The ARCTIC Workshop: An Interprofessional Education Activity in an Academic Health Sciences Center

Susan E. Sutherland, DDS, MSc; Karen A. Moline, MRT(T), ACT, BSc

Abstract: The complex care required to address the needs of head and neck cancer patients requires interprofessional collaboration. Using the compelling narrative of a patient’s journey through cancer treatment in the Canadian setting, the aim of this study was to engage health professions students to discover the importance of interprofessional care for complex patients, while delivering content on head and neck cancer care and providing training/experience in interprofessional education (IPE) facilitation to clinicians. In the study, 38 students from nine health disciplines participated in a three-hour workshop that included interactive presentations and facilitated small- and large-group activities. The Interdisciplinary Education Perception Scale (IEPS) was administered pre and post workshop to examine changes in students’ attitudes and perceptions about IPE. Qualitative participant and facilitator feedback regarding the session was obtained using a structured questionnaire and debriefing sessions with each group. An overall improvement of scores on the IEPS was observed, while analyses of individual items showed improved scores on all items but one. Session feedback from students and facilitators was positive. The results suggest that combining case-based methods with interprofessional learning in the clinical setting allowed students to develop an appreciation for the complex needs of head and neck cancer patients and the need for collaboration to improve patient outcomes.

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Keywords: interprofessional education, collaboration, patient-centered care, head and neck cancer, facilitation, faculty development

Submitted for publication 8/26/14; accepted 11/7/14

The value of interprofessional education (IPE) in the health sciences has been recognized globally as an important strategy for producing health care practitioners who can work collaboratively to improve outcomes for patients.¹ In Canada, both the federal government and the province of Ontario are committed to IPE as a way to achieve a strong and sustainable health care system, built on collaborative, patient-focused models of care.²,³ Effective interprofessional collaboration is essential to high-quality patient care in light of increasing patient complexity and the changing needs of health care systems.¹²

The complexity of care required to address the needs of patients with head and neck cancer requires interprofessional collaboration. In addition to a core care team of 11 health care professionals led by a primary provider, an extended team with an additional 17 health disciplines may be needed to facilitate planning, treatment, survivorship, and rehabilitation of head and neck oncology patients.⁴⁵

The Center for Interprofessional Education at the University of Toronto (UT) has developed and implemented a mandatory longitudinal, competency-based IPE curriculum for 11 health professions programs.⁶ The competency framework includes three constructs (collaboration, communication, and values and ethics) across three levels of learning (exposure, immersion, and competence), with specific core competencies related to knowledge, skills/behaviors, and attitudes described for each construct and for each level. The expectation is that every student will achieve all core competencies by graduation from his or her professional program and enter the workforce prepared for collaborative practice. The curriculum includes both core and elective learning activities, delivered on campus and at clinical placement sites. Each IPE learning activity is valued utilizing a points system (Points for Interprofessional Education system, PIPEs), with each activity weighted using specific criteria on process (interactivity, facilitators, professions, frequency) and content (performance-based, IPE constructs, debrief, case-based learning), for which a minimum standard must be met. The center provides faculty development opportunities, as well as resources and tools, to enable clinical teachers
and educators to develop and implement innovative IPE activities for learners.

Sunnybrook Health Sciences Center is a member of the Toronto Academic Health Sciences Centers Network, a consortium of the UT and its affiliated academic hospitals. Students in more than 20 health professions receive a component of their clinical education at Sunnybrook, where interprofessional education and care are a priority. The Sunnybrook Education Advisory Council (SEAC) is dedicated to ensuring that IPE and interprofessional care principles weave through all areas of education: staff education, student education, patient education, and educator development.

In this environment, clinical faculty from radiation therapy and dentistry collaborated to provide a new interprofessional elective for health professions students on placement or rotation at Sunnybrook. This article describes the design and implementation of a structured interprofessional, case-based learning activity grounded in head and neck oncology for these students. The activity is titled Appreciating Roles and Collaboration to Improve Care (ARCTIC). Using the compelling narrative of a patient’s journey through cancer treatment in our center, we sought to engage the students to discover and appreciate the interventions provided by their colleagues and to recognize the importance of interprofessional care for complex patients. Secondary goals included the delivery of content on the care of patients with head and neck cancer from an interprofessional perspective and to train and provide experience in facilitation of IPE to a diverse group of health sciences clinicians. The aim of our study was to evaluate the impact of the activity on students’ perceptions of IPE.

### Materials and Methods

Approval was granted by the Center for Interprofessional Education for the recognition of ARCTIC as an elective IPE learning activity, for which participating students would receive PIPEs points for their cumulative competency profiles. Ethics approval for the study was received from the Sunnybrook Research Ethics Board (IRB #077-2011). Students who completed the surveys were deemed to have given consent.

A total of 38 students on clinical rotation or placement at Sunnybrook from nine undergraduate professional programs (dentistry, nutrition, occupational therapy, pharmacy, physiotherapy, physiotherapy assistant, radiation therapy, radiological technology, and social work) participated in the elective. Learners were at various stages of professional training. Radiation therapy and technology students had completed one year of a three-year program; dental students had just completed their third year; pharmacy students were in their fourth year or were residents; and the remainder had completed the first or second year of their programs. The facilitators were 12 Sunnybrook clinicians from the disciplines of dentistry, nutrition, occupational therapy, pharmacy, physiotherapy, radiation therapy, radiological technology, and social work who volunteered to participate. The professional affiliations of students and facilitators are shown in Table 1.

Students were contacted by email two weeks prior to the event with details of the educational activity and a description of the research study. The three-hour event included interactive large-group presentations and cofacilitated small-group activities. The small groups consisted of seven or eight students.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Number</th>
<th>Profession</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentistry</td>
<td>5</td>
<td>Dentistry</td>
<td>2</td>
</tr>
<tr>
<td>Nutrition</td>
<td>1</td>
<td>Occupational therapy</td>
<td>2</td>
</tr>
<tr>
<td>Occupational therapy</td>
<td>1</td>
<td>Physiotherapy</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>4</td>
<td>Radiation therapy</td>
<td>1</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>7</td>
<td>Radiological technology</td>
<td>1</td>
</tr>
<tr>
<td>Physiotherapy assistant</td>
<td>2</td>
<td>Social work</td>
<td>3</td>
</tr>
<tr>
<td>Radiation therapy</td>
<td>12</td>
<td>Total</td>
<td>12</td>
</tr>
<tr>
<td>Radiological technology</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social work</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
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with a minimum of five different health professionals per group. The content of the IPE learning activity included principles of IPE and interprofessional care, an overview of head and neck cancer, and management of patients with this disease, including the roles of various professions.

The anonymized case of a consented patient with Stage II squamous cell carcinoma of the tongue treated at Sunnybrook was used. The patient’s medical and social history, initial presentation, diagnosis/staging, multi-modality treatment, and rehabilitation phases of care were presented to students. The patient was chosen because he was well known to both authors, who had been involved in all aspects of his care. His disease, medical and dental status, social history, and treatment illustrated the complexity of head and neck cancer. All students received the same background information on the case and, in facilitated small groups, developed an interprofessional care plan along the continuum from diagnosis to end of life care. The detailed agenda for the session is shown in Table 2.

A cofacilitator model was used for both small- and large-group activities. While most facilitators had experience teaching in small groups, many had little or no previous experience in IPE facilitation. Two weeks prior to the IPE learning activity, a two-hour facilitator workshop was held, covering principles of IPE and small-group IPE learning, the use of icebreakers, facilitating in small IP groups, including strategies to address challenges, and specific facilitator roles for the ARCTIC event. A facilitator guide was developed that detailed each component of the workshop, and case-based, profession-specific guides were provided to the facilitators. The latter contained a brief summary of the case as well as probing questions and responses from the perspective of each profession involved in the care of this patient, as previous work had informed us that clinician facilitators believed they needed some grounding in the content to be comfortable and able to concentrate on interprofessional aspects during small-group discussions.

A pre- and post-activity questionnaire was administered to examine the change in students’ attitudes and perceptions about IPE following the ARCTIC learning activity using the Interdisciplinary Education Perception Scale (IEPS). Qualitative participant feedback regarding the session was obtained from students using a structured questionnaire and debriefing sessions with each group, and a facilitator evaluation form was completed. As a requirement for the PIPEs program, students were asked to complete pre/post self-assessment of learning. We also held a debriefing meeting with the facilitators following the session to gather feedback on the design and implementation of the session.

Quantitative data were analyzed using SAS software (SAS Institute Inc., Cary, NC, USA) and NCSS (NCSS, LLC, Kaysville, UT, USA). A paired t-test was used to analyze the before and after results on the IEPS. Separate analyses of individual items were conducted using the Wilcoxon signed-rank test. Themes from the student and facilitator debrief sessions and the student post evaluation forms were collated and interpreted.

In previous unpublished work, we had found a statistically significant change in the overall mean score of the IEPS in 15 paired responses (mean=0.419, SD=0.3092) when the response rate for survey completion was 75%. Based on that result, a larger degree of variation (SD=0.6092) and an anticipated response rate of 60% to an electronic survey to conservatively estimate a required sample size of 35 students was used. As noted below, the electronic survey format was subsequently abandoned in favor of paper surveys.

Results

All students completed the paired IEPS surveys (100% response rate), analysis of which showed an overall improvement of scores pre- and post-workshop (paired t=4.82; p<0.0001). Separate analyses of individual items showed improved scores (Table 3) on all but one item (“Individuals in my profession demonstrate a great deal of autonomy”) for which there was no change. For eight items, the improvement was statistically significant.

All 38 students also completed the quantitative and qualitative session evaluations. Participants rated the session content for each segment of the learning activity on a five-point scale from 1=not helpful/useful to 5=very helpful/useful. The participants gave the individual segments the following mean ratings: icebreaker 4; presentations 4.4; case content 4.6; small-group work 4.7; and small-group debrief 4.5. Answers to qualitative questions indicated that students believed they gained knowledge and understanding about the roles of other professionals in the treatment of cancer patients, how other professions can assist them in their own care activities, and how collaboration facilitates the patient’s journey. The participants reported feeling most engaged during


<table>
<thead>
<tr>
<th>Activity (minutes)</th>
<th>Description</th>
<th>Format</th>
</tr>
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</table>
| Welcome, introduction, and icebreaker activity (15)         | • Goals of ice breaker  
  ○ Learn more about each other's discipline.  
  ○ Create relaxed, safe learning environment.  
  ○ Enhance professional identity.  
  • Each student wrote on a sticky note, collected by the facilitator, 1 or 2 acronyms or jargon frequently used in their discipline.  
  • The facilitator asked the group to guess the meaning of each term.  
  • The author explained term from his or her profession's point of view.  
  • Group discussed similar acronyms: different meanings used by various professions and potential adverse effect on patient safety.                                                                                       | Large group, interactive      |
| What is IPE? (10)                                           | Formal presentation on definition and relevance of IPE and interprofessional collaboration, as well as essential elements, attitudes, and personal attributes required for collaborative practice.                                                                                                                                   | Large group, didactic/interactive |
| Head and neck oncology (12)                                 | Formal presentation on epidemiology, diagnosis, clinical presentation, treatment, and prognosis of head and neck cancer.                                                                                                                                                                                                                       | Large group, didactic/interactive |
| Side effects for radiation therapy (12)                     | Formal presentation on acute toxicity and late sequelae of head and neck radiotherapy, as well as dental management pre and post treatment.                                                                                                                                                                                                     | Large group, didactic/interactive |
| Case presentation (5)                                       | Patient case was introduced.*                                                                                                                                                                                                                                                                                                                | Large group                   |
| Explore IP roles and patient issues; develop care plan (25) | Students were divided into five mixed-professions groups and asked to explore professional roles, discuss issues faced by the patient, and develop goal-based care plans. They were asked to identify relevant professions not present in their group and to consider what their contribution might be. Each of the groups looked at a different stage of the patient journey:  
  • Diagnosis and detection  
  • Treatment: in-patient  
  • Treatment: out-patient  
  • Rehabilitation and follow-up  
  • End of life care                                                                 | Cofacilitated small-group activity |
| Care plan: report back to peers (45)                        | Two students from each group reported the identified issues and their care plan to the large group and received questions and feedback from their peers.                                                                                                                                                                                               | Large group                   |
| Case review: discuss role overlap and patient outcomes (15) | Students identified overlapping roles of various professions, as well as unique professional skill sets and contributions, and discussed benefits of interprofessional collaboration to patient outcome. Values and ethical issues, including hierarchy and perceived power imbalances, were explored.                                                                                      | Cofacilitated small-group activity |
| Session debrief (15)                                        | Facilitators asked some or all of the following questions:  
  • How was the group?  
  • Did you find the group supportive?  
  • What did you learn about yourself and your ability to describe your role?  
  • What surprised you about another discipline?  
  • What did you learn about caring for head and neck cancer patients?  
  • How did you learn differently in this workshop?  
  • Was there any conflict? If so, how was it resolved?  
  • How do you plan to develop your interprofessional skills?  
  • What did you like most about the session?  
  • What could have made your experience better?                                                                 | Cofacilitated small-group activity |
| Wrap-up and evaluations (15)                                | Post-activity IEPS and session evaluation forms completed.                                                                                                                                                                                                                                                                                   | Large group                   |
| Debrief meeting with facilitators                           | Informal discussion with facilitators regarding their experience, comfort level, logistical issues.                                                                                                                                                                                                                                          | Unstructured format           |

*At subsequent workshops, the written case was supplemented with a video in which our patient described his journey and his perceptions of the interprofessional care he received.
the small-group work, the group presentations, and the debriefing activity. They found the small-group discussions, the facilitators, the presentations, and learning about others to be very helpful.

When the students were asked about the most important information they learned in the activity, themes included the number of professionals involved in clinical care, the essential role of interprofessional collaboration in patient-centered care, and the previously unknown scopes of practice of other groups. Their suggestions for future sessions included longer small-group time, shorter presentations, and the involvement of more professions in the learning activity.

A total of 123 evaluations were completed by students on the faculty facilitators. On a seven-point scale ranging from 1=poor to 7=excellent, the facilitator scores ranged from 5.2 to 7, with an overall average score of 6.4. The items and scores for the facilitator evaluations are shown in Table 4.

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Average</th>
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<tbody>
<tr>
<td>Promotion of thinking and problem-solving</td>
<td>5.8-6.7</td>
<td>6.3</td>
</tr>
<tr>
<td>Ability to encourage interaction</td>
<td>5.8-7</td>
<td>6.4</td>
</tr>
<tr>
<td>Provision of an environment in which you felt safe and comfortable participating</td>
<td>6.2-7</td>
<td>6.5</td>
</tr>
<tr>
<td>Facilitation of group’s learning (e.g., address learning objectives)</td>
<td>5.2-6.8</td>
<td>6.3</td>
</tr>
<tr>
<td>Ability to highlight clinically relevant issues</td>
<td>5.4-7</td>
<td>6.3</td>
</tr>
<tr>
<td>Ability to role model and facilitate interprofessional collaboration</td>
<td>5.8-7</td>
<td>6.5</td>
</tr>
</tbody>
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Note: Evaluations were given on a seven-point scale ranging from 1=poor to 7=excellent.

Discussion

Exposure to IPE for UT health sciences students begins in the first year of their professional programs. A combination of structured core learning activities, electives, and clinical placements provides the opportunity for students to achieve the required core competencies in IPE by graduation. Students participating in ARCTIC had varying past exposure to IPE. All students had participated in a mandatory introductory IPE session focused on teamwork in the first year of their professional programs. Dental and pharmacy students had participated in a week-long interdisciplinary pain collaborative in their second or third years. The radiation therapy program intereweaves IPE through all aspects of its curriculum.

The ARCTIC workshop sought to provide an elective learning event in a practice setting, with facilitation by clinicians, many of whom were involved with the care of the patient in the case study or similar patients in their daily practices. The didactic large-group presentations on head and neck cancer and the side effects of radiotherapy were intended to provide baseline information to ensure that all students had adequate knowledge in preparation for their small-group work. The cofacilitators provided guided inquiry to help the students learn from each other; they added to the discussion only to correct misinformation or to role model interprofessional collaboration.

Despite the short time span between the pre and post tests, the results of the IEPS demonstrated an overall improvement in scores. Using the case of an actual though anonymized patient with a compelling narrative lent authenticity to the case to reinforce patient-centered care. Students who participated were at Sunnybrook on a short clinical rotation or longer placement, so that the session was integrated with, rather than supplemental to, their current curricular activities. The focus on the IPE aspects of the case enabled students to see facilitator IPE champions in the clinical context, rather than the traditional academic setting.

We used cofacilitation methods to demonstrate interprofessional collaboration to the students. Holland suggests that IPE facilitators require knowledge of the professions and the current issues facing them in practice, knowledge of evidence-based practice, and knowledge and experience with interprofessional collaboration. To meet these parameters, a range of professions was represented in the facilitator group, all of whom were involved in clinical teaching and practice. The facilitation of interprofessional learning is both complex and demanding. To enhance the skills of both novice and experienced IPE facilitators, a facilitator workshop was conducted with two colleagues with extensive experience in facilitation and facilitator training. The debriefing session with facilitators at the end of the event provided an opportunity for reflection on individual and group successes and challenges, as well as valuable feedback for future interprofessional planning. Cofacilitation provides the opportunity for role modelling, shared learning and responsibility, mutual facilitator support, and stimulation of group dynamics. In IPE, cofacilitation is a powerful strategy to model the collaboration that is essential for interprofessional care.

One of the drawbacks of the ARCTIC IPE learning elective was the one-time nature of the event for the students. Tuckman’s model of small-group development hypothesizes that groups go through the stages of forming, norming, storming, performing, and adjourning an opportunity that was missing in our session. In each stage, the group engages in interpersonal relationship development, as well as task behaviors. While group stability is an important element in effective IPE learning, the one-time nature of the ARCTIC session is reflective of many workplace collaborations, in which the interprofessional “team” is in constant flux underscoring the need for a variety of IPE learning activities throughout the curricula of health professions training.

We attempted to achieve professional balance in the makeup of the small groups, but because of scheduling difficulties, we were unable to include medical or nursing students in the workshop. We were able to include dental students only because the event was intentionally scheduled during their one-week hospital rotation at our site. Despite the fact that the organizational climate and culture of both Sunnybrook and the UT are supportive of IPE activities, curriculum timetabling and scheduling remain among the most difficult challenges for IPE learning activities. In addition, perceived hierarchy, professional culture, and power relationships have been studied in the context of IPE with medicine highlighted as being more resistant to the “soft” skills required for collaboration.

Because of the “silo” nature of dental education and especially subsequent practice, little attention has been paid in the interprofessional literature to the power hierarchy as it concerns dentists—although within the dental disciplines, professional conflict
is well described.\textsuperscript{22-24} The nature of the relationship between physicians and dentists is relatively collegial, and dentistry has remained outside “medical dominance” in contrast to many other health professions.\textsuperscript{23} However, in a study of the attitudes of medical, dental, and nursing students toward academic status in the context of interprofessional education, rivalry—although somewhat benign and bilateral—was noted between medical and dental students.\textsuperscript{26} Of particular note was that the nursing students in that study did not even consider dental students in their view of academic inequality, acknowledging only the medical students. Although planning time for our study included liaison meetings with the directors of medical and nursing education, the absence of medical and nursing students and facilitators was a limitation that we continue to address. Having representatives of ten professions overall with a minimum of five in each small group enriched the discovery and discussions during the event. The excellent collaboration among the facilitators and their ability to engage the groups was noted in the evaluations completed by the attendees.

Sunnybrook is located approximately ten kilometers from the main UT campus, so it is difficult for students to attend our session unless they are here on rotation or placement. We ensured that each student in the study had passes for our free shuttle bus that travels frequently between sites. As word has spread about this learning activity, we have had requests from numerous students to attend future events and from several faculties to hold the event on the main campus after school hours. We are currently holding discussions with the UT IPE office in this regard and will need to balance the loss of clinical context with the ability to offer the event more broadly.

The IEPS is widely used to measure the impact of IPE. Administration of the tool immediately before and after a learning activity is likely to result in recall bias. However, in our study, the geographic distance and difficulty in accessing students from various faculties presented obstacles in distributing the pre test in advance. We explored electronic survey methods, which presented several challenges and resulted in limitations to the study. We were unable to obtain email addresses for all students and found that students had a tendency to check their personal email accounts rather than their university accounts. Nevertheless, we did attempt to use this format for the pre test initially. One week prior to the session, following an introductory email, 37 students for whom email addresses were known were sent an electronic link to the questionnaire using SurveyMonkey, with additional information requested about gender, professional program, and expected year of graduation. Reminders were sent two days and five days later. Due to an error in the creation of the unique identifier in SurveyMonkey, accurate paired matching for analysis would not have occurred. This problem was identified prior to the learning activity, and the electronic format was abandoned. The response rate for the electronic pre survey was excellent (81%), and we conclude that this might be a useful method in the future.

Future directions for the ARCTIC event include offering the elective in both the fall and spring semesters to include more professions. The faculty will continue to collaborate with medicine and nursing, as well as other health professions, to develop improved recruitment strategies for student and faculty participation. Feedback from students and facilitators will inform changes to the format of future sessions. The patient in the case study has consented to participate in a video in which he will describe his journey and his perceptions about interprofessional care.

Conclusion

A strong supportive culture for IPE at both the university and the academic health sciences center levels was essential for the successful delivery of a case-based interprofessional educational session for undergraduate health professions students. Our study suggests that student engagement was facilitated by use of the case of a complex patient with a compelling narrative, clear goals and objectives with concrete student rewards (in our case, points for their mandatory IPE portfolios), and interactive large- and small-group formats. Cofacilitation with participation from various health professions allowed collaboration to be role-modeled for students and provided experience for new facilitators to enhance their skills in a supportive environment.

Disclosure

The authors report no conflicts of interest.

REFERENCES