

# The Impact of an Acute Medical Unit in Internal Medicine on Resident Education

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## ABSTRACT

**BACKGROUND:** Medical trainees are expected to provide care for increasingly sick and treatment intensive patients. To improve patient care, hospitals worldwide have developed acute medical units (AMUs), dedicated medical wards that provide care for patients during the first 24 to 72 hours of an emergency medical hospital admission. A distinguishing feature of these units is that they are supervised by senior clinicians and offer multidisciplinary patient-centered care. Little is known about the impact of AMUs on trainee supervision and education.

**METHODS:** In this educational case study, we describe the evolution, process and structure of our AMU service. We also provide resident and teaching faculty perceptions of the impact of this intervention on education and supervision.

**RESULTS:** Questionnaire results showed that residents and teaching attendings believed that supervision and education were improved on the AMU, as compared to the traditional medical ward model. Residents also felt that their knowledge and clinical skills in managing acute patients improved. Procedure skills were less impacted by the intervention. A small number of residents believed that the AMU model worsened supervision and education.

**CONCLUSION:** Integrating medical trainees into an AMU allowed for early evaluation and input from senior clinicians and increased opportunities to work in and learn from multidisciplinary teams, contributing to improved resident supervision and education. Future studies are needed to assess the long-term impact of the AMU on educational outcomes.

**KEYWORDS:** acute medicine, residents, acute medical unit, deliberate practice

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## Background

Over the past decade, there has been an increase in the volume and acuity of medical emergencies presenting to hospital emergency departments.<sup>1</sup> As the majority of patients are sickest when first admitted to the hospital, the initial period of hospitalization can significantly impact patient outcomes. In academic medical centers, medical trainees frequently provide the initial assessment and management of newly admitted patients. However, several studies have documented deficiencies in trainees' knowledge and skills in treating acutely ill patients.<sup>2,3</sup> It has been documented that medical trainees lack knowledge in basic aspects of acute care and often fail to detect clinical deterioration or to provide timely life-saving interventions.<sup>2,3</sup> Research has also shown that the quality of care provided by trainees improves when direct supervision by a clinical supervisor is immediately available.<sup>4</sup> Yet, in most teaching hospitals, the direct supervision of residents is limited.

There are several factors that undermine senior physicians' availability and capacity to serve as direct clinical teachers and supervisors.<sup>5</sup> On a traditional medical ward, daily attending rounds typically occur in the morning. Teaching is mostly informal and patient case-based. The residents then spend

the remainder of the day following up on test results, communicating with families and evaluating new admissions, whereas the senior physicians provide patient care in outpatient clinics or participate in administrative or research duties. In this model, supervision is indirect and fragmented. Further, patient care and learning are vulnerable to the unpredictability of clinical exposures, staff shortages, time constraints, and demands for high clinical productivity.<sup>6,7</sup>

As such, both trainee education and patient care needs are inadequately met with the traditional medical ward model. In response, many hospitals in the United Kingdom, Australia, New Zealand, and elsewhere, have introduced acute medical units (AMUs) alongside of, or instead of, traditional medical wards.<sup>8–10</sup> AMUs are dedicated medical wards that provide care for patients during the first 24 to 72 hours of an emergency medical hospital admission.<sup>11,12</sup> A distinguishing feature of these units is that they are supervised by senior clinicians and offer multidisciplinary patient-centered care.<sup>12</sup> Multinational studies have shown that AMUs decrease length of stay, reduce inpatient mortality, and improve patient and staff satisfaction.<sup>12,13</sup> However, there is a paucity of publications on the impact of AMUs on trainee supervision and education.



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In 2020, we developed the first AMU in an academic medical center in the United Arab Emirates (UAE), with an explicit goal of improving medical resident supervision and training. In this manuscript, we describe the evolution, process and structure of our AMU service. We also provide resident and teaching faculty perceptions of the impact of this intervention on education and supervision.

## Intervention

### *Theoretical framework*

The underlying educational framework for our intervention was deliberate practice, which posits that repetition of a skill or task, with direct observation and immediate feedback, allows self-reflection to enable the learner to make iterative adjustments and improvements.<sup>14</sup> Deliberate practice is a clinical knowledge and skills improvement process that requires well-defined learning objectives, motivated learners, and direct observation and feedback from clinical supervisors.<sup>15</sup> We felt that a structured curriculum with daily teaching sessions, and integrated patient care with direct feedback by senior physicians would strengthen trainee knowledge and skills in managing acutely ill patients.

### *Setting*

Sheikh Khalifa Medical City (SKMC) is the largest government tertiary care center in Abu Dhabi, the UAE's capital. It is a 586-bed facility and a major referral center for the region. It is also the largest provider of postgraduate medical education in the UAE. In August 2020, we developed a 21-bed AMU for the internal medicine department. All newly admitted non-COVID-19 patients from the emergency department, elective admissions, or admissions from outpatient clinics spend the initial 24–48 hours of hospitalization on the ward. Of note, patients with COVID-19 infection are admitted to a separate ward and not managed by the medical trainees.

The support of both clinical and educational leadership was essential for the successful implementation of the AMU. Hospital leadership facilitated dedicated space and manpower for the ward, with the goal of decreasing patient length of stay and improving quality of care. The residency program director developed an acute medicine curriculum, which featured a competency-based approach, with structured learning experiences tied to assessments, and led several meetings with the trainees and teaching faculty to discuss the AMU's new structure, organization and goals.

### *Educational interventions*

Table 1 lists the educational interventions on the AMU, mapped to corresponding competencies of the Accreditation Council for Graduate Medical Education International (ACGME-I) competency framework.<sup>16</sup> On the AMU, there are 2 medical teams that provide clinical care, each consisting

of an attending physician, a senior resident, and 2 junior residents. Residents are scheduled for 4-week rotations on the AMU service. The learners have graded responsibilities commensurate with their level of training. Multidisciplinary rounds, including nurses, physiotherapists, dietitian, social worker, pharmacist and a dedicated case manager take place at 8am, with follow-up huddles with the physician team, charge nurse and case manager at 11am, and 3pm daily. The attending physician has no additional clinical responsibilities while on this service, and works from 8am to 8pm to oversee daily bedside teaching rounds, provide clinical care and supervision for all new admissions to the ward, and directly supervise the trainees in the care of any patient who clinically deteriorates to minimize delays and errors. Early evaluation and input from senior clinicians has been shown to facilitate improved educational outcomes, while ensuring safe and efficient patient care.<sup>4,17</sup> The senior clinicians engage in interactions specifically directed towards resident learning. Bedside teaching rounds take place seven days a week. In addition, formal teaching time is structured into the daily work schedule. Teaching is focused on the diagnosis and management of acute conditions, such as sepsis, acute gastrointestinal bleeding, or seizures. Teaching formats include formal lectures and small group discussions. In addition to direct instruction to the trainees, the teaching attendings have opportunities throughout the workday to provide feedback, role model, and coach the residents. Multisource evaluations are completed for each resident at the end of the month-long rotation by the teaching attending, nurses, case managers, and peers. In addition, each resident is expected to complete two mini-clinical evaluation exercises (mini-CEX) during the rotation, assessing physical exam skills and counseling/communication skills.

### *Impact*

The Sheikh Khalifa Medical City Institutional Review Board reviewed and approved this study [RS-732]. In December 2021, surveys were administered to all residents and teaching attendings who had worked on the AMU and the traditional medical ward to assess their perceptions of the impact of the AMU on resident education and supervision. Two individual surveys were developed following a comprehensive literature search on AMUs and workplace-based learning. The resident survey was piloted on 4 recent graduates of the residency program. The faculty survey was piloted on 2 attending physicians who joined the department after the development of the AMU. The surveys were iteratively revised based on pilot feedback. These individuals did not participate in the final survey. Using a five-point likert scale (much improved, somewhat improved, no change, somewhat worsened, much worsened), respondents were asked to compare their experiences on the AMU to the traditional medical ward. The resident survey included perceptions of teaching and learning, supervision

**Table 1.** Educational interventions on the acute medical ward.

<b>Core Competency</b>	Patient Care	Medical Knowledge	Practice-based learning and improvement	System-based practice	Professionalism	Interpersonal Skills Communication
<b>Educational Activity</b>	Bedside teaching	Bedside teaching	Small group discussion	MDT-rounds	MDT-rounds	MDT-rounds
	Direct supervision by senior clinician	Formal lectures				Direct supervision/role-modeling by senior clinician
	MDT-rounds	Small group discussion				
<b>Assessment</b>	Direct observation Mini-CEX	Direct observation		Multisource evaluation	Multisource evaluation	Multisource evaluation Mini-CEX

Abbreviations: MDT- multidisciplinary team; Mini-CEX- mini-clinical evaluation exercise.

and opportunities for interprofessional care on the AMU, as compared to the traditional medical ward. For the teaching attendings, the survey queried their perceptions of resident collaboration, communication, and clinical skills on the AMU. Attendings were also asked about their personal experiences in teaching and supervising trainees on the AMU. In December 2021, all internal medicine residents and general medicine teaching attendings received an email with a link to a web-based questionnaire. Participation was voluntary and no incentives were offered. Data were analyzed using descriptive statistics.

## Results

Of 35 total internal medicine residents, 31 completed the survey (88.6% response rate). All 10 general internal medicine teaching attendings who rotate through the AMU completed the survey (100% response rate). Figures 1 and 2 depict the results of the resident and teaching attending surveys.

Surveys of teaching attendings showed that they believed that working on the AMU provided them personally with greater opportunity for teaching and supervising trainees. They all also believed that, as compared to the traditional medical ward, residents on AMU had greater improvements in their knowledge and treatment of acute medical conditions. Resident surveys revealed that the majority felt that the AMU model facilitated improved teaching and supervision, improved knowledge and skills in acute medicine, and provided greater opportunity for interprofessional collaboration. A minority of residents felt that learning and education were not changed on the AMU, with a small minority also expressing worsened teaching and supervision with the AMU model. Most trainees and teaching attendings reported no change in resident procedural skills with implementation of the AMU model.

## Discussion

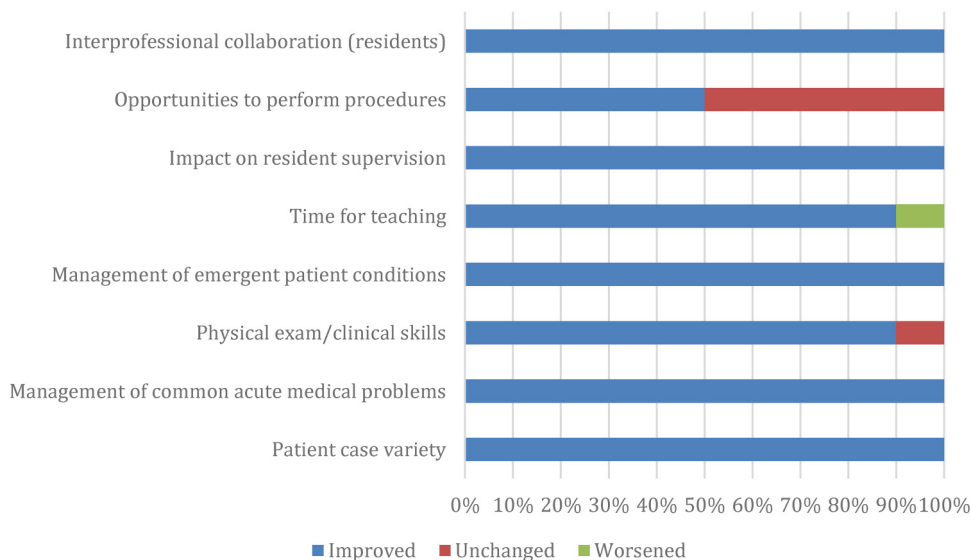
In this educational case study, we describe the implementation of an AMU in an internal medicine department in a teaching

hospital in the UAE, and its impact on resident supervision and education. AMUs have demonstrated clinical benefit in many international studies.<sup>12,13</sup> The availability and input of senior clinicians in the critical early hours of an emergency admission facilitate rapid diagnostic and therapeutic interventions.<sup>17</sup> The inclusion of a multidisciplinary approach also positively impacts patient care. We believe that the AMU model can also reconcile the inherent tensions between the needs of patients and those of trainees that exist on traditional medical wards.

Through increased opportunities for observation and practice, with direct instruction and immediate feedback, learners can gain experience and develop the knowledge and skills to care for acutely ill patients.<sup>17</sup> Research on work-based learning has shown that when trainees and clinical supervisors interact regularly during clinical encounters, education can be enhanced while ensuring safe patient care delivery.<sup>18</sup> Also, deliberate practice, as a learning framework, has been shown to be an effective method for clinical skills attainment.<sup>15</sup>

Moreover, AMU trainees have access to a large, multidisciplinary team of healthcare professionals to provide additional opportunities for observation and learning.<sup>11</sup> A recent study of a clinical teaching unit documented improvements in multidisciplinary learning and interprofessional collaboration.<sup>19</sup> An earlier review of workplace learning in primary care showed that healthcare professionals learn during clinical practice through collaboration with others.<sup>20</sup> The authors emphasized that dedicated time and resources, as well as close relationships, can optimize learning.<sup>20</sup> Other researchers have found that collaboration and learning are improved when individuals better know and understand each other.<sup>21</sup> Our daily multidisciplinary huddles were intended not only to provide multidisciplinary care, but to also foster improved camaraderie and teamwork. Accordingly, our survey results demonstrate that both residents and faculty believe that the AMU facilitated teamwork and interprofessional collaboration. Other studies have described Dedicated Education Units (DEUs), in which nurses provide

### Attendings



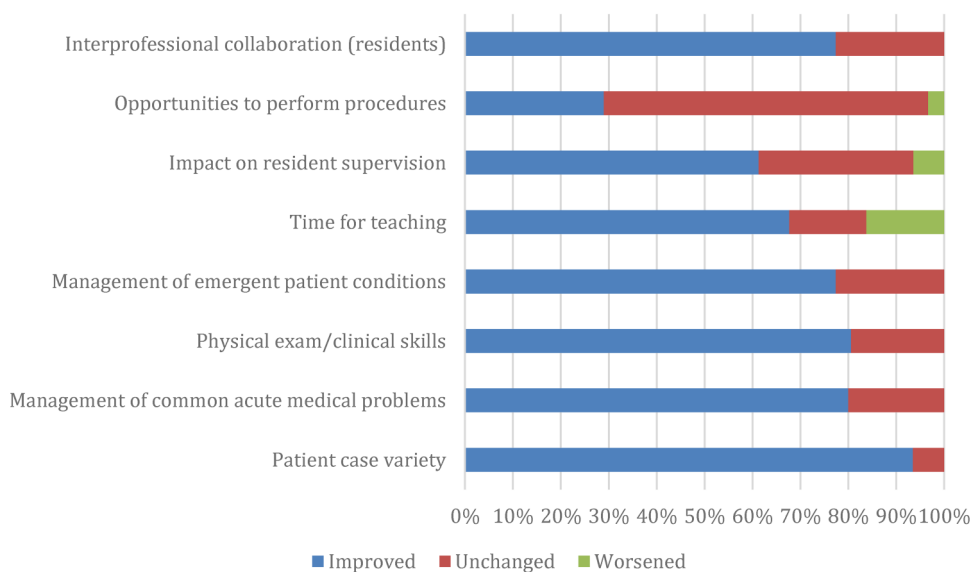
**Figure 1.** Senior physician perceptions of resident experiences on the acute medical unit as compared to a traditional medical ward (10 responses).

primary clinical instruction for trainees.<sup>22</sup> Prior research has shown that healthcare professionals can learn continuously from each other through collaboration.<sup>20</sup> Increased integration of nurses in resident teaching activities would likely further support an environment conducive to learning and improve interprofessional collaboration. This is an important area for future consideration and research.

Questionnaire results show that residents and teaching attendings believed that supervision and education were improved on the AMU, as compared to the traditional

medical ward model. Residents also felt that their knowledge and clinical skills in managing acute patients improved. We believe that the availability of the senior physician for direct supervision and immediate feedback on all aspects of patient care, including diagnostic reasoning, physical examination skills, communication, and management improved teaching and learning, as well as facilitated safe patient care. It is notable that a small percentage of residents felt that teaching and supervision was worse on the AMU, as compared to the traditional medical ward. It is possible that some trainees may

### Residents



**Figure 2.** Resident perceptions of their experiences working on the acute medical unit as compared to a traditional medical ward (31 responses).

view the high turnover of patients on this ward as disruptive to continuity and longitudinal patient care, thereby, adversely affecting education. Understanding the needs of all learners is important; residency program leadership will continue to monitor the long-term impact of the AMU on resident perceptions of education and supervision. Further, residents did not report improvement in their procedural skills. Based on these findings, we have added simulation and task trainer workshops to improve procedural skills training.

Our findings have some limitations. First, they represent the perceptions of trainees and clinical faculty in a single academic medical center in the UAE. Second, the surveys reflect perceptions, which may not correspond to actual knowledge or skill attainment. Studies have shown poor correlation between medical trainee self-assessment and actual performance.<sup>23</sup> Long-term educational and clinical outcomes are needed to assess the impact of this intervention. Finally, although the AMU did not admit patients with COVID-19, the pandemic has affected many aspects of hospital activities and resident education. The impact of the pandemic on the AMU is an important area for future study. Despite these limitations, our study adds to the literature on workplace learning and shows that effective learning can take place in an acute medical setting.

## Conclusion

Our intervention shows that integrating medical trainees into an AMU allowed for early evaluation and input from senior clinicians and increased opportunities to work in and learn from multidisciplinary teams, contributing to improved resident supervision and education. Future studies are needed to assess the long-term impact of the AMU on educational outcomes.

## Ethical Approval

The study was reviewed and approved by the Sheikh Khalifa Institutional Review Board [RS-732].

## Informed Consent

Consent to participate was obtained electronically by all subjects prior to completing the survey.

## Trial Registration

Not applicable, because this article does not contain any clinical trials.

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