Is There a Role for Internal Medicine Residency Preparation Courses in the Fourth Year Curriculum? A Single-Center Experience

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INTRODUCTION

The transition from medical school to residency represents a substantial increase in patient care responsibilities for graduating medical students. In order to prepare for this transition, most medical schools require at least one sub-internship during the fourth (M4) year.¹ The benefits of sub-internships have been well described;² however, there is growing concern that essential skills required for residency are not reliably addressed in the face of restricted duty hours. For example, decreased overnight experiences may lead to less training in cross-coverage and medical emergencies.³ In addition, it has been demonstrated that few students receive formal handoff training.⁴ Capstone courses, also known as “Residency Preparation Courses” (RPCs), or “Boot Camps,” represent an emerging strategy to bridge this gap and are well described in the surgical literature.⁵ However, little has been described about the potential value added from internal medicine (IM) RPCs. Our goal is to explore the differences between our IM RPC and sub-internship experiences.

METHODS

At the University of Michigan Medical School, a 4-week IM RPC elective was offered to M4 students in the spring of 2017 (as a pilot) and 2018. The objective was to review essential knowledge and skills critical to day 1 of internal medicine internship. The curriculum consisted of interactive didactics, small-group discussions, procedure and code simulations, and simulated cross-cover (Table 1). Students received formative feedback in multiple ACGME competency domains (Table 1).⁶ Grading was pass/fail based on participation. An anonymous electronic survey was distributed to students upon course completion. The survey inquired if students recommend the course

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to others based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Students were asked a free text question: “How does the educational value of the IM RPC differ from the educational value of a sub-internship?” One of the authors (LH) categorized the responses.

RESULTS

Thirty-four students enrolled in the IM RPC: 7 in 2017 and 27 in 2018. Survey response rate was 100%. Most students ($n = 32$, 94%) strongly recommended the IM RPC to others, with an average Likert score of 4.94.

Students highlighted the differences in educational value between IM RPC and sub-internship rotations (Table 2). One student noted that the RPC “allowed us to synthesize the information in a very safe and non-judgmental environment...[The RPC is] at the perfect time, when we are highly motivated to learn and when we have the knowledge base to think about how to apply what we learned to patient care. [The RPC] provides a different learning style and environment that supplements the experience of a sub-I.” Another student stated, “I don’t think this should replace taking a sub-I, but think it is a fantastic combination to take both courses. The practical learning aspects of being an intern are learned in the Sub-I and the background knowledge is filled in with boot camp.”

DISCUSSION

This study describes the unique value added from IM RPCs to the M4 curriculum and specifically highlights their role as complementary to sub-internships. RPCs provide a standardized curriculum to ensure equity in regard to uniform exposure to specific topics that may not be provided by sub-internships. In addition, the timing of the IM RPC (late M4) is important. Sub-internships are often taken before residency applications are submitted; thus, there is pressure to obtain letters of recommendation and to earn a high normative-based grade. In contrast, since RPCs are late in the M4 year, they provide an environment to provide formative data to the learner. This

Table 1 Structure of Internal Medicine Residency Preparation Course Elective

Category	Topics covered (examples)		Assessments (<i>IM milestones</i>)
Interactive didactic sessions	<i>Medical emergencies:</i> Tachyarrhythmias and bradyarrhythmias Acute coronary syndrome Gastrointestinal bleeding Sepsis Respiratory failure Altered mental status Acute stroke Oncologic emergencies Pulmonary embolism Acute pancreatitis <i>Outpatient topics</i> Documentation best practices Outpatient telephone medicine Clinic phone triage Upper respiratory infections Hypertension overview Diabetes overview Common musculoskeletal injuries	<i>Inpatient-common encounters</i> Type 2 diabetes Congestive heart failure Antibiotics overview Hypertensive urgency Pain management Electrolyte disturbances Top “5” renal consults EKG overview Chest and abdominal X-ray <i>Career-building</i> How to make a CV How to make a great presentation High value care practices <i>Other</i> Death exam and notification Legal aspects of medicine Goals of care conversations How to give a chalk talk	30-question quiz based on clinical vignettes utilizing free text and multiple-choice questions on the first day of the rotation. Answers were graded by course instructors and were reviewed during interactive didactic sessions throughout the month-long rotation. (<i>MK1</i>) 20-question EKG and X-ray quiz with free text and multiple-choice questions given in beginning of rotation. Answers were graded by course instructors and reviewed throughout the course. (<i>MK2</i>)
Small-group discussions	Making mistakes Resilience and wellness Patient safety/quality improvement How to run a code		
Residents as teachers	Students present a medical topic to peers and course instructors.		Formative feedback from instructors and peers on presentation skills and content. (<i>ICS2</i>)
Cross-cover curriculum	Students practice providing “cross-cover” on simulated patients and are asked to respond to urgent and emergent cross-cover scenarios by communicating with trained nurses.		Trained nurses score students on clinical decision-making (based on expert-validated checklist), and interpersonal communication skills. Faculty members assess documentation of cross-cover notes. (<i>PC1, PC2, SBP1, PROF1, ICS2, ICS3</i>)
Outpatient paging curriculum	Students practice outpatient phone calls on simulated clinic patients and are scored on clinical decision-making and communication skills.		Trained nurses score students on clinical decision-making (based on expert-validated checklist), and interpersonal communication. (<i>PC1, PC2, SBP1, PROF1, ICS1, ICS2</i>)
Procedural simulation training and practice	Introduction to ultrasound Lumbar puncture Thoracentesis Paracentesis Central venous catheterization		Supervision and feedback by course instructors on procedural technique (<i>PC4</i>)
Code and rapid response simulation	Students lead a variety of simulated scenarios including tachyarrhythmia, bradyarrhythmia, pulseless electrical activity, ventricular tachycardia, and anaphylaxis.		Feedback by peers and faculty instructor on leadership skills communication, and clinical management. (<i>PC1, PC3, ICS2</i>)
Inter-professional clinical experiences	Rapid response team Respiratory therapy Physical therapy Wound/ostomy team	Speech language pathology Medical ICU nurse Procedures service	
Intern panel	Panel of interns and one senior resident answer questions related to expectations of interns, strategies for a successful intern year, strategies for building efficiency and organization, avoiding burn-out.		

IM internal medicine, EKG electrocardiogram, ICU intensive care unit, CV curriculum vitae, MK medical knowledge, PC patient care, PROF professionalism, ICS interpersonal communication skills, PBLI practice-based learning and improvement, SBP systems-based practice

allows learners to safely explore areas for development in a criterion-referenced environment. Ideally, the learner should integrate assessment data from both the sub-internship and IM RPC experiences in order to fully understand their strengths and areas for development. This creation of a competency-based continuum would provide meaning to the final year of medical school.

Limitations include that this is a single-center study with a small number of participants. One strength of our study is the 100% survey response rate. In the future, we hope to further gauge the impact of IM RPCs by surveying interns and tracking additional metrics, such as milestone evaluations.

In conclusion, the IM RPC helps prepare students for the transition to residency and builds upon the education received

Table 2 Categorization of Free Text Responses Comparing Education Value of Internal Medicine Residency Preparation Course (IM RPC) and Sub-internships, *n* = 34

	IM RPC rotation	M4 sub-internship rotation
Medical knowledge, <i>n</i> = 31	<ul style="list-style-type: none"> • Wide breadth of disease states and topics reviewed • Interactive didactics, small groups, simulated patients, participation in simulated paging programs <p><i>“Bootcamp ensures that all the common/high-yield topics will be covered, whereas on a sub-I, you are somewhat subjected to the whims of what patients are admitted and you end up taking.... I think both sub-I and boot camp are critical to learning—sub-I was great for following a patient from admission to discharge, learning all the ins/outs of the day to day work, and obviously getting hands on experience. The boot camp removes the day-to-day stuff...and allows us to learn high-yield topics in a practical way, in didactic form...Both are helpful in their own way, and would recommend any student to first do a sub-I, and then a boot camp.”</i></p>	<ul style="list-style-type: none"> • Diseases covered are limited to the patients the student is assigned • “Learning by doing,” bedside teaching on rounds, lectures
Learning atmosphere, <i>n</i> = 14	<ul style="list-style-type: none"> • Grading is pass/fail, does not impact residency match • 30–40 h/week • More time to study and synthesize information • Non-judgmental: can ask questions without fearing this will impact grade <p><i>“On any sub-I, there is a pressure of being evaluated/not looking dumb in front of the attending. And many M4s use the sub-I as a time to get recommendation letters for residency, so the pressure is increased. Bootcamp is great because it's absolute no pressure combined with high motivation to learn—I think a lot of us felt totally comfortable admitting we don't know something, asking “stupid” questions, and fumbling our way through the mock pages. Being allowed to be totally open about what we don't know without the pressure of later being evaluated really helps facilitate learning.”</i></p>	<ul style="list-style-type: none"> • Grading is honors, high pass, pass, fail, and may impact residency match • 40–80 h/week depending on patient load • Less time to review • Less likely to admit knowledge gaps given perception it may influence grade
Skills developed, <i>n</i> = 17	<p>Emphasizes skills as follows:</p> <ul style="list-style-type: none"> • Common bedside procedures • Ultrasound basics • Leading medical emergencies and codes • Developing educator skills • Providing cross-cover care and responding to urgent medical cross-cover scenarios <p><i>“...the simulation cases offered in the bootcamp allowed us to practice procedures we may not have otherwise had exposure too...The mock paging course also allowed us to simulate pages that we would not have gotten during a sub-internship.”</i></p>	<p>Emphasizes skills as follows:</p> <ul style="list-style-type: none"> • Day-to-day practical management of patients • Navigating day-to-day logistics of the hospital setting • Efficiency • Communication with patients and families • Communication with team members, e.g., consultants, presenting on rounds • Limited cross-cover experience • Limited procedural experience
Timing, <i>n</i> = 6	<p>After residency interviews are finished, around the time of residency match</p> <p><i>“This allowed dedicated time for synthesis of information...We covered topics that we have been taught or experienced in practice throughout M1–M4 years. This means that we are now able to view the information through a different lens and synthesize before moving on to residency. It comes at a great time of the year when we are motivated to learn.”</i></p>	<p>Often early in M4, prior to completion of residency application</p>

M4 fourth year of medical school

during sub-internships. We recommend consideration of IM RPCs into all medical school curricula.

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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