



October 2023

Discordant Cardiopulmonary Resuscitation at an Academic Midwest Medical Center- Prevalence and Solutions

Jeremy Payne
University of Nebraska Medical Center


Anne Skinner
University of Nebraska Medical Center

David Gannon
University of Nebraska Medical Center

Jenenne A. Geske
University of Nebraska Medical Center

Tell us how you used this information in this [short survey](#).

Follow this and additional works at: <https://digitalcommons.unmc.edu/gmerj>

 Part of the [Bioethics and Medical Ethics Commons](#), [Critical Care Commons](#), [Critical Care Nursing Commons](#), [Higher Education Commons](#), [Medical Education Commons](#), [Palliative Care Commons](#), [Palliative Nursing Commons](#), [Patient Safety Commons](#), and the [Social Justice Commons](#)

Recommended Citation

Payne, J., Skinner, A., Gannon, D., , Geske, J. A. Discordant Cardiopulmonary Resuscitation at an Academic Midwest Medical Center- Prevalence and Solutions. Graduate Medical Education Research Journal. 2023 Oct 27; 5(2).
<https://digitalcommons.unmc.edu/gmerj/vol5/iss2/1>

This Original Report is brought to you for free and open access by DigitalCommons@UNMC. It has been accepted for inclusion in Graduate Medical Education Research Journal by an authorized editor of DigitalCommons@UNMC. For more information, please contact digitalcommons@unmc.edu.

Discordant Cardiopulmonary Resuscitation at an Academic Midwest Medical Center- Prevalence and Solutions

Abstract

BACKGROUND: Code status orders are important features of patient-centered clinical decisions, patient autonomy, and end-of-life care. Despite proper documentation of “do not resuscitate” (DNR) code status, hospitalized patients may be subjected to cardiopulmonary resuscitation (CPR) efforts that go against their wishes.

PURPOSE: The objective of this study was to identify and describe the population of hospitalized patients receiving discordant resuscitation efforts at a Midwest academic medical center utilizing electronic health records (EHR).

METHODS: The study included EHR records between 01/01/2011 and 01/01/2021 for hospitalized patients 19 years and older who experienced cardiac arrest (ICD-10 I46) and were documented as DNR. Patients younger than 19 years of age and those with full code status were excluded.

EPIC’s “code narrator” was queried for records meeting the inclusion criteria. Using the code start and stop time along with the timestamp of their code status order, patients who were DNR at the time of the code start time were included, and all others were excluded.

RESULTS: Thirteen of 112 (11.6%) of DNR patients who experienced cardiac arrest had CPR performed, with two patients experiencing discordant resuscitation twice. Patients who experienced resuscitation efforts discordant with their code status were 53.8% female and 84.6% White, with a median age of 82 years old (47-94). Median code duration was 16.9 minutes (1.7-50.9) with 9.89 minutes (5-50.9) of chest compressions. Average length of code status prior to code start time was 1.66 days. Seven of 15 (46.7%) CPR events resulted in return of spontaneous circulation (ROSC).

CONCLUSIONS: Discordant in-hospital resuscitation efforts contribute to significant patient harm and moral distress. Thirteen unique patients whose resuscitation wishes were not followed were identified. Long term goals of this project are to investigate possible causes of these events and develop solutions.

Keywords

Advanced Directives, Cardiopulmonary Resuscitation, CPR, Do not attempt resuscitation, Do not resuscitate, DNR, discordant, code status, end-of-life care, resuscitation orders, cardiac arrest

Creative Commons License



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Discordant Cardiopulmonary Resuscitation at an Academic Midwest Medical Center — Prevalence and Solutions

Jeremy Payne¹, Anne Skinner¹, David Gannon¹, Jenenne A. Geske¹

¹University of Nebraska Medical Center, Omaha, NE, USA

<https://doi.org/10.32873/unmc.dc.gmerj.5.2.007>

Abstract

Background: Code status orders are important features of patient-centered clinical decisions, patient autonomy, and end-of-life care. Despite proper documentation of “do not resuscitate” (DNR) code status, hospitalized patients may be subjected to cardiopulmonary resuscitation (CPR) efforts that go against their wishes.

Purpose: The objective of this study was to identify and describe the population of hospitalized patients receiving discordant resuscitation efforts at a Midwest academic medical center utilizing electronic health records (EHR).

Method: The study included EHR records between 01/01/2011 and 01/01/2021 for hospitalized patients 19 years and older who experienced cardiac arrest (ICD-10 I46) and were documented as DNR. Patients younger than 19 years of age and those with full code status were excluded.

Epic’s “code narrator” was queried for records meeting the inclusion criteria. Using the code start and stop time along with the timestamp of their code status order, patients who were DNR at the time of the code start time were included, and all others were excluded.

Results: Thirteen of 112 (11.6%) DNR patients who experienced cardiac arrest had CPR performed, with two patients experiencing discordant resuscitation twice. Patients who experienced resuscitation efforts discordant with their code status were 53.8% female and 84.6% White, with a median age of 82 years old (47 - 94 years). Median code duration was 16.9 minutes (1.7 - 50.9 minutes) with 9.89 minutes (5 - 50.9 minutes) of chest compressions. Average length of code status prior to code start time was 1.66 days. Seven of 15 (46.7%) CPR events resulted in return of spontaneous circulation (ROSC).

Conclusion: Discordant in-hospital resuscitation efforts contribute to significant patient harm and moral distress. Thirteen unique patients whose resuscitation wishes were not followed were identified. Long term

goals of this project are to investigate possible causes of these events and develop solutions.

Keywords

Advanced Directives, Cardiopulmonary Resuscitation, CPR, Do not attempt resuscitation, Do not resuscitate, DNR, discordant, code status, end-of-life care, resuscitation orders, cardiac arrest.

Introduction

Code status orders, along with other advanced directives, are essential features of patient-centered clinical decisions, patient autonomy, and end-of-life care. Unfortunately, despite many national efforts to record, communicate, and respect patients’ end-of-life wishes, it has been shown that 1 in 10 patients who receive cardiopulmonary resuscitation (CPR) have active do not resuscitate (DNR) orders.¹⁻³ This problem is exacerbated by the inadequacy of health care systems in recording patients’ code status. In fact, among U.S. medical and surgical patients, approximately 73% had no documented code status decision.⁴ Uncertainty around CPR events has been shown to cause harm and moral distress to hospital providers.^{5,6} Numerous factors have been proposed as contributors of discordant resuscitation, such as poor communication⁷ and differing definitions of code status.⁸ However, no single overarching cause has been identified. Ultimately, it will be critical to understand the causes and develop solutions for discordant CPR. However, it is first necessary to assess the prevalence and characteristics of the patient population in which they have occurred. Therefore, this study aimed to identify and describe the population of hospitalized patients receiving discordant resuscitation efforts at a Midwest academic medical center utilizing electronic health records (EHR).

Methods

Database/Search Methods: This study took place at a large Midwest academic medical center utilizing an Epic EHR. Following IRB approval, a data acquisition request was submitted to the institution’s Electronic

Health Record Data Access Core. The study included EHR records between 01/01/2011 and 01/01/2021 for hospitalized patients 19 years and older who experienced cardiac arrest (ICD-10 I46) and were documented as DNR. In Epic, code status is documented as a procedure code, with ten different options (Table 1). Patients with active code statuses COD11 or COD7 during cardiac arrest (ICD-10 I46) were excluded. Patients younger than 19 years of age and those with full code status were also excluded.

Epic’s “code narrator,” the standard method of documenting various elements of a CPR event, was then queried for records meeting the inclusion criteria. Patients who underwent cardiac arrest with no code narrator documentation were excluded. All patients captured by this search were then analyzed via manual chart review. Patients who were not discordantly resuscitated were subsequently removed from the analysis. Using the code start and stop time along with the timestamp of their code status order, patients who were not “full code,” as outlined above, at the time of the code start time were included, and all others were excluded.

Statistical Analysis: Continuous variables are presented as median (ranges), and discrete variables as N (%). All statistics were completed with SPSS v28.0.0.

Table 1. Epic code status procedure codes

Code status procedure codes	
COD1	DNR/OK TO INTUBATE
COD 3	Code limitations
COD 4	DNI (DO NOT INTUBATE)
COD 5	NO CPR OR DEFIBRILLATE BUT USE ALL OTHER RESUSCITATION INTERVENTIONS
COD 6	TAILORED RESUSCITATION MEASURES
COD 7	FULL CODE
COD 8	DNI, NO CPR, NO DEFIB BUT USE ALL OTHER RESUSCITATION INTERVENTIONS
COD 9	CMO (DNR + COMFORT MEASURES ONLY)
COD 11	FULL CODE (6 HR DURATION)
COD 12	DNR/DNI

Results

The search yielded 1,244 unique records of in-hospital cardiac arrests, 773 of whom experienced resuscitative measures as shown by code narrator documentation. Of those, 112 patients had an active DNR code status. Thirteen of 112 (11.6%) of the DNR patients who experienced cardiac arrest had CPR performed, with two patients experiencing discordant resuscitation twice (Figure 1). The included incidences met the following criteria: 1) occurrence of in-hospital cardiac arrest, 2) presence of code narrator documentation, and 3) existence of an active DNR order at the time of cardiac arrest. Seven of the 15 code events had a subsequent note describing a realization that the code was discordant.

Demographic characteristics: The population of patients who experienced resuscitation efforts discordant with their code status was 53.8% (7) female and 84.6% (11) White, with a median age of 82 years old (47 - 94

years). All patients were insured primarily by the government (e.g., Medicare, Medicaid, Tricare, and VA), were non-Hispanic, and had English documented as their primary language (Figure 2).

Resuscitation characteristics: Median duration of resuscitation was 16.9 minutes (1.7 - 50.9 minutes) with 9.89 minutes (5 - 50.9 minutes) of chest compressions. Of the 15 CPR events, nine had documented arrhythmias with three documented defibrillations in total. Five of the 9 documented arrhythmias were asystole, with the other 4 pulseless electrical activity (PEA). Seven of 15 (46.7%) CPR events resulted in return of spontaneous circulation (ROSC) (Figure 3).

Advance care planning characteristics: Patients who experienced CPR discordant with code status had an average time of active code status prior to code start time of 1.66 days. Three of 13 patients (23.1%) had documented advanced directives before

the code, all of whom expressed their desire not to be resuscitated. None of the patients had powers of attorney (POA) at the time of cardiac arrest. Three of 13 patients (23.1%) had documented living wills. Two of 13 patients (15.4%) had palliative care consults prior to the cardiac arrest event. Eight of 15 (53.3%) discordant CPR events occurred in the intensive care unit (ICU) (Figure 4).

Discussion

This study aimed to investigate the prevalence of discordant resuscitation of hospitalized DNR patients. Over 10 years, our study determined greater than 10% of DNR patients experiencing cardiac arrest received discordant CPR, with two patients experiencing discordant resuscitation twice. Despite having advanced directive documents that outlined their DNR preferences, three patients were discordantly resuscitated with both an advance directive and an active DNR code status. Few patients had palliative care consults, and zero patients had recorded powers of attorney prior to cardiac arrest. Interestingly, our study also showed nearly half of discordant resuscitations resulted in ROSC.

Though the literature is quite limited in this area, other studies corroborate our findings. A large retrospective study of over 20,000 deceased critical care patients from 237 U.S. hospitals demonstrated a rate of discordant resuscitation prevalence of around 8%, similar to the rate found in our study. However, this study did not include patients who survived CPR. Researchers determined small teaching and nonteaching hospitals were more likely associated with discordant CPR when compared to large teaching hospitals. While the causes of these events were not

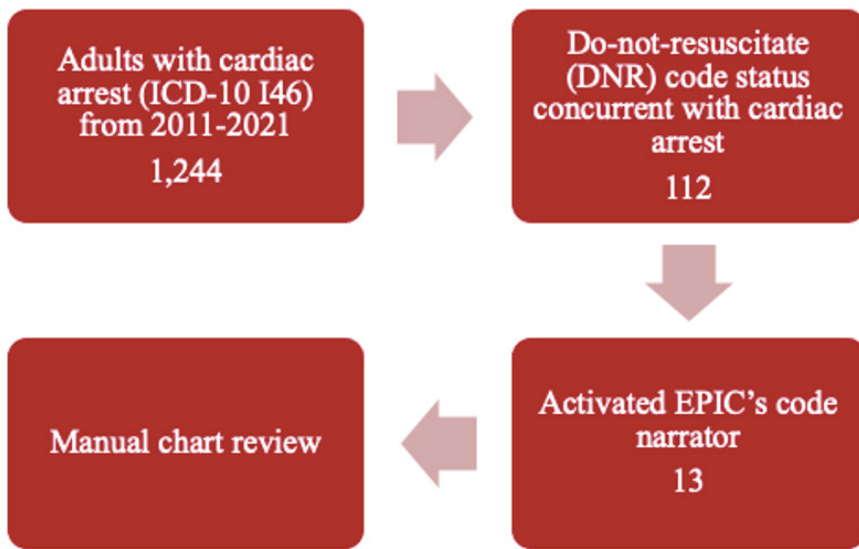


Figure 1. Identifying patients who experienced cardiac arrest with active DNR code status.

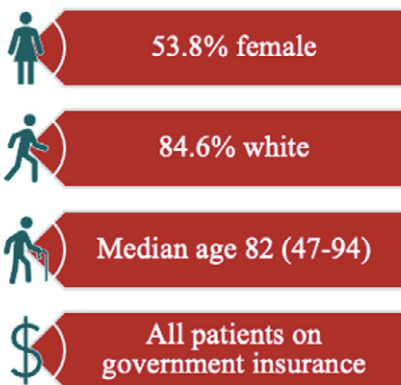


Figure 2. Demographic breakdown of discordantly resuscitated patients

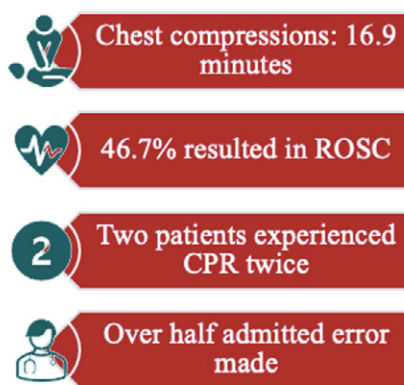


Figure 3. Resuscitation characteristics of discordantly resuscitated patients

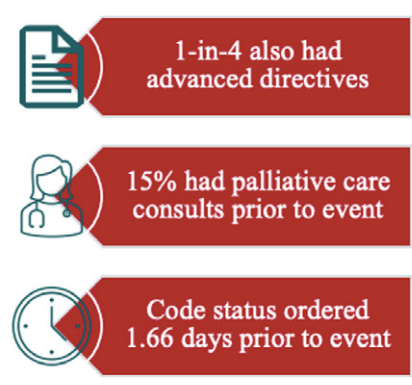


Figure 4. Advanced care planning characteristics of discordantly resuscitated patients.

determined, the authors hypothesized it was likely related to unclear communication and they recommended a CPR committee at all hospitals that reviews CPR events and assesses concordance with the patients' stated wishes.⁹

Additionally, studies investigating discordant CPR in other countries support our findings, with rates of discordant resuscitation between 7.2 and 10.4%. This emphasizes that discordant CPR is not unique to the United States, underscoring the idea that these adverse events occur irrespective of various hospital policies and protocols around the world.¹⁰⁻¹¹

Researchers have also examined cardiac arrest outside of in-hospital settings, including the emergency department and nursing homes. In retrospective chart reviews of emergency department patients, rates of discordant resuscitation range from 14 - 58.46%.¹²⁻¹³ Furthermore, nearly one in four CPR events in nursing homes/residential facilities occur on DNR residents.¹⁴⁻¹⁵ Rates of discordant CPR vary widely in the literature, perhaps due to unique barriers to acquiring and respecting end-of-life wishes in each setting.

The limited number of studies on this subject makes it difficult to determine a universal root cause for these occurrences. However, there are a number of potential causes outlined in the literature. Each institution and locale has their own policies regarding enforcement of DNR status, which can cause confusion.² Additionally, there is a lack of uniformity in handoffs and coloration and symbols in the chart to represent code status all vary by hospital and/or municipality.¹⁶ Furthermore, code status documentation can be incorrect, missing, or challenging to find.¹⁷ The lack of national standards coupled with the immediate inaccessibility of information leads to significant confusion during these time-sensitive events. In fact, around 70% of nursing executives could recall situations in which there was confusion around DNR status which led to "problems in patient care."¹⁸ Other described causes include poor communication within resuscitation teams and lack of communication regarding code status.⁹

There are many potential solutions to mitigate discordant code events. First, improving communication among providers may decrease the frequency of these events. This could be accomplished with national standards to create uniformity of code status symbols and colors for hospitals across the country. Furthermore, standardizing handoffs to include code status and other

advance direct orders as a component of the "checklist," may prompt reinforcement and dissemination of the patient's wishes. Leveraging technology to convey code status may also mitigate these events. For example, this could include a display area for code status on cardiac telemetry monitors, allowing providers to diagnose a malignant arrhythmia and a patient's wishes simultaneously. Additionally, "code blue" activation buttons could have superimposed lighting denoting code status as a reminder. Furthermore, EHR's could prompt documenters in the activated code narrator when the patient's code status is DNR. Lastly, hospitals could establish CPR committees that review all resuscitation efforts and suggest ways to improve CPR events to provide a more systematic approach.⁹ Regardless, it will be critical for future studies to identify the root causes of these events to find the solution that most specifically addresses it.

There are several limitations of our study. First, to identify evidence of discordant CPR events, code status must be documented. However, several studies suggest that code status is often under-documented. In a retrospective cross-sectional study of inpatient medical and cardiology units, only 39% had a code status documented at all.¹⁹ In fact, 31 - 81% of hospitalized patients never discuss resuscitation preferences with their physician prior to cardiac arrest, with 25% of them being DNR.^{16, 20, 21} This suggests retrospective studies, which inherently rely on code status documentation, are likely underestimating the number of discordant resuscitation events. Additionally, specific billing and procedure codes were used to identify patients for our study, meaning our search criteria may not have captured all applicable patients. Finally, the retrospective nature of this study limits our ability to draw conclusions regarding potential causes of these events.

There are several strengths of our study. This study provided a framework on how to use the EHR to identify discordant CPR events. This study also used 10 years of data from a large academic medical center. Finally, this study was done at a single site, which decreased variability in code status documentation.

Conclusion

Hospitalized patients are subjected to cardiopulmonary resuscitation despite their expressed, documented wishes. It was determined that, over a 10-year period at a large academic Midwest medical center, 11.6% of DNR patients who experienced

cardiac arrest had CPR performed, with two patients experiencing discordant resuscitation twice. Further studies are required to understand the prevalence of this issue nationwide, and to better determine the causes of the events. It will be imperative that national standards are established on how best to discuss CPR with patients and their families, document code status, communicate to staff and other hospitals via a formal standardized handoff, and have safeguards in place to prevent unwanted CPR. ■

Reference

- 1 Rabkin Mitchell, G.G., Rice Nancy, Orders Not To Resuscitate. *The New England Journal Of Medicine*, 1976(295): p. 364-366.
- 2 Yuen, J.K., M.C. Reid, and M.D. Fetters, Hospital do-not-resuscitate orders: why they have failed and how to fix them. *J Gen Intern Med*, 2011. 26(7): p. 791-7.
- 3 Field, R.A., et al., Systematic review of interventions to improve appropriate use and outcomes associated with do-not-attempt-cardiopulmonary-resuscitation decisions. *Resuscitation*, 2014. 85(11): p. 1418-31.
- 4 Duplan, K.L. and A.M. Pirret, Documentation of cardiopulmonary resuscitation decisions in a New Zealand hospital: A prospective observational study. *Intensive Crit Care Nurs*, 2016. 37: p. 75-81.
- 5 Søvareid, T.J. and S. Balandin, Nurses' perceptions of attempting cardiopulmonary resuscitation on oldest old patients. *Journal of Advanced Nursing*, 2011. 67(8): p. 1739-1748.
- 6 Calam B, F.S., Andrew R, Discussions of "code status" on a family practice teaching ward: what barriers do family physicians face? *CMAJ*, 2000. 163: p. 1255-1259.
- 7 Brown, M., R. Ruberu, and C.H. Thompson, Inadequate resuscitation documentation in older patients' clinical case notes. *Intern Med J*, 2014. 44(1): p. 93-6.
- 8 Uhlmann, R.F., C.K. Cassel, and W.J. McDonald, Some treatment-withholding implications of no-code orders in an academic hospital. *Crit Care Med*, 1984. 12(10): p. 879-81.
- 9 Robbins, A.J., et al., Discordant Cardiopulmonary Resuscitation and Code Status at Death. *J Pain Symptom Manage*, 2021. 61(4): p. 770-780 e1.
- 10 King, D., Davies, K. N., Cope, C. S. and Silas, J. H., Survey of cardiac arrests and cardiac arrest trolleys in a district general hospital. *The British Journal of Clinical Practice*, 1994. 48(5): p. 248-250.
- 11 G P Findlay, H.S.P., K Kelly BA, M Mason PhD, National confidential enquiry into patient outcome and death. Time to intervene?. 2012: *National Confidential Enquiry into Patient Outcome and Death*. p. 1-124.
- 12 Haddad, G., et al., A descriptive analysis of obstacles to fulfilling the end of life care goals among cardiac arrest patients. *Resusc Plus*, 2021. 8: p. 100160.
- 13 Marco CA, M.S., Bleyer J, Post A., Do-not-resuscitate orders among trauma patients. *Am J Emerg Med*. 2015. 33(12):1770-2. doi: .
- 14 Becker, L.J., et al., Resuscitation of residents with do not resuscitate orders in long-term care facilities. *Prehosp Emerg Care*, 2003. 7(3): p. 303-6.
- 15 Richardson, D.K., et al., Concordance of out-of-hospital and emergency department cardiac arrest resuscitation with documented end-of-life choices in Oregon. *Ann Emerg Med*, 2014. 63(4): p. 375-83.
- 16 Creaney, N.C.a.W.J., 'Do not resuscitate' decisions in continuing care psychiatric patients: what influences decisions? *Psychiatry Bulletin*, 2006. 30: p. 376-378.

- 17 Pitt, U.S.a.B., 'Do Not Resuscitate': How? Why? And When? *International Journal of Geriatric Psychiatry*, 1997. 12: p. 667-670.
- 18 Sehgal, N.L. and R.M. Wachter, Identification of inpatient DNR status: a safety hazard begging for standardization. *J Hosp Med*, 2007. 2(6): p. 366-71.
- 19 AL Mouaalamy NA, H.G., and Lewis D, Documentation of Code Status for Elderly Patients Admitted to a Hospital. *Archives of Medicine*, 2018. 10.
- 20 Vidal Essebag, M.C., Gordon Crelinsten, Routine Advance Directive and Organ Donation Questioning on Admission to Hospital. *Annals RCPSC*, 2002. 35: p. 225-231.
- 21 Delbanco, S.E.B.a.T.L., Choices About Cardiopulmonary Resuscitation In The Hospital. *The New England Journal Of Medicine*, 1984. 310(17): p. 1089-1092.