ANESTHESIOLOGY

# Beyond the Do-not-resuscitate Order: An Expanded Approach to Decision-making Regarding Cardiopulmonary Resuscitation in Older Surgical Patients

Matthew B. Allen, M.D., Rachelle E. Bernacki, M.D., Bruce L. Gewertz, M.D., Zara Cooper, M.D., M.Sc., Joshua L. Abrams, J.D., Allan B. Peetz, M.D., Angela M. Bader, M.D., M.P.H., Nicholas Sadovnikoff, M.D.

*ANESTHESIOLOGY 2021; 135:781–7*

## ABSTRACT

American Society of Anesthesiologists guidelines recommend that anesthesiologists revisit do-not-resuscitate orders preoperatively and revise them if necessary based on patient preferences. In patients without do-not-resuscitate orders or other directives limiting treatment however, "full code" is the default option irrespective of clinical circumstances and patient preferences. It is time to revisit this approach based on (1) increasing understanding of the power of default options in healthcare settings, (2) changing demographics and growing evidence suggesting that an expanding subset of patients is vulnerable to poor outcomes after perioperative cardiopulmonary resuscitation (CPR), and (3) recommendations from multiple societies promoting risk assessment and goal-concordant care in older surgical patients. The authors reconsider current guidelines in the context of these developments and advocate for an expanded approach to decision-making regarding CPR, which involves identifying high-risk elderly patients and eliciting their preferences regarding CPR irrespective of existing or presumed code status.

(ANESTHESIOLOGY 2021; 135:781–7)

Current American Society of Anesthesiologists (ASA; Schaumburg, Illinois) guidelines regarding do-not-resuscitate (DNR) orders underwent their last major revision in 2001, and recommend that anesthesiologists revisit DNR orders preoperatively and revise them if necessary, based on patient preferences.[1] Discussion about cardiopulmonary resuscitation (CPR) is recommended only for patients with existing DNR orders or other directives limiting treatment; in all other patients, "full code" is the default option irrespective of clinical circumstances and patient preferences. Important trends suggest that it is time to revisit this approach to decision-making regarding perioperative CPR. First, an increasing understanding of the power of default options highlights a need to scrutinize defaults to ensure they are ethically appropriate.[2–4] Second, changing demographics and a growing body of evidence suggest that an expanding subset of patients are vulnerable to poor outcomes after perioperative CPR.[5–7] Additionally, recommendations from multiple societies regarding management of older surgical patients have embraced a new paradigm in perioperative medicine focused on geriatric risk assessment and goal-concordant care.[8–11] Most notably, in 2019, the American College of Surgeons launched the Geriatric Surgery Verification Quality Improvement Program, which established standards focused on shared decision-making, assessment of geriatric-specific vulnerabilities, and interdisciplinary care planning.[10,11] These developments provide a compelling argument for reconsideration of current ASA guidelines and adoption of an expanded approach to decision-making regarding perioperative CPR—one based not on existing or presumed code status, but rather on patient-specific goals and vulnerabilities. We propose a framework for identifying high-risk patients and clarifying their code status before anesthesia and surgery.

## "Full Code" as Default Option

Default options are events or conditions that will be set in place if an alternative is not actively chosen.[2] Because they often do not involve an explicit decision-making process, default options exert unique power over behavior in a variety of contexts, and have been the target of ethical scrutiny in healthcare settings.[2–4] Appropriateness of default options in health care depends on both preserving patient autonomy by allowing individuals to deviate from the default without significant barriers and satisfying the best-interest standard, i.e., promoting the reasonably assumed best interest of the patients affected (since the default is affecting care

Submitted for publication April 17, 2021. Accepted for publication June 24, 2021. Published online first on September 8, 2021. From the Department of Anesthesiology, Perioperative and Pain Medicine (M.B.A., A.M.B., N.S.), Division of Palliative Medicine, Department of Medicine (R.E.B.), Department of Surgery (Z.C.), and Center for Surgery and Public Health (Z.C., A.M.B.), Brigham and Women's Hospital, and Department of Psychosocial Oncology and Palliative Care, Dana-Farber Cancer Institute (R.E.B.), and Center for Bioethics (J.L.A., N.S.), Harvard Medical School, Boston, Massachusetts; Department of Surgery, Cedars-Sinai Medical Center, Los Angeles, California (B.L.G.); Office of General Counsel, Mass General Brigham, Boston, Massachusetts (J.L.A.); and Division of Trauma and Surgical Critical Care, Department of Surgery (A.B.P.), and Center for Biomedical Ethics and Society (A.B.P.), Vanderbilt University School of Medicine, Nashville, Tennessee.

 Anesthesiology 2021; 135:781–7. DOI: 10.1097/ALN.0000000000003937





<zdoi;. DOI: 10.1097/ALN.0000000000003937>

without preferences being elicited).[2–4,12] Use of defaults is discouraged "when no single decision is clearly optimal for a majority of people."[2] Ensuring that patients can choose an alternative is particularly important when "patients' health states and preferences may influence the propriety of the default."[4] While certain defaults are unavoidable (e.g., options for treatment must be presented in some order, and this ordering can be changed but not abolished), others represent assumptions that can be abandoned or clarified via an explicit decision-making process (e.g., re-establishing code status on admission to the hospital instead of assuming patients are "full code" by default).

For example, in analyzing the once widely employed practice of automatically reversing DNR orders before surgery, Truog outlined the complexity of decisions about whether to perform CPR in patients with preexisting directives limiting treatment.[13] He concluded that automatic reversal should be modified in favor of "the traditional medical practice of responding individually and compassionately to the unique needs of each patient."[13] When reconsidered using frameworks outlining ethical use of default options, automatic reversal failed to preserve freedom of choice (because patients were not regularly informed or consulted regarding reversal of their code status) and did not reliably satisfy the best-interest standard (due to its inflexibility and lack of nuance regarding individual patient circumstances and preferences).

ASA guidelines were revised accordingly in 1993, and since 2001 have included the "goal-directed approach" to reviewing and reconsidering perioperative DNR orders articulated by Truog et al. in 1999.[14] These analyses and revisions reflect a trajectory of enhanced shared decision-making and patient-centered care in patients with DNR orders or other directives limiting treatment, but the practice of treating all other patients as "full code" by default raises other ethical concerns.[14–16] First, the current approach does not acknowledge freedom of choice in patients without DNR orders. The guidelines do not recommend informing patients that a decision about code status is even being made, let alone enabling them to deviate from the default (fig. 1). Second, there is mounting evidence that a growing number of patients are at risk for poor outcomes after CPR, and use of "full code" as a default option in this population may not consistently satisfy the best-interest standard.[6,7,17–21]

## Does "Full Code" as Default Option Satisfy the Best-interest Standard?

The American Medical Association (Chicago, Illinois) Code of Medical Ethics outlines the following as relevant considerations in applying the best-interest standard: pain and suffering associated with an intervention, degree of/potential for benefit, impairments that may result from the intervention, and expected quality of life.[12] Resuscitation for perioperative cardiac arrest is generally believed to satisfy the best-interest standard because of its relatively high likelihood of success and the degree of benefit.[13,18] This reasoning is sound for most patients, but may be less applicable to the subset of elderly patients who face a less favorable trajectory not only after surgery and anesthesia but also after cardiac arrest and CPR.

A recent study of outcomes for nearly 7,000 perioperative cardiac arrests found an 11- and 32-fold increase in 30-day mortality for patients with ASA Physical Status IV and V, respectively (compared to ASA I and II patients).[6] These findings are consistent with a previous investigation of perioperative CPR outcomes demonstrating survival to discharge of 17% for ASA IV and 8% for ASA V patients.[7] That study also identified age and impaired functional status as important predictors of mortality. Survival to discharge in patients age greater than 85 yr was only 14%. Patients without functional impairment had a 25% rate of survival to discharge, compared to 15% in partially dependent patients and 11% in totally dependent patients.[7]

The risk/benefit ratio of perioperative CPR may be less favorable in high-risk elderly patients for several reasons. In older patients with significant comorbidities, cardiac arrest in the operating room is more likely to be related to the burden of underlying conditions, and thus might be less reversible compared to arrests caused by anesthetic or surgical complications.[17] Such patients are also more likely to be clinically frail, a state of diminished physiologic reserves that predisposes to worse outcomes in a variety of settings.[5] Although outcome data for frail patients undergoing perioperative CPR are lacking, frail patients undergoing CPR for in-hospital cardiac arrest have a dismal prognosis. Survival to discharge ranges from 0 to 4.8% in recent studies (compared to 26% and 31% in non-frail patients).[19–21] Quality of life and functional outcomes in those who survive are in need of further study.

Outcomes in frail patients after perioperative CPR may be better than these data suggest, but the consistently unfavorable trajectory for frail patients in other contexts is nonetheless revealing. It suggests that their course is shaped by factors beyond the clinical circumstances surrounding cardiac arrest, including vulnerability to complications of resuscitation itself. Significant injuries are common even in non-frail patients who undergo CPR (e.g., rib fractures, sternal fracture, pulmonary contusion, pneumothorax), and traumatic rib fractures carry a poor prognosis for elderly patients even outside the context of cardiac arrest.[22,23] Outcomes of mechanical ventilation in high-risk patients are also relevant, since respiratory complications and need for ventilator support are common in this setting.[7] Patients with clinical frailty who require mechanical ventilation are more likely to experience in-hospital mortality, extubation failure, need for tracheostomy, and discharge to long-term care.[24]

Because high-risk patients are less likely to survive and more likely to suffer complications and changes in quality

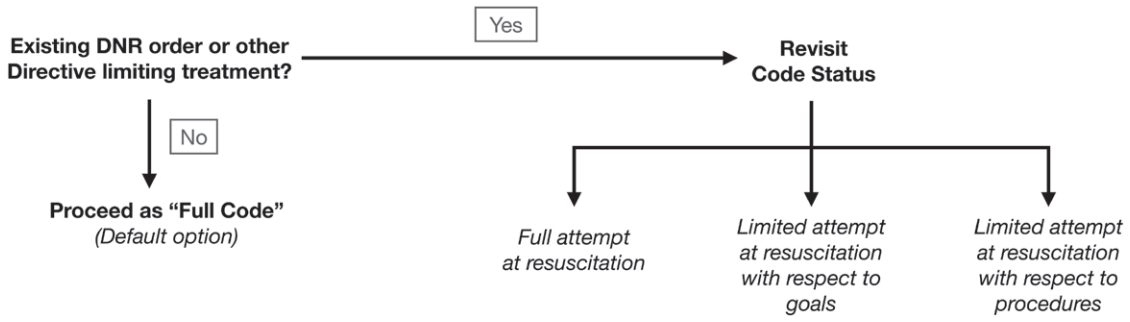


**Fig. 1.** Current American Society of Anesthesiologists guidelines. Patients' clinical characteristics are notably absent, and "full code" is the default for all patients without an existing do-not-resuscitate (DNR) order or other directives limiting treatment. The patient or surrogate may opt for a "full attempt at resuscitation," a "limited attempt at resuscitation with respect to procedures" (*i.e.*, elect to refuse specific procedures), or a "limited attempt at resuscitation with respect to goals" (*i.e.*, allow the anesthesiologist and surgeon/proceduralist to exercise clinical judgment regarding which resuscitative procedures are appropriate based on the patient's goals and values).

of life after perioperative CPR, it is apparent that using "full code" as a default option does not reliably satisfy the best-interest standard. The available evidence does not necessarily justify viewing perioperative CPR as "inappropriate" in high-risk patients, but it does suggest that its appropriateness depends on patient-centered consideration of risks and benefits. Many high-risk patients have a DNR order or other directive limiting treatment in place, so clarifying code status is already standard practice in these cases. However, well-described deficits in advance care planning reveal that a large subset of high-risk patients proceed to surgery without having such discussions.[25]

Limitations of code status documentation are also relevant. Although a patient may be "full code" in the medical record, this status may be "unconfirmed," or "presumed." In such cases, it is possible either that no discussion of code status has occurred, or that a patient's documented preferences have not been integrated into their medical record. These possibilities are particularly concerning given litigation over the last decade around failure of medical practitioners to adhere to patients' documented preferences to forgo life-sustaining therapies. Although courts have yet to rule in favor of plaintiffs' claims of "wrongful life," several lawsuits have resulted in out-of-court settlements and administrative penalties.[26] Review of these legal proceedings is beyond the scope of the current discussion, but such cases highlight the importance of proactive efforts to minimize the likelihood of delivering unwanted care.

## Expanded Approach to Decision-making Regarding Perioperative Resuscitation

Since using "full code" as a default option neither consistently satisfies the best-interest standard nor preserves freedom of choice in high-risk surgical patients, it should not be assumed that all elements of resuscitation are concordant with high-risk patients' goals and preferences (fig. 2). When caring for patients age 75 yr or greater, anesthesiologists should be attuned to documentation or evidence of conditions that indicate vulnerability to complications and poor outcomes after CPR, including age 85 or greater, ASA Physical Status IV or greater, functional impairment, and frailty. Whenever possible, the presence of these conditions should trigger discussion with patients (or their surrogates in cases of decisional incapacity) to clarify preferences regarding perioperative resuscitation. More detailed, patient-centered outcome data may justify expansion of the proposed framework to include younger patients with serious illness in the future.

Ideally, the anesthesiologist's discussion regarding perioperative resuscitation in high-risk patients would occur in collaboration with the surgeon/proceduralist and, if applicable and practicable, another physician with a close relationship to the patient (e.g., primary care physician, geriatrician, or other medical specialist). Use of the goal-directed approach (*i.e.*, limitations on attempts at resuscitation with respect to specific procedures or patient's goals) might be particularly useful in generating a plan tailored to high-risk patients' specific concerns and vulnerabilities.[1,14,27] In many cases, the discussion may be brief (*e.g.*, when confirming a status of "full code" that reflects a previous code status discussion that remains relevant). This scenario may become increasingly common with implementation of American College of Surgeons (Chicago, Illinois) standards for geriatric surgery, which recommend that surgeons confirm code status in all patients age 75 yr or greater and clarify preferences for other life-sustaining therapies in patients with planned admission to the intensive care unit (fig. 3).[11] Circumstances will sometimes prevent providers from clarifying code status in high-risk patients, particularly in the setting of emergency surgery where time constraints, patient incapacity, and unavailability of surrogates are often

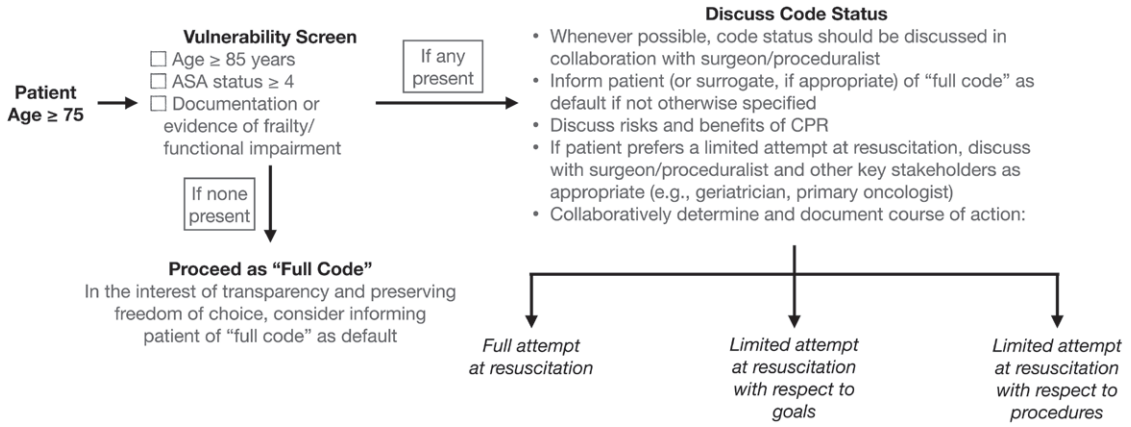


**Fig. 2.** Expanded approach to decision-making regarding cardiopulmonary resuscitation (CPR) in older surgical patients. In patients age 75 yr or greater, anesthesiologists should be attuned to documentation or evidence of conditions that indicate vulnerability to complications after cardiopulmonary resuscitation, including age 85 yr or greater, American Society of Anesthesiologists (ASA) Physical Status IV or greater, frailty, and functional impairment. Whenever possible, the presence of these conditions should trigger discussion with patients (or their surrogates in cases of decisional incapacity) to clarify preferences regarding perioperative resuscitation. Further evidence will enable refinement of the criteria that should be used to define "high-risk" in this context. The goal-directed approach outlined in figure 1 and in American Society of Anesthesiologists guidelines is preserved.

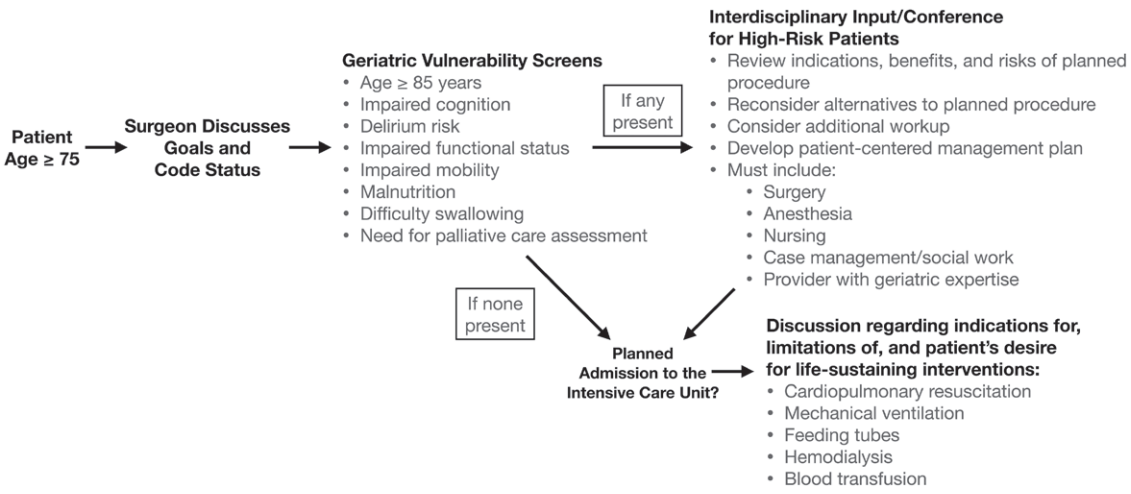


**Fig. 3.** American College of Surgeons' Geriatric Surgery Verification Quality Improvement Program framework for identifying and engaging high-risk patients regarding life-sustaining therapies.

insurmountable barriers. Consistent with current practice, "full code" should remain the default in such situations.

This proposed approach has several advantages over current guidelines. First, it expands shared decision-making regarding perioperative CPR to include high-risk patients irrespective of existing code status, thereby promoting freedom of choice and goal-concordant care in a high-risk patient population.[2] Second, it is compatible and synergistic with new geriatric surgery standards from the American College of Surgeons that will call on anesthesiologists and consultants to collaborate in tailoring perioperative care to elderly patients' vulnerabilities and preferences (fig. 3).[11] Third, its implementation is realistically scalable, serving to practically enhance institutions' adherence to new American College of Surgeons geriatric surgery standards and other screening recommendations including those from the American Geriatrics Society and the Society for Perioperative Assessment and Quality Improvement.[8–11]

## Future Directions and Barriers to Implementation

Expanding decision-making to include high-risk patients irrespective of existing code status raises several issues in need of further discussion, including the question of how high-risk patients should be defined and identified. Research in this area is expanding, and refinement of criteria that define "high-risk" will be necessary based on emerging evidence and multidisciplinary collaboration. While ASA status and age are easily established, there are dozens of tools to measure frailty.[5,28] A recent systematic review and meta-analysis of 70 studies measuring 35 frailty instruments found that the Clinical Frailty Scale was most effective in predicting postoperative mortality and was the easiest to use.[28] Its accuracy in predicting outcomes after perioperative CPR is unknown, but the Clinical Frailty Scale score has been associated with increased mortality after resuscitation for in-hospital cardiac arrest and unfavorable outcomes after mechanical ventilation.[19,20,24] Based on its demonstrated practicability and association with related outcomes, the Clinical Frailty Scale is a logical choice for screening in this context.[28] However, consistent with societal recommendations, the proposed approach emphasizes the importance of screening without dictating use of a particular screening tool.[11,29] These initiatives face significant barriers, and in many cases it will continue to fall upon individual providers to identify high-risk patients via review of the medical record and preoperative evaluation.[30] Although it should not generally be considered a substitute for formal screening, clinical impression can be important in identifying high-risk patients when more detailed evaluations are not feasible due to limited time, resources, or infrastructure.[31]

The proposed framework is inherently interdisciplinary. Its implementation will therefore require buy-in from multiple stakeholders, including surgeons, proceduralists, and anesthesiologists, as well as geriatricians and palliative care specialists. Although surgeons' opposition to limitations on aggressiveness of care is sometimes cited as a barrier to code status discussions, newly established American College of Surgeons standards reflect a heightened commitment to goal-concordant care and geriatric risk stratification.[10,11] Some stakeholders will likely object to the time commitment associated with engaging patients and families in discussions about perioperative resuscitation. This is an important concern that highlights the need for mechanisms to identify high-risk patients early so they can be referred to geriatricians and/or palliative care specialists for formal evaluation and high-quality discussions regarding goals and care preferences.[11,29,32] Referring all high-risk patients, however, would risk overwhelming already strained geriatrics and palliative care services and may not be an option in many settings.[33,34] It will therefore become increasingly important to develop an understanding of which high-risk patients will benefit most from geriatric or palliative care consultation, and to establish mechanisms by which surgeons and anesthesiologists can develop competency in discussing code status and performing elements of geriatric risk assessment.

The trajectory of perioperative medicine is one of increasing collaboration and integration of multidisciplinary expertise. Adoption of the proposed approach to decision-making regarding perioperative CPR is therefore not the task of the individual anesthesiologist. Rather, implementation must begin with discussion among perioperative physicians regarding limitations of existing guidelines when applied to high-risk patients. Such discussion may serve as a basis for revision of ASA guidelines, integration with ongoing efforts from the American College of Surgeons (fig. 3), and initiatives at the institutional level to facilitate identification and management of high-risk geriatric surgical populations.[1,8–11,29] New American College of Surgeons standards for geriatric surgery face similar barriers and present an opportunity for interdisciplinary collaboration to create sensible hospital policies and infrastructure.[8–10,29] Best practices regarding the content and documentation of code status discussions and developing/amending hospital policies regarding approach to DNR orders in the perioperative setting have been well-described elsewhere, and these remain broadly applicable.[1,14–16]

Because there is a growing, identifiable subset of surgical patients who are less likely to survive and more likely to suffer complications and changes in quality of life after perioperative CPR, it is no longer appropriate to assume as a default that all elements of resuscitation are concordant with high-risk patients' goals and preferences. Instead, anesthesiologists should implement an expanded approach to perioperative decision-making regarding CPR that is focused on patient-specific preferences and vulnerabilities. Doing so will take time and a multidisciplinary effort, but is a necessary step toward realizing "the traditional medical practice of responding individually and compassionately to the unique needs of each patient."[13]

## Research Support

Support was provided solely from institutional and/or departmental sources.

## Competing Interests

Dr. Bernacki is a board member of the American Academy of Hospice and Palliative Medicine (Chicago, Illinois). The other authors declare no competing interests.

## Correspondence

Address correspondence to Dr. Allen: Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, 75 Francis Street, Boston, Massachusetts 02115. mallen13@partners.org. Anesthesiology's articles are made freely accessible to all

## References


1. American Society of Anesthesiologists. Ethical guidelines for the anesthesia care of patients with do-not-resuscitate (DNR) orders or other directives that limit treatment. Available at: https://www.asahq.org/standards-and-guidelines/.FTE. Accessed April 12, 2021.
2. Halpern SD, Ubel PA, Asch DA: Harnessing the power of default options to improve health care. N Engl J Med 2007; 357:1340–4
3. Gorin M, Joffe S, Dickert N, Halpern S: Justifying clinical nudges. Hastings Cent Rep 2017; 47:32–8
4. Hart J, Halpern SD: Default options in the ICU: Widely used but insufficiently understood. Curr Opin Crit Care 2014; 20:662–7
5. McIsaac DI, MacDonald DB, Aucoin SD: Frailty for perioperative clinicians: A narrative review. Anesth Analg 2020; 130:1450–60
6. Kaiser HA, Saied NN, Kokoefer AS, Saffour L, Zoller JK, Helwani MA: Incidence and prediction of intraoperative and postoperative cardiac arrest requiring cardiopulmonary resuscitation and 30-day mortality in non-cardiac surgical patients. PLoS One 2020; 15:e0225939
7. Kazaure HS, Roman SA, Rosenthal RA, Sosa JA: Cardiac arrest among surgical patients: an analysis of incidence, patient characteristics, and outcomes in ACS-NSQIP. JAMA Surg 2013; 148:14–21
8. Chow WB, Rosenthal RA, Merkow RP, Ko CY, Esnaola NF; American College of Surgeons National Surgical Quality Improvement Program; American Geriatrics Society: Optimal preoperative assessment of the geriatric surgical patient: A best practices guideline from the American College of Surgeons National Surgical Quality Improvement Program and the American Geriatrics Society. J Am Coll Surg 2012; 215:453–66
9. Alvarez-Nebreda ML, Bentov N, Urman RD, Setia S, Huang JC, Pfeifer K, Bennett K, Ong TD, Richman D, Gollapudi D, Alec Rooke G, Javedan H: Recommendations for preoperative management of frailty from the Society for Perioperative Assessment and Quality Improvement (SPAQI). J Clin Anesth 2018; 47:33–42
10. Berian JR, Rosenthal RA, Baker TL, Coleman J, Finlayson E, Katlic MR, Lagoo-Deenadayalan SA, Tang VL, Robinson TN, Ko CY, Russell MM: Hospital standards to promote optimal surgical care of the older adult: A report from the Coalition for Quality in Geriatric Surgery. Ann Surg 2018; 267:280–90
11. American College of Surgeons: Geriatric surgery verification program. Available at: https://www.facs.org/quality-programs/geriatric-surgery. Accessed April 3, 2021.
12. American Medical Association: Code of medical ethics. Available at: https://www.ama-assn.org/delivering-care/ethics/code-medical-ethics-consent-communication-decision-making. Accessed April 3, 2021.
13. Truog RD: "Do-not-resuscitate" orders during anesthesia and surgery. Anesthesiology 1991; 74:606–8
14. Truog RD, Waisel DB, Burns JP: DNR in the OR: A goal-directed approach. Anesthesiology 1999; 90:289–95
15. Waisel DB, Burns JP, Johnson JA, Hardart GE, Truog RD: Guidelines for perioperative do-not-resuscitate policies. J Clin Anesth 2002; 14:467–73
16. Waisel D, Jackson S, Fine P: Should do-not-resuscitate orders be suspended for surgical cases? Curr Opin Anaesthesiol 2003; 16:209–13
17. Nunes JC, Braz JR, Oliveira TS, de Carvalho LR, Castiglia YM, Braz LG: Intraoperative and anesthesia-related cardiac arrest and its mortality in older patients: A 15-year survey in a tertiary teaching hospital. PLoS One 2014; 9:e104041
18. Kalkman S, Hooft L, Meijerman JM, Knape JT, van Delden JJ: Survival after perioperative cardiopulmonary resuscitation: Providing an evidence base for ethical management of do-not-resuscitate orders. Anesthesiology 2016; 124:723–9
19. Wharton C, King E, MacDuff A: Frailty is associated with adverse outcome from in-hospital cardiopulmonary resuscitation. Resuscitation 2019; 143:208–11
20. Ibitoye SE, Rawlinson S, Cavanagh A, Phillips V, Shipway DJH: Frailty status predicts futility of cardiopulmonary resuscitation in older adults. Age Ageing 2021; 50:147–52
21. Fernando SM, McIsaac DI, Rochwerg B, Cook DJ, Bagshaw SM, Muscedere J, Munshi L, Nolan JP, Perry JJ, Downar J, Dave C, Reardon PM, Tanuseputro P, Kyeremanteng K: Frailty and associated outcomes and resource utilization following in-hospital cardiac arrest. Resuscitation 2020; 146:138–44
22. Bulger EM, Arneson MA, Mock CN, Jurkovich GJ: Rib fractures in the elderly. J Trauma 2000; 48:1040–7.
23. Kashiwagi Y, Sasakawa T, Tampo A, Kawata D, Nishiura T, Kokita N, Iwasaki H, Fujita S: Computed tomography findings of complications resulting from cardiopulmonary resuscitation. Resuscitation 2015; 88:86–91
24. Fernando SM, McIsaac DI, Rochwerg B, Bagshaw SM, Muscedere J, Munshi L, Ferguson ND, Seely AJE, Cook DJ, Dave C, Tanuseputro P, Kyeremanteng K: Frailty and invasive mechanical ventilation: Association with outcomes, extubation failure, and tracheostomy. Intensive Care Med 2019; 45:1742–52
25. Tang VL, Dillon EC, Yang Y, Tai-Seale M, Boscardin J, Kata A, Sudore RL: Advance care planning in older adults with multiple chronic conditions undergoing high-risk surgery. JAMA Surg 2019; 154:261–4

26. Pope TM: Legal briefing: New penalties for ignoring advance directives and do-not-resuscitate orders. J Clin Ethics 2017; 28:74–81
27. Ruisch JE, Sipers W, Plum PF, Spaetgens B: Individualized approach to reconsider perioperative do-not-resuscitate orders in frail older patients. Geriatr Gerontol Int 2020; 20:989–90
28. Aucoin SD, Hao M, Sohi R, Shaw J, Bentov I, Walker D, McIsaac DI: Accuracy and feasibility of clinically applied frailty instruments before surgery: A systematic review and meta-analysis. Anesthesiology 2020; 133:78–95
29. Cooper L, Abbett SK, Feng A, Bernacki RE, Cooper Z, Urman RD, Frain LN, Edwards AF, Blitz JD, Javedan H, Bader AM: Launching a geriatric surgery center: Recommendations from the Society for Perioperative Assessment and Quality Improvement. J Am Geriatr Soc 2020; 68:1941–6
30. Eamer G, Gibson JA, Gillis C, Hsu AT, Krawczyk M, MacDonald E, Whitlock R, Khadaroo RG: Surgical frailty assessment: A missed opportunity. BMC Anesthesiol 2017; 17:99
31. O'Neill BR, Batterham AM, Hollingsworth AC, Durrand JW, Danjoux GR: Do first impressions count? Frailty judged by initial clinical impression predicts medium-term mortality in vascular surgical patients. Anaesthesia 2016; 71:684–91
32. Olufajo OA, Tulebaev S, Javedan H, Gates J, Wang J, Duarte M, Kelly E, Lilley E, Salim A, Cooper Z: Integrating geriatric consults into routine care of older trauma patients: One-year experience of a level I trauma center. J Am Coll Surg 2016; 222:1029–35
33. Lupu D; American Academy of Hospice and Palliative Medicine Workforce Task Force: Estimate of current hospice and palliative medicine physician workforce shortage. J Pain Symptom Manage 2010; 40:899–911
34. American Geriatrics Society: State of the geriatrician workforce. Available at: https://www.americangeriatrics.org/geriatrics-profession/about-geriatrics/geriatrics-workforce-numbers. Accessed April 12, 2021.

## ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

# Shipway Apparatus: Warming up to Ether Administration


The optimal temperature for vaporized anesthetics was a hot topic in 1916 when Francis E. Shipway, M.D. (1875 to 1968), introduced his eponymous apparatus for warm anesthetic delivery (*right*). The technique gathered steam on both sides of the Atlantic when prominent anesthesiologist James T. Gwathmey, M.D., published on warm ether administration in the United States. Unlike the simple wire-mesh mask (*lower left*) used for "cold ether," the Shipway apparatus consisted of two vaporizers—one each for ether and chloroform—and a thermos containing a "U-tube" in heated water. Shipway's previously frosty relationships with surgeons thawed when everyone realized that warm ether meant cooler operating rooms. Heated vapors also appeared to provide smoother anesthetic delivery, fewer pulmonary complications, and improved temperature regulation for the patient. After the fervor for warm anesthetics cooled, Shipway's career only continued to heat up. He was knighted in 1928 after anesthetizing King George V for several procedures. (Copyright © the American Society of Anesthesiologists' Wood Library-Museum of Anesthesiology.)

*Melissa L. Coleman, M.D., Penn State College of Medicine, Hershey, Pennsylvania, and Jane S. Moon, M.D., University of California, Los Angeles, California.*