

# Adult Perianesthesia Do Not Resuscitate Orders: A Systematic Review

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**Purpose:** *The purpose of this systematic review is to assess if Do Not Resuscitate (DNR) orders should be routinely rescinded during anesthesia, determine if consensus on retaining DNR orders exists in the literature, and explore the current state of clinical practice.*

**Design:** *This systematic review followed preferred reporting items for systematic reviews and meta-analyses guidelines.*

**Methods:** *In June 2018, the Cumulative Index to Nursing and Allied Health Literature and PubMed databases were systematically searched using defined inclusion/exclusion criteria.*

**Findings:** *Ninety-one articles from the databases were pooled with 16 works identified as formative to the research questions. Forty-nine articles were analyzed and included in this study.*

**Conclusions:** *It is unethical to automatically rescind DNR orders during anesthesia. Patients have the right to retain their DNR orders unaltered or modify them for the perianesthesia period. Sufficient evidence exists to create meaningful policy at every level. A consensus exists among professional organizations that the standard of care is a required reconsideration of DNR orders before anesthesia.*

**Keywords:** *do not resuscitate, DNR, anesthesia, ethics, cardiopulmonary resuscitation.*

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**DURING THE LATTER HALF** of the twentieth and early twenty-first centuries, technology and health care intersected in a way never witnessed in history. The results of this nexus included improved health, decreased disease, and reduced mortality. However, the ethical challenges associated with the ability to prolong life are now more vexing for modern health care professionals than they were in the past. One of these issues is the use of adult Do Not Resuscitate (DNR) orders during the perianesthesia period—the period that begins during preoperative evaluation and

ends at discharge from the postanesthesia care unit. Historically, DNR orders were automatically rescinded during and immediately after surgery. Perianesthesia clinicians once assumed that the nature of anesthesia prohibited DNR orders and other instruments limiting resuscitative care (eg, practitioner orders for life-sustaining treatment, advanced directives, and so forth). While every relevant professional organization criticizes this practice as unethical, the practice persists today. Significantly even where institutional policy has developed supporting the patient's right to retain their DNR orders during anesthesia, a culture of *de facto* automatic revocation often develops. In this case, perianesthesia patients are led to believe, either explicitly or implicitly, that DNR orders are inappropriate during anesthesia and should be rescinded.

The incongruity between practice recommendations and actual practice is unsurprising. Retaining DNR orders during the perianesthesia

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period is complex, both ethically and practically. Such a decision requires planning, coordinated communication between the patient and multiple caregivers, and skilled anesthesia administration. Less overtly, the process challenges patriarchal notions about decision-making in the perianesthesia environment. Moreover, retaining an active DNR order during anesthesia also has the potential to create anxiety among perianesthesia clinicians and great moral distress if iatrogenic death occurs during anesthesia. Nevertheless, it is estimated that 15% of surgical patients have a DNR order<sup>1</sup> and that percentage is likely to increase as an aging population is confronted with issues of chronic disease and mortality. In addition, federal accrediting agencies now require that hospitals address advanced directives and offer assistance with these documents during the hospital admission process.<sup>2</sup> Although there are numerous articles and practice recommendations addressing perianesthesia DNR orders, no systematic review addressing the problem is available. Therefore, the purpose of this systematic review was to (1) explore the current state of clinical practice, (2) clarify whether DNR orders should be routinely rescinded during anesthesia, (3) determine if consensus on retaining, modifying, or rescinding DNR orders exists in the literature, and (d) illuminate obstacles and challenges to implementing best practice recommendations.

## Background

Understanding how perianesthesia clinicians— anesthesiologists, certified registered nurse anesthetists (CRNAs), and registered nurses (RNs)—frame perianesthesia DNR orders requires a review of the DNR order's historical development. The DNR order is enmeshed with the historical and sociocultural movements of the last century, and its contemporary application cannot be unwoven from those contextual factors.

In a series of articles typified by Kouwenhoven et al,<sup>3</sup> researchers at Johns Hopkins Hospital reported the first successful clinical trials involving closed cardiac massage. The experiments by Kouwenhoven et al<sup>3</sup> proved the efficacy of closed cardiac massage for the treatment of pulseless dysrhythmias. Before closed cardiac massage, physicians could only observe the death of intraopera-

tive patients, whereas they now have an effective resuscitative treatment for pulselessness during surgery. The advent of what would become known as cardiopulmonary resuscitation (CPR) began in the operating room (OR), but it spread quickly to hospital wards and into the field. The health care provider's thrill about being able to treat an individual whose heart stopped during surgery when before they could do nothing was both influential and profoundly formative of OR culture. By the early 1970s, CPR was cemented in national culture as well, and initiating CPR was rarely questioned. However, Burns et al<sup>4</sup> observed that by the late 1970s, the excitement over CPR as a lifesaving treatment was meeting the reality of needlessly prolonging imminent death in hospitals. Burns et al<sup>4</sup> continued by noting that many health care providers witnessed the anguish caused by repeated resuscitation events. These observations were contemporaneously noted by Rabkin et al.<sup>5</sup> As a result, the topics of suffering and futility when treating patients with terminal conditions entered the ethical discourse.

Moral distress over prolonging patient suffering for physicians, nurses, and patients' families incited the era of the "slow" code.<sup>4</sup> During slow codes, providers and nurses made decisions about who would receive the full measure of medical interventions at the time of death and who would not. The result was a pantomime where providers went through the motions of a resuscitation attempt, but their response time and actions were inappropriately delayed. Patients and families were often uninvolved in these decisions. Nonetheless, as CPR was establishing its universality and slow codes were becoming more common in hospitals, a paradigm shift in the provider-patient relationship occurred.<sup>4,6</sup> The paternalistic approach to decision-making was harshly criticized at the time, and a new emphasis on patient-centered care and shared decision-making infiltrated hospitals across the country.<sup>5,6</sup>

Consequently, the President's Commission for the Study of Ethical Problems in Medicine and Biomedical Research<sup>7</sup> addressed concerns over the morality of slow codes and frustrations with paternalism. The commission concluded that consent for CPR was implied. This landmark report created the DNR order, as it is currently conceptualized, in 1984. Since that time, in the

United States (US), it was widely assumed that patients wanted every possible intervention to prolong life unless the patient has expressly documented otherwise.

During the early 1980s, vacating DNR orders during the perianesthesia period became routine practice, and patients were often not told that their DNR order was rescinded.<sup>4</sup> The routine suspension of DNR orders for anesthesia became deeply ingrained in the perianesthesia ethos. However, the enactment of the Patient Self-Determination Act in 1990 exposed concerns over the morality of automatically suspending DNR orders.<sup>8</sup> As a result, the American Society of Anesthesiologists (ASA) and the American College of Surgeons (ACS) issued a joint statement denouncing the practice.<sup>9</sup> Still, the law and practice guidelines did little to change a perianesthesia culture that remembers a time when providers would have to watch helplessly during perianesthesia cardiac arrests. When viewed from a historical context, three research questions arose: (1) Should DNR orders be honored during the perianesthesia period? (2) What is current practice for managing perianesthesia DNR orders? and (3) What barriers to implementing best practice recommendations are evident in the literature?

## Methods

To answer these research questions, a systematic literature review was conducted in June 2018. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed (Medline) databases were used. The search terms “Do Not Resuscitate” and “anesthesia” were used. Tangential searches were conducted in CINAHL and PubMed using the terms “DNR”, “Do Not Attempt Resuscitation”, “DNAR”, and “perianesthesia”. The search was limited to English-language studies and studies conducted in or directly pertaining to the US. In addition, because knowledge of this phenomenon developed primarily within a moral epistemology, it was essential to capture the genesis and development of ethical discourse on the subject. Because the publication of the article by Walker<sup>10</sup> in 1991 marks the beginning of contemporary ethical thought on perianesthesia DNR orders, data were collected from 1991 forward. Consequently, the search protocol

included all articles published from 1991 to 2018.

The search yielded 93 results. Sixteen additional results were identified by the authors as primary or substantive contributors to current thinking on perianesthesia DNR orders and added to the results. The other sources identified as fundamental to understanding adult perianesthesia DNR orders included a legal briefing, provided by Pope<sup>11</sup> and selected by author (Forshier) as critical. Another search using the same search terms conducted in August 2018 resulted in two additional articles from Medline, increasing the pooled article total to 95, but there were no other interim changes. The records were checked for duplicates using the online citation manager Refworks (Proquest, LLC, Ann Arbor, MI); four duplicates were found and eliminated. A total of 107 articles were identified for preliminary screening.

Abstracts were reviewed for relevancy. At this time, pediatric studies were eliminated. In addition, international studies were eliminated because the US has a unique approach to implementing and withholding CPR, making comparison between countries generally noncontributory. Therefore, the exclusion criteria were pediatric populations and non-English language studies. In total, 56 articles were excluded. Fifty-one full articles were retrieved. Each article was read and evaluated for relevance to the research questions. At this point, one article by Truog et al<sup>12</sup> was determined to be focused on pediatric DNR orders; therefore, it was eliminated. In addition, the study by Belcaid et al<sup>13</sup> was eliminated because the authors' correspondence reported on a quality assurance project conducted in Canada; therefore, the study did not meet the inclusion criterion of focusing on the US health care system. However, readers should note that the study by Belcaid et al<sup>13</sup> may be clinically useful because the investigators found that patients with pre-existing DNR orders seek elective surgical care at a higher rate (19-25%) than expected and that documentation about perianesthesia DNR reconsideration was poor. Interested readers are referred to the study by Belcaid et al<sup>13</sup> for further information.

Each article was then reread and appraised for relevance, level, and quality using standardized

research and nonresearch appraisal tools. Articles were reviewed independently by each author. Incongruities between each author's findings were discussed, and an accord was reached. Readers are referred to the book by Dearholt and Dang<sup>14</sup> for a detailed description of each tool and its application. Critically, the authors subscribe to the philosophy on systematic reviews best articulated by Sandelowski.<sup>15</sup> Sandelowski<sup>15</sup> suggests that there may be occasions when the systematic review process is subjective and characterized by the interplay between the reviewer and the texts assessed. Consequently, every effort was made to minimize the authors' resistance to inclusion and limit exclusion while maximizing procedural objectivity. Readers are referred to the study by Sandelowski<sup>15</sup> for more information about rigor and reflexivity in the systematic review process. Finally, after article appraisal, no additional exclusions were needed; thus, 49 articles are included in this review (Figure 1).

## Results

The articles were leveled using Johns Hopkins Nursing Evidence-Based Practice Model guidelines.<sup>14</sup> Briefly, Level I evidence indicates a Randomized Control Trial; Level II suggests a Quasi Experimental study; Level III uses qualitative design; Level IV evidence represents Clinical Practice Guidelines or Position Statements; and, finally, Level V evidence includes literature reviews (nonsystematic), expert opinion, quality improvement, financial or program evaluation, case reports, community standards, clinician experience, and consumer preferences. Interested readers are referred to Dearholt and Dang<sup>14</sup> or the Johns Hopkins Evidence-Based Practice website for additional information. The appraisal identified one level II and nine level III articles of good or high quality. Most articles that failed to achieve high quality did so because of their publication age or small sample sizes. One level III study was appraised as low quality because of its extremely small sample size, poor generalizability, and questionable reliability. Four level IV articles were identified as either high or good quality. Incidentally, the study by Pope<sup>11</sup> is included in the level IV articles because, as a legal brief, it most closely aligns with position statements as explicated by the Johns Hopkins' Non-Research Evidence Appraisal Tool.<sup>14</sup> Finally, 35 level V articles were isolated as

high or good quality. Thirty-two of the level V articles were expert opinion, one was quality improvement, and two were case reports. These results are presented chronologically in [Supplementary Table 1](#).

The search results were thematically analyzed, and five dimensions that represent the conceptual framing and current thinking about perianesthesia DNR orders were isolated. The five dimensions are ethical, legal, practice guidelines, policy development, and human and provider. The findings from each of the 49 articles were synthesized, and the results are presented in relation to the five dimensions of perianesthesia DNR orders.

### *Ethical Dimension*

Ethical thought on retaining DNR orders during anesthesia is almost universally principlist in origin. Principlist ethical theory is characterized by the classic work by Beauchamp and Childress,<sup>16</sup> *Principles of Biomedical Ethics*, which uses the ethical tenets of autonomy, beneficence, nonmaleficence, and justice to construct an ethical decision-making schema. Invariably, using the principlist approach to bioethics frames ethical problems as dilemmas with solutions, an apt characterization for current ethical thinking on perianesthesia DNR orders. Indeed, thought on the subject has developed primarily with a moral epistemology. As a result, the ethical discourse surrounding perianesthesia DNR orders is susceptible to criticisms of paternalism, ethnocentricity, and sexism. Nevertheless, almost without exception, authors who used ethical explication to decide the morality of automatically rescinding DNR orders for anesthesia found that patient autonomy outweighs notions of beneficence on the part of the anesthesia clinician.<sup>1,17-28</sup> Bastron<sup>27</sup> and Bastron<sup>28</sup> articulate the counterpoint, arguing that patient autonomy is not absolute and that the perianesthesia environment necessitates limits on autonomy. Bastron<sup>27</sup> is refuted by Berry and Heitman<sup>29</sup> and Cohen and Cohen<sup>30</sup> in letters to the editor where they note that patient autonomy is not overridden by physician convenience. Furthermore, the authors rebut the notion that patients are incapable of understanding the difference between resuscitation from anesthesia and resuscitation from their

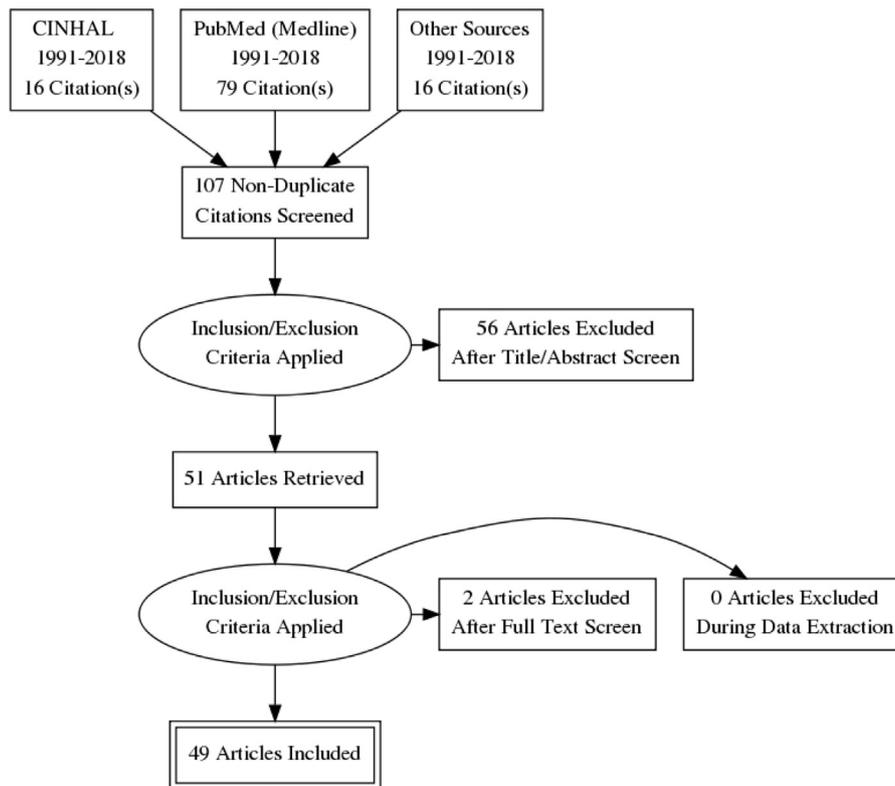


Figure 1. Flowchart depicting the systematic literature review conducted in this study.

disease states, and Braunschweig<sup>31</sup> and Burkle et al<sup>32</sup> concur. Finally, additional clarification is required on the obligation of anesthesia providers to ensure that patients understand that they can retain their DNR order during anesthesia. Obtaining consent for anesthesia when patients are not fully aware of all their DNR order options amounts to a *de facto* automatic revocation of the DNR order. Moreover, it runs counter to the principles of informed consent. Currently, the notion of *de facto* DNR revocation is unexplored in the extant perianesthesia literature. Therefore, investigation of the *de facto* automatic revocation phenomenon is recommended.

However, perhaps the most eloquent ethical dialectic occurred at the beginning of discourse about DNR use during anesthesia between Walker<sup>10</sup> and Truog<sup>33</sup> in 1991. Walker<sup>10</sup> argued for the possibility of retaining DNR orders during anesthesia. In addition to recognizing the supremacy of patient autonomy as an ethical value, Walker<sup>10</sup> articulated the case for retaining DNR orders during anesthesia. Walker<sup>10</sup> observed that patients assume a risk of death during anes-

thesia. Walker<sup>10</sup> notes, "Though concern about possible agency in the patient's death is understandable, such concern alone does not warrant overriding the patient's refusal of resuscitation." Walker<sup>10</sup> analogizes this point with the case of a Jehovah's Witness refusing blood after a massive intraoperative hemorrhage. Then, Walker<sup>10</sup> explores the argument of double effect and makes the comparison between a palliative care patient who receives high doses of narcotics that may result in his or her death and a surgical DNR patient. In the perianesthesia death of a patient with a DNR order, the good, surgery, is linked to the bad, death, in the same way that the good, narcotic, is linked to the bad, the death of the palliative care patient.

While Truog<sup>33</sup> agrees with Walker's<sup>10</sup> ethical explanation, Truog suggests that the process of anesthesia necessarily involves elements of resuscitation. Furthermore, Truog<sup>33</sup> notes the difficulty that practicing anesthesia clinicians will have distinguishing normal anesthesia care from resuscitation and the high moral cost iatrogenic death from anesthesia complication might have on those

**Table 1. Current Ethical Reasoning on Perianesthesia DNR Orders**

Preeminent Ethical Principles	Subordinate Ethical Principles
Autonomy. Autonomy is the patient's right to make informed decisions about his or her care. Autonomy in the perianesthesia environment is validated by informed consent. Autonomy is exemplified by the patient's right to refuse care—including resuscitation. <sup>16</sup> When in conflict with other values, autonomy and the right of self-determination are legally and morally the paramount value. <sup>1,6,7</sup>	Beneficence. Beneficence is the ethical principle that health care providers should do good. Resuscitation will not always preserve life, nor will resuscitation always do good for the patient. <sup>16,21</sup>
Principle of double effect. The principle of double effect states that some ethically right and morally good actions may have potentially harmful effects. For example, during the process of end-of-life palliation, a patient receives a dose of fentanyl sufficient to hasten death. However, it was not the intention of the clinician administering the opioid to accelerate the dying process although a speedier death was the result of the medication administration. It would be morally and ethically wrong to withhold analgesics in this case. Perianesthesia DNR orders are analogous. <sup>10</sup>	Nonmaleficence. Nonmaleficence means that one should do no harm. Nonmaleficence is subordinated by the principle of double effect. In addition, terminally ill patients may not view death as intrinsically harmful. <sup>16</sup>
Justice. Justice, in this case, refers to the fair and equitable use of resources. Expending resources for unwanted resuscitation might limit the resources available for wanted medical interventions. <sup>16</sup>	

Current ethical thinking on perianesthesia DNR orders relies almost exclusively on a principlist bioethical framework best explicated by Beauchamp and Childress.<sup>16</sup>

clinicians. At the time, Younger et al<sup>34</sup> recognized the complexity and importance of the discourse between Truog<sup>35</sup> and Walker<sup>10</sup>, and Anderson and Freeman<sup>17</sup> cited the arguments as the scholarly foundation for thinking on perianesthesia DNR orders. Simultaneously, Braunschweig<sup>31</sup> noted that Truog's<sup>33</sup> approach devalued the importance of outcome-based DNR management for perianesthesia patients. Even today, the dialectic between Walker<sup>10</sup> and Truog<sup>35</sup> best summarizes the contemporary ethical argument on the subject. Nevertheless, the evidence within this dimension is manifest. The automatic revocation of DNR orders before anesthesia is morally wrong and ethically untenable.<sup>1,10,18-22,26</sup> Current bioethical thinking on perianesthesia DNR orders explicated in the literature is summarized in Table 1.

### **Legal Dimension**

In addition to ethical explication, many authors were compelled to provide a legal foundation

for retaining DNR orders during anesthesia, including Bishop et al<sup>35</sup> and Guarisco.<sup>22</sup> However, Waisel et al<sup>36</sup> provided the most comprehensive legal assessment. Waisel et al<sup>36</sup> concluded that there is little risk of legal liability when a preoperative discussion regarding the patient's DNR wishes is executed, documented, and communicated to stakeholders. In fact, there is likely a higher risk of legal liability if the DNR order is not addressed or the patient is resuscitated against their wishes. Waisel et al<sup>36</sup> note that:

*Given the well-established right of a patient to refuse medical treatment (which, in most cases, can be exercised by an appropriate surrogate), state statute law, and the paucity of cases finding physicians liable for honoring DNR requests, we believe that there is limited risk of liability for honoring an appropriately entered and considered perioperative DNR order.*

Critically, there is sometimes an exaggerated concern that intraoperative death may in some way diminish the status of the hospital or expose the involved clinicians or institutions to additional review by accrediting bodies, for example, the Joint Commission. However, should perianesthesia death occur, patients with adequately documented and reviewed perianesthesia DNR orders are classified as anticipated deaths in terms of reporting and regulatory requirements.<sup>34,37,38</sup>

Moreover, failure to follow a patient's advanced care directive can have legal consequences for practitioners and facilities. Most of these cases are settled out of court in confidential agreements, so it is difficult to know just how often these cases are filed. Legal theories for providing unwanted life-sustaining treatment include battery, treating without consent; inadequate informed consent or failure to inform of risks, complications, and alternatives of treatment; negligence, not providing the medically acceptable standard of care; intentional infliction of emotional distress; and breach of contract.<sup>11</sup>

In *Doctors Hospital of Augusta v. Alicea*, the granddaughter and health care agent of a 91-year-old woman sued the hospital and the physician who intubated and put her grandmother on a ventilator. These actions were contrary to the advance care directive in place for DNR orders that staff were unable to locate. Furthermore, no one notified the granddaughter at the time, rationalizing that if the family did not want the patient intubated, they could just "undo" the procedure and remove the tube. The court rejected the hospital's claim of immunity stating "it is the will of the patient or her designated agent, and not the will of the health care provider, that controls."<sup>11</sup> The court differentiated between following the patient's DNR order and allowing her to passively die and the necessity of taking the affirmative action of removing the life-sustaining mechanical ventilator. While the end result is death, the "emotional and psychological differences have been well documented."<sup>11</sup>

In another case, clinicians at Maryland General Hospital failed to follow the DNR orders of a woman who had suffered a stroke and had deteriorated to the point where her health care agent

decided that continued treatment was not warranted. When she suffered a cardiac arrest, clinicians resuscitated her against her wishes, leaving her to live "in a condition repugnant to her values and wishes as to how she wanted to die."<sup>11</sup> An out-of-court settlement was eventually reached in this case.

In addition to civil actions under the aforementioned theories, there are state and federal laws and regulations requiring that advance care directives are honored. Facilities must comply with Medicare/Medicaid regulations as well as their state health and/or human services provisions. Failure to do so can lead to significant fines. The practitioner may also have to answer to their licensing board for failure to follow standards of practice. In one case, the court stated that "unless health care providers face consequences for ignoring or failing to follow a patient's directives, the public policy favoring these directives stands to be undermined."<sup>11</sup>

The prevailing legal opinion on the management of perianesthesia DNR orders is clear. It would be wise for all professionals involved in the patient's presurgical care to have a clear understanding of the patient's goals for treatment or foregoing lifesaving treatment during surgery. Any surgical patient with an advanced care directive must have a conversation with their anesthesia provider and surgeon to garner an understanding of what, if any, life-sustaining measures should be undertaken during surgery and in the immediate time after surgery. There must be clearly documented and understood orders, and all members of the surgical team must be aware of these goals/orders. Policies should be in place stating precisely when the DNR will again become active if it is suspended during surgery. A more robust discussion of perianesthesia DNR policy is provided in the "Policy Development Dimension" section.

### ***Practice Guidelines Dimension***

The professional organizations directly involved with issuing practice recommendations on perianesthesia DNR orders are the American Association of Nurse Anesthetists (AANA), ACS, ASA, Association of periOperative Registered Nurses (AORN), and American Society of PeriAnesthesia

**Table 2. Practical Guidelines for Care**

Professional Organization	Standard	Automatic Suspension Deemed Unethical	Patient May Retain DNR Order During Surgery/Anesthesia
AANA <sup>39</sup>	Required reconsideration	Yes	Yes
ACS <sup>9</sup>	Required reconsideration	Yes	Yes
AORN <sup>42</sup>	Required reconsideration	Yes	Yes
ASA <sup>43</sup>	Required reconsideration	Yes	Yes
ASPAN <sup>41</sup>	Required reconsideration	Yes	Yes

**Significant developments in legal opinion***Doctors Hospital of Augusta v. Alicea*

The Georgia Supreme Court found that (1) a tenet of advanced directives and other directives limiting care is to ensure that control remains with the patient's legally designated agent instead of health care providers and (2) patients perceive a substantive difference between their loved ones passively dying and being placed in a position of having to withdraw care that was caused by aggressive medical treatment, for example, intubation and mechanical ventilation.<sup>11</sup>

Nurses (ASPAN). There is universal accord among these bodies. They unanimously endorse a policy of mandatory reconsideration of DNR orders before anesthesia or surgery.<sup>9,39-42</sup> Furthermore, these organizations reject the practice of automatically suspending DNR orders during the perianesthesia period (Table 2). In accordance with ASA<sup>43</sup> recommendations, the American Academy of Nursing<sup>44</sup> suggests that patients and providers select one of three alternatives for managing their DNR order during anesthesia: (1) full suspension of the DNR order; (2) limited resuscitation based on patient-defined criteria; or (3) resuscitation defined by a provider-patient understanding of the patient's values and beliefs (goal-directed management). Crucially, patients may also choose to retain their full DNR during anesthesia although this choice is minimized by all the aforementioned professional organizations. Furthermore, Nurok et al<sup>45</sup> believe these options are applicable during procedural interventions outside of the OR areas where anesthesia is used. Based on the extant practice recommendations, there is sufficient evidence to conclude that auto-

matically revoking DNR orders for the perianesthesia period is contrary to the standard of care. Moreover, it is reasonable to conclude that patients may choose to either retain their current DNR or modify the document for the duration of the perianesthesia period. Whichever course is selected, the anesthetic plan should be tailored to the unique needs of the patient.<sup>36,46,47</sup> However, there is still ambiguity surrounding (1) the application of these guidelines in extended anesthesia care settings; (2) when the perianesthesia period begins and ends; and (3) the demarcation between usual anesthesia care and resuscitation.<sup>25,45,48</sup> Finally, there is strong level V evidence to support goal-directed management as the current strategy of choice for managing perianesthesia DNR orders and intra-anesthesia resuscitative interventions.

**Policy Development Dimension**

The first decade of the twenty-first century produced literature supporting the development of policy at the institutional level. In fact, from 1996

until the late 2010s, the ethical discourse about the morality of perianesthesia DNR orders ebbed. Instead, the literature veered toward policy development.<sup>49</sup> Early attempts at policy development were haphazard; however, nascent policy efforts did establish that perioperative and perianesthesia personnel should ensure that the disposition of DNR orders during surgery are addressed and adequately documented.<sup>24</sup> While initial attempts at developing policy statements were economical by design and limited in function,<sup>23,28,39</sup> authors such as Bower,<sup>37</sup> Guarisco,<sup>22</sup> McGraw,<sup>50</sup> and Scott and Gavrin<sup>51</sup> were more comprehensive. Nevertheless, even early policy recommendations affirmed the concept of required reconsideration.<sup>24,52</sup>

Again, Waisel et al<sup>36</sup> submit a particularly well-informed and representative exemplar of policy recommendations that is echoed and refined by Waisel et al.<sup>53</sup> Waisel et al<sup>36</sup> and Waisel et al<sup>53</sup> conclude that policies should be (1) memorialized in writing, (2) developed for the institution rather than for individual departments within institutions, (3) flexible, (4) explicit in the need to reconsider all DNR orders before anesthesia, (5) define documentation requirements, and (6) list resources available for help. Waisel et al<sup>36</sup> observe:

*Policies should address the most common causes for inadequate end-of-life care: insufficient knowledge of the ethical standards, misunderstood legal requirements, and an absence of implementation strategies. More specifically, perioperative DNR policies should establish the legitimacy of patient refusal of perioperative resuscitation and include mechanisms for obtaining and documenting the order.*

Jackson<sup>54</sup> affirms recommendations of Waisel et al<sup>36</sup>. In addition, Jackson<sup>54</sup> concludes that real-time decision-making about perianesthesia DNR orders requires the anesthesia provider to act in ways that best achieve patients' objectives and uphold patients' values that are derived from preoperative assessment and discussion. Waisel<sup>47</sup> terms this approach goal-directed management. Jackson<sup>54</sup> and Waisel<sup>47</sup> admirably attempt to reconcile the practical realities of anesthesia care with the patient's rights to autonomy and self-determination. Waisel notes, "The goal-directed approach arose from the idea that, because pa-

tients think in terms of outcomes, it is often more effective to talk about goals rather than procedures." However, goal-directed reconsideration places the anesthesia provider in the role of patient proxy.<sup>38</sup> The approach may represent, therefore, a return to paternalism.<sup>38</sup>

Conversely, Bernat and Grabowski<sup>55</sup> offer a minority opinion arguing for a moratorium on all DNR orders for as long as 72 hours after anesthesia. Bernat and Grabowski<sup>55</sup> equate requiring anesthesia providers to refrain from resuscitative efforts with execution. However, Walker<sup>10</sup> refutes this assertion by noting that patients have the right to refuse rescue, and patients do not abandon their rights by consenting to anesthesia or surgery. Cohen and Cohen<sup>56</sup> articulate another perspective arguing that perianesthesia DNR orders are inappropriate because of the increased survival rate demonstrated during intraoperative resuscitation. However, Waisel et al<sup>57</sup> observe that physicians often overestimate the chances of success during intraoperative resuscitation; moreover, Walsh et al<sup>58</sup> found increased mortality in postoperative patients with DNR orders. In addition, patients have the right to refuse resuscitation.<sup>7</sup> Practically, Tungpalen and Tan<sup>59</sup> note the importance of expressly identifying when revoked perianesthesia DNR orders should be reinstated.

Today, Sumrall et al<sup>25</sup> suggest a contemporary policy consistent with mandatory reconsideration of perianesthesia DNR orders and improving patient-provider communication. Interestingly, Bishop et al<sup>35</sup> provide a unique alternative to the usual approach to policy development by juxtaposing the strategy used in the US to resuscitation in the United Kingdom. Bishop et al<sup>35</sup> propose turning toward a policy model that treats CPR like any other intervention—used when necessary or withheld when not needed—eliminating the need for DNR orders. However, in the US, widespread adoption of this perspective seems likely only in the distant future.

Finally, the policy recommendations exemplified by Bernat and Grabowski<sup>55</sup> and Bishop et al<sup>35</sup> represent the minority perspective. Therefore, there is strong level IV and V evidence to support the development of policies that reject the automatic suspension of DNR orders and affirm the current standard of care espoused by the ASA and

other professional organizations to have a documented conversation about perianesthesia DNR status. Policies should be memorialized in writing, be flexible, be explicit, and privilege the patient's values and objectives.

### ***Human and Provider Dimension***

The human and provider dimension is epitomized by a series of articles examining how anesthesia providers, surgeons, perioperative nurses, internal medicine physicians, and patients view the use of perianesthesia DNR orders. Significantly, only three studies focus on how perianesthesia patients feel about using their DNR orders during anesthesia.<sup>32,51,60</sup> The remaining articles grouped within the human and provider dimension focus on how anesthesiologists, CRNAs, surgeons, and internists experience perianesthesia DNR orders. In summary, data indicate that many anesthesiologists and CRNAs are unaware that DNR orders are not automatically suspended during anesthesia.<sup>57,61-63</sup> In addition, most anesthesia clinicians feel anxious when caring for patients with active DNR orders.<sup>62-64</sup> Many of these clinicians would feel moral distress if their patient experienced perianesthesia death.<sup>17,48,59</sup> Critically, up to 53% of surveyed anesthesiologists might intervene against patients' wishes if the cause of the perianesthesia death was, in their judgment, reversible.<sup>32,57,60</sup>

It is difficult to draw conclusions about how today's anesthesia professionals feel about perianesthesia DNR orders because of the age of these studies; in addition, the extant perianesthesia literature strikingly lacks qualitative foundation. However, a small study by Nurok et al<sup>65</sup> indicates little has changed in anesthesiologists' approach to perianesthesia DNR orders since the classic series of articles published by Clemency and Thompson in the 1990s.<sup>60-62</sup> In addition, an informal survey by Tungpalen and Tan<sup>59</sup> found that none of the Hawaii hospitals they surveyed followed ASA recommendations. The findings of Tungpalen and Tan<sup>59</sup> are supported by Waisel et al<sup>57</sup> who found that only about half of the anesthesiologists they surveyed were familiar with the current ASA guidelines on perianesthesia DNR orders. Furthermore, Sumrall et al<sup>25</sup> contend that an inherent ethical tension between anesthesiologists' training

to preserve life and maintain homeostasis during anesthesia and their respect for patients' rights to retain their DNR orders continues to limit compliance with the standard of care. These findings comport with the conclusion of Waisel et al<sup>57</sup> that the iatrogenicity of the death impacted anesthesiologists' decision-making during resuscitation and that during anesthesia, providers tend to pursue resuscitative procedures well beyond the scope of what is immediately reversible or mutually agreed to by the patient.

Unfortunately, there is no available evidence beyond the studies by Clemency and Thompson<sup>60</sup> and Burkle et al<sup>32</sup> that address the patient's point of view. Clemency and Thompson<sup>60</sup> found that patients' reasons for executing DNR orders are diverse and that patients' motivations for seeking surgical intervention while retaining DNR orders are equally complex. For example, Burkle et al<sup>32</sup> add that although most surgical patients (57%) agreed that their DNR orders should be suspended during the perianesthesia period, 92% of patients surveyed believed that a discussion about their DNR orders should occur before surgery. In addition, Ewachuk and Brindley<sup>21</sup> underscore the uniqueness of the perianesthesia environment by observing that in other parts of the hospital, patients might be with their loved ones at the time of death, whereas death in the perianesthesia environment may not allow for family presence. Waisel et al<sup>53</sup> observes, "With respect to end-of-life decision making, such as refusal of resuscitation, a value dissonance often becomes manifest: physicians prioritize the imminent danger of death, while patients focus on their functional status." The "value dissonance" described by Waisel et al<sup>53</sup> and Waisel et al<sup>57</sup> is a difficult compliance obstacle to overcome. Ultimately, there is insufficient current evidence to draw firm conclusions about how today's perianesthesia clinicians and patients view DNR orders, and further research is needed in this dimension. However, based on the available data from Burkle et al,<sup>32</sup> it may be truthfully contended that patients expect to have a conversation with their anesthesia providers about their DNR status. In addition, it is reasonable to conclude, based on the evidence, that most patients will choose to rescind their DNR orders if provided all the appropriate information about anesthesia care. Simultaneously, there is little evidence to suggest advancement in this dimension.

## Discussion

Significant scholarly discourse regarding DNR orders during the perianesthesia period can be traced to 1991 and the dialectic between Truog<sup>33</sup> and Walker.<sup>10</sup> The next few years saw the swift development of practice recommendations and policy guidelines. Today, however, there is little evidence to suggest change in perianesthesia practice. When viewed as a five-dimensional thematic construct, it is evident that scientific consensus has occurred in the ethical, legal, practice guidelines, and policy development dimensions. Opinion and perceptions in the human and provider dimension, conversely, remain relatively unchanged. The evidence indicates that a clear discussion between patient and anesthesia provider about their perianesthesia DNR status must occur before surgery, and the mutually agreed upon outcome of that conversation needs to be communicated to all members of the perianesthesia team.<sup>40,53,57</sup> In addition, perianesthesia nurses serve the vital role of facilitating that discussion and ensuring patients are aware of their rights to rescind, retain, or modify their DNR orders during and after anesthesia.<sup>17,41,42</sup>

However, modern surgical departments emphasize production.<sup>56,57</sup> Perianesthesia clinicians have little time to conduct exhaustive interviews about end-of-life decisions and document minutia about what interventions patients want to be administered or withheld.<sup>36,53,57</sup> This is a salient observation because when presented with ambiguity over patients' end-of-life choices, most anesthesia providers would choose to err on the side of preserving life.<sup>21,57,61</sup> Moreover, there is a strong possibility that many clinicians continue to believe that DNR orders are incompatible with the nature of anesthesia.<sup>36,57,61</sup> However, patients with incurable illnesses and DNR orders frequently require surgery.<sup>58</sup> For example, some people may want to repair a hip fracture after falling to relieve pain, while other patients may want a feeding tube to spend time with their families before death. Although Walsh et al<sup>58</sup> observe that most patients with DNR orders undergo surgery on an emergent basis for palliation and symptom relief, patients have many reasons for seeking surgical intervention and anesthesia services while wishing to retain

their DNR orders.<sup>36,51</sup> In addition, it is possible to act efficiently and aggressively to mitigate risk before surgery, maintain homeostasis during anesthesia up to the point of cardiac arrest, and identify and address postanesthesia complications before cardiac arrest occurs.<sup>10,34,51,56</sup> In fact, Walsh et al<sup>58</sup> note that postoperative mortality in patients with DNR orders is unlikely due to inadequate or less aggressive treatment. Guarisco<sup>22</sup> observes that identifying the patient's acceptable limits of intervention and communicating those limits to the perianesthesia team preoperatively reduces uncertainty in moments requiring rapid decision-making. Skilled anesthesia providers and postanesthesia care unit nurses do these things every day.<sup>41</sup> However, should these proactive interventions fail to prevent cardiorespiratory collapse, the specter of having to stand impotently watching while providing human dignity and respect but refraining from aggressive treatment remains anxiety provoking for many perianesthesia clinicians.<sup>61,63</sup>

A careful review of the literature suggests more nebulous reasons for intractability on this issue. Waisel et al<sup>36</sup> observe:

*The tenor of the OR is different from that of most other places in the hospital. For instance, there still exists a feeling that "the patient is not going to die on my watch," which is exacerbated by the increased likelihood that the cause and effect of a perioperative event is more easily identified with a specific clinician. In addition, physicians may feel that while it is acceptable to honor a patient's refusal of medical treatments that might delay death or disease, it may be somewhat less acceptable to honor a patient's refusal of treatment that might delay death caused by an iatrogenic event.*

The moral distress that anesthesiologists, CRNAs, and perianesthesia nurses carry when a perianesthesia death occurs should not be minimized.<sup>66-68</sup> Browning<sup>68</sup> demonstrated that critical care nurses experience exacerbated moral distress when they cannot provide ethically sound end-of-life care to patients. Aligning perianesthesia practice with the patient's end-of-life wishes

empowers both the patient and the clinician.<sup>26</sup> According to Browning, empowering nurses decreases the frequency of moral distress. However, the perianesthesia environment is unique. While a patient who dies from an infection caused by a urinary catheter experiences iatrogenic death, the responsibility for that death rarely rests on the nurse who inserted the device.<sup>10</sup> In addition, allowing patients to die without intervention runs counter to perianesthesia ethos and the training of every member of the perianesthesia team.<sup>25,33,59</sup> This line of thinking is compounded by the fact that patients are more likely to survive perianesthesia cardiac arrest without neurologic disability than an unwitnessed event.<sup>17,58,69</sup> Walsh et al,<sup>58</sup> however, observe that patients with pre-existing DNR orders have higher mortality rates and increased length of hospital stays after surgery compared with their non-DNR counterparts. Nonetheless, fear of being responsible for iatrogenic death and concern about the judgment of peers are human weaknesses, but there are little data available that address the moral distress levied on perianesthesia clinicians caring for patients with active DNR orders. Indeed, Fine and Jackson<sup>70</sup> observe that emotional and psychological responses to “inviting the ‘enemy’ (death) into the operating room” are core to clinicians’ clinical reasoning and real-time decision-making. This area requires additional evidence specific to perianesthesia practice; therefore, more research focusing on moral distress in perianesthesia clinicians is recommended.

The ethical rationale for the dilemma of whether patients should be allowed to keep their DNR orders during anesthesia is resolved, and the practice guidelines are unanimous in their recommendations. Furthermore, adequate data to construct useful and operationalizable policy exist in the literature.<sup>1,22,36</sup> However, the human and provider dimension to this phenomenon is underdeveloped. There is a need for research that identifies the goals, motivations, perceptions, and intents of perianesthesia patients with DNR orders. In addition, studies such as the classic works of Clemency and Thompson<sup>60</sup> and Clemency and Thompson,<sup>62</sup> as well as Coopmans and Gries,<sup>63</sup> need to be repeated. Such studies would provide data on how contemporary anesthesiologists,

CRNAs, and perianesthesia nurses understand and experience DNR orders during the perianesthesia period. Additionally, qualitative inquiry mapping patients’ experiences and motivations for their perianesthesia resuscitative decisions is warranted. Finally, a new avenue of study that examines the moral distress created by perianesthesia DNR orders and iatrogenic death is appropriate.

### **Limitations**

The strategy used to search the CINAHL and PubMed databases did not yield many articles that the authors deemed formative to the practice recommendations published by the ACS, ASA, and other professional organizations and current thought on perianesthesia DNR orders. Therefore, the references informing the practice recommendations were mined for additional data sources. The additional sources were pooled and listed as other sources. This search strategy reduces rigor and creates the potential for bias. Finally, the authors are cognizant of the somewhat artificial and arbitrary objectivity inherent to systematic reviews that is best articulated by Sandelowski.<sup>15</sup> Nevertheless, every effort toward inclusivity and strict adherence to research protocols was maintained.

### **Conclusion**

The perianesthesia environment is unique. However, patients’ rights do not end when they consent to surgery and anesthesia. Indeed, perianesthesia nurses, anesthesiologists, and CRNAs recognize their obligation to be more diligent in ensuring those rights are maintained.<sup>40,42,63</sup> The drive to honor surgery schedules and increase surgical volume does not justify the minimization of this duty.<sup>36</sup> The results of this systematic review are unambiguous in four dimensions. First, it is unethical to automatically rescind DNR orders during anesthesia. Moreover, patients have the right to retain their DNR orders unaltered or modify them for the perianesthesia period. Second, there is sufficient evidence to create meaningful policy at every level. Third, there is consensus among professional organizations that the standard of care is a required reconsideration of DNR orders before anesthesia.<sup>39-44</sup> Fourth, there is little risk of legal liability if patients with

properly reconsidered and documented DNR orders die as a result of honoring the patient's wishes. The final dimension, human and provider, is less straightforward. The moral distress and subsequent burden experienced by anesthesia clinicians caring for patients with active DNR orders may be hindering progress on this phenomenon. If this is the case, future research should focus on the values and goals of perianesthesia patients as well as the moral distress and fatigue experienced by clinicians

when caring for patients with active DNR orders. Evidence on these issues may be the key to effectively addressing perianesthesia DNR orders and improving health outcomes for this unique and underserved population.

## Supplementary Data

Supplementary data related to this article can be found at <http://doi.org/10.1016/j.jopan.2019.03.009>.

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Supplementary Table 1. Summary Findings

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Walker <sup>10</sup> (1991)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• DNR orders should not be routinely rescinded during anesthesia, and they should be honored when possible</li> <li>• Delineates the case for retaining perianesthesia DNR orders—assumption of operative risk, Jehovah's Witness analogy, applicability of double effect, and inapplicability of assisted suicide</li> <li>• Suggests guidelines for intraoperative DNR orders</li> <li>• Addresses morality of perianesthesia DNR orders</li> </ul>	<ul style="list-style-type: none"> <li>• Considered seminal for this phenomenon</li> <li>• Frames moral explication/ethical dilemma as the dominant epistemology for this phenomenon</li> <li>• Age of the study may be considered a possible limiter</li> <li>• Based on moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Younger et al <sup>34</sup> (1991)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• Editorial revealing anesthesiologist concerns about iatrogenic death during anesthesia.</li> <li>• Directly addresses the importance of the study by Walker<sup>10</sup> (1991)</li> <li>• Begins a dialectic about this phenomenon that culminates in the first joint statement condemning the practice of automatically revoking DNR orders for surgery</li> </ul>	<ul style="list-style-type: none"> <li>• Editorialization</li> <li>• The age of the article is limiting</li> </ul>	Level V Good quality
Truog <sup>33</sup> (1991)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• DNR orders should not be routinely rescinded during anesthesia</li> <li>• The nature of the perianesthesia environment makes retaining DNR orders problematic</li> <li>• Considered dialectic with Walker<sup>10</sup> (1991)</li> </ul>	<ul style="list-style-type: none"> <li>• Considered seminal for this phenomenon</li> <li>• Age of the study may be considered a limiter</li> <li>• Physician is locus of control—patriarchal</li> </ul>	Level V High quality
Anderson & Freeman <sup>17</sup> (1992)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Essay examining the ethics of retaining versus rescinding DNR orders during surgery</li> <li>• Speculates that most patients will elect to rescind their DNR orders if the nature of anesthesia and their</li> </ul>	<ul style="list-style-type: none"> <li>• The study's age is limiting.</li> </ul>	Level V High quality

(Continued)

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Braunschweig <sup>31</sup> (1992)	Expert Opinion	Perianesthesia setting	<p>chances of fully recovering from intraoperative CPR are adequately explained.</p> <ul style="list-style-type: none"> <li>• Concludes that patients have the absolute right to retain or rescind their DNR orders during surgery.</li> <li>• Letter to the Editor regarding Truog<sup>33</sup> (1991)</li> <li>• Contends that patients can understand the difference between resuscitation from anesthesia and resuscitation from their underlying disease status</li> </ul>	<ul style="list-style-type: none"> <li>• Editorial correspondence</li> <li>• Marks early description of goal-directed DNR management</li> </ul>	<p>Level V Good Quality</p>
Cohen & Cohen <sup>56</sup> (1992)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Recommend a policy of required reconsideration of DNR orders before surgery or invasive procedures</li> <li>• Rejects the use of perianesthesia DNR orders because of the increased survival rate from perianesthesia cardiac arrest and the difficulty distinguishing between normal perianesthesia care and resuscitation</li> </ul>	<ul style="list-style-type: none"> <li>• The study's age is limiting</li> <li>• The study, written in a time of uncertainty when the ramifications of the Patient Self-Determination Act (PSDA) were unknown, presumes that the PSDA would create a reality where DNR orders were globally retained without reconsideration. This concern did not materialize.</li> </ul>	<p>Level V Good quality</p>
Franklin & Rothenberg <sup>49</sup> (1992)	Nonexperimental; descriptive	Perianesthesia setting Survey of accredited anesthesia programs (n, 156) 72% response rate	<ul style="list-style-type: none"> <li>• 81% of hospitals automatically suspended patients' DNR orders before surgery</li> <li>• Institutions should develop written policies that address perianesthesia DNR orders</li> <li>• The authors believe that suspending DNR orders during surgery and anesthesia with informed patient consent is optimum</li> </ul>	<ul style="list-style-type: none"> <li>• The study's age is a limiting factor</li> <li>• Patriarchal bias is evident</li> </ul>	<p>Level V High quality</p>
Bernat & Grabowski <sup>55</sup> (1993)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Requiring anesthesiologists and surgical personnel to retain DNR orders during and after anesthesia creates an untenable paradox for anesthesia</li> </ul>	<ul style="list-style-type: none"> <li>• The study's age is limiting.</li> <li>• Patriarchal bias is evident</li> </ul>	<p>Level V High quality</p>

Clemency & Thompson <sup>61</sup> (1993)	Nonexperimental; descriptive	453 surveys sent to anesthesiologists who were active members of the Georgia Society of Anesthesiologists in 1990 193 (n = 193) surveys were returned and analyzed Perianesthesia setting	<p>providers because of the nature of anesthesia requires resuscitation.</p> <ul style="list-style-type: none"> <li>• DNR orders should be routinely rescinded during the perianesthesia period.</li> <li>• Most anesthesiologists are disinclined to follow DNR during general anesthesia</li> <li>• Most anesthesiologists believe that DNR orders are automatically rescinded during general anesthesia</li> <li>• Most anesthesiologists would override a patient's DNR even if they had previously agreed to honor it if the cause of the patient's death during anesthesia was directly related to anesthesia administration</li> <li>• A <math>\chi^2</math> comparison revealed Georgia Anesthesia Society over-represented the 30- to 39-year-old age range but under-represented anesthesiologists aged 55 years and older (<math>P &lt; 0.001</math>). The sample also under-represented solo practitioners (<math>P &lt; 0.001</math>)</li> <li>• 60% of anesthesiologists assumed that the DNR order is automatically rescinded for surgery.</li> <li>• 46% of respondents would require suspension of DNR orders during general anesthesia. However, respondents were more likely to retain a DNR order for spinal and monitored anesthesia care (MAC) scenarios</li> <li>• The study is considered foundational, and it is often referenced today</li> </ul>	<ul style="list-style-type: none"> <li>• One of the few descriptive studies available</li> <li>• Age of the study is limiting although there is current evidence that suggests continued validity (see the study by Nurok<sup>41</sup>)</li> <li>• The study was limited to Georgia anesthesiologists who responded to a survey. Therefore, the generalizability of the findings is suspect</li> </ul>	Level III High quality
Reeder <sup>24</sup> (1993)	Expert opinion	Perioperative	<ul style="list-style-type: none"> <li>• At the time, most hospitals had no policy addressing perianesthesia DNR orders</li> <li>• More than 75% of hospitals automatically rescinded DNR orders before surgery</li> </ul>	<ul style="list-style-type: none"> <li>• The study's age is limiting</li> <li>• Case-study format provides practical insights</li> </ul>	Level V High quality

(Continued)

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
The American Association of Nurse Anesthetists <sup>39</sup> (1994)	Consensus position statement	Perianesthesia setting	<ul style="list-style-type: none"> <li>Argued that automatic revocation of DNR orders before surgery is unethical on the grounds that patients have the right to refuse treatment, including resuscitation, even if it results in their deaths</li> <li>Automatic revocation of DNR orders before surgery is unethical</li> <li>Perioperative nurses should ensure that DNR orders are adequately addressed and conclusions about the order disposition adequately documented before surgery</li> </ul>	<ul style="list-style-type: none"> <li>Based on moral epistemology—patriarchal/cultural bias</li> <li>Consistent with current practice recommendations</li> </ul>	Level IV Good quality
Clark et al <sup>46</sup> (1994)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>Decisions regarding DNR status during anesthesia should be tailored to the patient's needs</li> <li>Autonomy is the preeminent value</li> <li>Establishes that the margin between anesthesia care and resuscitation is nebulous</li> </ul>	<ul style="list-style-type: none"> <li>The age of the study is limiting; however, it efficiently summarizes concerns of anesthesia providers about perianesthesia DNR orders</li> </ul>	Level III Good quality
Clemency & Thompson <sup>62</sup> (1994)	Nonexperimental; descriptive	<p>600 internists and 600 surgeons from Georgia were surveyed by questionnaire</p> <p>This was compared with 420 surveyed anesthesiologists. 192 (internists), 199 (surgeons), and 190 (anesthesiologists) responses were analyzed.</p> <p>Perianesthesia setting Perianesthesia setting</p>	<ul style="list-style-type: none"> <li>Anesthesiologists (60%) are more likely than surgeons to be internists who assume that a DNR order is automatically suspended before surgery (<math>P &lt; 0.01</math>)</li> <li>The study is considered foundational, and it is often referenced today</li> </ul>	<ul style="list-style-type: none"> <li>One of the few descriptive studies available</li> <li>The generalizability of the study is questionable because the sample population is not representative</li> <li>The age of the study is limiting</li> </ul>	Level III High quality

Loch and Clark <sup>23</sup> (1994)	Quality improvement		<ul style="list-style-type: none"> <li>• Introduces a document used in a hospital that gives the patients the right to choose (1) limiting resuscitation during surgery or (2) rescinding their DNR status</li> </ul>	<ul style="list-style-type: none"> <li>• Developed to address the needs of a discreet hospital</li> <li>• Based on the opinion/philosophy of the attending anesthesia staff</li> </ul>	Level V Low quality
Coopmans & Gries <sup>63</sup> (1995)	Nonexperimental; descriptive	500 active members of the American Association of Nurse Anesthetists (AANA) were surveyed using a questionnaire The response rate was 45.6% (n = 228) Perianesthesia setting	<ul style="list-style-type: none"> <li>• Routine suspension of DNR orders is unethical</li> <li>• Most certified registered nurse anesthetists (CRNAs) are disinclined to follow DNR orders during general anesthesia</li> <li>• Most CRNAs assume that DNR orders are automatically rescinded during general anesthesia (67.2%)</li> <li>• 30-40% of respondents would perform CPR even if they were aware of an active perianesthesia DNR order</li> </ul>	<ul style="list-style-type: none"> <li>• Although from an advanced practice perspective, this study provided evidence of nursing knowledge and attitudes</li> <li>• Age of the study is limiting</li> <li>• There is a significant difference (<math>P &lt; 0.05</math>) between the survey population and AANA membership. Therefore, the sample is not representative</li> </ul>	Level III High quality
Fine and Jackson <sup>70</sup> (1995)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• Routinely suspending DNR orders during the perianesthesia time period is a violation of patient autonomy</li> <li>• Supports a policy of required reconsideration</li> <li>• Death in the operating room can be challenging for anesthesiologists and anesthesia personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Moral epistemology—patriarchal/cultural bias</li> <li>• The study's age is limiting</li> </ul>	Level V High quality
Golanowski <sup>52</sup> (1995)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Supports mandatory reconsideration of DNR orders before anesthesia</li> <li>• Recommends defaulting to suspension of DNR orders during the perianesthesia period</li> <li>• Significantly articulates the importance of documenting and sharing the decision to retain or suspend the DNR order</li> </ul>	<ul style="list-style-type: none"> <li>• Age is limiting</li> </ul>	Level V Good quality
Margolis et al <sup>1</sup> (1995)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• Recommend continuing DNR orders during surgery after discussing the order with the patient</li> <li>• Ethical explication that makes the case for developing</li> </ul>	<ul style="list-style-type: none"> <li>• Moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality

(Continued)

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Bastron <sup>27</sup> (1996)	Expert opinion	Perianesthesia setting	<p>institutional policy allowing intraoperative DNR orders</p> <ul style="list-style-type: none"> <li>• Critiques the ASA guidelines on perianesthesia DNR orders by exploring one hospital's policy</li> <li>• Advocates a goal-oriented approach that places decision-making responsibility with the anesthesiologists</li> <li>• Criticism of the ASA guidelines at the time of publication is that the guidelines are not feasible and fundamentally misunderstand the concept of autonomy</li> <li>• Argues that autonomy is prima facie and not an absolute right and that autonomy is contextual</li> <li>• The authors argue that anesthesiologists act as the patient's proxy during anesthesia</li> </ul>	<ul style="list-style-type: none"> <li>• Age is limiting</li> <li>• The article is critiqued through letters to the editor: Berry and Heitman<sup>29</sup> (1997) and Cohen and Cohen<sup>30</sup> (1997). The author replied in the article by Bastron<sup>28</sup> (1997)</li> </ul>	Level V Good quality
Bastron <sup>28</sup> (1997)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Response to Berry and Heitman<sup>29</sup> (1997) and Cohen and Cohen<sup>30</sup> (1997)</li> <li>• Reaffirms original positions</li> </ul>	<ul style="list-style-type: none"> <li>• Response to correspondence</li> <li>• Age is limiting</li> </ul>	Level V Good quality
Berry & Heitman <sup>29</sup> (1997)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Response to Cohen and Cohen<sup>30</sup> (1997)</li> <li>• Argues that although autonomy is not absolute, the principle outweighs convenience for physicians</li> <li>• Rejects the notion that patients are not sufficiently medically savvy to understand anesthesia care</li> <li>• Notes that the policy described by Bastron<sup>28</sup> (1997) marks a return to paternalism</li> </ul>	<ul style="list-style-type: none"> <li>• Letter to the Editor</li> <li>• Age is limiting</li> </ul>	Level V Good quality

Clemency & Thompson <sup>60</sup> (1997)	Qualitative	Perianesthesia setting 18 terminally ill perianesthesia patients with DNR orders interviewed from 1994 to 1995	<ul style="list-style-type: none"> <li>• Many patients with active DNR orders desire surgery for a variety of reasons from palliation to primary treatment</li> <li>• Because of different intents behind each patient's DNR order—for example, fear of prolonged intubation versus willingness to tolerate short periods of mechanical ventilation—assumptions about rescinding the order for surgery cannot be justified</li> <li>• Anesthesiologists must address DNR orders on a case-by-case basis</li> </ul>	<ul style="list-style-type: none"> <li>• To date, this is one of only two studies addressing patients' perspectives regarding perianesthesia DNR orders</li> <li>• Age of the study is limiting but mitigated by the uniqueness of data</li> <li>• Small sample size</li> </ul>	Level III Good Quality
Cohen & Cohen <sup>30</sup> (1997)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Argues that patient autonomy while not absolute cannot be over-ridden for the physician's convenience or to privilege the physician's perspective</li> <li>• Patients are capable of understanding the difference between resuscitation from anesthesia and resuscitation from their disease state</li> <li>• Advocate advanced notification of patients with DNR orders so that the order may be re-evaluated</li> </ul>	<ul style="list-style-type: none"> <li>• Letter to the Editor</li> <li>• Age is limiting</li> </ul>	Level V Good quality
Booth <sup>64</sup> (1998)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• The presence of advanced directives of DNR orders significantly increases the stress of certified registered nurse anesthetists (CRNAs) administering anesthesia</li> <li>• Iatrogenic death is strongly associated with professional failure for CRNAs and may lead to significant moral distress</li> </ul>	<ul style="list-style-type: none"> <li>• Age of the study is limiting</li> <li>• One of only two studies addressing the attitudes of CRNAs and by limited extension perianesthesia nurses about retaining DNR orders during anesthesia</li> </ul>	Level V Good quality

(Continued)

**Supplementary Table 1. Continued**

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
McGraw <sup>50</sup> (1998)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Perianesthesia DNR orders are part of the informed consent process</li> <li>• Autonomy is the preeminent value when considering perianesthesia DNR orders</li> </ul>	<ul style="list-style-type: none"> <li>• Age of the study may be limiting</li> <li>• Includes a case study to exemplify a real-lifescenario</li> </ul>	Level V Good quality
Waisel <sup>47</sup> (2000)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Patients have the right to refuse resuscitation during surgery and anesthesia</li> <li>• Advocates mandatory reconsideration of DNR orders before surgery and anesthesia</li> <li>• Explicates three options for perianesthesia DNR orders: (1) full resuscitation; (2) limited resuscitation— procedure directed; and (3) goal-directed orders</li> <li>• Goal-directed orders rely on the anesthesia provider's interpretation of the patient's desired surgical/anesthesia outcomes to guide decision-making</li> </ul>	<ul style="list-style-type: none"> <li>• Waisel represents a strong and consistent expert voice on perianesthesia DNR orders</li> </ul>	Level V High quality
Bower <sup>37</sup> (2001)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• A policy of mandatory reconsideration of DNR orders before anesthesia is required</li> <li>• Policy alone is insufficient. A systematic educational effort is required to ensure compliance with a policy of mandatory reconsideration</li> <li>• Primacy of the provider-patient dyad in making perianesthesia DNR decisions is highlighted</li> </ul>	<ul style="list-style-type: none"> <li>• Includes a case study to exemplify a real-life scenario</li> </ul>	Level V High quality

Tungpalen & Tan <sup>59</sup> (2001)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>• Offers exhaustive ethical review based on principlist ethical theory (see the study by Beachamp &amp; Childress<sup>16</sup>)</li> <li>• Identifies physician concerns over allowing iatrogenic death as a primary reason why anesthesia providers and surgeons are hesitant about allowing patients to retain the DNR orders during anesthesia</li> <li>• The development of the ASA guidelines for the care of patients with DNR orders is explicated</li> <li>• Identifies policies of required reconsideration as the standard of care</li> <li>• Examines Hawaii's compliance with ASA recommendations for mandatory reconsideration— as of 2001, no Hawaii hospitals surveyed complied</li> <li>• Effective resuscitation requires full resuscitation; therefore, patients should not be offered modified resuscitation options</li> <li>• The timeframe for the revocation of a DNR order should be clearly established; the DNR is usually reinstated upon discharge from the PACU</li> </ul>	<ul style="list-style-type: none"> <li>• Age of the study is limiting</li> <li>• Includes a hypothesized case study to exemplify a real-life scenario</li> </ul>	Level V High quality
Waisel et al <sup>36</sup> (2002)	Clinical practice guidelines	Perioperative setting	<ul style="list-style-type: none"> <li>• Exhaustive list of policy recommendations derived from the literature.</li> <li>• Includes a legal analysis of perianesthesia DNR orders</li> <li>• This study marks a shift toward operationalizing</li> </ul>	<ul style="list-style-type: none"> <li>• The locus of control rests not with patient but with the provider—this creates bias</li> <li>• Does not examine cultural and community context in relation to policy recommendations.</li> <li>• Fails to address the policy ramifications for nonphysician</li> </ul>	Level IV Good quality

(Continued)

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Waisel et al <sup>53</sup> (2003)	Expert opinion	Perianesthesia setting	<p>mandatory reconsideration of DNR orders before anesthesia</p> <ul style="list-style-type: none"> <li>Identifies barriers to health care providers' acceptance of perianesthesia DNR order practice guidelines. Barriers include oppositional values between patients and physicians or physicians and other physicians and legal concerns</li> <li>Recommends hospital policies that explicitly state that DNR orders must be re-evaluated before anesthesia, describe available options for perianesthesia DNR orders, require and define appropriate documentation, and provide resources for conflict resolution and help in decision-making</li> </ul>	<p>clinicians (eg, CRNAs, RNs, surgical technologists)</p> <ul style="list-style-type: none"> <li>Well-explained and clear examples of perianesthesia DNR policy development</li> </ul>	Level V High quality
Guarisco <sup>22</sup> (2004)	Expert opinion	Perianesthesia setting	<ul style="list-style-type: none"> <li>Affirms that automatic suspension of DNR orders is unethical</li> <li>Autonomy and self-determination are paramount values.</li> <li>Recommends an addendum to informed consent documents that would allow patients to maintain their DNR orders during surgery</li> </ul>	<ul style="list-style-type: none"> <li>Based on moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Ewanchuk & Brindley <sup>21</sup> (2006)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>Establishes a policy of required reconsideration as the current standard of care</li> <li>Examines the ethics of allowing iatrogenic death from anesthesia for patients with DNR orders</li> <li>The influence of historical context tying the history of cardiopulmonary resuscitation</li> </ul>	<ul style="list-style-type: none"> <li>Moral epistemology—patriarchal/cultural bias</li> <li>Does not fully address the moral distress caused by iatrogenic intraoperative death</li> </ul>	Level V High quality

Ball <sup>18</sup> (2009)	Case report	Perioperative setting	<p>(CPR) to the history of DNR orders provides context for current perianesthesia practices.</p> <ul style="list-style-type: none"> <li>• The historical timeline becomes a vital component of studies from this point forward</li> <li>• Automatically suspending DNR orders during surgery in unjust.</li> <li>• Mandatory reconsideration of DNR orders before surgery is required, and the patient's wishes are of paramount value</li> </ul> <p>Perioperative DNR orders are framed as a moral dilemma with a practical solution</p>	<ul style="list-style-type: none"> <li>• Provides one of the few case analyses on this phenomenon</li> <li>• Moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Waisel et al <sup>57</sup> (2009)	Nonexperimental; descriptive	Perioperative setting N = 30	<ul style="list-style-type: none"> <li>• Simulation-based investigation to determine if anesthesiologists effectively reassess DNR orders before surgery and if a relationship exists between the preoperative DNR re-evaluation and intra-anesthesia resuscitation decisions</li> <li>• In simulation, 57% of anesthesiologists addressed resuscitation and 27% suspended the DNR order against the patient's wishes. Ninety percent of participants continued simulated interventions until the simulation ended. This indicates continuing interventions well beyond the level of reversible complications.</li> <li>• Most preoperative re-evaluations of DNR orders are of inferior quality</li> <li>• Only about half of the anesthesiologists surveyed are familiar with the ASA recommendations for perianesthesia DNR orders</li> </ul>	<ul style="list-style-type: none"> <li>• Study was conducted entirely in simulation although the simulation fidelity was high</li> <li>• Limited generalizability</li> </ul>	Level III High quality

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**Supplementary Table 1. Continued**

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Bishop et al <sup>35</sup> (2010)	Expert opinion	End-of-life care	<ul style="list-style-type: none"> <li>• In the simulation, patients' DNR orders were not adequately re-evaluated, leading to miscommunication that resulted in the DNR being revoked without patient permission or physicians not understanding or disregarding patient preferences</li> <li>• Anesthesiologists seemed less able to comprehend patients' preferences to refuse resuscitation than the patients' desires to receive resuscitation</li> <li>• Providers tended to overestimate the chances of successful resuscitation</li> <li>• The physicians in the study often based their decisions on the iatrogenicity of the potential death</li> <li>• Groupthink may influence the persistence of automatic revocation of DNR orders and resuscitation in the perianesthesia environment</li> <li>• Simulation-based learning is an effective modality for learning about perianesthesia DNR orders</li> <li>• Compares the perianesthesia DNR practices in the United States with those of the United Kingdom</li> <li>• Relevant to perianesthesia practice because of the</li> </ul>	<ul style="list-style-type: none"> <li>• Setting is tangential to the perianesthesia experience, and this may limit the study's applicability</li> </ul>	Level V High quality

Scott & Garvin <sup>51</sup> (2012)	Expert opinion	Palliative care	<p>unique postmodern perspective on DNR orders</p> <ul style="list-style-type: none"> <li>• Articulates the idea that CPR is a treatment to be administered when needed and withheld when inappropriate</li> <li>• Provides a detailed history of palliative care DNR orders in relation to the perianesthesia experience</li> <li>• Attempts to integrate the patient's feelings about retaining or rescinding their DNR orders for anesthesia—includes the fear of being neglected if they retain the DNR order</li> <li>• Recommends that palliative care patients with DNR orders undergo an extensive negotiation with their anesthesia providers regarding their resuscitative wishes preoperatively</li> <li>• Provides extensive guidance on perianesthesia management of patients choosing to retain their DNR status</li> </ul>	<ul style="list-style-type: none"> <li>• Provides a contrary or borderline bioethical opinion on when to administer resuscitative efforts</li> <li>• Applies mostly to the palliative care patient undergoing anesthesia. The applicability to patients with generic DNR orders may be limited</li> </ul>	Level V High quality
Zinn <sup>26</sup> (2012)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• Perioperative DNR orders are presented as a moral dilemma</li> <li>• Autonomy and self-determination are characterized as the preeminent values</li> </ul>	<ul style="list-style-type: none"> <li>• Moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Burkle et al <sup>32</sup> (2013)	Nonexperimental; descriptive	Perioperative Survey of 500 sequential patients (84% response rate) 384 anonymous, online surveys of anesthesiologists, internists, and surgeons were	<ul style="list-style-type: none"> <li>• Most surgical patients (57%) agreed that their DNR orders should be suspended during perianesthesia period</li> <li>• 92% of patients surveyed believed that a discussion about their DNR orders should occur before surgery</li> <li>• 18% of anesthesiologist would automatically suspend DNR</li> </ul>	<ul style="list-style-type: none"> <li>• Single-site study resulting in limited generalizability</li> <li>• Conducted at Mayo Clinic, widely regarded as among the best health care systems in the US and a major referral center</li> <li>• Results may not apply to smaller institutions</li> </ul>	Level III High quality

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Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
Nurok et al <sup>65</sup> (2013)	Nonexperimental; descriptive	included (53% response rate)  34 board-certified anesthesiologists were surveyed in true or false fashion. The survey was “surprise” during a commonly attended meeting.  Response rates varied from 33 to 34 per question Perianesthesia setting Perianesthesia setting	orders before surgery, but the statistic rises to 30% when surgeons and internists are included  • 53% of doctors surveyed indicate they would not follow the DNR order if patients experienced intraoperative complications  • 55% of doctors found retaining a perianesthesia DNR order illogical  • Found inadequate knowledge regarding the American Society of Anesthesiologist’s recommendation of mandatory reconsideration of DNR orders before anesthesia  • 45% of respondents believed that DNR orders should routinely be suspended before surgery	<ul style="list-style-type: none"> <li>• Extremely small study.</li> <li>• Results are not generalizable</li> <li>• Results may not be reliable</li> <li>• Limited scientific applicability</li> <li>• If accurate, little progress has occurred on this problem since the study by Clemency (1993)</li> </ul>	Level III Low quality
Byrne et al <sup>19</sup> (2014)	Expert opinion	Perianesthesia setting Perianesthesia setting	<ul style="list-style-type: none"> <li>• Addresses nuances of resuscitation in the perianesthesia setting</li> <li>• Summarizes current practice guidelines from the American Society of Anesthesiologists, American Society of Perianesthesia Nursing, Association of Operating Room Nurses, and the American College of Surgeons, among others</li> <li>• There is no support for the practice of rescinding a DNR order before anesthesia</li> </ul>	<ul style="list-style-type: none"> <li>• Use of case study format is a strength</li> <li>• Based on moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality

American Academy of Nursing <sup>44</sup> (2015)	Practice guidelines	Perianesthesia setting	<ul style="list-style-type: none"> <li>• It is unethical to automatically suspend DNR orders during the perianesthesia period</li> <li>• Hospitals and institutions providing anesthesia services should develop comprehensive and consistent policies mandating reconsideration of DNR orders before anesthesia</li> </ul>	<ul style="list-style-type: none"> <li>• Guidelines are consistent with the American Society of Anesthesiologists (ASA) guidelines of care</li> </ul>	Level IV High quality
Crigger & Sindt <sup>20</sup> (2015)	Case report	Perioperative setting	<ul style="list-style-type: none"> <li>• Major professional organizations reviewed indicate that patients' rights of autonomy and self-determination are preeminent values</li> <li>• Details on practical application of DNR practice recommendations during surgery are provided in case study format</li> <li>• The use of perianesthesia DNR orders is framed as an ethical dilemma with the nurse's role as a patient advocate emphasized</li> <li>• Cultural consideration is addressed to reduce bias</li> </ul>	<ul style="list-style-type: none"> <li>• The use of a case study is unique and illustrative</li> <li>• Moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Jackson <sup>54</sup> (2015)	Expert opinion	Perianesthesia	<ul style="list-style-type: none"> <li>• Informal literature review on perianesthesia DNR orders</li> <li>• Current guidelines espouse policies of mandatory reconsideration; however, the author criticizes the rigid and procedural disposition of the guidelines</li> <li>• Advocates resuscitation based on the patients values and goals derived from patient assessment and discussion</li> <li>• Brief legal review finds little chance of liability if DNR is retained during anesthesia</li> </ul>	<ul style="list-style-type: none"> <li>• Moral epistemology—patriarchal/cultural bias</li> </ul>	Level V High quality
Kalkman et al <sup>69</sup> (2016)	Systematic review	Perianesthesia setting Seven studies (n = 7) were identified for inclusion Inclusion criteria: original studies;	<ul style="list-style-type: none"> <li>• Automatically rescinding DNR orders during anesthesia remains common practice</li> <li>• The chance of surviving a perianesthesia cardiac arrest without significant neurologic impairment is better</li> </ul>	<ul style="list-style-type: none"> <li>• The authors account for a number of limitations including the possibility that patients with DNR orders may have comorbidities that will poorly impact postresuscitation outcomes and monitoring the postsurgical</li> </ul>	Level III High quality

(Continued)

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
		intraoperative/ perianesthesia CPR; outcomes included morbidity/mortality	(25% compared with 15%) than for unwitnessed cardiac arrest <ul style="list-style-type: none"> <li>• Understanding that resuscitation may have a more favorable outcome may impact patients' informed consent and decisions about retaining or rescinding their DNR orders</li> <li>• Overall survival rate for perianesthesia cardiac arrest: 32 to 55.7%; favorable neurologic outcome: 45.3 to 66.8%</li> </ul>	cardiac arrest patient may account for improved survival and outcomes; however, increased monitoring may be desirable for patients with DNR orders	
Leopold & Leopold <sup>48</sup> (2016)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• "Resuscitation" is a poorly defined concept</li> <li>• Confusion exists between patient, surgeons, and anesthesiologists about retaining DNR orders during surgery</li> <li>• "Doing nothing when something can be done" during surgery causes significant anxiety and moral distress for clinicians</li> <li>• Advocates informed discussion between surgeon and patient</li> </ul>	<ul style="list-style-type: none"> <li>• Orthopedic surgeons' perspectives on DNR orders during surgery</li> <li>• Editorialization</li> </ul>	Level V Good quality
Sumrall et al <sup>25</sup> (2016)	Expert opinion	Perioperative setting	<ul style="list-style-type: none"> <li>• Communication between anesthesiologist and team is a key factor for resolving ethical dilemmas</li> <li>• Ethical dilemmas about perianesthesia DNR orders arise from tension between the usual aspects of anesthesia care and hallmarks of resuscitation</li> <li>• CPR marks the start of resuscitation for anesthesia providers</li> <li>• Advocates mandatory reconsideration of perianesthesia DNR orders</li> <li>• Provides an example of perianesthesia DNR policy currently used at the Ochsner Clinic that is consistent</li> </ul>	<ul style="list-style-type: none"> <li>• Moral epistemology—patriarchal/cultural bias</li> <li>• Succinct and contemporary synopsis of current ethical thought on perianesthesia DNR orders</li> </ul>	Level V Good quality

Nurok et al <sup>45</sup> (2017)	Expert opinion	Perianesthesia setting	<p>with the current ASA recommendations</p> <ul style="list-style-type: none"> <li>• Simulation training may improve compliance and understanding of perianesthesia DNR orders</li> <li>• ASA guidelines should be followed for interventional procedures where anesthesia is required or when interventional procedures are used for patients who are too ill for invasive operative intervention</li> </ul>	<ul style="list-style-type: none"> <li>• Addresses how to manage DNR orders during anesthesia procedures</li> </ul>	Level V Good quality
Pope <sup>11</sup> (2018)	Position statement	Legal opinion	<ul style="list-style-type: none"> <li>• Courts and administrative agencies have become increasingly willing to impose fines for ignoring DNR orders</li> <li>• Courts acknowledge the emotional and psychological burden experienced by families when clinicians negligently ignore DNR orders or bypass the spirit of the DNR order by opting to affirmatively administer life-saving interventions designed to prolong life or defer decisions about allowing patients to die. For example, a physician defendant claimed that the decision to intubate a patient could always be reversed later (ie, removing the endotracheal tube and allowing the patient to die). However, the court disagreed concluding that the defendant's actions necessitated an affirmative, as opposed to passive, response by the patient's family</li> <li>• Courts emphasized that a central purpose of directives limiting care is place control in the hands of an appointed representative</li> </ul>	<ul style="list-style-type: none"> <li>• Explicates current legal opinion</li> <li>• Is not an exhaustive legal history</li> </ul>	Level IV High quality
Walsh et al <sup>58</sup> (2018)	Retrospective cohort Study A sample of 9854	Perioperative setting	<ul style="list-style-type: none"> <li>• Findings indicate increased mortality but not morbidity in patients with DNR orders</li> </ul>	<ul style="list-style-type: none"> <li>• Findings are highly generalizable owing to the large sample</li> </ul>	Level II High quality

*(Continued)*

Supplementary Table 1. Continued

Reference	Evidence Type	Sample Description & Setting	Relevant Findings	Strengths/Limitations	Evidence Level & Quality <sup>a</sup>
	patients aged 18 years or older with pre-existing DNR orders underwent surgery between 2007 and 2013 N = 5629 DNR cases matched to 443,555 non-DNR cases		undergoing surgery, indicating that higher rates of postoperative death are not associated with less aggressive treatment or failure to rescue <ul style="list-style-type: none"> <li>• Intra-abdominal/bowel surgery is the most common general surgery performed on patients with DNR orders</li> <li>• Patients with DNR orders had higher percentages of amputations and extremity vascular procedures than patients without DNR orders</li> <li>• Surgeries on DNR patients were classified as emergent, and the goal was most often symptom relief</li> <li>• CPR and reintubation were significantly less common in DNR patients (<math>P &lt; 0.001</math>)</li> <li>• Compared with the non-DNR group, DNR patients underwent significantly fewer elective procedures (<math>P &lt; 0.001</math>)</li> <li>• Patients with DNR orders had significantly increased lengths of stay in hospitals after surgery (13.1 days compared with 6.7 days for non-DNR patients, <math>P &lt; 0.001</math>)</li> </ul>	size inclusive of diverse practice settings <ul style="list-style-type: none"> <li>• Variability in the individual institution's reporting practices to the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) is a limitation</li> </ul>	

<sup>a</sup>Refer to the study by Dearholt and Dang<sup>14</sup> for a detailed discussion of the tools and criteria used to level and appraise each article or text.