



Interpretation of Do Not Attempt Resuscitation Orders for Children Requiring Anesthesia and Surgery

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This clinical report addresses the topic of pre-existing do not attempt resuscitation or limited resuscitation orders for children and adolescents undergoing anesthesia and surgery. Pertinent considerations for the clinician include the rights of children, decision-making by parents or legally approved representatives, the process of informed consent, and the roles of surgeon and anesthesiologist. A process of re-evaluation of the do not attempt resuscitation orders, called “required reconsideration,” should be incorporated into the process of informed consent for surgery and anesthesia, distinguishing between goal-directed and procedure-directed approaches. The child’s individual needs are best served by allowing the parent or legally approved representative and involved clinicians to consider whether full resuscitation, limitations based on procedures, or limitations based on goals is most appropriate.

abstract

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CONSIDERATIONS FOR CHILDREN WITH DO NOT RESUSCITATE OR LIMITED RESUSCITATION ORDERS WHO REQUIRE ANESTHESIA AND SURGERY

Origin of Do Not Resuscitate Orders

In the 1970s, the Critical Care Committee at Massachusetts General Hospital developed the original do not resuscitate (DNR) guidelines in response to nursing requests for clarification of what should be done when cardiopulmonary resuscitation (CPR) was unwanted or believed to be unwarranted by a patient, parent, or legally approved representative (hereafter referred to as representative).¹ Alternative names or abbreviations for a DNR policy vary geographically, with some including the letter “A,” as in “do not attempt resuscitation” or “DNAR.”^{2,3} For purposes of this document, the term DNAR will be used, recognizing that neither of these terms carries a universal meaning. Both DNR and DNAR terms imply the omission of action, historically synonymous and sometimes misperceived as “giving up,” and some have advocated

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for the term “allow natural death,” to emphasize that the order is to allow the natural consequences of a disease or injury and to emphasize ongoing end-of-life care.² Partial DNR or limited resuscitation orders are also described.^{4–6} DNAR orders may be clinically and ethically appropriate when the burdens of resuscitation exceed the expected benefit. A common misunderstanding that patients and families have is that CPR (calling a code) will keep patients alive and living exactly as they were before the code, not recognizing that the need for CPR can result in ischemia to the brain and resultant long-term disability.

Currently, all hospitals seeking accreditation from The Joint Commission are required to have a DNAR or resuscitation limits policy in place.⁷ The policy should define a DNAR order and describe the guidelines for its inclusion in a patient’s medical record. A DNAR order implies a documented discussion with the patient, family, or representative, addressing the patient’s wishes about resuscitation interventions. DNAR orders specify what interventions are permitted and what interventions are not permitted. The orders need to be documented in the medical record in a standardized fashion such that they are clearly identified and are uniformly accessible by all medical care providers. In some institutions, they will be featured in some way, such as color-coding. Hard copies may be printed if the patient is traveling to another location in the hospital. Some jurisdictions may require confirmation by a witness or a second treating physician. DNAR orders should not have implications regarding the use of other therapeutic interventions that may be appropriate for the patient, including surgery and anesthesia.^{8–10}

Origin of DNAR Orders for Patients Undergoing Surgery and Anesthesia

The controversial topic of DNAR orders for patients undergoing surgery and anesthesia has received growing attention in the medical literature since the early 1990s. Authors began to more specifically address the pediatric age group, beginning with the publication of the predecessor of this clinical report in 2004, “Do-Not-Resuscitate Orders for Pediatric Patients Who Require Anesthesia and Surgery.”¹¹ For children, contemporary DNAR orders are generally written when (1) in the judgment of the treating physician, an attempt to resuscitate the child will not benefit the child (this may be with or without parent or representative concurrence; for example, if the child has satisfied state criteria for brain death); or (2) the parent or representative (with the assent of a developmentally appropriate child) expresses his or her preference that CPR be withheld in the event the child suffers a cardiopulmonary arrest, and the physician concurs.^{8,12,13} DNAR orders usually are written with the assumption that cardiopulmonary arrest will be a spontaneous event that is the culmination of the dying process of a child who has a terminal or life-limiting illness with an expected decline in bodily function over time. The dilemma with which surgeons and anesthesiologists are confronted regarding children with DNAR orders undergoing an operative procedure is twofold: (1) anesthesia promotes some degree of hemodynamic abnormality that may result in cardiopulmonary arrest, and (2) many routine anesthetic manipulations can be classified as resuscitative measures.

A number of hospitals across the nation still do not have a policy that specifically addresses the extent to which DNAR orders apply in the operating room. Hospital and anesthesia staff continue to

advocate suspension of the DNAR in the operating room.^{14–16} There is persistent reticence by some specialty surgeons to routinely discuss advance directives preoperatively or to perform surgery on adult patients whose directives limit postoperative care.¹⁷ The American Academy of Pediatrics and the American Society of Anesthesiologists (ASA) have issued guidelines on forgoing life-sustaining medical treatment, issues of informed consent,^{18,19} and evaluation and preparation of pediatric patients undergoing anesthesia.²⁰ None of these policies offers a detailed approach for operative procedures considered for children with an existing DNAR order. In the current statement, we address the dilemmas of who should assume responsibility (ie, the primary care physician, the surgeon, or the anesthesiologist) for discussing with the parent or representative the potential risks of cardiopulmonary arrest during surgery and anesthesia, whether the DNAR order should be temporarily suspended during the procedure, and how long a temporary suspension should last if this option is chosen. Early involvement of palliative care may help families and the medical team better gauge the need for operative procedures, their goals, and what to do if there is an intraoperative change in status.²¹

DISCUSSION

Physicians caring for children have a duty to respect the wishes of the child and family, to do good (beneficence), and to avoid harm (nonmaleficence). This may lead to conflicting considerations for a child with a DNAR order. Some physicians believe that honoring a DNAR request harms a child by allowing a potentially preventable death to occur. Others believe that the child’s welfare is best served by not having a sustained and poor health-related quality of life and

not having to endure nonbeneficial therapy, which may be painful or unpleasant.^{14,15,21} Older children and adolescents should be included in the decision-making process (patient assent) when their neurologic status, development, and level of maturity allow. However, state laws usually require that a parent or legal representative make these decisions on the child's behalf¹⁸ because this individual generally will be the person presumed to be the most appropriate and capable to determine what actions would be in the best interest of the child. Conflicts arise when the parent or representative and/or child and the physician fail to agree on what would be optimal care under a given set of circumstances.

Resuscitative interventions outside of the operating room setting are those used to prevent or reverse cardiopulmonary arrest.²² The operative setting complicates a discussion of resuscitative interventions because anesthetic agents routinely promote cardiovascular instability.^{11,12,14,22} During the perioperative period, resuscitative measures only refer to the measures undertaken to restore spontaneous respiration and circulation once a cardiopulmonary arrest has occurred.^{9,23} Surveys of physicians and patients with DNAR orders confirm that clarification is needed on the interpretation of a DNAR order, especially its applicability in the operating room.^{24,25}

Informed Permission

Physicians generally must obtain informed permission from a parent or representative before a child can undergo any medical intervention, including surgery.¹⁹ For resuscitation efforts, consent may often be inferred from emergency circumstances, unless the patient's representative is available to provide or refuse consent or unless there is evidence that consent would be refused if sought.

However, the parents of terminally ill children or children with life-limiting severe disabilities may have already been asked to address whether resuscitation should be attempted in the event the child's underlying disease results in cardiopulmonary arrest.

Customarily, physicians will approach the parent or representative about instituting a DNAR or the limits of resuscitation order when it is believed that resuscitation of the child would not be beneficial and would only prolong the dying process.²⁵ When a parent or representative agrees to a DNAR order, it is generally a decision guided by information a physician or medical team has provided, anticipating that cardiopulmonary arrest will be a direct consequence of the child's underlying disease. Surgery and anesthesia each introduce additional risks to the patient and may lead to different probabilities of a successful outcome, depending on the strategy. For example, local or regional anesthesia might be a good strategy for some procedures, but only in a cooperative patient. Because surgeons and anesthesiologists are rarely involved in the original DNAR decision, they cannot be certain that the implications of the DNAR status in the perioperative setting were discussed with the patient's parent or representative.¹⁵ Therefore, it is appropriate for the parent or representative, the surgeon, and the anesthesiologist to re-evaluate the DNAR order for a child who requires an operative procedure. This re-evaluation process is called "required reconsideration"¹⁵ and may be incorporated into the process of informed consent for surgery and anesthesia. Discussions with families and patients regarding consent under these circumstances may be initiated by attending staff, particularly in hospitals with residency teaching programs, where residents may be routinely involved in the consent process.

There is often no previous relationship established between the patient, parents, and surgical team, with the exception of a brief preoperative assessment. Active listening and compassionate understanding are essential and are a critical part of patient- and family-centered care.²⁶ Using an integrated approach by including the hospitalist, intensive care, or palliative care team in the discussion is appropriate and may be more comfortable for the family. Including the primary care physician is also an option if he or she is available and willing to be part of the discussion. The parent or representative is asked about specific interventions and his or her understanding of the relative merits of each of these interventions during anesthesia and surgery (Table 1).²⁰ Airway management is determined by what is mandated by the child's condition and the surgical procedure. Specific prohibition of tracheal intubation is problematic, and beliefs and concerns of the patient and family are carefully elicited and discussed. Exceptions to the injunctions against intervention are specifically noted in the patient's medical record. The parent or representative may agree to a temporary suspension of the DNAR order during the perioperative period. If so, the temporal end point to the DNAR suspension needs to be recorded. If an agreement cannot be obtained after thorough discussion, the wishes of the informed parent or representative will prevail. In some cases, the parents may believe that the burden of a therapy is not worth the potential benefits and decline the procedure. When an individual physician believes that the parent's wishes are inconsistent with his or her medical, ethical, or moral views, the physician's professional refusal of participation in care may be appropriate, with withdrawal from the case after ensuring continuity of care.^{11,18} Consultation with the institutional ethics committee may be beneficial.²⁷

TABLE 1 Perioperative Interventions

Airway management
Bag and mask ventilation
Intubation
Needle thoracentesis
Chest tube insertion
Blood product transfusion
Invasive monitoring (eg, central venous, arterial)
Chest compressions
Defibrillation
Cardiac pacing
Point-of-care arrest medications (epinephrine, atropine, sodium bicarbonate, calcium, other vasoactive drugs)
Postoperative ventilation support

Optimum care for hopelessly ill patients. A report of the Clinical Care Committee of the Massachusetts General Hospital. *N Engl J Med.* 1976;295(7):362–364.

Role of the Surgeon or Proceduralist

The following are representative operative interventions that might be considered for a pediatric patient with a DNAR order. Some of these are procedures that might be performed in interventional radiology by a radiologist, in the endoscopy suite by a gastroenterologist or pulmonologist, or at the bedside:

1. Provision of a support device that will enable the child to be discharged from the hospital (eg, gastrostomy tube or tracheostomy);
2. Urgent surgery for a condition unrelated to the underlying chronic problem (eg, acute appendicitis in a patient with terminal cancer);
3. Urgent surgery for a condition related to the underlying chronic problem but not believed to be a terminal event (eg, a pathologic fracture or bowel obstruction);
4. A procedure to decrease pain;
5. A procedure to provide vascular access; and
6. An endoscopic procedure to investigate gastrointestinal tract bleeding.

As part of the expected professional role, the operating surgeon is required

to discuss the risks of a procedure with the parent or representative of any pediatric patient, including how the patient's condition might influence the risk of anesthesia. The American College of Surgeons issued a statement to guide surgeons in operating on patients with an active DNAR order.²⁸ The Association of periOperative Registered Nurses also has a similar statement to guide the essential members of the perioperative team.²⁹ It is expected that the surgeon will advise the parent or representative and the child (if developmentally appropriate) regarding the operative risks and benefits and recommend a policy of required reconsideration of previous DNAR orders. The results of all discussions are documented in the patient's medical record. The surgeon will ultimately convey the patient's and/or representative's wishes to the members of the entire surgical team, help team members understand the wishes of the patient, parent, or representative, and replace individuals who find that the family's wishes conflict with their personal values. The difficulty arises when there is no one who is willing to honor a family's wish to continue the DNAR status during anesthesia and surgery. Stalemates such as this may be referred to the ethics committee of the institution.

Role of the Anesthesiologist

As early as 1994, the ASA released recommendations on caring for surgical patients with active DNAR orders, explicitly rejecting the practice of automatically rescinding the DNAR order before procedures involving the use of anesthesia because this practice "may not sufficiently address a patient's rights to self-determination in a responsible and ethical manner."²⁰ The purpose of required reconsideration of DNAR orders is to determine what is best for the patient under the circumstances, not to convince the patient and family to have the DNAR order

suspended. The guidelines proposed by the ASA clearly recommend that all physicians involved in the case (primary physician, surgeon, and anesthesiologist) discuss together with the patient (and parent or representative) the appropriateness of maintaining the DNAR order during the operation, distinguishing between goal-directed and procedure-directed DNAR orders. This integrated approach is a hallmark of patient- and family-centered care.²⁶ Model procedure-specific DNAR documentation forms are published and may be modified for individual hospital use.¹²

A common concern of families is that the preoperative anesthesiologist is often not the one who will perform the procedure, making specific communication with the anesthesiologist of record optimal, if at all possible. A number of procedures are also now performed by using "sedation" and may be performed outside of the operating room environment. For purposes of this statement, the considerations regarding pre-existing DNAR orders are the same.

Goal-Directed Approach

A goal-directed approach is used to focus on the patient's goals, values, and preferences rather than on individual procedures that may be used in resuscitation. The primary goal is to do everything to prevent the need for resuscitation, but if it is indicated, this approach is used to recognize that patients are often less concerned with technical details of the resuscitation than with more subjective and personal issues regarding quality of life before and after resuscitation. An approach that honors the family's treatment goals while reflecting the reality and unique aspects of the perioperative environment is promulgated with this model. However, some anesthesiologists are uncomfortable with the indeterminate nature of

a goal-directed DNAR order and have ethical or legal concerns about having such crucial decisions rest solely on their best judgment at the time of an arrest. In addition, goal-directed DNAR orders may be less feasible if the anesthesiologist and surgeon caring for the child have not established a relationship with the family before surgery.

Procedure-Directed Approach

A procedure-directed approach may be more appropriate in these circumstances, which involves careful consideration of a series of specific interventions that are more likely to be used (Table 1). This checklist is not unlike what might be used if a child has resuscitation limits. Each procedure must be placed in the context of the child's usual quality of life and likelihood of the ability of the procedure to produce the desired effect, given his or her unique physiology. This approach has limited flexibility when an unexpected situation occurs.¹² In addition, many of the procedures listed are not resuscitative by nature, but circumstance and the ability of the medical team to convey this effectively and without misunderstanding may be difficult. Critics of this approach believe that parents or caregivers often lack the capacity to truly understand the plan being developed, whereas proponents believe that at least some parents can make thoughtful decisions about specific interventions, and their wishes should be respected.^{4-6,10} Although the goal-directed approach can conceivably be integrated with a procedure-directed approach (ie, formulating a procedure-directed plan based on the parent and patient goals), this often requires the luxury of time and is not always feasible. However, many of the procedures that might be considered in this group of children also are not emergencies, and there is time for thoughtful discussion and decision.

Perioperative suspension of the DNAR order is considered by some anesthesiologists to be the ideal compromise because it enables the physician to act without restraint while providing the patient with a realistic chance of achieving the operative goals.^{30,31} Anesthetic agents and techniques may promote some degree of hemodynamic and respiratory instability, especially in patients with a deteriorated health condition.^{16,32} The deliberate depression of vital functions by the anesthetic may require resuscitative measures to stabilize the patient.³³ Consequently, controversy about the use of these interventions arises when the patient has a written DNAR order. Many of the routine anesthetic interventions performed as part of operative support are considered resuscitative measures under different circumstances. These include the use of paralytic agents, vasoactive drugs, blood products, and positive-pressure ventilation. This overlap in terminology promotes confusion and inconsistencies among physicians in the interpretation of a patient's DNAR order and what it implies in an operative setting. Keffer and Keffer²³ have proposed that resuscitation in the operating room be defined as "those measures undertaken to re-establish cardiac rhythm once a cardiac arrest has occurred." This definition establishes a simple end point beyond which a patient's desire to not be resuscitated would come into play.

For a fragile patient, providing anesthesia can be a fine balance between controlling pain and supporting hemodynamic stability, for example, in a preterm newborn infant or a septic patient. The anesthesiologist's concern for patient comfort during the procedure may support perioperative suspension of DNAR orders. An active DNAR order restricts the physicians' ability to treat any complications of their own procedure during anesthesia. Faced with this dilemma, anesthesiologists

are forced to decrease the risk of cardiopulmonary arrest by increasing hemodynamic stability through the use of less anesthetic.^{33,34} For the patient, this may potentially result in more discomfort and suffering.

One reason to distinguish DNAR in the operating room from DNAR in other settings is the difference in the success rate of CPR administered for a spontaneous cardiopulmonary arrest versus one that results from anesthesia. Anesthetic-related arrests are believed to be more easily reversible because of the immediate ability to respond and the controlled nature of the event.³⁵⁻³⁷ When a cardiac arrest is ascribed to anesthesia, there is a better chance of successful resuscitation.³⁸ This increased chance of recovery is likely based on the fact that the arrest is not attributable to the underlying disease and does not necessarily presage death. A relevant survey was conducted on 4301 seriously ill adult patients, of which 745 underwent an operative procedure and 57 had previously written DNAR orders in their medical records. Only 3 of the 57 patients with preoperative DNAR orders (5%) experienced an intraoperative cardiopulmonary arrest, 2 of whom had the DNAR order reversed before surgery and 1 who did not and died in the operating room without an attempt at resuscitation. All 3 patients died within 5 days of operation.³⁸ Overall, 31 (54%) of the patients with DNAR orders who underwent surgery survived to leave the hospital, and 30% survived at least 4 months.

A more recent review of 4128 adult patients with a DNAR order and 4128 age-matched and procedure-matched patients without a DNAR order in 120 hospitals participating in the American College of Surgeons National Surgical Quality Improvement Program from 2005 to 2008 reported that surgical patients with DNAR orders have significant comorbidities; many patients sustain postoperative

complications, and nearly 1 in 4 die within 30 days of surgery. DNR status was an independent risk factor for poor surgical outcome.^{16,32} The multivariate logistic regression model was adjusted for more than 30 risk factors, including ASA class 3 to 5, ascites, albumin level <3.5 g/dL, impaired sensorium, preoperative sepsis, disseminated cancer, and dialysis dependence.

The possibility of legal action or investigation exists when withholding or withdrawing care at the end of a patient's life. Standard and accepted practices of communication, collaboration, and a well-documented DNAR order, with documentation of the conversation and decision from the patient and family, will be legally protective.³⁹

Traditionally, CPR has been considered a success if the patient survives the initial resuscitation effort. For patients with pre-existing DNAR orders who consider rescinding this status perioperatively, the utility of CPR may be better gauged on the length of patient survival and health care–related quality of life after resuscitation. By using this definition, CPR may be inappropriate from the parent or representative viewpoint if resuscitation has the overwhelming probability of resulting in patient suffering and only prolonging the time to death.⁸ The anesthesiologist will need to inform the parent or representative of the risks and potential benefits of intraoperative resuscitation. Required reconsideration as part of the process of informed consent for anesthesia may reduce ambiguities and misunderstandings associated with patients who have DNAR orders. It will provide anesthesiologists with the opportunity to educate the parent or representative and become familiar with their values and perceptions of the child's quality of life and together clarify how the child's DNAR order should

be interpreted perioperatively. By giving parents or representatives and clinicians the option of choosing from among full resuscitation, limitations based on procedures, or limitations based on goals, the child's needs are individualized and better served. Regardless of the decision made by the parent or representative, the individual acting on behalf of the child must be readily available for consultation during the procedure. The ASA, like the American College of Surgeons, advocates that physicians withdraw from a case if they are unwilling or unable to respect and implement the decision of the patient (or parent or representative) to limit the use of resuscitation.^{20,28}

If DNAR Orders Are Suspended

If the decision is made to suspend DNAR orders during anesthesia and surgery, it is necessary to define the duration of suspension.^{20,40} The physiologic effects of anesthesia and surgery rarely terminate at the end of the procedure, but the duration thereafter depends on the anesthetic technique used and the type of surgical procedure performed. The acute effects of most anesthetic medications generally resolve within several hours or a day after surgery. It is a requirement of the Centers for Medicaid & Medicare Services that an inpatient have a postoperative visit within 48 hours of a procedure involving anesthesia and that there be documentation in the medical record.⁴¹ Recovery of respiratory function after surgery is dependent on preoperative pulmonary function, chronicity of illness, and length of the procedure. Some patients will experience cardiopulmonary arrest during or immediately after surgery resulting from an acute and reversible complication. It may be appropriate to use mechanical ventilation after surgery as long as the patient continues to show significant and sustained improvement in pulmonary function. Once the patient

ceases to recover or deteriorates, withdrawal of ventilatory support may be considered. This might include compassionate extubation for end-of-life comfort care with family present. Generally speaking, the suspension of DNAR orders continue until the postanesthetic visit, until the patient has been weaned from mechanical ventilation, or until the primary physician involved in the patient's care and the family agree to reinstate the DNAR order.

The surgeon and anesthesiologist may, in consultation with the family, reinstate a DNAR order intraoperatively. For example, if cardiac arrest occurs during surgery, and it is apparent that the arrest is the result of an irreversible underlying disease or complication and that CPR would only allow continued deterioration, the DNAR order may be reinstated.

If resuscitation measures are withheld and intraoperative arrest occurs, such a death may be classified as "expected" for quality assurance purposes, rather than "unexpected." Expected deaths do not require root cause analysis or the in-depth quality assurance review of the individual providers or program required when the death is unexpected, but expected deaths will still require notification of the medical examiner and organ procurement organization.^{14,22,41,42} Discussion of the death for educational purposes is valuable and allows staff debriefing of the event to prevent secondary psychological trauma and to examine the appropriateness of the patient's refusal of aggressive treatment, whether documentation was adequate, and whether care was consistent with the patient's wishes.^{14,22,41}

IMPLEMENTING REQUIRED RECONSIDERATION

Hospitals are encouraged to develop and maintain written

policies permitting the forgoing of life-sustaining treatment of patients, including the child or adolescent patient, in appropriate circumstances.^{18,19} Once a DNAR order is in place according to accepted standards, it is important that it be reviewed before surgery to determine applicability in the operating room and the postoperative recovery period. Table 2 lists the ideal elements of a required reconsideration policy for children with a DNAR or limited resuscitation orders, and the following represents a summary of the essential elements of discussion and documentation:

- A preoperative discussion with the child's parent or representative and the developmentally appropriate child or adolescent, including information about the likelihood of requiring resuscitation, the potential causes of an arrest and their reversibility, the chance of success, and possible outcomes with and without resuscitation;
- An agreement about what, if any, resuscitative measures will be instituted during the procedure;
- A decision to uphold or suspend a DNAR order on the basis of the planned procedure, the anticipated benefit for the child, and the likelihood of patient compromise as a result of the procedure;
- Documentation of the salient features of the physician-family discussion in the medical record;
- Communication by the surgeon of plans to honor an intraoperative DNAR order to relevant staff;
- Allowing a physician or other health care professional who is unwilling to honor a family's refusal of resuscitation to withdraw from the case and allow others to assume care. Ideally, the withdrawing

TABLE 2 Required Reconsideration Options for Pediatric Patients With DNAR Orders Who Require Anesthesia and Surgery

Full resuscitation	Perioperative suspension of DNAR orders with qualification of perioperative interval
Goal-directed approach	Focuses on patient goals, values, and preferences Implies personal relationship between physician and patient and family with understanding of quality-of-life concerns Most subjective approach
Procedure-directed approach	Specific interventions (see Table 1) placed in context of child's quality of life are each reviewed before procedure

physician or health care professional will make a conscientious effort to identify another health care professional to replace him or her with someone who is willing to honor the DNAR request^{11,14};

- Recognition that the decision of a patient, parent, or representative to refuse intraoperative resuscitation can be compatible with the provision of therapeutic measures (including those listed in Table 1, with the exception of chest compressions and defibrillation) to treat conditions other than arrest. This decision does not necessarily imply limits on other forms of care, such as intensive care; and
- If the family chooses to rescind the DNAR order in the operating room and arrest culminates in successful resuscitation, but the patient's process of dying has only been prolonged, make a provision to discuss withdrawal of life support after a determined amount of time.^{20,40}

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ABBREVIATIONS

ASA: American Society of Anesthesiologists
CPR: cardiopulmonary resuscitation
DNAR: do not attempt resuscitation
DNR: do not resuscitate

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