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Impact of an Innovative Curriculum on Medical Student Preparedness for Interprofessional Practice

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Title: Impact of an Innovative Curriculum on Medical Student Preparedness for Interprofessional Practice

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Abstract:

Interprofessional education (IPE), defined by the World Health Organization as a process that “occurs when students from two or more professions learn about, from, and with each other”¹ is well-established as an important contributor to improving collaborative care and patient outcomes. However, strong evidence for specific interventions to foster IPE in the clinical setting is currently lacking. The goals of our curriculum are to expose medical students to the value of IPE and improve their knowledge about and attitudes towards the roles and responsibilities of other non-physician healthcare professionals in a real clinical environment.

Students identified two non-physician healthcare professionals involved in the care of patients they were responsible for, observed them in the clinical environment, and interviewed them. Students completed a pre- and post-curriculum survey including the Nebraska Interprofessional Education Attitudes Scale (NYPEAS). Wilcoxon signed rank test was used to compare responses and account for paired data. Student ability to correctly identify appropriate collaborators, as determined by the authors, was compared before and after the activity. All rotating students wrote individual and small group reflections during structured debrief sessions, and the session moderator documented highlights of these whole group sessions. Each debrief session was attended by at least four non-physician healthcare professionals who spoke about their roles and answered any questions from the medical students. A constant comparative multi-reviewer process was utilized for qualitative analysis to develop and finalize major themes.

Statistically significant improvements occurred in 9 of 19 NYPEAS items in the post-curriculum survey compared to pre-curriculum. Following the IPE curriculum, students were better able to identify appropriate collaborators in patient care. To explore potential ways to improve patient care and

outcomes, the qualitative analysis identified key themes from the debrief sessions following the implementation of the interprofessional education curriculum. These themes included the diversity of expertise, collaborative care, mutual respect, comprehensive or holistic care, and a deeper understanding of roles. Additional themes highlighted the importance of improved communication, an environment conducive to learning, innovation, inclusivity, and the challenges inherent in these processes.

Format: Medical students selected two patients for whom they cared on the wards and identified at least two non-physician healthcare professionals involved in their care. The students directly observed and interviewed these professionals to understand their roles and contributions to the patients' care. This clinical component was followed by a classroom-based debrief session, facilitated by one or two physicians and an education specialist, with a panel of at least four non-physician healthcare professionals. The panel's role was to participate in the discussion and answer student questions to further clarify the roles of these non – physician healthcare professionals.

Target audience: Medical students rotating on the general pediatrics inpatient teams during their pediatric clerkship

Objectives:

The aim of the activity was to expose medical students to the value of interprofessional collaborative practice through exposure to other healthcare professionals in a clinical setting.

Specific objectives of the curricular activity were: 1) identify at least two other healthcare professionals that students can collaborate with in their specific patient's care, 2) describe their contributions to patient's care, and 3) articulate the value of engaging diverse professionals who complement one's own professional expertise to meet the specific healthcare needs of a patient.

Each learning objective was mapped to an Interprofessional Education Collaborative (IPEC) core competency or competencies (Table 1).^{2,3}

Activity description:

At the start of the pediatric clerkship, medical students were instructed to select two patients for whom they were caring and identify at least two non-physician healthcare professionals involved in those patients' care. Students received a handout with the curricular activities and learning objectives (Appendix A), which included guiding questions to support them in choosing and interviewing non-physician healthcare professionals. Towards the end of their six-week clerkship, students attended a structured 50-minute debrief session with peers during which they shared insights gained from the activity. Students were expected to attend at least one out of two identical debrief sessions that were conducted for each cohort. To ensure consistency within and across cohorts, session facilitators utilized the same debrief structure (Appendix B) for leading the session, which was comprised of prompted individual reflections, small group discussions, and whole group discussions. There were at least four non-physician healthcare professionals (in addition to one or two physicians and an education specialist) present during the debrief sessions to contribute to discussions and answer student questions. There were approximately 10 - 12 students present in each session.

Assessment:

The activity was implemented for all six cohorts of students rotating through the pediatric clerkship during the 2022-2023 academic year. Of 123 total students, 121 completed the pre-curriculum survey and 106 completed the post-curriculum survey. We matched 92 pre- and post-curriculum surveys using a participant selected anonymous identifier. Demographic information was not collected for those who completed the survey. To measure the perceived effectiveness of the curricular intervention, survey

questions included the validated Nebraska Interprofessional Education Attitudes Scale survey⁴ (with written consent obtained from the survey authors) and open-ended questions about student understanding of interprofessional collaborative practice (Appendix C). The response to each survey item was treated as a discrete variable on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The change score for each item was calculated as post-curriculum response minus pre-curriculum response. A positive value indicated higher self-perceived attitudes post-curriculum while a negative value indicated lower self-perceived attitudes post-curriculum. To assess whether self-perceived attitudes changed pre- versus post-curriculum in the overall cohort and by cohort, Wilcoxon signed rank tests and Kruskal-Wallis tests were used, respectively. Statistical significance was defined as $p < 0.05$.

The survey also contained a sample patient case. Students were asked to list all non-physician healthcare professionals who could contribute to that patient's care. A list of appropriate collaborators was decided by consensus by the authors of the paper prior to analysis of student responses. Student ability to correctly identify appropriate collaborators, as determined by the authors, was compared before and after the activity using paired t-test.

Finally, all rotating students provided written individual reflections and small group reflections to the provided prompts (Appendix B) during the debrief sessions. Notes from whole group discussions were recorded by the education specialist.

For the qualitative analysis, four authors reviewed the open-ended responses from 229 surveys (both pre- and post-curriculum) and moderator notes from 12 debrief sessions across six cohorts of rotating medical students to generate an initial list of emergent themes. These themes helped us determine how the activity impacted student knowledge and attitudes of the contribution of these professionals to patient care and the overall value of collaboration (objectives 2 and 3). Each author independently

analyzed the data to identify recurring themes across the different data sources. A constant comparative method⁵ was applied to continuously review the data until reaching saturation. We then used an inductive approach to refine the themes, with two researchers co-coding the first three cohorts before the entire team reached consensus on the coding framework.

Our study was exempt from review by the Duke University Hospital Institutional Review Board. All students in the Pediatrics clerkship were invited to participate in an anonymous, voluntary survey, with no impact on their clinical evaluations or grades. Consent was implied through participation, and no formal recruitment process was used. As the intervention was part of the standard curriculum for all clerkship students, implementing a control group was not feasible. The study aimed to assess the impact of the interprofessional curriculum on all participants, rather than compare groups. Therefore, we used pre- and post-curriculum surveys to evaluate changes in students' knowledge and attitudes toward interprofessional collaboration.

Evaluation:

After completing this curriculum, statistically significant differences were noted in 9 of 19 NIPEAS items in the overall cohort, including greater proportions of students in the post-curriculum survey selecting “strongly agree” with self-perception of ability to communicate effectively with other professionals (pre: 18.5%, post: 67.4%), understanding of roles of oneself (pre: 20.7%, post: 66.3%) and other healthcare professionals (pre: 14.1%, post: 45.7%), the importance of compromise and listening as part of a healthcare team (pre: 45.7%, post: 65.2%), and agreement that the plan should be made by the team as a whole (pre: 48.9%, post: 71.7%) (Table 2). There were no statistically significant changes in scores for each item by cohort, as determined by the time of year students completed their pediatric clerkship (results not shown).

Prior to the activity, students identified an average of 4 (SD 1.5) appropriate collaborators and the average increased to 5 (SD 2.1) following the activity (average change score of 1.0 with SD = 1.9, p-value < 0.001).

A total of 12 consensus themes were identified from qualitative data, as shown in Table 3. Students overall viewed the activity positively, with narrative responses consistent with the positive change scores noted from the NIPEAS survey. Notably, themes drawn from narrative responses closely aligned with IPEC's 2016 and 2023 core and sub-competencies. A commonly recurring theme was the value of a more comprehensive approach to patient care (Theme 4). Students described collaborating with a wide range of non-physician healthcare professionals, including (listed in alphabetical order) case managers, chaplains, child life specialists, dieticians, lactation consultants, nurses, occupational therapists, pharmacists, physical therapists, respiratory therapists, social workers, and speech therapists. This collaboration fostered a deeper appreciation for holistic patient care, addressing not only physical health but also emotional and mental well-being, unmet social needs, and the incorporation of innovative ideas.

The activity was effective in evolving students' knowledge of and attitudes towards interprofessional roles, underscoring the importance of diverse expertise and perspectives, and promoting the benefits of collaborative care. One student highlighted this by saying, "Engaging diverse professionals ensures that all patient needs are appreciated and addressed." Another student added, "Different training backgrounds give professionals different perspectives, strengths, and ideas that others may not have," emphasizing the importance of diversity in opinions and care provided by interprofessional collaboration (Theme 1). Students expressed relief that they were not the sole providers making decisions, with one noting, "[The activity] helped take away pressure that I have to make all the decisions going forward," highlighting the importance of collaborative care (Theme 6). A better understanding of roles was

another common theme identified (Theme 7), as reflected by a student who stated, “My main understanding of IPEC prior to this was PA/nursing/NPs, but now I have a broadened definition to include many other roles.” This demonstrated the broadening of students' understanding of interprofessional education and collaboration.

Challenges to interprofessional collaboration that students identified (Theme 12) included issues related to communication and decision-making, especially when multiple healthcare professionals are involved and when in-person interactions are not possible. Students recognized the potential for miscommunication in a larger patient care team. Identifying these challenges provides an opportunity to evaluate the structure of interprofessional learning in the clinical setting to reshape future physicians' approaches to patient care and teamwork.

Impact:

Systematic reviews have shown that interprofessional education and collaboration improves team member knowledge, fosters more positive attitudes around collaboration, increases adherence to recommended practice guidelines, and increases utilization of additional health resources, each of which may contribute to improved patient outcomes.⁶⁻⁸ Teamwork training is associated with reduced adverse events, reduced morbidity and mortality, and improved patient care coordination.⁹ Studies have demonstrated that when healthcare professionals from different disciplines work together, they bring unique perspectives and expertise, ultimately enhancing the quality of care delivered to patients.¹⁰ Additionally, IPE helps to reduce barriers between professionals, fostering mutual respect and improving communication.¹¹

Despite the established importance of IPE, there is still a gap in understanding the most effective methods for embedding interprofessional collaboration into clinical practice.¹²⁻¹³ While classroom instruction provides a theoretical foundation for knowing about collaboration with other professionals, students need the opportunity to apply their knowledge within a clinical setting to move beyond theoretical knowledge. This aligns closely with a constructivist approach to learning, which argues that learners construct their knowledge from experiences and reflection on experiences.¹⁴⁻¹⁶ Medical students often lack the opportunity to engage in real-world interprofessional teamwork, highlighting the need for curricular interventions that bridge the gap between theory and practice, enabling students to directly observe and engage with professionals from other disciplines in a clinical setting. Through guided and intentional reflection on collaboration with other professionals in the care of patients, clerkship students have the opportunity to deepen their knowledge of and attitudes towards interprofessional collaboration beyond the theoretical to actual practice. Our curriculum was associated with improvement in multiple domains related to understanding of healthcare professional roles, effective communication, mutual respect, and team dynamics. The experiential nature of the curriculum provided opportunity for medical students to directly observe and interact with non-physician healthcare professionals in a clinical setting, while the structured debrief sessions allowed students to reflect on their own learning and to learn from the experiences of other students, leading to further understanding of the roles of a wider range of health professionals and the value of interprofessional collaboration. We believe this combination of experiential learning paired together with the debrief sessions provided the greatest impact on student learning and attitudes. The hands-on, real-world exposure allowed students to see collaboration in action, which allowed for a deeper understanding of the roles and contributions of non-physician healthcare professionals to patient care. By actively engaging with these professionals, students contextualized their knowledge of interprofessional collaboration in ways that theoretical classroom instruction alone could not provide.

The reflective components of the activity played a crucial role in reinforcing the learning outcomes. In both individual and small-group reflections, students were able to identify and process their experiences of collaboration. They reported a greater appreciation for the diverse skill sets and perspectives that other healthcare professionals bring to patient care. As one student noted, “Engaging with professionals from different fields gave me a broader understanding of holistic care and how multiple perspectives improve patient outcomes.”

Furthermore, several of the statistically significant changes observed on the NIPEAS survey were in areas that directly aligned with the experiential components of the curriculum. These included the ability to communicate effectively with other professionals, the understanding of the need for compromise, and the recognition of the importance of listening to others. Students showed a strong appreciation for the idea that decisions should be made collaboratively by the team rather than unilaterally. These shifts in attitudes may have stemmed from the hands-on learning experience, as students were able to witness and reflect on collaborative decision-making processes in real patient care contexts.

Overall, the combination of experiential learning and reflective practice—where students not only observed professionals but also interacted with them and engaged in structured reflection—may have provided a stronger impact on their preparedness for interprofessional practice, than either curricular intervention alone.

Our results suggest that the activity met the overall goal and learning objectives, with students better able to describe an understanding of the importance of other healthcare professionals on patient care, articulate the value of collaborating with other healthcare professionals, and identify appropriate collaborators in a particular patient’s care. For the NIPEAS items that indicated no significant change, some items showed similar distribution across both timepoints, indicating it was not impacted by our curricular intervention (for example, item 10 on ethical principles) and some items had high levels of

agreement prior to the intervention, leaving little room for change (for example, item 14 on effective communication).

This curriculum provides a method for implementing IPE in a real clinical environment. Other studies showing improved attitudes towards interprofessional collaboration amongst learners primarily utilized methods of role modeling or a brief intervention in the classroom setting or simulation environment.^{17,18}

To our knowledge, our study is one of the first to show improved attitudes towards IPE and knowledge of other health professional contributions to patient care amongst students in a clinical environment while caring for patients.

The qualitative analysis reveals that medical students are increasingly recognizing the vital role of other healthcare professionals in delivering comprehensive care. Many students expressed an appreciation for interprofessional collaboration, particularly in the context of post-discharge care, where case management plays a key role in coordinating home health services and ensuring proper outpatient follow-up. Students acknowledged the valuable expertise of non-physician health professionals, expressing relief that, as future physicians, they won't be solely responsible for every aspect of patient care. Moreover, students noted how interprofessional collaboration contributes to diversity and equity in healthcare. These insights underscore the potential of such curricula to significantly improve future healthcare practices by fostering holistic, equitable, and comprehensive patient care.

The significant differences in students' attitudes for interprofessional collaboration were maintained across the cohorts, regardless of the time of year they completed their clerkships, suggesting that the observed improvements may have been specifically due to the curricular intervention, rather than being influenced by other factors that vary throughout the academic year. These findings from a clinical environment could result in changes in attitude towards IPE amongst students, potentially contributing to a more collaborative healthcare environment.

Students were able to identify challenges that arise in the setting of collaborative care, including potential for miscommunication and a larger expectation for continued clarification that has potential to negatively impact patient care. We believe this further emphasizes the importance of learning experiences as an opportunity to improve interprofessional communication and collaboration to reshape future physicians' approaches to patient care and teamwork.

Some limitations to our study exist. The study was conducted at one institution, which may limit generalizability to other institutions. The study only analyzed data from one year of medical students without obtaining follow-up data. Therefore, we cannot comment on any longitudinal impact the activity has on student preparedness for interprofessional collaboration, a common limitation within current data on IPE.¹⁸⁻²⁰ Similarly, the study focused only on knowledge and attitudes and not on behavior change. Other factors may have impacted students' self-perception and knowledge acquisition beyond the activity itself. However, the statistically significant differences remained consistent, regardless of the time of year when the medical students participated in the rotations. Although a control group would provide additional insights into the specific impact of the curriculum, our pre- and post-curriculum survey design allowed us to observe significant improvements in medical students' attitudes and knowledge about interprofessional collaboration. The statistical significance in many items on the NIPEAS and the qualitative themes derived from student reflections demonstrate that the curriculum had a meaningful impact on students' understanding of interprofessional roles and teamwork. In future work, we plan to explore the possibility of creating a control group through a randomized control design to better assess the specific impact of this curriculum compared to standard medical education approaches and collect longitudinal data to evaluate the long-term effects of the curriculum on student behavior and interprofessional collaboration. Additionally, we will gather qualitative data from interprofessional faculty who participate in debrief sessions to understand their perspectives and

contributions to the curriculum and incorporate interprofessional team members as primary facilitators of debrief sessions.

Our curriculum is relatively simple to implement but has the potential to prime students to observe interprofessional interactions more closely, understand the value of other healthcare professionals and feel more comfortable in communicating with other healthcare professionals. Institutions may utilize this as an additional modality for teaching interprofessional collaboration in a clinical environment. Our next steps are to consider expansion and integration of this curriculum to other clinical training experiences within Duke University and across other institutions. Given the lack of longitudinal data and evaluation of practice change available in the literature, future work will focus on development of a tool to measure behavioral change related to interprofessional collaboration in the clinical setting to further evaluate impact of curricular interventions. In summary, our curriculum has shown promising results in enhancing medical students' understanding of interprofessional collaboration within a clinical setting. Moving forward, we plan to assess the long-term effects of the curriculum and expand it to other clinical training environments, with a focus on capturing behavioral changes, broader datasets, student demographics, and learner perceptions to better understand its full impact.

Required materials: All required materials are attached as tables and appendices as indicated above.

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Tables:

Table 1. Interprofessional collaborative practice activity learning objectives mapped to IPEC core competencies and sub-competencies.

Objective	IPEC Competencies	IPEC Sub-Competencies 2016	IPEC Sub-Competencies 2023
Identify at least 2 other professions that students can collaborate with in a specific patient's care	Roles/Responsibilities	RR3	RR3
Describe the contributions of those 2 professionals in the context of this patient's care	Roles/Responsibilities	RR4	RR4
Articulate the value of engaging diverse professionals who complement one's own professional expertise to meet the specific healthcare needs of a specific patient	Values/Ethics for Interprofessional Practice Roles/Responsibilities	VE4, RR3, RR4, RR9	VE4, VE5, RR4

Table 2. Self-perceived attitudes pre- and post-curriculum. Significant values are highlighted.

NIPEAS items	Pre (N = 92)	Post (N = 92)	P-value
[1] I am able to communicate effectively about patient care with persons from healthcare professions different from my own			<0.001
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	2 (2.2%)	0 (0.0%)	
(3) Neither agree nor disagree	5 (5.4%)	0 (0.0%)	
(4) Somewhat agree	68 (73.9%)	30 (32.6%)	
(5) Strongly agree	17 (18.5%)	62 (67.4%)	
[2] I am able to use terminology that is unique to other healthcare professions			<0.001
(1) Strongly disagree	5 (5.4%)	0 (0.0%)	
(2) Somewhat disagree	30 (32.6%)	1 (1.1%)	

(3) Neither agree nor disagree	30 (32.6%)	15 (16.3%)	
(4) Somewhat agree	26 (28.3%)	54 (58.7%)	
(5) Strongly agree	0 (0.0%)	22 (23.9%)	
Missing	1 (1.1%)	0 (0.0%)	
[3] I understand my own role within the healthcare team			<0.001
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	2 (2.2%)	0 (0.0%)	
(3) Neither agree nor disagree	6 (6.5%)	1 (1.1%)	
(4) Somewhat agree	65 (70.7%)	30 (32.6%)	
(5) Strongly agree	19 (20.7%)	61 (66.3%)	
[4] I understand the roles of other healthcare professionals			<0.001
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	9 (9.8%)	0 (0.0%)	
(3) Neither agree nor disagree	8 (8.7%)	2 (2.2%)	
(4) Somewhat agree	62 (67.4%)	48 (52.2%)	
(5) Strongly agree	13 (14.1%)	42 (45.7%)	
[5] I should learn about the values and expertise required for healthcare professions other than my own.			0.023
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	1 (1.1%)	0 (0.0%)	
(3) Neither agree nor disagree	4 (4.3%)	0 (0.0%)	
(4) Somewhat agree	21 (22.8%)	17 (18.5%)	
(5) Strongly agree	65 (70.7%)	75 (81.5%)	
Missing	1 (1.1%)	0 (0.0%)	
[6] Appreciation of the expertise of other healthcare professionals leads to a better work environment			0.835
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	1 (1.1%)	0 (0.0%)	
(4) Somewhat agree	9 (9.8%)	10 (10.9%)	

(5) Strongly agree	82 (89.1%)	82 (89.1%)	
[7] I can provide a higher standard of care if I consider input from other professionals than if I work independently			0.488
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	1 (1.1%)	0 (0.0%)	
(3) Neither agree nor disagree	0 (0.0%)	1 (1.1%)	
(4) Somewhat agree	6 (6.5%)	9 (9.8%)	
(5) Strongly agree	84 (91.3%)	82 (89.1%)	
Missing	1 (1.1%)	0 (0.0%)	
[8] In order to be an effective team member, I may have to compromise with others who hold different values			0.001
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	2 (2.2%)	0 (0.0%)	
(3) Neither agree nor disagree	5 (5.4%)	3 (3.3%)	
(4) Somewhat agree	43 (46.7%)	29 (31.5%)	
(5) Strongly agree	42 (45.7%)	60 (65.2%)	
[9] To be competent, a person in my profession must work cooperatively with other healthcare providers			0.848
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	0 (0.0%)	0 (0.0%)	
(4) Somewhat agree	15 (16.3%)	14 (15.2%)	
(5) Strongly agree	76 (82.6%)	78 (84.8%)	
Missing	1 (1.1%)	0 (0.0%)	
[10] Ethical principles that are foundational to healthcare are the same for all healthcare professions			0.304
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	2 (2.2%)	5 (5.4%)	
(3) Neither agree nor disagree	6 (6.5%)	3 (3.3%)	
(4) Somewhat agree	32 (34.8%)	22 (23.9%)	
(5) Strongly agree	50 (54.3%)	62 (67.4%)	

Missing	2 (2.2%)	0 (0.0%)	
[11] I consider ethnical practice and high quality of patient care to be more important than demonstrations of my own knowledge and skills			0.843
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	1 (1.1%)	0 (0.0%)	
(4) Somewhat agree	14 (15.2%)	15 (16.3%)	
(5) Strongly agree	77 (83.7%)	77 (83.7%)	
[12] I would be receptive to critique of my performance from another person in my own profession			0.068
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	1 (1.1%)	
(3) Neither agree nor disagree	2 (2.2%)	3 (3.3%)	
(4) Somewhat agree	12 (13.0%)	18 (19.8%)	
(5) Strongly agree	78 (84.8%)	69 (75.8%)	
Missing	-	1	
[13] I can learn about my own profession from healthcare professionals outside of my own profession			0.02
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	1 (1.1%)	0 (0.0%)	
(3) Neither agree nor disagree	5 (5.4%)	2 (2.2%)	
(4) Somewhat agree	26 (28.3%)	21 (23.1%)	
(5) Strongly agree	60 (65.2%)	68 (74.7%)	
Missing	-	1	
[14] Effective communication is an essential component of all treatment plans			0.267
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	0 (0.0%)	0 (0.0%)	
(4) Somewhat agree	6 (6.5%)	10 (10.9%)	
(5) Strongly agree	85 (92.4%)	82 (89.1%)	

Missing	1 (1.1%)	0 (0.0%)	
[15] I need to establish good relationships with professionals outside of my own profession in order to practice effectively			0.841
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	0 (0.0%)	1 (1.1%)	
(4) Somewhat agree	19 (20.7%)	16 (17.4%)	
(5) Strongly agree	73 (79.3%)	75 (81.5%)	
[16] It is more important to listen to the opinions of other healthcare team members than to state my own viewpoint			<0.001
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	10 (10.9%)	5 (5.4%)	
(3) Neither agree nor disagree	26 (28.3%)	13 (14.1%)	
(4) Somewhat agree	32 (34.8%)	25 (27.2%)	
(5) Strongly agree	24 (26.1%)	49 (53.3%)	
[17] Forming relationships with members of other professions can improve patient care and advance learning			0.301
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	0 (0.0%)	0 (0.0%)	
(3) Neither agree nor disagree	0 (0.0%)	0 (0.0%)	
(4) Somewhat agree	15 (16.3%)	11 (12.0%)	
(5) Strongly agree	75 (81.5%)	81 (88.0%)	
Missing	2 (2.2%)	0 (0.0%)	
[18] I would be receptive to critique of my performance from a person who is in a difference profession than my own			0.058
(1) Strongly disagree	0 (0.0%)	0 (0.0%)	
(2) Somewhat disagree	5 (5.4%)	3 (3.3%)	
(3) Neither agree nor disagree	2 (2.2%)	3 (3.3%)	

(4) Somewhat agree	32 (34.8%)	21 (22.8%)	
(5) Strongly agree	53 (57.6%)	65 (70.7%)	
[19] The healthcare team's approach should be determined by the team as a whole rather than by the team leader			<0.001
(1) Strongly disagree	0 (0.0%)	1 (1.1%)	
(2) Somewhat disagree	2 (2.2%)	0 (0.0%)	
(3) Neither agree nor disagree	9 (9.8%)	3 (3.3%)	
(4) Somewhat agree	36 (39.1%)	22 (23.9%)	
(5) Strongly agree	45 (48.9%)	66 (71.7%)	

Table 3. Overarching themes with corresponding categories of coded data.

Theme	Student Descriptions Leading to Themes	Representative Quotes
(1) Diversity of Expertise	Unique perspective, individual expertise, diverse or different approach to patient care	"Different training backgrounds gives professionals different perspectives, strengths, and ideas that others may not have."
(2) Collaborative Care	Teamwork, shared goals, unified plan, working together	"[the activity] helped take away pressure that I have to make all the decisions going forward."
(3) Mutual Respect	Respect for and support of other professionals, appreciation of other roles, emphasizing importance of other roles in contributing to patient care, seeing others as critical to patient care	"Engaging diverse professionals... allows for mutual learning which not only allows for better patient care, but also allows providers to expand their knowledge and expertise."
(4) Comprehensive or Holistic Care	Patient-centered, culturally-competent, complete care; meeting complex needs of the patient, supporting emotionally and financially, meeting all of the various and diverse needs of the patient, individualized care, support and resources for home	"Engaging diverse professionals ensures that all patient needs are appreciated and addressed."

(5) Improved Patient Outcomes	High quality care, better or best care, decreased medical errors, including smooth transition to discharge	"[Collaborative practice] improves patient safety, outcomes, and quality of care both in the hospital and longitudinally while also reducing stress on providers."
(6) No Single Provider	Physician cannot address all aspects of a patient's care. Physicians do not know everything and are not equipped to have all the knowledge, not enough time for one provider to provide all of necessary care. Patient care goes beyond ability of one profession	"More reassuring that medicine isn't just one person making decisions or having to figure out what is going on with a patient" "Different providers have different roles in patient care, and no one provider can do it all"
(7) Understanding of Roles	Understanding and knowledge of the roles and breadth of responsibility of other healthcare professionals, knowing when to get other providers involved in patient care	"My main understanding of IPEC prior to this was PA/nursing/NPs, but now I have a broadened definition to include many other roles."
(8) Communication	Improved communication, closed-loop communication	"Interactions (verbal, non-verbal, and written) should be grounded in respect, open-mindedness, professionalism, and a focus on constructive team improvement."
(9) Environment of Learning & Care	Creating a safe and inclusive environment, comfort reaching out to other healthcare professionals not within one's own field	"[I now have a] much lower threshold for involving these teams. I used to think I could look it up on UpToDate but now I feel really comfortable asking questions. [I] used to think I had to figure it out."
(10) Innovation	Collaboration can lead to innovation as opposed to determining next steps on one's own. Those new ideas provide unique solutions to patient care.	"When you incorporate different skill sets and experiences into patient care, you open up the space for new ideas and approaches."
(11) Inclusivity	Workforce and patients come from diverse backgrounds, including different life/lived experiences; more equitable outcomes	"As a healthcare team, we... care for a diverse patient population that is reflective of the communities we live in. As such, it is imperative that the medical team similarly reflects a diverse set of personal experience, background, values, beliefs, and perspectives. This not only creates

		<p>a more inclusive environment but also creates greater opportunities for learning from and challenging one another."</p> <p>"Having people of many different life experiences and perspectives can augment the care of patients because people may have different ideas or thoughts that come from their own lives versus something that can be taught in a classroom or a textbook."</p>
(12) Challenges	Greater potential for miscommunication, error, potential to affect rapport	<p>"When used efficiently and effectively it can boost patient care, but if they aren't coordinating well it can actually be detrimental. Miscommunication can impact patients... things get lost in translation, losing patient trust is not a good thing"</p>



IPEC Learning Activity



Background

IPEC's (Interprofessional Education Collaborative) mission is to ensure that new and current health professionals are proficient in the competencies essential for patient-centered, community and population oriented, interprofessional, collaborative practice.

Interprofessional collaborative practice occurs when multiple health workers from different professional backgrounds provide comprehensive health services by working with patients, their families, and communities to deliver the highest quality care. (World Health Organization)



Goals and Objectives

This learning activity is intended to expose learners to the value of IPEC and improve understanding of the roles and responsibilities of other health care professionals.

Learning Objectives: By the end of this activity, learners will be able to:

- 1) *Articulate the value of engaging diverse professionals who complement one's own professional expertise to meet the specific healthcare needs of a specific patient.*
- 2) *Identify at least 2 other professions that they could collaborate with in a specific patient's care.*
- 3) *Describe the contributions of those 2 professionals in the context of this patient's care.*



Your Task

1. Identify 2 patients whose care would benefit from a collaborative team.
2. Consider the following questions:
 - Who do you need to talk to in order to optimize care of this patient?
 - What specific contribution do you want from these health care professionals for this patient?
 - What is the value of collaborating with these health care professionals for this patient's care?
3. For the health care professionals with whom you are collaborating for patient care,
 - A. Please spend time with one of the collaborators in a setting in which they are working to observe what they do. For example, observe a swallow study with a speech therapist, go to the gym in the afternoon with OT/PT to observe therapy sessions, or learn from a dietician how they calculate caloric requirements.
 - B. Interview at least one or more members of the team separately to learn about that profession's roles and responsibilities.
 - C. Share your findings with a small group at the end of your pediatric rotation.

IPEC Debrief Guide

Note: Times below are flexible and are intended only as a guide.

Time	Activity	Notes
3:00 – 3:05	Introduction, Overview, and Ground Rules	<p>Share Ground Rules.</p> <p>Monitor your air time. Expect everyone to participate. Listen to and learn from your peers. Share your experiences openly and honestly.</p>
3:05– 3:10	Individual Reflections	<p>Remind students to respond in a Word document and save for later submission.</p> <p>In preparation for presentations to their small groups, students respond to the following questions:</p> <ul style="list-style-type: none"> • Which professional(s) did you identify? • Why did you identify this/these professional(s)? • What did they contribute to patient care? • What did you learn about the collaborator’s role in patient care?
		Transition to small groups
3:10 – 3:20	Presentations	Students will move to small groups and present their findings in a round robin. Each student will have approximately 3 - 5 minutes to present their information.
3:20 – 3:30	Small Group Discussion	<p>After presentations, students will engage in small group discussions.</p> <p>Remind students to assign a recorder, a presenter, and a timekeeper.</p> <p>Recorder: record key points of the discussion in the same Word document as your reflection. Label them “Discussion Notes” in your document to separate them from your individual reflection notes.</p> <p>Presenter: be prepared to share key takeaways with the larger group.</p>

		<p>Timekeeper: monitor discussion time to ensure the group has time to respond to all of the questions below. You will have 10 minutes for the full discussion.</p> <p>Small groups should discuss the following questions:</p> <ul style="list-style-type: none"> • Consider each of the cases, what other professionals could we have engaged? • Now that you've identified these professionals, what would be your next steps in collaboration with them for each case? • What was the impact of the collaboration on patient care? • What do you see as the value of collaborating with these professionals in providing patient care?
	Break and Transition to Whole Group	
3:30– 3:40	Whole Group Discussion	<p>Begin by asking each group to share key ideas from their small group discussions. Then pose the following whole group discussion questions:</p> <ul style="list-style-type: none"> • How do you feel about IPEC now? • How does collaboration impact patient care? • What do you see as the value of collaborating with these professionals in providing patient care?
3:40 – 3:50	Presentations from various disciplines related to IPEC and Q&A	Ask the staff to share briefly about their role and answer questions/respond to the large group discussion.

Key Points for Facilitators

- During the presentations and discussions, listen for and reinforce the following key ideas about interprofessional collaboration:
 - Collaboration with others reinforces a climate of mutual respect and shared values.
 - Communication with patients, families, communities, and other professionals in health care is key for improving the quality of patient care, including maintenance of health and the prevention and treatment of disease.

- Relationship-building supports team dynamics and effective communication and collaboration across roles.

Journal Pre-proof

Define interprofessional collaborative practice.

What is the value of engaging diverse professionals to meet the health care needs of a patient?

Respond to each of the following statements using a scale from strongly disagree to strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am able to communicate effectively about patient care with persons from health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Somewhat disagree	agree nor disagree	Somewhat agree	Strongly agree
care professions different from my own.					
I am able to use terminology that is unique to other health care professions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand my own role within the healthcare team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand the roles of other health care professionals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I should learn about the values and expertise required for health care professions other than my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciation of the expertise of other health care professionals leads to a better work environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can provide a higher standard of care if I consider input from other professionals than if I work independently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In order to be an effective team member, I may have to compromise with others who hold different values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To be competent, a person in my profession must work cooperatively with other health care providers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethical principles that are foundational to health care are the	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Somewhat disagree	agree nor disagree	Somewhat agree	Strongly agree
same for all health care professions.					
I consider ethical practice and high quality of patient care to be more important than demonstrations of my own knowledge and skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be receptive to critique of my performance from another person in my own profession.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can learn about my own profession from health care professionals outside of my own profession.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication is an essential component of all treatment plans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I need to establish good relationships with professionals outside of my own profession in order to practice effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is more important to listen to the opinions of other health care team members than to state my own viewpoint.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forming relationships with members of other professions can improve patient care and advance learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be receptive to critique of my performance from a person who is in a different profession than my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strongly
disagreeSomewhat
disagreeagree nor
disagreeSomewhat
agreeStrongly
agree

The health care team's approach should be determined by the team as a whole rather than by the team leader.



Block 1

Please read the case scenario below and respond to the corresponding questions.

Peter is a 3 year old male with a history of febrile seizures who presented after a drowning event in a freshwater lake. He was admitted initially to the pediatric intensive care unit (PICU) for cardiopulmonary arrest and hypoxic respiratory failure. He was also found to have a hypoxic brain injury. While in the PICU, he developed acute respiratory distress syndrome (ARDS) and was intubated on a ventilator for a week. He was able to be extubated to oxygen supplementation via nasal cannula. He started to have seizures and muscle spasticity from his brain injury. He is having difficulty speaking and swallowing. He had a G-tube placed and now requires enteric feeds via the G-tube for nutrition. He was transferred to the pediatrics floor today for continued management and coordination of care. He will need to be placed at a rehabilitation center following discharge.

What additional health care professionals might you involve in this case?

Why did you choose each of these collaborators?

What would each collaborator contribute to the case?

Block 2

To provide an anonymous way to compare pre- and post- responses for curriculum evaluation, please provide the name of the street you grew up on followed by the day of the month you were born. For example: if I grew up on Briar Cliff Road and my birthday is the tenth of April, my response would be briarcliff10.

Block 3

On a scale of 1 - 5, how effective was this activity in fostering IPEC for you (1 = not very effective and 5 = very effective)?

What would have made this activity more effective for you?

What is one key takeaway for you from this activity?

Block 4

Please upload your reflection/discussion notes here. Remember, erase any identifying information (do not include your name, do not save with your name or group members' names).

References:

1. Beck Dallaghan GL, Lyden E, Meza J, Hugh Stoddard, Catherine Bevil, Dean Collier, Margaret Winnicki, Devin Nickol et al. The nebraska interprofessional education attitudes scale: A new instrument for assessing the attitudes of health professions students. *Journal of Interprofessional Education & Practice*. 2016;4:33-39.

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