Fall 11-23-2021

Implications of an Education Tool as a Noise Reduction Strategy in the Operating Room

Sona Wardius
DePaul University, sona.ambani.w@gmail.com

Amanda Parker
DePaul University, APARKE33@depaul.edu

Implications of an Education Tool as a Noise Reduction Strategy in the Operating Room

Amanda Parker and Sona Wardius

DePaul University

Abstract

Noise in the operating room (OR) can be from many sources, including personnel and medical equipment. Excessive noise is prevalent in the OR and can lead to distractions, interruptions, stress, and medical errors. These distractions have been well-documented in the literature and can reduce the quality of patient care. Awareness and education have proven to be solutions to noise reduction, but there is little evidence in the literature regarding the adoption of a clinical guideline. The goal of this study is to bring awareness of noise levels in the OR, the most common noise distractions, and how these relate to adverse events for the patient through the adaptation of an education tool as an initial step for future researchers to develop a guideline. The researchers measured decibel levels in the OR prior to and after the implementation of an educational tool for noise reduction in the OR. Seventeen surgical cases were evaluated, and a post-intervention survey was sent out to OR staff. While there was no significant difference between the sound levels pre- and post-intervention, the majority of healthcare providers defined excessive noise as a problem in the OR that ultimately leads to miscommunication and specifically, added stress.

Introduction

Background and Significance

The operating room (OR) environment includes devices, equipment, and individuals that create noise. Noise can be generated by communication between all team members, as well as safety aspects of equipment that alarms the providers of pertinent patient data (Burlingame, 2019; Hogan & Harvey, 2015). However, crucial information can be obscured by excessive and unnecessary noise. This can occur in the OR, frequently leading to miscommunication, distractions and unnecessary interruptions which can potentially increase medical errors, stress, and fatigue that jeopardizes patient safety (Hogan & Harvey, 2015). Education and awareness of OR noise are successful at minimizing excessive noise, but further study regarding sound reduction strategies in the OR is required.

As nurse anesthetist trainees (NAT), current experience in the OR is limited to the time in clinical residency. During this experience, the learning curve is tremendously steep. Transitioning from registered nurses in the intensive care unit (ICU) to new NATs is a challenging adjustment, and additionally alarm fatigue and the effects of excessive noise are critical aspects that greatly impact the care of patients. As seasoned ICU nurses in a comfortable environment, NAT were able to focus on important alarms while completing tasks without threatening patient safety. In a new role, NAT are placed in the unfamiliar surroundings of the OR and find themselves consumed with problem solving with the challenge to pay attention to the overall situation around us. Due to the immense impact on patient safety, it is imperative to understand the influence of an education tool for all team members, and how it can reduce excessive noise, and thus, improve the care they provide.

Methods

Study Design

This study used a modified pretest-posttest and post-intervention research design. The modification included pre-intervention and post-intervention data collection as well as a post-intervention questionnaire. The research plan included measuring noise levels in similar surgical cases before and after implementation of a noise reduction education tool. The purpose was to bring awareness of 1) noise levels in the OR, 2) the most common noise distractions, and 3) how these relate to adverse events for the patient.

Key concepts related to this study include: *noise distraction, critical event, adverse event.* Definitions listed below:

- *Noise distraction:* loud sound occurring that draws attention away from one's original focus
- *Critical event:* "events in routine surgery during which there is a high risk of an adverse occurrence"; for example, during induction or emergence of anesthesia (Wright, 2016).
- *Adverse event:* an undesirable, unexpected occurrence resulting in medical injury

Sample

The sample for this study included seventeen surgical cases, and all personnel working in the operating room at these times. The process required cooperation from the surgical team, circulating nurses, and anesthesia team. Inclusion criteria comprised willingness to participate in the implementation of an education tool as a noise reduction strategy and surgical procedures scheduled for 3 hours or less.

Setting

The authors requested permission from NorthShore University HealthSystem Evanston Hospital to measure noise in various OR cases and implement a noise reduction education tool and received NorthShore IRB approval. Ten surgical cases were chosen to measure decibel levels before any education was provided. The next ten surgical cases measured sound levels after participants and staff members reviewed the noise reduction clinical education tool. A brief post-intervention survey was dispersed to participants and staff members to collect additional information.

Instruments

Accurate data collection was imperative to answer the research questions regarding the effects of excessive noise. The Meterk Digital Sound Meter was utilized for each case and placed in the same location each time. The machine was calibrated before each use. To increase reliability, the measured intervals were the same for each patient.

Pretest-posttest research designs typically have weak internal validity. Threats to internal validity related to this study include history, selection, and instrumentation (Polit & Beck, 2017). To minimize these confounding variables, the researchers were present in all OR cases when noise levels were measured. Similar surgical cases utilizing general anesthesia were chosen, since they had similar inductions, types of critical events, and emergences.

Both the educational tool and post-interventional survey were validated by a panel of experts. The panel consisted of five certified registered nurse anesthetists (CRNAs) with several years of clinical practice experience, who were educated in the concerns of excessive noise in the operating room. The panel recommended improvements and ultimately, unanimously approved

the tool and survey for use in clinical research.

Recruitment Procedures

Recruitment of participants for data collection was done through email and flyers posted for all OR staff. Intraoperative participants were assembled according to the surgical cases selected for sound measurement. A waiver for consent for participation was completed before data collection, due to the lack of participant and patient information obtained. Implementation of the education tool was administered to all team members with active roles in the OR setting with the intention to educate all OR staff.

Data Collection Procedures

Data was collected through the use of the Meterk Digital Sound Level Meter, which measures a range between 30 and 130 decibels. This device was chosen for its ease of use, precise measurements, and measurement range. This sound meter was calibrated before each use and turned on to collect data as the patient entered the operating room. Sound levels were measured until the patient left the operating room. The researchers were present to document timing of intraoperative critical events including induction, intubation, extubation, and any other pertinent events. The researcher also recorded the sound level during each of these critical events, as well as every three minutes throughout the case. For post-intervention surgical cases, the researchers additionally documented adherence to the noise reduction strategy by participants.

Data Analytic Procedures

By using a modified pretest-posttest study, the authors examined the influence of the clinical education tool by measuring noise levels in the OR directly, and used SPSS software for data analysis. First, descriptive statistics were used to determine distribution of sound levels

throughout the procedures, including the mean and median sound levels as well as standard deviations. A *Spearman's rho* correlation was utilized to correlate decibel levels with the number of people in the room throughout the case. Finally, descriptive statistics were used to analyze survey responses.

Ethics and Human Subjects Protection

The Institutional Review Board (IRB) at DePaul University and NorthShore University HealthSystem reviewed and approved this study prior to data collection. The authors recorded data only on decibel levels during specific phases of surgeries, and no specific patient information was recorded. However, the type of surgical procedures and anesthetic were recorded, and this information was obtained from the daily OR schedule, thus not violating patient confidentiality. The researchers completed the required collaborative institutional training initiative (CITI) training for human subjects, as well as financial conflict of interest (FCOI) and good clinical practice (GCP) training. Participation in the study from the surgical staff was voluntary. The researchers received no compensation from Meterk for use of the digital sound meter.

Results

Decibel Levels

Throughout the ten pre-intervention surgical cases, a total of 333 sound levels were measured. The sound level ranged from a minimum of 56.7 decibels, to a maximum of 98.4 decibels. The median sound level was 75.2 decibels, with a standard deviation of 6.9398. A total of 264 sound levels were measured throughout the seven post-intervention surgical cases. The minimum sound level was 61 decibels, ranging to a maximum of 90.5 decibels. The median sound level was 76 decibels, with a standard deviation of 5.8426.

Because both pre- and post-intervention data sets were not normally distributed (see Figure 1 and Figure 2 below), non-parametric tests were used to analyze data. Researchers utilized *Spearman's rho* to correlate the sound level in the OR with the number of people in the room. The p value for the correlation between pre-intervention sound levels and people in the room was 0.087, while the post-intervention sound levels p value was 0.348. Both of these p values are larger than the alpha value of 0.05. Therefore, there was no statistically significant correlation was found between the number of people in the OR and sound levels in the OR (see Figure 3 and 4 below).

Figure 1. Distribution of Pre-Intervention Sound Levels

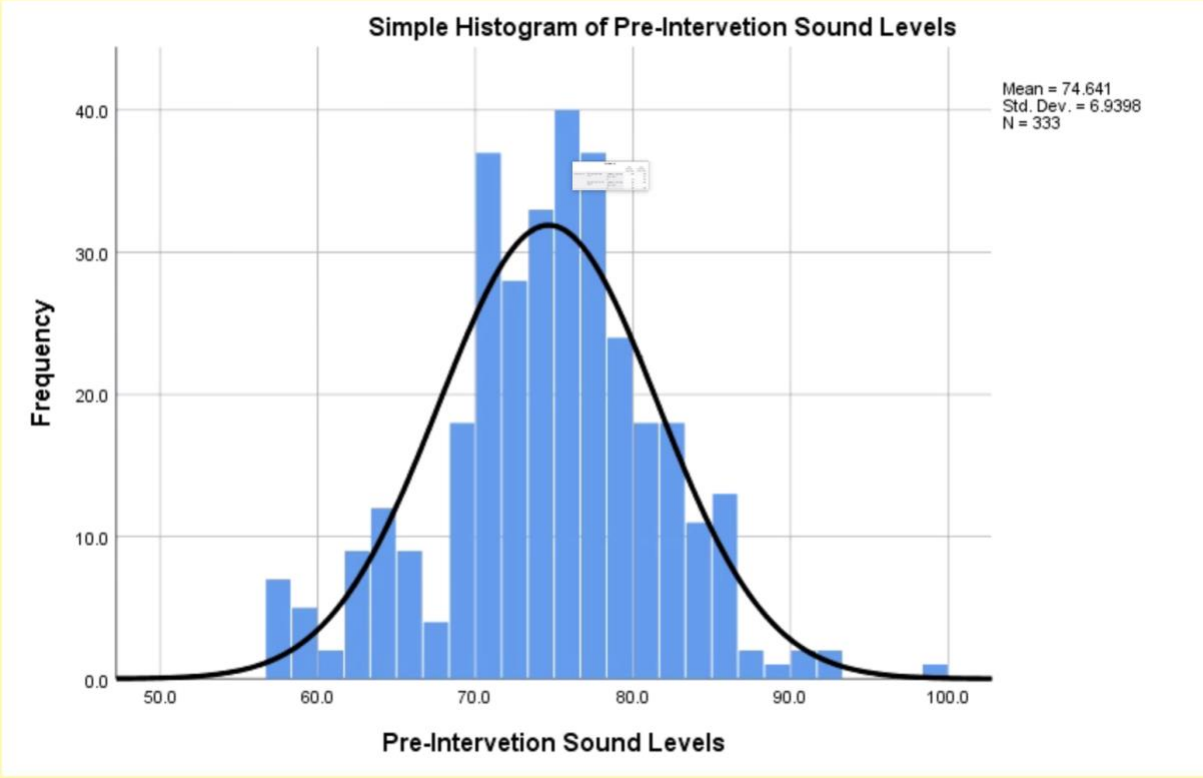
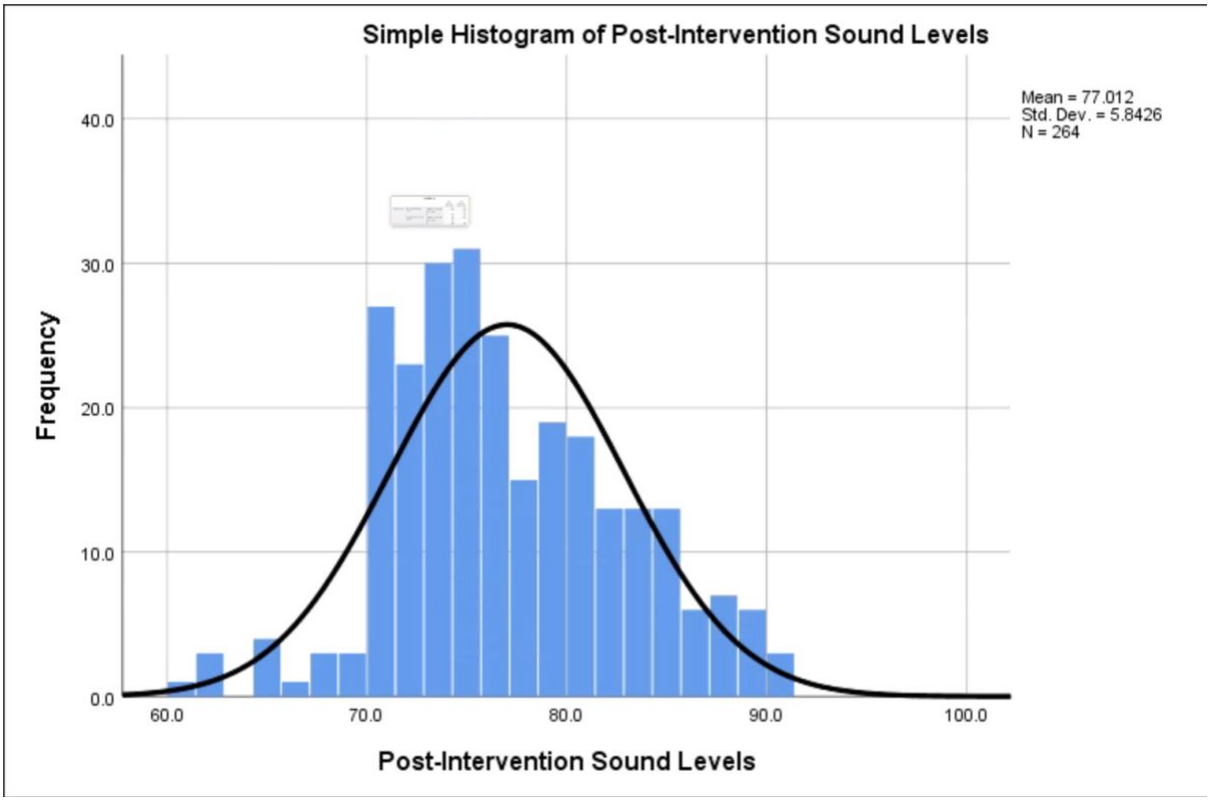


Figure 2. Distribution of Post-Intervention Sound Levels



Figures 3 and 4. Correlations between Sound Levels and Number of People in the Room.

Correlations

			Post-Intervention Sound Levels	Post People in Room
Spearman's rho	Post-Intervention Sound Levels	Correlation Coefficient	1.000	.182
		Sig. (1-tailed)	.	.348
		N	264	7
	Post People in Room	Correlation Coefficient	.182	1.000
		Sig. (1-tailed)	.348	.
		N	7	7

Correlations

			Pre-Intervetion Sound Levels	Pre People in Room
Spearman's rho	Pre-Intervetion Sound Levels	Correlation Coefficient	1.000	-.466
		Sig. (1-tailed)	.	.087
		N	333	10
	Pre People in Room	Correlation Coefficient	-.466	1.000
		Sig. (1-tailed)	.087	.
		N	10	10

Survey

Demographic data from 45 participants included their roles in the OR and experience levels. Roles included nurse, surgeon, anesthesiologist, and CRNA. Experience was classified into four categories: 0-3 years, 4-7 years, 8-10 years, and over 10 years in their specified role. 22% of the participants were nurses, 22% were anesthesiologists, 27% were surgeons, and 29% were CRNAs. 71% of all respondents had over 10 years of experience. 18% had 0-3 years' experience, 7% had 4-7 years' experience, and 4% had 8-10 years' experience. 44% of participants received the educational tool provided by the researchers, while 56% stated they had not received it.

Questions were also asked regarding excessive noise in the OR. 62% of participants perceived excess noise or distractions while in the operating room (Figure 5). These sources of noise included music (35%), equipment (30%), conversation (30%), and non-specified other (4%) (Figure 6). Respondents were asked what consequences they perceived were from excessive noise in the OR. Miscommunication (35%), increased stress (27%), medical errors/adverse events (14%), patient safety (20%), and non-specified other (3%) were all included as potential repercussions of excessive noise.

Figure 5.

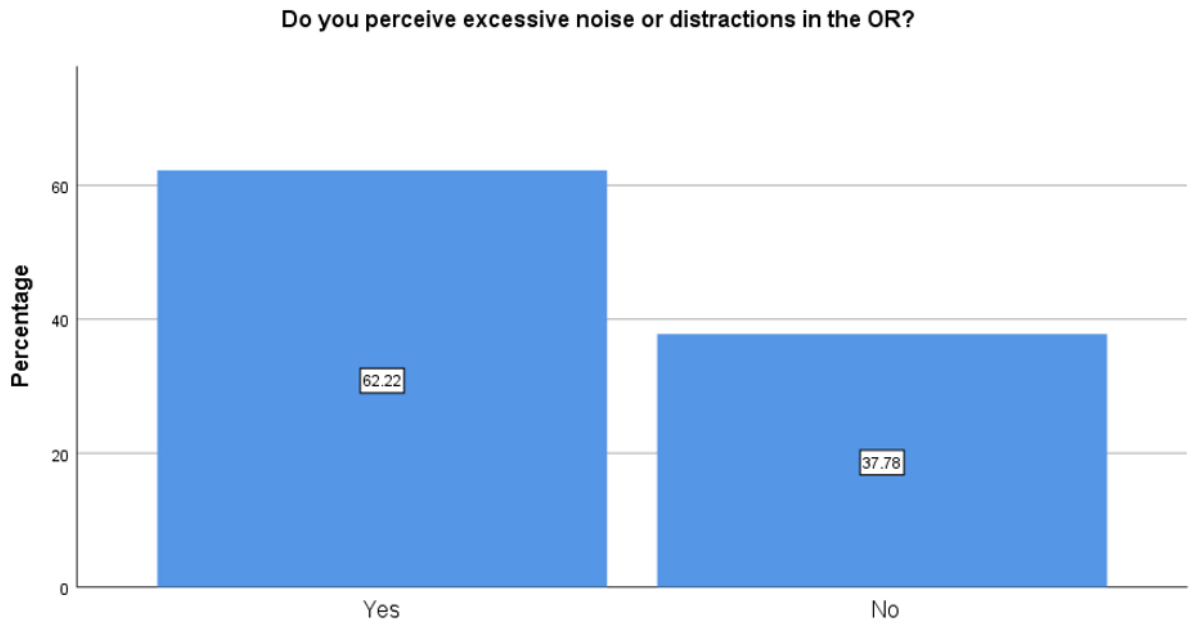
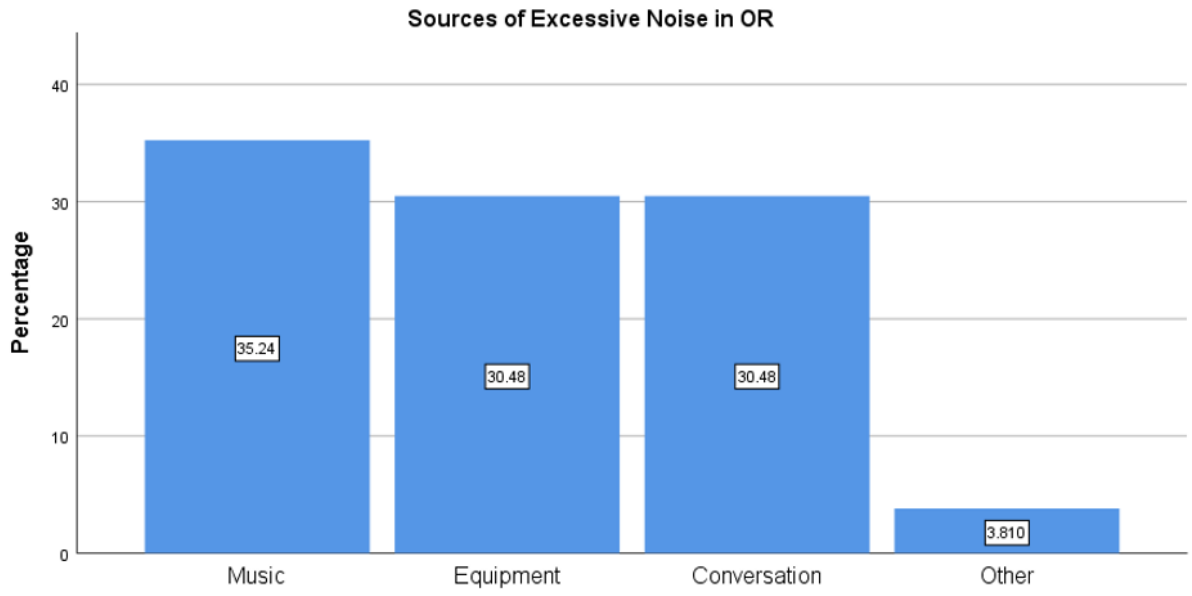


Figure 6.



Discussion

As discussed previously, the purpose of this study was to explore the effects of excessive noise during critical times in the operating room from the perspectives of a multidisciplinary team, before and after implementation of a noise reduction education tool. Critical times include induction, emergence, and any other significant events throughout the case. In decreasing excessive noise in the operating room, the goal is to reduce associated adverse events and thus improve patient safety.

Distractions in the operating room have been well-documented and have shown to reduce the quality of patient care. Awareness and education have proven to be solutions to reduce noise, but there is little evidence in the literature regarding the adoption of a clinical guideline. The purpose of this study was to bring awareness of noise levels in the OR, the most common noise

distractions, and how these relate to adverse events for the patient through the adaptation of an education tool as an initial step for future researchers to develop a guideline.

The authors found that distractions such as music, non-essential conversation, and equipment contributed to the overall increase in noise levels. It was also concluded that the average decibel levels during this study were above the average operating noise levels found in our literature review which emphasized the need for an education tool to decrease excessive noise. Furthermore, the majority of healthcare providers in the operating room conveyed that excessive noise is a problem they face continuously, many citing miscommunication and added stress as ramifications of noise.

Through pre-intervention and post-intervention data collection of sound levels, the researchers were able to emphasize the issue of excessive noise in the operating room. Though this was an apparent issue that was highlighted in the literature review, we were able to investigate the impact of an education tool as a noise reduction strategy. Additionally, our post-intervention survey provided imperative information regarding demographics of providers, perceived sources of excessive noise, stress levels, and other useful data that can contribute to the overall goal of noise reduction. Most importantly, this pilot study provided a significant amount of strengths and limitations that can be included in future research.

Strengths and Limitations

During each step of the research process, several strengths and limitations were identified that can improve future research. An obvious strength is the applicability of the research topic, and its effects on patient safety. Excessive noise is prevalent in the OR and can lead to distractions, interruptions, stress, and medical errors. Effects of excess noise are well-documented in the literature and can reduce the quality of patient care. Awareness and education have proven to be solutions to the negative outcomes of excessive noise in regard to patient

safety. Thus, this research project and development of an education tool, have brought awareness and knowledge in reducing excessive noise to team members of the operating room.

One of the strongest limitations to this pilot study was the unanticipated complexity of the many variables surrounding excessive noise. Variables included the type of surgical procedures, type of anesthesia provided, and the participants involved in each case. Additionally, an initial proposed target was to measure sound levels in ten pre-intervention cases and ten post-intervention cases. Due to the *COVID-19 pandemic*, sound levels of only seven post-intervention cases were obtained, which resulted in a significant difference in the data when comparing pre- and post-intervention sound levels. Furthermore, when comparing pre- and post-intervention cases, there were a variety of cases that were found to be incomparable during data analysis. For example, comparing sound levels of a laparoscopic hernia repair to sound levels of anal polyp excision is arbitrary and does not take into account the complexity of the case or the devices used. These two factors may have contributed to the results of the research study. More consistency, in participants and case variables, will allow future research to focus on the implications of an education tool and its impact on excessive noise.

Directions for Future Research

Measuring excessive noise in the OR was found to be much more complex than the previous literature notes. This research project was essentially a pilot study and needs to be replicated with a larger data set. Future studies must be mindful of the challenges that this study faced, including the decisions about continuous decibel level monitoring, the types of surgeries, and the high level of variability of the surgical procedure process. Such variabilities included the type of surgical procedures, type of anesthesia provided, and the participants included in each case. Suggestions for future research would include matching similar surgical procedures in the pre-intervention and post-intervention data collection. By doing this, the type of anesthesia

provided would also be consistent in the pre-intervention and post-intervention data collection. For example, comparing a simple mastectomy under general anesthesia would eliminate such variability, and thus, allow for better comparison of data.

Conclusion

The goal of this pilot study was to explore the implications of an education tool as a noise reduction strategy in the operating room. Though the results did not show a significant improvement when comparing pre-intervention sound levels to post-intervention sound levels, several lessons were learned. Most importantly, future research is necessary and will require overcoming the limitations while highlighting positive outcomes. Incorporating the strengths and limitations of this study into future research as well as a larger data set will allow for a more robust study that can highlight the implications of an education tool as a noise reduction strategy. It is imperative that excessive intraoperative workplace noise be further examined in order to improve patient safety and better outcomes.

References

Burlingame, B. L. (2019). Clinical Issues—January 2019. *AORN Journal*, *109*(1), 120–126. https://doi-org.ezproxy.depaul.edu/10.1002/aorn.12465

Council endorses periop noise reduction resource. (2015). *Same-Day Surgery, 39*(7), 76–77.

Damschroder, L., Aron, D., Keith, R., Kirsh, S., Alexander, J., & Lowery, J. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science, 4*(50), 1-15. doi:10.1186/1748-5908-4-50

Excessive noise in the OR poses short-term and long-term risk to surgical staff. (2018). *Medical Environment Update*, *28*(4), 1–4.

Ford, D. A. (2015). Patient Safety First: Speaking Up to Reduce Noise in the OR. *AORN Journal*, *102*(1), 85–89. https://doi.org/10.1016/j.aorn.2015.04.019

Giv, M. D., Sani, K. G., Alizadeh, M., Valinejadi, A., & Majdabadi, H. A. (2017). Evaluation of noise pollution level in the operating rooms of hospitals: A study in Iran. *Interventional Medicine and Applied Science*, *9*(2), 61–66. doi: 10.1556/1646.9.2017.15

Hasfeldt, D., Laerkner E., & Birkelund R. (2010). Noise in the operating room—what do we know? A review of the literature. *Journal of PeriAnesthesia Nursing, 25*(6), 380–386. https://doi-org.ezproxy.depaul.edu/10.1016/j.jopan.2010.10.001

Hogan, L. J., & Harvey, R. L. (2015). Creating a Culture of Safety by Reducing Noise Levels in the OR. *AORN Journal, 102*(4), 410.e1-410.e7.

https://doi-org.ezproxy.depaul.edu/10.1016/j.aorn.2015.08.005

Ilkkaya, N. K., Ustun, F. E., Sener, E. B., Kaya, C., Ustun, Y. B., Koksal, E., … Ozkan, F. (2014). The Effects of Music, White Noise, and Ambient Noise on Sedation and Anxiety in Patients Under Spinal Anesthesia During Surgery. *Journal of PeriAnesthesia Nursing*, *29*(5), 418–426. doi: 10.1016/j.jopan.2014.05.008

Jung, J. J., & Grantcharov, T. P. (2019). Impact of Distraction on Intraoperative Events During Minimally Invasive Surgery. *Journal of the American College of Surgeons*, *229*(4). doi: 10.1016/j.jamcollsurg.2019.08.341

Keller, S., Tschan, F., Semmer, N., Holzer, E., Candinas, D., Brink, M., & Beldi, G. (2018). Noise in the operating room distracts members of the surgical team: an observational study. *World Journal of Surgery : Official Journal of the International Society of Surgery/société Internationale De Chirurgie, 42*(12), 3880-3887. doi:10.1007/s00268-018-4730-7

McNeer, R., Bennett, C., & Dudaryk, R. (2016). Intraoperative noise increases perceived task load and fatigue in anesthesiology residents: A simulation-based study. *Anesthesia and Analgesia, 122*(2), 512-25. doi:10.1213/ANE.0000000000001067

Palinkas, L., Spear, S., Mendon, S., Villamar, J., Valente, T., Chou, C., Landsverk, J., Kellam, S., & Brown, C. (2016). Measuring sustainment of prevention programs and initiatives: A study protocol. *Implementation Science, 11*(95), 2-11. doi: 10.1186/s13012-016-0467-6

Plaxton, H. (2017). Communication, Noise, and Distractions in the Operating Room:

The Impact on Patients and Strategies to Improve Outcomes. *ORNAC Journal, 35*(2), 13–22.

Plumb, A. A. O., Lambregts, D., Bellini, D., Stoker, J., & Taylor, S. (2019). Making useful clinical guidelines: the ESGAR perspective. *European Radiology, 29*(7), 3757–3760. doi: 10.1007/s00330-019-6002-9

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice*. Philadelphia, PA: Wolters Kluwer.

Smith, P., & Gibbs, J. (2016). "Below ten thousand": An effective behavioural noise reduction strategy? *ACORN: The Journal of Perioperative Nursing in Australia, 29*(3), 29–32.

Way, T. J., Long, A., Weihing, J., Ritchie, R., Jones, R., Bush, M., & Shinn, J. B. (2013). Effect of noise on auditory processing in the operating room. *Journal of the American College of Surgeons, 216*(5), 933–938. https://doi.org/10.1016/j.jamcollsurg.2012.12.048

Wheelock, A., Suliman, A., Wharton, R., Babu, E. D., Hull, L., Vincent, C., … Arora, S. (2015). The Impact of Operating Room Distractions on Stress, Workload, and Teamwork. *Annals of Surgery, 261*(6), 1079–1084. doi:10.1097/sla.0000000000001051

Wright, M. I. (2016). Implementing No Interruption Zones in the Perioperative Environment. *AORN Journal, 104*(6), 536–540. https://doi-org.ezproxy.depaul.edu/10.1016/j.aorn.2016.09.018

Appendix A: Clinical Journal Guidelines

VISION AND MISSION

Vision: The *AORN Journal* will be indispensable resource recognized for scholarly, evidence-based, peer-reviewed articles that convey standards of excellence and innovations in the delivery of perioperative nursing.

Mission: The *AORN Journal* provides professional perioperative registered nurses with evidence-based practice information needed to help meet the physiological, behavioral, safety, and health system needs of a diverse patient population.
Journal content supports the clinical, research/quality improvement, education, and management strategies related to the nurses' role in caring for patients before, during, or after operative and other invasive and interventional procedures in ambulatory and inpatient settings.

SEVEN MAIN ARTICLE CATEGORIES

Clinical: Clinical articles present new skills or knowledge related to perioperative patient care, provide an empirically or clinically based review of a disease state and surgical procedure, or analyze the current literature related to a topic. Clinical articles may be written in first person or third person as appropriate (**Appendix B**).

Management: Management articles provide concise, up-to-date information that helps readers understand a perioperative management process, policy, procedure, or issue. Management articles may contain information about trends in management and the surgical environment, changing policies and regulations, administrative issues, and developments in clinical practice and technology that affect managers, directors, and supervisors in perioperative settings. Management articles may be written in first person or third person as appropriate (**Appendix C**).

Research: Research manuscripts are final reports of completed original clinical, educational, health systems, health policy, or historical investigations. Research produces new information that adds to the body of knowledge about perioperative nursing practice, management, or education. Research results should be generalizable or transferable to settings or populations beyond the setting and sample of the study. Manuscripts should include the research aims or questions, a brief review of relevant literature, theoretical or conceptual framework, research design and methods, results, discussion, and implications for perioperative nursing. The research design may be quantitative, qualitative, or mixed design. For quantitative methods, justification of the desired sample size and evidence of measurement reliability and validity supporting the investigators use of the research instruments in the study being reported are essential. Reports of studies involving human participants must include a description of the level of institutional review board review and approval, and methods used to ensure protection of participants rights, including informed consent. All results obtained in the study must be reported in one manuscript. Pilot study results should not be reported in a separate manuscript; they should be included in the report of the main study. Research manuscripts must be written in the first person (**Appendix D**).

Quality Improvement (QI): Quality improvement manuscripts describe a project that was carried out at the author's place of employment to determine the best solution to a practice issue. The results of QI projects cannot be generalized beyond the institution in which they are conducted, and therefore are not considered research manuscripts. However, QI project reports should include evidence of Institutional Review Board (IRB) review if human participants were involved, and should adhere to accepted scientific standards for data collection, including evidence of measurement reliability and validity. Quality improvement articles should be written in first person (**Appendix E**).

Education: Education articles describe perioperative educational practices that are of interest to nurses in academia, staff nurse educators, mentors, or anyone responsible for developing educational materials and disseminating information to nursing students, perioperative nurses, other perioperative team members, and patients. Education articles may be either didactic or clinical in nature. Education articles may be written in first person or third person as appropriate (**Appendix F**).

Literature Review: A systematic review is a summary of the clinical literature. It is a critical assessment and evaluation of all research studies that address a particular clinical issue. Researchers should use an organized method of locating, assembling, and evaluating a body of literature on a particular topic using a set of specific criteria. A systematic review typically includes a description of finding of the collection of research studies. The systematic review also may include a quantitative pooling of data, called a meta-analysis (**Appendix K**).

Concept Analysis: Concept analyses are original manuscripts reporting on a single concept relevant to perioperative nursing. The manuscript should include purpose and uses, method of analysis, concept definition, defining characteristics, and model case. (**Appendix L**).

BEFORE YOU BEGIN

Ethics in publishing

Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Conflict of interest

The AORN Journal complies with the position of the International Committee of Medical Journal Editors on "Conflict of Interest." Conflict of interest for authors is defined as "financial and other conflicts of interest that might bias their work" (http://www.icmje.org). Authors are responsible for making certain that their final, accepted manuscript and page proofs provide full disclosure of all potential conflicts of interest (financial or non-financial) and any other pertinent information.

Conflicts of interest. A conflict of interest exists when a professional judgment concerning a primary interest (such as patients' welfare or the validity or interpretation of research) may be influenced by a secondary interest (such as a financial gain or personal rivalry). If conflicts of interest are revealed after an article is published, a reasonable reader may feel misled or deceived. The simplest remedy for conflict of interest is disclosure. In the AORN Journal, disclosure will be achieved by the inclusion of a short footnote with each published article.

Using the tables on page 2 of the AORN Journal Copyright Transfer/Publishing Agreement (**Appendix I**) all authors must disclose if they or any immediate family member have within the last three years had any affiliations that they consider to be relevant and important with any organization that to any author's knowledge has a direct interest, particularly a financial interest, in the subject matter or materials discussed (for instructions, see **Appendix J**). Such affiliations include, but are not limited to,

- employment by an industrial concern,
- ownership of stock,
- membership on a standing committee or board of directors, and
- consultancies, or being publicly associated with a company or its products.

Other areas of real or perceived conflict of interest include the receipt of honoraria, consulting fees, grants, or funds from such corporations or individuals representing such corporations. Not all relationships represent true conflict of interest. Conflict of interest can exist whether or not an individual believes that the relationship affects his or her scientific judgment.

AORN will consider publishing articles written by experts who declare relationships with companies (eg, accepting research grants, honoraria, or serving as consultants). Such relationships should be disclosed upon submission of the manuscript—using the tables on page 2 of the AORN Journal Copyright Transfer/Publishing Agreement (**Appendix I**)—and will be noted in the resulting published article.

AORN will not reject manuscripts simply because of conflict of interest, but these conflicts will be declared to the readership. AORN reserves the right to refuse to consider for publication manuscripts which in its sole judgment may be perceived as biased.

Financial relationships. Financial benefits are usually associated with roles such as employment, management positions, independent contractor relationships (including contracted research), consulting, speaking and teaching, membership on advisory committees or review panels, board membership, and other activities from which a fee is received or expected.

AORN defines financial relationships as those relationships in which the individual or family member benefits by receiving a salary, royalty, intellectual property rights, consulting fees, honoraria, ownership interest (eg, stocks; stock options; or other ownership interest, excluding diversified mutual funds), or other financial benefit. Financial relationships also can include contracted research where the institution receives a grant and manages the funds and an individual is the principal or named investigator on the grant.

Research sponsorship. AORN requires that the author(s) disclose any research sponsorship that he/she received to conduct a study or prepare the manuscript for review. This information will be published together with the author affiliation information. Examples of acceptable statements are:

- "The study was carried out with support of an unrestricted educational grant from X" or "This study was funded in whole/in part by a grant from Y."
- The role of the funding organization or sponsor, if any, in each of the following should be specified: design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Manuscripts should contain timely and accurate information and must conform to the specifications of the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, established by the International Committee of Medical Journal Editors (ICMJE) (http://www.icmje.org)

Submission declaration and verification

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see 'Multiple, redundant or concurrent publication' section of our ethics policy for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service CrossCheck.

Authorship

All authors should have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

The AORN Journal adheres to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals set by the International Committee of Medical Journal Editors (www.icmje.org). All persons designated as authors should qualify for authorship, and all those who qualify should be so credited. Supporting the manuscript or collecting data alone does not constitute authorship. Declaring authorship based solely on position (eg, research supervisor, department head) is not permitted.

Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Allowing one's name to appear as an author without having contributed significantly to the study or adding the name of an individual who has not contributed or who has not agreed to the work in its current form is considered a breach of appropriate authorship.

Corresponding author. The corresponding author (or co-author designee) will serve on behalf of all coauthors as the primary correspondent with the editorial office during the submission and review process. If the manuscript is accepted, the corresponding author will review an edited typescript and proof.

The corresponding author is responsible for ensuring that the Acknowledgment section of the manuscript is complete. The corresponding author must sign the Acknowledgment statement part of the AORN Journal Copyright Transfer/Publishing Agreement (**Appendix I**) confirming that all persons who have contributed substantially but who are not authors are identified in the Acknowledgment section and that written permission from each person acknowledged has been obtained. The corresponding author must be willing to provide the editors with copies of these permissions if asked to do so.

Changes to authorship

Authors are expected to consider carefully the list and order of authors **before** submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Article transfer service. This journal is part of our Article Transfer Service. This means that if the Editor feels your article is more suitable in one of our other participating journals, then you may be asked to consider transferring the article to one of those. If you agree, your article will be transferred automatically on your behalf with no need to reformat. Please note that your article will be reviewed again by the new journal. More information.

Copyright

Authors submitting a manuscript do so with the understanding that if it is accepted for publication, copyright of the article will be assigned exclusively to AORN. This copyright release gives AORN, Inc, permanent publication rights for all print and electronic media (including all alternative media currently in existence [eg, Internet, CD-ROM] or that may be developed in the future) and international publication rights (including translations). AORN will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the *Journal*.

- A manuscript is submitted with the understanding that
- it has not been published previously in either print or electronic media;
- it is being submitted exclusively to the AORN Journal;
- the content is not fraudulent;
- any investigation involving human participants received appropriate institutional approval, and evidence of such approval will be provided upon request;
- the material does not infringe on or violate on any copyright agreements or any other personal or proprietary rights; and
- all financial support for the work described in the article and any potential conflicts of interest are declared.

Federal employment. A work prepared by a government employee, including Military personnel, as part of his or her official duties is called a "work of the US Government" and is not subject to copyright. If it is not prepared as part of the employee's official duties, it may be subject to copyright.

Author-retained rights. The author(s) understands that she/he retains or is hereby granted (without the need to obtain further permission) rights to use certain versions of the article for certain scholarly purposes, including the right to use the *Pre-print* or *Accepted Author's Manuscript for Personal Use, Internal Institutional Use*, and for *Scholarly Posting*; and the *Published Journal Article* for *Personal*

Use and *Internal Institutional Use*. The following definitions are related to using certain versions of the article for certain scholarly purposes:

- *Pre-print.* Author's own write-up of research results and analysis that has not been refereed, nor had any other value added to it by a publisher (ie, formatting, copyediting).
- *Accepted Author's Manuscript (AAM).* Author's version of the manuscript of a paper that has been accepted for publication and which may include any author-incorporated changes suggested through the peer review process. AAMs should not include other publisher value-added contributions, however, such as formatting, pagination, and copyediting.
- *Internal Institutional Use.* Use by the author's institution for classroom teaching at the institution including distribution of copies, paper or electronic, and use in coursepacks and courseware programs, and posting on secure Intranet sites for scholarly purposes.
- *Personal Use.* Use by an author in the author's classroom teaching (ie, distribution of paper or electronic copies), distribution of copies to research colleagues for their personal use, use in a subsequent compilation of the author's works, inclusion in a thesis or dissertation, preparation of other derivative works such as extending the article to book-length form, or otherwise using or re-using portions or excerpts in other works with full acknowledgment of the original publication of the article.
- *Published Journal Article (PJA).* The definitive final published record that appears or will appear in the AORN Journal and embodies all value-adding publisher activities including formatting, pagination, editing, and copyediting.
- *Scholarly Posting.* Postings on open web sites operated by the author or the author's institution for scholarly purposes, or (in connection with pre-prints) pre-print servers, provided there is no commercial purpose involved. Deposit in or posting to special subject repositories (eg, PubMed® Central) is permitted only under specific agreements and only consistent with Wiley's policies concerning such repositories.

To reproduce any text, figures, tables, or illustrations from the manuscript in future works of their own, the author(s) must obtain written permission from AORN.

Excluded rights. The author(s) understands that she/he may not use or post articles for commercial gain. This restriction includes, but is not limited to, the posting by companies of their employee-authored works for use by their customers (eg, pharmaceutical companies and physician-prescribers); the commercial exploitation of the article (such as directly associating advertising with such posting); the charging of fees for document delivery or access; and/or the systematic distribution to others via e-mail lists or list servs to parties other than known colleagues, whether for a fee or for free.

Role of the funding source

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Funding body agreements and policies. A number of agreements with funding bodies allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the Open Access Publication Fee. Details of existing agreements are available online.

Green open access. Authors can share their research in a variety of different ways. We recommend authors see our green open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications.

Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. Find out more.

This journal has an embargo period of 12 months.

Language (usage and editing services). Please write your text in good English (American or British usage is accepted, but not a mixture of these.

Permission and consents

What requires permission?

- Direct quotations from copyrighted material.
    - Direct quotes should be cited in the text with a reference number and page number (eg, Smith 1(p345))
- Tables, illustrations, photographs, or videos from copyrighted material
- Any photo that includes a recognizable individual, including authors
- Any facility or institution documentation (eg, form, table, figure, checklist, documented process)

If your manuscript contains any of the aforementioned items, you must obtain written permission for their use from the copyright owner(s) and original author, including complete source information. The credit line should appear in the figure caption and should be worded according to the copyright holder's specifications. Subject or guardian consent must accompany any photograph that shows a recognizable likeness of a person. To assist you in obtaining permission to use others' works/likenesses in your article, please review the following: Sample Request for Permission Letter (**Appendix G**) Sample Photographic Consent (**Appendix H**) For additional assistance to determine whether you need permission, or to get clarification on how to obtain permission, please contact the editorial office by email, aornjournal@aorn.org, or by phone 303-755-6304 x283.

Required author paperwork

All authors (ie, the corresponding author and each co-author) must complete and submit the AORN Journal Copyright Transfer/Publishing Agreement (Appendix I). On page 1 of the form, authors are required to identify their contributions to the work described in the manuscript and provide signed statements on Authorship Responsibility, Criteria, and Contributions; Financial Disclosure and Funding/Support; and either Copyright Transfer/Publishing Agreement or Federal Employment. The corresponding author must sign the Acknowledgement statement, an acknowledgment is included in the manuscript. Each author is required to provide specific information related to Conflicts of Interest and Financial Disclosures identified in section 3 of page 1. Guidelines for completing the tables on page 2 of the *AORN Journal* Copyright Transfer/Publishing Agreement can be found in (Appendix J).

The signed *AORN Journal* Copyright Transfer/Publishing Agreement should be e-mailed to the editorial office at aornjournal@aorn.org (preferred) or faxed to 1-303-750-3441.

All permission and consent forms, including required author paperwork, must be submitted to the editorial office at the time of manuscript submission.

Submission

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

Submit your article. All manuscripts must be submitted through the *AORN Journal* online submission and review web site, also known as ScholarOne (https://mc.manuscriptcentral.com/aornjournal). Manuscripts should not be submitted in PDF format, but in Microsoft Word format (DOC/DOCX). Users of other word processing software should save or convert files into Rich Text format (RTF) before submission.

To access tutorials that address some frequently asked questions about the manuscript submission process via ScholarOne, visit the Author Tutorial section of EES Support. Corresponding authors who are unable to provide the files in this format or who have other circumstances that prevent online submission should contact the editorial office at aornjournal@aorn.org or (800) 755-2676 x283 to discuss alternate options.

Review process. After manuscripts are submitted electronically, the Editor-in-Chief and members of the *AORN Journal* Review Panel evaluate the article based on accuracy, content, organization, style, contribution to the nursing literature, and originality. Publishing and editorial decisions are then based on reviewer's evaluations and the Editor-in-Chief's judgment of the quality of writing, scientific accuracy, timeliness of the topic, and potential interest to readers of the Journal. The corresponding author will be notified of the editor's decision approximately six to eight weeks after submitting the manuscript. Authors may be asked to revise and resubmit the manuscript.

Editing process. In consultation with the author(s), the *AORN Journal* reserves the right to edit all manuscripts with regard to length, timeliness, and readability consistent with *Journal* style. An AORN staff editor will confirm that reviewers' comments have been addressed, verify references, and make changes to address *Journal* style issues. Before publication, the corresponding author will receive an edited copy of the manuscript highlighting any questions that arose during the editing process. These questions may include requests for additional references or clarification and expansion of the ideas presented in the article. The corresponding author will then be asked to answer any outstanding questions and approve the content.

Layout process. After the corresponding author has approved the content, the edited manuscript is sent to our publishing partner, Wiley, for layout. Copyeditors at Wiley will copyedit the manuscript to ensure that no grammar errors inadvertently occurred during the layout process but editors will not change the content of your manuscript. The corresponding author will then receive an author proof of the final layout of the article.

PREPARATION

Article structure

Basic style requirements.

- Feature-length articles should not exceed the designated word count, not including figures and tables (word counts are based on article category).
- Author name(s) and credentials should be listed according the American Nurses Association's recommendation
    - Education (highest earned degree first)
        - Optional: if highest degree is not a nursing degree, then the highest nursing degree (not all) can be included
        - If the author has two earned degrees at the same level, the nursing degree is listed first
    - Licensure (state designation or requirement)
    - National certification
    - Awarded and honorary titles
- Manuscript style should follow the *American Medical Association (AMA) Manual of Style, 10th edition.*
- Text should be double-spaced, left-aligned (unjustified), and in a 12-point font.
- All pages should be numbered and should include a short running head (ie, shortened title of the manuscript) in the header.

- References should be endnotes, not footnotes; any material considered appropriate for a footnote should be referenced.
- In-text citations should be followed by superscript numbers (eg, Smith[1]).
- Numbers less than 10 should be spelled out; numerals are used for numbers 10 and higher.
- Standard acronyms should be used consistently throughout the article. All acronyms should be spelled out the first time they appear in text, with the acronym listed afterward in parentheses.
- Generic drug names should be used; however, proprietary names may be inserted in parentheses after the generic name. If equipment must be identified by its proprietary name, the manufacturer name and city/state should be provided.
- Temperatures should be expressed in degrees Celsius and Fahrenheit.
- To ensure anonymity during the peer review process, avoid using any author identifiers (eg, names of individuals, institutions, etc) in the body of the manuscript. You may do this one of two ways:
    - submit one full manuscript with identifiers and one full manuscript without identifiers, or
    - submit one full manuscript without identifiers and a cross-referencing document to indicate the necessary identifiers (eg, "Institution A" is General Hospital).

Please note: If English is not your native language, please seek assistance from someone highly proficient in written English before submitting.

Cover letter. This page introduces your manuscript to the editor and should include any specific information you would like the editor to know.

Title page. This page must include not only the manuscript title, but also each author's:

- name,
- credentials,
- current professional position(s), and
- contact information (ie, address and phone number, e-mail address).

The title page also should designate a corresponding author (ie, lead contact) who will work directly with one of AORN's staff editors members throughout the editorial process (**Appendix A**).

Abstract & key words. Include a 150-word informative abstract that follows the manuscript's outline and summarizes the research results (if applicable). The abstract should be included in the main manuscript document and indicated as such. Abstracts should identify the main points of the article including who, what, where, when, and why, as well as the final concluding point. Also, identify five key words related to your article. These key words help categorize your article in search engines after it is published. *The corresponding author will be prompted to enter the abstract and key words during the submission process in the EES system.*

Manuscript. Manuscripts should be structured largely based on article type. There are six main article categories:

Clinical: The maximum length is 3,000-4,000 words. For more information, please review "Suggested Structure for a Clinical Manuscript" (**Appendix B**).
Management: The maximum length is 3,000-4,000 words. For more information, please review "Suggested Structure for a Management Manuscript" (**Appendix C**).
Research: The maximum length is 3,000-5,000 words. Longer research articles or components of longer articles (eg, tables) may be published online at AORNs sole discretion. For more information, please review "Suggested Structure for a Research Manuscript" (**Appendix D**).
Quality Improvement (QI): The maximum length is 3,000-4,000 words. For more information, please review "Suggested Structure for a Quality Improvement Manuscript" (**Appendix E**).
Education: The maximum length is 3,000-4,000 words. For more information, please review

"Suggested Structure for an Education Manuscript" (**Appendix F**).
Literature Review: For more information, please review "Comprehensive Literature Reviews" (**Appendix K**). Length should be between 3,000-5,000 words.

Acknowledgements. Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

All contributors who do not meet the criteria for authorship should be listed in the Acknowledgment section.

Formatting of funding sources. List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Artwork

Electronic artwork

General points.

- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- All figures, including diagrams, flow charts, line drawings, and photographs, must be cited within the text (eg, Figure 1).
- Number the illustrations according to their sequence in the text. Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
- Size the illustrations close to the desired dimensions of the printed version.
- Submit each illustration as a separate file.

Formats. If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.

Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

- EPS (or PDF): Vector drawings, embed all used fonts.
- TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
- TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
- TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:

- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
- Supply files that are too low in resolution;
- Submit graphics that are disproportionately large for the content.

During the editing process, the author may be asked to submit the figure in its original source format. In some instances, AORN works with artists to convert an author's rough sketch or artwork description into a finished illustration to accompany a manuscript. After an author's manuscript is accepted for publication, the author may be contacted by the editor to discuss possible illustrations.

Color artwork. Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF) or MS Office files) and with the correct resolution.

Figure captions. Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Permission must be obtained to reproduce or closely adapt previously published figures and illustrations. Credits for the reproduced work are included in the figure caption and must include author(s), title, either publisher and city (and country, if other than the United States) or periodical name, volume, page, and year. Please refer to the *"Permissions and Consents"* section for further information.

Tables

Tables should be self-explanatory, include a brief title, and enhance the text. Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

Permission must be obtained to reproduce or closely adapt previously published tables. Credits for the reproduced work are included in the table footnote and must include author(s), title, either publisher and city (and country, if other than the United States) or periodical name, volume, page, and year. Please refer to the *"Permissions and Consents"* section for further information.

References

Citation in text. Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Reference links. Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. In order to allow us to create links to abstracting and indexing services, such as Scopus, CrossRef and PubMed, please ensure that data provided in the references are correct. Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors. Use of the DOI is encouraged.

A DOI can be used to cite and link to electronic articles where an article is in-press and full citation details are not yet known, but the article is available online. A DOI is guaranteed never to change, so you can use it as a permanent link to any electronic article. An example of a citation using DOI for an article not yet in an issue is: VanDecar J.C., Russo R.M., James D.E., Ambeh W.B., Franke M.

(2003). Aseismic continuation of the Lesser Antilles slab beneath northeastern Venezuela. Journal of Geophysical Research, https://doi.org/10.1029/2001JB000884. Please note the format of such citations should be in the same style as all other references in the paper.

Data references. This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue. Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

Reference management software. Most journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley and Zotero, as well as EndNote. Using the word processor plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link: External link http://open.mendeley.com/use-citation-style/aorn-journal
When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Reference style. All references should

- be contextually relevant, pertinent, and supportive of your topic;
- reflect most currently available resources (eg, most current edition);
- be verified and denoted consecutively in the text with superscript numerals;
- be featured in a double-spaced, numbered reference list at the end of the manuscript;
- conform to AMA style; conform to the Index Medicus (http://www2.bg.am.poznan.pl/czasopisma/medicus.php?lang=eng) for abbreviations of journal titles; and
- name all authors up to and including the sixth author, or if there are more than six authors, list the first three authors followed by ", et al."

Resources that are pertinent to the article but are not cited in the text can be listed in a Resources section after the References. The resources format also should follow AMA style.

Examples:

Journal article
Mellinger E, Skinker L, Sears D, Gardner D, Shult P. Safe handling of chemotherapy in the perioperative setting. *AORN J.* 2010;91(4):435-453.

Book
Winkler I. *Contemporary Leadership Theories: Enhancing the Understanding of the Complexity, Subjectivity, and Dynamic of Leadership.* Heidelberg, Germany: Physica-Verlag; 2010.

Chapter in a book
Bipolar disorders. In: Preston JD, O'Neal JH, Talaga MC. *Handbook of Clinical Psychopharmacology for Therapists.* 6th ed. Oakland, CA: New Harbinger Publications; 2010:89-100.

Website
OSHA fact sheet: carbon monoxide poisoning. United States Occupational Safety and Health Administration. External link http://www.osha.gov/OshDoc/data_General_Facts/carbonmonoxide-factsheet.pdf. Accessed November 19, 2010.

Videos

Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed.

Before submission, please ensure that:

- Video clips are relevant to the article and enhance the information in the text.
- Video clips are between one (1) and three (3) minutes in length, and do not exceed five (5) minutes in length or 10 MB in file size.
- Each clip is saved in a separate file in one of the following formats:
    - MPEG-1 or MPEG-2 (.mpg)
    - MPEG-4 (.mp4)
    - Microsoft Audio/Video Interface (.avi)
    - Apple QuickTime (.mov)
    - CompuServ GIF (.gif)
- A separate page with concise legends accompanies each video clip.
- Videos are recorded at the highest possible quality setting. The Journal can accept only video submissions that meet the Journal's formatting and image quality requirements.
- If the video includes music or other copyrighted material, you obtain permission for its use from the copyright owner(s) *and submit a copy of the signed permission form to AORN.*
- If the video includes footage of people, you obtain signed video consents from each identifiable individual *and submit a copy of the signed permission form to AORN.*

For additional information related to videos, please contact the editorial office by e-mail, aornjournal@aorn.org, or by phone, 303-755-6304 x283.

Supplementary material

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

AudioSlides

The journal encourages authors to create an AudioSlides presentation with their published article. AudioSlides are brief, webinar-style presentations that are shown next to the online article on ScienceDirect. This gives authors the opportunity to summarize their research in their own words and to help readers understand what the paper is about. More information and examples are available. Authors of this journal will automatically receive an invitation e-mail to create an AudioSlides presentation after acceptance of their paper.

Submission checklist

___ Cover letter
___ Title page (**Appendix A**)
___ Manuscript, including references
___Clinical manuscript (**Appendix B**)
___Management manuscript (**Appendix C**)
___Research manuscript (**Appendex D**)
___Quality Improvement manuscript (**Appendix E**)
___Education manuscript (**Appendix F**)

___Literature Review manuscript (**Appendix K**)
___Tables, figures, photos, or video
___Applicable permission forms
___Permissions letter (**Appendix G**)
___Photographic consent (**Appendix H**)
___Signed AORN Journal Copyright Transfer/Publishing Agreement (**Appendix I**)
___Instructions (**Appendix J**)

AFTER ACCEPTANCE

Proofs

One set of page proofs (as PDF files) will be sent by e-mail to the corresponding author (if we do not have an e-mail address then paper proofs will be sent by post) or, a link will be provided in the e-mail so that authors can download the files themselves.

If you do not wish to use the PDF annotations function, you may list the corrections (including replies to the Query Form) and return them to Wiley in an e-mail. Please list your corrections quoting line number. If, for any reason, this is not possible, then mark the corrections and any other comments (including replies to the Query Form) on a printout of your proof and scan the pages and return via e-mail. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. We will do everything possible to get your article published quickly and accurately. It is important to ensure that all corrections are sent back to us in one communication: please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

Offprints

The corresponding author, at no cost, will be provided with a copy of the Journal issue that his or her article appears in, as well as a PDF file of the article via e-mail (the PDF file is a watermarked version of the published article and includes a cover sheet with the journal cover image and a disclaimer outlining the terms and conditions of use). For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication.

Sources

Uniform Requirements for Manuscripts Submitted to Biomedical Journals. International Committee of Medical Journal Editors. Updated April 2010. http://www.icmje.org. Accessed October 15, 2010.

ICMJE Form for Disclosure of Potential Conflicts of Interest. International Committee of Medical Journal Editors. http://www.icmje.org/coi_disclosure.pdf. Accessed October 15, 2010.

Iverson C, Christiansen S, Flanagin A, et al. *AMA Manual of Style: A Guide for Authors and Editors.* 10th ed. New York, NY: Oxford University Press; 2007.

AUTHOR INQUIRIES

Visit the Wiley Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch. You can also check the status of your submitted article or find out when your accepted article will be published.

COPYRIGHT & LICENSING

You may choose to publish under the terms of the journal's standard copyright agreement, or Open Access under the terms of a Creative Commons License. Standard **re-use and licensing rights** vary by journal. Note that **certain funders** mandate a particular type of CC license be used. This journal uses the CC-BY-NC-ND **Creative Commons License**.

Self-Archiving Definitions and Policies: Note that the journal's standard copyright agreement allows for **self-archiving** of different versions of the article under specific conditions.