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Celia P. MacDonnell, PharmD, Paul George, MD, and Kara Misto, RN

The Committee of Health Professions Education, as part of the Institute of Medicine, held a summit in 2002 in which 150 multidisciplinary heath care educators discussed strategies for integrating a core set of competencies into the curriculum of future healthcare professionals. The resultant publication, *Health Professions Education: A Bridge to Quality* recommended that a core set of competencies be integrated into curricula for health care professionals.[1] One of the core areas described was the ability of professionals to cooperate, collaborate, communicate, and integrate care as part of an interdisciplinary healthcare team. The World Health Organization has long espoused the belief that **Interprofessional Education (IPE)** is necessary in preparing health care providers for effective collaborative practice which will ultimately improve patient health outcomes.[2]

Three years after the symposium, **University of Rhode Island (URI)** College of Pharmacy began an initiative to develop a series of interdisciplinary practice laboratory modules to be held with students in URI's College of Nursing. A brief presentation on caring for patients with diabetes was first presented and included a seminar with both pharmacy and nursing implications. Following this, groups of nursing and pharmacy students participated in various interactive learning stations. These stations enabled students to test themselves with blood glucose meters, handle insulin pens, and practice subcutaneous injections in interprofessional teams. There was also a station where students could prepare the contents of a sick day management kit for patients with diabetes. The station had items such as: a thermometer, notepad and pen, various food choices, sports drinks and gelatin. The collaboration was regarded as highly successful by not only the faculty facilitating this seminar, but also the students from each discipline.[3] It remains an essential part of the curriculum of the respective programs to this day.

Interprofessional Work with Medicine: Methods and Results

In 2008, in an effort to continue to grow student learning partnerships, we approached the Director of the Office of Medical Education and the Associate Director of Preclinical Curriculum at the **Warren Alpert School of Medicine at Brown University (AMS)** to discuss the potential to provide new collaborative learning opportunities for students in the health-care programs in the state. AMS embraced the proposal, and the process of working together to develop an expanded, team-based, educational program for students prior to concentrated clinical training began. We hoped to impact students early in their training so that interprofessional teamwork became the norm when they entered their clinical training.

There are clear benefits to interprofessional education.

Over the past five years faculty members from AMS and URI's College of Pharmacy and College of Nursing worked together to develop a curriculum containing content that naturally lends itself to the expertise of each student group. The overarching goal is for students to develop interprofessional skills through active and problem-based learning. This educational concept has been used for many years in Canada, and is known as "Seamless Care".[4] With this model as a conceptual framework, the three schools introduced introductory IPE experiences to pharmacy, medical and nursing students.

Our current curriculum for PharmD students includes the required participation of second year medical students, 4th year (senior) nursing and 5th year pharmacy students (the PharmD students are in their 3rd year of pharmacy coursework). The students participate in a half-day workshop where they are assigned to equally balanced, interdisciplinary teams. In these teams, the students begin to gain a greater understanding of the knowledge and skills *each* healthcare practitioner brings to patient care.

We assign students to interprofessional teams prior to the workshop. Students then work together within their teams to discuss paper problem-based learning scenarios and teach each other about the medical, therapeutic and nursing aspects of chronic obstructive pulmonary disease and asthma. We carefully crafted and refined these cases so health issues important to each discipline are highlighted. In addition, each learning station is also supplied with a variety of teaching tools such as placebo inhalers. This allows the groups to work together on demonstration of inhaler technique and patient teaching points.

Running parallel to case-based work, one-third of the interdisciplinary student teams meet with a standardized patient (an actor portraying a patient) who presents to them with pneumonia. They take a history, perform a physical examination, determine a diagnosis and select "appropriate" therapy together as a team. Sometimes the students are correct, and sometimes they miss the mark (they are preclinical students after all). However, the most valuable component of this introductory encounter is *how well they work together as a team and if they were aware of any benefit to patient outcomes with this approach.*

After the workshop, we asked students to complete a survey with both closed ended and open ended questions indicating their satisfaction with the workshop. The results of this initiative have been very positive. Survey data over the last three years has confirmed the students' overwhelming approval of the interprofessional team-based learning approach. Greater than 80% of the students agreed or strongly agreed that "workshops such as these promoting teamwork among different disciplines are important for professional development. ($p < 0.001$) The

results also verify that at the workshops conclusion, each of the disciplines had a greater understanding of the each other's knowledge and skills.[5] The students were also asked if workshops likes these should be required during their "pre-license" education and 63.7% responded that they *strongly agreed* that it should be part of the required curriculum. ($p < 0.001$) Qualitative data also reflect the success of the workshop. As an example, one student wrote in a reflection, "In the future, I will take advantage of the other medical professionals to improve my patient's care."

Advantage to an Interprofessional Approach

There are clear benefits to interprofessional education. The importance of interprofessional healthcare teams in the provision of patient care is well recognized for improved patient outcomes.[6] Teams composed of healthcare professionals from different disciplines who conduct individual assessments and develop patient care plans independently *are not* considered interprofessional teams.[7] As a result of the success of our single workshop, we added a second workshop in 2012 where students from AMS and URI work together as a team (using a standardized patient once again).

Barriers to implementation of programs such as this include: space (although this is less of a concern now with the opening of AMS's new medical school in downtown Providence), and proximity of academic institutions (although separated by less than 30 miles, transporting nursing and pharmacy students to Providence is difficult). Challenges to a program such as this are many. The scheduling logistics of holding this one-day practicum are daunting, as each if the three discipline's class size is approximately 100 students.

We worked diligently to determine the appropriate level of education for the three student disciplines. This has been challenging. In the first year of the workshop, third year nursing students participated. Through our survey data, we determined that this cohort of students did not yet have the same level of educational experience to feel comfortable participating in the workshop activities with the other disciplines. Conversely, the following year, students from the College of Nursing's Family Nurse Practitioner Graduate Program participated, and were at a much higher practice level than the students in the other two disciplines. It is clear in the literature that if one student in the group is unable to contribute, it negatively reinforces the stereotypes of that entire profession.[9] We finally settled on fourth year nursing students to work with second year medical students and third professional year pharmacy students. We believe this combination works well for our workshop.

A final challenge comes from faculty and practitioners. We cannot expect students to adopt an *esprit des corps* if we do not fully embrace it ourselves. Teaching, research and practice often takes place in silos. We also may benefit from interprofessional training to be able to effectively work as a team to model for our students even further the benefits of interprofessional teamwork. Plans are underway to provide faculty development in this arena.

Finally, the authors recently attended the Interprofessional Education Institute in Washington DC. There, as a team we developed the framework of an interprofessional education curriculum to be disseminated to administrators at AMS, URI and Rhode Island College (we included nursing students from Rhode Island College to participate in our last workshop). Our plans for the two workshops next year include the addition of graduate students from the School of Social Work at Rhode Island College as part of the interprofessional team. Additionally, we plan on developing both preclinical and clinical electives (that count as part of student grades) for nursing, medical, pharmacy and social work students to take jointly.

We can no longer expect students in the healthcare field to go from the classroom directly into a clinical setting, and to *then* be able to function as a patient focused team, with no cohesive training.

Educational experiences, such as this initiative, foster interprofessional trust and the necessary communication skills for students to effectively participate as active members of healthcare teams in the future as healthcare providers.

We believe that team-based, patient-centered care *must* begin with undergraduate (pre-licensure) interprofessional education. Educational experiences such as this furnish students with the confidence and the skills needed for the pursuit of post-graduate inter-professional collaborations and will ultimately serve to enhance any patient centered care program.

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Disclosure of Financial Interests

The authors and/or their spouses/significant others have no financial interests to disclose.

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