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# Hospital factors that influence ICU admission decision-making: a qualitative study of eight hospitals

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## Abstract

**Purpose:** Some hospitals in the United States (US) use intensive care 20 times more than others. Since intensive care is lifesaving for some but potentially harmful for others, there is a need to understand factors that influence how intensive care unit (ICU) admission decisions are made.

**Methods:** A qualitative analysis of eight US hospitals was conducted with semi-structured, one-on-one interviews supplemented by site visits and clinical observations.

**Results:** A total of 87 participants (24 nurses, 52 physicians, and 11 other staff) were interviewed, and 40 h were spent observing ICU operations across the eight hospitals. Four hospital-level factors were identified that influenced ICU admission decision-making. First, availability of intermediate care led to reallocation of patients who might otherwise be sent to an ICU. Second, participants stressed the importance of ICU nurse availability as a key modifier of ICU capacity. Patients cared for by experienced general care physicians and nurses were less likely to receive ICU care. Third, smaller or rural hospitals opted for longer emergency department patient-stays over ICU admission to expedite interhospital transfer of critically ill patients. Fourth, lack of clarity in ICU admission policies led clinicians to feel pressured to use ICU care for patients who might otherwise not have received it.

**Conclusion:** Health care systems should evaluate their use of ICU care and establish institutional patterns that ensure ICU admission decisions are patient-centered but also account for resources and constraints particular to each hospital.

**Keywords:** Intensive care unit, ICU triage, ICU admissions, Qualitative research

## Introduction

Intensive care is recognized as lifesaving for some patients but non-beneficial, costly, and even harmful for others [1–4]. Guidelines for intensive care unit (ICU) admission recommend patients receive care based solely on their ability to benefit [5]. “ICU benefit” has traditionally been defined at the patient-level, as a function of a patient’s severity of illness, likelihood of survival, and treatment preferences [6].

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Yet, the degree of variability in ICU use between hospitals substantially exceeds that which can be explained by observable variation in severity of illness or treatment preferences. Some hospitals in the United States (US) use intensive care 20 times more than others, suggesting there are additional, unrecognized drivers of ICU admission [7].

There is a need for a more complete understanding of how ICU admission decisions are made. We adopted a strategy of open-ended inquiry, working on the assumption that clinicians in practice have identified other hospital-level factors important to decision-making—factors that may be overlooked in guidelines and quantitative work. We sought to identify these factors to build upon the current paradigm focusing on severity of illness and preferences, support the development of next-generation guidelines, and refine the use of intensive care.

## Methods

To understand hospital-level factors that influence ICU admissions, we conducted clinical observations and one-on-one interviews with health care staff involved with ICU triage at eight hospitals. We focused on how ICU admission decisions might be made for patients who could reasonably receive ICU or general care (i.e., those without obvious indications for ICU care). ICU use for these patients is highly variable and most likely to be influenced by hospital factors [1, 2, 4, 5, 8]. In contrast, patients with clear ICU indications (e.g., those receiving invasive mechanical ventilation or vasopressors) nearly always receive ICU care in the US [1, 6, 9, 10].

### Hospital selection

Eight unaffiliated US hospitals in Michigan were selected for variation across four dimensions: ICU admission rates, number of ICU beds, teaching status, and rurality. Additional details about hospital selection, interviews, and data analysis are in Appendix A in supplementary material.

### Site visits

A primary informant was identified at each hospital to guide site visits and recruitment. Prior to the site visit, the primary informant (typically an ICU nurse supervisor) completed a survey of hospital characteristics (Appendix B in supplementary material) and a semi-structured interview to understand hospital context (Appendix C supplementary material). A preliminary diagram was then created to describe the ICU admission process (Appendix D supplementary material). It was used to inform site visits and as a discussion prompt in interviews.

## Take-home message

This qualitative study, with direct clinical observations and 87 staff interviews in eight hospitals in the United States, found four hospital-level factors that influenced intensive care unit (ICU) admission practices: (1) availability of ICU beds or alternative care locations; (2) availability, experience, comfort, and rapport of staff; (3) the hospital's place in the hierarchy of interhospital transfer networks; and (4) hospital policies related to ICU admission. Health care systems should evaluate their use of ICU care to ensure that ICU admission decisions are centered around the needs of their critically ill patients while also considering the resources and constraints of their hospitals

Site visits were conducted by TSV, an ICU physician and health services researcher, and JM and LM, research assistants with training in sociology. Site visits included guided hospital tours and observations of routine care. Field notes were collected during site visits (Appendix E supplementary material).

### Interviews

Participants were purposively sampled based on their roles within hospitals: physicians, nurses, and other key informants (e.g., bed managers, quality officers). Between eight and 12 participants were recruited at each site [11].

Separate interview guides were developed specific to ICU physicians, emergency department (ED) or hospitalist physicians, and other key informants (Appendix C supplementary material). Interview guides were pilot tested with ten physicians and nurses from an academic medical center that did not participate. These data were used to refine the interview guides and develop a draft codebook.

One-on-one, semi-structured interviews were conducted by JM or LM. Interviews lasted 30–75 min and were transcribed verbatim by a medical transcriptionist. All data were collected from May 2019 to February 2020. We used the Journal Article Reporting Standards for Qualitative Research to report this study [12].

### Data analysis

Analysis of field notes and interviews occurred iteratively with data collection. Interpretive description, an inductive approach to context-sensitive qualitative inquiry in clinical settings, framed the analysis [13, 14]. Four study team members (TSV, AS, LM, KL) iteratively developed a codebook and identified themes through discussion (Appendix F supplementary material).

### Results

The study team spent 40 h observing ICU operations in the eight hospitals. Of 120 individuals identified for recruitment, 33 did not participate in the study. Most

non-participants were ED or general care physicians from larger hospitals, who were unable to be contacted or did not respond to interview requests. Eighty-seven participants were interviewed: 20 ICU physicians (with five ICU directors); 15 ED physicians; 17 hospitalists (with four who worked in both general and ICU care); 16 ICU nurses; eight ED, general care, or rapid response nurses; and 11 other staff (including supervisors, advanced practice professionals, transfer staff, and bed managers) (Table 1).

ICU admission rates ranged from 3 to 21% across hospitals. Three of eight hospitals were in rural areas, and four were teaching hospitals. ICU bed capacity ranged from eight to 156. Half of hospitals had closed admission models (i.e., patients were admitted under the sole care of intensivists). In varying combinations, most hospitals employed intensivists, utilized advanced practice professionals in ICUs, or had intermediate care units (Table 1). ICU admission processes varied substantially across hospitals (Appendix D supplementary material).

We identified four hospital-level factors influencing whether a patient might receive ICU care: (1) availability of ICU beds or alternative care locations; (2) availability, experience, comfort, and rapport of

staff; (3) the hospital's place in the hierarchy of inter-hospital transfer networks; and (4) hospital policies (actual and perceived) related to ICU admission (Fig. 1).

#### Availability of ICU beds or alternative care locations

Participants spoke about ICUs routinely operating near capacity (Table 2, quotations 1–3 (Q1-3)), which triggered difficult conversations about patient placement. To accommodate new patients, existing ICU patients were often reevaluated and rapidly transferred out of ICUs to free up space (Q3-4). However, this became complicated when no existing ICU patients were ready for transfer to general care or when general care units in the hospital were also at capacity.

During these situations, clinicians were forced to identify alternatives to ICU care. Boarding critically ill patients in EDs when ICU beds were unavailable was common across hospitals. For example, Hospital E had a special ED location with ICU-trained ED staff for patients waiting for an ICU bed. Since they were able to provide ICU-level care, ED providers reported their patients were often at lowest priority for ICU beds compared to general care patients and incoming interhospital transfers. This resulted in further delay in ICU admission

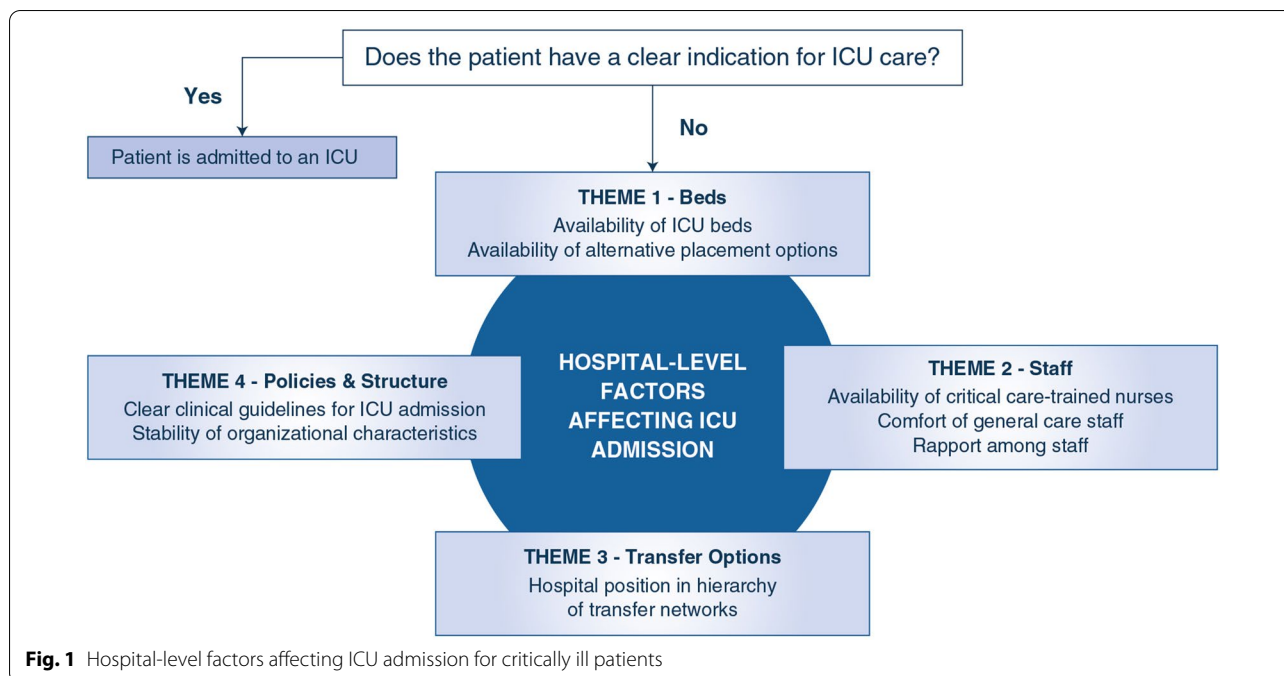
**Table 1 Hospital and participant characteristics**

Hospital	A	B	C	D	E	F	G	H
<b>Hospital characteristics (Total N=8)</b>								
Admission model	Open	Closed	Open	Open	Closed	Closed	Open	Closed
<i>Primary ICU physician</i>								
Hospitalists	Yes	No	Yes	No	No	No	Yes	No
Intensivists	No	Yes	No	Yes	Yes	Yes	Yes	Yes
APPs <sup>a</sup> in ICU	Yes	No	No	Yes	Yes	Yes	No	Yes
Intermediate care	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Total ICU beds (N) <sup>b</sup>	1–19	1–19	1–19	40–59	60+	20–39	40–59	20–39
ICU admission rate	3%	12%	14%	7%	21%	9%	15%	16%
Teaching hospital	No	Yes	No	Yes	Yes	Yes	No	No
Rural/urban	Urban	Urban	Rural	Urban	Urban	Urban	Rural	Rural
<b>Participant characteristics (Total N=87)</b>								
N per hospital	10	8	8	15	15	9	9	13
Age (range)	32–61	36–63	29–62	27–60	28–47	31–64	35–61	29–56
Gender (% women)	40%	38%	25%	53%	47%	44%	44%	46%
Ethnicity (% White <sup>c</sup> )	80%	88%	75%	60%	67%	100%	100%	62%
<i>Role at hospital</i>								
Nurse	3	2	1	5	3	1	3	6
Physician	5	4	5	10	12	5	5	6
Other	2	2	2	0	0	3	1	1

<sup>a</sup> Advanced practice professionals (APPs)

<sup>b</sup> Ranges provided to avoid unmasking hospitals

<sup>c</sup> Non-Hispanic, Non-Middle Eastern



for these ED patients and conflict about which patients should be prioritized for open ICU beds (Q5).

Intermediate care units provided an alternative care location for patients deemed too sick for general care but not ill enough for ICU care (Q6-7). Participants at hospitals without intermediate care described decision-making as more “binary” than hospitals with intermediate care (Q8-9).

#### Availability, experience, comfort, and rapport of staff

Participants described ICU admission as dependent on an ICU bed but also, critically, on the availability of an ICU nurse (Q10–11). Hospital C, for example, had nine ICU beds, and the nurse-to-patient ratio was 1:2. Typically, this ICU staffed four nurses per shift, who could care for eight patients. However, if a ninth ICU patient were to be admitted, two options were available. A fifth nurse could be called in to work; however, it often took hours for an on-call nurse to arrive. Alternatively, a nurse with ICU experience could be shifted from another hospital unit. To prevent shortages, nurses described keeping patients in the ICU longer than necessary to maintain nurse staffing (Q12–13).

There were times when patients were admitted to ICUs because general care staff were uncomfortable caring for higher-acuity patients, even if ICU staff felt the patient did not require ICU-level care (Q14). Participants spoke about recognizing different staff members’ levels of comfort and experience: “It’s important to maintain collegial relations with everyone in the hospital, so if

someone genuinely wants someone in the ICU, I don’t put up a big fight” (ICU physician/director, Hospital F).

Experience also varied by hospital size. Patients in smaller hospitals were more likely to be admitted to ICUs (Q15) or transferred out of the hospital for higher levels of care: “We have very limited resources, we’re in the middle of nowhere, there aren’t a lot of specialists. If there are, they’re at home sleeping. If a patient decompensates, it’s...us against the world” (ED physician, Hospital C). This reliance on ICUs to care for patients who might receive general care at other hospitals ran the risk of perpetuating a cycle in which general care staff had fewer opportunities to gain experience caring for sicker patients, resulting in increasing dependence on ICU care over time (Q16). Over-reliance on ICUs was also a common source of dissatisfaction among ICU nurses, who disliked when patients were placed in ICU care for reasons such as increased nursing attention (Q17–18).

A culture of direct communication and rapport between units and staff contributed to decreased ICU admissions. One hospitalist described an incident in which she decided to keep a sick but stable patient in general care with a bedside nurse whom she trusted, despite protests from the charge nurse (Q19).

#### Hierarchy of interhospital transfer networks

The role of interhospital transfers on ICU admissions differed depending on the hospital’s place within the hierarchy. The largest hospitals (Hospitals D and E) had

**Table 2 Illustrative quotations**

Sub-themes	Illustrative quotations	Hospital	Role
<b>THEME 1: Availability of ICU beds or alternative care locations</b>			
ICUs operating near full capacity	1: The only time it gets complicated is on a day like today, where literally every bed in our hospital is full. I think of our eight ICU beds only one person right now is actually ICU status. Yes, that complicates things in the sense that we can't accept more ICU patients because we don't have rooms, but we don't have rooms anywhere in the hospital	A	Physician Assistant
	2: Our ICUs probably run at 95 to 100% capacity daily. For example, today we have absolutely not one MICU bed. We have not one surgical ICU bed. The only beds we have in-house are cardiac ICU right now, and there's only a few there. So we're completely full. And we have [over 150] ICU beds	E	Rapid Response Nurse
	3: Our units are typically high capacity. We often don't have many beds available. So...if you want to admit somebody, then you need to have a backup plan to move someone else out because I don't have a bed or I don't have staff	H	ICU Nurse Supervisor
Discharging ICU patients to free up ICU beds	4: [When there are no ICU beds] I have to look at who's in ICU and is there somebody we can transfer out of ICU. If there is, then we free up the ICU bed. And if there's not, then we have to look at the patient who potentially needs an ICU bed and try to make the best decision. Do I think the patient's going to respond and get better? Can they stay where they are now? Or do I need to consider transferring them to another hospital out of our community? Generally, it's resolved with good communication between two providers, or a nursing supervisor and the ICU provider, to take a close look at the patient population in the ICU and try to identify one or two patients that, "Hey, they probably could come out of ICU," so as to make a bed available for a more acutely ill patient. Because we try to not transfer people [to another hospital] too often	C	Co-Chief Hospitalist
Boarding patients in EDs	5: The ER can literally be drowning and because most of the critical care patients who get transferred in will physically roll through the ER—whether they land on the chopper pad and come through the ER, or the ambulances park outside the ER and they come through there—and we will be sitting on five, six, ten boarders [who need an ICU bed] and you're just watching a constant stream of outside transfers coming through. We try to develop good relationships with the MICU bed coordinators, so we'll have some very candid conversations where we're like, "I'm drowning down here, I need beds." And they'd say, "I'd love to give you a bed, but I'm taking an outside transfer from an ICU bed at another hospital that we've decided to take first." And it's a punch in the gut when you're sitting on so many patients that you're just trying to decompress and get rid of and, "Wait, you're taking a patient that's sitting already in an ICU bed at another outside hospital, and you're taking that over us?"... And that's systemic. [Hospital E] prides itself on "we never say no." They try to have a very open transfer policy; that's just philosophically how they've decided to do business. So I can complain about it all I want, but ultimately I'm complaining against a philosophy of the health system	E	ED Charge Nurse
Intermediate care as alternative to ICU	6: If there's no intermediate care, then there's gonna be a lot of patients that don't need ICU in the ICU... I mean, when you admit someone, they're coming in sick, you don't know which direction they're gonna turn. So no one's gonna take a risk and put them on the medical ward, so my guess is, most of them would go to the ICU in the hospital that doesn't have intermediate care	D	Chief Internal Medicine Resident
	7: I think that sometimes [hospitalists] put some of their slightly more complex patients in the intermediate care because our ICU nurses are higher trained as far as acuity of patients go. I think they trust our judgment more. So, if there's a problem, we can let the physician know that we recognize the problem sooner perhaps than somebody else would, and sort of just send them a page saying what we need and then they would assess and put the orders in. They have less work to do, typically with those type of patients just because they put them in our unit... I think that it actually takes some of their burden off	F	ICU Charge Nurse

**Table 2 (continued)**

Sub-themes	Illustrative quotations	Hospital	Role
No intermediate care in hospital	8: I have more binary options in this ED. If they're going to be admitted, they're either going to go to the floor or to the ICU. So I think that opens up a lot of patients that potentially end up needing to go to the ICU	E	ED Physician
	9: If we don't have that middle ground, you have to assume the worst-case scenario and escalate care. I think there's a "when in doubt put them in ICU" kind of mentality, because there isn't that middle ground... As patients get better after a couple days in ICU, you might hold onto them longer in ICU, knowing that the thing you're trying to avoid is them going to the floor and then have them be transferred back to the ICU if they begin to deteriorate. So you tend to hold onto patients longer, if there isn't a dedicated step-down area	G	Chief Hospitalist
<b>Theme 2: Availability, experience, comfort, and rapport of staff</b>			
Nurses as important as beds	10: They will occasionally tell us that [the ICU is] full. Although, I want to draw a distinction for you that when they say they're full, it's usually not that there is no other physical beds and rooms. It's that they're at their maximum patient capacity for the current nursing staffing levels. So "full" usually means we have five nurses, ten patients—so we're full. And I would say that I encounter that as a roadblock to someone being admitted once per week maybe	B	Hospitalist
	11: I do know at night not all nurses are capable of caring for patients in the ICU. Not everybody wants to work nights. I do know there are issues, or there have been times where the bed might be there but there isn't a nurse that's available to take care of patients	C	Co-Chief Hospitalist
Strategies to increase nursing staff	12: Sometimes ICU, they'll have a call in, or they are not staffed to grid. They'll pull a nurse from [another unit] to work in ICU... [Later] the supervisor will ask the ICU, do you have any transfers out? "Oh, no. I don't think so. I don't think we have any transfers out. Not today." Then what ends up happening is, because they don't want to give up that nurse, they [will keep patients in the ICU]. They'll hold on to their patients and sit on them until another patient comes in, because they don't want to get rid of that nurse. Because if they give up that nurse, that's not a guarantee that that nurse is coming back either	B	Staffing Office Manager
	13: Sometimes we pull med-surg nurses to [intermediate care/IMC] in order to pull [an IMC] level nurse to the ICU, which is a little uncomfortable to them but at least they have more [critical care] knowledge than the med-surg nurse. Sometimes we pull directly from med-surg to ICU, just so there's another set of eyes and hands. They can't necessarily take care of the ICU patients, but they can help and assist	H	General Care Nurse
Comfort of non-ICU staff	14: There are some clinical conditions that I don't feel need ICU management. One could argue that since I'm the critical care doc, and I'm comfortable with the severity of illness, I could manage them out on the floor. But if an internist feels that the severity of illness is out of their scope of management, then they don't want to manage them on the floor and need to manage them in the ICU. So there lies the challenge of, "Does the patient actually need ICU care, or is the provider not comfortable with the level of severity of illness?"	F	ICU Physician
Comfort in small hospitals	15: Our hospitalists probably send people that don't really need to go to the ICU, to the ICU. Unfortunately, a lot of times the reasons that I hear them say—I understand where they're coming from, but I don't really like it because I think that they're band-aiding a problem instead of fixing it. They'll say that there's not enough nurses at night on the floor or a lot of the nurses are young and don't know what they're doing. There's just a lot of reasons that people end up in ICU. It makes me cringe a little bit. Why don't we fix some of those problems rather than sending everybody to the ICU? But I get it from their standpoint... I can understand them wanting that little bit of a safety net	C	ED Physician/ Director



**Table 2 (continued)**

Sub-themes	Illustrative quotations	Hospital	Role
Discomfort leading to inappropriate patient placement	16: Sometimes when we admit a patient that is sicker to the floor, the nurses on the floor will throw a fit. They'll call, "We just looked at this chart and this lab is this, and this is this and this patient is too sick to be on this floor. You need to send this to ICU." I don't know if it's a work aversion thing or if it's a coping mechanism because what they said is actually true—that they're not comfortable taking care of sick patients so it's a defense mechanism. Either way, it would be interesting to really dig into some of those cases and find out, did that person need to go to ICU or did they not? Then do some education. If people are truly not up to snuff in terms of taking care of patients, I think that that needs to be fixed rather than just sending everybody to ICU	C	ED Physician/ Director
	17: [Admitting a patient to the ICU for increased nursing attention rather than acuity] is a significant dissatisfier from a nursing staff standpoint	G	ICU nurse manager
	18: I would say critical care nurses are very much into the physiology and they like to be busy with the medical things. If their job becomes just being the place where less sick but more difficult personality or behavior-wise patients go, that's kind of demoralizing for them... [ICU nurses] need to be taking care of [sicker] patients to maintain their skills	G	ICU Physician
Direct communication and rapport	19: We had a pretty sick patient, but the patient wasn't unstable—just needed frequent monitoring, and I know this nurse. She's a really darn good bedside nurse and I knew she could handle it. I asked her, "Can you handle this patient here or do you want me to move them?" She was like, "No, I'm doing fine with it." Then, her charge nurse was not okay with it and was like, "No, this patient needs to move to the ICU." I was like, "Well, I don't feel that's necessary because this nurse and I have discussed it, and based on her comfort level and her patient load and her experience, she thinks the patient's fine here." So, after that conversation we left the patient there, and I was checking on the patient frequently, and the nurse was giving me updates... Had it been one of the new nurses that had just graduated from nursing school that I didn't know well, I probably would have moved them off [to ICU]	G	Hospitalist
<b>Theme 3: The hospital's place in the hierarchy of interhospital transfer networks</b>			
Small hospitals and staffing challenges	20: I think the biggest issue [admitting to the ICU] would be our hospital does not have that sub-specialty. So, say I had a patient who needed vascular surgery—we don't have that here. So it would be a matter of transfer, so I wouldn't even try to get them admitted [to the ICU]. My job is to get them to a place where they can get the care they need, and sometimes it's not this hospital and that's just the nature of being in a smaller city	A	ED Physician
	21: There's times that our hospital, with it being so rural, sometimes we request patients get transferred out of the facility. We probably have a transfer, I would say, at least once a day, but sometimes I'll see up to three to four transfers. There's a lot of times that our staffing in the ICU, we're maxed out and so I will always let our ER know, "Hey, you got any sick ones? They got to go out. I don't have room."	C	House Supervisor
Small hospitals and geographic challenges	22: I think one of the unique things we have up here too, that other places may not have, is weather in the wintertime where we can't get people transferred out because of the bad roads or the helicopters not being able to fly. We do sometimes get people in our ICU that we'd love to get out of here, but we're stuck with them. We'll call [other hospital] or [another hospital], wherever, and say we need to transfer, but there's nobody flying; the roads could be really bad. We have cases where we do the best we can for them here. We'll bring them up to the ICU, and we'll get the transfer process started, but they may not leave for sometimes one, two, three days	C	Hospitalist

**Table 2 (continued)**

Sub-themes	Illustrative quotations	Hospital	Role
	23: I've had times where I'm going to transfer a patient out and either there's no ambulances because they have been working such long shifts that to go from [our hospital] down to [another hospital]. You're talking about, a [several hour] drive, so that takes a rig out for essentially an entire shift. I've had multiple times where they are not transferring because it's late and they don't have enough crews and guys need to get some sleep	C	ED Physician
ED to ED interhospital transfers	24: So when you move from ED to ED, that's relatively an easy process. The patient's admitted from ED to ED. If you move from ICU to ICU, you'd have to have an accepting physician, where you don't have to have that when the patient's in the emergency room	C	Nurse Practitioner
<b>Theme 4: Hospital policies (actual and perceived) related to ICU admission</b>			
Arbitrary admission policies	25: I've found here, to be honest with you, there are a lot more—random anachronisms, I guess that I'll say. Random, specific requirements that can get a patient into the ICU that I haven't found elsewhere. For example, randomly, a sodium of below 120 can automatically get a patient into the ICU. That's been something that I've learned over time being here. . . . If I'm busy or if I don't have time to think or parse this out. . . . [there are] a couple of little random tricks in my back pocket, to say, "Oh, well, whatever. Their sodium's 119. Sorry, they need to go to the ICU. I don't have further time to deal with this right now."	E	ED Physician
Confusing, unknown, or nonexistent policies	26: Since I came here, I've been looking for [our sepsis] policy, and I could not find it. Actually, one of the things that I'm recommending is we need to have some sort of written guidelines on who comes to medical intensive care. It's funny, I've been looking for those guidelines on who comes to ICU, and I can't really find a reason. I found [admission policies] in Society of Critical Care Medicine, and I gave it to our CNO. . . . but I don't know where we're at with that	D	ICU Nurse Manager
Guidelines erring on the side of caution	27: If a patient looks fantastic—let's say their oxygen is six liters and they're not changed, even though it's at the cutoff, I make a strong argument and push back hard that that person doesn't need ICU, so I don't care what a policy says. Even if policy said that, that doesn't make sense, that's not their clinical issue. So, I think in general, we have discretion, but sometimes we're beholden to tradition or dogma if things are written down	E	ED Physician
	28: At our hospital we tend to err on safety and concern. . . . Sometimes on paper it's clear they need to go to ICU. But when you see the patients, they're not medically sick, but they'll [still go to the ICU]	H	Hospitalist
Structural change leading to conflict	29: What's supposed to happen is, if I [ED physician] have a patient that I think needs ICU, and I call the intensivist and they agree, and then I call the hospitalist, the hospitalist should be like, "Yes, sir. Can I have another?" Then they admit the patient. What ends up happening sometimes is we call the intensivist, get the patient admitted to ICU, then we call the hospitalist who has to do the admission, and they don't agree, and they change it to floor	B	ED Physician/ Director
	30: Right now, our [hospitalists], our in-house doctors, and the new ED group, they butt heads. The [hospitalist] physician group, they do not like to follow our [new] protocols for ICU admits, where the ED doctors like to follow the rules, and so there's a clash there. The [hospitalists], once their patient is admitted to the ICU, the intensivist takes over. They do not like that. So they avoid, avoid, avoid the ICU as much as they can. . . . [because] they're going to lose control of the patient for that time	B	Staffing Office Manager



resources to care for all patients. Mid-sized hospitals (Hospitals G and H) were able to avoid transferring most patients, unless they needed highly specialized treatments, like extracorporeal membrane oxygenation.

However, smaller hospitals (Hospitals A and C) were frequently forced to consider transfer at the time of ICU admission (Q20–21). To clinicians in these hospitals, triage was described as less of a decision between general or ICU care, but rather ICU care at their hospital or at a larger hospital. Participants in smaller hospitals described some patients being transferred out of the hospital on a Friday if staff anticipated the patient might worsen and require a service not offered over the weekend, like renal replacement therapy or cardiac catheterization. Additional factors, such as geographic isolation, inclement weather, or shortages of ambulance staff sometimes made transfers difficult and had to be considered at the time of ICU admission (Q22–23). Patients who might need a higher level of care at some point during their hospitalization were sometimes kept in EDs rather than admitted to ICUs because interhospital ED transfers were perceived as more expeditious than interhospital ICU transfers (Q24).

#### **Hospital policies related to ICU admission**

Most hospital policies dealt with conditions clearly requiring ICU care or increased nursing attention, like mechanical ventilation, titrated medications, or alcohol withdrawal. Sometimes, certain policies made it easier to admit patients without obvious ICU needs to an ICU (Q25). However, more often, policies were confusing, unknown, or nonexistent (Q26). Participants were often unsure whether certain norms were codified in hospital policy. One participant described their hospital's practice of admitting all patients with non-ST-elevation myocardial infarction to an ICU: "But when I pulled the policy, that wasn't in the policy. But we believed that to be the truth" (ED physician, Hospital E).

In several cases, admission guidelines dictated stable patients be placed in ICUs, erring on the side of caution but inefficiently using ICU resources (Q27–28). Participants often discussed a willingness to disregard both formal and informal admission policies if they felt strongly about where a patient would be best cared for, making it difficult to establish or enforce standardized admission rules: "We can tell if a patient is sick as a dog and about to crump just by looking at them. I can know nothing about a patient, I can never have looked in their chart, and I can walk in the room and be like, 'ICU'. So, I think by allowing us that freedom—and we do respect the ICU—I think we really utilize it effectively and appropriately without having to put people there that don't require it" (Hospitalist, Hospital G). However, some participants described

feeling pressured to use ICUs more frequently, even when they thought patients did not need ICU-level care: "I do think there is a well-intentioned, although overly simplistic view, from hospital administration, that the patient will be safest and get the best care in the ICU. So when in doubt, put them there. And again, that is well-intentioned, although not always true" (Hospitalist, Hospital B).

Participants in hospitals that had recently undergone changes to their organizational structure described ICU admission as a more contested process. For example, Hospital B had recently transitioned from an open (hospitalists admitted and cared for ICU patients) to closed (only intensivists admitted and cared for ICU patients) model, resulting in resistance from some staff and a breakdown in shared understandings of ICU admission. Hospitalists were particularly resistant to the shift in patient care, which now involved being restricted from using ICU care at their discretion and "handing over" patients to intensivists (Q29–30).

#### **Discussion**

This study found that actual decisions to use ICU care—and by proxy, beliefs about ICU benefit for individual patients—are not entirely patient-centered and vary based on the hospital. We identified four hospital-level determinants influencing whether a patient receives ICU care: (1) availability of ICU beds or alternative care locations; (2) availability, experience, comfort, and rapport of staff; (3) the hospital's place in the hierarchy of interhospital transfer networks; and (4) hospital policies related to ICU admission.

International guidelines recommend ICU admission be offered to patients based solely on their ability to benefit from intensive care [5]. However, the use of ICU benefit to guide admission decision-making is problematic for several reasons. First, a patient's likelihood to benefit from ICU care depends on several patient factors (e.g., severity of illness, chance of survival, treatment preferences) that are poorly measured and dynamic. Second, ICU benefit depends on a subjective hospital-specific counterfactual—the difference in a patient's outcome (typically, survival) if a patient received ICU care compared to an alternative to ICU care (e.g., general or intermediate care). Therefore, ICU benefit may vary depending on both the patient and the hospital.

Most studies examining variation in ICU use have focused on ICU bed capacity and availability [15–19]. Bed availability plays an important role in ICU admissions. Our study, in addition to others [20–22], supports the belief that the likelihood of a patient receiving ICU care diminishes with fewer available ICU beds. As bed capacity becomes limited, clinicians were more likely

to use alternatives to ICU care. This theme of ICU bed availability is particularly important when considering resource constraints across high-, middle-, and low-income health systems globally. For example, some health systems are shifting ICU patients towards intermediate care, with its use rising steadily over the past 2 decades [23, 24]. Yet, the concept of intermediate care and the types of patients who should receive intermediate care remain poorly defined.

Nurse staffing ratios have previously been associated with outcomes for critically ill patients [25]. However, our study also identified nurse staffing as crucial to true ICU bed availability. Because nurse staffing ratios in the US are typically fixed within intensive care, participants described strategies (e.g., delaying transfers of stabilized patients out of ICUs to keep nurses in ICUs, re-allocating general care nurses to ICUs, calling in nurses from home) to ensure there were enough nurses available to avoid closing off ICU beds. These strategies were particularly important in hospitals dealing with nursing shortages. However, nurse staffing is generally unmeasured in most research datasets used to evaluate ICU use, highlighting a critical gap [26].

Experienced physicians and nurses were often felt to be more comfortable caring for sick patients, whether in general or ICU care. At the same time, ICU nurses and physicians described dissatisfaction when forced to provide ICU care to patients without obvious critical care needs. These themes are particularly pertinent, given increased concerns about workforce turnover and burnout [27]. Critical care outreach teams could play a role in improving ICU admission decision-making, though evidence about their ability to improve outcomes is mixed [28]. Participating hospitals had nurse-led rapid response teams, but dominant themes did not emerge about their role in decision-making.

Factors such as bed availability and staff experience also influenced decisions to transfer patients from smaller or rural hospitals to larger hospitals for higher levels of care. These decisions were often time-sensitive, as interhospital transfers were felt to be most streamlined when they occurred in EDs, as compared to ICUs. Prior studies have demonstrated pressure to expedite transfers, combined with the cumbersome nature of the transfer process, often resulted in decisions to transfer patients to hospitals based on existing relationships and ease of transfer, rather than to hospitals offering the highest quality of care [29, 30].

Our study has several strengths. This is a large, multi-center qualitative study that examines determinants of ICU admission, with prior studies conducted within single centers [31, 32]. In addition, we compiled rich data, with contributions from clinical observations within a

diverse selection of hospitals supplemented by perspectives from several types of hospital staff (e.g., ICU, ED, hospitalist physicians; ICU, ED, rapid response nurses; administrators).

This study also has certain limitations. Because this is an exploratory qualitative study, we cannot comment on causality between hospital-level factors and ICU admission. Furthermore, practices at these eight fee-for-service US hospitals may not generalize to all hospitals, particularly internationally. This study was also conducted prior to the coronavirus disease 2019 (COVID-19) pandemic, which may have altered ICU admission practices in some hospitals.

This study has important implications for patients, clinicians, and health systems. While focus has traditionally been placed on minimizing between-hospital variation in ICU use, an alternative goal may be to reduce unwarranted within-hospital variation. This strategy would recognize that ICU admission decisions may reasonably differ between hospitals, depending on their available resources. As such, individual hospitals would ideally develop institutional consensus about the broad patterns of patients who should receive ICU care in their hospital.

## Conclusion

Guidelines recommend that ICU admission be based on a patient's likelihood to benefit from ICU care. However, these guidelines have been nearly impossible to operationalize. ICU use should be tailored by individual hospitals to reflect the needs of their patients, often driven by severity of illness and treatment preferences, while also accounting for the resources and constraints specific to the hospital.

## Supplementary Information

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### Author contributions

The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. Study concept and design: TSV. Acquisition of data: TSV, JM and LM. Analysis and interpretation of data: TSV, AS, JM, LM, KL, TLE, HK, CRC and TJI. Drafting of the manuscript: TSV and AS. Critical revision of the manuscript for important intellectual content: TSV, AS, JM, LM, KL, TLE, HK, CRC and TJI. Qualitative analysis: TSV, AS, JM, LM and KL. Obtained funding: TSV.

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### Data availability

De-identified data are available at the discretion of the corresponding author.

### Declarations

### Conflicts of interest

All authors declare: no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous 3 years; and no other relationships or activities that could appear to have influenced the submitted work.

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