



Twenty-four-Hour Intensivist Staffing in Teaching Hospitals

Tensions Between Safety Today and Safety Tomorrow

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There is an inherent tension between the training needs of inexperienced clinicians and the safety of the patients for whom they are responsible. Our society has accepted this tension as a necessary trade-off to maintain a competent workforce of physicians year after year. However, recent trends in medical education have diminished resident autonomy in favor of the safety of current patients. One dramatic example is the rapid increase in the number of academic ICUs that provide coverage by attending physicians at all hours. The potential benefits of this staffing model have strong face validity: improved quality and efficiency from the constant involvement of experienced intensivists, increased family and staff satisfaction from the immediate availability of attending physicians, and reduced burn-out among intensivists from reduced on-call responsibilities. Thus, many hospitals have moved toward 24-h coverage by attending intensivist physicians without evidence that these benefits actually accrue and perhaps without full consideration of possible unintended consequences. In this article, we discuss the potential benefits and risks of nocturnal intensivist staffing, considering the needs of current and future patients. Furthermore, we suggest that there remains sufficient uncertainty about these benefits and risks that it is both necessary and ethical to study the effects in earnest. *CHEST 2012; 141(5):1315–1320*

Medical education entails an inherent tension between the training needs of inexperienced clinicians and the safety of the patients for whom they are responsible.¹ Whenever clinicians empower trainees to make decisions or perform procedures on their patients, they abrogate the traditional notion that a physician's primary obligation is to his or her current patients. This exception to traditional professional

ethos has persisted for generations,² either because it has been opaque to most onlookers or because society implicitly accepts that small sacrifices in the care of current patients are reasonable and necessary to maintain competent physicians year after year.

Despite a confluence of ethical, legal, and economic support for the notion that physicians cannot avoid their dual roles as agents of society and guardians of their current patients' best interests,³⁻⁵ recent trends in teaching hospitals have slowly but surely shifted the balance toward the latter role in unbridled efforts to promote the safety of current patients. A dramatic example of this trend is the rapid increase in the proportion of academic ICUs that provide around-the-clock staffing with attending physicians trained in critical care. This model of 24-h intensivist staffing offers several potential benefits for patients and health-care providers alike: (1) greater patient safety and operational efficiency stemming from more experienced clinical decision making and procedural performance, (2) increased patient and family satisfaction from the immediate availability of a trained critical care specialist, (3) reduced burnout among attending physicians if models are

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implemented to provide more manageable hours and clinical responsibilities, and (4) reduced burnout among bedside nurses whose advocacy for their patients may be fostered by the onsite presence of more senior physicians.

Because these potential benefits have such strong face validity, 24-h in-hospital intensivist staffing has been implemented in many academic institutions, despite the lack of evidence that these benefits actually accrue, and perhaps without full consideration of this policy's potential downsides. One risk of nocturnal intensivist staffing involves resident autonomy. Experiential learning has unquestionable value in medical training, and the presence of constant supervision by an attending physician could improve the learning experiences of trainees through greater exposure to bedside teaching, immediate feedback to trainees, and real-time refinement of clinical decisions. However, if increased supervision leads to a more passive roles for trainees, fewer opportunities to make decisions, and a reduced sense of personal responsibility for patients' welfare, greater supervision today could reduce the quality of the physician workforce tomorrow. Will residents exit their training with less confidence and competence without having been empowered to "run the unit" (typically with telephone backup) at night? The current shortage of trained intensivists, insufficient to staff all ICUs even during daytime hours,⁶ raises a second risk in rapidly implementing 24-h attending physician staffing: that it may exacerbate existing disparities in health-care access, because the more prosperous hospitals attract disproportionate numbers of specialists, leaving increasing numbers of other institutions with inadequate coverage or none at all. Third, as has happened with implementation of resident work hours reforms,⁷ broad implementation of 24-h intensivist staffing could lead to its acceptance as the standard of care, precluding experimental evaluation of either its intended or unintended effects, thereby sabotaging opportunities to improve on the original model.

Against this backdrop, this essay has two central goals. First, we seek to provide a normative justification for considering the safety of all patients, those of today and those of tomorrow, when making ICU staffing decisions. In doing so, we provide a framework for balancing the needs of medical education and patient safety in the ICU. Second, we suggest that despite its many potential benefits and increasing implementation, there remains sufficient uncertainty regarding the pros and cons of 24-h intensivist staffing that it remains ethically acceptable to study its effects in earnest, including through randomized assignment of patients to 24-h vs daytime intensivist staffing.

PATIENT SAFETY IS AT RISK IN OUR HEALTH-CARE SYSTEM

In 1999, the Institute of Medicine published *To Err Is Human*, calling new attention to medical errors in the US health system.⁸ The report brought patient safety to the forefront of health services research, national policy development, and public attention. The Institute of Medicine spelled out the consequences of medical errors, including direct harm to patients, increased health-care expenditures, and decreased confidence in the US health-care system. In short, the Institute of Medicine effectively demanded change by exposing the vulnerabilities and shortcomings of the prevailing models of health-care delivery.

Responses to this call to action have come from every direction as multiple stakeholders have scrutinized the system to find opportunities for improvement. For example, the Joint Commission established the National Patient Safety Goals program in 2002 to broadly improve safety standards for all health-care settings,⁹ revamping the accreditation process for US hospitals. Patients and their families have organized into advocacy and safety champions, gaining voices in the media and power in legislative and policy decisions. The Accreditation Council for Graduate Medical Education placed limits on resident work hours, in part to respond to patient safety concerns that arose with high-profile cases¹⁰ and clinical research¹¹ that suggested that trainee fatigue could increase clinical errors. The Leapfrog Group advocated certain standards of intensivist staffing in ICUs without clear evidence to support their recommendations.¹² Making attending intensivists available at all times in ICUs is merely one of the latest ideas intended to improve patient safety.

BENEFITS OF 24-H INTENSIVIST STAFFING TO PATIENTS TODAY

Twenty-four-hour intensivist staffing could benefit patients directly and indirectly. It is logical, for example, that a specialty-trained, experienced clinician would provide optimal diagnostic acumen and therapeutic competency in managing critically ill patients. Continuous availability of an intensivist may lead to more timely and accurate diagnostic evaluation and appropriate therapeutic decisions, leading to higher quality, safer, and more efficient care. Some have also raised the possibility that care might be less costly with 24-h intensivist staffing if patients' lengths of stay were reduced.¹³ And indeed, several studies suggest that patients in ICUs with "high-intensity" critical care physician staffing (ie, ICUs that require either transfer of care to, or mandatory consult of, an attending

intensivist), experience reduced mortality and length of stay compared with patients admitted to ICUs with other staffing models.^{14,15} Although at least one high-profile study suggested harm with high-intensity staffing, particularly among low-risk patients,¹⁶ methodologic concerns have been raised with this study,¹⁷ and the bulk of observational data continues to favor high-intensity staffing.¹⁵

Also generally accepted in critical care is the importance of the “golden” hours, the early period of critical illness when timely interventions may improve outcomes.¹⁸⁻²⁰ Thus, attention by a clinician who can make assessments and implement appropriate therapies in the middle of the night, rather than deferring them until the morning, holds clear potential to improve patient outcomes. In support of this argument are several studies that suggest worse outcomes for patients admitted during nighttime or weekend hours, although a recent systematic review found substantial heterogeneity among the single-center studies.²¹

Indirect benefits to patients may also favor 24-h intensivist staffing. Improved team building may result from increased satisfaction of the nursing staff and physicians themselves with a continuous-coverage model. From a survey of critical care nurses, many reported a perception of communication delays when a covering physician must be reached by phone, and a greater likelihood of alerting physicians to a change in a patient’s status if the physician is physically present.²² Increased satisfaction in the domains of patient care, relations and communications, and education were noted by allied health staff (including nurses, pharmacists, and respiratory therapists) after a transition to a continuous attending staffing model in one academic ICU.²³ Physicians in the same ICU agreed that communications and relations were better, and expressed a reduced sense or fear of burn-out. These positive changes may translate into benefits for patients today, because better integration of care across disciplines may improve outcomes.²⁴ They may also portend benefits for patients tomorrow. If 24-h staffing models are implemented in ways that reduce burn-out among ICU physicians, they may be better able to continue providing critical care well into the more experienced portions of their careers.

UNINTENDED CONSEQUENCES OF 24-H INTENSIVIST STAFFING FOR PATIENTS TODAY AND TOMORROW

Before establishing 24-h intensivist staffing as the standard of care, however, several plausible downsides to this model merit consideration. First, the current supply of intensivists is insufficient to meet the demands of all critically ill patients. Indeed, many

US ICUs lack intensivists entirely.⁶ Although some of these units care primarily for lower-acuity patients admitted to the ICU for monitoring purposes, risks to occasional higher-acuity patients remain because these ICUs are disproportionately located in regions where access to health care is reduced more generally. Moving toward 24-h intensivist staffing may pull even more specialists away from hospitals where they are already sparse, thereby widening the variability in quality of care across the health system. Academic hospitals and hospitals located in more prosperous regions may be able to increase staffing sufficiently to provide attending intensivists around the clock, but with relatively fixed supplies of ICU-trained physicians, nurses, and other professionals, this trend widens existing chasms in care.

Though perhaps more difficult to predict, 24-h intensivist staffing also poses risks to patients in the future. It is unknown what the effect of having attending physicians in the hospital at all hours will be on medical education. Would reduction in stress for the resident result from increased supervision and more immediate bedside teaching result in improved learning during overnight shifts? Or would diminishing trainee autonomy reduce competency as residents are less often positioned to make their own clinical decisions? Adult education theory is unequivocal: we learn by doing. If trainees are never forced to “do,” there is a risk that they will leave their residencies with less confidence and skill as they enter the workforce as independent practitioners, compromising the quality of care for the patients of tomorrow. Although 24-h intensivist staffing may improve some components of education by providing more opportunities for trainees to directly observe and partner with experienced clinicians in action, such potential benefits would only accrue if these new shift-work intensivists inculcate education as part of their mission. Clearly, evidence is needed to determine the overall impact on trainees.

The fundamental change in the educational environment of an ICU that will occur with 24-h intensivists may also change the pattern of recruiting trainees into critical care. If the residents’ loss of autonomy translates into a less engaging and enjoyable experience during general training, there is a risk that fewer trainees will choose to pursue careers as intensivists themselves, potentially resulting in an even greater disparity between the supply of and demand for critical care practitioners.²⁵ If we believe that intensivists provide better care to critically ill patients, then moving toward 24-h intensivist staffing paradoxically may compromise the quality of our health care in the future. Alternatively, the more regular hours afforded intensivists working in 24-h staffing units might motivate trainees to pursue careers in critical care, because

such careers start to appear more manageable. Further, more immediate feedback and teaching at night may provide a more satisfying learning experience for trainees, which could also enhance the attractiveness of a critical care career.

A FRAMEWORK TO BALANCE THE SAFETY OF OUR PATIENTS TODAY WITH THE NEEDS OF OUR PATIENTS TOMORROW

How ought we to balance potential benefits and harms to readily identifiable critically ill patients vs the anonymous but larger group of patients at risk of future critical illness? As noted, the implicit rationale underlying medical education is that the individual good may, on occasion, be sacrificed for purposes of broader social good.¹ Organ allocation provides an example of how we make such tradeoffs. Recipient selection is not guided merely by the desire to maximize benefits for those at the top of waitlists, but also by our shared social values of promoting equity in access and maximizing total benefits across the pool of potential recipients in the face of a limited organ supply.^{26,27} Allocation of ICU beds also tends to follow a strategy of maximizing the “greater” good rather than the individual good. When ICUs are particularly busy, patients are often discharged sooner to accommodate more patients,^{28,29} and such prematurely discharged patients experience greater risks of clinical decompensation requiring ICU readmission.²⁹⁻³¹ This suggests that we are willing to tolerate some individual harm in order to provide critical care services to a greater number of patients.

Our willingness to sacrifice some degree of benefit for identifiable patients to promote greater net social benefit over the long term in the domains of medical education and the allocation of transplantable organs and ICU beds establishes a precedent for a similar approach to intensivist staffing. However, given the multiple potential advantages and disadvantages of 24-h intensivist staffing, much of the argument is entirely speculative. An evidence-based approach is needed to determine how best to balance the safety of patients today with the needs of patients tomorrow, and to better understand the cost-benefit ratios of 24-h intensivist staffing for individual patients, practitioners, trainees, and society.

STUDYING 24-H INTENSIVIST STAFFING: DOES EQUIPOISE EXIST?

Robust outcomes research clearly can inform the wisdom of interventions that could amount to major shifts in medical care, expenditures, and education. Yet, somewhat ironically, we tend to require a much

higher level of evidence before bringing to market a new drug that might affect outcomes for a few thousand patients per year than before implementing a policy change likely to affect tens of millions of patients annually. We have heard colleagues suggest that one could not conduct a prospective controlled study of 24-h intensivist staffing because clinical equipoise³² no longer exists; a randomized trial of this staffing model would seem to be out of the question. However, despite the fact that the train of 24-h intensivist staffing has already left the station, and that the model has a certain degree of face validity, there is as yet little evidence to support such change. The existing knowledge base stems from two retrospective, single-center, observational studies using historical controls with limited adjustments for secular trends.^{23,33} Even if substantive improvements in care had been noted in these studies (none were), these methodologic features would limit our ability to draw meaningful inferences regarding the staffing model's effects. Further, such limitations cloud interpretation of the one study examining the economic effects of 24-h staffing¹³ because of its reliance on the same data. Finally, because of the absence of data regarding processes of care, and these studies' poor specification of nocturnal intensivists' actual roles, we have little basis upon which to decipher mechanisms of effects or to replicate such effects in other settings.

For a largely benign policy change, perhaps reasonable face validity, evolving practice patterns, and a paucity of evidence would suffice. But given the potentially large incremental costs and educational downsides to 24-h intensivist staffing, it seems that we should, at a bare minimum, be certain that the purported short-term benefits actually manifest. Ideally, such studies would also be designed to provide preliminary insights into some of the unintended consequences of this staffing change, such as whether it increases regional disparities in access to intensivists or erodes the competence of future clinicians. Understanding intermediate-term changes in the recruitment and retention of critical care physicians and nurses would also help provide a robust understanding of the comparative effectiveness of ICU staffing models.

Thus, although some may feel that clinical equipoise, a state of genuine uncertainty among expert clinicians regarding the comparative merits of two or more interventions,³² no longer exists, more modern conceptualizations of equipoise remain intact. Specifically, “evidence-based equipoise”³⁴ has not been broached; the superiority of one approach has yet to be supported by high-level evidence. Further, what has recently been termed “behavioral equipoise”³⁵ most certainly exists; by this standard, future interventional studies are precluded only when high-level evidence

exists to support one intervention and clinicians are nearly uniformly convinced by this evidence (as opposed to the perhaps more common situation in which a major trial leads to some advocates and some critics of the new approach). Therefore, although this window of equipoise exists, and considering the substantive stakes of the decision, we believe it is imperative to initiate prospective, randomized trials of 24-h vs daytime-only intensivist physician staffing. This is not to suggest that institutions that have adopted 24-h staffing should drop this model pending such evidence, any more than institutions that have not adopted it should be required to do so. Instead, the conclusion is that research is both needed and justified and, once it is available, could inform the decisions of both types of institutions. Otherwise, as progressively more stakeholders take sides on this debate, the perception that broad coverage equals better care may trump reasoned skepticism, removing the remaining opportunities to study the model prospectively.

CONCLUSIONS

There are important tradeoffs inherent in many strategies designed to improve patient safety, where unintended consequences may, on balance, harm broad populations of present or future patients despite benefiting certain currently identifiable patients. Using the example of 24-h coverage by attending physicians in ICUs, we have discussed the nature of these potential tradeoffs, suggested that impacts on both today's and tomorrow's patients be considered, and provided justification for studying this staffing model in earnest. We may well learn that 24-h intensivist staffing has substantial benefits across many relevant domains and should be adopted as broadly as possible. But if we do not seize the present opportunity to study the concept in randomized fashion, we risk eternal blindness to a deleterious and costly standard of care.

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