


# How the Hospital Works: An Interdisciplinary, Systems-Based Practice Medical Student Elective

Andrew J Hale<sup>1</sup> , Jason Bartsch<sup>1</sup>, Renee D Stapleton<sup>1</sup> and Polly E Parsons<sup>1</sup>

<sup>1</sup>Department of Medicine, University of Vermont Medical Center, Burlington, VT, USA.

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## ABSTRACT

**OBJECTIVES:** Although proficient systems-based practice is a foundational skill for physicians, how best to teach it has not been well established. An elective course for fourth-year medical students wherein participants had an immersive experience with multiple interprofessional staff was created and analyzed. The authors hypothesized that participating students and interprofessional staff would show gains in systems-based knowledge and interprofessional communication.

**METHODS:** The course was a 2-week elective experience for fourth-year medical students at the Larner College of Medicine at the University of Vermont, Burlington, VT, USA. Participants integrated into a variety of interprofessional, non-physician, and administrative roles within the hospital system. Pre- and post-elective systems-based knowledge and interprofessional communication were assessed. Participating interprofessional staff were also surveyed on their experiences

**RESULTS:** From 2019 through 2022, 14 students participated in the elective, all of whom provided data. All participating students showed a quantitative improvement in systems-based knowledge and qualitatively commented on the high value of the elective in furthering their understanding of interdisciplinary care and communication. Of the 22 participating interprofessional staff surveyed, 17 responded (response rate 77%), and data showed high satisfaction with the experience and that having students learn more about their jobs improved their own job satisfaction.

**CONCLUSIONS:** An immersive, hands-on experience with interprofessional colleagues showed dual benefits for both students and staff alike. Such an elective experience is scalable to other institutions nationally and should become a standard part of medical student curricula.

**KEYWORDS:** interdisciplinary care, medical education, hospital management, systems-based practice

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**CORRESPONDING AUTHOR:** Andrew Hale, Department of Medicine, University of Vermont Medical Center, Infectious Disease Unit, 111 Colchester Avenue, Mailstop 115 SM2, Burlington VT 05401, USA.  
Email: Andrew.Hale@UVMhealth.org

## Introduction

Skilled systems-based practice has become a requirement of the practice of medicine, as signified by its inclusion as 1 of 6 core competencies outlined by the Accreditation Council for Graduate Medical Education.<sup>1</sup> However, providing meaningful education on systems-based practice to medical students remains a significant challenge.<sup>2,3</sup> Systems-based practice is defined as actions that demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to call on system resources effectively to provide care that is of optimal value.<sup>4</sup> As such, systems-based practice education must cover a wide scope, and specific teaching points can be nebulous and thus challenging for medical faculty to deliver effectively.<sup>4,5</sup> Prior literature focused on teaching systems-based practice skills to residents has suggested that a didactic-based curriculum is a poor method of delivering systems-based practice skills and that hands-on, experiential learning is superior.<sup>3,6–8</sup> Despite calls for improved systems-based practice education at the medical student level, the ideal methodology has yet to be well defined.<sup>9,10</sup> Prior reports of medical student elective experiences have

demonstrated gains in interdisciplinary collaboration and medical student empowerment toward successful interprofessional partnership, suggesting that such experiences might be effective in teaching students about systems-based practice.<sup>11</sup>

We sought to expand upon prior literature<sup>11</sup> and hypothesized that medical students exposed to an immersive experience with hospital-based non-physician colleagues and physicians with leadership and administrative roles (interprofessional staff) would show gains in systems-based knowledge and a greater appreciation for what makes the hospital work. We also hypothesized that these colleagues would appreciate having medical students understand their work more, which may lead to improved interprofessional understanding and communication.

## Methods

We created a 2-week elective experience for fourth-year medical students at the Larner College of Medicine (LCOM) at the University of Vermont (UVM), Burlington, VT, USA. It took place at the UVM Medical Center (UVMHC), a 561-bed tertiary care academic medical center in Burlington, VT. The elective is entitled “How the Hospital Works,” and has been run twice yearly with 1 to 3 students per course



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Day 1	Day 2	Day 3	Day 4	Day 5
Course orientation	Social Work	Language Access	Nursing	Patient Logistics and Regional Transport
Administration and Finances	Case Management	Hospital Phone Operators		Patient and Family Advocacy
Day 6	Day 7	Day 8	Day 9	Day 10
Operative Room Support	Infection Control	Physical and Occupational Therapy	Environmental Services and Facilities	Pharmacy
Patient Support and Transport	Clinical Skills Center	Speech and Language Pathology	Food Services	Course Wrap-Up

**Figure 1.** Organization of the “How the Hospital Works” elective. Shown is the basic schedule and outline of content for the “How the Hospital Works” elective. Each day is split into 2 half-day components, except for the nursing experience which is a full day.

since 2019, and was adapted from prior work.<sup>11</sup> Participating students self-select into this elective from the LCOM course catalog and there is no explicit incentive or requirement to participate.

The experience involved immersive integration into a variety of interprofessional, non-physician, and administrative roles within the hospital system as shown in Figure 1. For instance, students join staff from environmental services, food services, patient and family advocacy, and a wide range of other non-physician professionals working within the hospital system. They had meetings with the chair of medicine and the president of the medical center to further understand the administration and financing of a large medical system. Participating students joined the interprofessional staff, were given an overview of their role within the hospital, and fully participated in their daily work. Interdisciplinary staff were recruited on a volunteer basis, without an explicit incentive. As an example of what this looks like in practice, for the food services experience the students start by meeting with the head chef, who provides an overview of how the menu is made and sourced and the associated finances; then they join kitchen staff to understand how food is made for the hundreds of inpatients; then they join service staff delivering food to patient rooms.

We completed a descriptive analysis of the course as an observational study. Inclusion criteria included all participating students and staff. There were no exclusion criteria. Pre- and post-elective systems-based knowledge and interprofessional communication were assessed from all participating medical students with Likert-style questioning and compared with paired *t*-tests. Students were also required to provide daily written reflective pieces and an end-of-course written narrative review of their experiences and knowledge gained.

Participating interprofessional staff were surveyed on their experiences of having medical students join them and the perceived benefit of having medical students understand their and

**Table 1.** Pre- and post-elective assessment questions.

	Pre-elective mean score <sup>a</sup> (SD) (n = 14)	Post-elective mean score <sup>a</sup> (SD) (n = 14)	p-value
Understanding of the different roles of interprofessional staff in the hospital care system	2.2 (0.39)	3.2 (0.39)	.007
Understanding how the services offered by interprofessional staff complement those offered by physicians	2.1 (0.29)	3.2 (0.39)	.002
Ability to communicate with interprofessional staff	2.9 (0.51)	3.6 (0.48)	.003
Feeling comfortable approaching interprofessional staff	2.8 (0.58)	3.8 (0.39)	.001
Understanding “what it is like” to be one of these interprofessional staff	1.7 (0.62)	3.0 (0.43)	.002
Understanding the common challenges faced by interprofessional staff	1.4 (0.48)	3.1 (0.29)	.001

<sup>a</sup>Pre- and post-elective mean scores were assessed by a 1–4 Likert score, with 1 indicating “no understanding, comfort, or ability” and 4 indicating “excellent understanding, comfort, or ability.”

their colleagues’ jobs more. The survey was sent electronically, was not required, and there was no explicit benefit to participating.

The elective experience and soliciting of feedback regarding it was deemed to not be human subjects research and did not require research oversight from the UVM institutional review board. No written or verbal consent was required to be obtained.

*Statistical Analysis*

Pre- and post-elective numerical survey data were compared with paired *t*-tests. A *p*-value of <.05 was considered statistically significant. Analysis was completed with Microsoft Excel.

**Results**

From 2019 through 2022, 14 students participated in the elective, all of whom completed the surveys. Pre- and post-elective knowledge assessment is shown in Table 1. There were statistically significant gains in knowledge in all categories assessed. For instance, on a Likert-style scale from 1 (low) to 4 (high), student understanding of the different roles of interprofessional staff rose from 2.2 (SD = 0.4) to 3.2 (SD = 0.4), *p* = .007, and their understanding of what it is like to work as interprofessional staff increased from 1.7 (SD = 0.6) to 3.0 (SD = 0.4), *p* = .002. Select qualitative feedback is shown in Table 2, and demonstrates the high level of importance the students placed on the

experiences gained within the domains of systems-based practice and interprofessional communication.

Of the 22 participating interprofessional staff surveyed, 17 responded (response rate 77%), as shown in Table 3. These colleagues felt that having medical students learn more about their job was important (mean of 4.7 (SD = 0.6) on a Likert scale from 1 (lowest) to 5 (highest), improved their own job satisfaction (mean 4.1 (SD = 0.8)), improved interprofessional communication (mean 4.4 (SD = 1.1)), and helped medical students understand common challenges they faced (mean 4.5 (SD = 1.0)). Select qualitative feedback from participating interprofessional staff colleagues is shown in Table 2 and suggests this was a positive experience.

**Discussion**

It has been written more than once that exceptional medical care and well-functioning hospital systems require excellent

**Table 2.** Select qualitative feedback from medical students and interprofessional staff.

Theme	Medical Students
<b>Systems-based care</b>	As the old adage goes, “you don’t know what you don’t know.” This elective brought to light for me all of the things I didn’t know about how a hospital system functions.
	The glorified view of a physician as the heroic savior no longer exists for me. Without a complex system of care, the physician is much less capable.
	This elective should be a requirement for all students. How is this not a standardized curriculum?
	This experience has generated a greater sense of empathy and understanding toward all of the individuals who make our hospital work.
	Participating in this course made me feel like part of the hospital community, and I only wish I could have taken it sooner in my medical education.
	There are way more people involved in effective patient care besides doctors and nurses, and everyone from the therapists to the documentation specialists to the environmental services staff was excited to tell me more about how they contribute to that mission.
	This elective has opened my eyes to the many positions and services in healthcare I took for granted before. I have a better understanding of the struggles non-physicians face and what I, as a future physician, can do to help. It has been a humbling two weeks.
<b>Interprofessional communication</b>	The best part of the experience for me was just showing up each day and having these “off-the-cuff” conversations and getting a deeper understanding of the challenges and barriers that non-physician staff face.
	I feel that I will be able to have much more meaningful and informed conversations with the non-physician professionals I work with in the future.
	Interprofessional challenges are numerous throughout the hospital and take on many forms. The clearest theme in every group was communication. Particularly when there are people of so many different backgrounds coming together to do a job, determining what information is relevant for which people and then communicating that information appropriately is so vital. When communication is important, there’s seldom a good substitute for a conversation.
<b>Interprofessional staff</b>	
	Interpreter Services staff appreciate being included in the course curriculum because it is a recognition that what we do is important to patient care.
	There is something very special that happens when the 4-year medical students come through and see what we do in Nutrition Services. In my opinion, it is paramount for new doctors to know where their food comes from whether it be in their hospitals’ food service, their own personal connection, or the community that they serve.
	I am amazed at how engaged and curious the medical students are in learning about our work in Environmental Services, it is very affirming.

**Table 3.** Assessment from interprofessional staff on the elective experience.

Having medical students learn more about the job me and my colleagues do:	Mean response <sup>a</sup> (n = 17)	Standard deviation
• Is important	4.7	0.6
• Improves my sense of job satisfaction	4.1	0.8
• Improves interprofessional communication	4.4	1.1
• Helps them understand the common challenges we face	4.5	1.0

<sup>a</sup>Responses obtained from survey data of participating interprofessional staff with a Likert-scale from 1 (strongly disagree) to 5 (strongly agree).

multidisciplinary communication, teamwork, and an “it takes a village” approach.<sup>12,13</sup> To that end, we created a fourth-year medical student elective that provided participants with an immersive systems-based practice and interprofessional experience. All participating students showed a quantitative improvement in systems-based knowledge and qualitatively commented on the high value of the elective in furthering their understanding of interdisciplinary care and communication. Additionally, the participating interprofessional staff not only found this to be an important and rewarding experience, but importantly they noted that it improved their own job satisfaction. As burnout throughout the medical system—including but not limited to physicians—becomes increasingly prevalent,<sup>14</sup> our findings suggest that improved interdisciplinary communication and co-understanding may be a mitigating factor. Other authors have found similar findings<sup>15</sup> and we posit that the benefit of an elective like the one described here goes well beyond the students involved.

Prior authors have previously shown the effectiveness of similar elective experiences in empowering students to engage with their non-physician colleagues more effectively. Authors at Johns Hopkins University School of Medicine were one of the first in the literature to describe such an elective.<sup>11</sup> Other authors at the University of Cincinnati have described an interprofessional education course with a cultural competency component,<sup>16</sup> while others in Tennessee have provided an interdisciplinary elective with a focus on rural social work.<sup>17</sup> Our elective and study of it here differs in the scope of the experience offered, and also in demonstrating the significant value of the experience to the participating interprofessional staff, not just to the mentored medical students. Our finding of a dual-benefit is novel and suggests that interprofessional-focused electives for medical students have beneficial “off-target” effects within the healthcare environment.

There are several limitations to our study. The elective takes significant administrative effort and we had resources allocated from the UVMC Department of Medicine to help coordinate all aspects of the rotation, which may not be available at other centers. This was a single-center experience at a tertiary care academic medical center; a broader scope may add additional value. The total number of participating students was relatively small, and we did not complete power calculations, but we were able to show significant pre- and post-elective differences. The survey questions we solicited were not validated or piloted and relied on the subjects’ own perceptions of their understanding and abilities, which could be erroneous. We were not able to track long-term outcomes.

## Conclusions

We believe this elective experience is scalable to other institutions nationally and should become a standard part of medical student curricula. A deeper understanding of the roles non-physicians play in the effective care of patients is a critical and necessary step in the evolution of student to physician. As one of our participating students put it, “this elective should be a requirement for all students.” All physicians must learn at some point in their training that they cannot go it alone, and we believe this educational experience is an important intervention in placing a physician within the larger hospital ecosystem.

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## Author Contributions

All co-authors have seen and agree with the contents of the manuscript and have contributed significantly to the work

## ORCID iD

Andrew J. Hale  <https://orcid.org/0000-0001-7038-1353>

## Supplemental Material

Supplemental material for this article is available online.

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