

Out-of-Hospital Resuscitation: Have We Gone Too Far?

Corita Grudzen, MD

Robert Wood Johnson Critical Scholar,
University of California-Los Angeles, School
of Medicine, Los Angeles, California USA

Correspondence:

Corita Grudzen, MD
University of California-Los Angeles
School of Medicine
911 Broxton Avenue
Los Angeles, California 90024 USA
E-mail: cgrudzen@mednet.ucla.edu

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Abbreviations:

ACLS = advanced cardiac life support
CPR = cardiopulmonary resuscitation
DNR = do-not-resuscitate
ED = emergency department
EMS = emergency medical services
EMT = emergency medical technician
POLST = Physician Orders for Life-
Sustaining Treatment

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Abstract

Americans are living longer and are more likely to be chronically or terminally ill at the time of death. Although surveys indicate that most people prefer to die at home, the majority of people in the United States die in acute care hospitals. Each year, approximately 400,000 persons suffer sudden cardiac arrest in the US, the majority occurring in the out-of-hospital setting. Mortality rates are high and reach almost 100% when prehospital care has failed to restore spontaneous circulation. Nonetheless, patients who receive little benefit or may wish to forgo life-sustaining treatment often are resuscitated. Risk versus harm of resuscitation efforts can be differentiated by various factors, including cardiac rhythm. Emergency medical services policy regarding resuscitation should consider its utility in various clinical scenarios. Patients, family members, emergency medical providers, and physicians all are important stakeholders to consider in decisions about out-of-hospital cardiac arrest. Ideally, future policy will place greater emphasis on patient preferences and quality of life by including all of these viewpoints.

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Scope of the Problem

The life expectancy of Americans increases each year. Life expectancy has reached an all-time high in the United States: 77.6 years in 2003, up from 77.3 years in 2002.¹ Causes of death are changing to reflect the epidemiology of the aging population. While heart disease remains the number one cause of mortality, homicide dropped out of the top 15 and Parkinson's disease entered the list. Death from chronic diseases can be an increased outcome of higher life expectancy. These diseases include cancer, diabetes, hypertension, and kidney and liver disease, among others.¹ Thus, Americans are more likely to be chronically or terminally ill at the time of death.

The economic costs of care for the elderly at the end of life also is substantial. Spending for Medicare beneficiaries during the last year of life account for 27.4% of all Medicare outlays.² The typical Medicare patient has had four significant co-morbid diseases by at the end of life. Additionally, more care does not mean better outcomes—greater frequency of medical visits and hospital care has not been shown to improve health outcomes for the chronically ill. Two randomized, controlled trials of chronically ill veterans noted an increased frequency of office visits, and intensive primary care was associated with increased use of hospital services, but had no effect on health or function.^{3,4} Both studies failed to find a significant positive correlation between mortality and those with more office visits. A study by Fisher *et al* compared practice patterns and health outcomes across different regions of the US with similar health status but differing utilization of medical services.⁵ Regions with higher spending had lower quality of care and 2–5% higher mortality rates, demonstrating that higher use of supply-sensitive services was associated with worse outcomes.⁶ Greater use of hospital and specialist care may expose patients to medical errors.

Not only is the cost of care at the end of life high and the efficacy of the investment questionable but also, many patients do not want the care. The Study to Understand the Prognoses and Preferences for Outcomes and Risk of Treatment (SUPPORT) confirmed that cardiopulmonary resuscitation and treatment in an intensive care unit will occur even when a patient or family member expresses a desire for "comfort care" rather than such life-extending measures.⁷ Patient preferences about place of death also had no effect on where the death occurred. Although surveys indicate that most people prefer to die at home, the majority of people in the US die in acute care hospitals.⁸ Do-not-resuscitate (DNR) orders are one way in which patients can control the end of life. Do-not-resuscitate orders ideally prevent a patient from receiving cardiopulmonary resuscitation (CPR) by emergency medical technicians and paramedics if he or she suffers a cardiac arrest at home or in a chronic care facility. A review noted that only 15–25% of the general population had advanced directives, and therefore, many patients with chronic and terminal illness are resuscitated, though it may be non-beneficial medically.⁹ Like other types of care of the chronically ill provided at the end of life, resuscitation may prolong life but have little effect on preserving functionality.

Each year, approximately 400,000 persons suffer sudden cardiac death in the US, the majority occurring in the out-of-hospital setting.¹⁰ Mortality rates are high and reach almost 100% when prehospital care has failed to restore spontaneous circulation.¹¹ Few studies have directly evaluated the cost of resuscitation attempts on the chronically and terminally ill. Some research has examined expenditures for unsuccessful, out-of-hospital resuscitations. In 1993, Bonnin *et al* estimated a cost of \$500 million annually for continued emergency department resuscitation attempts of the clinically dead.¹² A second study examined Medicare expenditures for unsuccessful, out-of-hospital resuscitation at a Connecticut hospital in 1995.¹³ Suchard *et al* used Medicare reimbursement rates for services rendered on the date of death, then projected national annual expenditures for an estimate of \$58 million. A third study estimated the per patient cost for those admitted after unsuccessful prehospital resuscitation at \$11,307 in 1991.¹⁴ All of these studies were based solely on medical charges and did not consider other indirect costs, such as risky, high-speed transport by ambulance and the time taken away from other emergency department (ED) patients. All researchers concluded that the continued resuscitation efforts for patients who have no return of spontaneous circulation in the field not only is costly, but also is non-beneficial.

According to the National Hospital Ambulatory Medical Care Survey released this year (2006), emergency department visits in the US are at an all-time high, and the number of emergency departments is shrinking.¹⁵ Visits reached a record of almost 114 million in 2003, and the number of EDs decreased by 12% from 1993 to 2003. As emergency medical personnel, physicians, and nurses become overworked caring for more patients, resources must be prioritized towards patients who stand to benefit from the provision of such care.

Outcomes in Out-of-Hospital Cardiac Arrest

Ventricular fibrillation, a potentially reversible arrhythmia, is the initial rhythm for most patients suffering sudden cardiac arrest.¹⁶ If defibrillation does not occur quickly, the rhythm quickly degenerates to asystole, which generally is terminal. In the past, if resuscitation was unsuccessful patients were rushed to an ED, where efforts were continued. Pronouncement of death in the field was limited in most states to patients with rigor mortis, dependent lividity, or decapitation. Due to a growing body of literature on predicting outcomes from out-of-hospital cardiac arrest, many paramedics now may terminate resuscitation efforts for some patients.

Beginning in the 1980s, researchers began to delineate a subset of patients who do not benefit from resuscitation. Numerous retrospective studies demonstrated that continued resuscitation efforts for patients who remain pulseless on arrival to the ED is medically non-beneficial. In 1988, Kellerman *et al* showed that only 1.6% of patients who failed to respond to initial resuscitation were discharged from the hospital alive.¹⁷ Of these four patients, two were discharged to chronic care facilities with severe neurological sequelae. The other two were initially resuscitated in the field but lost vital signs minutes before arrival to the ED—therefore, they did not qualify as unresponsive. Gray *et al* reviewed the records of 185 patients who presented to a Rhode Island Hospital ED after failed out-of-hospital resuscitation.¹⁴ Only 16 of the 185 patients (9%) were resuscitated successfully in the ED, and none survived to discharge. Bonnin *et al* attempted to develop distinct criteria for on-scene termination of resuscitation.¹² Of the 952 cardiac arrests, only 0.6% of those that did not achieve return of spontaneous circulation at the scene survived. All of these patients had persistent ventricular fibrillation. They concluded that termination of resuscitation at the scene was justified when patients do not regain spontaneous circulation within 25 minutes following standard advanced cardiac life support (ACLS), except in those with persistent ventricular fibrillation.

Patients who receive little benefit from resuscitation efforts also can be differentiated by cardiac rhythm. Patients suffering from asystole or pulseless electrical activity have a worse prognosis than do those whose initial electrocardiographic rhythm was ventricular fibrillation or pulseless ventricular tachycardia. In an analysis of 240 patients in Seattle, survival was almost 25% for ventricular fibrillation, as low as 1% for asystole, and 6% for pulseless electrical activity.¹⁸ In a study the same year by Arahamian *et al*, the presence of ventricular fibrillation was the most important predictor of survival.¹⁹ This was more important than whether the arrest was witnessed, the presence or absence of bystander CPR, or time to emergency medical response. Many studies have failed to demonstrate survival to discharge for patients presenting with asystole. In 1980, Myerburg *et al* showed that for patients with bradyarrhythmias or asystole, only nine of 108 patients survived to hospital admission, but none were discharged alive.²⁰

In 2000, the National Association of Emergency Medical Services (EMS) Physicians published updated

guidelines on the “termination of resuscitation in the prehospital setting for adults suffering from non-traumatic cardiac arrest”.²¹ They recommended that full resuscitative efforts should be initiated in the absence of a DNR order. They suggest that termination can be considered for those patients who fail to respond to ACLS interventions within 20 minutes, except in the case of persistent ventricular fibrillation when patients should be transported to the hospital. They also recommended considering family wishes, safety of the crew, and the public and poor prognostic factors in the decision on whether to terminate the resuscitation effort.

Few studies to date have directly addressed the outcomes of cardiac arrest in patients with chronic and/or terminal illnesses. In 1996, a study by Schultz *et al* showed that patients >60 years of age and those with co-morbid diseases were associated with a poor prognosis.²² It is likely that these patients derive even less benefit, and possibly prolong life at the cost of severe neurological sequelae.

Stakeholder Attitudes, Beliefs, and Experiences

Patients, family members, emergency medical providers, and physicians all are important stakeholders and should play a role in decisions about the interim and continuation resuscitation efforts for victims of out-of-hospital cardiac arrest. Patient attitudes on death, their family's receptiveness to pronouncement of death outside of a hospital, and the comfort of EMS providers with notifying the family are important considerations. Acceptance by family members has been examined in three studies—each suggested that survivors generally were “satisfied” with the care they received from paramedics. The first study interviewed 31 family members of cardiac arrest victims who were not transported to a hospital. None of the survivors wished that the patient had been conveyed to the ED; 81% thought the emergency medical technicians (EMTs) had informed them of the death in a professional manner.²³ Delbridge *et al* found that 24 of 25 family members of victims were satisfied with the decision to terminate resuscitation efforts in the field.²⁴ Edwardsen *et al* interviewed 21 family members of victims of sudden cardiac arrest who had resuscitation efforts terminated in the field. All of them were satisfied with the medical care and emotional support provided by EMS.²⁵

Because cardiac arrest is sudden, medical and psychological demands on EMS providers during resuscitation efforts are high. In urban areas, they also discontinue resuscitation and pronounce death following the termination of resuscitation an average of 10 times annually—as often or more so than some physicians.^{26,27} Paramedic attitudes and comfort levels are important components of any termination of resuscitation policy. In the only survey to date, 62% of paramedics experienced stress during the death of a patient in the field and 77% during notification of families.²⁷

Emergency physicians' practices and attitudes toward resuscitation also are important to consider before making policy changes. In a survey of 409 emergency physicians, pre-existing disease (92%), presumed interval between onset of arrest and application of CPR (92%), duration of resuscitation attempt (90%), and age of the patient (89%) were most important in determining when to terminate

resuscitation efforts.²⁸ While physicians consider age and chronic illness when deciding how aggressively to resuscitate a patient, this is not reflected in official EMS policies.

Ethical Considerations

The traditional role of physicians has been to preserve life. For this reason, ethical dilemmas often arise when physicians try to balance the principles of beneficence and non-maleficence at the end of life. Historically, beneficence has outweighed non-maleficence when caring for patients. Procedures, including resuscitation, are defined as detrimental only if they are futile. Futility, defined as the absence of benefit, does not consider the harms of resuscitation, and ignores the delicate benefit/harm balance. Instead, physicians should consider the utility of resuscitation for each patient based on the risk of benefit versus harm.

Ardagh describes many of the often ignored harms related to the performance of resuscitation efforts.²⁹ First, the harm of resuscitating a patient who is too ill to benefit is described. This may cause the patient physical discomfort, loss of dignity, instill false hope, and prolong survival with an unacceptable quality of life. Ardagh also cites the potential diversion of resources from other patients in the ED who may stand to gain more. Lastly, because many patients do not have advanced directives in place, many are likely the resuscitated against their wishes. Ardagh claims that the utility of resuscitation should be considered by balancing benefit and potential harms from the perspective of the patient. Because physicians strongly resist death and view it as a professional failure, it often is easier to prolong life indiscriminately rather than weigh the risks and benefits to interventions.

Medicolegal Considerations

Emergency physicians often raise medicolegal concerns to withholding care. In a survey of 1,252 emergency physicians, 62% made decisions regarding resuscitation because of their fear of litigation.³⁰ Almost all physicians (94%) felt legal concerns influenced their overall practice, although most (78%) agreed they should not. While physicians agree that decisions regarding resuscitation should be based on likelihood of patient benefit versus harm, physicians feel forced to resuscitate patients with little chance of meaningful survival due to fear of litigation.

How valid are the medicolegal concerns of physicians? This is addressed in a recent piece by Levy and Kelen titled, “Resuscitation Attempts in Asystolic Patients: The Legal Tail Wagging the Dog?”³¹ Malpractice suits usually are based on claims of negligence, which requires the plaintiff to prove all of the elements that constitute a negligent act. The plaintiff first must show that the defendant had a duty to the plaintiff. The defendant must breach that duty and cause injury that can be proven to have resulted directly from the negligent act or omission.

In a case of cardiac arrest brought to an ED, the emergency physician clearly has a duty to the patient. A breach of duty occurs when a physician does not follow the standard of care, as defined by current practice pattern, expert opinion, and peer-reviewed research. As described above,

continued resuscitation efforts for patients who remain pulseless upon arrival to the ED is not medically beneficial. This view is supported by expert opinion, research, and specialty organizations. The American Heart Association has recognized that "resuscitation may be discontinued in the prehospital setting when the patient is non-resuscitatable after an adequate trial of Advanced Cardiac Life Support."³² Therefore, in cases regarding failed out-of-hospital resuscitation efforts, it is difficult to prove breach of duty and even more difficult to prove causation and damage. In this case, the injury is death and the plaintiff must prove that the defendant negligently caused the death. The subset of patients who do not respond to out-of-hospital resuscitation efforts have such a poor prognosis that it would be very difficult to prove the physician caused death by failing to continue a non-beneficial resuscitation. If professional societies, expert opinion, and peer-reviewed research all support withholding care in failed out-of-hospital resuscitation, it seems more appropriate for physicians to be concerned about the medicolegal implications of negligently resuscitating patients who will not benefit from continued resuscitation efforts than by withholding care appropriately.

Past Policy Solutions and their Effectiveness

As the US population ages and the prevalence of chronic diseases increases, it becomes even more important for patients to delineate their wishes at the end of life. In 1994, the National Association of EMS Physicians published guidelines for the statewide implementation of "do-not-resuscitate" programs.³³ They recommended comprehensive statewide, or even national policies, and standardized forms that are easily identifiable. At the time of publication, 11 states had specific legislation authorizing the implementation of EMS-DNR orders, six had legal opinions or policies, and 14 states had working groups and/or legislation pending. A national, comprehensive, and easily identifiable EMS-DNR form still has not been implemented.

In the US, Oregon has had the most success in honoring the wishes of patients at the end of life. The state maintains the highest rate of deaths occurring at home and in nursing homes, as opposed to hospitals.³⁴ This is due, in part, to implementation of Physician Orders for Life-Sustaining Treatment (POLST), a form that delineates the wishes of a dying patient to have or limit life-sustaining treatment. The one-page, bright pink form accompanies the patient from their home or nursing home to the hospital. Tolle *et al* examined the extent to which the POLST form ensured that the wishes of nursing home residents were honored. The study measured compliance with DNR orders and requests for transfer only if comfort measures failed.³⁵ The POLST orders regarding CPR have been respected universally. The nursing home residents also received remarkably high levels of comfort care and low rates of transfer for aggressive, life-extending treatments. There now are efforts underway to extend POLST to other states.

The first step in the implementation of statewide EMS-DNR orders is physician and patient education. Although prehospital-DNR orders had been established in Washington State for eight years, 60% of physicians surveyed did not

know that an EMS-specific DNR form was required.³⁶ Even with DNR orders in place, some patients still are resuscitated by paramedics and emergency physicians. In long-term care facilities, 29 of the 139 patients (21%) who had DNR orders were resuscitated anyway.³⁷ In a study done in Toronto, there was no difference in the likelihood of initiation of CPR among patients with or without a DNR order (73% vs. 83%; $p = 0.17$).³⁸ While 89% of EMTs surveyed would withhold resuscitation of patients with an official state-approved DNR orders, few (4%) would honor an unofficial document.³⁹ In 1997, a survey of physicians indicated that 78% honor legal advance directives, but only 7% follow unofficial documents.³⁰ Sixty-two percent make decisions regarding resuscitation for fear of litigation or criticism, and 55% have resuscitated patients despite believing it would be medically non-beneficial.

Guidelines for termination of resuscitation efforts are another way to halt, but not prevent, resuscitation of the chronically and terminally ill. A national survey of 200 EMS programs regarding termination protocols was done by Jaslow *et al* in 1997.⁴⁰ Most (68%) reported having protocols for the termination of unsuccessful resuscitation efforts, some of which required a final rhythm of asystole and/or consultation with the base station. The study did not address the use of chronic or terminal illness as a criterion for termination. The termination guidelines published by the National Association for EMS Physicians also do not emphasize consideration of co-morbidities or how they may affect prognosis. Additionally, protocols do ensure consistency. In an observational study by Eckstein *et al*, there was great variability in the incidence of termination of resuscitative efforts by an EMS base station (37% vs. 14%; $p < 0.0001$).⁴¹

Possibilities for the Future

Patients should be entitled to liberty in death. First and foremost, those with wishes regarding the end of life should be encouraged or even forced to record them. Second, all aspects of the medical system, from chronic care facilities to EDs, should be required to follow them. Taking personal responsibility for one's health increasingly is becoming recognized as an important aspect of American society. Residents of Massachusetts who can afford it, soon will be required to buy health insurance. Forcing individuals to record and periodically update their preferences regarding resuscitation could be considered an extension of this type of personal accountability. The challenge ahead will be ensuring that individuals are counseled appropriately when making these important end-of-life decisions.

Errors of commission should be considered as grave as those of omission. While modern American medicine focuses on the preservation of life at all costs, it gives less attention to the harm caused by medically non-beneficial interventions. Large governing bodies and the court system must begin to discipline injury caused by unwarranted procedures as they do to omitted ones. Quality improvement efforts should be directed not only toward failing to act but also acting inappropriately. For example, quality assurance

by EMS base stations and EDs can include a review of cases in which DNR orders were not followed or resuscitation efforts were continued inappropriately. While this would result in a true paradigm shift for American medicine, its time has come. In the modern version of the Hippocratic Oath written in 1964 by Louis Lasagna, he states, "I will apply, for the benefit of the sick, all measures which are required, avoiding those twin traps of over-treatment and therapeutic nihilism."⁴² While all physicians take a similar oath, the current culture promotes over-treatment rather than undertreatment, even if futile.

Additionally, the National Association of EMS Physicians should take the lead on implementing a more uniform and readily identifiable DNR order. Do-not-resuscitate orders should be national, recognized both in

and outside of the hospital, and physically worn by the patient at all times. Doctors, nurses, and EMS providers should be made aware of changes in DNR policy, possibly through state licensing procedures.

Finally, physicians, nurses, EMS providers, and the general public must learn how to die and let die. Much of the research on resuscitation of patients in cardiac arrest laments the low survival rate. If all patients with cardiac arrest survived, we would all live forever. Narratives and visual imagery of the truly grotesque way in which many Americans now die in the media may be the only way to mobilize the public to make real policy changes. Physicians must work to change protocols for resuscitation of the chronic and terminally ill not only because they are non-beneficial and costly, but most importantly, because they are inhumane.

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