associated with compassion fatigue and burnout in nurses.[5] Employees who feel valued and supported perform better at work. Support at work can be critical during stressful times, such was when short staffed or extremely busy, and although stress is a normal and unavoidable part of life, especially at work, too much stress can affect an individual's emotional and physical well-being.[20] Managerial support in the workplace is a critical component of creating safe and healthy workplace environments. In the United States, federal law provides that

each individual is entitled to a safe workplace that is free from hazards.[20] Safety involves effective communication between employees and managers that can help increase an employee's feelings of competence and productivity, which meets management goals of having a team full of exceptional employees.[20]

Research on compassion fatigue suggests that it is best managed by prevention through proactive assessment, education, and support both formal and informal.[7,9,21-23] For any ED or clinical setting, an essential component of a supportive, productive, and healthy work environment is having a nurse manager who is visible on the unit, promotes communication, validates employee concerns, and has strong leadership skills.[9,22] An essential component of inclusive leadership involves nurse managers and administrators who are able to develop positive relationships with open lines of communication.[5] Although nurses themselves need to identify their personal stressors, it is imperative that ED management and hospital administration also acknowledge these concerns and act on the workplace issues. The emergency nurses in this study felt that there was little support given from hospital administration.

In our study, emergency nurses shared that short staffing was a problem across all nursing specialties within their own hospital, but they felt it could be helped, if not solved, through realistic planning with hiring of additional staff and opportunities to debrief after major cases (overdose, trauma). The increases in the number of patients with OUD and SUD are not expected to stop any time soon, especially in Philadelphia.[16] Staffing in the emergency department needs to reflect this reality. Overstressed nurses often react by leaving a position when they believe they will not get relief. It is expensive to recruit, orient, and train new nurses to take the place of experienced nurses. Administrators and management need to balance the cost of doing this against providing debriefing, psychological or formal support, and education.

Management and administration also can use formal supports to help nurses with the negative feelings associated with compassion fatigue and work stress through a benefit program, often called an employee assistance program (EAP). An EAP is a voluntary, work-based program that offers free and confidential assessments, short-term counseling, referrals, and follow-up services to employees who have personal and/or work-related problems. Many individuals use EAPs to cope with workplace violence, trauma, and other emergency response or disaster situations. EAPs address a broad and complex body of issues affecting mental and emotional well-being, such as stress, grief, family problems, alcohol, other substance abuse issues, and psychological disorders.[24] In our study, we were surprised that there were nurses who stated that they were unaware that EAP services existed at their hospital. Nurses who were aware of or had used EAP for a work-related incident shared that they found the EAP response to be of no help, occurring too late after a crisis or trauma case happened. Not surprisingly, many of the nurses in our study turned to their peers for informal support. Peer support during the shift and often after work may provide the benefit of informal support based on an understanding that their peers have gone through similar situations with associated feelings. Social support and talking with colleagues have been found to be significant moderators between aggression/conflict situations and emotional exhaustion in addition to a useful self-care strategy supporting balancing work with a personal life.[13,22,25]

OPPORTUNITIES FOR DEBRIEFING

A successful evidence-based action to decrease compassion fatigue is the purpose of debriefing, which is defined as a session that involves sharing and examining information after a critical event to improve communication and review team performance, as well as provide emotional support.[26] Debriefing is not counseling, because it is a structured voluntary discussion aimed at putting an abnormal event into perspective.[21,26] Reviewing the positives and negatives of a difficult experience encourages communication with reflection on specific actions to incorporate improvement into future performance. Allen and Palk[21] reported that debriefing was the most common action found to be beneficial to resilience and coping. The process of debriefing involves structured voluntary discussion aimed at putting an atypical, complex, challenging, or traumatic event into perspective.[26,27] In a perfect and well-staffed work environment, debriefing after a traumatic case or event should be provided immediately after the case or as soon as possible; some recommend no longer than the first 24 to 72 hours after the initial impact of the event.[26] Others have found that debriefing is effective when conducted within the first week after a difficult or traumatic case.[21,27] Further research on what timeline for debriefing works best for nurses, staff, and providers and how to implement in an ED setting is recommended.

EDUCATION

Debriefing also can include an educational component that focuses on learning about compassion fatigue, OUD/SUD knowledge, and self-care techniques to promote individual well-being. Specialty education programs can increase both

knowledge and skill in the ED environment with a spotlight on how to identify, manage, and reduce stress in addition to the latest innovations in combating and preventing compassion fatigue. Trauma informed care, workplace violence identification, and reporting to enhance ED safety are other educational ways to prevent compassion fatigue. Understanding how to manage frustration with patients, negative emotional responses, and job dissatisfaction also can help nurses' professional and personal growth while providing better patient care. Education for nurses can be accomplished through modules, standard continuing education contact hours, courses, simulations, virtual conferences, or speakers. In our study, emergency nurses expressed a desire to receive education about providing care to individuals with OUD and SUD. Areas identified for education included the neurobiology of addiction to improve attitudes of working with patients with OUDs and SUDs, which may increase nurse knowledge to help separate the person from their addiction.

THE WARM HANDOFF PROGRAM

In the Commonwealth of Pennsylvania and across the city of Philadelphia, there is a state-supported program called the Warm Handoff Program that was developed and implemented to better meet the needs of individuals with OUD/SUD diagnosis and their recidivism rates.[28] The program was designed to provide recognition and response to the need for improved OUD/SUD treatment access. The goal of the program is to directly transfer overdose survivors from the hospital emergency department to a drug treatment provider and recovery services.[28] The program provides support for the individual and staff given that patients with OUD/SUD entering the emergency department must be treated for their priority problem, trauma, medical complication or disease process, opioid relapse, or impending death owing to overdose. The emergency nurses in this study voiced frustration that these "high," "high care," and "needy" patients with OUD and SUD limited their capacity to care for other sick patients. Emergency nurses were frustrated and resentful when expected to provide care to someone with OUD/SUD over someone without it, especially if they perceived that the patient was someone they frequently saw in the emergency department. At the time of this study, the emergency department had not had a Warm Handoff drug/rehabilitation contact or a full-time social worker or psychiatric/mental health liaison for a number of months. This lack of a program designed to help ED staff by taking patients with OUD/SUD directly into rehabilitation or recovery may have been a factor in nurses' feelings of exhaustion and frustration surrounding perceptions of patient recidivism.

Limitations

Although this study provides strong support for emergency nurses having high levels of compassion fatigue related to their providing care to patients with OUD/SUD, limitations should be considered. First, the emergency nurses in this study were from a single, level I trauma center in Philadelphia and there was no comparison group, and all participants were from the same clinical unit, which limits generalizability and provides the greater threat to external validity, meaning application of these findings to other settings may be limited. The sample size was small and included a range of ages, years of nursing and emergency nursing experience, in addition to the study occuring in late 2019 and early 2020, before the coronavirus pandemic. Because this study consisted of focus groups with emergency nurses who chose to participate (self-selection), their personal feelings and perceptions of experiences working with patients with OUD/SUD suggest that the transferability of the findings also may be limited. Although more than half of the full-time emergency nurses participated in this study, the small sample size may not be representative of other larger or smaller emergency or other nurse groups. There is also the possibility that some of the emergency nurses may have felt peer pressure to participate in the focus groups or to give similar answers as others in the group when faced with the moderator's questions. In addition, our sample was biased toward education with more than 73% being prepared at the baccalaureate level and all were working in a Magnet recognized hospital. Future research could focus on the impact of compassion fatigue interventions (management supports, education, consistent and timely debriefing, and/or huddles) in a more diverse range of emergency departments and with nurses such as those who are younger. Inclusion of more ethnically diverse and male nurses to determine the effectiveness of interventions designed to reduce compassion fatigue also must be included in the future.

Conclusion

Across the nation and in the city of Philadelphia, emergency nurses, providers, and staff witness devastating illness, suffering, and trauma on a daily basis. Adding to this workload are patients with drug and addiction issues that nurses in our focus groups shared were increasing their feelings of frustration, negative emotions, and job dissatisfaction. These feelings were found to interfere with nurses' well-being, job satisfaction, and ability to provide patient-centered quality care. Emergency nurses, providers, nurse managers, and hospital administrators must begin to understand the effects of compassion fatigue and recognize the signs and symptoms. Fostering a high level of

management support with encouragement, self-awareness, and understanding of how the work environment influences personal well-being are suggested strategies to avoid the negative frustrations and emotional responses associated with compassion fatigue. Using formal support systems, debriefing, education, and recognition to prevent and address nurses' compassion fatigue must be prioritized.

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Author Disclosures

Conflicts of interest: none to report.

REFERENCES

1. Drug overdose deaths. Centers for Disease Control and Prevention. CDC; Published 2022. Accessed June 7, 2022. https://www.cdc.gov/drugoverdose/deaths/index.html
2. Hunsaker S, Chen HC, Maughan D, Heaston S. Factors that influence the development of compassion fatigue, burnout, and compassion satisfaction in emergency department nurses. *J Nurs Scholarsh*. 2015;47(2):186-194. https://doi.org/10.1111/jnu.12122
3. O'Callaghan E, Lam L, Cant R, Moss C. Compassion satisfaction and compassion fatigue in Australian emergency nurses: a descriptive cross-sectional study. *Int Emerg Nurs*. 2020;48:1-8. https://doi.org/10.1016/j.ienj.2019.06.008
4. Schmidt M, Haglund K. Debrief in emergency departments to improve compassion fatigue and promote resiliency. *J Trauma Nurs*. 2017;24(5):317-322. https://doi.org/10.1097/JTN.0000000000000315
5. Shah MK, Gandrakota N, Cimiotti JP, Ghose N, Moore M, Ali MK. Prevalence of and factors associated with nurse burnout in the US. *JAMA Netw Open*. 2021;4(2):e2036469. https://doi.org/10.1001/jamanetworkopen.2020.36469
6. Joinson C. Coping with compassion fatigue. *Nursing*. 1992;22(4), 116:118–120.
7. Boyle DA. Countering compassion fatigue: a requisite nursing agenda. *Online J Issues Nurs*. 2011;16(1):2. https://doi.org/10.3912/OJIN.Vol16No01Man02
8. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion satisfaction, burnout, and compassion fatigue among emergency nurses compared with nurses in other selected inpatient specialties. *J Emer Nurs*. 2010;36(5):420-427. https://doi.org/10.1016/j.jen.2009.11.027
9. Lombardo B, Eyre C. Compassion fatigue: a nurse's primer. *Online J Issues Nurs*. 2011;16(1):3. https://doi.org/10.3912/ojin.vol16no01man03
10. Peters E. Compassion fatigue in nursing: a concept analysis. *Nurs Forum*. 2018;53(4):466-480. https://doi.org/10.1111/nuf.12274
11. Adriaenssens J, DeGucht V, Maes S. Causes and consequences of occupational stress in emergency nurses, a longitudinal study. *J Nurs Manag*. 2015;23(3):346-358. https://doi.org/10.1111/jonm.12138
12. Adriaenssens J, DeGucht V, Maes S. Determinants and prevalence of burnout in emergency nurses: a systematic review of 25 years of research. *Int J Nurs Stud*. 2015;52(2):649-661. https://doi.org/10.1016/j.ijnurstu.2014.11.004
13. de Wijn AN, van der Doef MP. Patient-related stressful situations and stress-related outcomes in emergency nurses: a cross sectional study on the role of work factors and recovery during leisure time. *Int J Nurs Stud*. 2020;103579:107. https://doi.org/10.1016/j.ijnurstu.2020.103579
14. Horner G, Daddona J, Burke DJ, Cullinane J, Skeer M, Wurcel AG. "You're kind of at war with yourself as a nurse": perspectives of inpatient nurses on treating people who present with comorbid opioid use disorder. *PLoS One*. 2019;14(10):e0224335. https://doi.org/10.1371/journal.pone.0224335
15. Philly's opioid crisis has been worse than ever amid the COVID-19 pandemic. Kanik H. Published April 23, 2021. Accessed June 20, 2021. https://www.phillyvoice.com/philadelphia-opioid-overdose-deaths-2020-covid-19-pandemic/
16. Substance use Philadelphia. Philadelphia Department of Public Health. PA; Published 2021. Accessed June 29, 2021. https://www.substanceusephilly.com/
17. Johnson B, Turner LA. Data collection strategies in mixed methods research. In: Tashakkori AM, Teddlie CB, eds. *Handbook of Mixed Methods in Social and Behavioral Research*. SAGE Publications; 2003:297-319.
18. Braun V, Clarke V. *Successful Qualitative Research: A Practical Guide for Beginners*. SAGE Publications; 2013.
19. Pike E, Tillson M, Webster J, Stanton M. A mixed methods assessment of the impact of the opioid epidemic on first responder burnout. *Drug Alcohol Depend*. 2019;107620:205. https://doi.org/10.1016/j.drugalcdep.2019.107620
20. OSHA workers rights and responsibilities. Occupational Safety and Health Administration. OSHA; Published 2019. Accessed February 28, 2022. https://www.osha.gov/workers
21. Allen RC, Palk G. Development of recommendations and guidelines for strengthening resilience in emergency department nurses. *Traumatology*. 2018;24(2):148-156. https://doi.org/10.1037/trm0000141
22. Enns CL, Sawatsky JA. Emergency nurses' perspectives: factors affecting caring. *J Emer Nurs*. 2016;42(3):240-245. https://doi.org/10.1016/j.jen.2015.12.003
23. McBeth CL, Durbin-Johnson B, Siegel EO. Interprofessional huddle: one Children's Hospital's approach to improving patient flow. *Pediatr Nurs*. 2017;43(2):71-76.
24. Employee assistance program (EAP). US Department of Health and Human Services. US DHHS; Published 2022. Accessed February 28, 2022. https://www.hhs.gov/about/agencies/asa/foh/bhs/employee-assistant-program/index.html

25. Adriaenssens J, De Gucht V, Van Der Doef M, Maes S. Exploring the burden of emergency care: predictors of stress-health outcomes in emergency nurses. *J Adv Nurs*. 2011;67(6):1317-1328. https://doi.org/10.1111/j.1365-2648.2010.05599.x

26. Ugwu CV, Medows M, Don-Pedro D, Chan J. Critical event debriefing in a community hospital. *Cureus*. 2020;12(6):e8822. https://doi.org/10.7759/cureus.8822

27. Browning ED, Cruz JS. Reflective debriefing: a social work intervention addressing moral distress among ICU nurses. *J Soc Work End Life Palliat Care*. 2018;14(1):44-72. https://doi.org/10.1080/15524256.2018.1437588

28. Warm handoff. Pennsylvania Department of Drug and Alcohol Programs. PA; Published 2022. Accessed February 28, 2022. https://www.ddap.pa.gov/Pages/Warm-Hand-Off.aspx

Emergency Department Nurses' Perceptions of Patient Substance Use, Impact on Sexual Assault Care, and Access to Follow-up Behavioral Health Resources

Authors: M. Kathryn Allison, PhD, MPH, Hannah M. Henderson, Geoffrey M. Curran, PhD, and Melissa J. Zielinski, PhD, Little Rock, AR

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Contribution to Emergency Nursing Practice

- What is already known on patient substance use and sexual assault care: patients may be under the influence of drugs and alcohol when they present to the emergency department for sexual assault care; however, nurses may not be prepared to meet their unique needs or to make referrals to services.
- The main finding of this paper: participants recognized the opportunity to discuss patient substance use and connect them with treatment or prevention resources, but most were not making referrals and perceived limited access to local service providers.
- Recommendations for translating findings into emergency clinical practice: mobile health may be a feasible and acceptable strategy to promote follow-up behavioral health care for sexual assault survivors after emergency care.

Abstract

Introduction: Patients may present to the emergency department for sexual assault care under the influence of drugs or alcohol. However, many emergency nurses are not prepared to meet their unique needs or aware of follow-up behavioral health resources. The purpose of this study was to (1) summarize current resources provided to patients and processes for referral to behavioral health services after sexual assault care, (2) explore emergency nurses' attitudes and behaviors toward patient substance use, and (3) explore nurses' perceptions of adjunct mobile health interventions for follow-up behavioral health care and describe anticipated barriers to use.

Methods: Fifteen emergency nurses participated in semi-structured qualitative interviews.

Results: Participants had mixed perceptions of patient intoxication during sexual assault care. They felt that conversations about substance use may be more appropriate after the ED visit. Participants recognized the opportunity to connect ED patients with substance use treatment or prevention resources but perceived that there are few local service providers. Most participants were not referring patients with substance use issues to behavioral health services after sexual assault care and said that their emergency departments did not have processes for referral to these services. Acceptability of mobile health for follow-up behavioral health care was high, but participants had concerns for patient privacy and internet access. Participants gave recommendations to improve referral practices and patient engagement with mobile health interventions.

M. Kathryn Allison is a Research Assistant Professor, Department of Health Behavior and Health Education, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, Little Rock, AR. **Twitter:** katyallisonphd. **ORCID identifier**: http://orcid.org/0000-0001-6178-0352.

Hannah M. Henderson is a Research Assistant, Psychiatric Research Institute, University of Arkansas for Medical Sciences, Little Rock, AR.

Geoffrey M. Curran is a Professor, Departments of Pharmacy Practice and Psychiatry, Center for Implementation Research, University of Arkansas for Medical Sciences, Little Rock, AR. **ORCID identifier**: http://orcid.org/0000-0003-3464-8422.

Melissa J. Zielinski is an Assistant Professor, Psychiatric Research Institute, University of Arkansas for Medical Sciences, Little Rock, AR. **ORCID identifier**: http://orcid.org/0000-0002-1125-110X.

For correspondence, write: M. Kathryn Allison, PhD, MPH, University of Arkansas for Medical Sciences, 4301 W. Markham Street, Slot 820, Little Rock, AR 72205; E-mail: kallison@uams.edu

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Discussion: This study highlights the need for emergency nurses to consider patient intoxication during sexual assault care and opportunities to connect patients with resources post-assault.

Key words: Emergency department; Sexual assault; Behavioral health care; Substance use; Digital health; Mobile health

Introduction

Substance use and sexual assault are often intertwined. Studies of adolescent and college-age females suggest that over half of sexual assault survivors report alcohol use at the time they were assaulted.[1-4] Compared with alcohol use, illicit drug use at the time of assault is less common; however, cannabis use has been indicated in approximately one-third of sexual assaults.[5] Drug and alcohol intoxication can increase vulnerability to sexual assault.[6] A past study revealed that women who use both alcohol and drugs or only drugs are more likely to be assaulted than women who do not use substances.[7]

NEGATIVE BEHAVIORAL HEALTH OUTCOMES AFTER SEXUAL ASSAULT

Sexual assault can lead to short- and long-term behavioral health problems, including misuse of substances (drugs and alcohol),[8,9] acute symptoms of stress and depression,[10] risk of suicide,[11,12] and symptoms of posttraumatic stress disorder.[13-15] Sexual assault increases risk for drug and alcohol problems.[16-18] Survivors may use substances as a form of self-medication, as a manifestation of self-harming behavior, or to cope with traumatic memories, low self-esteem, anxiety, depression, or loneliness after the assault. History of sexual assault is associated with both recent drug use as well as history of drug use issues; in fact, assault has been shown to precede substance use disorder onset in most cases among those with prior histories of substance misuse and assault.[19] Substance use at time of assault also was significantly positively associated with substance use 6 weeks later in a study of women seeking postassault medical services, demonstrating the importance of screening for substance use in the weeks after assault.[1] A study by Liebschutz et al[20] revealed a high frequency of physical and sexual abuse among women (81%) and men (68%) admitted for inpatient detoxification. They found that physical and sexual abuse was significantly associated with more substance use consequences.[20]

PATIENT INTOXICATION AND SEXUAL ASSAULT CARE

Although sexual assault survivors are more likely to delay emergency care if they are intoxicated,[2] ED providers should be aware that patients may be under the influence or have recently used substances when they present for emergency sexual assault care. In one study, one-third of young adults (36%) reporting alcohol use at the time of assault were evaluated on the day of the assault.[2] Studies indicate that approximately half of sexual assault survivors seeking ED-based medical care after their assault reported substance use at the time of assault.[1,21] Therefore, emergency departments must be prepared to meet patients' unique needs related to the sexual assault, including the possibility that the patient is intoxicated at the emergency department or has a substance use disorder; however, nurses are often not trained to care for sexual assault patients.[22] In addition, one study found that nurses experience low motivation and role-support related to caring for patients with a history of illicit drug use.[23]

BEHAVIORAL HEALTH CARE AFTER SEXUAL ASSAULT

Along with exacerbating associated mental health consequences[9] and increasing risk for sexual revictimization,[24] patient substance use may influence engagement with follow-up care. Currently, only 1 in 3 survivors engages in follow-up care after a sexual assault forensic medical exam.[25,26] A retrospective cohort study of women presenting to an urban hospital after sexual assault confirmed low follow-up care rates among survivors over a 36-month period, and use of cocaine was associated with less follow-up.[25] However, alcohol use was associated with more follow-up.[25]

The emergency department may present an opportunity to link sexual assault survivors to follow-up behavioral health services and resources, including substance use prevention or treatment services, yet referral to local follow-up services may be lacking. Emergency departments often struggle to provide information on survivor medical and behavioral health care,[27] in part owing to lack of awareness of services or lack of availability of follow-up behavioral health services in under-resourced or rural communities.[28,29] Little is known about emergency nurses' perspective on their role in referring patients to behavioral health resources, particularly patients who are recent survivors of sexual assault.

OPPORTUNITY FOR SCREENING AND BRIEF INTERVENTION VIA MOBILE HEALTH

Because patient-provider contact during emergency care is often short, and adequate follow-up after ED visits can be difficult to access,[30] innovative solutions to link sexual

assault survivors to behavioral health resources are needed. Adjunct digital or mobile health (mHealth) applications could be useful in screening for emergent behavioral health symptoms, providing brief behavioral health interventions, and promoting in-person follow-up care. Follow-up mHealth interventions may be particularly feasible, given that nearly all ED patients in the United States report having cell phone access.[31,32] mHealth interventions have shown promise in reducing substance use, at least in the short-term,[33] as well as promise in promoting attendance of needed health care.[34] A recent study found that sexual assault survivors perceived that their feedback provided via a mobile application would likely encourage service providers to be more responsive to their suggestions on how to improve their care.[35] However, little is known about emergency nurses perspectives on offering mHealth interventions.

PURPOSE OF THE STUDY

Emergency departments must be prepared to provide quality care to patients who are intoxicated or under the influence of substances upon arrival for sexual assault care, as well as link patients to needed follow-up services. Additional research is needed to explore emergency nurses' perceptions of patient intoxication, impact on sexual assault care, and the need for follow-up behavioral health services and resources, as well as opportunities to enhance referral to treatment for patients with existing substance use disorder or referral to prevention resources for patients at increased risk for substance use after sexual assault. The purpose of this study was to (1) summarize current resources provided to sexual assault patients and processes for referral to behavioral health services in a southern state; (2) explore nurses' attitudes and behaviors toward the substance use of patients and potential unmet needs; and (3) explore nurses' perceptions of the potential utility of adjunct mHealth interventions for follow-up behavioral health care and describe anticipated facilitators and barriers to use.

Methods

PARTICIPANTS

Participants were 15 nurses from 13 emergency departments across Arkansas (11 rural, 2 urban). On average, interview participants had been in nursing practice for 15.7 years (range: 3-35 years), with their current emergency department for 9.7 years (range: 1-20 years), and in their current nursing role for 9 years (range: 2-18 years). Nearly half of participants (46%) had worked in previous roles in their current hospital before becoming a nurse.

PROCEDURE

Data for this study were collected between August and December 2020. In the context of a larger project that aimed to examine sexual assault care processes and telemedicine use in Arkansas emergency departments, we surveyed leadership from 16 emergency departments. Using contact information provided by their ED leadership, a total of 48 non–sexual assault nurse examiner (SANE) nurses from these 16 emergency departments were contacted via email by the first author, informing them about the study aims and methods and inviting them to respond if they were interested in participating in a phone interview. Participants were eligible if they were currently employed in an Arkansas emergency department, were not sexual assault nurse examiner–certified, and had facilitated a sexual assault forensic medical exam within the past year. Aiming to recruit at minimum 1 nurse per emergency department, we achieved an 81% ED response rate.

Data collection consisted of a 1-time phone interview using a semistructured interview guide. The interview guide explored (1) current behavioral health and advocacy resources provided to sexual assault patients, (2) attitudes and behaviors toward the substance use of patients and potential unmet needs, and (3) nurses' perceptions of the potential utility of adjunct web-based interventions for follow-up behavioral health care and describe anticipated facilitators and barriers to use (see Table for interview questions). All participants gave informed consent. Each participant was compensated $50 for their time participating. This reimbursement amount was determined based on the average hourly wage of an emergency nurse and the anticipation that the introduction, consent process, and interview together would last approximately 1.5 hours. Interviews lasted for an average of 63 minutes (range: 43-82 minutes). Data analysis was ongoing during data collection, and data collection continued until saturation of themes had been reached. Interviews were audio recorded and transcribed verbatim. The University of Arkansas for Medical Sciences Institutional Review Board approved study procedures.

DATA ANALYSIS

The codebook was created in an iterative process of discussion and refinement. First, 3 coders independently coded 5 interviews and identified preliminary codes. The team

TABLE
Interview guide questions by topic

Topic	Interview guide questions
Referral resources for sexual assault patients	Can you walk me through the protocol for when you have a sexual assault patient come into your ED?
	What resources does your community have for follow-up services after the patient leaves the ED? Probing questions: Do you have a local rape crisis center? Do advocates (from rape crisis centers) attend the visits? What about local mental health care? What about local behavioral health care or substance use treatment?
	Are sexual assault patients regularly referred to any of the above resources or services for follow-up care? Probing questions: If so, can you describe that process? If not, what gets in the way of referring patients to follow-up treatment?
mHealth utility and implementation facilitators and barriers	What is your first impression of the idea to use a web-app or website to provide follow-up mental or behavioral health screening or resources?
	What types of support do these patients need after they leave the ED? Probing question: What types of topics should be covered?
	To what extent do you think sexual assault patients would use this resource?
	What do you think would get in the way of patients accessing/downloading the web-app? What would help patients to remember to download it? What would help patients to remember to use it?
	Would you be willing to help your patients download an app or access the website for the first time, if one is available? What would help you remember to do this?
	How would we get the word out about this mobile intervention as a resource for ED providers? How would we remind providers to refer patients to it?
Attitudes toward patient substance use and referral to substance use treatment	Can you walk me through the process of caring for a sexual assault patient that is under the influence of drugs or alcohol when they present in the ED? Probing questions: Is there ever a delay in their exam? Do you think that intoxication affects their ability to consent to the exam?
	How common is it for sexual assault patients to present in the ED under the influence of drugs or alcohol?
	Do you screen sexual assault patients for substance use disorders? Probing question: If so, what type of screening?
	Do you discuss the sexual assault patient's drinking and/or drug use? Are you comfortable asking a sexual assault patient about their drug and/or alcohol use? Probing question: What would you need to feel more comfortable talking to sexual assault patients about substance misuse?
	How do you personally feel about referring sexual assault patients to treatment for substance misuse? Probing questions: Would it be appropriate? Would it be helpful?
	What gets in the way of referring patients to substance use treatment when needed? Is there a policy or procedure for referring sexual assault patients to services for SUD?

SUD, substance use disorder.

then met to discuss coding, identified common codes, and organized them into major themes, establishing the preliminary codebook. Coding for interviews 1 to 5 was then revised to reflect the codes in the preliminary codebook. Then, the research team collectively coded 5 additional interviews in group discussion, revising the codes and definitions as needed. Once the codebook had been established, the first author coded the remaining 5

interviews. This coding was checked by a second coder, and they met to discuss and resolve any disagreements in coding. Coding discrepancies were resolved through consensus or by a third reviewer.

Results

Qualitative analysis revealed 6 themes: (1) limited follow-up resources provided to sexual assault patients, (2) emergency departments lacking processes for referral to local behavioral health services, (3) mixed perceptions of patient intoxication frequency and impact on sexual assault care, (4) hesitance toward substance use screening and referral as part of sexual assault care, (5) concerns regarding patient privacy, anonymity, and access to mHealth for follow-up behavioral health intervention, and (6) needed patient-level, provider-level, and ED-level strategies for mHealth dissemination.

LIMITED FOLLOW-UP RESOURCES PROVIDED TO SEXUAL ASSAULT PATIENTS

Participants perceived that there were no or few sexual assault–specific follow-up resources for survivors in their local community. These emergency nurses often rely on a small number of community behavioral health care providers to serve their patient population after discharge from the emergency department, particularly those in rural areas where local service providers are limited. Some participants were aware of local behavioral health care providers, but these nurses were not helping their sexual assault patients make follow-up appointments with these providers.

EMERGENCY DEPARTMENTS LACKING PROCESSES FOR REFERRAL TO LOCAL BEHAVIORAL HEALTH SERVICES

Most participants said that their emergency department has no formal process for referral to behavioral health services and that it is up to the individual nurse to decide to help connect patients to resources. However, most were willing to make referrals, but 1 participant highlighted the issue of service availability, saying, "You really can't refer patients to things that aren't there." Many participants perceived that other professionals (eg, social workers) should help patients navigate follow-up care, but many said that they do not have these resources at their emergency department. Participants' go-to standard of care was to provide patients with the resource sheet found in the state crime lab's sexual assault evidence collection kits before discharge. However, they perceived that the resources listed are out of date, and most are not local. One participant said, "Even the resources in [rural town] are very limited...Used to give [a resource sheet] to them, but I know that I've tried several of the numbers on there myself and know a lot of them don't exist anymore."

MIXED PERCEPTIONS OF PATIENT INTOXICATION FREQUENCY AND IMPACT ON SEXUAL ASSAULT CARE

Participant opinions were mixed on how frequently they encounter patients who are intoxicated or under the influence of drugs and/or alcohol when they present for sexual assault care. For example, 1 participant said, "I have not had anyone that has been totally under the influence of drugs and alcohol that's come in," and another said, "It's not as common as you think, actually." However, others had a different perception of frequency. One participant perceived that patients are under the influence of drugs or alcohol when they present for sexual assault care "Fifty percent of the time maybe," and another said, "I will say that I've done more exams on patients that have been intoxicated than not."

Several said they regularly see patients the morning after the sexual assault, and therefore, even if patients were intoxicated when they were assaulted, they perceive that the patient would be sober when they arrived at the emergency department. One participant said, "It's hours later usually. It occurred that night, and they show up the next morning." Some participants perceived that if the patient was intoxicated when they arrive at the emergency department, it was most likely from methamphetamine use. One participant said, "The ones that actually come in high, most of the time it's meth." Another said, "It's not uncommon for us to see patients that are still super high. Meth is very popular in our area, and so we get a lot of people that are very high on meth."

Participants discussed the influence intoxication could have on a patient's ability to consent to the sexual assault exam, as well as on their willingness to undergo forensic evidence collection. Some made connections between patient intoxication and timeliness of forensic evidence collection. One participant said, "We would, a lot of times, let them sober up before. Because legally if they're under the influence they can't legally consent to that exam," and went on to say, "I think sometimes we have to weigh up the delay of the exam versus consent.... If there is a delay in collecting evidence, which has a time factor…you're risking losing precious evidence." While some participants said that there

may be a delay in forensic evidence collection if they wait for the patient to sober up, some participants said that patient intoxication delays care "only if they are combative, if they are not cooperative with the exam." When asked whether there is a delay in the exam if the patient is intoxicated, another participant said, "If they are not cooperative, you give them a while to cool off and settle down, let them think about it, sober up a little, and then go back and try to start over." Some participants said that patient intoxication does not delay care so long as the patient verbally agrees to the exam. One participant said, "You try to go off of what they tell you…If they allow you to do a collection, if they allow you to do an exam, then you do it." Another participant said, "Some of them, even though they are high or whatever, still understand what we're doing and can still talk to us and let us know what happened or whatever. But we, again, we're just going to try to.… We do what they'll allow us to do."

HESITANCE TOWARD SUBSTANCE USE SCREENING AND REFERRAL AS PART OF SEXUAL ASSAULT CARE

Participants were comfortable talking about substance use with patients generally, but many were unsure of the appropriateness of talking about substance use as part of the sexual assault forensic medical exam. The emergency nurses reported asking basic substance use screening questions of all patients and discussing substance use with sexual assault patients "if it's indicated"; however, they reported seeing the sexual assault as the main issue at hand and primary focus in these interactions. Participants were hesitant to discuss substance use with patients after sexual assault, because they were sensitive to the need to avoid statements that could be perceived as victim blaming. One participant described this as a "fine line." However, they recognized the ED visit as an opportunity to get patients the help they need for substance use disorders. Most participants said that this conversation about substance use may be more appropriate at a later time, rather than at the sexual assault exam. For example, 1 participant said, "I don't know if it would be appropriate at that time. I mean, unless the patient asks for some sort of assistance," and went on to say that this conversation would be more appropriate "at a different time, when they're not just in the aftermath of being assaulted." Another participant was hesitant to discuss substance use during the exam, because "you don't want to put blame on that as being the reason as to why they did [get sexually assaulted]," and another participant suggested providing "something that's addressed post-discharge, just in an educational setting like, 'What makes us at more risk?'"

Participants also described barriers to getting their patients with substance use disorders to substance use treatment after their ED visit. Some participants reported the belief that patients may not be receptive to substance use treatment and that suggesting it may be perceived as judgmental, such as, "If it's someone that's very closed off...they're not receptive to anything...then I would hate to bring that up and them feel like they were being judged in our facility." Participants also said that because patients seeking sexual assault care often present at night or on the weekend, it can be hard to get patients into substance use treatment, because service providers may only be open during the work week and "There's nobody to call nights, weekends, or in a crisis." In addition, some said that treatment centers may not take patients without private insurance. One participant noted, "If they don't have insurance, a lot of places won't accept patients … It's difficult to find placement for patients who have no insurance in those type of facilities."

UTILITY OF MHEALTH FOR FOLLOW-UP BEHAVIORAL HEALTH INTERVENTION WITH PRIVACY AND ACCESS CONSIDERATIONS

Acceptability of an MHealth intervention for follow-up behavioral health after sexual assault care was high among participants. Participants repeatedly highlighted anonymity as a positive aspect, such as, "You don't have to talk to anybody to use an app…it's intimidating to call someone and say, 'XYZ happened to me.'" Another participant said,

> *When they leave here, they're looking at a list of phone numbers, and they may not be ready to talk to somebody on the phone or know really how to ask or tell what they're feeling. And that they can do it...people can pick up their iPhone and Google something or a symptom and this will give them a place to start their research. It will give them a place that has the answers to their questions. And it will make it easier.*

However, some had concerns about patient privacy and access to mHealth after sexual assault. In reference to privacy concerns, many participants pointed at abusive relationships, for instance, "If they have something like that on their phone, if they're still with the person who was abusing them...they might feel that somebody's spying on them."

Participants perceived that most patients have smart phones but may not have consistent data or wireless internet access. They recommended that there be multiple options to access the intervention, such as a mobile application, a weblink, and a phone number, to address access issues and privacy concerns.

In addition to access issues and privacy concerns, some participants perceived that patients' pre-existing mental health or substance use issues may be a barrier to their use of an mHealth intervention. One participant highlighted compliance issues: "I feel like patients that have mental health issues already or substance abuse issues already may not be the most compliant patients."

NEEDED PATIENT-LEVEL, PROVIDER-LEVEL, AND ED-LEVEL STRATEGIES FOR MHEALTH DISSEMINATION

Participants gave recommendations for patient-level dissemination strategies for the mHealth intervention, including providing a flyer or info sheet to the patient at discharge advertising the mHealth intervention. They also suggested that the app should have reminders to engage with the intervention (eg, push notifications). They believed that active outreach or virtual coaching would help to remind patients to use it. One participant said, "If you had someone that checked on them every so often, that would increase their usage of their app."

Participants also gave recommendations for ED- and provider-level dissemination strategies. Many suggested that the referral to the mHealth app should be added to their workflow (eg, put it on their checklist). They also suggested that information about the mHealth intervention should be added to the discharge paperwork in the electronic health record (EHR). One participant said, "It would need to be part of the protocol…to document in the medical record." Some suggested that a flag could be built into the EHR to remind nurses to discuss it with the patient. Many participants also recommended posting flyers about the mHealth intervention in the emergency department where nurses would see it, such as on bulletin boards. Participants recommended providing in-service education about the mHealth intervention so that they would have more information about it and be able to describe it to patients and answer questions.

Discussion

The primary objectives of this qualitative study were to (1) identify resources provided to sexual assault patients and processes for referral to treatment services; (2) explore nurses' attitudes and behaviors toward the substance use of patients; and (3) explore nurses' perceptions of the potential utility of adjunct mHealth interventions for follow-up behavioral health care and describe anticipated facilitators and barriers to use. Given that many of these participants were employed at hospitals in rural areas, where mental and behavioral health services are often lacking,[36] it is not surprising that some participants were unaware of substance use treatment and prevention resources or that some struggled to identify reliable services to refer their patients to after their ED visit for sexual assault care. Improving linkage to substance use treatment after an ED visit is a national priority. In fact, one of the Healthy People 2030 objectives is to "increase the proportion of people who get a referral for substance use treatment after an emergency department visit."[37] There is a growing body of evidence suggesting that screening, providing brief intervention, and referring patients to treatment (known as "SBIRT") for substance use can be a clinical and cost-effective strategy in the emergency department.[38] However, little research has been conducted exploring this strategy with patients who have recently been sexually assaulted or how nurses' attitudes about it may impact implementation. Our study revealed that emergency nurses can be hesitant to discuss substance use with patients seeking sexual assault care and perceive that this discussion may be more appropriate at a later time, after the patient leaves the emergency department. Recognizing that trauma can increase risk for subsequent behavioral health problems, participants agreed that follow-up behavioral health care, including ongoing screening and access to treatment and prevention interventions, could be beneficial to patients after sexual assault care.

STRATEGIES TO IMPROVE LINKAGE TO FOLLOW-UP CARE

Study participants requested an up-to-date resource list, including information about national, state, and local behavioral health resources, that can be given to their patients to improve linkage to follow-up care. However, maintaining such a list would require periodic updating and dissemination. Implementing systems that ensure that such resources lists are kept up-to-date and are provided to patients in need of services should be a priority. This type of resource list may be of particular benefit to patients accessing care in rural emergency departments, where patients may have few options for local behavioral health services and may benefit from access to mHealth interventions or services outside of their local community.

Because some participants were hesitant to talk with patients about substance use in the same visit as the sexual assault exam, it may be beneficial for this conversation to occur in a follow-up phone call. Follow-up contact via phone call, video, or text message also could provide an opportunity for emergency nurses to present or remind patients about substance use prevention resources. As participants highlighted, such a recommendation would need to be made sensitively and without judgment or blame. To avoid stigmatizing language, survivor input should inform the language used by clinicians when screening, providing intervention, and referring survivors to substance use treatment and resources.

mHEALTH FOR BEHAVIORAL HEALTH CARE AFTER SEXUAL ASSAULT

Digital health and mHealth interventions also may help to improve patient engagement with follow-up behavioral health services. A 2019 study by Kmiec and Suffoletto[39] found that nearly half of ED patients with a substance use disorder being referred to outpatient treatment agreed to use a text message program that provided daily motivational messages, assessments, tailored feedback, and reminders about treatment location and contact information. In their study, individuals who opted in to the text message program had higher rates of substance use disorder treatment initiation than individuals who did not opt in, and 84% of program participants said that they would recommend the program to someone else.[39] A common concern among the nurses we interviewed was patient receptiveness to mHealth interventions, mostly regarding privacy. However, a study by Mahlalela et al[35] found that 72% of participants endorsed high comfort levels specifically with postrape mHealth interventions. Nurses should be educated about the receptiveness of patients to engage in mHealth interventions after an assault, as well as patient cell phone access.[31,32]

Participants in this study also gave recommendations for improving both patient engagement with and provider referral to an mHealth intervention to prevent substance misuse after assault. To encourage patient engagement with mHealth interventions, nurses recommended information sheets about the intervention be provided to patients at discharge, as well as active outreach and push notifications to remind patients to engage with the intervention. To remind providers to refer patients to the mHealth intervention, nurses recommended putting the referral in their workflow, including a reminder in the EHR discharge paperwork, and posting flyers about the intervention to inform and remind nurses about it.

A recent systematic review by Gagnon et al[40] of mHealth adoption by health care professionals found that adoption was often influenced by perceptions of mHealth usefulness and ease of use, familiarity with the technology, design and technical concerns, cost, time, privacy and security issues, risk-benefit assessment, and interaction with others. Given the findings of Gagnon et al[40] that familiarity with the technology influences clinician adoption of mHealth, training on the mHealth technology may be warranted. Our participants agreed that in-service training on the mHealth intervention would help them feel more prepared to talk to the patient about the intervention.

EDUCATION ON SUBSTANCE USE, TREATMENT OPTIONS, AND PREVENTION RESOURCES

Given the hesitancy of our participants to have conversations with sexual assault patients about substance use and treatment options, as well as past studies revealing nurses' low motivation to care for patients with a history of illicit drug use revealed in previous research,[23] our findings suggest that education on strategies for discussing substance use with sexual assault patients also may be beneficial. Education addressing bias and stigma toward intoxicated patients and those with substance use disorders and compliance with treatment is needed. This education also may improve patient-centered care, considering that training on how to deliver SBIRT has been shown to improve nursing students' attitudes toward patients who use alcohol.[41] Given participants' lack of awareness of substance use treatment options and prevention resources, continuing education should provide information about these services, particularly those that are specific to trauma survivors. Education on appropriate processes for obtaining patient consent for forensic evidence collection when patients have recently used substances also may be warranted.

Limitations

This exploratory qualitative study had several limitations. First, the study involved interviews with emergency nurses only. While nurses play a critical role in the care of patients after a sexual assault, the perspective of other providers and patients may have enhanced findings of this study. Second, assessment of facilitators and barriers to follow-up mHealth interventions for this patient population were speculative, given that such an mHealth intervention had not been disseminated. This study took place in a southern state with nurses from predominantly rural emergency

departments; therefore, these findings should be considered within this context, as they may differ in other regions or areas. Moreover, because most participants were from rural emergency departments, this prohibited comparison between urban and rural emergency departments. In addition, these interviews served as an introductory, exploratory assessment of a range of topics; additional, in-depth qualitative interviews with both emergency nurses and patients seeking sexual assault care about these topics would further enhance our understanding of the nuances of the impact of patient substance use on sexual assault care and follow-up care needs.

Implications for Emergency Nurses

Emergency nurses should be aware that patients may be under the influence of drugs or alcohol when they present for sexual assault forensic medical care. Training should be provided to emergency nurses to facilitate discussions about substance use and treatment options with patients after sexual assault care. Alternatively, a process for follow-up contact with the patient to discuss substance use and treatment options could be implemented. When local substance use treatment providers and prevention resources are scarce, emergency departments should consider referring patients to digital and mHealth resources to provide supportive services to patients after they leave the emergency department; however, consideration should be made for patients' concerns with privacy, anonymity, and access to internet for mHealth use.

Conclusion

This study highlights the need for improved training of emergency nurses to meet the unique needs of patients who are under the influence of drugs and alcohol, as well as patients with existing substance use issues, when they seek sexual assault care. Participants expressed resistance to addressing substance use during the sexual assault forensic medical exam out of concern for victim blaming and instead encouraged referral to prevention resources or treatment resources to occur sometime after the ED visit. Participants perceive limited availability of follow-up behavioral health resources in their local communities and did not have consistent processes for making referrals to follow-up services. There may be an opportunity to fill this gap by leveraging mHealth to provide ongoing screening, offer brief treatment or prevention interventions, and promote follow-up health care utilization after the ED visit. In this study, the emergency nurses interviewed had favorable views toward referring patients to an mHealth resource and the anonymity and convenience it would provide. Future research should explore the role of mHealth in preventing negative behavioral health outcomes such as substance use after sexual assault and explore the opportunities that emergency departments present in connecting patients with digital interventions after sexual assault care.

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REFERENCES

1. Resnick HS, Walsh K, McCauley JL, Schumacher JA, Kilpatrick DG, Acierno RE. Assault related substance use as a predictor of substance use over time within a sample of recent victims of sexual assault. *Addict Behav*. 2012;37(8):914-921. https://doi.org/10.1016/j.addbeh.2012.03.017
2. Tadros A, Sharon MJ, Hoffman SM, Davidov DM. Emergency department visits for sexual assault by emerging adults: is alcohol a factor? *West J Emerg Med*. 2018;19(5):797-802. https://doi.org/10.5811/westjem.2018.6.38219
3. Sheridan T, Evans DD. Alcohol use and sexual assault among college students: implications for APRN practice. *Adv Emerg Nurs J*. 2019;41(1):2-9. https://doi.org/10.1097/TME.0000000000000233
4. Abbey A. Alcohol-related sexual assault: a common problem among college students. *J Stud Alcohol Suppl*. 2002;14:118-128. https://doi.org/10.15288/jsas.2002.s14.118

5. Hindmarch I, ElSohly M, Gambles J, Salamone S. Forensic urinalysis of drug use in cases of alleged sexual assault. *J Clin Forensic Med*. 2001;8(4):197-205. https://doi.org/10.1054/JCFM.2001.0513
6. Ledray LE. Alcohol and sexual assault: what can/should we do in the emergency department? *J Forensic Nurs*. 2008;4(2):91-93. https://doi.org/10.1111/J.1939-3938.2008.00014.X
7. Kilpatrick DG, Acierno R, Resnick HS, Saunders BE, Best CL. A 2-year longitudinal analysis of the relationships between violent assault and substance use in women. *J Consult Clin Psychol*. 1997;65(5):834-847. https://doi.org/10.1037//0022-006X.65.5.834
8. Leeies M, Pagura J, Sareen J, Bolton JM. The use of alcohol and drugs to self-medicate symptoms of posttraumatic stress disorder. *Depress Anxiety*. 2010;27(8):731-736. https://doi.org/10.1002/da.20677
9. Kaysen D, Atkins DC, Moore SA, Lindgren KP, Dillworth T, Simpson T. Alcohol use, problems, and the course of posttraumatic stress disorder: a prospective study of female crime victims. *J Dual Diagn*. 2011;7(4):262-279. https://doi.org/10.1080/15504263.2011.620449
10. Gilmore AK, Flanagan JC. Acute mental health symptoms among individuals receiving a sexual assault medical forensic exam: the role of previous intimate partner violence victimization. *Arch Womens Ment Health*. 2020;23(1):81-89. https://doi.org/10.1007/s00737-019-0947-1
11. Kilpatrick DG, Edmunds CN, Seymour AK. Rape in America: a report to the nation. National Victim Center & the Crime Victims Research and Treatment. Center, Medical University of South Carolina; 1992.
12. Davidson JR, Hughes DC, George LK, Blazer DG. The association of sexual assault and attempted suicide within the community. *Arch Gen Psychiatry*. 1996;53(6):550-555. https://doi.org/10.1001/archpsyc.1996.01830060096013
13. Ullman SE, Relyea M, Peter-Hagene L, Vasquez AL. Trauma histories, substance use coping, PTSD, and problem substance use among sexual assault victims. *Addict Behav*. 2013;38(6):2219-2223. https://doi.org/10.1016/j.addbeh.2013.01.027
14. Newins AR, Glenn JJ, Wilson LC, et al. Psychological outcomes following sexual assault: differences by sexual assault setting. *Psychol Serv*. 2021;18(4):504-511. https://doi.org/10.1037/ser0000426
15. Steenkamp MM, Dickstein BD, Salters-Pedneault K, Hofmann SG, Litz BT. Trajectories of PTSD symptoms following sexual assault: is resilience the modal outcome? *J Trauma Stress*. 2012;25(4):469-474. https://doi.org/10.1002/jts.21718
16. Kilpatrick DG, Ruggiero KJ, Acierno R, Saunders BE, Resnick HS, Best CL. Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: results from the national survey of adolescents. *J Consult Clin Psychol*. 2003;71(4):692-700. https://doi.org/10.1037/0022-006X.71.4.692
17. Resick PA. The psychological impact of rape. *J Interpers Violence*. 1993;8(2):223-255. https://doi.org/10.1177/088626093008002005
18. Steketee G, Foa EB. Rape victims: post-traumatic stress responses and their treatment: a review of the literature. *J Anxiety Disord*. 1987;1(1):69-86. https://doi.org/10.1016/0887-6185(87)90024-7
19. Resnick HS, Walsh K, Schumacher JA, Kilpatrick DG, Acierno R. Prior substance abuse and related treatment history reported by recent victims of sexual assault. *Addict Behav*. 2013;38(4):2074-2079. https://doi.org/10.1016/j.addbeh.2012.12.010
20. Liebschutz J, Savetsky JB, Saitz R, Horton NJD, Lloyd-Travaglini C, Samet JH. The relationship between sexual and physical abuse and substance abuse consequences. *J Subst Abuse Treat*. 2002;22(3):121-128. https://doi.org/10.1016/s0740-5472(02)00220-9
21. Avegno J, Mills TJ, Mills LD. Sexual assault victims in the emergency department: analysis by demographic and event characteristics. *J Emerg Med*. 2009;37(3):328-334. https://doi.org/10.1016/j.jemermed.2007.10.025
22. Nielson MH, Strong L, Stewart JG. Does sexual assault nurse examiner (SANE) training affect attitudes of emergency department nurses toward sexual assault survivors? *J Forensic Nurs*. 2015;11(3):137-143. https://doi.org/10.1097/JFN.0000000000000081
23. Chu C, Galang A. Hospital nurses' attitudes toward patients with a history of illicit drug use. *Can Nurse*. 2013;109(6):29-33.
24. Hannan SM, Orcutt HK, Miron LR, Thompson KL. Childhood sexual abuse and later alcohol-related problems: investigating the roles of revictimization, PTSD, and drinking motivations among college women. *J Interpers Violence*. 2017;32(14):2118-2138. https://doi.org/10.1177/0886260515591276
25. Ackerman DR, Sugar NF, Fine DN, Eckert LO. Sexual assault victims: factors associated with follow-up care. *Am J Obstet Gynecol*. 2006;194(6):1653-1659. https://doi.org/10.1016/j.ajog.2006.03.014
26. Choi ES. *The Care of the Sexual Assault Patient*. Thesis. Yale Medicine Thesis Digital Library; 2019. Accessed August 18, 2022. https://elischolar.library.yale.edu/ymtdl/3483/
27. Ciancone AC, Wilson C, Collette R, Gerson LW. Sexual assault nurse examiner programs in the United States. *Ann Emerg Med*. 2000;35(4):353-357. https://doi.org/10.1016/S0196-0644(00)70053-9
28. Smalley KB, Warren JC, Rainer JP. *Rural Mental Health: Issues, Policies, and Best Practices*. Springer Publishing Company; 2012.
29. DeLeon PH, Wakefield M, Hagglund KJ. The behavioral health care needs of rural communities. In: Stamm BH, ed. *Rural Behavioral Health Care: An Interdisciplinary Guide*. American Psychological Association; 2003:23-31.
30. Ranney ML, Suffoletto B. Extending our reach: use of mhealth to support patients after emergency care. *Ann Emerg Med*. 2014;63(6):755-756. https://doi.org/10.1016/j.annemergmed.2014.01.015
31. Post LA, Vaca FE, Biroscak BJ, et al. The prevalence and characteristics of emergency medicine patient use of new media. *JMIR Mhealth Uhealth*. 2015;3(3):e72. https://doi.org/10.2196/mhealth.4438
32. Kim E, Torous J, Horng S, et al. Mobile device ownership among emergency department patients. *Int J Med Inform*. 2019;126:114-117. https://doi.org/10.1016/j.ijmedinf.2019.03.020
33. Bahadoor R, Alexandre JM, Fournet L, Gellé T, Serre F, Auriacombe M. Inventory and analysis of controlled trials of mobile phone applications targeting substance use disorders: a systematic

review. *Front Psychiatry*. 2021;12:622394. https://doi.org/10.3389/fpsyt.2021.622394

34. Marcolina MS, Oliveira JAQ, D'Agostino M, Ribujeiro AL, Alkmim MBM, Novillo-Ortiz D. The impact of mhealth interventions: systematic review of systematic reviews. *JMIR Mhealth Uhealth*. 2018;6(1):e23. https://doi.org/10.2196/MHEALTH.8873
35. Mahlalela NB, Johnson S, Mills E. Feasibility and acceptability of a mobile phone intervention to improve post-rape service delivery in South Africa. 2017. Accessed August 19, 2022. https://core.ac.uk/download/pdf/77037857.pdf
36. Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. *J Clin Transl Sci*. 2020;4(5):463-467. https://doi.org/10.1017/CTS.2020.42
37. Healthy People 2030: building a healthier future for all. US Department of Human Services. Accessed August 19, 2022. https://health.gov/healthypeople
38. Bernstein SL, D'Onofrio G. A promising approach for emergency departments to care for patients with substance use and behavioral disorders. *Health Aff (Millwood)*. 2013;32(12):2122-2128. https://doi.org/10.1377/hlthaff.2013.0664
39. Kmiec J, Suffoletto B. Implementations of a text-message intervention to increase linkage from the emergency department to outpatient treatment for substance use disorders. *J Subst Abuse Treat*. 2019;100:39-44. https://doi.org/10.1016/j.jsat.2019.02.005
40. Gagnon MP, Ngangue P, Payne-Gagnon J, Desmartis M. m-Health adoption by healthcare professionals: a systematic review. *J Am Med Inform Assoc*. 2016;23(1):212-220. https://doi.org/10.1093/jamia/ocv052
41. Puskar K, Gotham HJ, Terhorst L, et al. Effects of screening, brief intervention, and referral to treatment (SBIRT) education and training on nursing students' attitudes toward working with patients who use alcohol and drugs. *Subst Abus*. 2013;34(2):122-128. https://doi.org/10.1080/08897077.2012.715621

Pathway to Healing and Recovery: Alleviation of Survivor Worries in Sexual Assault Nurse Examiner-Led Sexual Assault Telehealth Examinations

Authors: Sheridan Miyamoto, PhD, FNP, RN, FAAN, Elizabeth Thiede, MSN, FNP, Cameron Richardson, PhD, Elizabeth N. Wright, PhD, RN, and Cynthia Bittner, BS, RN, Pennsylvania, PA

NCPD Earn Up to 8.5 Hours. See page 719.

Contribution to Emergency Nursing Practice

- Sexual assault is a public health crisis, yet a small percentage of victims come forward for essential health services. Care delivered by sexual assault nurse examiner has been shown to be beneficial to patients.
- This paper adds an understanding of the pre-examination worries/concerns of sexual assault victims, and whether those worries were experienced or resolved during the examination. In addition, in this study, participants endorsed that having a telehealth-supported sexual assault nurse examiner-led sexual assault examination helped them feel better and that having a telehealth consultation improved the quality of care they received.
- The findings from this study should strengthen the commitment of emergency departments to building and supporting sexual assault nurse examiner-led care for victims of sexual assault.

Abstract

Introduction: The purpose of this study is to understand the pre-examination worries of individuals who experience sexual assault, and whether those worries were experienced or resolved during a telehealth-enabled, sexual assault nurse examiner-led sexual assault examination.

Methods: Patient surveys were administered to understand pre-examination worries, whether those worries were ultimately experienced during the consultation, and patient perceptions of care quality, telehealth consultation, and whether the examination helped individuals feel better. Data analysis was conducted using descriptive statistics and binomial proportion tests.

Results: Surveys were collected from 74 adolescents and adults who obtained sexual assault care at 6 rural and 2 suburban hospitals. Study findings showed individuals overcome substantial worries to access care, with 66% having at least 1 worry and 41% endorsing 3 or more pre-examination worries. Most participants felt believed (83%) and did not feel judged (88%) or blamed (85%) during their examination. Analysis of pre-examination worries and worry resolution during the examination showed 88% to 100% resolution of worries related to being believed, judged, blamed or lacking control. Participants highly rated the quality of care received (92%) and 84% stated the examination helped them feel better, suggesting a sexual assault nurse examiner-led examination is an important step toward recovery and healing.

Sheridan Miyamoto is Associate Professor and Director of the SAFE-T Center, Ross and Carol Nese College of Nursing, The Pennsylvania State University, University Park, PA. **Twitter:** @SWMiyamoto. **ORCID identifier:** https://orcid.org/0000-0003-0494-1839.

Elizabeth Thiede is Doctoral Student, Ross and Carol Nese College of Nursing, The Pennsylvania State University, University Park, PA. **ORCID identifier:** https://orcid.org/0000-0003-4596-4965.

Cameron Richardson is Assistant Research Professor, Clearinghouse for Military Family Readiness, The Pennsylvania State University, University Park, PA. **ORCID identifier:** https://orcid.org/0000-0002-4998-2012.

Elizabeth N. Wright is Post-Doctoral Scholar, Ross and Carol Nese College of Nursing, The Pennsylvania State University, University Park, PA. **ORCID identifier:** https://orcid.org/0000-0002-0923-3965.

Cynthia Bittner is Assistant Director of the SAFE-T Center, Ross and Carol Nese College of Nursing, The Pennsylvania State University, University Park, PA.

For correspondence, write: Sheridan Miyamoto, PhD, College of Nursing, The Pennsylvania State University, 307H Nursing Sciences Building, University Park, Pennsylvania, PA 16802; E-mail: smiyamoto@psu.edu

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Discussion: These findings have implications for emergency department support for sexual assault nurse examiner-led care and public health messaging to demystify sexual assault care, allay fears, and highlight care benefits.

Key words: Sexual assault; Sexual assault nurse examiner; Forensic nursing; Quality; Patient experience; Telehealth

Introduction

The MeToo movement, high-profile cases of celebrity sexual perpetration (eg, Harvey Weinstein, Bill Cosby), and organizational complicity of sexual violence (eg, United States gymnastics, university sports, Catholic church) have shone a bright light on what statistics have demonstrated for years—that sexual assault (SA) is a public health crisis, with an estimated 459,310 rapes and/or SAs reported in 2019.[1] To promote healing and recovery, those who are victimized must feel safe coming forward to receive physical and mental health care. An important aspect of addressing this crisis requires understanding the barriers to victim disclosure and obstacles faced by those seeking help.

There are numerous fears or concerns that may keep survivors from seeking care after an SA. Even when SA examinations are conducted with a compassionate, person-centered, trauma-informed approach, they inherently contain elements that may produce fear and anxiety for someone considering whether to seek care.[2] Individuals are asked to recount in detail the assault they endured. This information is essential to guide the health care provider as they assess for injury and preserve trace evidence of the assault. A thorough examination can last 3 to 5 hours, including detailed body and genital inspection and photodocumentation to support what is seen during the examination. These elements alone provide ample reason for an individual to opt out of this experience. Concerns that an individual will not be believed or be shamed or judged are warranted given that there are disparities in whether a survivor will be cared for by a health care provider trained in the delivery of forensic SA care.[3] For these reasons, health care access may be delayed or foregone and the opportunity to document and preserve evidence of the assault is missed. Furthermore, only 5% of reported SA cases result in arrest and 2.5% result in successful prosecution,[4] and the likelihood of a case being prosecuted is exceedingly rare without an examination or physical evidence of the assault.[5,6] Given this, it is not surprising that only 21% to 43% of survivors disclose their assault/seek medical care.[7-11]

The negative effects of sexual trauma take a toll on the lives of those victimized and have significant costs, with estimated societal costs of $3.1 trillion (in 2014 US$) over the victimized individuals' lifetime.[12] Therefore, early interactions are critical to establishing a healing pathway for survivors and to ensure every individual who experiences trauma is afforded compassionate, trauma-informed care by health care, advocate, and law enforcement responders.

Given the low rates of survivors seeking medical and legal post-assault services, studies are needed to better understand fears, concerns, and worries that may prevent survivors from seeking help. Furthermore, studies are needed to explore whether fears, concerns, and worries are actually experienced and whether the examination ultimately resolves worries and helps survivors feel better.

This study focuses on the retrospective (ie, immediately postexamination) accounts of the pre-examination worries of individuals who access SA nurse examiner (SANE)-led SA health care supported by expert telehealth consultation, and their perceptions of various elements of the examination experience. This study was conducted as part of a larger evaluation project examining the efficacy of a telehealth program that provides training, peer review, and mentoring through live telehealth consultation with certified SA experts (teleSANEs) to enhance access to SANE care.[13,14]

Methods

STUDY DESIGN AND RECRUITMENT

Patient experience data were collected from 8 hospitals (6 rural and 2 suburban) partnered with the SA Forensic Examination Telehealth Systems telehealth program to support less experienced local SANE-trained nurse examiners in Pennsylvania between 2018 and 2021. All patients 12 years of age and older who presented to a partner hospital for an SA examination were offered a telehealth consultation by the local SANE provider. During telehealth consultations, SANE-trained local nurses provide the on-site care to the patient while also connecting in real time with highly experienced, certified SANEs (teleSANEs) using specialized telehealth equipment, allowing the remote expert to mentor, provide quality assurance, and seamlessly participate virtually in all aspects of care. Detail regarding telehealth care delivery has been described previously.[13,14]

Patients who consented to receive a telehealth consultation were offered the opportunity to participate in a survey about their experience at examination completion. Patients

were eligible to participate in research if they consented to receive an SA telehealth consultation, were 12 years of age or older, and were English speaking. Incarcerated individuals in state facilities were eligible to participate. Patients were ineligible if they were incapacitated or if they were incarcerated in county or federal institutions because those institutions do not have a centralized body to approve research, making inclusion of these groups not feasible. Before research consent, teleSANEs provided detailed information about the research, answered any questions, and obtained informed consent. Of note, TeleSANEs are required to complete the Collaborative Institutional Training Initiative course on the Protection of Human Research Participants[15] and receive additional training in obtaining informed consent for research to ensure the highest level of protection for study participants.

After the completion of the SA telehealth-supported examination, patient SA examination experience surveys were administered on a tablet via Research Electronic Data Capture (REDCap), a secure, electronic research data management system.[16] Neither local nurses nor teleSANEs were able to view patient responses. Response bias was limited by providing privacy and confidentiality so the individual could record honest responses about care received. All procedures in this descriptive study were approved by the university's Institutional Review Board for human subjects.

MEASURES

Worry/Concerns

An expert panel of SANEs and research methodologists developed the items used in this study. Items were developed to elicit concerns individuals had about receiving a forensic SA examination and whether the care provided resulted in the individual actually experiencing those concerns during the examination. The measures developed for this study are consistent with previous research methodology[17,18] examining patient perceptions of SANE examinations and added elements to explore survivor concerns about being believed, being in control, being judged, being blamed, being embarrassed, and experiencing pain during the examination. Items were included that assessed patients' retrospective (ie, postexamination) perceptions of whether they experienced those concerns during the examination (eg, feeling believed, in control).

Experience of Care

The patient survey included items to examine whether the individual perceived that the examination itself had a healing effect and an additional item to explore whether telehealth was perceived as beneficial. An open-ended question for comments or feedback about the care received was included.

Demographic data collected included age, gender identity, ethnicity, incarceration status, and race. All patient survey questions were answered postexamination. Participants were asked to rate their level of agreement with 6 preexamination worry items using a Likert scale. The survey instrument can be viewed in Supplementary Data.

HYPOTHESIS AND ANALYSIS PLAN

The primary hypothesis was that individuals would endorse having worries/concerns before obtaining an examination and that with care provided by trained clinicians (SANEs), worry resolution will occur more frequently than by chance. The secondary hypotheses were that care provided by SANE-trained nurses with additional support from experienced certified SANEs via telehealth would result in individuals endorsing that the exam helped them to feel better and high endorsement of care quality. There was a scant amount of missing data across responses ($< 5\%$), and missing data were spread across respondents and items, suggesting no systematic pattern to missing data. In addition, no evidence of straightlining (answering all questions with the same response) was found.[19] As a result, pairwise deletion of missing responses was deemed appropriate and used.[20] Binomial proportion tests were run between the subset of participants who had initial worries and experienced resolution of those worries (eg, those worried about being blamed before their examination and who responded "I did NOT feel blamed" at examination completion).

Qualitative data were analyzed by 3 of the study authors. Initial coding was done by the lead author followed by 2 rounds of discussion with study team members to refine the thematic categories. In 2 instances, participants gave feedback that fell into more than 1 category and those comments were parsed and placed in more than 1 category.

Results

From September 15, 2018 to June 30, 2021, 139 telehealth SA consultations were conducted in 8 SA Forensic Examination Telehealth Systems partner hospitals. Of those, 29 patients (21%) declined research participation and 24 were ineligible (17%). Of those deemed ineligible, 3 individuals (13%) were non-English speaking, 2 had a cognitive disability (8%) that limited their participation, and 2 were ineligible (8%) because research was not yet approved at that hospital site. Early in the project implementation, 8

TABLE 1
Demographic characteristics of patients who completed a patient experience survey

Variable	*N*	%
Age ($n = 74$)		
< 18 y	14	19
18-24 y	27	37
25-40 y	24	32
40-60 y	9	12
Gender identity ($n = 74$)		
Female	64	87
Male	6	8
Transgender/Genderqueer/Gender nonconforming	4	5
Race ($n = 68$)		
American Indian or Alaska Native	1	2
Black or African American	7	10
White	58	85
Unknown or prefer not to answer	2	3
Ethnicity ($n = 68$)		
Hispanic or Latino	3	4
Non-Hispanic or Latino	55	81
Unknown or prefer not to answer	10	15
Incarcerated status ($n = 74$)		
Incarcerated individual	6	8
Nonincarcerated individuals	68	92

Missing data were minimal across all questions, never exceeding 6 respondents (ie, sample size for each question ranged from 68 to 74). Race response categories of Asian and Native Hawaiian or other Pacific Islander had $n = 0$ responses. Gender response categories of different identity, or patient declined to answer had $n = 0$ responses.

incarcerated individuals (33%) were ineligible; 7 because they presented for care prior to Institutional Review Board approval allowing the participation of incarcerated individuals and 1 individual was incarcerated in a local jail or federal prison. An additional 9 individuals (38%) were ineligible owing to consent process errors (eg, errors in data input on electronic forms). The remaining 86 patients consented to research participation. Of those, 12 left without being offered the survey (14%). The final sample included in this analysis comprised the 74 SA patients who consented to participate in this study and completed a survey.

Sample demographics are presented in Table 1. Participants were predominantly White ($n = 58$; 85%), Non-Hispanic ($n = 55$; 81%), and female ($n = 64$; 87%). Most were between the ages of 18 and 40 years ($n = 51$; 69%) with a mean age of 27 years (SD = 11.60).

Mean participant endorsement (range of 0 [no worry] to 5 [high worry]) of worry categories is presented in Table 2. Notable is that "lack of control" was less of a worry than other categories. Figure 1 shows how many different categories of worry that participants were concerned about pre-examination.

Pre-examination worry levels and whether the worry was realized during the examination are presented in Figure 2. For each item, responses were aggregated into the following groups: agreement (strongly agree or agree), slight agreement/disagreement (slightly agree or slightly disagree), and disagreement (disagree or strongly disagree). To examine response patterns, each actual examination experience (rows in the table) is presented alongside the pre-examination worry (columns in the table).

Control: Of 74 responses, $n = 32$ (43%) expressed some degree of pre-examination worry about lack of control. During the examination, $n = 14$ (19%) expressed some level of lack of control, whereas $n = 60$ (81%) stated they felt in control.

Being believed: Of 72 responses, $n = 44$ (61%) expressed some degree of pre-examination worry about being believed. During the examination, $n = 12$ (17%) expressed some level of not being believed, whereas $n = 60$ (83%) stated they felt believed.

Being judged: Of 69 responses, $n = 39$ (57%) expressed some degree of pre-examination worry about being judged. During the examination, $n = 8$ (11%) expressed some level of not feeling believed, whereas $n = 61$ (88%) stated they did not feel judged.

Being blamed: Of 73 responses, $n = 42$ (58%) expressed some degree of pre-examination worry about

TABLE 2
Mean participant endorsement of worries

Worry category	*n*	Mean	SD	Range
Lack of control	74	1.65	1.55	0-5
Being believed	73	2.62	1.87	0-5
Being judged	69	2.36	1.94	0-5
Being blamed	73	2.40	1.91	0-5
Genital examination would be physically painful	74	2.68	1.77	0-5
Examination would be embarrassing	72	2.71	1.73	0-5

Missing data were minimal across all questions, never exceeding 8 respondents (ie, sample size for each question ranged from 66 to 74). 0 = Strongly Disagree, 5 = Strongly Agree. To prevent underestimates of worry for those with missing data, adjustments to the denominator were made proportional to the amount of missing data. $n = 1$ respondent who had missing data on 2 worry items; $n = 7$ respondents who had missing data on 1 worry item.

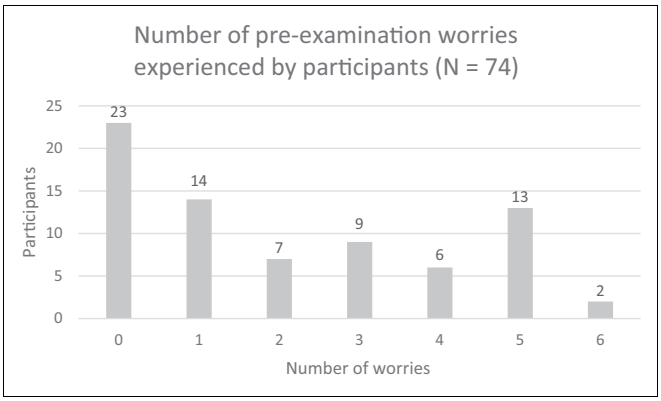

FIGURE 1

Number of pre-examination worry categories endorsed by study participants. Worries are those that individuals retrospectively reported having felt worried about prior to the examination. One respondent had missing data on 2 of the 6 worry items, while 7 respondents had missing data on 1 of the 6 worry items. Little's MCAR test[21,22] was not significant ($\chi^2 = 17.13$, df = 19, $P = .581$), suggesting that the missingness does not bias results. Thus, data from all 74 respondents is included in the figure.

being blamed. During the examination, $n = 11$ (15%) expressed feeling some amount of blame, whereas $n = 62$ (85%) stated they did not feel blamed.

Pain: Of 74 responses, $n = 52$ (71%) expressed some degree of pre-examination worry about pain during the genital examination. During the examination, $n = 30$ (40%) expressed having some level of genital pain, whereas $n = 44$ (59%) stated they did not experience genital pain.

Embarrassment: Of 70 responses, $n = 49$ (70%) expressed some degree of pre-examination worry about the examination being embarrassing. During the examination, $n = 19$ (27%) expressed some level of embarrassment, whereas $n = 51$ (73%) stated the examination was conducted so as to feel less embarrassed.

Table 3 displays binomial proportion test results to determine whether worry resolution (ie, pre-examination worries not being realized during the examination) was statistically different than chance. Resolution of worries related to lack of control, being believed, being judged, and being blamed were statistically significant ($P < .01$). Worry resolution for concerns about the examination being painful or embarrassing was not statistically significant.

Individuals rated 3 additional elements of the examination on a 5-point scale (5 represented either "strongly agree" or "excellent" depending on the question) yielding the following mean and SD results. Individuals highly endorsed that the examination helped them to feel better with 4.27 (SD = 1.01). Additionally, participants highly endorsed that having a telehealth consultation improved the quality of care they received (4.35 [SD 1.08]), and they highly rated the care they received (4.68 [SD 0.66]).

Of the 74 participants, 16 participants (21%) wrote comments about the care they received. The responses fell into 5 themes: (1) caring nurses; (2) empowering information and choice; (3) made to feel safe; (4) positive feedback; and (5) critical feedback. Representative quotes for each of the 5 categories are presented in Table 4.

Discussion

The first step toward recovery from SA begins when an individual can safely and confidently access health care from SANEs or trained health care providers. Yet many victims of SA do not access health care services. Understanding barriers to accessing care and individual experience of the care received can provide information to improve public health messaging about the benefits of SANE-led health care evaluation if sexually assaulted. This study addresses these gaps by engaging individuals who received a telehealth-supported, SANE-led examination to reflect on the fears/worries they had prior to obtaining the examination and reflections on whether those fears/worries were realized/experienced during the examination.

Our findings demonstrate that most individuals who come forward must overcome substantial concerns to access care, with 66% being worried about at least 1 aspect of the examination and 41% endorsing 3 or more pre-examination fears/worries. Importantly, most participants felt believed (83%) and did not feel judged (88%) or blamed (85%) during their examination. This suggests that for most, their original worries did not come to fruition. In all, 88% to 100% of respondents indicating a pre-examination worry

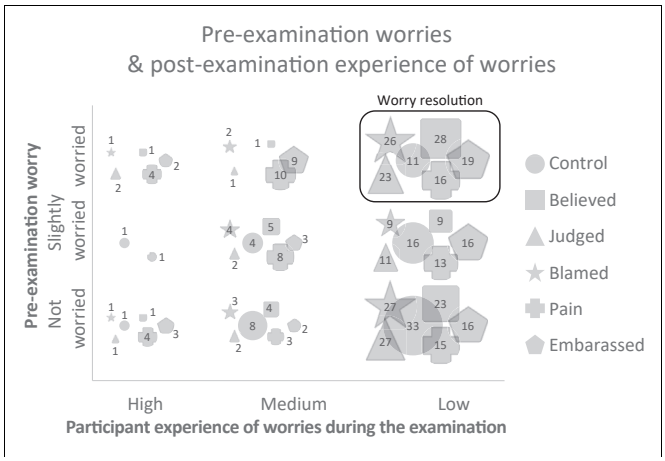

FIGURE 2

Numbers represent the number of participants that indicated each of the 9 combinations of pre-examination worry and examination experience of worries (e.g., the top right circle indicates that 11 participants expressed worry about control prior to the exam and yet felt in control during the examination). Total sample size ranged from 69-74 within each of the six worry/experience categories. Respondent agreement (i.e., "Strongly Agree" or "Agree") with the six different aspects of the examination ranged from 59% ("The genital examination was NOT physically painful") to 88% ("I did NOT feel judged"). "Not Worried" = "Strongly Disagree" or "Disagree"; "Slightly Worried" = "Slightly Agree" or "Slightly Disagree"; "Worried" = "Strongly Agree" or "Agree" to the question set: "I was worried about lack of control"/"I was worried about being believed"/"I was worried about being judged"/"I was worried about being blamed"/"I was worried the genital examination would be physically painful"/"I was worried the examination would be embarrassing". "High" = "Strongly Agree" or "Agree"; "Medium" = "Slightly Agree" or "Slightly Disagree"; "Low" = "Strongly Disagree" or "Disagree" to the question set: "I felt in control"/"I felt believed"/"I did NOT feel judged"/"I did NOT feel blamed"/"The genital examination was NOT physically painful"/"The way the examination was done made me feel less embarrassed."

about being judged, being blamed, being believed, or lacking control indicated their worry was not realized during the examination. Worries related to the examination being painful and embarrassing were not experienced by most participants (59% and 73%, respectively), although rates of worry resolution were lower than for the other concerns (53% and 63%, respectively). These findings suggest that in settings where SA victims have access to care delivered by trained SANEs and supported by certified SANEs via telehealth, the fears/worries that individuals may harbor before an examination are largely not realized.

The findings from this study are similar to other studies that have examined patient experience of SA examinations conducted by SANE examiners. In-depth interviews of adolescent survivors of SA revealed an overall positive experience with the SANE care they received, specifically citing the importance of being believed, having their accounts of their assault validated, and not being judged by the nurse examiner.[17] Another study found that 95% of those who received a SANE examination felt believed and did not feel judged.[23] A multisite study of adult females who had received a SANE-led examination ($n = 695$) found that most patients rated their care as high-quality and endorsed that SANEs took their needs seriously, showed care and compassion, explained examination processes, and did not blame the victim.[24] Our findings extend previous research by examining worry resolution, where individuals who endorsed being worried before the examination largely did not experience those worries during the examination. The extent to which concerns were not experienced (particularly among those who held these worries/concerns pre-examination) reflect the positive psychological effects of high-quality SANE care during the examination.

SANE training is rooted in person-centered, trauma-informed principles. SANE care aims to empower survivors by restoring choice and control over all aspects of the examination. Examinations are conducted with attention to the preservation of dignity and privacy. However, SA examinations are detailed, and even with the most sensitive and compassionate response, the patient is likely to feel vulnerable. In this study, individuals had less worry resolution related to whether the examination was painful or embarrassing. These findings are not surprising given previous research findings in which participants cited the inherent awkwardness and uncomfortableness of the examination and yet credited the SANE nurses' sensitivity to those discomforts as easing the process.[17] Another study highlighted that the caring and compassionate responses of the nurses, coupled with the choice afforded to the patient throughout the examination, resulted in a positive "humanizing" experience.[18] Like this study, previous studies similarly found high levels of patient satisfaction with the care they received.[17,18,23]

Participants endorsed that having a telehealth consultation improved the care they received (88%) and 92%

TABLE 3
Binomial proportion tests of pre-examination worries and worry resolution

Worry	Pre-examination worries		Worry resolution		
	n	%	*n*	%	*P*
About lack of control	$n = 11$	15	$n = 11$	100	$< .001$
About being believed	$n = 30$	41	$n = 28$	93	$< .001$
About being judged	$n = 26$	38	$n = 23$	88	$< .001$
About being blamed	$n = 29$	40	$n = 26$	90	$< .001$
About examination being painful	$n = 30$	41	$n = 16$	53	.856
About examination being embarrassing	$n = 30$	42	$n = 19$	63	.200

"Pre-Examination Worries" indicates the number (%) of individuals who retrospectively reported "Agree" (4) or "Strongly Agree" (5) to having felt worried about a particular aspect of the examination prior to the examination. "Worry Resolution" indicates the number of individuals who reported not experiencing their pre-examination concern during the examination (eg, "Agree" [4] or "Strongly Agree" [5] to "I was worried about being blamed" and "Agree" [4] or "Strongly Agree" [5] to "I did not feel blamed during the exam"). The *n* for each question varied between 69-74 participants.

rated their care as "excellent" or "very good." These findings suggest patients recognize the benefits they receive from this relatively new model of SA care where experienced SANE nurses are paired with experienced, certified SANEs through telehealth, working together to ensure best clinical practices are used and that a safe and caring environment exists for the patient. Beyond satisfaction with care, we were interested in whether patients felt better after their examination. Most study participants (84%) stated that the examination helped them to feel better. Others have also found that care delivered by SANEs improves health outcomes for SA survivors.[25,26] Acute care delivered by a SANE after an SA can set in motion a positive path of recovery and healing.

Patient fears/worries of negative reactions are justified. Numerous studies show that individuals disclosing SA are frequently met with negative reactions.[27] Law enforcement response that results in a secondary victimization of individuals who have experienced SA has been covered extensively in the literature and the media.[28,29] Our findings, and those of other SANE-led programs,[17,18,23] provide evidence that in most cases the fears that may keep individuals from seeking health care after an SA are not realized in interactions within SANE-led programs. This study specifically demonstrates that individuals who experience SA feel better after receiving care from a SANE and a teleSANE partner.

Limitations

There are several study limitations. This study was conducted in a single state, in sites that deliver a local SANE-led response supported by an experienced, certified SANE consultant via telehealth, so findings are not generalizable to examinations conducted by providers who are not SANE-trained and are not supported by an experienced teleSANE consultant. Although the study sample is small, it is relatively robust given that SA examination perception data were rare, especially in rural and underserved areas. This study has some strengths and limitations related to diversity. The study sample comprised mostly White women and does not adequately examine perspectives of persons of color, diverse ethnic groups, or male perspectives of SA examination experience. All but one of the individuals who declined to participate were White, indicating that lack of diversity in the sample may be caused by a nondiverse community population. Notably, 5% of the population identified as transgender or gender nonconforming, showing some progress in provision of care to those with historically greater barriers to accessing care for SA.

Although our results indicate that telehealth-supported SANE examinations helped patients feel better, no studies have examined this effect in programs with care provided only by local-SANE-trained nurses. Data collection from comparison hospitals without a teleSANE response is underway.

Implications for Emergency Nurses

This study highlights the high degree of worry that individuals must overcome to seek care for SA. Concerns are likely to be even greater in the many that chose to not seek care. These findings could guide the development of communications, public relations, and educational campaigns about the availability and benefits of SANE examinations. Quality SANE programs could lead to more trust and utilization of the health care system in rural and underserved communities, ensuring more victims receive quality care in their community. Public messaging should address that SANE examinations are supportive, rehumanizing, and restore a sense of control.

TABLE 4
Participant qualitative free-response themes and representative quotes

Themes	Responses *N*	Representative quotes
Caring nurses	4/16	"I really felt approved and loved by everyone. They really helped me and were very supportive. I felt like they knew me and understood me. They didn't judge or question me about things I did not feel comfortable talking about." "[The nurse] was amazing and talked me through such a rough time." "I loved having the lady on the screen in the room [telehealth consultant]. She was incredibly helpful and helped me relax"
Empowering information and choice	5/16	"I think this was an informed experience." "Very knowledgeable and thorough. Great at explaining things."
Made to feel safe	2/16	"[The nurses (local and telehealth consultant)] did great and made me feel safe and comfortable." "I felt in control and safe, comforted and guided the right way."
Positive feedback	6/16	"Nurses and staff were amazing." "So nice 2 me even tho I was miserable."
Critical feedback	1/16	"Felt as though the supply kit was a bit outdated. Two speculums broke during the procedure."

Comments were double coded, as appropriate. Double coding applied to $n = 2$ comments.

The findings from this study should strengthen health care organizations' commitment to quality SA care delivery. Hospitals that have new or relatively inexperienced SANE nurses or have low SA patient volume can benefit from the mentoring, quality assurance, and real-time expertise provided in a comprehensive SA telehealth program. SANE programs benefit the community by demonstrating that the hospital cares about victims of SA and has taken measures to ensure that consistent, quality care is available. With most patients stating the examination helped them to feel better, quality SANE examinations may lead to greater uptake of supportive recovery and mental health services, thereby reducing the deleterious effects of SA.

Conclusion

Individuals who have experienced SA have substantial pre-examination worries to overcome to access care. Worries such as fear of not being believed, being judged, or being blamed during the examination are rarely experienced by individuals receiving care from telehealth-supported SANE programs. Findings demonstrating that the examination helped survivors feel better and high endorsement of care quality signify that care delivered in SANE programs can initiate a pathway of recovery and healing. These findings have implications for hospital administrators related to supporting SANE-led care and public health messaging to demystify SA care, allay fears, and highlight the benefit of care delivered by SANE nurses.

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Supplementary Data

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REFERENCES

1. Criminal victimization, 2017. Morgan R, Truman J. Published 2019. Accessed March 28, 2022. https://bjs.ojp.gov/content/pub/pdf/cv17.pdf
2. Campbell R, Javorka M, Gregory K, Vollinger L, Ma W. The right to say no: why adult sexual assault patients decline medical forensic exams and sexual assault kit evidence collection. *J Forensic Nurs*. 2021;17(1):3-13. https://doi.org/10.1097/JFN.0000000000000315
3. Nielson MH, Strong L, Stewart JG. Does sexual assault nurse examiner (SANE) training affect attitudes of emergency department nurses toward sexual assault survivors? *J Forensic Nurs*. 2015;11(3):137-143. https://doi.org/10.1097/JFN.0000000000000081
4. Federal Bureau of Investigation, National Incident-Based Reporting System, 2012-2016 (2017). The criminal justice system: statistics. RAINN; 2022. Accessed March 28, 2022. https://www.rainn.org/statistics/criminal-justice-system
5. Campbell R, Patterson D, Bybee D. Prosecution of adult sexual assault cases: a longitudinal analysis of the impact of a sexual assault nurse examiner program. *Violence Against Women*. 2012;18(2):223-244. https://doi.org/10.1177/1077801212440158
6. Kjærulff MLB, Bonde U, Astrup BS. The significance of the forensic clinical examination on the judicial assessment of rape complaints–developments and trends. *Forensic Sci Int*. 2019;297:90-99. https://doi.org/10.1016/j.forsciint.2019.01.031
7. Amstadter AB, McCauley JL, Ruggiero KJ, Resnick HS, Kilpatrick DG. Service utilization and help seeking in a national sample of female rape victims. *Psychiatr Serv*. 2008;59(12):1450-1457. https://doi.org/10.1176/appi.ps.59.12.1450
8. Campbell R, Wasco SM, Ahrens CE, Sefl T, Barnes HE. Preventing the "second rape" rape survivors' experiences with community service providers. *J Interpers Violence*. 2001;16(12):1239-1259. https://doi.org/10.1177/088626001016012002
9. Resnick HS, Holmes MM, Kilpatrick DG, et al. Predictors of post-rape medical care in a national sample of women. *Am J Prev Med*. 2000;19(4):214-219. https://doi.org/10.1016/s0749-3797(00)00226-9
10. Ullman SE, Lorenz K. African American sexual assault survivors and mental health help-seeking: a mixed methods study. *Violence Against Women*. 2020;26(15-16):1941-1965. https://doi.org/10.1177/1077801219892650
11. Zinzow HM, Resnick HS, Barr SC, Danielson CK, Kilpatrick DG. Receipt of post-rape medical care in a national sample of female victims. *Am J Prev Med*. 2012;43(2):183-187. https://doi.org/10.1016/j.amepre.2012.02.025
12. Peterson C, DeGue S, Florence C, Lokey C. Lifetime economic burden of rape in the United States. *Am J Prev Med*. 2017;52(6):691-701. https://doi.org/10.1016/j.amepre.2016.11.014
13. Miyamoto S, Thiede E, Dorn L, Perkins DF, Bittner C, Scanlon D. The Sexual Assault Forensic Examination Telehealth (SAFE-T) Center: a comprehensive, nurse-led telehealth model to address disparities in sexual assault care. *J Rural Health*. 2021;37(1):92-102. https://doi.org/10.1111/jrh.12474
14. Miyamoto S, Thiede E, Wright EN, et al. The implementation of the sexual assault forensic examination telehealth Center: a program evaluation. *J Forensic Nurs*. 2021;17(3):E24-E33. https://doi.org/10.1097/JFN.0000000000000337
15. IRB Member - Biomedical Focus. Citi Program. Published 2018. Accessed July 28, 2022. https://about.citiprogram.org/course/human-subjects-research-irb-biomedical-focus/
16. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: building an international community of software platform partners. *J Biomed Inform*. 2019;95:103208. https://doi.org/10.1016/j.jbi.2019.103208
17. Campbell R, Greeson MR, Fehler-Cabral G. With care and compassion: adolescent sexual assault victims' experiences in sexual assault nurse examiner programs. *J Forensic Nurs*. 2013;9(2):68-75. https://doi.org/10.1097/jfn.0b013e31828badfa
18. Fehler-Cabral G, Campbell R, Patterson D. Adult sexual assault survivors' experiences with sexual assault nurse examiners (SANEs). *J Interpers Violence*. 2011;26(18):3618-3639. https://doi.org/10.1177/0886260511403761
19. Kim Y, Dykema J, Stevenson J, Black P, Moberg DP. Straightlining: overview of measurement, comparison of indicators, and effects in

mail–web mixed-mode surveys. *Soc Sci Comput Rev*. 2019;37(2):214-233. https://doi.org/10.1177/0894439317752406

20. Peugh JL, Enders CK. Missing data in educational research: a review of reporting practices and suggestions for improvement. *Rev Educ Res*. 2004;74(4):525-556. https://doi.org/10.3102/00346543074004525
21. Lee KJ, Tilling KM, Cornish RP, et al. Framework for the treatment and reporting of missing data in observational studies: the Treatment and Reporting of Missing data in Observational Studies framework. *J Clin Epidemiol*. 2021;134:79-88. https://doi.org/10.1016/j.jclinepi.2021.01.008
22. Little RJ. A test of missing completely at random for multivariate data with missing values. *J Am Stat Assoc*. 1988;83(404):1198-1202. https://doi.org/10.1080/01621459.1988.10478722
23. Du Mont J, Macdonald S, White M, et al. Client satisfaction with nursing-led sexual assault and domestic violence services in Ontario. *J Forensic Nurs*. 2014;10(3):122-134. https://doi.org/10.1097/jfn.0000000000000035
24. Lechner M, Bell K, Short NA, et al. Perceived care quality among women receiving sexual assault nurse examiner care: results from a 1-week post-examination survey in a large multisite prospective study. *J Emerg Nurs*. 2021;47(3):449-458. https://doi.org/10.1016/j.jen.2020.11.011
25. Campbell R, Patterson D, Lichty LF. The effectiveness of sexual assault nurse examiner (SANE) programs: a review of psychological, medical, legal, and community outcomes. *Trauma Violence Abuse*. 2005;6(4):313-329. https://doi.org/10.1177/1524838005280328
26. Nugent-Borakove ME, Fanflik P, Troutman D, Johnson N, Burgress A, O'Connor A. Testing the Efficacy of the SANE/SART Programs. American Prosecutors Research Institute website. Published 2006. Accessed March 28, 2022. https://www.ojp.gov/pdffiles1/nij/grants/214252.pdf
27. Ullman SE. Correlates of social reactions to victims' disclosures of sexual assault and intimate partner violence: a systematic review. *Trauma Violence Abuse*. 2021:15248380211016013. https://doi.org/10.1177/15248380211016013
28. Campbell R, Bybee D, Townsend SM, Shaw J, Karim N, Markowitz J. The impact of sexual assault nurse examiner programs on criminal justice case outcomes: a multisite replication study. *Violence Against Women*. 2014;20(5):607-625. https://doi.org/10.1177/1077801214536286
29. Campbell R, Fehler-Cabral G. Why police "couldn't or wouldn't" submit sexual assault kits for forensic DNA testing: a focal concerns theory analysis of untested rape kits. *Law Soc Rev*. 2018;52(1):73-105. https://doi.org/10.1111/lasr.12310

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