# Subinternships in the Medical Intensive Care Unit

## A Needs Assessment

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### BACKGROUND

Fourth-year medical students (subinterns) rotate through the intensive care unit (ICU) as either an elective or required rotation. The purpose of the subinternship rotation is to prepare students for the upcoming rigor of internship by cultivating and expanding upon the knowledge and skills developed during third-year clerkships (1). Although it has been demonstrated that completion of a critical care elective leads to improvement in critical thinking and patient management skills, it is unclear whether institutional variability in the ICU curriculum may affect these outcomes (2–4).

Pediatric clerkship and program directors in the United States identified wide institutional variability in curricula and evaluation practices for pediatric ICU rotations. In response, the Council on Medical Student Education in Pediatrics and the Association of Pediatric Program Directors published a national standardized curriculum for pediatric ICU subinternships to provide students with more structured, deliberate learning (5).

Currently, there is a paucity of data characterizing medical ICU (MICU)

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rotations for subinterns within the United States, and it is unclear how curricula vary between institutions. In this context, the objective of this study was to characterize learning objectives and training and evaluation practices across MICU rotations for subinterns in the United States. In addition, we sought to assess interest in institutional collaboration to create a standardized national MICU curriculum for subinterns.

## METHODS

Survey questions were developed by the study authors and were reviewed and refined by multiinstitutional medical educators with expertise in survey design. The preliminary survey was pretested using cognitive interviews, and additional revisions were made to clarify questions and response options.

The survey contained 18 questions formatted as multiple choice or short answer and took approximately 5 minutes to complete. Respondents were not required to complete all questions. Survey questions were categorized as learning objectives, training practices, evaluation process, or curriculum collaboration. Institutional demographic information was also collected.

We distributed a needs assessment survey of MICU subinternships using Qualtrics. Our survey was administered via e-mail on November 12, 2019, to 63 MICU subinternship directors across the United States identified by members of the American Thoracic Society Section on Medical Education. In addition, the survey was distributed over the DR-ED educational listserv of more than 3,000 medical undergraduate educators in an attempt to reach additional MICU subinternship directors through a self-selection survey. Two follow-up e-mails were sent, and responses were censored 2 weeks after the initial e-mail.

Data were analyzed with descriptive statistics using SAS version 9.4 (SAS Institute). Free-text responses regarding curriculum development and collaboration were reviewed and summarized.

## RESULTS

There were 58 respondents ($n = 63$ known survey recipients), most representing institutions with class sizes greater than 101 students ($n = 37$, 76%). *See* Table 1 for institutional demographic information.

Almost all institutions reviewed the following learning objectives: delivering oral presentations, understanding clinical/physiological conceptual correlations, and interpreting data. End-of-life care and meeting procedural training expectations were included as learning objectives at

**Table 1.** Institutional demographic information

| Characteristic | N (%) |
|---|---|
| Class size | |
| <50 | 4 (8.3) |
| 50–100 | 7 (14.6) |
| 101–150 | 14 (29.2) |
| 151–200 | 13 (27.1) |
| >200 | 10 (20.8) |
| Required MICU subinternship | 12 (21.1) |
| Designated course director | |
| Pulmonary/critical care | 43 (76.8) |
| General internal medicine | 8 (14.3) |
| Other | 3 (5.4) |
| Internal medicine subspecialty | 2 (3.6) |
| Required in-person orientation | 25 (46.3) |

56.6% and 45.3% of institutions, respectively. Thirty-six institutions (64.3%) required didactic sessions, and a majority had in-person sessions. Of the 14 institutions that used simulation, management of hypotension (52.6%) and airway management (57.9%) were the most common scenarios. Few institutions ($n = 10$) required face-to-face evaluations, and almost all (95.2%) relied on critical care faculty to evaluate subintern performance (Table 2).

Four institutions (7.7%) reported collaborating to build their curriculum, but the majority ($n = 51$; 98.1%) reported interest in collaborating. Institutions were most interested in collaborating on didactic sessions ($n = 8$; 13.8%), online learning modules ($n = 7$; 12.1%), simulation cases ($n = 7$; 12.1%), and learning objectives ($n = 6$; 10.3%).

## DISCUSSION

Our study demonstrates that before the coronavirus disease (COVID-19) pandemic, there was significant institutional variability among learning objectives, didactics, and evaluation practices across MICU subinternship rotations nationally. In addition, MICU subinternship directors in the United States indicated interest in developing a national standardized MICU curriculum for subinterns.

Within emergency medicine and internal medicine in the United States, efforts have been made to outline key components of the subinternship curriculum and make recommendations on implementation (6, 7). These efforts sparked the Council on Medical Student Education in Pediatrics and the Association of Pediatric Program Directors to publish a standardized pediatric ICU subinternship curriculum in 2019, but the same standardization has yet to be applied to MICU subinternship rotations (5).

In our study, only two-thirds of institutions reviewed learning objectives during orientation, and there was variability among which objectives were included. Internationally, Shen and colleagues found that 63% of English-speaking medical schools did not provide a syllabus with learning objectives (8). Medical educators in the United Kingdom and the United States have sought to clarify core competencies for critical care subinterships through the performance of Delphi surveys, but these competencies have not been universally incorporated into existing MICU curricula (9, 10). In addition, we found that many institutions did not require didactic sessions. Our findings are consistent with prior literature which shows that less than half of medical schools offer a formal didactic curriculum (11, 12). Results of our free-text response questions indicate that medical educators in the United States are highly interested in collaborating to create a formal didactic curriculum for MICU subinternships.

### Limitations

The main limitations of this study were selection bias in survey participants and nonresponder bias. In addition, using the DR-ED listserv led to uncertainty in the total number of survey recipients and institutional demographics. However, to our knowledge, this is the first study assessing MICU subinternship curricula in the United States, and the results correlate with what has previously been demonstrated about ICU rotation curricula.

**Table 2.** Needs assessment survey of subinternships in the medical intensive care unit

| Question | Response | N (%) |
|---|---|---|
| Learning objectives | | |
| Learning objectives reviewed during orientation | True | 34 (61.8) |
| Learning objectives reviewed in the syllabus | Interpreting patient data | 53 (100.0) |
| | Delivers oral presentations on rounds | 52 (98.1) |
| | Demonstrates understanding of clinical/physiological conceptual correlations | 51 (96.2) |
| | Communicates effectively with patients and/or family members | 49 (92.5) |
| | Demonstrates level-appropriate understanding of MICU disease states | 49 (92.5) |
| | Demonstrates an understanding and appreciation for the role of interprofessional care team members | 48 (90.6) |
| | Participates in palliative and end-of-life conversations | 30 (56.6) |
| | Meets appropriate level procedural training expectations | 24 (45.3) |
| Training practices | | |
| Required didactics | True | 36 (64.3) |
| Didactics are the same for subinterns and residents | Yes | 16 (47.1) |
| Didactic methods used | In-person | 48 (92.3) |
| | Online | 18 (34.6) |
| | Simulation | 14 (26.9) |
| | Flipped classroom | 5 (9.6) |
| | Other | 3 (5.8) |
| Simulated scenarios | Airway | 11 (57.9) |
| | Hypotension | 10 (52.6) |
| | Central line | 7 (36.8) |
| | Arrhythmia | 7 (36.8) |

**Table 2.** *Continued.*

| Question | Response | N (%) |
|---|---|---|
| | Other | 7 (36.8) |
| | Communication with family | 6 (31.6) |
| | Interprofessional team | 5 (26.3) |
| | Unresponsive patient | 4 (21.1) |
| | Not applicable | 0 (0.0) |
| Evaluation process | | |
| Faculty that evaluate subinterns | Critical care faculty | 50 (95.2) |
| | Residents | 33 (63.5) |
| | Subinternship director | 26 (50.0) |
| | Nursing | 6 (11.5) |
| | Other | 6 (11.5) |
| Faculty that are evaluated by subinterns | Critical care faculty | 38 (73.1) |
| | Residents | 22 (42.3) |
| | Subinternship director | 12 (23.1) |
| | Nursing | 2 (3.9) |
| | None | 0 (0.0) |
| Required in-person evaluations | True but not enforced | 20 (38.5) |
| | True | 10 (19.2) |
| Curriculum collaboration | | |
| Presence of collaboration in building a MICU curriculum | Yes | 4 (7.7) |
| Interest in future collaboration in building a MICU curriculum | Yes | 51 (98.1) |

*Definition of abbreviation*: MICU = medical intensive care unit.

Our study is the first to demonstrate the lack of standardization across MICU subinternship curricula. Future efforts should be made by medical educators and supported by national adult critical care societies to facilitate institutional collaboration in the creation of a standardized MICU curriculum for subinterns in the United States.

Author disclosures are available with the text of this article at www.atsjournals.org.

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