Ryerson-Sunnybrook Interprofessional Certificate in Advanced Neuroscience-Stroke Care

Final Evaluation Report
July, 2009
EXECUTIVE SUMMARY

In early 2009, Ryerson University’s G. Raymond Chang School of Continuing Education began a partnership with Sunnybrook Health Sciences Centre and the North & East GTA Ontario Stroke Region and Network to build a new Interprofessional Certificate in Advanced Neuroscience-Stroke Care (the “Certificate”). The Certificate was designed to achieve the following goals:

- Build interprofessional-based continuing education opportunities to promote the planning and delivery of neuroscience-stroke care.
- Foster collaboration between expert health care providers and university academics to develop high quality education that promotes interprofessional practice in the planning and delivery of health care services.
- Increase existing health care organizations’ capacity to translate and integrate evidence-based practices in the delivery of neuroscience-stroke care.
- Prepare and/or build on current practitioners’ capacity to work in interprofessional neuroscience and stroke settings.

Evaluation Focus

The partnership enlisted the services of the Centre for Community Based Research (CCBR) to conduct an evaluation of the pilot phase of the Certificate, focusing on four online distance education courses. CCBR developed an initiative logic model and evaluation methodology designed to answer a range of questions about:

A. The development of the Certificate and the four pilot courses
B. The implementation of the courses
C. Short-term knowledge outcomes of students in relation to each courses
D. Intermediate outcomes regarding practical application of learned skills

A detailed list of specific evaluation questions can be found in each associated section under “III. Evaluation Findings”

Methods

The evaluation used a mixed methods approach that included overall and course-specific surveys (pre- and post format), student written feedback, student interviews, course development team interviews, and a focus group with management. This combination of methods helped to answer questions about formative development, implementation, and student outcomes.
Evaluation Findings

The main findings of each section of the evaluation are summarized as follows:

A. The development of the Certificate and the four pilot courses

- Development of the certificate was challenging due to severe time constraints. Integrating IPE exacerbated time challenges.
- Populating course teams was difficult because of a lack of available interprofessional expertise to draw from in the field.
- Despite time constraints, the process was consensus-based, productive, and ultimately successful in getting to launch.
- Development of a course building model has had to be flexible and experimental, with room for innovation. A lesson is that there is no single model. Future development must attend to existing capacities and opportunities.
- The unique piece of this Certificate is its focus on development based on organizational partnerships that support IP student teams to build, over time, a critical mass of people doing IPP/C in organizations.
- Realistically, an initiative of this type needs much more upfront time to build partnerships and build the curriculum – possibly two years before actual launch.
- Course developers experienced similar time constraints and felt the process at the beginning was disorganized, including problems with role clarity. This improved in a later course.
- Proceeding with course development interprofessionally was challenging due to timelines, availability of others, etc. – ultimately instructors felt IPE principles were successfully integrated into courses.
- The course writer role needs to be reconsidered. It may be more efficient to have instructors take the lead in writing and building the course.
- Course developers need more time and resources up front to build courses. Many more resources and approaches have been developed for use in new courses.

B. The implementation of the courses

- Student perceptions of IPE in the courses differed. Some felt the integration of IPE was successful, while others disagreed. Courses appeared to differ, with CVNS 620 (the most recent course to be offered) most likely to be offered) most likely to be seen as promoting IPE principles. In contrast CVNS 600 and CVNS 630 were less likely to be seen as promoting IPE. This is suggestive of improvements to the courses over time as the certificate continued to develop.
- Many students had concerns with instructor communication around grades and feedback, and other inquiries. This was primarily in reference to CVNS 630, and to some degree CVNS 600. This was not seen as an issue for CVNS 620. Again, this
could be explained in part by improvements to the course development process, since CVNS 620 was the most recent of the four courses to be offered.

- Despite issues with communication, the CVNS 630 course was seen as very well organized.
- Most students were complimentary of the online format and especially appreciated the OTN sessions. The online discussion forums were less popular. However, instructor engagement and participation in the discussion forums appeared to be related to student satisfaction with the technology.
- A smaller subset of students had general difficulties with distance education technology.
- The flexibility and convenience of the distance education format was very important to many of the students.
- Overall, students scored in mid- to high ranges on the NSSE, indicating many important pedagogical goals were met for all the courses. CVNS 620 in particular was associated with a very high online learning experience.
- Ryerson received extremely positive feedback regarding their administration and openness to respond to student concerns.

C. Short-term knowledge outcomes of students in relation to each course

- The expected outcomes of the certificate are highly consistent with the professional needs expressed by students. The Certificate contains content that is extremely relevant to the range of allied health practitioners who enrolled.
- On average, students’ self-ratings showed positive gains on core content and skill areas associated with their courses. This shows extremely strong support for the attainment of the certificates short-term outcomes.
- Qualitative feedback complimented the ratings, demonstrating a range of benefits experience by students in their professions.

D. Intermediate outcomes regarding practical application of learned skills

- The main quantitative measures used to measure IPP/C appeared to suffer from ceiling effects and may not be sensitive or “nuanced” enough to capture the complexities of IPP/C in the real world.
- An uncritical view of the data could suggest that students were a) already unproblematically practicing IPP/C and b) they did not improve.
- Qualitative data suggested that there are in fact many ongoing challenges to IPP/C, including limited time, resources, knowledge gaps, organizational support, and “disciplinary silos” in the field, reinforcing the need for the Certificate.
- Qualitative data also suggested that students are applying the course learnings and concepts in order to work with a greater IPP/C focus.
• The assumptions of the certificate appear to be consistent with student need – that greater organizational support and knowledge translation need to occur in their organizations and that the Certificate can serve this function.
• Intermediate outcomes needed to be investigated with better measures and in relation to program assumptions of “dose”, sufficient time to apply learnings to practice, and organizational buy-in, linkages and support.

Conclusions and Recommendations

• The certificate has a very strong, theoretically sound model that specifies how it will positively impact stroke practice and care and patient/client outcomes. Given the lack of opportunities for this type and level of education, the Certificate fills a crucial gap in the neuroscience-stroke health care system.
• The research literature on interprofessional education and care in neuroscience-stroke is young and underdeveloped. The majority of articles in the literature reflect “silos of care” and are written in a manner that promote the application of research findings by specific professional groups. This will continue to present a challenge to course development.
• The level and type of reach of the Certificate reflects a systemic quality that is often absent in educational interventions. This was accomplished by engaging multiple organizational partners within the allied health system, as opposed to recruiting individual, disconnected students. This allowed for the promotion of interprofessional practice of multiple providers within single organizations and across the system. This is a promising model of capacity building that has implications for many other health and social service domains.
• Continued impact of this initiative requires further infrastructure endorsement and support. Formal industry recognition of the certificate by the Ontario Stroke System and the Ministry of Health and Long-term Care would promote participation in this form of interprofessional education.
• Mandates supporting the delivery of IPE-focused programs and faculty development should be developed and promoted by the Ministry of Training, Colleges, and Universities to address the “evidence to practice gap”. Strong collaborative partnerships with clinical partners should be established for all health science programs.
• Future evaluation should repeat the present design, with some adjustments, for future courses while also focusing on the attainment of practice based outcomes over longer time frames.
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I. INTRODUCTION AND BACKGROUND

Stroke and other neurological conditions represent a spectrum of health problems that present ongoing challenges to the responsiveness and quality of local health care systems. Stroke itself is a leading cause of disability and death in Ontario and Canada. Some relevant population statistics include the following:

- Stroke is the fourth leading cause of death in Canada and the leading cause of adult neurological disability
- 5 million Canadians are living with high blood pressure and 40% of them are not aware of their condition, putting millions at risk of stroke.
- Stroke impacts across the lifespan. 300,000 stroke survivors live in Canada and 50,000 new cases of stroke occur each year in men and women.
- Stroke is often devastating for the individual, while also impacting family, the community, and the health care system. Stroke is complex and has numerous implications for the continuum of care.

In June 2000, The Ministry of Health and Long-Term Care released *Towards a Integrated Stroke Strategy for Ontario* and created the Ontario Stroke Strategy. The Ontario Stroke System (OSS) emerged as eleven geographically regionalized clusters of stakeholder and health service provider organizations/agencies (hospitals, rehabilitation centres, ambulatory clinics, community health services, and other social services) which now comprise the regional network model. Through collaborative partnerships, the goal of the OSS network is to reduce stroke incidence while also strengthening the full continuum of services designed to enhance stroke care outcomes for individuals living with stroke and their families. The infrastructure of the OSS network model was also developed in way that places emphasis on *Interprofessional Practice and Care (IPP/C) uptake*.

IPP/C and related terms have been defined in many different ways across many different health domains and sectors. However, these definitions are most often more similar than different. D’amour (2005) offers the following definition of “interprofessionality”:

“...the development of a cohesive practice between professionals from different disciplines. It is the process by which professionals reflect on and develop ways of practicing that provides an integrated and cohesive answer to the needs of the client/family/population.” (p. 8)

Observing interprofessional practice and care (IPP/C) therefore requires collaborative health interventions that draw on the strengths of different disciplines to provide optimal health care. Ideally, interprofessional practice should permeate a system as the standard approach to care within the context of complex health needs. In
the context of stroke, IPP/C requires the coordinated efforts of physicians, nurses, physiotherapists, speech language pathologists, occupational therapists, audiologists, psychologists, various community care workers, and number of other health care specialists to support the health, care and recovery of the “whole” person.

While the stroke network reflects an excellent vehicle to promote interprofessional practice and care, the knowledge base and skills required by health professionals must be nurtured within the system itself. A necessary contributor to improved interprofessional practice and care is professional education. In early 2009, Ryerson University’s G. Raymond Chang School of Continuing Education began a partnership with Sunnybrook Health Sciences Centre and the North & East GTA Ontario Stroke Region and Network\(^1\) to build a new Interprofessional Certificate in Advanced Neuroscience- Stroke Care (henceforth referred to as “the IPE/IPC Neuro-Stroke Certificate” or simply “the certificate”).\(^2\)

The purpose of the present report is to document a process and outcome evaluation of the IPE/IPC Neuro-Stroke Certificate. We will begin by describing the details of the program itself, followed by a summary of the central evaluation questions, program logic model, and overall framework and methodology. Subsequent sections will provide the evaluation results and interpretation, ending with recommendations for continued development and refinement of the IPE/IPC Neuro-Stroke Certificate.

**SYSTEMS NEEDS DRIVING THE CERTIFICATE**

In the province of Ontario there was a need to respond more effectively to the devastating impact of stroke. Establishing improved access, coordination and integration of evidence based stroke care across the care delivery continuum was vital. With the adoption of an organized Ontario Stroke System (OSS) a provincial reduction in stroke incidence and improved outcomes is expected to result.

The Ministry of Health and Long Term Care was instrumental in supporting the establishment of eleven geographic regions and local networks of care assisted by the leadership of designated Regional Stroke Centres, District Stroke Centres and Secondary Prevention Clinics across Ontario. Under this system of stroke care organization, two challenges remain significant: human resources capacity deficits and then need for broader uptake and utilization of new knowledge and evidence into care delivery. In parallel, there are a wide variety of systems and health care resource pressures that make it difficult for health organizations to provide optimal, integrated care. In an effort to address the identified challenges the North and East GTA Stroke Region (N&E GTASR) and Sunnybrook Health Sciences Centre have partnered with The Chang School at

\(^1\) Referred to henceforth as the “Ryerson-Sunnybrook-N&E GTA OSRN partnership” or simply “the partnership”.
\(^2\) funded by HealthForceOntario.
Ryerson University to collaborate in the development of an Interprofessional Certificate in Advanced Neuroscience-Stroke Care. Thus, the Certificate was designed to achieve the following goals:

- Build interprofessional-based continuing education opportunities to promote the planning and delivery of neuroscience-stroke care.
- Foster collaboration between expert health care providers and university academics to develop high quality education that promotes interprofessional practice in the planning and delivery of health care services.
- Increase existing health care organizations’ capacity to translate and integrate evidence-based practices in the delivery of neuroscience-stroke care.
- Prepare and/or build on current practitioners’ capacity to work in interprofessional neuroscience and stroke settings.

THE MODEL OF INTERPROFESSIONAL EDUCATION

A precursor to interprofessional practice and care is the development and delivery of interprofessional education (IPE). The rationale is straightforward – in order to stimulate interprofessional practice, health science and systems education itself must be structured and delivered within an interprofessional framework. For established educational fields, including medicine, this is a considerable challenge. It is apparent that many of the barriers to IPP/C that exist in health systems are traceable to corresponding health education models that do not emphasize cross-disciplinary collaboration. There is an extensive literature on interprofessional education (see Barr, 2001 for a review), which is beyond the scope of the current report. However, we provide some common definitions and principles. The Interprofessional Education Consortium defines IPE as follows:

“a learning process that prepares professionals through interdisciplinary education and diverse fieldwork experiences to work collaboratively with communities to meet the multifaceted needs of children, youth, and families. It provides the knowledge, skills, and values individuals need to collaborate effectively with others as they serve communities and families.”

The Certificate has been designed to promote IPP/C and attempts to do so by ensuring the course content and pedagogical approach follow principles of interprofessional education. Through a process of engaging with academics and clinical experts from Ryerson University, the N&E GTA and Central East Stroke Regions, and Sunnybrook Health Centre the following principles were established for the Certificate:

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• Promotes interprofessional education and interprofessional collaboration across the continuum and builds interdisciplinary models.
• Supports the delivery of client/family-centered care.
• Recognizes the determinants of health and a population based approach to disease management and prevention.
• Follows evidence-based practice and includes best practices with measurable outcomes to promote client safety and rehabilitation.
• Facilitates knowledge transfer of current medical and scientific knowledge and stroke care best-practice into curriculum.
• Includes professional and client diversity.

TARGET STUDENTS AND ORGANIZATIONS

The IPE/IPC Neuro-Stroke Certificate is unique and innovative in its approach. Comparable university level post-baccalaureate courses in stroke-neuroscience are not available to health practitioners (e.g., nursing, social work, nutrition, physiotherapy, occupational therapy, speech pathology, etc.) in Canada. The certificate also targets mature students who are existing professionals in a diverse range of allied health specializations. Courses are offered in a flexible schedule and accessible delivery format to accommodate full-time employment and access to health professionals working in small town and rural settings. This model enhances the potential for improved system capacity and provides an opportunity to build real team contexts in an IPE environment that can potentially translate to IPP/C within health organizations that are part of the Ontario Stroke Network.

DISTANCE EDUCATION & ONLINE LEARNING TECHNOLOGY

The IPE/C Neuro-Stroke Certificate is offered via distance education modalities. This includes online web-based instruction/learning and video technologies. Students are supported with the use of an on-line content delivery system (“Blackboard”) which allows for course management and communication. During the implementation of this initiative, videoconferencing was delivered through the Ontario Telemedicine Network (OTN) to regional sites across the Greater Toronto Area and Ontario (Toronto, Barrie, Richmond Hill, and Oshawa) and has the potential for delivery to in all 11 Regions of the Stroke Network. Videoconferencing and on-line modalities allows for the engagement and network building among participating health professionals both within and across various organizations.

THE IPE/C NEURO-STROKE CERTIFICATE COURSES

With the funding of HealthForceOntario the partnership co-created an Interprofessional Certificate in Advanced Neuroscience-Stroke Care. A total of 7 courses have been conceptualized for the Certificate. With the funding that was received, the
first four courses of the certificate (CVNS 600, CVNS601, CVNS620 and CVNS630) were developed and delivered to participants between September 2009 and May 2009. One of these courses (CVNS 601) has since been modified and has been offered each term as a self-study resource for newly admitted and returning participants. The course addresses the foundational knowledge that has been identified as critical to participant success in the certificate. This foundational course ensures that all participants have the base knowledge of interprofessional care and practice theory, neuro-anatomy and physiology and other academic skills required for success in the Certificate.

The Ryerson-Sunnybrook-N&N GTA OSRN partnership has thoroughly documented the goals and implementation of this important curricula development phase. As an overview of the full certificate, the course descriptions of all the certificate courses are provided below. (Course descriptions are taken from internal program documents\(^4\).) The courses are presented in the sequence of delivery to date followed by courses underdeveloped for future delivery

Courses offered from Fall 2008 to Spring 2009:

**CVNS 601 Neuroscience-Stroke Foundations.** This “Self-Study” course prepares healthcare providers with foundational knowledge for interprofessional neuroscience-stroke practice. Students will self-assess their baseline knowledge of concepts and principles underlying interprofessional education, care, and practice, neuroscience and critical thinking; engage in interactive self-study; and self-evaluate their learning.

**CVNS 600 Critical Appraisal of Evidence.** This course provides interprofessional health care providers working in a neuroscience-stroke specialty with knowledge and skills required to critically appraise evidence to inform and apply findings to practice. Course content is taught in the context of the interprofessional team and will be directly applicable to the delivery of patient-centered care. This course is designed to engage students in interactive, application-focused learning.

**CVNS 620 Health Promotion Paradigms.** This course is designed for health care professionals, health educators as well as those with functional management responsibilities from all health disciplines interested in advancing health promotion, risk factor management and chronic illness prevention within the Ontario Stroke System. The purpose of this course is to develop core competencies in health promotion and prevention of transient ischemic attack and stroke in an interprofessional context across the continuum of stroke care.

**CVNS 630 Brain Structures & Cognition.** This course provides an advanced knowledge of brain structure, function, consequences of brain injury and related clinical applications

for interprofessional neuroscience-stroke settings. The main focus of this course is on the organization of the human brain and the role of the brain in motor control, attention, language, memory, executive function and emotion. The course is designed to engage learners in interactive, application-focused learning.

**Additional certificate courses for future development:**

**CVNS 640 Neuro-Stroke Assessment.** This course will provide information for the development of clinical core competencies and knowledge important in neuroscience-stroke assessment for complex stroke clients and their families. This course will promote the utilization of emerging best practice and evidence relate to complex case assessment and will examine domains of neuroanatomy, neurophysiology and assessment to support client, goal setting, care interventions and complex stroke recovery decision making by interprofessionals practicing in the neuroscience stroke care continuum.

**CVNS 650 Client Stroke Rehab Recovery.** This course provides information for the development of clinical core competencies and knowledge in rehabilitative care, recovery and life re-engagement planning for complex stroke clients and their families. By promoting the use of emerging best practice and evidence in neuroscience-stroke care, this course will examine areas essential to the philosophy of stroke recovery, assessments for goal setting, current treatments and care interventions, for use by professionals practicing in the neuroscience stroke care continuum.

**CVNS 660 Leadership in Stroke Care.** This course establishes foundational knowledge of the theory research and practice of transformational and situational leadership important in interprofessional collaboration. Grounded in the realities within neuroscience-stroke care settings, students will examine the topics of power and influence, communication, diversity, conflict management, decision making and problem solving, team effectiveness, altering behaviour and change management. (42 hours)

Each course was delivered over a 12 week period which included weekly on-line activities and discussions and 4-5 (3 hour) sessions of video conferencing. Students attended the OTN video conferencing with peers at one of the 4-5 designated organizational access centres within the Stroke Network.
II. EVALUATION OF THE IPE/C NEURO-STROKE CERTIFICATE

The Ryerson-Sunnybrook-N&E GTA OSRN partnership enlisted the services of the Centre for Community Based Research to conduct an evaluation of the IPE/C Neuro-Stroke Certificate. The evaluation began with formation of a steering committee composed of Ryerson University, the N&E GTA Stroke Region and Sunnybrook Health Centre representatives who lead the initiative. The introductory committee meeting served to identify the central areas of the IPE/C Neuro-Stroke Certificate that would be the focus of the evaluation. The following broad areas were discussed:

1. Developmental evaluation: Examining the development of the interprofessional education curriculum from the perspective of educators, course developers, and management.

2. Outcomes for interprofessional educators: Examining the subjective impact of the new curriculum and model of interprofessional education on the practices of IPE curriculum team members and instructors.

3. Process evaluation of course implementation: Examining the delivery of the courses, from the perspective of students and educators, with a focus on successes and challenges.

4. Evaluation of student knowledge outcomes: Assessing the impact of individual courses on the acquisition of desired knowledge and skill areas.

5. Evaluation of interprofessional practice: Assessing the impact of the IPE/C Neuro-Stroke Certificate on attitudes towards IPP, perceptions of interprofessional practice (personally and organizationally), and utilization of research evidence.

These five phases or domains of evaluation correspond to different aspects of process (1-3) and outcome evaluation (4-5). These will be given elaboration in subsequent sections.

Building the IPE/C Neuro-Stroke Certificate Logic Model

In order to organize these evaluation domains and to formulate specific evaluation questions, CCBR designed and delivered a program logic model building workshop attended by the steering committee and other key stakeholders associated with curriculum development and/or connected to the North and East GTA Stroke Team.
The purpose of the session was to visually capture and represent the activities and associated expected outcomes of the IPE/C Neuro-Stroke Certificate and to assess and critique the assumptions of the program. Participants were asked a range of questions that to answer two key overarching questions: Why is it expected that Certificate will be effective in meeting its objectives? What barriers or challenges would prevent meeting these objectives? The logic model is presented in Figure 1, below.
Figure 1 – IPE/C Neuro-Stroke and Neuroscience Certificate Program: Logic Model

IPE Course Development
- Creation of course development process
- Formation of development teams
- Development of course contents
- Translation into distance education medium

Pedagogical approaches in courses
- Didactic learning through webcasts, online & physical classes
- Online seminars, discussion forums and group work
- Case studies and role playing
- Reflective learning

Course Curriculum (as program progresses, curriculum moves from teaching core content to more complex IP care practices & system issues)

Semester 1
- Foundations Self-Study**

Semester 2
- Critical appraisal of research
- Brain Structures & Cognition

Semester 3
- Health Promotion

Future Semesters
- Additional courses

Practical Application of IPC
- Practical on-site assignments, group work, mentorship
- Creation of online portal for ongoing learning
- Create virtual workplaces
- Students engage in reflective practice
- Students engage in practical integration in care

Examples of general course based knowledge & skills outcomes
- Increased comprehension of IP domains, roles, responsibilities
- Increased knowledge of continuum of care
- Increased knowledge & ability to align clinical interventions to need in complex cases
- Increased conflict resolution skills in IP teams
- Increased leadership skills in team environment
- Increased ability to self directed learning
- Team management & dynamics, group skills
- Critical application of evidence & advanced IPP

Changes to team & organizational culture supportive of IPC
- Improved client health & quality of life outcomes (incl. improvement of OSS standards)
- Increased advocacy for IPC principles & practices

Critical appraisal of research

**Also offered in semesters 2 and 3 as embedded option in courses
The core activities at the top of the model (#1) represent the sequential, developmental process of designing and implementing the IPE/C Neuro-Stroke Certificate, from inception to course delivery. The process begins with IPP/C Course Development and is closely linked to the pedagogical approaches of the courses, important to effective IPE in a distance education format. These general design features are applied in the actual delivery of the course curriculum, in the form of the four courses that were developed and delivered as part of this initiative. Three additional courses have been conceptualized as part of the certificate. However, these are for future development and are not covered in this report. Finally, the promotion of IPE/C principles in the courses provides opportunities for practical application of IPP/C, which is a key element for effective translation of concepts to practice.

The next layer (#2) refers to course-based outcomes that are expected to result as a function of course participation. There are many course-level knowledge and skill domains under consideration and a few example outcomes are provided in this layer. Another key short-term outcome is increased ability in self-directed learning, following from the practical-level work.

The third layer (#3) contains two clusters of intermediate, practice based outcomes that are theorized to result from the participation in the certificate and the attainment of course-based knowledge and skills, and. The first cluster is entitled Critical application of evidence & advanced IPP, and includes outcomes associated with critical system knowledge, application of evidence-based practice, and integration of IP theory in practice. The second cluster is called Team management & dynamics, group skills. This cluster is comprised of outcomes linked to team work and contribution to goals in an interprofessional context. The two clusters are linked by a unifying practice outcome regarding “the ability to link IPP/C theory and practice”

The final layer (#4) provides the longer-term outcomes of the IPE/C Neuro-Stroke Certificate. These outcomes are broader, more distal, and rely on a degree of organizational culture change in the participants’ workplace. It is presumed that the influence of students themselves has the potential to foster this level of change over time (especially with continued student involvement and formal connections between organizations and the certificate). However, it should be noted that these long-term outcomes will only occur over a longer time frame and lay outside the direct control of this initiative. Certain system factors (staff reductions, local program changes, and budgetary reduction or lack of support from management, for example) will always have the potential to compromise these outcomes.

The completed logic model provided a useful tool to explicate the “theory of change” underlying the delivery of the Certificate to health care providers working within the stroke system. – the presumably causal relationships between the educational intervention and the desired outcomes, and the rationale as to why these causal relationships are in principle reasonable and defensible. The goal of the evaluation,
then, is to provide data and information to empirically validate the key connections in
the model, for example, providing evidence that course content and delivery modality
was useful to students and associated with content knowledge gains. Another function
of the evaluation was to track development and implementation in order to improve
and strengthen the certificate as it was developing. We will now move to the central
research questions of the evaluation.

Evaluation Questions

Evaluation questions can be meaningfully divided into two broad categories: 1) questions associated with program process and implementation and 2) questions associated with program outcomes. The next few sections will detail process-focused questions followed by outcome-focused questions and the associated methods, measures, and the methods and tools used to answer them.

Please note that a full listing and explanation of the methods/tools is provided in “Evaluation Tools and Methods” following the review of the evaluation questions.

A. PROCESS QUESTIONS ABOUT DEVELOPMENT OF THE IPE/C NEURO-STROKE CERTIFICATE, INDIVIDUAL COURSES, AND IPE CAPACITY BUILDING

A key concern of the evaluation is to understand the process by which the core courses of the program were developed. The key stakeholders from the Ryerson-Sunnybrook-N&E GTA OSRN partnership went through a detailed process of identifying expertise in the system to create course development teams that could integrate principles of IPE with course content. Course development teams were comprised of interprofessional groups and principles of interprofessional collaboration were integrated into a collaborative process of course development. In order to create courses for the hybrid on-line and videoconferencing modalities of delivery, development teams also collaborated with technology experts and instructional designers who assisted in the translation of course content into a distance education medium”..

We asked the following questions pertaining to course development and related issues:

- A.1. From the perspective of the management committee, what were the experiences, challenges, and successes of building the IPE/C Neuro-Stroke Certificate?
- A.2. From the perspective of the management committee and course development team members, what were experiences, challenges, and successes in developing IPE courses for the certificate?
• A.3. What lessons have been learned and what improvements would be helpful for future certificate and IPE course development?
• A.4. What did course team members learn, in reference to their own knowledge and practice, as a result of participating in the development of IPE-focused courses?
• A.5. What were the experiences, challenges, and successes, of translating the course into the distance education medium?

Methods/tools:

M4. Management focus group
M5. Interviews with course developers/instructors

B. PROCESS QUESTIONS ABOUT COURSE DELIVERY & PRACTICAL APPLICATION

An important aspect of process evaluation is ascertaining the extent to which program activities occurred as planned, and if not, why not? In the present evaluation, it was important to assess actual implementation. Understanding the process of course delivery is primarily accomplished by gathering information regarding students’ experiences of the course. Thus, information regarding students’ satisfaction with courses; perceived strengths and challenges/limitations; and feedback and recommendations were collected. We also drew on the perspectives of course instructors. We asked the following questions pertaining to course delivery, practical application, and related issues:

• B.1. How and to what extent have IPE principles and best practices been translated into the courses?
• B.2. What were the opportunities for group focused work, discussion and dialogue? How did students work together in practice as part of course curriculum?
• B.3. Are students satisfied with the way the course was delivered? What are students’ perceptions of strengths and challenges/limitations of the course?
• B.4. What barriers did students confront in completing their courses? What technological and practical barriers did they experience?
• B.5. What feedback do students have to improve the certificate course?
Some of these questions ask about how the course requirements and curriculum support practical application of IPP/C principles (i.e., process questions about how the courses are delivered). It should be noted that actual outcomes (changes to attitudes, behaviours, etc.) regarding IPP/C are asked in relation to outcome questions in later sections.

Methods/tools:

M1. Overall Student Survey
M2. Student Course Surveys
M3. Student Interviews
M5. Interviews with course developers/instructors

C. OUTCOME QUESTIONS ABOUT COURSE-BASED KNOWLEDGE & SKILL ACQUISITION

The first set of outcomes in the model refers to short-term gains in knowledge and skills experienced by students as a function of the four courses in the evaluation. These outcomes are specific to the curricula of the course and some examples are provided in the figure above. Short-term outcomes associated with knowledge are important to evaluate because they are the outcomes over which the program has the most direct control. Furthermore, the longer-term practical outcomes rely on successful achievement of these initial shorter term outcomes. Given the relatively short time frame of the evaluation, these outcomes were a primary focus.

The basic evaluation question to ask is a simple reiteration of the outcomes:

1. C.1. Are students achieving desired gains in knowledge and skills, as represented by the outcomes?

This generic question can be applied to all the relevant content areas covered by each of the courses. We were also interested in examining how much change occurred (or did not occur) from pre-course to post-course surveying.

Methods/tools:
D. OUTCOME QUESTIONS ABOUT CRITICAL APPLICATION AND TEAM MANAGEMENT

As described previously, two sets of intermediate outcomes follow from the short-term outcomes. These intermediate outcomes are focused on application of course principles in the practical setting. An important caveat of the current evaluation is that students may not have had enough time to practice their learnings in their real work environment to demonstrate improvements in these areas. We will follow up this issue in the results section. Nonetheless, it was important to ask the pertinent evaluation questions at the outset in order to gather relevant data at the pre-course stage for potential comparison in future evaluation work. The evaluation questions take a form similar to the short-term outcomes:

D.1 Are there increases/improvements in students’ critical application of evidence and advanced interprofessional practice?
D.2 Are students’ attitudes supportive of the principles of IPP/C
D.3 Are there increases/improvements in students’ attitudes and practice of team management skills and positive team dynamics?
D.4 What challenges have students experienced when implementing course strategies and practices into their own practice?

Methods/tools:

M1. Overall Student Survey
M3. Student Interviews

E. LONG-TERM OUTCOMES
Long-term outcomes are expected beneficial changes to be demonstrated by students, other professionals, and organizations and most importantly, patients/clients. Characteristic of long-term outcomes is their distal nature and the low level of control an intervention has over their attainment. In the present evaluation, the long-term outcomes are theoretically linked to the intervention in the sense that systematic benefits to individual students will, collectively, have a degree of impact over system level changes and enhanced patient/client outcomes. However, these changes are not expected to occur in the near-term (and certainly not within the time frame of the present evaluation) and require the ongoing influence of IPP/C as a function of knowledge and skill application of students in their practice within the stroke system. Furthermore, the attainment of these outcomes may be promoted or compromised by other local system forces. Organizational change does not fall squarely on the shoulders of the IPE/C Neuro-Stroke Certificate students and indeed there could be other organizational interventions in the future that could contribute to these important outcomes.

**Evaluation Tools and Methods**

This evaluation used a mixed-method quantitative and qualitative methodology and design to assess the range of questions associated with program process and program outcomes. Mixed methods are advantageous because they provide a degree of triangulation of data sources. Qualitative feedback can provide richer description of important program processes and can often speak to “why” things occurred as they did. They can also shed light on the interpretation of quantitative findings, which in turn are useful to generating group-based information about degrees of change. We used multiple methods, including quantitative scales (custom and existing), written feedback, and interviews, as well as multiple sources (students, instructors, and management). A summary of our methods/tools follows below.

**M1. Overall Student Survey.** The Overall Student Survey was conducted as a pre-test at the beginning of enrolment (beginning of Fall or Winter semesters, depending on student start date) and then again as a post-test at the end of the Spring semester. Participating students may have completed one, two, or three courses, and/or the self-study course. The survey contained a mix of demographic information, outcome scale instruments, and open-ended feedback responses regarding the program. The scale measures are described in Table 1, on the page following. 25 students completed the pre-test and 19 students completed the post-test, although the sample size for individual item responses varied. Only 9 students completed both the pre-test and the post-test of the overall student survey.
<table>
<thead>
<tr>
<th>Measure/Tool</th>
<th>Description &amp; Design</th>
<th>Relevant outcomes</th>
</tr>
</thead>
</table>
| **Interprofessional Learners Scale**: ILS (Pollard et al., 2004) | 5-point scale, measures attitudes towards interprofessional learning as beneficial approach in practical health settings (9 items). | • Increased ability to coordinate team and care needs.  
• Increased ability and comfort in working in a team.  
• Increased advocacy for IPC principles and practice. |
| **Interdisciplinary Education Perception Scale**\(^5\): IEPS adapted (McFadyen et al., 2007), Perceived Need for Cooperation subscale | 6-point scale, measures students’ perceptions of the need for interprofessional practice in their profession (2 items). | • Increased advocacy for IPC principles and practice. |
| **IEPS: Perception of Actual Cooperation subscale** | 6-point scale, measures students’ perceptions of actual interprofessional practice in their field. | • Changes to team and organizational structure supportive of interprofessional care (long-term outcome) |
| **Collaborative practice scale** (Chambers et al., 2008) | 7-point scale, measures students’ perceptions of their own and team’s collaboration and teamwork in health care (9 items). | • Increased critical assessment & action within org. & system  
• Increased ability and comfort in working in a team  
• Increased collaboration in addressing role conflict  
• Increased conflict resolution skills in IP teams  
• Increased ability to coordinate team and care needs |
| **Communication and Teamwork Scale** (Pollard et al., 2004) | 4-point scale, measures students’ perceptions of their own confidence and comfort in team-based communication and practice (9 items) | • Increased leadership skills in team environment  
• Increased ability and comfort in working in a team  
• Increased confidence in their skills to contribute to a team |
| **Evidence-based practice – Research utilization scale** (Birdsell et al., 2005) | 4-point scale, measures students’ application of research information in practice environments (6 items). | • Increased comprehension of system accountability, evidenced based practice (clinical & care outcomes & tools).  
• Increased critical assessment & action within org. & system  
• Increased ability to articulate knowledge & expertise in own profession  
• Increased ability to evaluate evidence & its application to practical settings |

\(^5\) A third subscale called “Competency and Autonomy” measures perceptions of one’s own profession in regards to general competency, level of training, trust, positive goals, etc. This subscale was included as part of the overall measure, but was not included in the evaluation since it was deemed of low relevance to the program intervention.
online course. The post-course surveys also contained open-ended questions for students to provide feedback about their experiences in the course. The sample sizes for the pre- and post course surveys are presented in Table 2.

M2. Student Course Surveys. A pre-post online survey was administered in relation to each of the CVNS 600, CVNS 630, CVNS 620 courses. The purpose of these surveys was to assess students’ self-reported knowledge in the core content areas of each course, before and after course completion. CVNS 601, the Self-Study, was not independently evaluated with a dedicated survey because the learning outcomes completely overlapped with those of the subsequent courses. This overlap was by design, as the Self-Study was to function as preparatory learning opportunity and prerequisite for later course. Thus, the evaluation of the three subsequent courses replaced a specific knowledge evaluation of CVNS 601. There was a pragmatic reason for this approach as well, since we wished to avoid overwhelming students with too many evaluation surveys.

Within the course-based surveys, the knowledge items (5-point agreement items) were generated in consultation with the steering committee and based on the stated knowledge objectives in the course outlines. In addition, the post-course surveys also contained the National Survey of Student Engagement (NSSE) that has been adapted for online use (Robinson, 2005). The NSSE is designed to assess student satisfaction and participation within an online course. The post-course surveys also contained open-ended questions for students to provide feedback about their experiences in the course. The sample sizes for the pre- and post course surveys are presented in Table 2.

Table 2 – Course survey sample sizes

<table>
<thead>
<tr>
<th>Course</th>
<th>Pre-Course</th>
<th>Post-Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVNS 600-Critical Appraisal of Evidence</td>
<td>20&lt;sup&gt;6&lt;/sup&gt;</td>
<td>9</td>
</tr>
<tr>
<td>CVNS 630-Brain Structures &amp; Cognition</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>CVNS 620-Health Promotion Paradigms</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

<sup>6</sup> We achieved a high sample size at pre-test for the Critical Appraisal course because the survey was embedded in the overall student survey, for efficiency purposes. In reference to the two other courses, only enrolled students were asked to participate. An ideal design would be to survey all non-course versus in-course students on all knowledge measures, to improve sample sizes for comparisons. However, this design would have required many more surveys and/or longer ones for students to fill out. The required level of participation would have been too prohibitive and may have instead led to frustration and attrition from the research among students.
**M3. Student Interviews.** A subsample of students were interviewed in more depth regarding their experiences in the certificate in Spring, 2009. The interview questions asked students to reflect on their motivations and goals for entering the program, the program’s impact in bridging research evidence and application, the usefulness of the program in promoting interprofessional principles in practice, and overall feedback and recommendations on how to improve the certificate. Six students participated.

**M4. Management Focus Group.** The evaluation included a focus group with members of the management steering committee. Five individuals participated representing the Chang School and distance education departments and Sunnybrook Health Sciences Centre. The purpose of this focus group was to gather perspectives on successes, challenges and recommendations in relation to program development and capacity building, assembling course development teams, integrating principles of interprofessional practice, development of the distance education medium, and future capacity and sustainability.

**M5. Interviews with course developers/instructors.** Interviews were conducted with members of the course development teams of CVNS 600, 630, and 620. The purpose of these interviews was to gather perspectives on the course development process, the effectiveness of integrating IPE/IPC principles into course content, and the level of success the course development process was in building the required curriculum.
III. EVALUATION FINDINGS

Student Demographics

To set the context for the evaluation findings, demographic and descriptive information regarding the students are presented. Forty-three students completed one or more courses. This figure includes students in the CVNS 601, which was subsequently converted to a self-study resource. The enrolments and withdrawals for each course are presented in Table 3a. We also include the number of students who completed the course-specific online surveys.

Table 3a – Enrolment by course

<table>
<thead>
<tr>
<th>Course</th>
<th># Completed Course</th>
<th># withdrawals</th>
<th>Course Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVNS 601 Neuroscience-Stroke Foundations</td>
<td>35</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CVNS 600 Critical Appraisal</td>
<td>15</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>CVNS 630 Brain Structure and Cognition</td>
<td>10</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>CVNS 620 Health Promotion</td>
<td>13</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Many more students completed the CVNS 601 than the other courses. 15 of the 35 who completed CVNS 601 did not enrol in additional courses. It is uncertain why this is the case and a gap in the evaluation is understanding why these students did not proceed with the other courses. Table 3b provides the frequency of students who completed 1, 2, 3, or all 4 courses. It should be mentioned that it is not necessarily the expectation of the certificate that most students complete all four courses sequentially in the same year. Ryerson’s distance education philosophy is one of flexibility and self-pacing and it would be overly optimistic to expect that most working professionals would be able to commit this level of time year around.

Table 3b – Course overlap of enrolment

<table>
<thead>
<tr>
<th>Course</th>
<th>1 Course</th>
<th>2 Courses</th>
<th>3 Courses</th>
<th>4 Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVNS 601 Neuroscience-Stroke Foundations</td>
<td>15</td>
<td>13</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CVNS 600 Critical Appraisal</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CVNS 630 Brain Structure and Cognition</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CVNS 620 Health Promotion</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Five students took all 4 courses and only 2 students took 3 courses. When students took 3 courses, it was always CVNS 601, CVNS 600 and CVNS 630. While this variation in “pacing” of individuals is crucial to the Chang School’s mandate regarding flexible
accessible education, there are implications for the assessment of outcomes. Namely, the logic model makes an assumption that students will be receiving the full complement of the program if the full complement of outcomes are to be achieved. We will return to this point in the results of the outcome evaluation.

INITIAL ENROLMENT IN THE CERTIFICATE

In addition to the students who completed the courses outlined above, 32 students registered in the hopes of participating in the certificate. Given the short-time frames and preparation for full commitment, many potential students withdrew their interest. This is quite different from academic withdrawal from courses underway and in fact seems to be an indicator of broad interest in the certificate and an encouraging figure for future enrolment.

DISCIPLINES REPRESENTED IN THE CERTIFICATE

The certificate hopes to promote interprofessional practice in part by ensuring students come from a variety of disciplines. This is an essential theoretical assumption of the program – effective interprofessional education and later practice requires the representation of multiple disciplines. Table 3c provides the breakdown of enrolled students by discipline, the overall certificate, and the courses.

Table 3c – Disciplines of enrolled students

<table>
<thead>
<tr>
<th>Profession</th>
<th>Total across all courses</th>
<th>600</th>
<th>601</th>
<th>630</th>
<th>620</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>14</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Occup. Therapist</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Communicative Disorders Assistant</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Dietician</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Audiologist</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Education Orientation</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Health Promoter</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Manager, Continuing Care Program</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nurse Educator</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Psychology</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Speech Pathologist</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(Information unavailable)</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>15</td>
<td>35</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>
The most common disciplinary category was “Nurse” (14), followed by “Physiotherapist” (8) and “Occupational Therapist” (6). The rest of the students are fairly evenly divided among other allied health professions. While there are many nurses proportionate to other disciplines, nurses can hardly be seen to be dominating enrollment. In fact, they are in the minority in all cases, with the exception of 620 Heath Promotion, and only have slight majority there. This information suggests that the assumptions of student representation – diverse and interdisciplinary – have been met by the program.

**ORGANIZATIONAL REPRESENTATION**

Another stated goal of the certificate is to promote interprofessional practice among multiple health professionals from health care teams within single organizations. It is also a goal to establish networks among health providers working within the Ontario Stroke System. Table 3d provides a breakdown of participating organizations. Of the 16 organizations represented, 9 only had one student enrolled. This is problematic in terms of developing a human resource capacity of health care teams within individual organizations. However, 5 of these 9 only enrolled in the Self-Study Course, so in effect only 4 students were lone representatives of their organization. Single students from organizations are still, however, provided with an opportunity to build networks with other health care providers from other organizations within the system. This is consistent with the aim of facilitating interprofessional links required for effective care coordination and transition in care delivery across the continuum of services. York Central had the highest student representation (10) and two organizations provided 2 students. Table 3d also provides an indication of interdisciplinary teams enrolled from each organization. North York General was homogeneous with 3 nurses. The remaining 6 organizations had two or more disciplines represented. York Central was the highest with 7. Overall, the initiative appears to be fairly successful in its pilot delivery in linking to multidisciplinary teams in partner organizations.

<table>
<thead>
<tr>
<th>Organization</th>
<th># of students</th>
<th>Disciplines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baycrest Centre</td>
<td>1</td>
<td>Occupational Therapist</td>
</tr>
<tr>
<td>ComCare Health Services</td>
<td>1</td>
<td>Occupational Therapist</td>
</tr>
<tr>
<td>Elgin St. Thomas Public Health</td>
<td>2</td>
<td>Nurse, Health Promoter</td>
</tr>
<tr>
<td>Hawkesbury &amp; District General Hospital</td>
<td>1</td>
<td>Education Orientation</td>
</tr>
<tr>
<td>Inter-Action Rehab</td>
<td>1</td>
<td>Physiotherapist</td>
</tr>
<tr>
<td>Lakeridge Health Centre</td>
<td>7</td>
<td>4 Nurses, 1 Dietician, 1 Physio.</td>
</tr>
<tr>
<td>North York General</td>
<td>3</td>
<td>3 Nurses</td>
</tr>
<tr>
<td>Providence Healthcare</td>
<td>1</td>
<td>Pharmacist</td>
</tr>
<tr>
<td>Royal Victoria Hospital</td>
<td>5</td>
<td>3 Physio., 2 OT</td>
</tr>
<tr>
<td>Sault Area Hospital</td>
<td>2</td>
<td>Nurse, Dietician</td>
</tr>
<tr>
<td>Southlake Regional Health</td>
<td>1</td>
<td>Nurse Educator</td>
</tr>
<tr>
<td>Organization</td>
<td># of students</td>
<td>Disciplines</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. John's Rehab</td>
<td>1</td>
<td>Physiotherapist</td>
</tr>
<tr>
<td>Sudbury Regional Hospital</td>
<td>1</td>
<td>Nurse</td>
</tr>
<tr>
<td>Sunnybrook H.S</td>
<td>3</td>
<td>Audiologist, 2 Comm. Disorders Asst.,</td>
</tr>
<tr>
<td>Toronto Western</td>
<td>1</td>
<td>Nurse</td>
</tr>
<tr>
<td>York Central Hospital</td>
<td>10</td>
<td>3 Nurses, 2 OT, 1 Physio., 1 Psych., 1 Speech Path., 1 Manager, 1 Nurse Practitioner</td>
</tr>
</tbody>
</table>

**DEMOGRAPHICS FROM THE EVALUATION**

Overall, 39 students participated in the evaluation in some way, either by completing one of the pre- or post-test surveys (overall and course specific) and/or participating in student interviews. Eight of our participants completed the overall student survey at pre-test, but subsequently withdraw. We collected additional demographics on the surveys that we were otherwise unable to gather from the general in-course pool (due to confidentiality).

- The age of the evaluation sample ranged from 24 to 60 and was spread out very evenly, i.e., about 25% of the sample fell into each of the ranges of “under 30”, “30 to 40”, “40 to 50” and “50 to 60”.
- The sample was overrepresented by females. Of those who responded, 36 were female and 1 was male. This proportion appears to be little different from the full enrollment.
- “Years in your current position” ranged from 1 to 27 years. Half the sample has been in their position for 5 years or less.
The Process and Implementation of the IPE/C Neuro-Stroke Certificate

In the sections that follow, we provide a summary of the findings of the process evaluation. Part A provides developmental and formative information regarding the creation of certificate program. Part B provides comprehensive process evaluation information from the perspective of students regarding their experiences in taking the courses and the certificate in general. We end each part with a section summary and recommendations.

Part A – Development of the Certificate and its Courses

Understanding the process by which the IPE/C Neuro-Stroke Certificate was developed, lessons learned therein, and the implications for future development and capacity building were key areas of the evaluation. The Ryerson-Sunnybrook-N&E GTA OSRN partnership is in the process (or will be in the process) of developing subsequent course offerings, while also looking forward to future opportunities for capacity building and partnerships within the sector. Thus, reflections on development and implementation are useful.

REFLECTIONS ON THE BIG PICTURE

We begin with an overarching, birds-eye perspective on this developmental process, drawing from findings from M4. Management Focus Group. In this focus group, the management committee engaged in a high level discussion of how the certificate was conceived, developed, promoted, and implemented. For our present purposes, we provide an overview of successes, challenges, and lessons learned for future recommendations. One evaluation question is particularly relevant:

A.1. From the perspective of the management committee, what were the experiences, challenges, successes, and lessons of building the IPE/C Neuro-Stroke Certificate?

REFLECTIONS ON THE MODEL AND THE NEED

The certificate was built based on the identified need in the stroke-neuroscience health care system that there is a serious disconnect between the knowledge that is available and continually emerging and its actual use in practice. As one committee member explained,

*There is a significant amount of emerging knowledge that is in print. There are standards, guidelines, evidence, and best practices, and there are scientists that have created [this knowledge base]. What the certificate is about is that the practitioners in their setting do not know how to use it. The literature around how to use it, how to teach it, is what’s missing. That’s where the gap of knowledge is.*
The committee also considered the certificate to be a unique innovation in its inception. The marrying of IPE/IPC in an educational-system partnership with a specialty in health care, such as neuroscience stroke – has few comparators. For example,

The researchers of IPE, the IPE clinics, that’s what they’re focusing on – let’s figure out how to get people to work together. They’ve not interested or invested themselves in understanding the next step, which is how do we get people to work together in this specialty area, how do we teach the specialty, the knowledge and the process of working collaboratively? No one is doing the two.

A central problem is one of **knowledge translation**. Even with the availability of scientific knowledge and best practices, practitioners often have difficulty in critically assessing and understanding its applicability in their field (presuming, that practitioners have the time and resources in the first place to access and digest relevant material). The role of interprofessional collaboration is equally crucial. While collaboration among health care providers will likely benefit patients in any health care sector, the area of stroke is rather unique in that stroke patients are complex and expressions of strokes can vary greatly from individual to individual. An interprofessional approach provides opportunities for integrated health solutions to patient-centred care that are flexible and innovative, that draw on evidence-based practice, but also on clinical, practitioner-based experience.

How do you take what’s known and work with an interprofessional team to integrate it into interprofessional care? What’s missing is the knowledge of how to do interprofessional care, or even what it means in many cases, and then how to take the evidence that’s out there, and apply it. In the event that evidence doesn’t exist, how to then act in that environment? When the evidence doesn’t exist, what then do you rely on and how do you plan care?

As we shall see, development of and IPP-focused certificate in neuroscience-stroke care has been a challenging but exciting endeavor. One of the greatest challenges was building a complex program of study within the context of limited time and resources.

**SHORT TIME FRAMES FOR DEVELOPMENT AND THE IMPACT**

The approval of funding from HealthForceOntario lead to a rather short window of less than 18 months time to design and build the vision, mandate, content, and delivery infrastructure (including the distance education medium) of the certificate courses.

*We had a limited opportunity, a limited time window... the leadership, the visioning, the program development and corresponding project plan, the engagement of broader partnership and stakeholders, and basically building this as an innovation model...could have had a completely different face if we had done it without those barriers and restrictions.*
This compressed time frame had a wide range of implications, such as making it difficult to access and assemble expertise for the course teams as well as restricting (but certainly not precluding) opportunities for partnership building and engagement with allied health organizations to gain buy-in, participation, and input around the certificate course. Despite these time constraints, the management committee felt there was a tremendous amount of success in building the IPE/C Neuro-Stroke Certificate within the timelines, through an evolving and innovative consensus-based partnership matched by hard work.

[This type of certificate program has] never been done before so everyone’s going to be learning, and they’re going to be learning and planning continuously, it’s a constant. There’s no distinction between one phase and the next...We had a very limited time frame... and I think it’s amazing in terms of our deliverables and what we were able to achieve, because it really should have been five times the amount of time.

Quite obviously, the committee recommended more time being allotted to the development of similar educational innovations in the future. Ideally, a full year devoted to visioning, partnership building, and project planning was recommended, followed by another full year for course development, before any courses are formally launched. This would facilitate more systematic and thoughtful development and a fuller use of an organizational partnership base for recruitment, dissemination, promotion, and buy-in. Members also desired more opportunity for “major reflective debriefing” about the process, as opposed to more reactive, “flashpoint debriefs”. Such complex innovations also require dedicated resources from organizational partners, such that project developers are not required to take on such large complex projects in addition to their existing workloads.

I think with our tendency to be workaholics we kept all the balls in the air, but if you’re going to approach something that’s this creative and innovative, then you have to get organizational buy-in from day one.

SUCCESSES AND CHALLENGES IN INTEGRATING IPP/C INTO THE CERTIFICATE

The committee reflected on the how the certificate evolved from an original need to fill a serious knowledge/skill gap in stroke and neuroscience in the field to a strong mandate to provide a program that promoted – and reflected – principles of interprofessional practice. This evolution comes from consensus building among stakeholders in the allied health sector.

There had been 4 focus groups to guide the movement forward of [the certificate]. What will it look like, what should we focus on? It went from a certificate that focused on advanced neuroscience stroke care for nurses to eliminating pediatrics and brain traumas with a focus on stroke only. Then it went to IPP because we realized if we really wanted the impact on the system, we couldn’t just change the nurses, you have to have everyone in there. IP then became a layer that the proposal introduced...We went in with both academics
and clinical people supporting it, that’s why we were able to do what we did in the first three months. The focus group and the groups that worked to refining the curriculum and the evaluation process was done really well, I don’t think we could have done it any better, or faster, or clearer.

The introduction of an IPP/C overlay in the certificate course introduced new capacity challenges to the process, and again taxed resources and time. First, it simply made things more complex, adding a layer of content regarding IPP, but also a wide range of pedagogical and technological ramifications; namely, to teach IPP/C means offering courses that observe principles of interprofessional education (IPE) within a distance education medium.

The fact that this had a funded IPE overlay linking to IPC added an exciting complexity to the project that meant that curriculum development needed even longer timelines.

Clinical, academic/research, IPP/E, and pedagogical and distance education designers expertise were required for all course teams. Another complexity was locating and accessing the expertise to assemble comprehensive course development teams when the pool of qualified people is small.

...the expertise and the knowledge we’re trying to build is absent at all levels. It’s absent in the health care system in the sense of the knowledge gap of the emerging science...When you go out to populate design teams to build curriculum, the challenge is that academia brings its expertise and clinicians bring [their expertise], but when you try to put those two together you realize that both have knowledge gaps. So the opportunity to synergize and to integrate developmentally what you need to do takes time. Unless you have the active engagement of the science leaders in those particular topic areas, the reality is, who builds the curriculum? It’s a very narrow compartment of knowledge expertise.

The extra development time in this context reflects the idea that principles of IPE and IPP/C need to reflexively mirrored in the course development process itself – IP course development supports interprofessional education focused curricula which lead to interprofessional practice of students. An additional problem is that there is little in the way of foundational literature of how to build post baccalaureate level, distance education courses in this way. Solving the problem required innovation, experimentation, and flexibility.

[The course teams] have had to learn what they were going to teach. They were learning, “what is this phenomena of IPC?” We found that there’s not a lot of literature to support that either. They were trying to blend or to create what made sense to them from an experiential perspective – the clinician, talking about what is or isn’t working[in practice]; and the course designer also trying to figure out what IPE is. They need to sit down and do a comprehensive literature review together, they have to critically evaluate the literature and then integrate that into the courses.
...there’s been a group at a leadership level who have been flexible, adaptable and continuously transforming the way we do things. It’s been messy. With the distance delivery, the course development teams, with how we were pulling people in, we literally kept finding new solutions and trying new ways of doing things. They were all less than perfect but getting better and better. We identify some of these obvious early resourcing needs such as IPE, and distance technology support and how to write curriculum, making the assumption that even academics don’t know how to do that.

REFLECTIONS ON ORGANIZATIONAL PARTNERSHIPS AND FUTURE CAPACITY BUILDING

Part of the innovation of the IPE/C Neuro-Stroke Certificate is the purposeful partnership building with relevant health organizations in Ontario. In the development phase, as mentioned previously, input and participation at the front end was viewed as crucial, to foster buy-in and to promote recruitment. The goal here was not only to ensure that the certificate was responsive to stakeholder needs in the field, but to establish the potential for capacity building and organizational change within the system. This is a crucial element of the “theory of change” of the initiative (Chen & Rossi, 1987; Weiss, 1995) – the stated rationale of how the program will operate to achieve short-, intermediate, and long-term outcomes.

Recalling the logic model, the certificate seeks to enhance individual student knowledge, skills, and applied practice. Following these outcomes to the longer-term, there is an expectation of organizational, systemic change that will result in improved patient outcomes. However, it is often the case that educational interventions have individualistic short-term outcomes that do not translate into longer-term systemic outcomes, since individuals, in isolated pockets throughout a given system, are unable to support meaningful organizational change. This disconnect between individual change and organizational change is all the more problematic for typical distance education programs where students hail from many different geographic regions and organizations. In contrast, the IPE/C Neuro-Stroke Certificate sought to recruit students from a defined pool of organizational partners in order to foster team development in those organizations. As one committee member explained,

The unique piece is we don’t want just one student from an organization, we don’t want the champion model. I don’t think we’re looking at the champion model that the individual makes the difference, the charismatic person, we took a critical mass approach. Give us 4-5 or 3-4 people from your organization, people on your stroke team, people leading the changes, making the decisions, caring for the patients – so it’s a critical mass approach. If you are building knowledge, capacity, and competencies required to make the changes needed in the system, and to enhance the system of care delivery, and you’ve got a critical mass in your organization doing it, our theory is, its going to make it happen because you’re not the lone champion, you’re a group.

The organizational support to endorse the program and encourage enrollment was also a supporting factor. The committee envisioned a “collaborative partnership model”
between the program and provider organizations because it was recognized that the overall system impact could be potentially negligible without institutional support.

You can build the most amazing program in the world but if we don’t have the right organizational cultures back where people do what they do, if we don’t have the right supports from those organizations, and the right buy in and engagement so people feel vested in it, it doesn’t matter how beautiful the courses are -- people might 1. never take them or 2. never use them or integrate them.

As with all aspects of the development phase, time pressures created challenges for the formation of organizational linkages. Looking forward, the committee sees strengthening organizational and other linkages as crucial to the ongoing development and improvement of the certificate.

Once we’re sort of a little cleaner, firmer, in terms of what we’re offering, then we need to continue to put into place structures to make sure that we’re current. [For example] do we have an expert panel that meets with us and senior academics yearly? We’re now establishing a program advisory committee that has representation from key leaders in the field and key academics. We have to find that structure and in my mind that may be a future allocation of an academic coordinator who is part time who is really linked to the system with supports with both partners.

BUILDING INDIVIDUAL COURSES – REFLECTIONS ON THE PROCESS

With the vision, mandate, and overall project planning in place, the Ryerson-Sunnybrook-N&amp;E GTA OSRN partnership’s next step was identify and assemble teams to develop the courses. Course teams were composed of course leads/instructors, contributors and expert advisors, writers, and reviewers. The goal was to mirror interprofessional processes in the development phase.

There were several evaluation questions that were posed in relation to this process. They include the following:

A.2. From the perspective of the management committee and course development team members, what were experiences, challenges, and successes in developing IPE courses for the certificate?
A.3. What lessons have been learned and what improvements would be helpful for future IPE course development?
A.4. What did course team members learn, in reference to their own knowledge and practice, as a result of participating in the development of IPE-focused courses?
A.5. What were the experiences, challenges, and successes, of translating the course into the distance education medium?
In the next few sections, we report on feedback from 3 course team members (4 instructor/leads and 1 instructor/writer) and from the management focus group.

As one might expect, the challenges expressed by the management committee in relation to compressed time lines were similarly identified by course team members. Time constraints were problematic because they appeared to impact multiple aspects of course development, such as meeting timelines for writing, review, and translation to distance education medium; establishing roles and communication; and pursuing an interprofessional process in doing the work. However, team members generally felt that the finalized courses, with some caveats, achieved their goals in terms of content, pedagogy, and IPE orientation. Perspectives on the courses in terms of actual implementation will be reviewed in a later section. Our focus here will remain on the development process.

**TIME CONSTRAINTS IN THE COURSE DEVELOPMENT PROCESS**

All team members felt that compressed timelines were major impediments to the development process. For example,

> The timelines were pretty tight, I think we had maybe three months. That was a major challenge, we really needed a lot more time to do it in a less stressful way. Time was always a major factor, we wish we had more.

> ...there wasn’t enough time initially and we had to have more...it took longer than anticipated both on my part and others. Timelines initially weren’t necessarily met, and we did need more time to organize the materials.

> [A challenge was] “time”. We had to develop all these course-based materials in a very limited time. It was difficult. This isn’t my job. I have another job. So it was difficult to complete all the demands, especially those related to writing.

One team member noted that the timelines and process were set out in advance of their involvement which left very little room for flexibility. It was also noted that the course development process is quite unique in this context because it requires input, actions, and oversight by multiple parties (e.g., writers, reviewers, distance education). Normally, course development is conducted by one individual, allowing for flexible pacing. This often means that later lectures or modules are created partway through the semester. However, within the certificate all course content needed to be completed prior to the start of the semester. We will revisit the issue of time constraints in relation other aspects of course development.

**SUPPORT AND RESOURCES IN THE COURSE DEVELOPMENT PROCESS**

Team members felt the course development process for the first course of the certificate was unorganized and without a clear structure of how the process would roll out. Some examples included not getting useful resources in time for course
integration, not enough orientation and background, missing opportunities for learning engagements because of short notice, and unproductive initial meetings. These criticisms were tempered by a general feeling that these difficulties were expected and normal in the context of developing a new program (“growing pains”), coupled with timelines that were necessarily tight.

In contrast, another team from a later course felt that the “working with the Chang School was wonderful, they were well set up and they had their processes in place”. In terms of resources for course teams, some were obviated by their late timing (as mentioned above). Furthermore, there was also an example of potential information overload for the second course:

I think they were trying to give us a lot of information about what would be possible in teaching an online hybrid course. It would almost have been easier if they had limited it to the things that could have been done quickly, then we could have focused on “okay this is what’s possible and let’s maybe see what happens”. We ended up getting distracted by technical aspirations, which I think, looking back, realistically we wouldn’t have been able to pull off in that short time frame.

ROLES AND ROLE CLARITY

There were several issues pertaining to roles and role clarity within the course team model. The first is general. Some respondents felt that expectations regarding the roles and time commitments of team members were unclear at the beginning of the process. This lead to a degree of stress and adjustment during the course development process for team members.

Another team member, an instructor, felt that the clinical emphasis of the course was not well articulated at the outset, leading to later difficulties in teaching the course,

Everything worked well, except…the course took a real clinical position. I don’t feel this was articulated to me at the beginning of the course. My co-lead took on this challenge, but I didn’t feel comfortable teaching a course to clinicians and not having that background myself.

Another respondent felt the different team roles and functions were clear, but there was a lack of clarity about the actual amount of work involved.

The roles were predetermined, so we all understood what our roles were. But that doesn’t necessarily equate with the magnitude of the job, and that related to the writers responsibilities and the overwhelmingness [sic] of what was required.

Second and more specifically, it was clear that the role of “course writer” did not function as intended. The intent of this position was to receive material from other team members, as directed by the course lead, to translate into the course curriculum.
One team member, a lead, responded that direction could not be provided until the material was read by the writer. This was viewed as an inefficient use of time, as it would have been easier for the lead to simply write it themselves. In some cases, the instructor/lead had to take on the dual role of lead and writer. Another respondent echoed these sentiments,

Having a course writer, at least in theory, was supposed to give us a hand in terms of getting things done. We [the instructors] were trying to decide on what content we wanted and also read through a lot of material to figure out what type of content should go into the course, and having then to dump that on the course writer who didn’t necessarily have the content expertise, didn’t really work very well. I ended up writing most of it myself, rather than leaving it to the course writer. I’ve never worked with a course writer before so I’m not exactly sure what the ideal scenario would be with a course writer, but I didn’t find it particularly helpful.

Having a course writer (and other expert contributors) is not, in fact, more efficient. One instructor felt that having a course writer made the process more time-consuming. Another dimension to this is the necessity of having writers who have the necessary expertise, but such people are not easy to find, let alone secure for participation:

Initially we had a good writer who was a neuroscientist which is what you need, but it was too much for her and she wasn’t able to complete. And then we brought on another person with different skills, of course everyone has different skills, and it just added to the process because there wasn’t a good match, and mapping of skills – my skills and the other person’s skills. So it added more time to the writing process. But again it’s all part and parcel of if it’s a new program you don’t know how things are going to turn out… it’s a lengthy process and it takes quite a lot of time.

The challenges associated with the course writer position were recognized by the management committee.

[In the future] I would not hire writers, only people who were subject matter experts who had a dedicated amount of time over a reasonable time frame to build a course because they’re good at it.

Course Development as an Interprofessional Approach

The course development model, as discussed, was designed to support an interprofessional team approach. This was viewed as the most optimal way to ensure an IPE focus in the courses that would in turn foster IPP. It appears that this model was only partially successful, once again due to compressed timelines. For example, time constraints made it difficult to form fully interprofessional teams. As a member of the management committee commented,
Finding resource people was a critical factor too because the whole process of trying to find the right people takes a tremendous amount of energy. In the end sometimes we got the people that we got, they could have been stronger in other aspects.

This challenge was repeated by a course team member,

...at this level it can be very difficult to find people with the expertise that’s needed. So would it have been appreciated to have other people with certain levels of expertise? – yes. On the other hand it’s difficult to get that and get someone to commit to doing the amount of work that was needed.

Another team member felt the course development process could have benefitted from greater interprofessional emphasis and representation.

We were trying, obviously, to put a strong interdisciplinary, interprofessional spin on the subject. We were doing health promotion and prevention, which is quite a broad area where many professionals could have gotten involved ...having an actual interprofessional mix of contributors would have been smarter, rather than a psychologist and a social worker trying to figure out medical, dietary, physio, those types of things. We felt a bit outside of our skills and expertise, sometimes, and we had some people we’d consult with but the consultation itself I think, given the short timeline, it just didn’t flow very well. So to have other professionals available for us to pick their brains, would have been helpful.

A corollary problem experienced by the teams was the limited opportunities to communicate within the teams and other professionals (e.g., expert advisors), again due to time constraints. There was the feeling that more principles of IPE need to be integrated earlier on with more “up-front, functional meetings” to push an IP approach throughout the whole course development process. There was also a desire to have more face-to-face interactions with the course teams. Alternative modes of communication, such as the SharePoint software, were not optimally used because they were deemed too complicated to learn in a short time.

This perspective is not to suggest that IP was not a central orienting principle of the intended model of the IPE/C Neuro-Stroke Certificate. Rather it suggests that in practice, it was simply difficult to do under the circumstances. One management committee member noted that they had developed a process in which all the different pieces of course development were to be vetted by a review panel, but that a failure to proceed interprofessionally up until that point meant that individuals components of the course did add up to an expected design.

We tried to make sure there was a review process that was going to address not just the IP piece but the clinical piece, and also the instructional design piece, and also what we thought there are some academic standards and perspectives that need to be addressed. We tried to use the review process to ensure all those pieces were captured. That whole review process was built on the assumption
that the developers knew the IP piece and knew the academic and clinical pieces because they were in this collaborative situation. As it turned out, when we hit the first review point – this was not IP. There needed to be changes to the clinical piece because it didn’t address what the clinicians wanted. This kept happening. You can’t just bring it in at the review process. Everyone came in with a different idea of what they thought IP was, or what a clinical application was. All the different perspectives, it came out that it’s not as easy as it appears or what you think it is in your head. In my mind that was the biggest obstacle was trying to seamlessly integrate all of those things.

The Ryerson-Sunnybrook-N&E GTA OSRN partnership has learned much from this experience and new models for co creating course development have been evolving. This includes the need to acknowledge that each course will need to be flexibly managed. Two management committee members speak to future course development below.

Our next three teams have some bench strength in curriculum development which is good but we’re also piloting in the three course developments, three alternative deliveries again. What I’m excited about is that we haven’t said there’s one model, because there isn’t, and that we’ve got three creative opportunities to further assess emerging models and to take the best of those and continue to reincorporate further development based on our learnings.

We used the process that was in place here at the Chang school in terms of course development. As we started to work through that, problems came up. When we looked at what the problem was, we asked is this something we need to create a resource for? We tried all sorts of different things to address each problem as it arose. At this point we now have a list of resources that we’ve developed that can be used by people who are developing the courses from day one. We’ve got a bag, a toolkit, a resource box that we’re going to be able to pull from, so that’s how this has changed.

LEARNING OUTCOMES FOR COURSE DEVELOPMENT TEAMS

Members of course development teams also represent clinicians, practitioners, academics, and researchers in the stroke-neuroscience system. It was hoped and expected that the course development process would provide learning benefits regarding IPE/IPC to team members in relation to their own work. When asked about learning outcomes, all team members felt that they benefitted from their role and participation, especially in understanding other disciplines’ roles and perspectives on stroke and recovery. For example,

[IP] hasn’t been an area of expertise for myself, but having to do all the reading and background work and read about different techniques to share, etc., it’s been invaluable for myself…knowing people’s various roles that the disciplines play a bit better, even though I do work with the other disciplines but you never really have the chance to just sit down and ask, what do you do, how do you see this? Different viewpoints from different experiences and professions has been good.
[Interprofessional] interaction and applying information to the various settings was something new that I had to do. And in terms of presenting that information and remembering you have a physiotherapist and nurse and nutritionist here, what does what you’re presenting mean in the context of those professions?....it was an interesting component for me. I work on a daily basis in clinical practice with all different professionals so I was well aware of what different professionals do, but keeping in mind that now I’m dealing with all those professionals in the context of a course, be able to provide them with material and information that potentially they could take away with them and have some application was the challenge and interest for me.

One team member felt the process did not affect their knowledge/practice in IPE/IPC “because we were already doing it”. However, the experience was “very purposeful in thinking about IPE” which challenges the assumption that having a multidisciplinary team also means it is interprofessional.

…it was a very purposeful approach toward thinking about IPE, so it wasn’t just taking it for granted then if you have several different team members that it’s necessarily IPE but it’s actually an active process. That’s probably the biggest thing for me is that it becomes a very conscious activity versus I think in the past, all of us assuming that when we talk about multidisciplinary that it’s the same thing as interprofessional.

There were few other learning outcomes mentioned, such as learning about new technology in a distance education medium and other pedagogical strategies.

DISTANCE EDUCATION, TECHNOLOGY AND IPE

From its inception, the IPE/C Neuro-Stroke Certificate had to meet the challenge of integrating IPE principles into a distance education format. By definition, distance education has the downside of physically separating students. Thus, there needed to be strategies to support student collaboration and discussion, and team-based learning. The certificate has attempted to bridge this gap by forming organizational teams of students who already work together, and developing technologies such as video conferencing for “face to face” meetings of students in a virtual classroom which was comprised of student groups connecting via video from 4-5 video-studios.. We will assess student’s perceptions of these strategies in a later section. The interviews with course development team members and the management committee shed some light on the upfront attempts to address this issue.

There were some challenges in ensuring that course materials were developed in time for translation into the distance education medium. A team member noted, for example,

*Some of the stuff that we wanted to do online to the website and stuff, I think we were naive as to how long it would have taken the design team at the Chang*
school to do, and then it wasn’t necessarily clear what we had to provide them with. So I don’t know if you want to call it surprise, I think we didn’t appreciate the timeline that they would have needed to get some of that stuff done. I can’t say there were many surprises, I think we were fooling ourselves thinking we could get it done in three or four months.

Another team member commented on the usefulness of technological support from distance education.

One individual got involved who was quite familiar with the organization for continuing education and how to set that up. I think that was quite useful because I’m kind of neophyte when it comes to organizing the material in the way that it needs to be set up for online and video conferencing type form, so having someone involved at the end to help organize that was quite useful. That’s probably the most useful component.

The technology itself was not viewed as an area of concern, as the distance education department is proficient in current technological applications. Technological application was not viewed as a barrier, rather it was ensuring that IPE and related pedagogy was appropriately developed in the first place by the teams for distance education to translate into the course. A representative from distance education offered the following:

Technology is really not an issue. We need good content, we need pedagogy – how to teach – it’s really not about how I apply it online, because we are here to take your activity…and translate it online. The most difficulties were in the knowledge and the pedagogy, putting it together first and then transferring it to online.

We will save reflections regarding the extent to which an IPE focus was accomplished in actual course delivery in the section regarding course implementation.

PART A - SECTION SUMMARY:

- Development of the certificate was challenging due to severe time constraints. Integrating IPE exacerbated time challenges.
- Populating course teams was difficult because of a lack of interprofessional expertise to draw from.
- Despite time constraints, the process was consensus-based, productive, and ultimately successful in getting to launch.
- Development of a course building model has had to be flexible and experimental, with room for innovation. A lesson is that there is no single model. Future development must attend to existing capacities and opportunities.
- The unique piece of this Certificate is its focus on development based on organizational partnerships that support IP student teams to build, over time, a critical mass of people doing IPP/C in organizations.
• Realistically, an initiative of this type needs much more upfront time to build partnerships and build the curriculum – possibly two years before actual launch
• Course developers experienced similar time constraints and felt the process at the beginning was disorganized, including problems with role clarity. This improved in a later course.
• Proceeding with course development interprofessionally was challenging due to timelines, availability of others, etc. – ultimately instructors felt IPE principles were successfully integrated into courses.
• The course writer role needs to be reconsidered. It may be more efficient to have instructors take the lead in writing and building the course.
• Course developers need more time and resources up front to build courses. Many more resources and approaches have been developed for use in new courses.

Part B – Examining Course Delivery

In this section we review the process of course implementation. This is a core piece of the process evaluation, since it provides information on how actual course delivery played out in comparison to intended delivery. Our concern here is primarily with student experiences, student ratings of course structure and process, and student feedback and recommendations, although we also add the perspectives of instructors to the discussion.

As a reminder, four courses are under consideration (in order of offering):

• CVNS 601 Neuroscience-Stroke Foundations (Self-Study)
• CVNS 600 Critical Appraisal of Evidence
• CVNS 620 Health Promotion Paradigms
• CVNS 630 Brain Structures & Cognition

For space considerations and readability, our analysis and report will attempt to summarize these four courses together with the acknowledgement that issues pertaining to individual courses will be highlighted where appropriate. This section will also address issues that pertain to the overall certificate and students’ perceptions of its mandate and overall goals. We draw on several information sources: M1. Overall Student Survey; M2. Student Course Surveys; M3. Student Interviews; and M5. Interviews with course developers/instructors.

CVNS 601 NEUROSCIENCE-STROKE FOUNDATIONS

We begin with a discussion of CVNS 601 (also informally referred to as the “Self Study” course). This course was evaluated via several questions appearing in the Overall
Student Survey, at post-test. Students were expected to take this online course Self-Study course in preparation for the certificate upon entry into the program. This was initially designed as a stand-alone, self-directed course. In the second semester, the course was translated into an optional online learning resource embedded in the regular courses. 35 students completed CVNS 601 (in the course or embedded form). Our overall student survey asked students to provide two ratings regarding the CVNS 601, as shown in Table 7. 13 students responded (8 took it in the Fall, 3 in the Winter, and 1 in the Spring).

Table 7 – Scale feedback on the CVNS 601 Neuroscience-Stroke Foundations

<table>
<thead>
<tr>
<th>How would you describe the clarity around the purpose of the Foundations Self-Study course?</th>
<th>Unclear</th>
<th>Somewhat clear</th>
<th>Very clear</th>
<th>Rating Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How would you describe the content of the Foundations Self-Study course?</th>
<th>much too basic</th>
<th>not challenging</th>
<th>appropriate</th>
<th>challenging</th>
<th>much too advanced</th>
<th>Rating Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>3.23</td>
</tr>
</tbody>
</table>

Most students rated the question regarding clarity at the midpoint. There suggests there is room for improvement in this area. One student explained a source of confusion:

*The Foundations course would have been more helpful if the module that was relevant to specific courses was clearly indicated. For example, it would have been nice to know that we complete module 1 of the self study for the evidence based course, and then module 2 for the cognition course and then module 3 for the health promotion course. I did the entire self study during the fall term and didn’t feel like I needed to complete at all once.*

The second rating was regarding the appropriateness of the content. The desired trend for this item is more frequent ratings at the midpoint – we do not wish to see ratings indicating that it is too basic or too advanced. Ten of the thirteen students rated it as “appropriate” at the midpoint, while three rated it as challenging. This is positive result regarding the appropriateness of the content of CVNS 601.

*I think the course was well put together, very informative and clear. I learned a lot from it and have been able to adapt my way of looking at my patients admitted with a chronic disease, especially diabetes and stroke.*
INTERPROFESSIONAL EDUCATION IN THE COURSES

The extent to which the principles of interprofessional education and practice were integrated into course delivery, and the certificate as a whole, was assessed in the evaluation. Two general evaluation questions are relevant:

B.1. To what extent have IPE principles and best practices been translated into the courses?
B.2. What were the opportunities for group focused work, discussion and dialogue? How did students work together in practice as part of course curriculum?

We begin with the perspective of the interviewed course developers and their reflections on the extent to which IPE and group collaboration was successfully integrated into their courses. One team member felt the IPE focus was successful in terms of the content reflecting multiple perspectives. This was supported by “Journal Club Presentations” that provided opportunities for case-based dialogue from an interprofessional perspective. A second team member (same course) cautioned that it was challenging to find creative ways to integrate IPE principles and that some student teams were not multidisciplinary, which made integration of interprofessional perspectives difficult. This was reflected in student presentations – diverse teams tended to have a greater IP focus in their presentations.

A third team member also felt their course was successful in engaging students in a IP environment.

[The course] it went off better than we thought it was going to. We were worried, just because we didn’t know what to expect with it being our first go around. Teaching by video conferencing was something that was quite new and I wasn’t sure if we were going to be able to have the dynamics within the class, the bonding that would naturally occur within a physical classroom setting. But it looked like the students, despite the remoteness, connected quite well.

However, this respondent also suggested that the interprofessional mix of students could have been improved.

The IP mix wasn’t as diverse as I would have liked it. We had quite a few nurses, and no one who represented nutrition, so I think that was a bit of a hole. But I don’t know what you could necessarily do to enhance that other than advertise more broadly. (is there a quote from course that had more IP diversity which could also be added here?)

The perspectives of students regarding the incorporation of IPE principles and the opportunity for group work into the courses were mixed, with some variation within courses and considerable variation between courses. Here is a selection of comments from students who felt the positively about group work and the IPE focus in the courses:
We read reports written by neuropsychologists and the doctors and it helped to fill in some knowledge there and to understand that physiotherapy is doing what, what pharmacy can contribute to it, and it also helped to educate others on what we can do as well. – CVNS 600/CVNS 630

What’s been great is that through various group activities in the course it’s been good practicing IP ideas with people with whom you don’t actually work. So it’s nice to have IP contact in an academic milieu away from one’s work setting…[Specific to CVNS 620] One of the instructors on the very first OTN, she made us learn each other’s names. There was something that changed everything once she did that which was kind of interesting. One of the activities we did was an OTN debate, and we debated people from other facilities and that forced us to contact people in an informal way. The debates worked pretty well, and I think fostered a lot of support and interaction. And that happened in one of the very first OTNs – I thought that was a very good idea.

I really enjoyed the time having [the instructors] on the OTN. I think they are really good facilitators. I really enjoyed working in our group, we all worked out really well. – CVNS 620

Additionally, positive comments for the IPE-focus of the courses were also provided by several students (5 of 15 who elected to provide written feedback) when asked what the main strengths of the certificate program are.

Alongside this positive feedback, other students (or sometimes the same students talking about different courses) offered some critical feedback about IPE focus (or lack thereof) in their courses. This feedback was largely in reference to CVNS 630 and CVNS 600 courses. For example,

I think that professional collaboration and education requires more than just putting people in a room. You have to really foster that collaboration and I’m not really sure if the courses really did that. – CVNS 600/CVNS 630

There were some errors that were made in the modules and my suggestion would be for them not to just consult with the textbook but to consult with someone who has knowledge in that field specifically just to go over that individual module. For example the speech [module], if they could consult a speech pathologist who could go over that module just to check for accuracy, because you wouldn’t expect a neuropsychologist to be an expert in that area. – CVNS 630

The thing that we found was that all of the professors were from a nursing background, that was the one thing about the [Critical Appraisal course], that it is very nursing focused. – CVNS 600

I don’t really see that it was the focus was IP education, I think the focus was neurological, the brain structures and cognition. We didn’t really talk a lot about practice, we didn’t really talk a lot about the different professions and how they would deal with the information presented and how they would use it differently. The only opportunity we had to see that was in the group presentations, so that was only about 80 minutes. Not a lot of the readings were based on IP, I think the
introductory course covered all of that, but the actual brain structures and cognition did not cover a lot of the IP stuff. – CVNS 630

I missed the collaboration with colleagues, I found it difficult over the OTN, like really getting to know people and getting to discuss amongst ourselves. It was a good opportunity to have open forum learning, but most of it was didactic – CVNS 600

The student comments are consistent with the challenges experienced by the course development teams in developing courses within a paradigm – IPP/C – that has yet to develop comprehensive resources, articles, textbooks, and so on. Most of the positive comments appear to be directed at CVNS 620, which is encouraging in the sense that this was the last of the four courses delivered as part of the initiative. This suggests to some degree that the course development process is improving as the certificate moves forward.

Our examination of IPE integration into the courses is one part of a larger question – the extent to which students were satisfied with the course, their perceptions of the courses’ strengths and weaknesses, and their feedback and recommendations on how to improve the certificate. It is to these issues that we now turn.

STUDENT SATISFACTION AND FEEDBACK ON THE COURSES

Students were asked to provide feedback on the courses within the two online surveys and in the student interviews. The following set of evaluation questions is relevant here:

B.3. Are students satisfied with the way the course was delivered? What are students’ perceptions of strengths and weaknesses of the course?
B.4. What barriers did students confront in completing their courses? What technological and practical barriers did they experience?
B.5. What feedback do students have to improve the certificate course?

The student course surveys contained the National Survey of Student Engagement (NSSE) that has been adapted for use in evaluating courses offered via distance modalities (Robinson, 2005). The NSSE is a generic measure that contains (predominantly) 4-point frequency subscales to evaluate different aspects of online courses. The subscales are:

1. Online interaction with instructors
2. Online interaction with other students
3. Online learning activities
   (Response categories are never= 1 , sometimes=2, often=3, and very often=4).
4. Mental activities
5. **Online learning experience**  
(Response categories are very little= 1, sometimes=2, often=3, and very often=4).

6. **Tests and evaluations**  
(Single item with a 7-point scale ranging from never=1, 4=to some extent, 7=very much)

Table 4 provides the scale means for each of the subscales for each course.

<table>
<thead>
<tr>
<th>NSSE Subscale</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2008 600 Critical Appraisal (n=9)</td>
</tr>
<tr>
<td>Online interaction with instructors</td>
<td>2.00</td>
</tr>
<tr>
<td>Online interaction with other students</td>
<td>1.74</td>
</tr>
<tr>
<td>Online learning activities</td>
<td>2.41</td>
</tr>
<tr>
<td>Mental activities</td>
<td>2.89</td>
</tr>
<tr>
<td>Online learning experience</td>
<td>2.36</td>
</tr>
<tr>
<td>Tests and evaluations</td>
<td>4.75</td>
</tr>
</tbody>
</table>

We will draw on the NSSE results of the three courses and complement the findings with qualitative feedback from students taken from the online surveys and interviews.

**INSTRUCTOR COMMUNICATION, FACILITATION, AND FEEDBACK**

The first NSSE subscale ("Online Interaction with Students") assesses the extent to which students interact with instructors in terms of obtaining feedback, discussing ideas about course content, discussing grades, etc. Results in Table 4 are based on 4 items. One item was removed because it lacked relevance ("How often have you discussed career plans with a faculty member") and was rated as "never" by all but one student across the 3 courses. Ratings are somewhat low for the 600 and 630 courses. 620 is higher but still slightly below the scale midpoint of 2.5.

A perusal of the interview and qualitative survey data provides some explanation for these findings. Many students expressed a degree of dissatisfaction over the amount and timeliness of communication in the courses, primarily 630. For example,
[The instructors] were hard to get a hold of via email, when they did communicate with us via email it was very short, they didn’t provide a lot of feedback when they marked our papers, and they didn’t mark any of the weekly assignments, they were going to wait until the end of the course which in my opinion wasn’t very helpful as we could be repeating the same mistakes and not be aware of it. – CVNS 630

[The instructors] There was a lot of miscommunication between the two instructors, which caused confusion. At times they contradicted each other regarding assignments and instructions, and it led to a lot of frustration. – CVNS 630

Grading of our assignments was incomplete at best, and the only feedback provided was an email containing a letter grade and generic, non-descript comments. – CVNS 630

I put in a lot of work into these assignments. I expect an equal amount of work in marking and making comments. I am doing this course to learn and expect fair, constructive feedback – CVNS 630

... material was not posted by specified dates or was posted just prior to OTN therefore not all student’s had the outlines/info...No responses or comments from instructors on discussion board – CVNS 630

The frustrations experienced by students in relation to CVNS 600 appeared to more related to a perceived lack of organization at the beginning of the course. As CVNS 600 was the first course of the certificate, it is not surprising that there were additional organizational challenges. Issues around communication need to be understood in the context of teaching and learning within a new and unfamiliar technological environment of online distance education. As a young certificate, there is room for growth and improvement in instructor-student communication within this new medium

Despite concerns with instructor communication already cited, CVNS 630 was considered very well organized by a number of the students and instructors reported receiving positive feedback regarding course content and organization. Some student feedback:

Organization of the modules and content was excellent. Really good additional material such as links to websites and short videos. – CVNS 630

This [course] one appeared more organized right from the beginning - with outline clear right from the first class and work load was more manageable when also working fulltime, kids, etc. – CVNS 630

The module content was presented in a very clear and organized manner. – CVNS 630

Module notes were excellent summary of material from text etc. and required readings added additional input to readings. – CVNS 630
I did like the modules, the way that they were structured was excellent. Because everyone has their own schedules so it’s nice that you can do it whenever you have the time. – CVNS 630

The written materials, the notes they’ve given us and the references have been outstanding. Very rich, very detailed, I so appreciated the access to that. – CVNS 630

High satisfaction with instructor communication in the last of the four courses offered (CVNS 620) was displayed by students. For example,

I’ve noticed in the course I’m doing now, the Health Promotions course, [the instructors] are more active online, contributing to the discussion and I think that’s how you learn. – CVNS 620

The instructors [for Health Promotion] have been sensitive, and facilitative, and so it’s made for a much more lively discussion at OTN. The other thing that has happened is that our discussion board posts have become much more lively and interactive and that’s been so much fun. And I think that’s been facilitated by the fact that the instructors have entered into the discussion, have asked some questions for more information or have pointed out little issues, and have just helped to keep the discussion moving forward very well. – CVNS 620

The instructors for the Health Prevention and Promotion module really got it right re: both the OTN sessions and the online discussions. It may be an idea to look at what they did as a guide to other instructors in the future: They were very supportive and encouraging. Specifically they participated in the online discussions by adding to student’s ideas, asking for expansion, mentioning references etc. As a result it didn’t feel as though one were simply posting into cyberspace – CVNS 620

This again suggests that ongoing development of the certificate has led to some improvements over time with the latest course offering.

FEEDBACK REGARDING THE ONLINE AND TECHNOLOGICAL LEARNING ENVIRONMENT

The next two NSSE subscales examine “Online Interactions with Other Students” and “Online Learning Activities”. The former is a simple 3-item scale that asks if students have “worked with other students on projects”, “tutored or taught other students”, or had “regular communication with other students on matters outside the course”. The average ratings were positive and above the midpoint for 620 and 630, and below the midpoint for 600. The “Online Learning Activities” subscale asks students to rate their frequency of engaging in various online activities, such as online discussions, presentations, and online researching. These ratings were again high and positive for 620 and 630 while 600 was just under the midpoint. The “online researching” items were particularly high for all three courses. Please see Table 4 for the item means.
These findings, generally positive, can be given more context by student feedback. There were two primary modes of student engagement and discussion via distance education technology – the OTN video conferencing and the online discussion forums. Student feedback generally reveals that students enjoyed and found great value in the OTN sessions. Although there were a few detractors, the OTN sessions were one of the most common “strengths” identified in relation to courses:

I actually really liked the OTN where we actually have kind of a face-to-face [with other sites] but also in an institution face-to-face discussion with each other. – CVNS 620

[A strength was the] use of modern technology in teaching via the OTN. – overall comment

I liked the videoconference approach as it made attending easier. I also liked the blackboard and self study. – overall comment

OTN sessions were amazing - they were engaging, interactive and it did feel like they were ‘testing’ us on the online modules - both instructors have been present at all OTN sessions. – CVNS 620

The OTN’s were very helpful but could have been better organized. – CVNS 600

I enjoyed the OTN sessions, and would like to see more sessions included in each of the courses to develop more rapport with my classmates and instructors. – CVNS 600

[A strength was the] combination of an on-line course with opportunity to discuss and share ideas through the OTN – CVNS 600

The video conferencing was very valuable particularly when the class started doing presentations. – CVNS 600

I enjoyed the OTN discussions and found them informative and thought-provoking. – CVNS 600

[A strength was the] presentations delivered by the other sites. The opportunity to meet live via videoconferencing. – CVNS 630

In contrast, many students experienced more difficulties with the online discussion forums. Here are some example quotes

[Re: online discussion forum] it takes a lot longer to read something than to talk about it, and it’s not as dynamic because there are time delays and whatnot. I think it would be better to have discussions via the OTN sessions; even if we met more often, like every two weeks as opposed to once a month, and still do the same assignments that are required, but instead of writing about it, maybe talking about it online with everyone – I just think that it would be more time efficient if it was done in person like the OTN as opposed to online. – CVNS 600/CVNS 630
I've never done discussion boards before. The discussion board is definitely something very new to me – but I wish that there was a lot more support before we even entered the course. – CVNS 620

On line discussion board questions - value could be added if the instructors gave their summing up of the case studies at some later point in the process. – CVNS 630

I REALLY do not like the impersonal reality of on-line learning. I do not get involved in on-line chat rooms. – CVNS 600

It was difficult to generate original online postings for the discussions given the types of questions given to discuss and the nature of the course itself. – CVNS 600

Blackboard discussions were very time intensive initially. – CVNS 600

I found the new technology very challenging. I did not participate much in the online bulletin board discussion, as I am very self conscious about my writing skills – CVNS 600

However, there were also a few other students who felt the online discussion forum was valuable. Two students, for example, listed “web based/internet forum” as a main strength of the forum. To reprise an earlier quote:

The other thing that has happened is that our discussion board posts have become much more lively and interactive and that’s been so much fun. And I think that’s been facilitated by the fact that the instructors have entered into the discussion, have asked some questions for more information or have pointed out little issues, and have just helped to keep the discussion moving forward very well. – CVNS 620

As the above quote illustrates, the online discussions appear to be deemed most useful when there is active facilitation on the discussion board by the instructors, and links heavily to our previous discussion regarding instructor engagement and communication:

I felt sometimes that some of the posts that we were doing were just being posted for the sake of posting going into the ether and didn’t matter. I did sometimes see errors in what fellow students did and think, that’s not exactly right, why doesn’t the instructor pick up on this and do something? – CVNS 600/CVNS 630

When [the instructors] are online and facilitating the discussions then we learn more from each other. – all courses

GENERAL FEEDBACK ON THE ONLINE DISTANCE EDUCATION FORMAT

Students had additional and general feedback regarding the online distance education model of course delivery. What we found was a mix of perspectives and reactions, with the majority of students enjoying and appreciating the online format (acknowledging
minor caveats) and minority disliking it. Students had the following comments on the student course and overall surveys.

[A strength of the certificate was that it] offered an opportunity to learn online in the work environment. – overall comment

[A strength of the certificate was] on-line independent study – overall comment

I liked the videoconference approach as it made attending easier. I also liked the blackboard and self study. – overall comment

Use of modern technology in teaching via the OTN. Self study provided a lot of guidance. – overall comment

Work at your own pace with a little structure. Do other online course that are very rigid and makes it hard to do – overall comment

The combination of an on-line course with opportunity to discuss and share ideas through the OTN – CVNS 600

It was great being able to do the bulk of the work in my own time. The video conferencing was very valuable particularly when the class started doing presentations – CVNS 600

Loved being able to access materials through e-reserve – CVNS 600

Content of the course, being accessible online – CVNS 630

It’s so convenient, because it’s DE and you do it at your own pace, and yet you have to follow the certain week’s guidelines so that everybody needs to be responsible with their own education. You have a certain amount of commitment yet you do it at your own pace, I think that was very convenient piece for DE. – CVNS 620

The strengths are that it’s quite flexible, you work at your own pace, it’s convenient. Certainly working full time and have kids at home. – all courses

Clearly, convenience and flexibility are important considerations for working professionals enrolled in higher education courses. In contrast, however, some students were less comfortable getting used to and working within the distance education format. Some students do not enter the program with the appropriate technological skills and knowledge to navigate the system. This is a fairly common problem for most online learning initiatives. It would be beneficial if students had more opportunities, in advance of enrollment, to have a more thorough orientation to the online environment. Here is some student feedback

I've never done online OTN before. I've never done discussion boards before. The discussion board is definitely something very new to me – but I wish that there was
a lot more support before we even entered the course….it took me a while to get
used to it, but now that I have the hang of it I actually like it. – CVNS 620

Preparation course should be more informative about online studying. It is a
great idea but for students who have not done continued education online
before, it is a lot of work to be comfortable with posting post, or checking course
info or assignments. I felt unprepared when I was accepted. – overall comment

Limited help available because it was an online course and communication with
professors only available online. – overall comment

It would be nice to have some orientation about distance learning (i.e., a lesson
or instruction on how to use some of the databases- for someone like me who
doesn’t do more than basic stuff. – overall comment

The on-line learning is a challenge, and I did not find user friendly. I had not taken
a on-line course. – overall comment

A pre-course about on-line learning. It was far to stressful learning the material
and the system. I did not expect the on-line component to be so stress provoking.
– overall comment.

This was my first online learning course and my first university course in 25yrs,
hence I found the new technology very challenging. – CVNS 600

In response to students’ challenges with online learning, the CVNS 601 course is now
available to all students as an online resource. This resource now includes a self study
of how to use the on-line learning system and a review of university skills required for
success (i.e. review of essay writing skills, APA referencing and on-line literature search
skills).

COURSE WORKLOADS

For a subset of students, workload was viewed as challenging, particularly in relation to
600. In contrast, work load was not mentioned as an issue in regards to 620 and 630.

The workload was very demanding and bottom loaded in the last 4-5 modules.

Too many modules, one per week did not give you time to assimilate the
information or process it.

I have been scared off of attempting any of the other courses, based on the
amount of work involved.

Amount of information being presented within a limited time frame

Emphasize the amount of time that each course will take. Some of my colleagues
were overwhelmed by the course load.
I was very surprised at the amount of work necessary to be completed outside of class time. I think they recommended 20 hours a week, plus class time, commuting time, and for me also having a full time job. I think the information offered in this program is very valuable, but the time commitment for me was not manageable.

Workload issues will be reviewed by the partnership to address student concerns. However it should also be pointed out that this certificate represents a comprehensive alternative to typical clinical education opportunities available to practitioners, such as short conferences or in-service sessions. This initiative represents an attempt to comprehensively translate research knowledge, evidence and practice in a complex arena of health care. As such, work load for these advanced courses will always require a time commitment that goes beyond conventional education opportunities currently available in the system.

**ONLINE LEARNING AND SKILL DEVELOPMENT**

Two scales from the NSSE, “Mental Activities” and “Online Learning Experience”, help to assess the extent to which the courses were beneficial to students in a range of learning and skill development domains. A third single item asks if students were challenged by tests, examinations, and other evaluations.

The “Mental Activities” scale asks students to rate the extent to which the courses emphasized memorization, analysis, synthesis, making judgments, and application. Thus, it is hoped that the courses are high in all areas except memorization, which reflects simple rote learning (as opposed to complex, higher learning). Table 4 confirms that the mean ratings (averaged across all domains) on the Mental Activities subscale were above the midpoint and considered high. Table 5, below, breaks the frequency responses down across all three courses, by domain area. As can be seen, memorization is much lower than the other more complex learning domains, which are much higher, all clustering on the positive end of the scale. Differences between courses were negligible with the exception of the “Application” domain, which was spread more evenly across the scale for 630. Overall, these results suggest that important pedagogical goals were achieved by the courses.

<table>
<thead>
<tr>
<th>How much as your online work emphasized...</th>
<th>Very Little</th>
<th>Some</th>
<th>Quite a bit</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMORIZING facts, ideas, or methods from your courses and readings</td>
<td>13 (59%)</td>
<td>4 (18%)</td>
<td>4 (18%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>ANALYZING the basic elements of an idea, experience, or theory.</td>
<td>0</td>
<td>2 (9%)</td>
<td>11 (50%)</td>
<td>9 (41%)</td>
</tr>
<tr>
<td>SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships</td>
<td>1 (5%)</td>
<td>2 (9%)</td>
<td>9 (41%)</td>
<td>10 (45%)</td>
</tr>
<tr>
<td></td>
<td>2 (9%)</td>
<td>3 (14%)</td>
<td>9 (41%)</td>
<td>8 (36%)</td>
</tr>
</tbody>
</table>
The “Online Learning Experience” subscale of the NSSE asks students to rate the extent to which they felt the course helped them in a range of learning skills, such as writing, speaking, thinking critically, analyzing quantitative problems, working in groups, working independently, and solving complex real-world problems. In this analysis, we do see a fair amount of differences between courses. Response frequencies for each course are provided in Tables 6a through 6c.

Table 6a – 600 Critical Appraisal: Frequencies for the Online Learning Subscale (NSSE)

<table>
<thead>
<tr>
<th>How much has your online learning experience helped you to...</th>
<th>Very Little</th>
<th>Somewhat</th>
<th>Quite a bit</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire job or work-related knowledge and skills</td>
<td>33.3% (3)</td>
<td>33.3% (3)</td>
<td>11.1% (1)</td>
<td>22.2% (2)</td>
</tr>
<tr>
<td>Write clearly and effectively</td>
<td>33.3% (3)</td>
<td>33.3% (3)</td>
<td>22.2% (2)</td>
<td>11.1% (1)</td>
</tr>
<tr>
<td>Speak clearly and effectively</td>
<td>33.3% (3)</td>
<td>44.4% (4)</td>
<td>11.1% (1)</td>
<td>11.1% (1)</td>
</tr>
<tr>
<td>Think critically and analytically</td>
<td>11.1% (1)</td>
<td>33.3% (3)</td>
<td>22.2% (2)</td>
<td>33.3% (3)</td>
</tr>
<tr>
<td>Analyze quantitative problems</td>
<td>11.1% (1)</td>
<td>33.3% (3)</td>
<td>22.2% (2)</td>
<td>33.3% (3)</td>
</tr>
<tr>
<td>Use computing and information technology</td>
<td>22.2% (2)</td>
<td>11.1% (1)</td>
<td>44.4% (4)</td>
<td>22.2% (2)</td>
</tr>
<tr>
<td>Work effectively with others</td>
<td>33.3% (3)</td>
<td>22.2% (2)</td>
<td>33.3% (3)</td>
<td>11.1% (1)</td>
</tr>
<tr>
<td>Learn effectively on your own</td>
<td>11.1% (1)</td>
<td>55.6% (5)</td>
<td>11.1% (1)</td>
<td>22.2% (2)</td>
</tr>
<tr>
<td>Solve complex real-world problems</td>
<td>44.4% (4)</td>
<td>22.2% (2)</td>
<td>22.2% (2)</td>
<td>11.1% (1)</td>
</tr>
</tbody>
</table>

Scale mean = 2.36/4.00

The Critical Appraisal course (600), showed lower ratings across the items, which is consistent with the lower overall mean of 2.36/4.00 (Table 6a). Some items are evenly split between the midpoint, such as “thinking critically and analytically” and “analyzing quantitative problems”. There is a bit more strength associated with the “use of computing and information technology”.

Table 6b – 630 Brain and Cognition: Frequencies for the Online Learning Subscale (NSSE)

<table>
<thead>
<tr>
<th>How much has your online learning experience helped you to...</th>
<th>Very Little</th>
<th>Somewhat</th>
<th>Quite a bit</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire job or work-related knowledge and skills</td>
<td>0</td>
<td>33.3% (2)</td>
<td>16.7% (1)</td>
<td>33.3% (2)</td>
</tr>
<tr>
<td>Write clearly and effectively</td>
<td>16.7% (1)</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
<td>16.7% (1)</td>
</tr>
<tr>
<td>Speak clearly and effectively</td>
<td>16.7% (1)</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
<td>16.7% (1)</td>
</tr>
<tr>
<td>Think critically and analytically</td>
<td>0</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
</tr>
<tr>
<td>Analyze quantitative problems</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
<td>33.3% (2)</td>
<td>0</td>
</tr>
</tbody>
</table>
The 630 course falls somewhere between the other on this measure. Overall, the scale mean is above the midpoint, which is positive. Three items – use of computing and information technology, working effectively with others, and learning effectively on your own – were at the high end of the scale. The remaining items were more evenly distributed across the scale.

Table 6c – 620 Health Promotion: Response for the Online Learning Subscale (NSSE)

<table>
<thead>
<tr>
<th>How much has your online learning experience helped you to…</th>
<th>Very Little</th>
<th>Somewhat</th>
<th>Quite a bit</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire job or work-related knowledge and skills</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100% (7)</td>
</tr>
<tr>
<td>Write clearly and effectively</td>
<td>0</td>
<td>28.6% (2)</td>
<td>28.6% (2)</td>
<td>42.9% (3)</td>
</tr>
<tr>
<td>Speak clearly and effectively</td>
<td>0</td>
<td>14.3% (1)</td>
<td>42.9% (3)</td>
<td>42.9% (3)</td>
</tr>
<tr>
<td>Think critically and analytically</td>
<td>0</td>
<td>0</td>
<td>14.3% (1)</td>
<td>85.7% (6)</td>
</tr>
<tr>
<td>Analyze quantitative problems</td>
<td>0</td>
<td>0</td>
<td>28.6% (2)</td>
<td>71.4% (5)</td>
</tr>
<tr>
<td>Use computing and information technology</td>
<td>0</td>
<td>14.3% (1)</td>
<td>42.9% (3)</td>
<td>42.9% (3)</td>
</tr>
<tr>
<td>Work effectively with others</td>
<td>0</td>
<td>14.3% (1)</td>
<td>28.6% (2)</td>
<td>57.1% (4)</td>
</tr>
<tr>
<td>Learn effectively on your own</td>
<td>0</td>
<td>0</td>
<td>28.6% (2)</td>
<td>71.4% (5)</td>
</tr>
<tr>
<td>Solve complex real-world problems</td>
<td>0</td>
<td>0</td>
<td>28.6% (2)</td>
<td>57.1% (4)</td>
</tr>
</tbody>
</table>

**Scale mean = 3.52/4.00**

The online learning experience in relation to 620 is very strong and it appears that students benefitted greatly from the course in all the domains. The most frequent response for all items was the high end of the scale, “Very Much”.

A single item from the NSSE assesses the extent to which students are challenged by tests and evaluations. On a 7 point scale, all the courses scored above the midpoint (4), as follows:

600: 4.75/7  
630: 5.17/7  
620: 5.50/7

Thus it appears that the students felt they were at least moderately challenged by the course evaluations.

**FEEDBACK ABOUT PROGRAM ADMINISTRATION**
In addition to the instructors, students had to engage with the Chang School at Ryerson in an administrative capacity – enrolling, setting of courses, receiving resources and guidance, troubleshooting, etc. There was one negative comment regarding program administration, and while it is lone opinion, it is worth including in this report:

I found the program extremely frustrating from an administration perspective. Firstly, we were told that we would be able to complete the foundations course prior to the evidence course so that we would not need to complete two at once. For a mother of young children who is working full time this promise was important. The program did not live up to this promise – overall comment

Problems with administration were limited to this one comment which appears related to the challenges the program experienced early on with tight timelines. In contrast, a number of students spontaneously expressed highly positive feedback regarding their interactions with program administration:

I just appreciate so much Ryerson’s willingness to respond to student concerns, and the continual updates that they look for and the research that they’re doing into our reactions, I think it’s making a big difference. And as I sell the program, because I’m trying to tell this to some of my colleagues over here, this is one of the selling points: they’re very responsive, things don’t work, you speak up and it changes. I also find the Ryerson people quite accessible. – overall comment

I really appreciate Ryerson’s responsiveness to student feedback. – overall comment

I am extremely impressed with those in administrative positions at Ryerson. They are prompt in responses, very good at communicating information, and very open and responsive to feedback. I am very pleased with this group. – overall comment

I’m really impressed with how Ryerson responds to comments. And the admin, excellent excellent excellent! – overall comment

Ryerson seems to be incredibly responsive to student feedback. – overall comment

PART B - SECTION SUMMARY:
- Student perceptions of IPE in the courses differed. Some were positive, others were less so. Courses appeared to differ, with CVNS 620 (the most recent course to be offered) most likely to be seen as promoting IPE principles. In contrast CVNS 600 and CVNS 630 were less likely to be seen as promoting IPE. This is suggestive of improvements to the courses over time as the certificate continued to develop.
- Many students had concerns with instructor communication around
grades and feedback, and other inquiries. This was primarily in reference to CVNS 630, and to some degree CVNS 600. This was not seen as an issue for CVNS 620. Again, this could be explained in part by improvements to the course development process, since CVNS 620 was the most recent of the four courses to be offered.

- Despite issues with communication, the CVNS 630 course was seen as very well organized.
- Most students were complimentary of the online format and especially appreciated the OTN sessions. The online discussion forums were less popular. However, instructor engagement and participation in the discussion forums appeared to be related to student satisfaction with the technology.
- A smaller subset of students had general difficulties with distance education technology.
- The flexibility and convenience of the DE format was very important to many of the students.
- Overall, students scored in mid- to high ranges on the NSSE, indicating many important pedagogical goals were met for all the courses. CVNS 620 in particular was associated with a very high online learning experience.
- Ryerson received extremely positive feedback regarding their administration and openness to respond to student concerns.

**Student Outcomes of the IPE/C Neuro-Stroke Certificate**

The long-term vision of the IPE/C Neuro-Stroke Certificate is to have a positive and systemic impact on the quality of stroke care in Ontario and, in time, beyond. That long-term vision must be systematically understood and “walked back down” to the concrete activities of the actual program. This demonstrates the analytic benefit of building a program logic model, outlined at the beginning of this report, because it allows the user to assess the critical theoretical assumptions underlying the program. Was the certificate developed as intended? Were the courses implemented as planned? Are the students linked to organizations in teams? Are the principles of IPE and IPP/C threaded throughout all of development and implementation? Are students satisfied with the courses? What are the barriers?

We examined these core assumptions in the process evaluation. It was found that some students experienced some barriers and/or were dissatisfied with certain aspects of the courses. On the other hand, our process data demonstrated that there were also many strengths identified by students pertaining to the courses and the overall certificate. On the whole, it appears that the assumptions were sufficiently met.
Another aspect of logic model assumption “testing” rests with linking the certificate design and implementation to short-, intermediate and long-term outcomes. As is commonly the case with many social or educational interventions, programs have a lot more direct and concentrated control over short-term outcomes. Intermediate and long-term outcomes, on the other hand, are bit harder to achieve since other intervening factors are implicated and/or the evaluation time frame is too short to confidently expect to see longer-term changes.

All these issues are pertinent here. This evaluation is occurring within the same academic year of the program. However, the “program theory” suggests that students will need time to practice what they have learned in their workplaces and therefore it might be too soon to measure practice-based outcomes (i.e., intermediate outcomes). “Dosage” is another important issue. Many students took two or less courses, whereas the program theory assumes that the cumulative effect of all four courses is necessary to result in comprehensive change. Finally, other factors external to basic course delivery are at play. Organizational culture must be supportive of IPP/C for students to pursue it in practice, which means that many more providers need the benefit of the courses for there to be (as one committee member put it) a “critical mass” – along with institutional support. The in-roads made by the certificate with organizational partners suggests that this aspect of program theory will continue to be strengthened -- more students will enroll, recent students will return, and organizations will get behind the principles of IPP. This initiative represents the development of a sustainable educational resource that is now available to promote and support the building of human capacity required to promote the changes needed for implementing the new system of care delivery.

But what can we expect now at this young point of the program? A critical aspect of the program theory is that knowledge and skill based outcomes specific to the courses must be attained. In the logic model, these are the first meaningful outcomes to be expected from course participation. These must be assessed for there to be the corresponding expectation that intermediate and long-term outcomes can be achieved, other assumptions notwithstanding.

Before we move into the assessment of short-term outcomes and, later, intermediate practice-based outcomes, we think it will be helpful to provide some context of student need.

**DO THE PROGRAM OUTCOMES CORRESPOND TO STUDENT NEEDS?**

We asked the students to discuss their motivations for entering the course to see how commensurate their needs and goals were with the outcomes expected by the course. The comments generally fell into three categories: a desire to increase knowledge and expertise, to improve critical appraisal of evidence, and to improve interprofessional
practice. No comments fell outside these three broad areas and many students mentioned all three. Here are some representative comments:

To increase my knowledge of the neuroscience of stroke, to enhance my effectiveness in delivering information to my colleagues, and to impact stroke care with in my organization. I feel that stroke care is at somewhat of a plateau in our organization, and I would like to more effectively speak the language to help engage our team forward.

To gain a more in-depth knowledge of neuroscience / stroke. To increase my ability to effectively promote best practice in stroke rehabilitation. To increase my ability to nurture interprofessional team development.

I wished to further my knowledge of advanced stroke care and interprofessional education. I am also very interested in enhancing our stroke programming and care on our ISU (Integrated Stroke Unit) and growing with our team (as many members of my team have also enrolled in the certificate course).

To gain further knowledge regarding stroke/neuroscience; evidence based research and development of interprofessional team.

To improve my critical thinking skills and to better understand how to interpret research with regards to my practice. I would also like to be able to appraise research to determine its validity in a practice setting.

Being able to apply evidence-based practices and research across the continuum of care. Being able to clinically appraise studies and apply findings to practice

To enhance my own knowledge, understanding and skills in this area and to explore the opportunity of learning in an interprofessional program. Also to create awareness of my own area of expertise within an interprofessional group.

These comments aptly illustrate a very strong correspondence between the short- and intermediate outcomes of the program – those outcomes that are focused on student knowledge, skill, and practice. We will now turn to the assessment of the certificate’s short-term outcomes.

**Part C – Assessing Short-Term Course Outcomes of Students**

The short-term outcomes, as mentioned, focus on the knowledge and skill areas that provide the focus of the courses. A single and fairly straightforward evaluation question is important here:

**C.1 Are students achieving desired gains in knowledge and skills, as represented by the outcomes?**
In the logic model (see Figure 1) the full complement of specific knowledge domains are not listed, as there are many. Rather, a few examples are provided. Our strategy to assess course-based outcomes was to develop a self-assessment survey (delivered pre-post, as part of M.2. Student Course Surveys) composed of 5-point scale items that correspond to the key knowledge goals of the respective course. These domains were drawn from the course outlines. Students are asked to rate their level of agreement with statements regarding their abilities and understanding of course concepts. Grades and other evaluations were not accessed to this end due to confidentiality and other administrative issues. However, it is reasonable to expect that a self-assessment by student professionals, in an independent and confidential external evaluation, would allow for honest, critical responses.

We provide the results according to each of the three courses in the next few sections. We should note that sample sizes are too small to conduct stable statistical analysis. However, we can comment on dominant patterns by examining the mean scores descriptively. As we shall see, the results achieve a high level of consistency (upward knowledge gains for all items) and this consistency provides a sense of robustness and meaningfulness.

600 CRITICAL APPRAISAL - KNOWLEDGE & SKILL OUTCOMES

The Critical Appraisal course was designed to develop students’ critical skills in assessing, integrating, and applying current research evidence and best practice knowledge. This is a core knowledge translation course that helps bridge the gap between scientific evidence and best practices within practical and applied settings. Table 8a provides the pre- and post-course mean ratings for a series of knowledge/skill domains.

Table 8a – Pre- and post-course knowledge & skill outcomes for 600 Critical Appraisal

<table>
<thead>
<tr>
<th>Thinking about your current level of knowledge in the area of stroke and neuroscience please rate your level of agreement with the following statements:</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 point scale from Strongly Disagree (1) to Strongly Agree (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can effectively engage in evidence-based practice in a clinical setting.</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>I understand strategies to effectively disseminate new knowledge in stroke and neuroscience, and the barriers that prevent effective dissemination.</td>
<td>3.7</td>
<td>4.0</td>
</tr>
<tr>
<td>I am able to critically appraise primary research studies and research reviews in stroke and neuroscience.</td>
<td>3.3</td>
<td>4.2</td>
</tr>
<tr>
<td>I am able to identify sources of bias and error in the evaluation of primary research studies and research reviews in stroke and neuroscience.</td>
<td>3.2</td>
<td>4.0</td>
</tr>
<tr>
<td>I am able to synthesize current knowledge and evidence in order to deliver the most appropriate diagnosis, treatment, and/or prognosis.</td>
<td>3.7</td>
<td>4.3</td>
</tr>
<tr>
<td>I am able to critically discuss the implications current research evidence on practice.</td>
<td>3.5</td>
<td>4.2</td>
</tr>
<tr>
<td>I can assess the relevance of research findings on complex stroke patients across the continuum of care.</td>
<td>3.4</td>
<td>4.1</td>
</tr>
</tbody>
</table>
I am able to critically appraise research studies regarding:

<table>
<thead>
<tr>
<th>5 point scale from Strongly Disagree (1) to Strongly Agree (5)</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative research methods</td>
<td>3.2</td>
<td>4.2</td>
</tr>
<tr>
<td>Tests used to diagnose stroke-related problems</td>
<td>3.4</td>
<td>3.9</td>
</tr>
<tr>
<td>Therapies used in treating or managing patients.</td>
<td>4.0</td>
<td>4.3</td>
</tr>
<tr>
<td>Factors that affect prognosis</td>
<td>3.7</td>
<td>4.1</td>
</tr>
<tr>
<td>Harms associated with interventions</td>
<td>3.6</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Pre N=21; Post N=9

All ratings increased from pre- to post-course. In some cases the means were somewhat high to begin with, representing a bit of a ceiling effect, and therefore gains were small. This is unsurprising since these are professionals with content expertise in many areas to begin with. Some of the larger gains included “ability to critically appraise...” and “ability to identify sources of bias and error...”. Interestingly, the largest gain was in reference to critical appraisal of “qualitative research studies”. Overall, these results are very positive and suggest attainment of short-term outcomes. A few students provided some illustrative comments:

I am so pleased that I did this course. I learned a tremendous amount from the course content and also about how to work online and independently. I am still a bit intimidated by this way of learning but have gained hugely in confidence in this area. I plan to keep doing the courses and am very pleased that Ryerson is doing this and that they are really trying to make this type of learning so accessible.

It definitely helped me....I do use evidence more now, if I’m going to be doing a therapy, I’m more likely to seek out more recent evidence based on what I’m already aware of. I’m using it much more now, and it’s really made it easier to find it, because that’s one thing that I didn’t get in previous education, like you know how to find it, but how to use other databases that you’re not aware of, so it’s really helped to make that process a lot easier. That course was excellent.

[The course] has absolutely changed my view of evidence based practice and knowledge, the importance of research translation and knowledge translation. This was an eye opener to me. I didn’t know what was out there, number one. And two, more importantly, I didn’t have the tools with which to access it and I think this course has given me that at a very specific skill level, which has been great....I much more frequently find myself in team meetings saying, do we have evidence for this, does anybody here know what does the literature shows, should we perhaps take a look – so gently learning to bring those concepts to the table.

Since doing the critical appraisal course I have become much more confident about the use of research evidence and am incorporating in practice with increasing frequency.

630 BRAIN STRUCTURE AND COGNITION - KNOWLEDGE & SKILL OUTCOMES
The Brain Structures and Cognition course was designed to develop students’ knowledge of cognitive neuroscience, neuroanatomy, diagnostic methods, stroke presentations, and the functional relationships between anatomic structure, neurotrauma and cognitive processes. Table 8b provides the pre- and post-course mean ratings for the relevant knowledge and skill domains.

As with 600, there were uniform increases in self-rated knowledge from pre- to post-course. The difference here is the magnitude of difference. Most of the pre-course means were lower and the overall gains were much higher for many items. With the majority of post-course means higher than 4, on average, it is sufficient to say that the knowledge outcomes for 630 were attained.

Table 8b – Pre- & post-course knowledge & skill outcomes for 630 Brain Structure & Cognition

<table>
<thead>
<tr>
<th>Thinking about your current level of knowledge in the area of stroke and neuroscience please rate your level of agreement with the following statements. I feel I am knowledgeable about:</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>The historical developments in cognitive neuroscience.</td>
<td>2.4</td>
<td>4.0</td>
</tr>
<tr>
<td>The strengths and limitations of various diagnostic methods e.g., CT scan, PET, and MRI used to evaluate brain function.</td>
<td>2.9</td>
<td>4.2</td>
</tr>
<tr>
<td>The anatomic organization and structural relationships of the central nervous system.</td>
<td>4.0</td>
<td>4.3</td>
</tr>
<tr>
<td>How to identify various stroke presentations – structural brain changes and cognition</td>
<td>3.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Symptoms associated with impairment to the brain’s blood supply system</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Gross organization of the brain.</td>
<td>4.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Orientation of the central nervous system.</td>
<td>3.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Brain regions that support cognitive processes.</td>
<td>3.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Aberrant changes to brain structures and their impact on cognitive dysfunction.</td>
<td>3.4</td>
<td>4.0</td>
</tr>
<tr>
<td>Neurons and neuronal communication.</td>
<td>3.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Neurophysiology.</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Neuroanatomy.</td>
<td>3.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Neurochemistry, neurotransmitters and the relationship to behaviour.</td>
<td>2.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Hemispheric specialization in neurologically intact people and in people with lesions.</td>
<td>3.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Individual differences in brain organization.</td>
<td>3.0</td>
<td>3.8</td>
</tr>
</tbody>
</table>
Thinking about your current level of knowledge in the area of stroke and neuroscience please rate your level of agreement with the following statements. I feel I am knowledgeable about:

<table>
<thead>
<tr>
<th>5 point scale from Strongly Disagree (1) to Strongly Agree (5)</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor systems and motor control.</td>
<td>3.9</td>
<td>4.2</td>
</tr>
<tr>
<td>The role of cognition in motor systems.</td>
<td>3.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Various motor disorders.</td>
<td>3.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Attention and attentional brain systems.</td>
<td>2.7</td>
<td>4.0</td>
</tr>
<tr>
<td>The impact of lesions on attention.</td>
<td>3.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Language and its neural basis.</td>
<td>3.6</td>
<td>4.3</td>
</tr>
<tr>
<td>Major aphasic syndromes.</td>
<td>3.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Memory and the memory system.</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>The relationship between memory and emotion.</td>
<td>2.5</td>
<td>3.7</td>
</tr>
<tr>
<td>The neurobiology of emotion.</td>
<td>2.3</td>
<td>3.7</td>
</tr>
<tr>
<td>The relationship between emotion and cognitive functions.</td>
<td>2.6</td>
<td>3.7</td>
</tr>
<tr>
<td>The constellation of abilities associated with executive function.</td>
<td>2.9</td>
<td>4.0</td>
</tr>
<tr>
<td>Executive function &amp; the role of the frontal lobe.</td>
<td>3.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Decision making and problem solving.</td>
<td>3.1</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Pre N=6; Post N=6

Some additional feedback from students supports these findings:

[re: knowledge gains] Absolutely. Some of the stuff I learned about the different types of MRIs and CT scans I was able to better explain to my patients the difference and why a doctor would want to have that specific test, and to explain to them how it works because they don’t understand how an MRI would make images of their body. I’m able to explain that better, I’m able to explain some information about neural transmitters better to my patients so it certainly helped me to be able to educate my patients a bit better.

I have never understood the process of neurotransmission as well as after going through some of the additional material.

The assignments were stimulating and the material and knowledge highly applicable to my current practice.
Really enjoy the stimulation offered by the course, the structure, and the content.

An instructor of 630 summed up student learnings this way:

*In terms of the course content and material, students quite enjoyed it and appreciated it, enjoyed the assignments, thought things were very interesting. At the end of the day the content is very interesting and has a lot of applications. Overall the students walked away learning quite a few things and maybe hopefully information that they can use or apply in their own settings because students came from a variety of different settings.*

**620 HEALTH PROMOTION - KNOWLEDGE & SKILL OUTCOMES**

The Health Promotion course was designed to develop students’ knowledge and skills regarding preventive interventions, health promotion strategies and models, determinants of health, health care systems including stroke, the continuum of care, and interprofessional practice. Table 8c provides the pre- and post-course mean ratings for the relevant knowledge and skill domains.

**Table 8c – Pre- & post-course knowledge & skill outcomes for 620 Health Promotion**

<table>
<thead>
<tr>
<th>5 point scale from Strongly Disagree (1) to Strongly Agree (5)</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>The global systems in Canada associated with stroke, including, the Canadian Stroke Network and Ontario Stoke System.</td>
<td>3.3</td>
<td>4.4</td>
</tr>
<tr>
<td>The determinants of health and how they relate to chronic disease.</td>
<td>3.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Information sources and resources regarding health promotion and chronic diseases prevention.</td>
<td>3.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Prevention strategies that health care professionals can employ at the individual level to support clients.</td>
<td>3.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Collective, preventive strategies that health care professionals can apply at the systems level to support clients and promote healthy change.</td>
<td>3.5</td>
<td>4.3</td>
</tr>
<tr>
<td>How to critically appraise the range and diversity of various Health Promotion and Illness Prevention Models in stroke care.</td>
<td>2.3</td>
<td>4.0</td>
</tr>
<tr>
<td>How health promotion is connected across the continuum of care.</td>
<td>3.3</td>
<td>4.6</td>
</tr>
<tr>
<td>The diverse inter-professional roles of health care and other providers within the continuum of stroke care and delivery.</td>
<td>3.8</td>
<td>4.6</td>
</tr>
<tr>
<td>How an interprofessional approach to stroke care can inform health prevention and promotion</td>
<td>3.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Health promotion and primary prevention services within the Ontario Stroke Network Continuum</td>
<td>3.1</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Pre N=8; Post N=7
As with the other two courses, there were gains in all associated items from pre- to post-course. Similar to the Critical Appraisal course, several of the pre-course means were high to begin with, reflecting pre-course knowledge associated with existing professional expertise. However, gains were quite substantial and very high overall at the end of the course. The item “how to critically appraise the range and diversity of various Health Promotion and Illness Prevention Models in stroke care” showed the biggest gain from 2.3 to 4. It is also encouraging to see a rather large increase in the item “how an interprofessional approach to stroke care can inform health prevention and promotion” (3.3 to 4.7). Overall, these gains provide strong evidence that short-term knowledge outcomes of the course were attained. As one student commented,

[The course had] a lot of information that’s really brand new to me. I did learn a lot of stuff from the research base, and I find it really good that we have the research here and we’re bringing it back to the bedside – so it’s really linking up.

PART C - SECTION SUMMARY:
- The expected outcomes of the certificate are highly consistent with the professional needs expressed by students
- On average, students self-ratings showed positive gains on core content and skill areas associated with their courses. This shows extremely strong support for the attainment of the certificates short-term outcomes.
- Qualitative feedback complimented the ratings, demonstrating a range of benefits experience by students in their professions.

Part D – In Practice: Assessing Intermediate Program Outcomes

Recalling the logic model, the certificate is designed to lead to improvements in knowledge/skill-based outcomes (just covered) which in turn will lead to intermediate, practice-based outcomes. The following evaluation questions are relevant:

D.1 Are there increases/improvements in students’ critical application of evidence and advanced interprofessional practice?
D.2 Are students’ attitudes supportive of the principles of IPP?
D.3 Are there increases/improvements in students’ attitudes and practice of team management skills and positive team dynamics?
D.4. What challenges have students experienced when implementing course strategies and practices into their own practice?

There are two broad outcome areas: Critical application of evidence and advanced IPP/C and Team management & dynamics, group skills (the relevant portion of the logic model is reprised below for convenience). These broad areas are further parsed into a number of unique, more specific outcomes.
Increased confidence in their skills to contribute to a team
Increased ability to integrate IP theory in practice setting
Increased ability to articulate knowledge & expertise in own profession
Increased advocacy for IPC principles & practices
Critical application of evidence & advanced IPP

We selected a variety of existing measurement instruments to assess these outcomes (please see the Evaluation Tools and Methods section for more details). Table 9 provides the pre- and post-test scale means for each measure as well as the associated outcomes that were assessed. Please note that the scales vary in their metric, from 4-point scales to 7-point scales.

Table 9 – Pre- and post-test means for IPP/C measures, with relevant outcomes

<table>
<thead>
<tr>
<th>Measure/Tool</th>
<th>Relevant outcomes</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
</table>
| **Interprofessional Learners Scale (5 point scale)** | • Increased ability to coordinate team and care needs.  
  • Increased ability and comfort in working in a team.  
  • Increased advocacy for IPC principles and practice. | 4.5   | 4.2   |
| **Perceived Need for Cooperation (6 point scale)**   | • Increased advocacy for IPC principles and practice.                               | 5.2   | 5.0   |
| **Perception of Actual Cooperation (6 point scale)** | • Changes to team and organizational structure supportive of interprofessional care (long-term outcome) | 4.8   | 4.8   |
| **Collaborative practice scale (7 point scale)**     | • Increased critical assessment & action within org. & system  
  • Increased ability and comfort in working in a team  
  • Increased collaboration in addressing role conflict  
  • Increased conflict resolution skills in IP teams  
  • Increased ability to coordinate team and care needs | 5.9   | 5.9   |
| **Communication and Teamwork Scale (4 point scale)** | • Increased leadership skills in team environment  
  • Increased ability and comfort in working in a team  
  • Increased confidence in their skills to contribute to a team | 3.3   | 3.3   |
<table>
<thead>
<tr>
<th>Measure/Tool</th>
<th>Relevant outcomes</th>
<th>Pre</th>
<th>Post</th>
</tr>
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</table>
| **Evidence-based practice – Research utilization scale (5 point scale)** | • Increased comprehension of system accountability, evidenced based practice  
• Increased critical assessment & action within org. & system  
• Increased ability to articulate knowledge & expertise in own profession  
• Increased ability to evaluate evidence & its application to practical settings | 2.5 | 2.9 |

Note: identical pre- and post means in the table are due to rounding and in actuality are slightly different from pre- to post-test (i.e., at the 100th decimal level).

In reviewing the data in this section, it becomes apparent that none of the pre-post means are different in any meaningful way (they are also statistically non-significant at p<.05). At first glance, this seems rather disappointing, since it tentatively suggests the program has been ineffective at translating strong knowledge gains (i.e., the attainment of short-term outcomes) into practice-based outcomes. There are two main categories of interpretation related to these null findings: 1) issues related to measurement and 2) issues related to program assumptions. We address each of these in turn.

**MEASUREMENT ISSUES**

There are several issues to consider related to measurement and instrumentation. First, we notice most of the pre-test means are high in relation to their scales. The Interprofessional Learners (ILS), Perceived Need for Cooperation (PNC), Collaborative practice (CP), and Communication and Teamwork Scale (CTS) are especially high, suggesting ceiling effects – a situation where the scale is either not sensitive to measure change or where the respondents simply score very high on what may be perceived as a socially desirable construct to begin with (or both). When examining the scales, we see that the ILS and the PNC have strong attitudinal components – respondents are in effect endorsing principles of interprofessional practice. Example items include “My skills in communicating with patients/clients would be improved through learning from other health and social care professionals” (ILS) and “Individuals in my profession need to cooperate with other professions”. One might expect students interested in IPP/C (in view of them taking the certificate) to be highly supportive of its principles, even before enrolment.

The CP scale is about collaboration and it appears that most students come from collaborative teams in their allied health organizations. While there may be significant room for improvement in interprofessional practice, it is questionable that the scale items (e.g., “My team and plan together to make decisions about the care for patients”) are reflective of the complexity of issues surrounding IPP. In other words, the scale might not be sensitive to change because it is fails to measure the nuances of IPP.
The CTS scale is focused on individual confidence, comfort and competence in team environments. Once again, it might be the case that the scale does in fact measure these constructs, but these are constructs that are not appropriately nuanced to reflect what happens in IPP. Students appear to be very team oriented and confident in their teamwork, independent of the course. However, the course may be impacting IPP/C in ways that have gone unmeasured by these instruments.

The Evidence-based practice – Research utilization scale (RUS) is another matter. The pre-test mean was at the scale midpoint (2.5) and there was a slight increase (2.9). One might expect a more prominent increase. This scale is especially behavioural – it asks about students’ actual activities around research use in their work. A lack of change may be due to a lack of time to practice course concepts within the short time frame of the evaluation. We will return to this point.

The potential (and likely) measurement limitations are concerning for the present and future evaluation. Clearly, prospective longitudinal research should not continue using instruments that display ceiling effects. The apparent inappropriateness of the measures we used represents a considerable gap in the research literature. We used them because they were validated tools that are commonly used in the research field. Neither are they overly generic, as each focuses on health care systems. Perhaps this represents an opportunity for the Ryerson-Sunnybrook-N&E GTA OSRN partnership to develop customized, “stroke-unique”, and locally sensitive measures that capture the complexity of IPP. Additionally, it suggests that evaluation research needs to use mixed methods. The qualitative data – as we shall see – strongly suggests that there are areas of interprofessional practice that can and should be improved.

**REVISITING THE ASSUMPTIONS OF EXPECTED CHANGE**

We have already touched upon important issues or assumptions associated with the logical theory of the certificate. These issues are separate from measurement, although reliable and valid measurement is necessary to test these assumptions. The intermediate outcomes should be expected when the following four conditions are met:

1. **Key knowledge and skill outcomes have been achieved.** Our previous section on short-term outcomes lent strong support to this assumption, coupled with a process evaluation that showed that implementation was largely successful – with the important acknowledgement that students experienced a range of course-specific barriers.

2. **“Program dose” is sufficient.** In other words, students are more likely to need the full complement of the three courses in order to optimize practice based outcomes. Our data is insufficient to test this assumption. Problems with measurement aside, to date there have only been five students who have completed all four courses, and we only have complete pre- and post data for 2 of these 5. In addition, this assumption includes three other courses that have yet to be offered. Future evaluation needs to solve the
problem of appropriate measurement and then track more students through the full certificate curriculum.

3. **There is organizational support for IPP.** This includes the presence of interprofessional teams in the participating organizations (ideally composed of staff who have completed the certificate program) and higher level institutional support for IPP/C principles. The process evaluation covering the development of the certificate and information on student and organizational representation demonstrate that the partnership has taken important first steps and is making in-roads in impacting at the organizational level. The long-term vision of the certificate includes organizational partnering and team building vis-à-vis course participation. In summary, there is evidence that this assumption is partially satisfied, but much more time (and academic years) are needed for it to be fully realized.

4. **There is sufficient time for students to translate course learnings into their own practice.** Perhaps most importantly (again, measurement difficulties aside), this evaluation occurred within a short-time frame. From its inception, it was acknowledged that there were low expectations in achieving intermediate outcomes because of assumptions 2 and 3 above, but also because there was little time for students to put course knowledge into practice. Thus, the main focus in this evaluation was to ask formative questions about certificate development, examine course implementation, and measure short-term outcomes that are directly impacted.

**WHAT DO STUDENTS SAY ABOUT IPP?**

The quantitative results may lead one to erroneously believe that IPP/C is occurring in straightforward, non-problematic way in the stroke systems and/or that students have gained very little in terms of their practice. However, the sensitivity and validity of the measurement tools may be called into question when one considers some of the qualitative data. First of all, students identified a number of challenges to pursuing IPP/C in the organizations in which they work. Time constraints were a common challenge, which included the time available to work in interprofessional teams and the time required to learn about IPP.

_Time is always a factor to have the team come together in a group to discuss better patient outcomes and set a plan._

…the OTs and speech language pathologists, the social workers, the psychologists, the neuropsychologists. they’re from all different companies so we’re not all in the same place so one of the challenges that’s been really big for me is communication. It’s still a challenge for me to be able to have the time to actually communicate with everyone as much as I’d like…On the whole I think the biggest issue would be actually having the opportunity to use that information on a daily basis.
A lot of it is time, because it’s very time consuming to have these rounds, to have the whole team together. Everybody’s job description or their priorities are different. It is really the biggest factor that we have in discussing patient care in a more elaborative, multidisciplinary way.

A number of students felt a challenge to working interprofessionally was ensuring that all team members had the requisite knowledge and background to facilitate IPP.

…we need to raise the bar on the core knowledge for all members of the team…we need to define which patient issues that require an IPC team approach.

A lot of us were trained in a very uni-disciplinary mode – so there is a way of thinking that has been in place for some years and people need to change their frame of reference and their perspective somewhat in order to embrace interprofessionalism. It’s going to take a little bit of a push for people to get beyond the norms of their training… I guess it’s a question of adapting. One of the issues that I’ve realized is that when you’ve done a course like this there are certain concepts that you come away with that your multidisciplinary team with whom you work don’t necessarily have.

The challenges are if the others on the team aren’t on the same page as you, if the rest of the team haven’t embraced it, it kind of makes it hard to do. Also if you have an organization that doesn’t foster that collaborative spirit, it also makes it difficult.

Some students made direct comments about interdisciplinary challenges. Most of these comments are in relation to nurses’ inability or unwillingness to share an IPP/C focus:

I think it's a challenge for most organizations, it starts with the senior team acknowledging that other professionals count and are just as competent as nursing to provide leadership. If you look at management, 99% are from a nursing profession. When we celebrate health care, nursing are most often featured. They are a large part of the team and play a very important role, however it tend to be the case that when care is being organized, other professions are not considered as important because we do not provide the same level and intensity (i.e. 24/7) of care.

[re: challenges] lack of interprofessional respect (in both directions) between nursing and health disciplines

I feel that we haven’t yet mastered working together interprofessionally - we tend to use an interdisciplinary model in which each professional contributes but we operate well within the boundaries of our discipline. The silos are still in evidence.

I find that allied health professionals are more likely to trust my decision making ability about patient care and demonstrate respect about my knowledge and skills in making shared decisions about patient care than some individuals in the nursing profession.
We would have the most contact with SLPs and nursing. However, nursing being the largest professional group tend to work separately from the other team members.

In my experience the nurses are rarely involved in team decisions around discharge planning. They are too task-oriented. They seem to only concentrate on getting through that particular day rather than goal setting with the patient.

The above comments speak to the necessity of organizational culture change, wherein IPP/C is institutionally supported and a prime directive of best practice that permeates the organization. In other words, the experiences of students are for the most part highly consistent with the theoretical assumptions that are guiding the certificate – fostering an IPP/C focus in team-based health organizations. Contrary to the interpretation that IPP/C is occurring in an unproblematic way (a possible interpretation of the high pretest results), the qualitative data demonstrate that there are many challenges to overcome and that the “theory of intervention” of the certificate appears to be sound.

Is it also the case that students have not made gains in interprofessional practice (another related interpretation of the scale data)? First of all, there was substantial evidence in the qualitative data regarding short-term course outcomes that students not only made gains in knowledge and skills, but that they were putting them into action. At the risk of being repetitive, the following quotes sample some of action oriented language used by students in relation to the course and IPP:

"...I much more frequently find myself in team meetings saying, do we have evidence for this, does anybody here know what does the literature shows, should we perhaps take a look – so gently learning to bring those concepts to the table.

I have become much more confident about the use of research evidence

I'm able to explain some information about neural transmitters better to my patients

...we're bringing it back to the bedside – so it's really linking up"

One student described the impact of the program on her practice this way:

"In an ideal world I'd love to see more people with whom I work actually doing this course. But we can raise the bar around issues such as evidence based practice and critical appraisal of literature. [The certificate] has changed me in ways that I think are very beneficial. It would be great if I could share that growth with the people with whom I work.

In a later comment she expressed an even broader vision of IPP, as facilitated by the certificate:
It’s so great to build up contact with professionals doing different things and know that one can have this care community that is not boundary limited. What I’m really secretly hoping is that once the course is over, that the contact between students will develop into more lasting peer support networks. And what is good then is it can help bring in people who don’t live in the GTA who maybe feel even more isolated… we become isolated within our professions, and then what the course has taught me, in a way we become isolated within our work facilities as well. What happens in my facility, I don’t know what happens two kilometres away. Maybe that’s one of the goals of IP as well, is to break down those facility barriers so that there’s more sharing of knowledge skills, etc.

PART D SECTION SUMMARY:

- The main quantitative measures used to measure IPP/C appeared to suffer from ceiling effects and may not be sensitive or “nuanced” enough to capture the complexities of IPP/C in the real world.
- An uncritical view of the data could suggest that students were a) already unproblematically practicing IPP/C and b) they did not improve.
- Qualitative data suggested that there are in fact many ongoing challenges to IPP, including limited time, resources, knowledge gaps, organizational support, and “disciplinary silos” in the field, reinforcing the need for the Certificate.
- Qualitative data also suggested that students are applying the course learnings and concepts in order to work with a greater IPP/C focus.
- The assumptions of the certificate appear to be consistent with student need – that greater organizational support and knowledge translation need to occur in their organizations and that the certificate program can serve this function.
- Intermediate outcomes needed to be investigated with better measures and in relation to program assumptions of “dose”, sufficient time to apply learnings to practice, and organizational buy-in, linkages and support.
IV. CONCLUSIONS AND RECOMMENDATIONS

This evaluation report documented the development of an evaluation and logic model framework and corresponding design and methodology to evaluate the IPE/C Neuro-Stroke Certificate created by the Ryerson-Sunnybrook-N&E GTA OSRN partnership. A central component of the framework was the specification of a number core evaluation questions. Overall, the partnership wished to understand:

1. The successes and challenges associated with building IPE course teams and the subsequent curriculum of three main courses.
2. The successes and challenges, from the perspective of students and course instructors, in the actual implementation of the course. 
3. The impact of the certificate courses on the short-term and intermediate outcomes.

These three areas of evaluation generated a wealth of information. Each main evaluation section (Parts A through D) contains, at their end, a summary of the findings and key recommendations. These findings are also provided in the Executive Summary. We end this report with discussion of several overarching issues and recommendations regarding the continued development of the initiative and future capacity building in the system.

Recommendations for the Certificate and the System

The certificate has a very strong, theoretically sound model that specifies how it will positively impact stroke practice and care and patient/client outcomes. With the funds received for this initiative, the partners have established a solid foundation for interprofessional learning at Ryerson University and within the Ontario Stroke System Network. The certificate represents an innovative vehicle for promoting interprofessional practice integration and knowledge translation of new and emerging evidence into the care of clients/patients who experience a stroke.

CERTIFICATE DEVELOPMENT

The development of the Certificate was a challenging but highly successful undertaking. As described previously, a key component of the model was to form interprofessional course development teams to build the course content. In turn, the course content and the associated pedagogical approaches also emphasize interprofessional education, care, and practice. Time pressure was a major challenge to overcome, as were adjustments instructors had to make to deliver an online course via distance education technology. However, an additional difficulty was developing course curricula based on a young and underdeveloped supporting literature. The majority of articles in the literature reflect “silos of care” and are written in a manner that promote the application of research findings by specific professional groups. The application of
findings in an interprofessional framework is rarely addressed or tested. Another challenge was associated with the traditional applied integration gap between the academic/research environment and the clinical environment. A key strategy for addressing these identified challenges during Certificate development was a focus on research-clinical integration and knowledge translation, supported by collaborative and co-creative strategies between the partners.

The evaluation indicates that although there were some "growing-pains" during development phases, the Certificate contains content that is extremely relevant to the range of allied health practitioners who enrolled. The findings also indicate that the courses on the whole were very well received by students and the attainment of short-term knowledge outcomes was strongly supported. Finally, the importance of evidence based practice and an interprofessional approach within the neuroscience-stroke field were considered by students to be central and integral to best practices in care. The relevance of the Certificate to health practice is exceptionally high. Given the lack of opportunities for this type and level of education, the Certificate fills a crucial gap in the neuroscience-stroke health care system.

CERTIFICATE REACH AND SYSTEM CAPACITY BUILDING

The Certificate was successful in engaging stakeholders in two Ontario Stroke System (OSS) regions and received endorsement from the North & East GTA - Ontario Stroke Region's Steering Committee and Ryerson University. The pilot offering of the first 4 certificate courses attracted 43 health professionals (as enrolled students), representing 14 professional groups and 16 organizations. Another 32 students expressed interest in enrolling in the Certificate, providing strong evidence that it is indeed positioned to meet the professional development needs of multiple disciplines. Development of the Certificate was also supported by knowledge exchange events focusing on principles of interprofessional practice and care. This included a one-day conference attended by over 140 participants representing diverse professional domains across the continuum of care.

This level and type of reach reflects a systemic quality that is often absent in educational interventions. Distance education programs traditionally focus on improving access across a wide geographical scope, irrespective of student affiliation. While the Certificate enrolment represented geographic diversity, this was accomplished by engaging multiple organizational partners within the allied health system, as opposed to recruiting individual, disconnected students. This allowed for the promotion of interprofessional practice within single organizations and across the system. Recalling the Certificate logic model, the expectation of systemic change following from skill and knowledge acquisition is bolstered by interprofessional environments fostered through organizational participation and endorsement. This is a very promising model of system capacity building that has implications for many other health and social service domains.
The partnership should encourage the transfer of knowledge regarding this initiative – how it was built, and how it is implemented and maintained – to other systems.

**FUTURE SYSTEM DEVELOPMENT**

The development and implementation of the Certificate reflects a reasoned, holistic, multi-leveled approach that marks it as particularly innovative, with an excellent infrastructure with which to move forward. In addition to future course and curricula development, there are two main areas to consider for future development in the broader neuroscience-stroke health system.

First, continued impact of this initiative requires further infrastructure endorsement and support. Formal industry recognition of the certificate by the Ontario Stroke System and the Ministry of Health and Long-term Care would promote participation in this form of interprofessional education. This could be accomplished in part by incorporating principles of IPE/C into accreditation criteria and human resources requirements for stroke services within provincially designated stroke centres and prevention clinics. Additionally, support from regulatory bodies to promote a formal, industry recognized vehicle for advanced training and standardization could aid in province-wide efforts to promote best practices care delivery.

Second, improved mandates supporting the delivery of IPE-focused programs and faculty development should be developed and promoted by the Ministry of Training, Colleges, and Universities. To address the “evidence to practice gap”, strong collaborative partnerships with clinical partners should be established for all health science programs. Building a collaborative “clinical-academic” infrastructure would increase the capacity of the health care system to sustain and advance IPP/IPC. Thus, continued efforts in the recognition and sustainability of the IPE/C Neuro-Stroke Certificate would support two important goals: 1) To promote continued knowledge and human resources capacity to support best practices in interprofessional care; and 2) to positively impact the incidence of stroke and stroke patient outcomes.

**FUTURE EVALUATION**

There is a wide range of options for future evaluation activities. The present evaluation targeted the first four initial courses. Continued evaluation should be focused on new course offerings to assess a combination of developmental, implementation, and outcome evaluation objectives. An evaluation design similar to the present framework is recommended. Additionally, longer-term evaluation would provide an opportunity to focus on the intermediate, practice-based outcomes. As mentioned previously, intermediate outcomes are more likely to be achieved over a longer period of time, allowing for greater knowledge and skill acquisition and time to enact interprofessional principles in real practice. Finally, elements of the current evaluation had several limitations. It appears that some of the measures used in this evaluation do not fully
capture the complexities of IPP. This will need to be addressed with the introduction of new measurement strategies as new and returning students move through the certificate. We suggest a mixed methods approach that allows for quantitative measurement of change over time while allowing qualitative elucidation of the complex nature of interprofessional care and practice in the neuroscience-stroke field.
References


