

## Title Page

### Promoting interprofessionalism within an academic environment

#### **Abstract**

Although clinical laboratory science (CLS) is a vital component of the healthcare system, it is often referred to as the “hidden profession.” Patients, as well as many healthcare professionals, are unaware of the specialized training of clinical laboratory scientists. Fortunately, recent interest in interprofessional collaboration has resulted in a number of interprofessional education (IPE) studies. However, there is a paucity of information regarding the incorporation of CLS students in these IPE experiences. The purpose of this study was to incorporate an IPE experience involving CLS and medical students into courses each were involved in, and to obtain student perceptions of the experience. A classroom hematology case-based student learning activity was related to the Interprofessional Education Collaborative (IPEC) competency domains of roles/responsibilities and interprofessional communication. Pre- and post-surveys, which included student self-perception of IPEC competency domains, student assessment of the learning activity, and student reflection were completed by the participants. Significant changes in student perceptions related to all three subcompetencies were noted. Additionally, responses to an open-ended question indicated an increased understanding of another profession’s roles, increased appreciation of another health professional, and increased respect of another profession. These findings indicate that IPE experiences may improve clinicians’ understanding of the “hidden profession.”

**Abbreviations:** interprofessional education (IPE); clinical laboratory science (CLS); Interprofessional Education Collaborative (IPEC); Clinical Laboratory Integration into Healthcare Collaborative (CLIHC™)

**Index Terms:** interprofessional education, interprofessionalism, team-based learning, collaborative practice

## **Introduction**

Interprofessional education (IPE) is defined as “When students from two or more professions learn about, from and with each other.”<sup>1</sup> There is an increasing amount of research in the field of interprofessional education (IPE). However, the literature is lacking information regarding the incorporation of clinical laboratory science (CLS) students in IPE efforts within the academic setting and as members of the health care team.

Proper ordering, performing, reporting, and interpretation of laboratory tests plays a critical role in improving patient outcomes and decreasing health care costs.<sup>2</sup> As early as 1996, Forsman reported that laboratory testing conducted by CLS professionals provides up to seventy percent of the objective information needed by physicians and other healthcare providers to make decisions about a patient’s plan of care.<sup>3</sup> A recent survey conducted by the Clinical Laboratory Integration into Healthcare Collaborative (CLIHC) indicated that primary care physicians lack confidence in diagnostic test ordering 14.7% of the time and lack certainty about correct interpretation of results in 8.3% of cases.<sup>4</sup> Clinical laboratory scientists have knowledge about appropriate test selection and interpretation of results and health care providers who order laboratory tests should be aware of their specialized training. Because laboratory scientists conduct their work outside of common patient care areas where most health care providers deliver services, clinical laboratory science is often referred to as the “hidden profession.” Many members of the health care team are unaware of the CLS profession and respective skill set.<sup>5</sup>

Collaborative practice or team-based care is encouraged or expected in various health care models, such as Accountable Care Organizations, Community Health Centers and Federally

Qualified Health Centers. Therefore, it has become increasingly important to prepare health care professional students to collaborate and work in teams. Health care professional students who are trained in an interprofessional manner are more likely to practice collaboratively post-graduation.<sup>6</sup>

In 2015, Louisiana State University Health-New Orleans (LSUHNO) established a Center for Interprofessional Education and Collaborative Practice (CIPECP). The goal of the CIPECP is to coordinate student education by utilizing a team-based, patient-centered approach which delivers the highest quality of care resulting in improved health outcomes. With the goal of improving health care services to patients through a collaborative approach, the School of Medicine and the CLS department developed an IPE experience for CLS and medical students.

The clinical focus of the case-based session was hematopoiesis and peripheral blood, and the IPE focus was exposure to two Interprofessional Education Collaborative (IPEC) competencies. IPEC is an organization that represents multiple national health professional education associations, such as the American Dental Education Association and the American Association of Colleges of Pharmacy. IPEC supports and guides interprofessional collaborative learning for students and health professionals through four competencies: Roles/Responsibilities, Values and Ethics, Interprofessional Communication, and Teams and Teamwork.<sup>7</sup> The IPE activity focused on Roles/Responsibilities (RR) and Interprofessional Communication (CC). The IPE student learning objectives for the case-based activity were the following three IPEC sub-competencies:

1. Recognize one's limitations in skills, knowledge, and abilities (RR2).
2. Explain the roles and responsibilities of other care providers and how the team works together to provide care (RR4)

3. Recognize how one's own uniqueness, including experience level, expertise, culture, power, and hierarchy within the healthcare team, contributes to effective communication, conflict resolution, and positive interprofessional working relationships (CC7).<sup>8</sup>

## Materials and methods

Students were asked to complete a pre- and post-survey using an electronic device, such as a laptop or smart phone. The survey was given to gather student perceptions of achievement of IPEC behavioral expectations, RR2, RR4 and CC7, and evaluation of the IPE experience. IPE discussion questions and their related IPEC sub-competencies are found in Table 1. Consent was implied by completing the survey. The research portion was anonymous and approved by the Institutional Review Board at LSUHNO.

Forty-nine clinical laboratory science students and two hundred and five medical students participated in the exercise. Two hours were allocated to the entire educational experience. The first ninety minutes included a team-based learning experience centered on blood cell identification and two case studies followed by thirty minutes for the interprofessional education activity.

As part of the IPE experience, students were provided stimulus questions focused on learning about the CLS and medicine curriculum, professional licensure, specializations and health professional roles. After individual student group discussions, each team was provided time to respond to answers orally during a group report for each question. Faculty facilitators were available in the classroom throughout the entire IPE session.

A Likert-type scale ranging from strongly disagree to strongly agree (1 to 5) measured the responses of three IPEC behavioral expectation questions on both the pre- and post-survey and five questions on the post-survey targeting their perception of the IPE activity. An open-ended question was also included on the post-survey asking the students “Once you graduate and

enter your profession, how will this experience change how you interact with the other professions represented today?”

All analyses were performed using the Statistical Analysis System (version 9.4). The pre/post unpaired comparisons were carried out using the Wilcoxon signed-rank test.

## Results

Pre- and post-surveys were offered to two hundred and fifty-four students enrolled in the CLS and medicine programs. Two hundred and nineteen students participated in the pre-survey and one hundred eighty nine participated in the post-survey. Pre- and post-survey responses by educational program are as follows: CLS 41 (pre) and 37 (post) and medicine 178 (pre) and 152 (post). After the data were cleaned for incomplete pre-post surveys, two-hundred eighteen and one hundred eighty-six surveys, respectively, were analyzed.

A summary of the results between the CLS and medicine programs are noted in Table 2. A significant difference in pre-post surveys was noted for all IPEC sub-competencies with the exception of CC7 for CLS students. Table 3 provides an overview of the student response rate regarding the IPE learning activity.

Table 4 provides representative student quotes from the open-ended question reflective of the targeted IPEC sub-competencies. Ninety-two students responded to the open-ended question, twenty from the CLS program and seventy-two from the medicine program. Student responses were one to two sentences in length. Three major themes were identified from the responses: increased understanding of another profession's roles, increased appreciation of another health professional, and increased respect of another profession.

## Discussion

Assessment of pre- and post- IPE scores for the single IPE experience revealed statistical differences. When asked a reflective question about how the IPE activity might influence how they practice in the future, many medical students indicated their understanding of the training and role of a clinical laboratory scientist increased. Medical student responses are foundational to developing competence in RR2 and RR4. Additionally, among medical students, significant movement toward competence in sub-competency CC7, was made.

The theme of lack of awareness about the CLS profession is not unique. Butina (2010) reported that CLS practitioners described a recurring necessity of explaining their professional identity to others.<sup>8</sup> Interestingly, the one IPEC sub-competency that did not demonstrate a significant difference between pre- and post-surveys was CC7 among CLS students. This, in conjunction with the student quote regarding CC7 (Table 4), suggests a skepticism on the part of CLS students that they will truly become a part of an interactive interprofessional team.

The learning activity focused on discussing the education, clinical training and roles of both the clinical laboratory scientist and the physician. Understanding the roles and responsibilities between these two professions is critical in optimizing health care services. At a minimum, clinical laboratory scientists rely on physicians to initiate laboratory tests for patients, and physicians rely on the timeliness and accuracy of those tests. However, if students had a more in depth understanding of the education each discipline received, these future colleagues could optimize their communication and collaboration. A physician might be more inclined to seek advice from a clinical laboratory scientist on appropriate test selection. The clinical



laboratory scientist could be more proactive in informing a physician so that the correct test is ordered for the patient to achieve the correct diagnosis as quickly and efficiently as possible.<sup>9</sup>

It is important to continue interprofessional interactions between CLS and medical students. In a 2015 IOM report, *Improving Diagnosis in Health Care*, diagnostic errors can stem from lack of communication and collaboration among health care providers.<sup>10</sup> IPE experiences within an academic setting provide a supportive and safe environment for students of various professions to learn from, about and with one another. In many instances, however, when schools provide interprofessional experiences, CLS students are not included.<sup>11,12</sup> Some studies involving nursing and CLS students have suggested that the IPE experiences have enhanced understanding of roles and responsibilities and interprofessional communication, but these experiences were spread out over longer periods of time.<sup>13,14</sup> To our knowledge, this is the first report involving medical students and CLS students in a single IPE experience providing such benefits. An additional IPE experience with CLS and Physician Assistant students and the incorporation of a multi-school IPE course component are currently in development at LSUHNO to help promote future collaboration and communication among our graduates.

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## Tables

Table 1. IPE discussion questions and related IPEC sub-competency

Small group discussion question	Targeted IPEC sub-competency
In your curriculum, how do you learn about blood and hematopoiesis?	RR2
How much time is spent on this area in your curriculum?	RR2
What degree will you have when you graduate?	CC7
What credentials or certifications will you need to practice?	CC7
Are there specializations that you can earn?	CC7
What is the role of the clinical laboratory scientist in regards to this case?	RR4
What is the roles of the physician in regards to this case?	RR4
Describe whether or not a hierarchy exists among health care providers.	CC7
What have you learned about the other professions represented here today?	RR2, RR4

Table 2. IPEC behavioral expectations among students

IPEC Competency	Mean pre-test	SD pre-test	Median (UQ/LQ)	Mean post-test	SD post-test	Median (UQ/LQ)	P Value
RR2 all students	3.75	0.90	4.0 (3.0/4.0)	4.15	0.77	4.0 (4.0/4.0)	<0.0001*
RR2 CLS	3.65	0.92	4.0 (3.0/4.0)	4.08	0.84	4.0 (3.5/5.0)	0.04*
RR2 medicine	3.77	0.90	4.0 (3.0/4.0)	4.17	0.76	4.0 (4.0/5.0)	<0.0001*
RR4 all students	3.30	0.82	3.0 (3.0/4.0)	3.99	0.76	4.0 (4.0/5.0)	<0.0001*
RR4 CLS	3.45	0.71	3.0 (3.0/4.0)	3.86	0.80	4.0 (3.0/4.0)	0.02*
RR4 medicine	3.27	0.85	3.0 (3.0/4.0)	4.02	0.75	4.0 (4.0/4.0)	<0.0001*
CC7 all students	4.00	0.76	4.0 (3.0/5.0)	4.23	0.75	4.0 (4.0/5.0)	0.0018*
CC7 CLS	3.88	0.76	4.0 (3.0/4.0)	4.00	0.79	4.0 (3.0/5.0)	0.49
CC7 medicine	4.03	0.76	4.0 (4.0/5.0)	4.28	0.73	4.0 (4.0/5.0)	0.0013*

UQ/LQ = upper quartile/lower quartile

\*Denotes significance

Table 3. Student evaluation of the IPE experience

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I was able to apply the information from the peripheral blood and hematopoiesis lecture to the small group case discussion	1.60%	3.19%	7.45%	47.87%	39.89%
Everyone in my small group contributed to the discussion	1.06%	3.72%	9.04%	44.15%	42.02%
All group conversations were respectful	0.53%	0.00%	4.26%	29.26%	65.96%
Instructions and goals were clearly stated for the case study	2.14%	3.74%	9.09%	47.59%	37.43%
My appreciation for an interprofessional/team-based approach has been enhanced by this experience	1.60%	6.38%	12.77%	41.49%	37.77%

Table 4. Student quotes reflective of IPEC sub-competencies

IPEC Sub-competency	Student Quote
RR 2	I probably won't stress about how I still lack knowledge on small details of hematopoiesis now that I know there's a whole degree centered around knowing these nuances.
RR4	I now understand the responsibilities of the clinical lab students. I believe that ignorance is the biggest cause of disrespect between professions in the medical field. Keep up the good work integrating IPE activities into major medical classes!
CC7	I am not sure I expect much from this brief meeting, maybe if there were more meetings. Hopefully down the road, the doctors and lab techs will correspond well with each other.