

Impact of Do-Not-Resuscitate Orders on Nursing Clinical Decision Making

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Objectives: Code status specifies the action that healthcare providers should take in the event of cardiac arrest. Studies have shown, however, that patients with do-not-resuscitate/do-not-intubate (DNR/DNI) orders have worse outcomes and do not consistently receive the standard of care. Several studies have demonstrated that physicians behave differently toward patients with DNR/DNI orders, but little research exists into whether DNR/DNI status affects the practice of other members of the care team. Our objective was to determine whether code status affects decision making by nursing staff.

Methods: This was an anonymous, self-administered survey of nurses between April 2018 and March 2019 using SurveyMonkey. The survey contained four previously published clinical vignettes followed by a series of questions regarding specific interventions tailored to reflect nursing escalation of care. Our focus was two local hospitals: one large academic quaternary-referral center and one large community hospital. Registered nurses on medical-surgical units identified based on available unit-specific e-mail listservs from both hospitals were the participants. Nurses in higher-acuity units were excluded.

Results: Nurses are significantly less likely to call rapid response or a physician when a patient undergoes certain changes in clinical status if the patient is labeled as DNR/DNI rather than full code. For all of the vignettes, respondents were less likely to say they would call rapid response or a physician for patients with a DNR/DNI status who developed tachycardia ($P < 0.001$). Nurses also were less likely to escalate care for patients with DNR/DNI status who developed tachypnea or mental status changes. Nurses were equally likely to call a physician for the development of abdominal pain or new hypotension ($P > 0.05$). Nurses with >3 years of experience were less likely to escalate care throughout the vignettes (odds ratio <1).

Conclusions: This study is the first to demonstrate that code status affects decision making by nursing staff. It highlights the limitations that code status designations create with regard to patient care. By acknowledging that patients with DNR/DNI orders receive different care, we can

create systems in which patients are treated equally, regardless of their code status.

Key Words: advanced care planning, code status, nursing care, nursing clinical decision making

Code status specifies the action(s) that healthcare providers should take in the event of a cardiac arrest. “Full code” indicates that a patient should receive all potential lifesaving interventions, including cardiopulmonary resuscitation (CPR) (eg, chest compressions, defibrillation, vasoactive medications) and intubation. “Do-not-resuscitate” (DNR) and “do-not-intubate” (DNI) orders indicate a patient’s preference to withhold those resuscitative measures. Originally, a DNR status indicated a patient’s imminent death in which CPR was not medically indicated and was intended to be used to avoid suffering inflicted by repeated resuscitation efforts that only prolonged futile care.¹

The American Medical Association first proposed in 1974 that a patient’s wishes regarding his or her code status be documented in the medical record.^{1,2} Before this proposal, making decisions about and communicating a patient’s code status occurred only if a hospital policy had been created on the matter.^{1,3,4} This provided the opportunity for medical personnel to discuss code status decisions with patients and families and to be able to communicate the decision with other medical personnel¹; however, code status orders tend to oversimplify patients’ wishes.^{5,6} These orders are at risk of being interpreted beyond what a patient has designated wanting in the event of cardiac arrest

Key Points

- Although previous studies have evaluated how the code status of patients may affect physician decisions, this is the first study to evaluate how code status may affect the decisions of bedside nurses.
- Patients with a do-not-resuscitate code status are less likely to have their bedside nurses escalate care in the setting of clinical decompensation.
- Code status as a strict binary (full code vs do-not-resuscitate) discourages patients and providers from pursuing nuanced care plans in serious illness; other forms of advanced care planning (“scales of care”) may help patients receive more personalized and appropriate care.

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and being applied to other forms of treatment given in and out of the hospital.^{7,8}

Multiple studies have shown that patients with DNR/DNI status do not receive standard of care and have worse outcomes.^{9–13} For example, patients who sustained a stroke and had a DNR order were less likely to be cared for by a stroke team and less likely to receive aspirin for ischemic strokes.¹¹ In addition, DNR patients admitted to the hospital for acute decompensated heart failure were less likely to receive appropriate medications or testing such as being prescribed angiotensin-converting enzyme inhibitors or having left ventricular function assessed.⁹ Similar findings also were seen in patients admitted to the hospital with acute myocardial infarction.¹⁰ After controlling for severity of illness on admission and several patient and hospital characteristics, one study found that patients with DNR orders were significantly more likely to die in the hospital and within 180 days of discharge.¹²

Previous studies have looked at physician medical decision making to determine whether an association exists that could explain why differences in outcomes occur.^{14–16} A questionnaire sent to resident physicians asked them to review patient charts with DNR/DNI orders and indicate on a checklist which interventions they would withhold.¹⁶ The majority stated they would withhold pacemakers, intensive care unit admission, and vasopressor support. Some physicians also indicated that they would withhold antibiotics and intravenous fluids. Additional surveys of attending and resident physicians using clinical vignettes demonstrated that a DNR order was negatively associated with intent to provide several standard treatments such as placing a central venous catheter or ordering blood cultures.^{14,15}

Although these studies demonstrate that physician decision making is affected by DNR orders, physicians represent just one part of a larger team that cares for hospitalized patients. Little research exists as to whether a DNR status affects the practice of other members of the care team, such as nurses. Nurses are typically the first personnel aware of any changes in a patient's clinical status and often spend more time at the bedside than physicians. Although there have been questionnaires examining the subjective interpretation of DNR orders by physicians and nurses, no study has surveyed nurses regarding care delivery for patients based on code status.^{17,18}

We conducted a survey of nurses at two local hospitals to assess whether a patient's code status affected nursing medical decision making. We hypothesized that nurses presented with identical vignettes would be less likely to consider escalating care (unrelated to CPR) in response to a clinical decline in patients with DNR/DNI status as compared with those patients who were full code.

Methods

Survey Design

We used a survey instrument containing four clinical vignettes that involved hospitalized patients suffering from several serious

illnesses. All four vignette stems had previously been published in different studies examining physician behaviors relating to code status.^{12,15} The previously published studies using these vignettes asked questions regarding physician escalation of care, and this was modified to reflect nursing scope of practice and escalation of care. A series of six questions followed each vignette asking whether the responder would agree with performing specific interventions for that patient, primarily relating to calling rapid response or the treating physician. Specifically, the first four questions ask whether the individual would call rapid response or the physician, and the last two questions ask only whether the individual would call the physician. Most of the questions involved changes in vital signs, and all six were common to each scenario (Table 1).

Respondents used a yes/no response to indicate whether they would choose to call rapid response or the provider if they were caring for the patient in the vignette. We adapted two final versions of the survey that included the same four clinical vignettes but differed in the code status (full code vs DNR/DNI) assigned to each vignette.¹⁵ Each survey included two vignettes with full code status and two vignettes with DNR/DNI status (Table 1). Finally, the survey asked basic demographic data about race/ethnicity, sex, and years of experience as a registered nurse.

Survey Administration

We surveyed registered nurses working on medical-surgical floors at a large academic quaternary-referral center and a large academic safety-net hospital. We used a self-administered, anonymous online questionnaire administered through SurveyMonkey

Table 1. Summary of vignettes and code status associated with each version of the survey

| Case description | Code status | |
|--|-------------|-----------|
| | Survey A | Survey B |
| Vignette 1: 72-year-old man with multiple myeloma and dementia, admitted from nursing facility with sudden change in mental status | DNR/DNI | Full code |
| Vignette 2: 34-year-old man with AIDS, admitted with presumed recurrent PCP | Full code | DNR/DNI |
| Vignette 3: 48-year-old woman with likely metastatic breast cancer admitted with postobstructive pneumonia | DNR/DNI | Full code |
| Vignette 4: 80-year-old recently treated as an outpatient for community-acquired pneumonia, admitted with <i>Clostridium difficile</i> infection | Full code | DNR/DNI |

AIDS, acquired immunodeficiency syndrome; DNI, do not intubate; DNR, do not resuscitate; PCP, pneumocystis carinii pneumonia.

(Palo Alto, CA). Study participants were identified based on available e-mail listservs from unit-specific listservs from both hospitals. Potential subjects were sent e-mails if they were registered nurses on medical or medical-surgical units at either of the included hospitals. Nurses in higher-acuity units (eg, intensive care units, progressive care units) were excluded. Study participants were invited to voluntarily participate in these questionnaires through work e-mails sent between April 2018 and March 2019. Reminder e-mails were sent during the study period. In addition, we posted a research flyer at participating nursing units that included a link to the survey as well as a QR code that could be scanned by using a smartphone. As an incentive to participate, the unit at each hospital with the highest percentage of completed surveys won a catered meal from the study team.

Consent was obtained electronically before completing the survey. Questionnaire data were stored and uploaded to SurveyMonkey and remained nonidentifiable and accessible only to study researchers. After completing the survey, we revealed to the participants that the purpose of the study was to assess whether code status affects decision making and that this was withheld initially to avoid potential bias. Respondents were then given another opportunity to agree to have their data collected for analysis after learning the goal of the research. The surveys and protocol received approval from the institutional review board at Emory University.

Statistical Analysis

A test of the equality of binomial proportions was used to determine whether nurses are equally as likely to intervene with patients with DNR/DNI and full code preferences. Multivariate analyses also were conducted to assess this relationship. A logistic regression model was fit to each survey question to estimate the effect of patients' DNR decisions on the log-odds of nurse intervention when an adverse health event occurs. We also included the nurse's sex, race, and years of experience as covariates that affect the likelihood that a nurse intervenes. A Bonferroni correction was applied to control the family-wise error rate at 0.05 in all univariate and multivariate analyses.

Results

A total of 358 nurses responded to our survey (194 to survey A and 164 to survey B). There were more respondents from the academic quaternary referral hospital (271) than from the academic safety net hospital (88). We are unable to determine exactly how many nurses received an e-mail, saw the flyer regarding the survey, or both to calculate a response rate. Respondent characteristics were similar between the two surveys (Table 2). Approximately 90% of the respondents were female, and almost 65% had >3 years of experience. Approximately 45% were white and the division of racial and ethnicity subtypes were similar in each group.

Patient code status significantly affected nursing decision making, as shown in Table 3. Across all four vignettes, nurses

Table 2. Respondent demographics

| Nursing characteristics | Survey A (N = 194) n (%) | Survey B (N = 164) n (%) |
|--|--------------------------------|--------------------------------|
| Race | | |
| Asian or Pacific Islander | 21 (11) | 14 (9) |
| Black or African American | 59 (30) | 56 (34) |
| Hispanic, Latino, or of Spanish origin | 5 (3) | 4 (2) |
| Multiple race/other | 13 (7) | 6 (4) |
| Prefer not to answer | 7 (4) | 6 (4) |
| White | 89 (46) | 78 (48) |
| Sex | | |
| Female | 173 (89) | 147 (90) |
| Male | 17 (9) | 14 (9) |
| Prefer not to answer | 4 (2) | 3 (2) |
| Experience | | |
| >3 y | 125 (64) | 103 (63) |
| <3 y | 69 (36) | 61 (37) |

were less likely to call rapid response or a physician if a patient developed tachypnea (range 89.7%–90.3% for DNR/DNI vs 98.2%–100% for full code; $P < 0.001$ for all of the scenarios). For three of four vignettes, nurses were less likely to call rapid response for tachycardia to heart rate 140s (range 87.9%–93.3% for DNR/DNI vs 97.4%–99% for full code; $P < 0.001$) or change in mental status (range 83.5%–92.7% for DNR/DNI vs 98.5%–99.4% for full code; $P < 0.001$). Nurses demonstrated similar trends in regard to calling rapid response or a physician for acute oxygen desaturation (only significant in 1 vignette), newly hypotensive to <90/60 (only significant in 1 vignette), or developed abdominal pain (no significant difference in any of the vignettes). Most of these clinical scenarios are criteria to call for rapid response according to hospital policy.

Finally, we examined whether specific nursing characteristics affected responses to each question. The Figure demonstrates the impact that the number of years of experience has on how likely a nurse would be to call rapid response or a physician. Regardless of code status, for half of the vignettes, nurses with >3 years of experience were less likely to call rapid response or a physician if a patient had worsening tachypnea, change in mental status, or worsening abdominal pain (odds ratio <1). Other nursing characteristics such as sex and race did not appear to significantly affect decisions about whether to escalate care.

Discussion

In a survey of medical-surgical nurses at two large academic hospitals, we demonstrated that nurses respond differently to patients based on their code status. Specifically, if a patient developed tachypnea, tachycardia, or a change in mental status, nurses said they were less likely to call rapid response or a physician if a patient had a code status of DNR/DNI. There did not

Table 3. Responses to clinical vignettes

| Vignette | Intervention | Full code | DNR/DNI | P |
|--|--|-----------|---------|----------|
| 72-year-old man with multiple myeloma and dementia, admitted from nursing facility with sudden change in mental status | Call rapid response or physician if new tachycardia to heart rate 140s | 97.4 | 87.9 | 0.0004* |
| | Call rapid response or physician if worsening tachypnea | 99 | 90.9 | 0.0003* |
| | Call rapid response or physician if new, acute change in mental status | 98.5 | 89.7 | 0.0003* |
| | Call rapid response or physician if acute oxygen desaturation | 92.3 | 95.2 | 0.27 |
| | Call physician to evaluate if new or worsening abdominal pain | 93.8 | 93.9 | 0.96 |
| | Call physician to evaluate if newly hypotensive to <90/60 | 96.4 | 92.7 | 0.12 |
| 34-year-old man with AIDS, admitted with presumed recurrent PCP pneumonia | Call rapid response or physician if new tachycardia to heart rate 140s | 98.8 | 90.2 | 0.0006* |
| | Call rapid response or physician if worsening tachypnea | 100 | 90.7 | <0.0001* |
| | Call rapid response or physician if new, acute change in mental status | 99.4 | 83.5 | <0.0001* |
| | Call rapid response or physician if acute oxygen desaturation | 98.8 | 88.1 | <0.0001* |
| | Call physician to evaluate if new or worsening abdominal pain | 93.9 | 89.2 | 0.11 |
| | Call physician to evaluate if newly hypotensive to <90/60 | 98.8 | 89.2 | 0.0002* |
| 48-year-old woman with likely metastatic breast cancer admitted with postobstructive pneumonia | Call rapid response or physician if new tachycardia to heart rate 140s | 99 | 90.3 | 0.0002* |
| | Call rapid response or physician if worsening tachypnea | 99.5 | 93.3 | 0.0012 |
| | Call rapid response or physician if new, acute change in mental status | 99 | 92.7 | 0.0023 |
| | Call rapid response or physician if acute oxygen desaturation | 94.3 | 97 | 0.23 |
| | Call physician to evaluate if new or worsening abdominal pain | 97.4 | 95.2 | 0.25 |
| | Call physician to evaluate if newly hypotensive to <90/60 | 93.8 | 91.5 | 0.40 |
| 80-year-old recently treated as an outpatient for community-acquired pneumonia, admitted with <i>Clostridium difficile</i> infection | Call rapid response or physician if new tachycardia to heart rate 140s | 97.6 | 89.7 | 0.0029 |
| | Call rapid response or physician if worsening tachypnea | 98.2 | 89.7 | 0.0011 |
| | Call rapid response or physician if new, acute change in mental status | 99.4 | 90.7 | 0.0003* |
| | Call rapid response or physician if acute oxygen desaturation | 97 | 89.2 | 0.0045 |
| | Call physician to evaluate if new or worsening abdominal pain | 97.6 | 94.3 | 0.13 |
| | Call physician to evaluate if newly hypotensive to <90/60 | 98.8 | 91.8 | 0.0023 |

AIDS, acquired immunodeficiency syndrome; DNI, do not intubate; DNR, do not resuscitate; PCP, pneumocystis carinii pneumonia.

*Statistically significant.

seem to be a robustly significant difference in the rates of escalating care if a patient developed acute oxygen desaturation, became newly hypotensive, or developed abdominal pain.

Multiple studies have shown that changes in vital signs account for a large portion of rapid response calls, and this could explain the tendency of nurses to be more likely to call for tachycardia and tachypnea.^{19,20} Most vignettes also were significantly different for changes in mentation. Mental status changes typically are associated with changes in vital signs or usually precede them if they have not developed yet.²¹ In one study, a change in mental status was seen in 37% of cardiac arrest cases and no control cases.²²

Although blood pressure and oxygen desaturation also are vital signs, neither led nurses to escalate care in most of the vignettes. The development of hypotension to <90/60 could be too high of a blood pressure cutoff to see a statistical difference between full code and DNR/DNI patients. Regarding the development of oxygen desaturation, this difference could be related to nurses recognizing that tachypnea is a better indicator of poor outcomes (eg, cardiac arrest, mortality) when compared with other vital signs such as hypoxia.^{23,24} Furthermore, data show that nurses and junior doctors tend to have a poor understanding of the correlation between pulse oximetry and ventilatory status,

which could lead to more uncertainty about what to do if an acute change develops.²⁵

Another interesting point to consider concerns the wording of the last two responses, which only state “call the physician” rather than “call rapid response or the physician.” The last two questions ask survey takers whether they would call the physician if the patient was to either develop worsening abdominal pain or become newly hypotensive to <90/60. The rate of calling the physician did not significantly differ across the vignettes for abdominal pain and was only significantly different in one vignette (34-year-old patient with acquired immunodeficiency syndrome [AIDS]) for hypotension. Overall, the lack of statistical significance appears to be due to respondents saying they would not call for the full code patient rather than to an increase in respondents saying they would call for a DNR/DNI patient. This could suggest that nurses overall feel more comfortable calling rapid response instead of physicians for these changes in clinical status. Rapid response teams were created to assist with the care of patients at risk of developing cardiac arrest or other life-threatening conditions.^{26–28} Although anyone can summon the rapid response team, research has shown that nurses most frequently use them.^{26,29,30} A literature review examining the nursing use of rapid response found that nurses more frequently

Effect of Years of Experience on Decision to Call Rapid Response or Physician

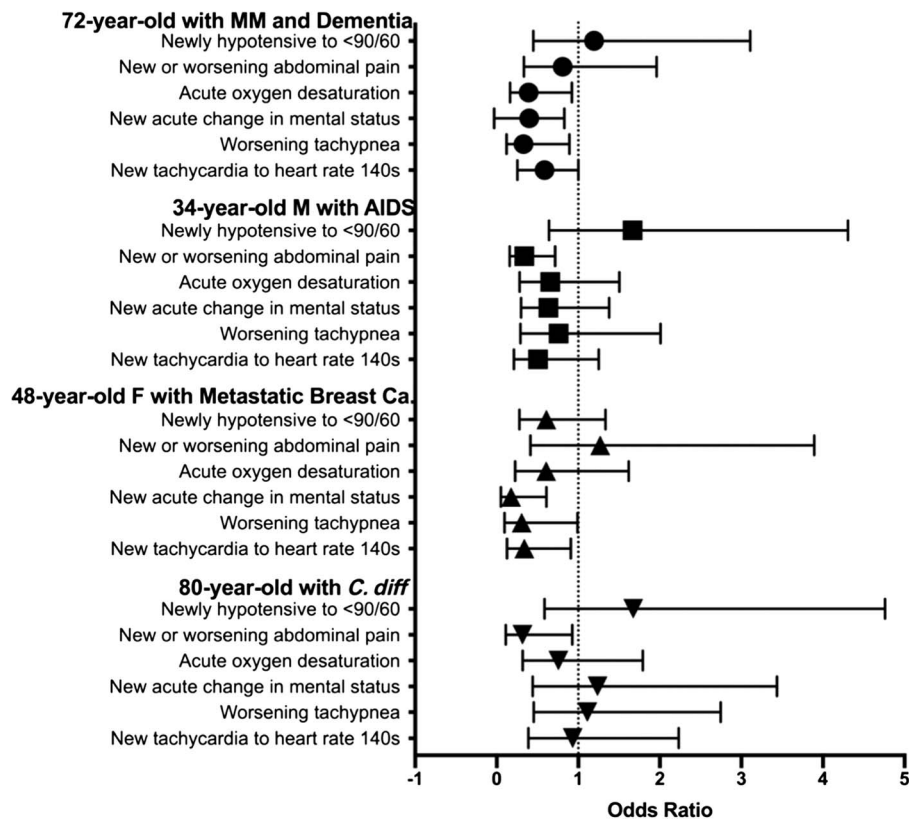


Fig. The odds ratio for each question in all of the vignettes regarding whether a nurse would call the physician or rapid response based on number of years of experience regardless of code status. An odds ratio <1 suggests that nurses with >3 years of experience are less likely than nurses with <3 years of experience to call rapid response or a physician. AIDS, acquired immunodeficiency syndrome; *C. diff*, *Clostridium difficile*; mm, multiple myeloma.

called the physician/medical team rather than rapid response.³¹ Our findings suggest that there may be a higher threshold for calling the physician alone rather than rapid response, however.

When evaluating patterns of significance within the vignettes, concerns for potential biases against patient characteristics arise. For example, the 34-year-old patient with AIDS mentioned above was emblematic of the most statistically significant decreases in respondents saying they would escalate care (all but one question: abdominal pain); however, a 48-year-old woman with metastatic breast cancer and a 80-year-old with *Clostridium difficile* infection both only had one statistically significant difference when the nurses were asked about escalating care based on code status. Previous research using these vignettes with residents also demonstrated less willingness to provide interventions based on code status to the young patient with AIDS and more willingness to provide interventions to the woman with metastatic breast cancer.¹⁵ This raises concerns that value judgments regarding a specific disease process may affect nurse decision making in this survey similar to how it affects resident decision making.¹⁵

Finally, the effect that years of experience has on willingness to call rapid response or a physician is interesting but possibly to

be expected. We found that nurses with >3 years of experience were overall less likely to call rapid response or the physician regardless of a patient's code status. Nursing intuition may play a role as experienced nurses may feel more comfortable managing changes in patient status before escalating care.³¹ There did not seem to be a difference whether the question included rapid response; however, previous studies demonstrated that experienced nurses were more likely than inexperienced nurses to call rapid response.³¹ It is believed that nursing intuition develops over time and may play a role in how quickly an inexperienced nurse versus an experienced nurse may escalate care.^{19,21}

As previously mentioned, to our knowledge, this is the first study to examine and demonstrate that code status affects nurse clinical decision making. An additional strength includes the random allocation of code status assignments in the two survey formats. This allowed us to isolate the effect code status has on nurses' decision making, which would not be possible with other study designs. Finally, nurses who responded to the survey overall appear to be representative of national averages regarding their demographic information. Respondents were 89% female, with the most common race being white, followed by African American and Asian.³²

There are a few limitations to this study as well, including the hypothetical nature of the clinical vignettes. Nurses were unable to further triage a patient as they may normally do before having to make the decision to escalate care. There are restrictions in generalizing the applicability of these findings to real-world events because the scenarios are theoretical. Although vignettes provide valuable insight into beliefs about a specific situation, they do not necessarily demonstrate the actual action a respondent may take.³³

A further limitation includes our inability to calculate a response rate. Given that the survey link was sent out via e-mail as well as posted on flyers in break areas, a denominator cannot be determined. As such, we cannot determine the extent to which respondents represent those who did not respond. We cannot be confident that the answers given by the respondents reflect the practice of other nurses who did not fill out the survey.

Conclusions

This multicenter study is the first to demonstrate that code status affects nurse clinical decision making. It joins a growing body of research that demonstrates the limitations that code status designations create in regard to patient care.^{2–8} Code status does not adequately translate a patient's preferences for what he or she would like done in various clinical scenarios, and patients with DNR/DNI status frequently state wanting otherwise aggressive measures.^{5,34,35}

Alternatives to code status orders should be considered to better represent patients' wishes to the care team. For example, certain proposals outline using "scales of care" rather than a simple DNR/DNI order.³⁶ These scales outline a continuum of care that allows patients to choose from one of four "care packages" ranging from comfort care measures to full aggressive measures.³⁶ Another frequently mentioned approach includes implementing physician/provider orders for life-sustaining treatment.^{5,15,34,37} These forms help determine and outline a patient's preferences regarding various interventions beyond simply code status and help better predict what measures a patient would want in different scenarios.⁵

Although changes to the way we document code status itself can improve patient care, educational initiatives can additionally be implemented to improve care delivery for patients with DNR/DNI status. Interdisciplinary educational initiatives can improve awareness of this issue for all members of the care team because this effect has been demonstrated at the provider and nursing levels. For example, extensive ethics educational interventions improve care delivery to patients with DNR/DNI orders in regard to their wishes outside code status.^{38,39} In addition, a 1-hour teaching intervention has helped nurses take patients' preferences into account when choosing nursing interventions for patients.⁴⁰ By acknowledging and addressing that patients with DNR/DNI orders receive different care, we can work to create a system in which patients are treated equally regardless of their choice of code status.

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