



Barriers to implementing the Leapfrog Group recommendations for intensivist physician staffing: A survey of intensive care unit directors

Jeremy M. Kahn MD, MSc^{a,*}, Francesca A. Matthews MS^b, Derek C. Angus MD, MPH^b, Amber E. Barnato MD, MPH, MSc^c, Gordon D. Rubenfeld MD, MSc^a

^aDivision of Pulmonary and Critical Care Medicine, Harborview Medical Center, University of Washington, Seattle, WA 98119, USA

^bCRISMA Laboratory, Department of Critical Care Medicine, University of Pittsburgh, Pittsburgh, PA 15213, USA

^cDepartment of Medicine, University of Pittsburgh, Pittsburgh, PA 15213, USA

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Abstract

Purpose: The Leapfrog Group, representing a consortium of health care purchasers, has promoted standards for intensive care unit (ICU) staffing in nonrural areas. The purpose of this study was to examine the perception of the Leapfrog standards among ICU directors and determine the potential barriers to implementing these standards.

Materials and Methods: We performed a telephone survey of physician ICU directors using a stratified random sample of hospitals in the Committee on Manpower for Pulmonary Critical Care Societies database.

Results: Seventy-two ICUs in 72 hospitals were surveyed. Forty-seven ICUs responded to telephone inquires. Of these, 21 (45%) could identify an ICU director, 20 of which answered questions about their own hospital's compliance. Only 5 ICU directors (25%) cited current compliance with the Leapfrog standard for intensivist staffing. Of the 15 directors not in compliance, 13 were motivated to adopt the recommendations in the future. Loss of control, loss of income, and increased cost to hospital administration were cited as important barriers to implementing the recommendations. Increased availability of intensivists, increased funds from hospital administrators, and assistance from government and third parties were viewed as important potential solutions to these barriers.

Conclusions: Numerous barriers exist to implementing the Leapfrog recommendations for intensivist staffing, not the least of which is the lack of an ICU director in many hospitals. Better strategies are needed to overcome these barriers before the widespread adoption of an intensivist care model similar to Leapfrog is feasible.

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1. Introduction

The Leapfrog Group is a consortium of health care purchasers formed to advocate for improved quality and safety in health care [1]. Founded in November of 2000, the organization uses its collective purchasing power to motivate

* Corresponding author. Division of Pulmonary and Critical Care Medicine, Harborview Medical Center, Box 359762, Seattle, WA 98119, USA. Tel.: +1 206 731 3356; fax: +1 206 731 8584.

E-mail address: jkahn@cceb.med.upenn.edu (J.M. Kahn).

hospitals to adopt discrete care practices thought to improve outcome and reduce medical errors. By publicly reporting these practice measures and steering their employees to providers that have adopted the measures, the Leapfrog Group aims to improve overall quality and safety in health care.

Of the 3 care practices currently advocated by the Leapfrog Group, 1 is intensivist physician staffing [2]. Considerable observational evidence exists showing that the presence of a trained critical care physician in the intensive care unit (ICU) is associated with lower mortality and resource use [3]. In response, the Leapfrog Group recommends that all nonrural hospitals adopt the intensivist model of critical care [4]. The Leapfrog standard for intensivist staffing has 4 main components: a physician board-certified or board-eligible in critical care (intensivist) should manage or co-manage all patients in the ICU; the intensivist should be present in the ICU during daylight hours with no other clinical duties; at other times, an intensivist should be able return ICU pages within 5 minutes; and another physician or a nonphysician extender such as an advance practice nurse certified in the care of critically ill patients should be able to reach the ICU within 5 minutes.

Although the Leapfrog Group has generated considerable publicity [5] and appears to have motivated some hospitals to affect change [6], concerns have been raised about the lack of definitive evidence for this type of intensivist staffing and potential obstacles to implementing the recommendations [7-9]. Currently, no information exists as to the perception of ICU physicians toward the Leapfrog guidelines for intensivist staffing or potential barriers to implementing these guidelines. To better understand the barriers and uncover possible solutions to these barriers, we undertook a survey of ICU directors in US hospitals.

2. Methods

2.1. Study design

We conducted a telephone survey of physician ICU directors. We chose to survey only physician ICU directors as they directly oversee ICU physician staffing and are the stakeholders likely to be most affected by, and most involved in, implementation of intensivist staffing in the ICU. Sites were randomly selected from hospitals in the Committee on Manpower for Pulmonary and Critical Care Societies database, a national database of all US acute care hospitals with at least one ICU [10]. The database has been recently updated to survey ICU directors about end-of-life practice [11]. The sampling frame was stratified by hospital size (<125 beds, 125-250 beds, >250 beds) and population size (<100,000, 100,000 to 3 million, >3 million) with categories chosen based upon natural cut-points. An equal number of hospitals were randomly chosen from each strata to ensure an even mix of large and small hospitals from both small and large communities. We categorized hospitals as either academic or community, using membership in the

American Association of Medical College's Council of Teaching Hospitals to define academic status.

2.2. Survey development

We developed and piloted the survey between May and August 2003. We sought to measure 4 domains regarding the Leapfrog Group recommendations for intensivist staffing: knowledge and perceived utility of the recommendations, current compliance, potential barriers to implementing the recommendations, and possible solutions to these barriers. These domains were based upon a previously described framework for adoption of clinical evidence into practice [12]; specific potential barriers were determined from expert local and published opinion [7-9]. We piloted the initial survey in a local sample of community and academic ICU clinicians and researchers experienced in survey design, revising the instrument based upon their advice and feedback. Content validity was ensured based upon both the derivation strategy and the pilot feedback. The final survey contained 21 items with a mixture of binary responses (yes/no) and 5-item Likert-scale responses ranging from "strongly disagree" to "strongly agree." The complete text of the survey questions is shown in Appendix A.

2.3. Survey administration

We conducted the survey by telephone between August 2003 and April 2004. An initial telephone call determined the presence of an ICU director, defined as a physician with sole administrative responsibilities over the ICU. If a hospital did not have a specific ICU director, this was confirmed through discussion with a nursing director, hospital administrators, and members of the ICU staff. If an ICU director could be identified and was willing to participate, then the survey was administered over the telephone by a member of the research team. If the presence or absence of an ICU director could not be confirmed or an identified ICU director could not be reached, this was considered a nonresponse; at least 3 and up to 13 phone calls were placed before classifying an ICU as a nonresponder.

2.4. Analysis

We compared characteristics of responders and nonresponders using the Fisher exact test. Binary survey responses are presented as percentage responding in the affirmative. Scaled responses are presented both continuously as mean and SD and categorically as percentage in agreement. Responses of "somewhat agree" and "strongly agree" were grouped together for the categorical analysis. Statistical tests were performed with Stata 8.0 (Stata Corp, College Station, Tex), and a *P* value of .05 or less was considered significant.

3. Results

A total of 72 hospitals were surveyed. Fifty-seven hospitals responded to telephone inquiries. Of the 57 par-

Table 1 Characteristics of the 72 hospitals in the survey

Variable	PID (n = 21)	No PID (n = 26)		Nonrespondents (n = 25)	
Hospital size					
<125 beds	3 (14)	9 (35)	$P = .30^a$	12 (48)	$P = .06^b$
125-250 beds	7 (33)	8 (31)		9 (26)	
>250 beds	11 (52)	9 (35)		4 (16)	
City size					
<100 000	6 (29)	10 (38)	$P = .23^a$	8 (32)	$P = 1.0^b$
100 000-3 million	5 (24)	10 (38)		9 (36)	
>3 million	10 (48)	6 (23)		8 (32)	
Hospital type					
Community	16 (76)	25 (96)	$P = .08^a$	22 (88)	$P = 1.0^b$
Academic	5 (24)	1 (4)		3 (12)	
Region					
Northeast	9 (43)	5 (19)	$P = .15^a$	5 (20)	$P = .49^b$
South	3 (14)	11 (42)		6 (24)	
Midwest	5 (24)	5 (19)		5 (20)	
West	4 (19)	5 (19)		9 (26)	

Values are reported as frequency (percentage). PID indicates physician ICU director.

^a P value comparing responding hospitals with a physician ICU director to hospitals without a physician ICU director.

^b P value comparing hospitals with and without a physician ICU director to nonresponding hospitals.

icipating hospitals, 26 (55%) did not have an identifiable physician ICU director. The remaining 21 hospitals had an identifiable ICU director to complete the survey. Hospital characteristics are shown in Table 1. Hospitals with no physician ICU director were smaller and less likely to be academic than those with a director, but these differences were not statistically significant ($P > .05$). Nonresponding hospitals were smaller than hospitals that responded, but similarly this difference was not statistically significant.

3.1. Knowledge and perceived utility

Of the 21 ICU directors, 11 (52%) considered themselves very familiar with the Leapfrog Group's guidelines for intensivist staffing. Ten directors (48%) agreed with the concept that health care purchasers should use financial incentives to improve quality of care, and 12 (60%) thought that the Leapfrog initiatives will make a significant improvement in patient care in the ICU.

3.2. Current compliance

Twenty ICU directors agreed to answer questions regarding their own hospital's current compliance with the Leapfrog Group's recommendations. Eight directors (40%) agreed with the statement that "the ICU that you direct is Leapfrog compliant." When asked about the individual components of the recommendations, compliance was variable, ranging from 30% to 75% (Fig. 1). Only 5 ICUs (25%) were actually compliant with all 4 of the recommendations compared with 8 that originally stated that they were compliant. Three of these ICUs were in academic hospitals, and the other 2 stated that housestaff were present in the ICU.

3.3. Barriers and solutions

Of the 15 directors from ICUs not in compliance with the recommendations, 1 declined to answer further questions and 2 stated that they would not attempt to become Leapfrog-compliant because they did not see utility in the recommendations. The remaining 13 directors responded to questions concerning potential barriers to implementing the Leapfrog recommendations and potential solutions to those barriers (Table 2). The most significant barrier to implementation was concern over loss of control for physicians who would no longer be providing care to critically ill patients. Loss of income and costs associated with the intensivist model were also important barriers, whereas perceived difficulties in finding qualified intensivists were perceived as less important. The most important potential

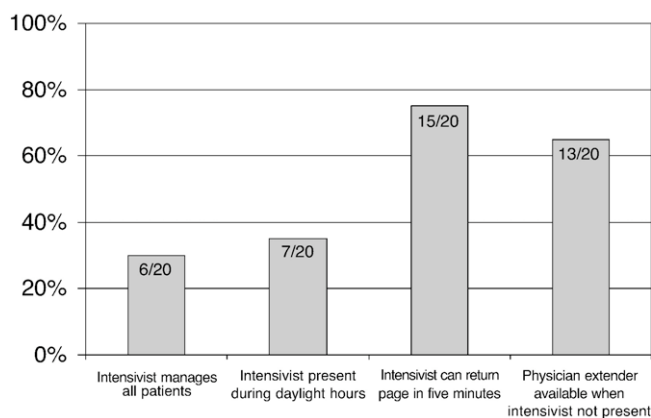


Fig. 1 Percentage of ICUs in compliance with the Leapfrog Group recommendations for intensivist staffing (among 20 responding ICU directors).

Table 2 Barriers and potential solutions to implementing the Leapfrog Group recommendations for intensivist staffing

	Rank (mean \pm SD) ^a	Percentage in agreement ^b
Barriers		
Loss of control to certain physician groups	4.4 \pm 0.5	100
Loss of income to certain physician groups	3.7 \pm 1.1	69
Increased cost to hospital administration	3.3 \pm 1.7	62
Difficulty in finding qualified intensivists	2.9 \pm 1.5	46
Potential solutions to barriers		
Hiring more intensivists	3.9 \pm 1.3	77
More money from administration	3.6 \pm 1.5	69
Incentives or assistance from government or another third party	3.3 \pm 1.8	62
Increasing the number of trainees ^c	3.3 \pm 1.6	57
Hiring advanced-practice nurses as physician extenders	3.0 \pm 1.5	46
Using telemedicine	2.6 \pm 1.4	23

^a On a scale from 1 to 5, with 1 indicating strong disagreement and 5 indicating strong agreement regarding a potential barrier or solution.

^b Intensive care unit directors responding "somewhat agree" or "strongly agree."

^c For hospitals with residents and/or fellows (n = 7).

solutions included hiring more intensivists and receiving money from hospital administration, government, or other third parties. Hiring nurses as direct care providers in the ICU and telemedicine were perceived as less significant potential solutions.

4. Discussion

This study highlights several important barriers to implementing the Leapfrog standard for intensivist physician staffing in the ICU. The foremost of these is that over half of the responding hospitals did not have an identifiable ICU director in charge of physician staffing in the ICU. Without an ICU director to effect change, there is little possibility that an ICU will have the means and motivation to incorporate all of the Leapfrog Group's recommendations for intensivist staffing. Although our survey was not designed to assess the factors related to the presence of an ICU director, this may be due to the overall cost of hiring intensivists or that many ICUs are not of sufficient size to justify a full-time director of critical care services.

In hospitals with an identifiable ICU director, loss of control and loss of income on the part of the primary

physicians were perceived as the most important barriers to implementing the Leapfrog Group guidelines. This suggests that as intensivists take over a larger role in the care of the critically ill, nonintensivists such as general internists and surgeons must relinquish both control over their patient's care and an important source of income. Primary physicians may feel that the benefit from first-hand knowledge of the patient's medical condition and the continuity of care created when the same clinician provides care throughout the course of the hospital stay justifies nonintensivist staffing.

The cost of adopting the intensivist model was also seen as an important barrier and, consequently, additional funds from hospital administration and assistance from government were seen as important potential solutions. The full cost of implementing the Leapfrog standard for an individual hospital is unknown. One financial model suggested an annual net cost savings ranging from approximately \$510 000 to \$3.3 million [13]. A sensitivity analysis, however, included the possibility for a net loss of up to \$1.3 million, which may be greater in small ICUs where adopting the Leapfrog standard may be more difficult regardless of cost. Moreover, even if full intensivist staffing was known to be associated with cost savings, adoption of the model requires considerable up-front expenditure in the form of recruitment costs and salaries for intensivists and physician extenders, with future savings that are highly dependent on the case mix and throughput of the ICU. Thus, financial barriers can remain important even if the recommendations as a whole are thought to result in net cost savings.

Other institutional barriers will need to be considered as the Leapfrog garners additional publicity and increased pressure is placed on health care organizations to become Leapfrog compliant. The availability of intensivists is one important issue. Evidence suggests that there may not be enough future critical care physicians to meet the needs of the aging population [10,14]. This problem could worsen as additional intensivists are required to meet the Leapfrog standard. Another important issue is the potential use of telemedicine to aid in Leapfrog compliance [15,16]. Telemedicine has been advocated as possible means to export the benefits of an intensivist to additional ICUs, and the Leapfrog group allows telemedicine to satisfy the requirement of a nonphysician extender. This survey, however, shows that few ICU directors view telemedicine as a viable solution to the staffing problem, perhaps because of costs or technical issues.

In addition, not all ICU directors agreed that financial incentives are an effective method of improving quality and safety in the ICU. The success of the Leapfrog Group hinges upon public reporting of performance data and pay-for-performance, either directly or through an increase in market share, as viable ways to improve health care quality. Both public reporting and pay-for-performance have long been advocated as potential solutions to the crisis in quality in US health care [17-19]. Leapfrog, which has already partnered

with the Joint Commission on Accreditation for Healthcare Organizations to develop hospital-based quality measures, will likely continue to play an important as use of public reporting and pay-for-performance expands in hospital care [20]. Few data exist, however, to support the idea that publicizing health data or pay-for-performance can meaningfully impact quality or market share in the acute care setting [21-23]. Acceptance of the Leapfrog standard will be hindered until more ICU directors are convinced of the importance of market pressures and financial incentives in improving the quality of critical care.

To overcome these barriers it will be necessary to learn more about the mechanism by which the presence of an intensivist improves the outcome of critical care [8]. The studies often used to justify the recommendations for 24-hour intensivist coverage in fact examined diverse interventions, ranging from completely closing the ICU [24] to having an intensivist participate on daily rounds [25,26]. It may be possible that to get the benefit of an intensivist, this individual need not be present everyday during daylight hours and available at all other times. Instead, the same outcome might be obtained with other interventions such as protocols for sedation and ventilator management [27-29] with an intensivist on site only to direct the ICU and consult when needed. Thus, a similar improvement in outcome could be seen without necessitating that nonintensivists give up control of patient care or a source of income, and with less financial expenditure.

Our study is limited by the relatively small sample size. The hospitals in the survey, however, were diverse in number of beds, population size, region, and academic status. Although only 21 ICU directors completed the survey, 26 other hospitals responded that they did not have an identifiable ICU director, which is in itself an important barrier to implementing the Leapfrog standard. Furthermore, our overall response rate is typical of physician surveys [30], and there were minimal differences between responders and nonresponders, making response bias unlikely. Although there were trends toward responding hospitals being larger, if anything this might be expected to make the ICU director more receptive toward the Leapfrog recommendations, as these hospitals may have fewer financial obstacles. Another limitation is that we did not survey other stakeholders in ICU staffing, such as hospital administrators, nurse managers, or nonintensivist physicians. Because ICU directors would be directly responsible for implementing the Leapfrog guidelines, we felt they would have the greatest insight into the barriers and potential strategies to adopt intensivist staffing. Finally, the relatively long period of our survey might mean that ICU directors surveyed earlier may have different perceptions of those surveyed later. All respondents, however, were surveyed more than 2 years after the introduction of the Leapfrog recommendations, making it unlikely that perceptions of the barriers to implementation would change during the study period.

5. Conclusion

Loss of control and loss of income to certain physician groups were seen as highly significant barriers to implementing the Leapfrog standard for intensivist physician staffing in the ICU. Increased financial support and hiring of additional intensivists were perceived as the principal solutions to these barriers. Hospital administrators, ICU directors, policy makers, and advocacy groups need to consider these barriers as hospitals come under increased pressure to adopt the full intensivist model of care. Research is needed into strategies to overcome these obstacles as well as into potential alternatives to the intensivist model of critical care, including consultation models as well as the use of standardized protocols for routine care.

Appendix A

Survey text. Questions with Likert responses ask about the extent a respondent agrees with the listed statement and are scaled from one to five, with one representing “strongly disagree” and five representing “strongly agree.”

Domain	Question	Response type
Knowledge/ utility	I am very familiar with the Leapfrog Group’s guidelines for intensive care units.	Likert
	Health care purchasers can and should use financial incentives to improve the quality of medical care.	Likert
	The Leapfrog initiative will make a significant improvement in patient care in the ICU.	Likert
Compliance	The ICU that you direct is Leapfrog compliant.	Likert
	Are all patients in your ICU managed or co-managed by an intensivist (a doctor that is board-certified or board-eligible in critical care medicine)?	Yes/no
	Is there at least one intensivist in your ICU eight hours in the daytime, seven days per week who doesn’t have any other conflicting clinical duties during those hours?	Yes/no

Compliance	When an intensivist is not physically present in your ICU, can an intensivist return a page within five minutes 95 percent of the time?	Yes/no
	When an intensivist is not physically present in your ICU and can't be there in five minutes, is there a mechanism for getting another physician or a certified non-physician extender to be in the ICU within five minutes 95 percent of the time.	Yes/no
Barriers	If not compliant: your ICU is not going to try to become compliant because you don't see the utility in the Leapfrog ICU recommendations.	Yes/no
	The increased cost to the hospital administration is a barrier for the ICU that you direct.	Likert
	The difficulty finding qualified intensivists is a barrier for the ICU that you direct.	Likert
	The loss of income to certain physician groups is a barrier for the ICU that you direct. ^a	Likert
Solutions	The loss of control to certain physician groups is a barrier for the ICU that you direct. ^a	Likert
	More money from the administration is a probably solution for the ICU that you direct.	Likert
	Incentives or assistance from the government or from another third-party is a probable solution for the ICU that you direct.	Likert
	Hiring more intensivists is a probable solution for the ICU that you direct.	Likert
	Hiring more non-critical care physicians is a probable solution for the ICU that you direct.	Likert

Hiring advance practice nurses to assist intensivist (physician extenders) is a probable solution of the ICU that you direct.	Likert
Increasing the number of trainees is a probable solution for the ICU that you direct.	Likert
Using telemedicine is a probable solution for the ICU that you direct.	Likert

^a Physician groups with potential loss of control or income were defined as surgeons, other hospital specialists, or primary care physicians.

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